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Sudan University of Science & Technology

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Information Technology in Support of Mobile Education And Learning in a Developing Environment

** A model for using Arabic Hindi Numerals in Arithmetic Competitions on cell phones for Basic School Pupils **

نموذج لإستخدام الأرقام العربية الهندية في منافسات حسابية على الهاتف السيار لتلاميذ مرحلة الأساس

Submitted for the Degree of Doctor of Philosophy in Information Technology

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Dedication

To my lovely Parents,

Wife,

Kids,

Brothers and Sisters for their care, continuous support and love.

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I am grateful to many friends and colleagues who have listened to my questions, often provided answers and have been patient with my idiosyncrasies.

I thank my parents, wife and my brothers, sisters for giving me endless encouragement and support. I thank them for their tolerance, and their smiles.

For my brother, Mohammed Elhassan Hammad, deeply I express my gratitude for his encourage me in English language requirements.

For my teacher, Saif El-Fadlabi, deeply I express my gratitude for his encourage me in English language requirements.

Abstract (English)

Over the last two decades, it has been observed that pupils of the early stages of learning mathematics face challenges working on the associated processes, particularly the simple ones, as addition, subtraction and multiplication. However, teaching aids are proved to be in need for new ideas to help pupils learn these calculations. Where Arabic speaking pupils and students study mathematics using the present characters of digits used in English, it is useful if these processes are done using Arabic Hindi numerals such as ١٢٣٤٥٦٧٨٩٠. Therefore research is required to seek a creative way that can help teach mathematical operations in an easy going activity. These early challenges facing pupils of the two first classes of basic schools in Sudan can be overcome making use of the new cell-phone and internet technologies. Studies of these devices have shown many and various aids in simple mathematical processes in concise results. The fact that pupils are keen in using cell-phones to play games is an opportunity to exploit this tendency into an educational activity, particularly mathematical ones. In addition, the researcher aims at making pupils busy using cell-phones, almost all the time, that offer competitions to help solve their challenges. This study required several techniques for data collection: observations, interviews and tests. The sample is a combination of pupils, teachers and practitioners. Since the solution is a mathematics competition the matter needs the pupils and their teachers beside the latter's opinions and views about what exactly their pupils need. The study presents a useful and usable model to work on that uses Arabic Hindi numerals instead of Arabic Numerals. Pupils used the application easily and experienced

benefits of the easy activities of mathematics HessApp provides with. In addition, the researcher proved the ability to convert Arabic Hindi numerals out of Java texts to simplify the application screen being easy in the native language integers 1234567890. The most important outcome is that HessApp can be used in class as a lesson plan aid when it needs only a few devices to compete during the period time. It is proved to be helpful in improving mathematics skills in elementary schools pupils. The population is limited at the early stages of basic school pupils and their teachers. They are all Sudanese in the Blue Nile state schools for three years 2013 – 2016.

المستخلص

على مر عقدين من الزمان لوحظ أن تلاميذ المراحل الباكرة يواجهون تحديات في تعلم الرياضيات حين قيامهم بالعمليات الرياضية تحديداً البسيطة منها: الجمع, الطرح والضرب. مع ذلك فإن المساعدات التعليمية بحاجة إلى أفكار جديدة تتم بها حساب الأعداد. وبينما يدرس التلاميذ هذه العمليات بشكل أعدادها المستخدم بالأعداد العربية الهندية حالياً, فإنه يمكن أن يكون من المفيد لو تم إجراء هذه العمليات بالأشكال العددية المتعارف عليها في لغة التلاميذ عبر الهاتف الخلوي. لذا, فإن البحث مطلوب لإيجاد طريقة مبتكرة تُعين على تدريس العمليات الرياضية بأسهل ما يمكن.

إن هذه التحديات الباكرة التي تواجه التلاميذ في الفصلين الأول والثاني من مدارس الأساس في السودان يمكن تجاوزها عبر الإستفادة من تقانات الهاتف الخلوي والإنترنت. وقد أثبتت التجارب مساعدة هذه الميزات الحديثة في إجراء الأنشطة الرياضية البسيطة وذلك بنتائج دقيقة. وحقيقةً أن التلاميذ أصبح لديهم شغف بإستخدام الهاتف الخلوي لممارسة الألعاب, كان ذلك مدخل الباحث لإستغلال هذا الميل ليكون كنشاط تعليمي تحديداً الأنشطة التعليمية. وهناك قضية أخرى أنه يهدف الباحث إلى جعل الطلاب في إنشغال دائم بالهاتف الخلوي, في الفصل, وفي البيت في القيام بالأنشطة المرتبطة بمشكلات وتحديات الرياضيات آنفة الذكر.

تطلبت هذه الدراسة العديد من منهجيات جمع البيانات مثل الملاحظات واللقاءات والإختبارات. وقد كانت عينات البحث تلاميذ وأساتذة ومدراء بتعليم مرحلة الأساس. وبسبب طبيعة الحل الذي قدمه الباحث, المنافسة الحسابية, فقد ضمت الدراسة التلاميذ ومدرسيهم بجانب آراء الآخرين حول ما يحتاجه تلاميذهم بالتحديد.

من نتائج هذه الدراسة أن نموذج(حساب) مفيد وسهل الإستخدام بحسب التجربة حيث أستخدمه التلاميذ بسهولة وأفادوا من أنشطته السهلة التي يقدمها على شكل منافسات في العمليات الحسابية. إضافة إلى أن الباحث أثبت إمكانية تحويل الأرقام العربية في قالب الأشكال المستخدمة في لغة التلاميذ وهي الأعداد العربية الهندية ١٢٣٤٥٦٧٨٩٠. ومن أهم النتائج أن نموذج حساب يمكن إستخدامه داخل الفصل كمعين للخطة الدرسية حيث يحتاج إلى القليل من الأجهزة الخلوية ليتنافس التلاميذ بها في إطار زمن الدرس.

شملت عينات البحث تلاميذ المراحل الباكرة من مدارس الأساس: الصف الأول والثاني ومدرسيهم. تم إجراء البحث والدراسة الميدانية في ولاية النيل الأزرق بمدارس الأساس لثلاثة سنوات من 2013 حتى 2016م.

List of Publications

Conference Papers:

- ** A Review of Arithmetic Competitions on Cell phones in basic school with particular emphasis on Arabic Hindi Numerals **, 19th – 20th Jan 2015, Khartoum , 3rd CCSIT (Accepted to be published) .
- التعليم الإلكتروني عبر تطبيقات الهاتف السيار في جمع الأعداد العربية الهندية لتلاميذ مرحلة الأساس لتعزيز الإدراك في عملية حسابية بسيطة

M-Learning Apps to Enhance Pupils, 10th INTERNATIONAL COMPUTING IN ARABIC, 12th – 14th March 2016 Khartoum.

Journal Papers:

- ** A Review of Arithmetic Competitions on Cell phones in basic school with particular emphasis on Arabic Hindi Numerals **, International Journal of Computer Science Trends and Technology (IJCST) – Volume 3 Issue 6, Nov-Dec 2015. [IMPACT FACTOR 1.76]
- ** M-Learning App (HessApp) to Enhance Pupils with particular emphasis on Arabic Hindi Numerals **, IJISET - International Journal of Innovative Science, Engineering & Technology, Vol. 2 Issue 12, December 2015. [IMPACT FACTOR 1.50]
- ** Smart Device Based Arithmetic Competition in Blue Nile State, Sudan, in Hindi-Arabic Script ** Is prepared throughout building the dissertation framework of the workshop in IST Africa May 2017, Windhoek, Namibia.

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List of Abbreviations

HNM	HessApp Numerals Model
SMS	Short Message Service
XMPP	eXtensible Messaging and Presence Protocol.
GPRS	General packet radio service.
Mxit	Is software used in South Africa which enables people to easily communicate with each other with text-based typed messages like SMS on cell phones.
DSR	Design Science Research
DSRcycles	Design Science Research Cycles
IDE	Integrated Development Environment
AVD	Android Virtual Device.
SDK	Software Development Kit
SPSS	Statistical Package for Social Sciences
WhatsApp	WhatsApp Messenger is a cross-platform instant messaging application that allows iPhone, BlackBerry, Android, Windows Phone and Nokia smartphone users to exchange text, image, video and audio messages for free (Church, Karen et al. 2013) (O'Hara, Kenton et al. 2014).

CHAPTER ONE

1 Introduction

1.1 Overview

Significant pass rate variations between mathematics and the other school subjects in primary schools were observed. According to UNESCO's 2010/2011, the pass rate for mathematics in 1998 was 21.4% compared to 86.8% for Islamic religion in Sudan. Additionally, the learning outcome was found weak in a learning assessment exercise conducted in 195 schools in three Sudanese States (Kassala,North Kordufan, and River Nile) in 2009. Only 35% of the average male students answered the mathematics questions correctly (UNESCO-IBE 2010/2011).

The reasons for poor mathematical performance in primary level schools from the teacher's point of view were investigated in 2010. The study focused on gender, specialization, academic qualification, and experience variables among the primary school pupils in government schools in Tulkarm Province (Palestine). According to the study findings, the poor performance in mathematics was attributable to:

1) The lack of personal interest in learning.
2) The lack of modern devices and techniques, among other reasons.

The study recommends improving the school learning environment, the techniques of teaching aids to motivate the pupils to learn mathematics (Saleh 2012).

It is now clear that there is a need to improve mathematics skills among primary school pupils since the results of pupils' exams in the early classes prove their humble performance.

The vital importance of the basic arithmetic skills such as addition and subtraction motivated this researcher to exert more efforts to succeed and progress in this crucial field of academy. Mastering this field may be achieved by exploiting the tremendous techniques and applications of computer and information technology

resources. At any rate, such a motivation can be fulfilled using smart applications and programs. The knowledge of these basic and simple arithmetic operations lays the foundation for understanding the more sophisticated aspects of mathematics skills and may enable the learner to progress in understanding algebra and mathematical equations and mathematics science generally in the future (Figure1).

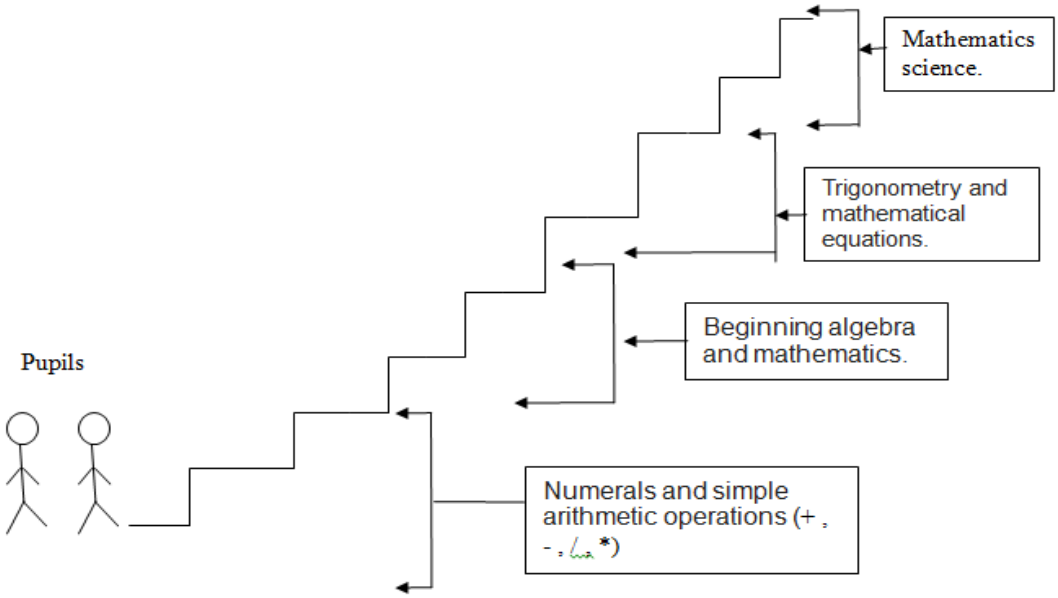

FIGURE 1.1: STAGES OF LEARNING (TEACHING) MATHEMATICS

There are fundamental reasons for the problem of a lack of understanding of mathematics among pupils and students in advanced classes in Sudan and the Arab world. Most of the methods and curriculum focuses on teaching students and pupils using Arabic Hindi numerals from the beginning of the first basic class until the third class of the high secondary school level.

The Arabic Hindi numerals are based on the Hindu numeral system which was devised by the Indian mathematicians between the first and fourth centuries and is the most common system for the symbolic representation of numbers in the world. The Persian mathematicians Muḥammad ibn Mūsā al-Khwārizmī embraced the system in his book on the calculation with Hindu Numerals. Later, the Arab mathematician Al-Kindi adopted the system, before spreading to Europe. Arabic

Hindi system represents the numerals using figures which look like these ١٢٣٤٥٦٧٨٩٠(MCKELVEY, J. V et al. 1915).

Later, when the pupils and students reach the university level in their academic endeavour, mathematics is taught using the Arabic numerals which are different in character from the Arabic Hindi writing symbols. Arabic numerals are written like this 1234567890 (IRANI, Rida.AK 1955).

Teaching the mathematics curricula to the children in Sudan is based on memorization of some arithmetic operations such as multiplication. This method makes the pupil memorize the result of two numerals multiplication; without actually knowing how this operation was calculated. Figure 2 shows examples of multiplication tables.

جدول العدد (١)				
١	×	١	=	١
١	×	٢	=	٢
١	×	٣	=	٣
١	×	٤	=	٤
١	×	٥	=	٥
١	×	٦	=	٦
١	×	٧	=	٧
١	×	٨	=	٨
١	×	٩	=	٩
١	×	١٠	=	١٠

جدول العدد (٢)				
٢	×	١	=	٢
٢	×	٢	=	٤
٢	×	٣	=	٦
٢	×	٤	=	٨
٢	×	٥	=	١٠
٢	×	٦	=	١٢
٢	×	٧	=	١٤
٢	×	٨	=	١٦
٢	×	٩	=	١٨
٢	×	١٠	=	٢٠

جدول العدد (٣)				
٣	×	١	=	٣
٣	×	٢	=	٦
٣	×	٣	=	٩
٣	×	٤	=	١٢
٣	×	٥	=	١٥
٣	×	٦	=	١٨
٣	×	٧	=	٢١
٣	×	٨	=	٢٤
٣	×	٩	=	٢٧
٣	×	١٠	=	٣٠

جدول العدد (٤)				
٤	×	١	=	٤
٤	×	٢	=	٨
٤	×	٣	=	١٢
٤	×	٤	=	١٦
٤	×	٥	=	٢٠
٤	×	٦	=	٢٤
٤	×	٧	=	٢٨
٤	×	٨	=	٣٢
٤	×	٩	=	٣٦
٤	×	١٠	=	٤٠

جدول العدد (٥)				
٥	×	١	=	٥
٥	×	٢	=	١٠
٥	×	٣	=	١٥
٥	×	٤	=	٢٠
٥	×	٥	=	٢٥
٥	×	٦	=	٣٠
٥	×	٧	=	٣٥
٥	×	٨	=	٤٠
٥	×	٩	=	٤٥
٥	×	١٠	=	٥٠

جدول العدد (٦)				
٦	×	١	=	٦
٦	×	٢	=	١٢
٦	×	٣	=	١٨
٦	×	٤	=	٢٤
٦	×	٥	=	٣٠
٦	×	٦	=	٣٦
٦	×	٧	=	٤٢
٦	×	٨	=	٤٨
٦	×	٩	=	٥٤
٦	×	١٠	=	٦٠

جدول العدد (٧)				
٧	×	١	=	٧
٧	×	٢	=	١٤
٧	×	٣	=	٢١
٧	×	٤	=	٢٨
٧	×	٥	=	٣٥
٧	×	٦	=	٤٢
٧	×	٧	=	٤٩
٧	×	٨	=	٥٦
٧	×	٩	=	٦٣
٧	×	١٠	=	٧٠

جدول العدد (٨)				
٨	×	١	=	٨
٨	×	٢	=	١٦
٨	×	٣	=	٢٤
٨	×	٤	=	٣٢
٨	×	٥	=	٤٠
٨	×	٦	=	٤٨
٨	×	٧	=	٥٦
٨	×	٨	=	٦٤
٨	×	٩	=	٧٢
٨	×	١٠	=	٨٠

جدول العدد (٩)				
٩	×	١	=	٩
٩	×	٢	=	١٨
٩	×	٣	=	٢٧
٩	×	٤	=	٣٦
٩	×	٥	=	٤٥
٩	×	٦	=	٥٤
٩	×	٧	=	٦٣
٩	×	٨	=	٧٢
٩	×	٩	=	٨١
٩	×	١٠	=	٩٠

جدول العدد (١٠)				
١٠	×	١	=	١٠
١٠	×	٢	=	٢٠
١٠	×	٣	=	٣٠
١٠	×	٤	=	٤٠
١٠	×	٥	=	٥٠
١٠	×	٦	=	٦٠
١٠	×	٧	=	٧٠
١٠	×	٨	=	٨٠
١٠	×	٩	=	٩٠
١٠	×	١٠	=	١٠٠

FIGURE 1.2: MULTIPLICATION TABLE IN HINDI NUMERALS

Sometimes forcing young pupils to memorize the arithmetic operations using corporal discipline in the first and the second grades in basic schools often

results in pupils hating mathematics altogether.

Introductions of scientifically correct 'solutions' to 'problems' in rural areas of Africa have reported mixed results. A range of reasons is offered as hampering local adoption of technology (VAN STAM, Gertjan 2013). In order to understand the problems of rural areas, history of Arabic Hindi Numerals and Arabic Numerals must be included in this current study.

1.2 History of Numerals

1.2.1 Al-Khwarizmi Numerals

The word Al-Khwarizmi echoes back to the Arab world and the Persian Muslim Abu Abdullah Muhammad Ibn Musa al-Khwarizmi. This mathematician, who was nicknamed Abu Jaafar al-Khwarizmi, was born in about 164 *hijri,* 781 *Anno Domini*, and died after 232 *hijri*, 847 *Anno Domini*. He was one of the first Muslimmathematicians and contributed to the advancement of mathematics. The most important achievement of Al-khwarizmi in arithmetics was the introduction of Arabic Hindi numerals to the Arab World, using the Arabic Hindi numbering system of the Indian mathematicians. The new system in the Arab World was called “Dixit algorizmi” or “Algoritmi de numero Indorum” (i.e. Indian art in the calculation of Khwarizmi). The term "algorithm" is derived from the aljawrism, the method of calculating Hindi numerals and Arabic numerals developed by Al-khwarizmi. Both the words "algorithm" and "aljawrism" were drawn from the Latin name for Al-khwarizmi (TOOMER, Gerald 1990) (GILLISPIE, Charles-Coulston 1981) (BRUSH, Stephen 1970).

1.2.2 Ghubar Numerals (Dust numerals)

The word Ghubar numerals (dust numerals) is a derivative of an Arabic word for dust (or sand). This term is used to refer to the Western Arabic numerals (the decimal digits 0–9) of today. These are derived from the style of digits written on ghubar tablets in North-West Africa and Iberia. As well, they are described as the 'West Arabic' or 'gubar' style (GANDZ, Solomon 1931).

Another author points out that Al-khawarizmi designed Arabic numerals in terms of the number of angles (acute or right) comprising the whole number. For instance, the number one (1) has an only one acute angle whereas the numeral two (2) has two acute angles. Three (3), it involves three angles and so on. The following figure shows how the original shapes of Arabic numerals written on a "dust board" were drawn with a point at each corner (Boucenna, Ahmed 2007).

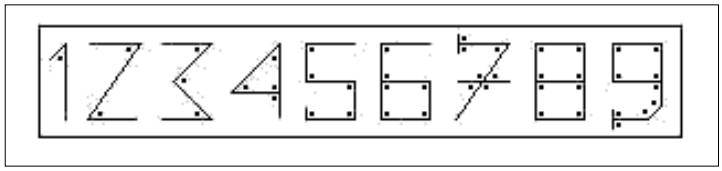

FIGURE 1.3 ARABIC DUST NUMERALS (GHUBAR)

Later these shapes were amended to their current forms. The most important inventions of Al-khawarizmi is the addition numeral zero to Arabic numerals which is formed as a circle where there is no angle. The first recording of Arab zero was due 873 *Anno Domini*. However, the first Indian zero goes back to 876 *Anno Domini*(Concise-Dictionary 2004).

1.3 Motivation and Problem Statement

The improvement of mathematical operations skills for pupils in the entire Arab world and in Sudan in particular is extremely important.

Most of the pupils face an enormous difficulty when learning mathematics and they view the subject as a dry and a monotonous one, something which caused them to refrain from learning it. In fact many of the pupils continue their high education into the humanities away from mathematics. Additionally, the pupil's weakness in mathematics and their poor performance (failure to attain the pass mark) made the subject a source of anxiety for them, their parents, and teachers alike. The anxiety is justified because learning this subject is hierarchically accumulative in which the new ideas are based on the previous ideas. Learning mathematics and understanding its basic concepts is still a problem to children, in particular, primary school pupils.

That is because this school level is the foundation for learning as it forms the link to the subsequent educational levels. Mathematics at the primary or basic level represents the main pillar and the solid groundwork upon which to build the fundamental mathematical concepts the pupil can rely on in their different future educational levels. The primary level is also the stage at which the transformation from the physical (tangible) operations to abstract operations happens. Many scientists, including Piaget in 1952, believe that all children are able to acquire most mathematical and scientific concepts at their childhood, and that their inability to comprehend the concept is not attributable to their inadequacy to learn but might be attributable to the deficiency in the ideas presented to them, because the environmental factors such as the culture, the society, and the economy, etc. have a significant effect in concept development (understanding) and may delay its comprehension (IMAD 2011).

One study has shown that there are many benefits resulting from the use of Handheld Games in learning mathematical skills. The first benefit is that the students who use a handheld-based arithmetic game improve their outcome better than those who did not use it. Second, students who have played handheld games more than four times a week overtook those who used the game only twice a week. The third benefit observed was that students with weak mathematical abilities who used a handheld game obtained good grade compared to the same levels of students who did not use the handheld game. Fourth, the solution to the cumulative number of problems as can be seen from the results of handheld game and attitude of students towards mathematics significantly correlated to scores of students in the final test of mathematics (Namsoo, Cathleen et al. 2006).

The current research extends the point of the previous research "Effects of Handheld Games" by adding the element of competition on cell phones using the Arabic Hindi Numerals. The technique adopts some sort of competitive arithmetic games where the pupil's success rate can be easily tracked. The importance of this proposed research stems from the following reasons:

1) The researcher observed that many third grade pupils in Sudan basic school do not understand the principles of arithmetic operations. These operations

which are taught using Arabic Hindi Numerals and form the basis for understanding of mathematics.

2) It is believed that the aforementioned problem is a result of pupils not having sufficient training in our arithmetic operations where they do not always accurately measure mathematical levels at grades under grade 3.

3) It is aimed that (HessApp Numerals Model) will improve the mathematical skills learning among basic school pupils.

4) There will be a monitoring program to measure the performance of the pupils during the arithmetic competition between the pupils using the application installed on the cell phones.

5) An Arithmetic operations application using Arabic Hindi numerals will be designed and installed on cell phones to carry out simple mathematical operations such as summation.

1.3.1 Arithmetic Competitions

Model for Arithmetic Competitions in Arabic Hindi numerals is:

1) The activity or condition of competing through the branch of mathematics concerned with the properties and manipulation of numbers.

2) Are the interactions between pupils to compete at adding or subtracting two integers numerals together (Concise-Dictionary 2004) (BUTGEREIT 2009).

1.3.2 HessApp Numerals Model

HessApp numerals model instantation created by this research is an application that uses Arabic Hindi numerals representation to learn arithmetic operations in a competitive manner among the pupils in the primary school level. Essentially, the application is an idea that is designed on a smart phone game for arithmetic operations competition. However, the game aims at simplicity and in turn, it should be simple and applicable. Thus, this model encourages every pupil to compete with other pupils in arithmetic completions. The model is intended to assist pupils in the first and second grades to understand and recognize simple calculations such as summation of two integers. In other words, this model is prepared to enhance

pupils' understanding of primary classes in basic schools especially in Sudan and the Arab world and that it will be done in Arabic Hindi numerals.

1.4 Research Issues (Research Questions)

The major aim of this research is to represent an alternatively easy approach to simplify arithmetic procedures students have been suffering from learning mathematics. This goal sets out of the factual supposition that Arabic Hindi numerals assist in the aforementioned issue. Elementary school level is the focal point. It helps pupils to do their digital manipulations in an easygoing way. A competition through some applications is a good and useful job to reach the academic aims of learning mathematics. This section sets out the research questions starting with primary question and sub-questions.

1.4.1 Primary Question

1) Can arithmetic competitions in Arabic Hindi numerals assist in mathematics at basic elementary school level?

A study that involved a specific sample as pupils must spot a light on the attitudes and psychological reactions and responses towards the model. It helped avoid the accidental short-comes and solvable mistakes due pupils are expected to have during manipulating HessApp modeling. Their gaming nature and competitively spirit pushes the feedback to improve the performance and application of the whole project.

1.4.2 Sub-Questions

1) What is the nature of learners' characteristics (attitude towards mathematics, arithmetic competition on cell phone and arithmetic competing performance) that influences pupil learning in arithmetic competition on cell phone environment?

Nowadays, pupils have a noticeable interest in mobile and have a fast rate to know how a mobile works. Exploiting this gift, the researcher designs a mathematical game uses Arabic Hindi digits solves the problem in a swift procedure.

It is expected to assist to use HessApp in schools to helpful rates that means success in mathematics.

2) How do pupils compete in such a social application of arithmetic competition on cell phone?

With the spread of cell-phone, pupils in all the early stages who are learning in many academic fields prove to be faster than the adult ones. The research stresses and strikes on this side of interest and directs this inching towards useful purposes of knowledge.

3) How can the mobile features be exploited to satisfy all the process and product requirements so that pupils have no trouble understanding them?

Training a sample of pupils for a suitable interval is required and will be enough to make the model be experimented in early learning levels. Pupils of such a prime phase of education lack the lowest idea of launching mobile applications. Even though, the course of training should be on how to activate the internet and how to use the application steps. Doing this way, the pupils exploit all the mobile features.

1.5 Research Objectives

The main objective of this research is to design a model using Arabic Hindi Numerals (HessApp) in arithmetic competitions on cell phones for basic school pupils. Also, it helps first and second grade of basic schools to learn arithmetic operations in an enjoyable and social way through the use of Mobile Applications.

1.6 Overview in Computer Science and Information Technology

Computer Science and Information Technology are two interrelated fields. The following accounts give few details about both fields.

Computer science is the scientific and practical approach to computation and its applications. It is the systematic study of the feasibility, structure, expression, and mechanization of the methodical procedures (or algorithms) that underlie the

acquisition, representation, processing, storage, communication of, and access to information. An alternate, more succinct definition of computer science is the study of automating algorithmic processes that scale. A computer scientist specializes in the theory of computation and the design of computational systems (Graham, Ronald 1994).

The field of computer science can be divided into many theoretical and practical disciplines. Some fields, such as computational complexity theory are highly abstract, while other fields such as computer graphics emphasize real-world visual applications. Still other fields focus on challenges in implementing computation. For example, programming language theory considers various approaches to the description of computation, while the study of computer programming itself investigates various aspects of the use of programming language and complex systems. Human–computer interaction considers the challenges in making computers and computations useful, usable, and universally accessible to humans (Regan, Gerard 2008) (Schäfer, Jörg 2010).

Information technology (IT) is the application of computers to store, retrieve, transmit and process data (Adewumi, I.O et al. 2013), often in the context of a business or other enterprise. IT is considered a subcategory of information and communications technology (ICT). In 2012, Zuppo and Colrain proposed an ICT hierarchy where each hierarchy level "contains some degree of commonality in that they are related to technologies that facilitate the transfer of information and various types of electronically mediated communications." Business/IT was one level of the ICT hierarchy (Zuppo, Colrain 2012).

The term IT is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones, including smart telephone devices. Several industries are associated with information technology, including computer hardware, software, electronics, semiconductors, internet, telecom equipment, engineering, healthcare, e-commerce and computer services (Chandler, Daniel et al. 2011) (Legris, Paul et al. 2003).

Humans have been storing, retrieving, manipulating and communicating

information since the Sumerians in Mesopotamia developed writing in about 3000 Before Christ, (Butler, Jeremy et al. 2012) but the root origins of the term IT in its modern use first appeared in a 1958 article published in the Harvard Business Review; authors Leavitt, Harold et al. in 1958 commented that "the new technology does not yet have a single established name. We shall call it information technology (IT)." Their definition consists of three categories: techniques for processing, the application of statistical and mathematical methods to decision-making, and the simulation of higher-order thinking through computer programs (Leavitt, Harold et al. 1958).

The distinguishable four distinct phases of IT development are:

1) Pre-mechanical (3000 BC – 1450 AD),
2) Mechanical (1450–1840),
3) Electromechanical (1840–1940), and
4) Electronic (1940–present) (Butler, Jeremy et al. 2012).

Carefully studying the differences between the definitions of the two fields of Computer Science and Information Technology, we realize that the IT concerns itself with one area of the smart phones and its applications. We put this in mind, this research deals with IT applications to support electronic learning through the use of smart phones applications not the computer science. This means the research is within the confinements of the Information Technology field, not the computer science.

Smart devices like Apple phones and Android tablets can be completely programmed to run many applications of use to humans. Smart applications to enable mobile learning are available in many subject areas including language education (GODWIN-JONES, R. 2011) and nursing education (PHILLIPPI, WYATT et al. 2011). This is a growing field and there are numerous examples at present and the potential to design new applications is as wide as the diversity of human needs. The researcher worked in one of these areas to make use of the applications in smart devices to help improve learning arithmetic operations skills and mathematics in general among pupils in primary schools.

1.7 Brief Introduction to DSR (Design Science Research)

This research will be conducted in DSR which attempts to solve important problems while creating new knowledge (Hevner, March et al. 2004) it was documented in 1995. DSR will be more fully described in Chapter 3 Research Methodology.

Design science research is poised to take its rightful place as an equal companion to natural science research in the Information Systems (IS) field (Von, R. Hevner et al. 2004).

1.8 Contribution

The contributions of this dissertation are summarized as follows:

The first contribution of this thesis is the design of Arabic Hindi numerals application on Android mobile devices environment in arithmetically competitive manner, and making the comparison between two Arabic Hindi numeral figures after converting these numerals to an integer number according to Java programming language, and later comparing the pupil's input with the result of the arithmetic operation (calculation).

The second contribution is the benefit that was attained through the use of the product HessApp Numerals Model (HNM). The analysis of the pupils' arithmetical skills acquisition results indicated that the pupils' arithmetic operation capabilities were improved.

1.9 Structure of the Thesis

This section describes the organization of the remaining chapters as follows:

Chapter 2 is the Literature Review: in this chapter, we will present an overview of E-Learning and M-Learning studies. It covers the basics method of E-Learning and M-Learning studies, the types of feature based of M-Learning method.

Chapter 3, Research Methodology: this chapter presents the methodology used in this research. A methodology is generally a guideline for solving a research problem.

It contains the generic framework of the research and the steps required to carry out the research systematically.

Chapter 4, HessApp Numerals Model, this chapter explains how the researcher set up the calculations and then how he translate it to the correct font. This chapter is more on the theory of how the researchers do this in a non-Western font.

Chapter 5 HessApp Numerals Instantiation: the main goal of this chapter is to design HessApp Numerals as a social and enjoyable way for summation two Arabic Hindi Numerals, also this chapter explain how the researcher designed the instantiation of HessApp Numerals Model.

Chapter 6, Results of analyses pupils enhancements and recognize understanding in summation, for basic schools stage in Sudan particular, which pupils in first and second grade level. In addition, this chapter explains the results of Arithmetic competition (HessApp application) in more details.

Chapter 7, Conclusion and Future Work: this chapter provides the overall the thesis and gives some recommendations for future works in the promising area Information Technology in support of Mobile Learning and Education in a Developing Context.

CHAPTER TWO

2 Literature Review

2.1Introduction

This chapter presents an overview of E-Learning and M-Learning studies. It covers the basic methods of E-Learning and M-Learning studies and the types of merits associated with M-Learning methods. It gives brief accounts on the basics of mobile learning, its challenges, objectives, and the advantages attainable through the use of the this new approach. Additionally, the researcher sheds light on Electronic education.

In addition, this chapter provides some literature review about Design Science Research to better explain Chapter 3 research methodologies.

2.2 Basics of Mobile Learning

Mobile learning is the ability of obtaining or providing educational content on mobile devices such as personal smart phones and mobile phones. Educational content is digital learning assets, which include any form of content or media available on a personal device. However, Mobile learning using mobile applications in arithmetic competitions might have more advantages to the learners. Mobile learning can be more attractive and enjoyable and can make pupils and students develop their arithmetic skills in a very good manner.

Many researchers and former teachers may offer mobile learning and immediate descendant of e-learning and others. E-learning means learning by digital tools electronic media, therefore, mobile learning is an e-learning process that uses mobile devices and communication means (Ye, Chengli, et al. 2004).

E-learning is a subset of technology-based training, as the e-learning can be expanded to function as an acceptable form of learning.

2.2.1 Objectives and Challenges in Mobile Learning

There are a number of objects and challenges facing e-learning through mobile phones. These include:

2.2.2. Objectives:

1) Encouraging 'anywhere, anytime' learning: Mobile devices allow pupils or students to gather, access, and process information outside the classroom. They can encourage learning in a real-world context, after school and in home environment.
2) Reaching under-served children: accessibility of their relatively low cost and in low-income communities.
3) Improving twenty-first century social interactions: power to promote and foster collaboration and communication obtainable in Mobile technologies.
4) Enabling a personalized learning experience: Not all pupils and children are similar; instructions in mobile application should be adaptable to individual and various. There are important opportunities for enjoyable math competitions, that supporting autonomous, differentiated, and individualized learning through mobile applications (Ye, Chengli, et al. 2004).

2.2.3 Challenges:

1) Negative aspects of mobile learning include: social, traditional, cognitive, and physical challenges must be surmounted when mobile devices are incorporated into pupil's learning. However, the expansion and spread of technology development in the world of mobile devices and mobile applications should have solved this challenge.
2) Cultural norms and attitudes: Many experts believe that mobile devices have significant possibility to transform pupils and children's learning, but parents and teachers apparently are not yet satisfied. However, BUTGEREIT (2009) found that the children have learned and benefited greatly from this study in South Africa, using e-learning.

3) Differentiated access and technology: The wide variety of mobile technologies is a challenge for teachers and pupils who want to speed up the academic results as well as producers of mobile applications who seek to facilitate such learning. However, the rapid technological advances - solved this challenge.

4) Limiting physical attributes: Some physical aspects of technical for mobile devices may prevent optimal test in learning experience. These limitations may include: restrictions in writing the texts, small size of screen and battery life. Beside that, the technical advancements in mobile devices have solved many of our problems with regard to screen size by zooming of screen (Ye, Chengli, et al. 2004).

2.3 Electronic Education

Teaching and learning are two complementary terms: Learning involves thinking, research, and cooperation with peers and teacher to make one's own world. Teaching, on the other hand, is almost entirely a listening exercise where the teacher is the sole speaker. An improvement of the current style of teaching could be the employment of electronic education as part of the education process (Asma 2010).

Electronic education is the use of technology and technological means in teaching and enabling the student to self-study as a member of a group and be the focus of the instruction. This could include the technology used to present the material within the class such as the multimedia and the electronic devices, as well as the smart schools and virtual classes through which the learning process members can interact with each other by means of the internet and interactive video conference. According to this definition of electronic education, learning can take places in three different environments: supportive web education, direct web education and mixed web education (Asma 2010).

Improving education aims at transforming the current teaching process from a mere indoctrination on the teacher's side and a memorization on the learner's side to an interactive dialogue between the two parties. Electronic education puts more responsibility on the learner in the learning process through exploration, expression, and practice leading to change in the roles of the student and the teacher, where the

first becomes a learner and the latter becomes a facilitator not an expert (Asma 2010).

This type of education is usually referred to as electronic education instead of virtual education. It is so because the electronic education type is similar to habitual education but it depends on electronic media devices. Therefore, electronic education is real not virtual. Dobbs and Philip argued that "Electronic education is a genuine one but s/he learns in an electronic environment" (Ismail, Fathi 2003).

2.4 Why building, promoting and developing pupils' thinking using electronic education

Thinking ability is considered to be the essential power that a pupil needs to mentally mature. Parents encourage their children to think. This is equally true for teachers who usually ask pupils to think so as to be able to solve problems. During the day, there are many problems that require one of the many devices and strategic skills to solve the face of such problems intelligently and flexibly to deal with the time, the environment in which we live (Alaa 2012).

There are two types of thinking. One type is everyday habitual thinking. A pupil obtains it naturally during growth and maturity. It does not need any training or learning. The other type is in classroom, which is the skillful thinking. However, this type of thinking requires training and learning, and can only happen through the everyday activities. This is similar to learning to swim or to climb mountain. It also increases pupils' knowledge and experiences and reflects a deep vision of life. Thus, thinking helps us in finding solutions and proofs, provides us with precise evaluation, and results in productive ideas for decision making (Zaitoon 2003).

2.5 Problem solving in a collaborative small group

This study proposed that learning is enhanced in a small group setting since learners actively engage with problems especially in the field of mathematics. The importance of problem solvingin mathematics for the poor performance of learners in

South Africa in international tests (TIMSS) in schools generally indicates that the focus should be on solving problems in the teaching and learning of mathematics. However, this scientific geometric study focused on solving the problem in small group collaborative settings. The researcher can consider arithmetic competition on cell phone environment that are between two of pupils like this type of study (Cooper, Phadiela 2010).

2.6 Effects of Handheld Games on Students Learning in Mathematics

Namsoo & Cathleen (2006) studied the impacts of using handheld and portable games on student learning in mathematics. The program proved to be a useful application and achieved its objectives. It is especially beneficial to weak students in mathematics overlooking their generic or ethnic differences.

There are two main objectives of this study: 1) to know which aspects of learner's characteristics impact student learning in handheld gaming environments. 2) Investigating the possibility of making use of handheld games in education and learning as an effective teaching aid.

Of the results, a statistically significant difference in the mathematic scores' changed over time in the two groups (one and two). Even for the low-level games, there is a significant effect. For gender differences on the test, there is no significant result (Namsoo, Cathleen et al. 2006).

One of the implications is that the program is consistent with what other researchers have confirmed i.e., it is an effective tool for facilitating student learning as well. In addition, gender does not have any effect on the mathematics test. There is no any kind of bias in tests students who use smart phones Games.

In class one, 21 students have used game cards that played in group, using flash cards. While the rest of the other students, who represent class three, were waited. Their performances have been measured by using the pre-test to enhance their skills in the game. With regard to measures, the students' score in the game represent the number of correctly solved answers in the Skills Arena game. The study also assesses the students' attitude toward mathematics and toward the handheld games.

The study had several important findings:

1) Receiving of the results in the math test, and promote the excellence of the students who used the game calculation on smart-phone, of those who do not use it.
2) Students who have played more than four times a week, excelled on those who are accustomed to the game only twice a week. Besides, dozens of gains on the same mathematis test, promote excellence for students of low ability who have used mobile game of those students a low-power who did not use it.
3) Numerous mathematical issues have been correctly solved through using the handheld game. The skills acquired by students were significantly correlated to the scores gained by students in the final arithmatic test. The handheld gaming environments have positively impacted the students' learning in mathematics, especially for low-ability groups. However, this study was conducted on elder students not young-ages pupils (Namsoo, Cathleen et al. 2006).

2.7 Enabling mathematics teachers to create Presence on MXIT and other chat areas

This study provided a model for the mathematic teachers who feel uncomfortable using symbols such as Θ, φ, Σ and Δ in an online environment. Recent research has shown that primary and secondary school pupils are more willing to discuss mathematics on MXit and in the environment of chats. Teacher's mathematics and other subjects, which allows teachers to easily create lists definition, formulas lists, quizzes, games and utilities lessons that can be accessed by their pupils using MXit on their cell phones in the foreground belong to a form of cell phones. Mxit is a mobile chat based synchronous communication system which is extremely popular in South Africa (Butgereit, Reinhardt et al. 2010).

What is Dr. Math? Dr Math is a tutoring system to help pupils with mathematics.

What is C³TO – Chatter Call Centre/Tutoring Online? Is a web application allowing teachers to create environment for tutoring which may be used with cell phones using Mxit. This tutoring environment allowed competitions, games and multiple choice quiz competitions in extra mathematically to keep participants busy during the periods of time when a tutor is not available (Butgereit, Reinhardt et al. 2010).

There are some mathematical skills competitions which include:

1) Addition – two integers can combine as a simple addition.
2) Subtraction – two integers subtract as a simple subtraction with the difference remaining positive.
3) Multiplication – two integers can combine as a simple multiplication.
4) Division – simple division of two integers with positive, natural number quotients.
5) Prime Factors – prime factors of a positive number.

This can be done from a multi-choice questionnaire after several competitions by the teacher. Participants can compete in answering questions. This is ideal for testing definitions (Butgereit, Reinhardt et al. 2010).

2.8 How Dr Math reaches Pupils with Competitions and Computer Games by using MXit

It is a MXit contact that persuaded pupils to join the application user-group to trigger competitions and games that are made out of mathematic processes. It is to say through what this app requires of mathematics skills, a plot of figure is solved. The current high school generation: who were 8 years old, at present they are teenagers in 2009, in Grade 12 are available in the Internet. In Africa, mathematics

teaching has been adopting innovative ideas of technologies (Windows, Internet, Cell phones, etc) (BUTGEREIT 2009).

Competitions: The first game was released in 2007; It was adding two integers together. High scores are given to correct answers, and to those who work harder and answer quickly so as to maintain their high scores. Over the months, the other processes of mathematic are applied one by one. Ethics and safety: It's a way to avoid the social problems that may be exposed to the participants. The appointment of a committee to monitor the competitions. And it prohibits contact between pupils. As a result of raising the social level: the game is an interesting example as a contribution to solving the problem, and social life to flourish (BUTGEREIT 2009).

Interactive fiction: It consists of games and competitions on the way to bridge the gap from the fantasy tradition when the public can be creative and below. It is a process of event development that's only completed through one of arithmetic process. Through comparing the scores, the competition is put on a hell of zeal to go on the game which means more skills of mathematics that are going to practiced and mastered (BUTGEREIT 2009).

Human Recourses Issues: The program is held by skillful tutors who can follow-up pupils and develop the Java-centred Mxit. So, the task is so hard. Two tutors in one place are put to meet the complicated needs of the hugely increasing numbers of pupils on spare time. Things to be done:

1) More professionally of well qualified developers.
2) A website should be devoted to these games.
3) Using Mxit as a teaching aid (BUTGEREIT 2009).

2.9 Dr Math gets MUDDY: The “Dirt” on How to Attract Teenagers to Mathematics and Science by Using Multi-User Dungeon Games over Mxit on Cell Phones

Those who use Mxit the contact on cell phones, are called many things due to their close correlation with their cell phones: thumb tribe, games, etc. The paper

explains that the application of multi-user dungeon games was launched for pupils to increase and enhance practicing of mathematics and science skills. The application was conducted on 93% of first year university students in South Africa who have limited knowledge in mathematics. Some institutes adopted Mxit to create a reach-line between their weak students and tutors to help them improve their mathematics skills. Also, to help them in their home works through using Mxit (Butgereit, Barend et al. 2010).

A MUD is "short for Multi User Dungeon", refers to a virtual social environment". They are computer programs, which accept multi-player connection.

Technology Description in MXit: pupils' data stored on their cell phones are linked to the cell phone network in order to reach the MXit server. This would allow sending or receiving messages to Dr. Math. The server synchronous state is linked to the updated status of each player. The server saves the XML in a folder during the running of MXit (Butgereit, Barend et al. 2010).

Interpreting of Mxit “lingo” or slang: Using of diversified technology media has led to use language in a different way. It became a slang style or a variety. However, whether it is a bad or good language style, it remains a means of interaction among the users of the new generations. The study findings have shown the following:

1) MUD was attempted in educational field.
2) Interface with MUD is weak.
3) Users do not play regularly.

They face difficulties navigate the interface (Butgereit, Barend et al. 2010).

2.10 Math on MXit: Using MXit as a Medium for Mathematics Education

This paper examines a mathematic club or mathematics system which is being run throughout MXit, the famous swift messaging system running on cell phones and extremely popular with young students. A contact between the learners and a tutor is held in durations stated formerly. The tutor is linked synchronously with players using an additional computer and keyboard. None of the students meant

uses his name in the program. The paper is based on the idea of exploiting instant messaging system, which is usually used to enhance education in the distance learning environment. It is a unique program because it uses mobile phones to carry games (Butgereit, L 2007).

MXit is software used in South Africa and that enable people to communicate easily with each other with written messages such as text-based SMS messages on mobile phones. It is similar to WhatsApp or Google hangouts but it came before them. It uses only the phone number to gain access to a set play. A conversation in the program is what represents the essence and practice. Of course, some difficulties encounter such a program of them is drawing triangles and graphs. Dr Math is held in English, for the tutors are English speaker. However, HNM aims to hold in Arabic numerals for the pupils in basic schools (Butgereit, L 2007).

Ethical bias is diminished through using nicknames in using Dr. Math application. Socially, the learners establish a virtual linkage with Dr. Math, because Dr. Math takes the chance to encourage learners play games on spare times. It is clear that students enjoy playing and using Dr. Math. They react through saying that the program is a great success (Butgereit, L 2007).

The bad use of Dr. Math is that; some students were abusing understand the messages, because they send some bad images or phrases. The program proved to be successful in helping the learners on homework in mathematics in the afternoon. The cost is minimal. As a result, Dr. Math correctly affects on different class of student tests (Butgereit, L 2007).

2.11 Education via mobile as an opportunity to promote education in developing countries - Ghana model

Education has become in Ghana one of the largest public institutions. It represents (11%) in the development program. Schools and educational services accommodate about a quarter of the population. The big challenge is the need for content, young people (pupils) and materials for self-learning. Moreover, there is slim and small proportion of teachers, the scarcity of trainers in schools in rural areas. It has expanded technical progress and the spread of mobile phone prospects

for education in developing countries. On the condition that the application is the concept of the learning by cell phone is the perfect solution to these problems. It drew attention to the impact factors in the experience of Ghana. The application was built for a number of teachers to support the development of the concept of teaching. It highlights its importance as a change in teaching practice integrates in the learning process through the cell phone in the car or school day. It was noted that the process of learning experience via cell-phone in the vehicle groups of students in secondary schools addresses the infrastructure problems such as: poverty, the attendance of students in schools. Applications are described as having the ability to reach students remotely from schools and libraries without the school staff. Experiences of students take advantage of these remote areas of the media and Smartphone applications. This paper is described as exploring learning opportunities across the cellular phone operation, particularly in Ghana. Notably, this study aims to holistic learning through the cell phone, however, HNM held in Arabic Hindi Numerals in competition at social way, for pupils to use the Arabic language (Grimus, Margarete et al. 2012).

2.12 Prevent inappropriate dialogues in the application Dr. Math

This application has come in order to make it easier for students in primary and secondary phases where it can be used to solve the duties of mathematics through their Smartphone's. However, there is what is traded through the application contexts, which is irrelevant in the basis of the intent of application (Butgereit, Botha et al. 2011).

This paper presents some conversations over Dr. Math for two reasons: One is that to determine the number of students who are in need of this application. The second is that; to determine the extent to which the talks can be found not relevant to the application goes against the aim of education. It pointed out that a lot about mathematics education in universities and private South Africa in the first year needs to support students in mathematics, such as exercises and solutions in the household and private duties. In addition students in high school could ask for help from these university assistances through the application of solutions to exercises in mathematics at the secondary level. This is what the application is doing: Linking these students at all levels to cooperate in order to solve domestic mathematics and

homework's. The reason for testing the conversations in Dr. Math that security and confidentiality of the talks no longer be control in all of chats in the application. In addition, for some reasons of learning, the teachers repeat the same answer for many of the students at the same time. Then this study describes what words are concentrated on the educational content of the program and lead the application requirements and not to break it, and vice what words are ignored. These appropriate words can be limited in mathematics or more specifically in the chapter in mathematics and so on (Butgereit, Botha et al. 2011).

2.13 Theoretical model proposed to do the education via cell-phone in developing countries

This study describes the possibility of using wireless technology in education with a focus on the possibility of the use of smart phones in the learning process in developing countries. This possibility was recovered from the reports of a number of scientific studies via smart phones. The theorem came on the presence of the benefits of these wireless devices used in education. Starting with the idea of learning theory through the cell-phone and the use of wireless technology in education has real advantages, and take advantage of the difficulties that occur when the introduction of wireless technologies in the field of education. However, some of the issues such as restrictions on the devices, and the problems of teaching, safety, and security issues are taken into account, and training and support, as well as costs. However, after studying the recommendations contained in the developing countries it is found that it is possible to adopt and create wireless technologies in the countries concerned in the education sector. These recommendations include the establishment of rules to ensure the optimal use of these wireless technologies, and design tools bearing taking into account the user (the student), as well as a network server. It confirms the adoption and establishment of mobile learning model through the cell phone in a developing country on the importance of vision systems in all the elements that is needed to learn and develop the environment in which the cell phone is used. This includes employers and useful items such as telecommunications infrastructure, mobile devices, students and teachers. All this is to ensure the proper use of wireless

technology in the field of education. This model includes the basic issues related to learning via the cell phone, as well as critical success factors necessary to ensure proper use. It was clear from the results of the study that the wireless technologies used in distance learning via the cellular mobile phone can engage students in educational activities is a collaborative and interactive successful solution (Barker et al., 2005).

2.14 Overview on Design Science Research

Design Science Research can produce four different types of artifacts: constructs, models, methods and instantiations. All of these four different types of artifacts show the following:

1) Constructs form a group of vocabulary and symbols in the area under research.
2) Models are abstractions, and a representation of the research in the field of information technology. And the model can be did how to solve a specific problem using computer technology to build a model to be usable on Android mobile devices for pupils to support learning through the cell phone.
3) Methods are algorithms and skills. In this research in the field of information technology, it can be a technique of generating random arithmetic calculations.
4) The instantiations are implementations and prototype model, for example, in the case of Mobile applications to design a model, you can do that through the instantiation that the actual figures will be on the design model to be compatible on Android mobile devices, next to this state (Hevner, March et al. 2004) (March, Smith et al. 1995).

There are seven characteristics for Design Science Research Methodology used for information systems and IT to solve problem (Hevner, March et al. 2004):

1) DSR must produce a viable artifact in the form of a construct, a model, a method or an instantiation.

2) The objective of Design Science Research is to develop technology based solutions to important and relevant problems.

3) The utility and efficacy of the artifact must be rigorously demonstrated.

4) There must be verifiable contributions and clear in the domain search problem area and Literature Review.

5) Rigorous methods (testing) must be used in the construction and evaluation of the artifact.

6) The search for an effective artifact (and components thereof) must satisfy the rules of the problem area.

7) Design science research must be presented to both technologies oriented audiences as well as management oriented audiences.

There are three cycles, which lies in the Design of Science Research: The relevance cycle, rigor cycle and design cycle (Hevner 2007). As can be seen in Figure 3.2 in chapter three research methodology.

The Relevance cycle initiates the design science research with the requirements for the research. The Rigor cycle draws on the vast knowledge base of scientific theories and engineering methods. The Design cycle is a cycle of activities including the construction of the artifact, the evaluation of the artifact, and feedback for the next iteration of the cycle (Hevner 2007). The researcher depends on the three cycles of design science research in the methodology of this research.

Moreover, the Design Science Research practiced in the fields of information and communication technology vary from the design practiced in other areas (such as architecture or industrial design); they are in need of a way to validate the results of research, for instance, the stress in the information systems (IS) has human-computer interfaces (HCI), in many branches of software engineering due to the foundations of those fields in management science, psychology and statistical disciplines (Vijay,William 2008).

Those (Walls, Widmeyer et al. 1992) presented Design Science Research to executive information systems (EISs), provide support for the operations of the emerging knowledge processes (EKPs), respectively, in the framework of theories

prescribe of IS information systems. Such theories are described as the practice of development (methods) and a type of the system solution.

2.15 Summary

This part of the study deals with the literature review that has hit the field of education. Thinking ability, Problem Solving, Handheld Games, E-learning, M-learning…etc. As well, the chapter shows the experience of some models as in Ghana, South Africa and Germany. Wholly, the section offers the theoretical model to do the education via cell-phone in developing countries. Finally, there is an overview on Design Science Research. The next chapter is chapter three which is the research methodology.

CHAPTER THREE

3 Research Methodology

3.1 Introduction

This chapter presents and explains how Design Science Research (DSR) works and then how the researcher follows the DSR rules.

In this chapter, the researcher used the three cycles "Design Science Research Cycles" (DSRC) (Hevner 2007) to build and design model (HNM), but it was also his major goals for how to design a scientific research methodology ways DSR (Vijay,William 2008). This research, which has helped to reach the advantages in science research. Also, this chapter takes into consideration the seven characteristics to design science research used for information systems and IT to solve the problem (March, Smith et al. 1995) explained in chapter six.

This chapter presents the different stages of this research work and discusses the methodology used to develop HessApp Numerals Model to achieve the objectives of this research. In this research HessApp Numerals Model (HNM) in Arabic Hindi Numerals is built on Android mobile application, and a testing method is proposed to do (HNM) experiments on the pupils in grade one and two in basic schools in Sudan. The domain problem is the Arabic Sudanese pupils in grade one and two in basic schools and in Blue Nile State in many cases of study. The contribution of this thesis is to create Arabic Hindi numerals in Android mobile applications environment in mathematics competitions on mobile cell phones, and do a comparison summation between two Arabic Hindi numerals after converting these figures to an integer among the results that will put some of the pupils during the competition. And the second contribution is extracted feature of the product (HNM) after an experiment which was done.

In addition, in this chapter, research issues and answers from the research and ethical questions and offered to have helped carry out experiments on pupils who have not come forward to compete HNM. Also, it has been providing research documents that were used in the Ministry of Education, schools and pupils environments in their homes.

3.2 The five steps of Design Science Research

In this section the general five steps underlying Design Science Research in its diversity of as practiced variants is described, followed by an explanation of the step as used in HessApp numerals model. The general methodology for all design science research is described in Figure 3.1.

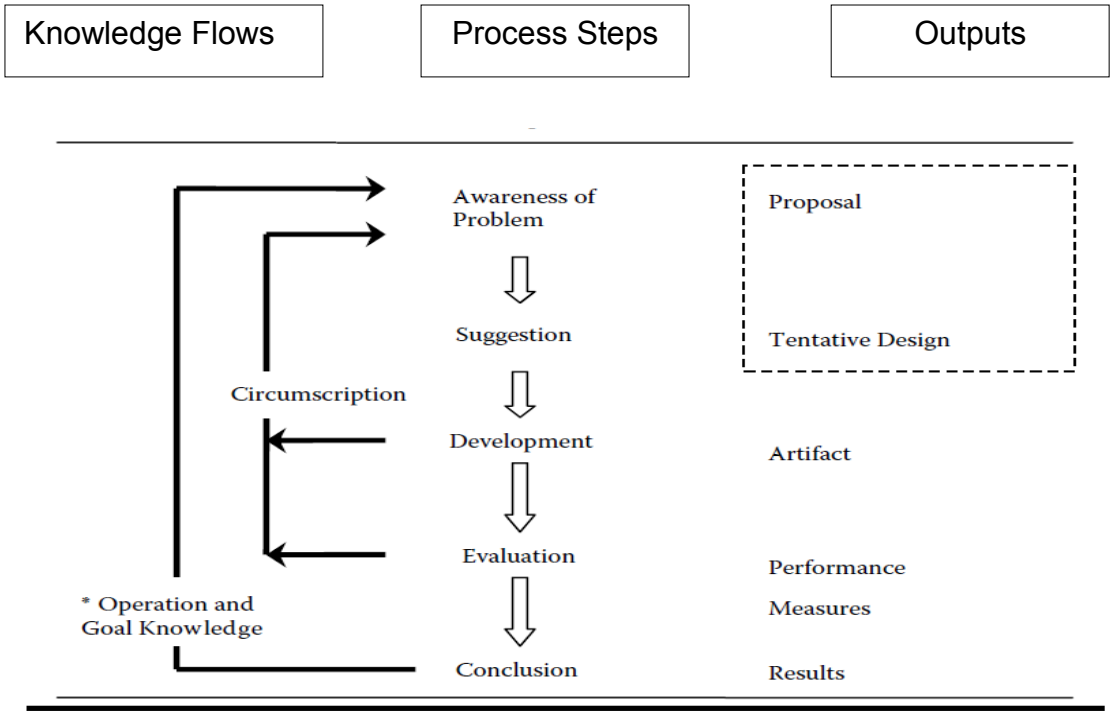

FIGURE 3.1 THE GENERAL METHODOLOGY OF DESIGN SCIENCE RESEARCH (HNM) (VIJAY,WILLIAM 2008).

Observations of many years indicated that Mathematics teachers have been concentrating on difficult processes of foreign numerals forgetting their early-staged pupils familiar with their mother language numbers. Also, pupils need to memorize all the steps actions. Pupils and students really need to practice properly in Arabic

Hindi numbers figures. There is no need to memorize at all as long as there is a possibility to carry out numerical mathematical calculations in the language of the pupils. There are notices indicate that the problem lies in the misunderstanding of the teaching of mathematics.

The general methodology for design science research (HNM) containing awareness of problem, the proposal (suggestion), development and the evaluation and conclusion.

3.2.1 Awareness of Problem

The awareness of the problem in this research is that pupils and students did not understand the mathematics in the advanced grades in Sudan and the Arab world.

As described in the scientific research in (UNESCO 2012), which appeared in 2011, the rate of success in mathematics in 1998 of 21.4% compared with 86.8% of the Islamic religion. In addition, it was found the results of poor education in the Learning Assessment process conducted in 195 schools in three states in Sudan (Kassala, North Kordofan, and the Nile) in 2009 found that 35% of the average answer math questions correctly by male students.

Most of the methods and curriculum focuses on teaching Arabic Hindi numerals to students from the beginning of the first basic school until third grade higher secondary education. Besides that, the teaching of beginning mathematics curricula in Sudan tends to memorization of some arithmetic operations.

3.2.2 Suggestion

The literature suggests that hand held mathematical games could help alleviate or solve the problems, which it's explained in awareness of problem step.

A new software development methodology(HessApp) specifically focused on Arithmetic competition application software used Arabic Hindi Numerals in (Eclipse Tools with Java IDE 8.0, AVD & SDK Manager (Mobile App) and AVD (Android Virtual Device)). Arithmetic Competitions was been among pupils to compete adding two integer numerals together. The researcher has implemented all these suggestions sequentially (more details in chapter five 5).

3.2.3 Development

The artifact here was inserted Arabic Hindi Numerals in Arithmetic competition application that uses tools, because this tools are considered Arabic Hindi numerals as a text, then Arabic Hindi Numerals are entered as text, afterwards converted text to an integer's numbers by using random function which supported the tool libraries. After that, made comparisons between summation of two integer's numerals and the result which entered from pupils to show what the result correct or wrong. This procedure was the important thing because it was the real contribution which can make the analysis of the results of competitions among the pupils.

3.2.4 Evaluation

The measures carried out by the researcher to evaluate the performance:

1) The mathematical evaluation of the application software competition in Arabic Hindi Numerals using Java SDK and AVD so as to achieve a better goal. Application has worked (HessApp) and run well in social ways for pupils.
2) Low cost mobile phones (Smartphone's), which work experience among pupils.
3) Experiment was performed in the application of arithmetic's competition on 10 pupils in first and second grade at primary level schools in the period (1-2 months).
4) A researcher tested the pupils before competition mathematics (HessApp) among pupils.
5) The researcher did a test after Arithmetic competition (HessApp) among pupils.
6) The final assessment has been done Arithmetic competition (HessApp application)during two months.

The researcher used the six stages to evaluate the arithmetic competition; also these six stages are referring to the development stage.

The results of Arithmetic competition are (HessApp application) in chapter 6 in details.

3.2.5 Conclusion

This phase is the finale of a specific research effort. Typically, it is the result of satisfying; although there are still deviations in the behavior of the artifact from the revised hypothetical predictions. The results are adjudged “good enough“(The actual conclusions are in chapter 7).

3.3 DSRC (Design Science Research Cycles) In Case Of HessApp Application

To achieve the objectives of the research, the researcher adopted the methodology to be able to get the research objectives. The methodology is "Design Science Research Cycles" (DSRC). There are three potential cycles in the design of science research cycles: all connected by the other cycle, rigor cycle, design cycle and relevance cycle. As can be seen in Figure 3.2 (Hevner 2007) three intertwined and connected cycles.

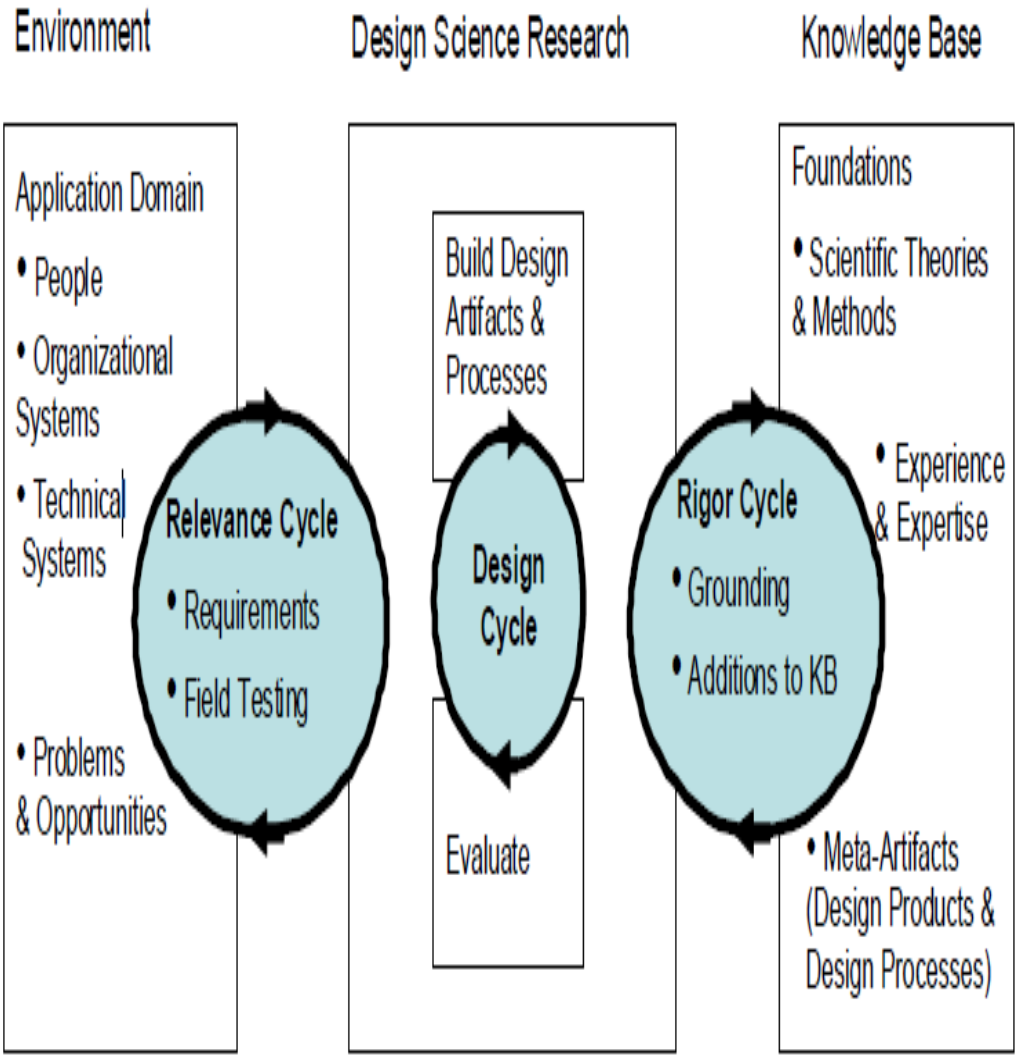

FIGURE 3.2 DESIGN SCIENCE RESEARCH CYCLES (HEVNER 2007)

3.3.1 Relevance Cycle

In this cycle the researcher talked to teachers, school administrators, pupils at home and education ministry. The problem here in this research is a lack of understanding of mathematics for pupils and students in advanced classes in Sudan and the Arab world. Opportunities which solved these problems designed model to support and enhance pupils to understand and recognize simple arithmetic's

operations such as summation of two numbers with Arabic Hindi Numerals in social media.

The researcher met the Minister of Blue Nile State Education Mr. Ramadan, and the manager of the Basic stage of Ministry of Education, Mr. Ahmed Yusuf Kooga, whom have shown their consent as explained in appendixes B and C. Also, they expressed their consent and they expressed their support for this application, which helps pupils to understand and increase the perception and study to carry out the outcome of knowledge for the first and second class of basic schools in Sudan. Also the researcher met the teachers of basic stage who teach first and second grade, Mr. Heg Allah Mohammed, Ms. Amna Omar and Ms Noha Ahmed Ali, whom expressed their admiration and agreeing to help such as this application (HessApp) which will have a significant impact in advancing education in mathematics for pupils in basic schools stage explained in appendix B and C.

3.3.2 Rigor Cycle

There are numbers of related work that have been taken up in (Literature Review) in Chapter Two, which support e-learning to a great extent a private secondary students and university students. Also this study [11] was a primary goal to provide a comprehensive solution to accelerate educational games via cell phone and implementation that make control, which supported e-learning, especially in the areas of mobile applications. The researcher used experiment application (HessApp) on samples of pupils in basic school using Android mobile devices. In the experiment the researcher pre-test and post-test for the pupils. You also interacted with children at school.

3.3.3 Design cycle

In this cycle researcher has designed (HNM) HessApp Numerals Model: A model for using Arabic Hindi Numerals in Arithmetic Competitions on cell phones for Basic School Pupils.

The researcher designed HNM by reading the literature, which help to add many features in the application to be enjoyable and in social way. The artifact here was inserted Arabic Hindi Numerals in Arithmetic competition application that uses

AVD, SDK and Java environment. Because Java programming language is considered Arabic Hindi numerals as a text, then Arabic Hindi Numerals are entered as text, afterwards converted text to an integer's numbers by using random function which supported in Java libraries. After that, made comparisons between summation of two integer's numerals and the result which entered from pupils and showed what the result correct or wrong. This procedure was the important thing because it was the real contribution which can make the analysis of the results of competitions among the pupils.

The evaluate made in this cycle, such as sounds effects to make the application (HessApp) more attractive and social to pupils like hands clapping, and another audio effect in the case of the pupil answer was wrong. Beside, another important evaluation here, after the completion of ten consecutive questions audio effects as a short song reflects that the pupil wins more than ten degrees. Also, in the case the pupil scored less than five degrees another short song expresses try again.

3.4 Ethics

Upon acceptance of this research by Sudan University of science and Technology, an application was made to the Ethics Committee of the university to ensure that all ethical regulations and rules are followed.

HNM application comes to enhance educational abilities and skills of pupils in Mathematics subject. Moreover, HNM has no bad effects because there is no contact among pupils and adults in this model. Also, the experiment was in an ethical way for pupils with controlling the pupils from their teachers and homes.

Here are some images of used HessApp application in schools with controlled from their teachers.

FIGURE 3.3 PUPILS USED HESSAPP NUMERALS MODEL APPLICATION

3.5 Research Documentations

In this part of this research used three documents:

1) The First contains the form which describes the authority and approval by the parents of the pupil contains the name of the pupil and family data and agreeing to make the game experience Mobile application calculations (Appendixes A).

2) The second contains a notification of the Ministry of Education, the state of the scientific experience of the application of the Mobile graders first and second (Appendixes B and C).

3) Third notification: the school to conduct the experiment on the part of pupils (Appendixes D).

4) Fourth the examination which has been done for pupils, in the first before HessApp arithmetic competition application test and after HessApp arithmetic competition application with pupils in the case of this study of this research (Appendixes F).

3.6 Summary

In chapter three, the study manipulates how the data collection is done. It explains the procedures of building the model, illustrates steps to construct research methodology and develops the steps to compose the Model HessApp. Next chapter is chapter four which presents HessApp Numerals Model in theoretical details.

CHAPTER FOUR

4 HessApp Numerals Model

4.1 Introduction

This chapter presents a DSR Model which attempts to solve important problems while creating new knowledge by designing HessApp Numerals Model. Design Science Research is poised to take its rightful place as an equal companion to natural science research in the Information Systems (IS) field.

In addition, this chapter explain how the researcher set up the calculations and then how translated Arabic Hindi Numerals to the correct as integers numbers in Java Programming language. In addition, this chapter is more on the theory of how the researcher does this application (HessApp) in a non-Western font. A non-Western font means of or relating to non-Western societies (non–Western values) in this research such as Arabic Hindi Numerals (١٢٣٤٥٦٧٨٩٠). HessApp Numerals Model contains two kinds of numerals: the first is Arabic Hindi Numerals which used as string to be clear for pupils in the way of mathematics learning in basic school and the second is Arabic Numerals (0123456789) inside Java Programming language after doing convert from Arabic Hindi Numerals to Arabic numerals.

4.2 Model Calculations Description of Setting up Application

The Model HessApp includes two choices: the first choice is easy while the second is difficult. The pupil can choose one of them easy or difficult. In HessApp Model application there are many calculations generated randomly string of Arabic Hindi numerals (١٢٣٤٥٦٧٨٩٠) to be clear for pupils as the curriculum in the schools.And then, at the last moment HessApp application processed and translated Arabic Hindi numerals into another font of numerals which can be any font.

The model, which was introduced as a simplified description, mathematics is considered as one of the system or process to help mathematics and expectations. The current study is based on model calculations as well. The idea dating back to the researcher's belief is about how to solve mathematics operations and difficulties that weaken the students' and pupils' motivation for self to master the initial aspects of the sort the problems. Then, the idea became a study that led to this theory characteristic style. The current model for HessApp (thesis) is set up as an application mobile phone; software that simulates the teacher, and the council of classroom management and pupils. Moreover, this process was based on the diversity of sub-processes any external screen that gives a virtual board used only by users (the teacher and the pupils, and other onlookers), interior architecture which has been completely redesigned by the researcher with interest advice. In the computer languages such as Java programming language; strings of symbols and figures agree that databases (input) is to be converted into the required operations on the pupils. It will be discussed in more details later (Chapter five).

To choose the font and strings follow the traditional structure of a special (Arabic typesetting) in the case of anyone looking at the reasons for writing the name on the front line of the specified computer language. However, at home using a diverse line completely from what appears on the screen. The first is in symbols Arabic numerals, while the latter is in the Arab Hindi numbers; this to facilitate the applicants using their mother tongue users target is Arabic Hindi numerals.

4.3 Setting Up the Model

The Model—generally—works on two numerals system: Arabic numerals and Arabic Hindi numerals. On the screen of HessApp application the Model use Arabic Hindi numerals, then converted and translated into Arabic Numerals. For example, if the pupil clicks Arabic numeral the Model responses.

The first speculation that came to the researcher is how to create targets Arabic Hindi Numerals (١٢٣٤٥٦٧٨٩٠) from inside the Java options than computer language which is not providing figures such as what we have in the machine usual calculator. So, the researcher exploits string model description as strategy i.e.

converting the Arabic Hindi Numerals put as strings and textures to be shown as Arabic Numerals that indicate: 1234567890. This is what is provided in Java language. The string is thus output ١٢٣٤٥٦٧٨٩٠further as٥٦٧٨٩٠they are then prepared as integers used expectedly in processes as summation to be compared with the pupil's answer.

The Model works in a concatenating (Manna, Zohar 2012) process where if a pupil chooses to answer with (16-sixteen), s/he has to press on (1=one=١) first; so when s/he touches the other numbers (6=six=٦), the first string (1=one=١) saved in a variable where Java Programming language concatenates between the variable and the number (6=six=٦) from left to right. The last answer out of all pressed numbers is as a string of Arabic Hindi Numerals. It depends on what the Android database works on of pre-put choices of changeability's. This potential is available for every button i.e. any two-digit numbers or more can be produced through the similar procedure.

Thus, in the case of the pupil choosing the number of triple digits, the 341 =٣٤١, Android Java string integrates the first number 3 = ٣ then next comes 4 = ٤, and the last element is 1 = ١ is read |: 341 = ٣٤١. The maximum items for one number are (11) eleven numerals. When the pupil chooses more than this limit the application HessApp stops, because the application is not allowed to twelve times in the Arabic Hindi numerals digits system.

The Model (HessApp) stimulates what the pupils habitually expect of mathematical processes' shapes i.e. vertical lines that begin in first to touch digit answer and the Android automatically and randomly gives dictated numbers. The sign (+) is already shown on the right-hand in all processes. So the answer is what the Android relies on to give right or wrong mark. Java language clears the last answer and gives a new blank space to a new question. The default numeral is zero. The first question, which is answered by HessApp Android application as a gift, is ٥ +٤= 4 + 5 the answer is 9 = 9. The default is prepared to face mistakes of giving no answers for the blank space.

For the model to easily proceed the strings via several and different language systems parse integer function is used in Java programming language.

The theory is based on a competition. Right answers increase the marks out of ten times. For mistakes, the competitor remains as s/he is. When the marks are 5 to 10, another screen is shown carrying an audio social encourage phrase. Lower than 5 marks are followed by another audio social phrase that hard lucks to the pupil to do his best in another attempt.

This research project created a model and an instantiation. The model explained how mobile smart devices could be used in areas of low internet connectivity to host arithmetic competitions in an script as long as it was a base-ten number system. This model was instantiated to specifically work with Arabic Hindi numerals. An instantiation of that model is described in this research and the results from the evaluation of that instantiation in more details in chapter five and six.

4.4 Summary

Presenting how the creative model HessApp works, is used, the researcher attempts introducing the full description of the inner software processes that the model is built through. The chapter handles on the model setting up. Briefly, this part attempts to cut short how this model can easily precede the strings through several and different language systems. An actual gradual action of using the model is shown in this chapter. The following chapter is chapter five which is HessApp Numerals Instantiation in more details.

CHAPTER FIVE

5 HessApp Numerals Instantiation

5.1 Introduction

This chapter presents (HessApp Numerals Instantiation) application in details on what the important tools or software's are used in this application and the main points of the design of HessApp application. The researcher designed HessApp application which was approval on Android mobile devices, and this application was HessApp Numerals Model (HNM) using Arabic Hindi Numerals and Arabic numerals.

The application HessApp presented in this chapter is a step in order to facilitate one of the subjects that are not easy. Its mathematics in the initial operations (add, subtraction,…etc). An application service via cell-phone which has an easy use and spread applications was easy on the basis schools pupils' because they deal easily with techniques. The application name HessApp, which means calculation, originally comes from Arabic language.

The researcher presents this study which aims to create a mechanism between the pupils and cell-phone. This mechanism is easy and social to use and available anywhere and anytime. The researcher details steps preparing the application electronically and then explained to the pupils by the image and presentation. Then the researcher pointed the reasons for which he devised a smart way to solve mathematics problems for the pupils in the early grades and indicated that the advantages provided by the application are: technical and scientific materials

(Computer Tools, Android devices). Also, the researcher attached the problem for which the application in Arabic Hindi numerals.

High prevalence of telecommunications and Internet applications of smart phones services, which led to the (HessApp rate) application and ease of use success.

5.2 HessApp Numerals Instantiation

The instantation of HessApp application uses Java Programming Language because it is the best and the language used in Android devices. In addition to, Java as a programming language is used in all machines and compiles without requiring compiler (Arnold, Ken et al. 1996). As well, Java is easily portable, installed and cheaper for cell phones. Besides, Java as a complicated language for computer programming is considered the best one to give exact and precise output. Mistakes are few either (Savitch, Walter 2000). Hence, after several experiments to use this application (HessApp), the smart phone, Java is most suitable for strings like Arabic Hindi numerals ١٢٣٤٥٦٧٨٩٠.

HessApp Numerals Instantiation for using Arabic Hindi Numerals in Arithmetic Competitions in operation Addition (+) On smart phones which support Android mobile applications.

5.2.1 Data used

Data used in this study is the Arabic text of the Arabic Hindi Numerals figures look like (١٢٣٤٥٦٧٨٩٠) and some of the illustrations, sound effects that make it an attractive application for young pupils, such as the sound of clapping and motivational songs to encourage pupils.

5.2.2 Software used

We also know that the application is associated with one area of smart phones and their applications which IT area. Besides, this research deals with information technology (IT) to support e-learning applications through the use of smart phones and their applications, not computer science. This means that research is within the

field of information technology, not computer science. So, here is the software that is used in the design HessApp Numerals Instantiation.

ADT (Android Development Tools)—Eclipse (Developers, Android 2011).	
JDK (Java Development Kit)	(Gong, Li et al. 1997)
JRE (Java Runtime Environment)	(Koved, Lawrence, et al. 2007)
JVM (Java Virtual Machine)	(Meyer, Jon et al. 1997)
AVD (Android Virtual Device)	(Meier, Reto2012)
SDK (Software Development Kit)	(Foxwell, Harry 1999)
XML (Extensible Markup Language)	(Harold, Elliotte 1998)

Table 5.1: The software which used in designing HessApp Numerals Instantation.

5.2.3 Steps of the application test (HessApp)

The flow chart of these steps interacted are as follow:

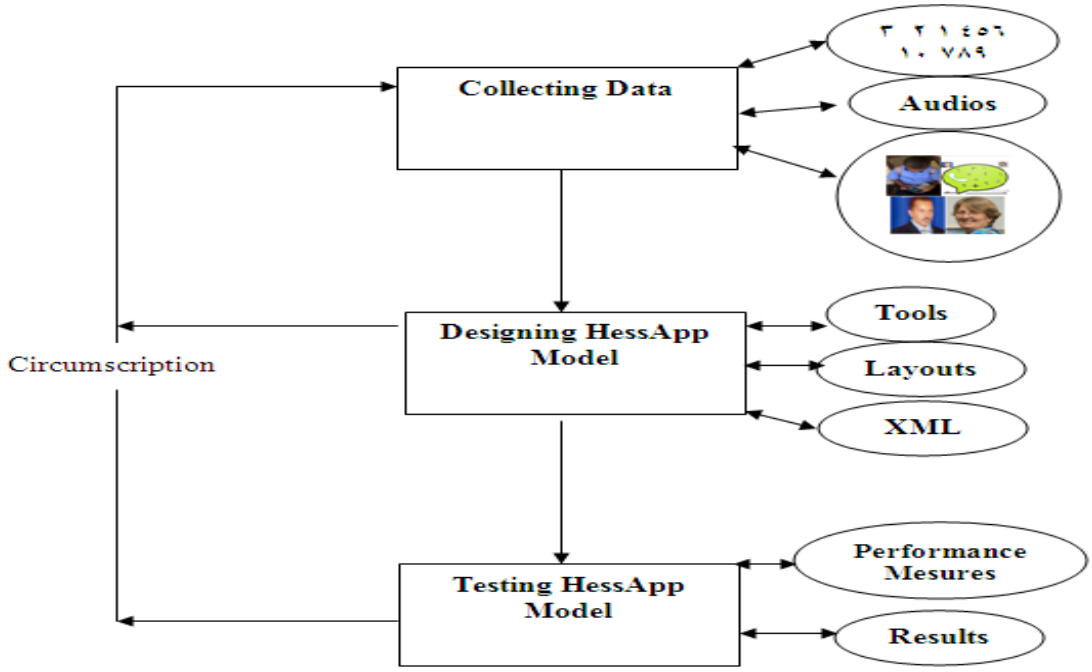

FIGURE 5.1: THE STEPS OF HESSAPP APPLICATION

Test (HessApp Numerals Instantiation) in three stages:

1) Phase I: Arabic Hindi Numerals was put in numeric buttons, and the generation of Arabic Hindi Numerals in two “TextVeiw” (Gargenta, Marko 2011) boxes as a shape of a vertical question. It was done for several different mathematical operations such as converting the text of the Arabic Hindi numerals to an integer numbers, because Java programming language considered Arabic Hindi numerals as a text. Then the application HessApp did the addition between numerals to do make comparison with the Arabic Hindi Numerals which the pupil will enter in the empty " PlainText" (Gargenta, Marko 2011) (Lee, Wei-Meng 2012), and the pupil answer of the addition among two "TextView"(Gargenta, Marko 2011) Arabic Hindi numerals.
2) Phase II: The researcher designed the model (HessApp) for using Arabic Hindu Numerals in Arithmetic Competitions in operation summation (+) in its final form Figure 5.3.
3) Phase III: The model (HNM) tested to do the purpose and effectiveness of the overall performance at a number of pupils (first basic school grade). It worked from 15 November 2015 -- 5 Jan 2016 in a good and excellent ways by the pupils controlled by their teachers and families.
4) The experiments have took the final results in about two months because the researcher kept the pupils for a long time to have a good time to train and know more about HNM application in smart phones which they are playing with.

5.3 HessApp Numerals Instantiation in Details

5.3.1 The First screen(Figure 5.2):

The program icon and the word HessApp (written in Arabic) and the picture are being explained. Also there are welcoming words in the beginning (written in Arabic), beside, text boxes “TextView” (Meier, Reto 2012) which clarify the application. Also, the screen contains three images (Hello, Burnette 2010):

(1) The researcher Mohammed-E.

(2) Supervisor (“Dr.Laurie Butgereit”).

(3) HessApp icon.

Also the screen contains command button (دخول) --Enter-- to enter and continue running HessApp application. This command button enter (دخول) have text box explanation below (للبدء أضغط هذا الزر) -- (to start Press this button) and the image below contains a hand finger pointing to the start.

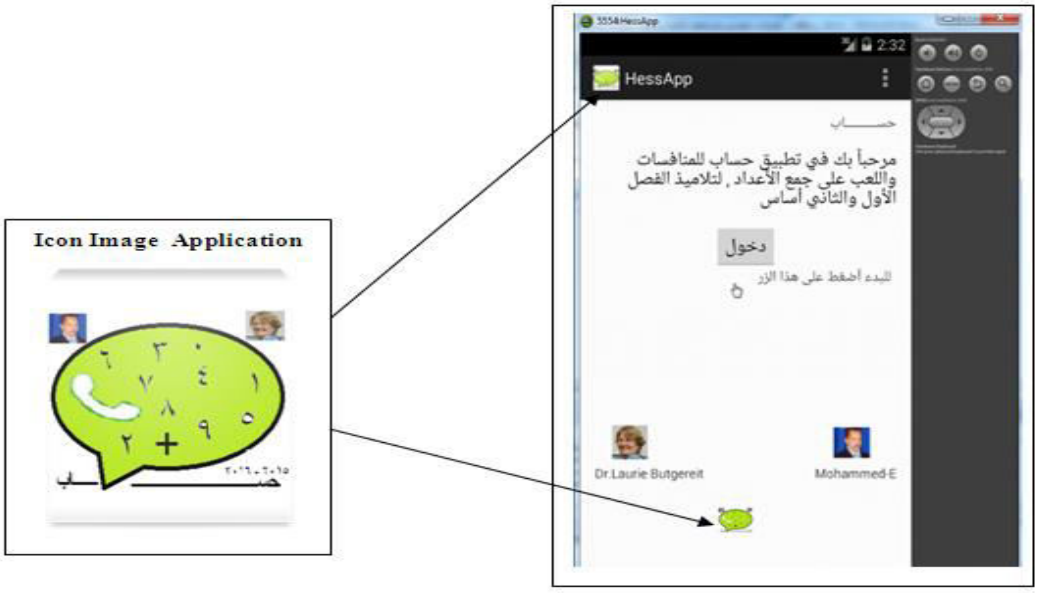

FIGURE 5.2: THE FIRST SCREEN

When pressing button (دخول) – Enter -- the first screen will close and open the second screen Figure 5.3 (Reto, Meier 2009).

FIGURE 5.3: SECOND SCREEN

5.3.2 The Second Screen(Figure 5.3)

This contains four text views (“TextView”):

1) The first one contains (هذا التطبيق للتمارين والتدريب في رياضيات الأساس والعمل على جمع الأعداد وفق منهج مرحلة الأساس بالسودان)--This application of competitions and training in mathematics of basic schools , and it works on the addition of Arabic Hindi numerals according to the basic stage curriculum in Sudan.

2) The second text box (“TextView”) clarifies (إسم التلميذ) -- the student's name.

3) The third ("TextView") contains (على التلميذ أن يجيب على عشر أسئلة متتالية ثم نعرف بعد كل عشر أسئلة ما هي الدرجة التي أحرزها التلميذ من مجموع عشر درجات) -- Pupils should answer the ten consecutive questions then will know after all ten questions what is the degree achieved by the pupil of the total ten degrees.

4) The fourth text box (“TextView”) explains (لبدء المنافسات الحسابية إختار أحد الأزرار)--To start arithmetic’s competitions choose one of the buttons (Jackson, Wallace 2013).

In the screen there is input text box ("EditText") to enter the pupil's name. Also there are three images in this screen: two of them are two children carrying mobile phone devices. They are opening HessApp application. The third image is of the hand finger icon of the screen appearing. There are also three command buttons: The first button (حفظ)--save--, and the second button (سهل) -- Easy-- this button is to compete in easy arithmetic summation operation, when pressed this button the screen closes and moves to the third screen Figure 5.3. The third button (صعب)--Difficult--this button is to compete in a difficult arithmetic summation operation, when pressed this button the screen closes and moves to the seven screen Figure 5.8.

5.3.3 The Third Screen (Figure 5.4) – Easy Competition:

This screen contains the following:

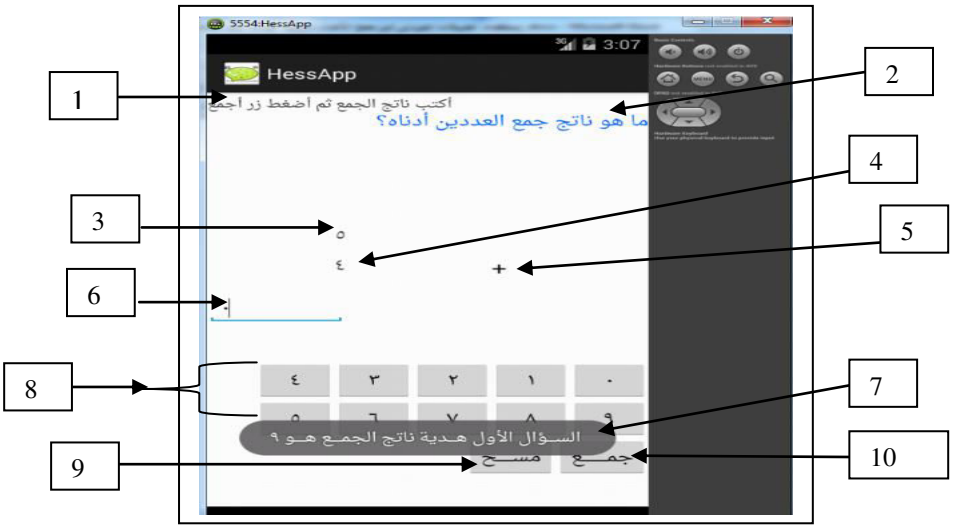

FIGURE 5.4: THE THIRD SCREEN : EASY COMPETITION

1) Text box (“TextView1”) contains: explanatory text for the pupil (أكتب ناتج الجمع ثم أضغط زر أجمع) -- Write the result then click the addition button.
2) Text box (“TextView2”) contains: the explanatory text of the pupil (ما هو ناتج جمع العددين أدناه؟)-- What is the result of summation of the two numbers below?

3) Text box (“TextView3”) contains some procedures(choose one item and that is a random text from a text string {" ,"٦" ,"٥" ,"٤" ,"٣" ,"٢" ,"١" ,"٠ ٩" ,"٨" , "٧""} because Java Programming language treats Arabic Hindi numerals are as text or as a character (David, Eck 2006).
4) Text box (“TextView4”) also contain some procedures(choose one item and that is a random text from a text string {" ,"٥" ,"٤" ,"٣" ,"٢" ,"١" ,"٠ ٩" ,"٨" , "٧" ,"٦""} because Java Programming language treated Arabic Hindi numerals are as text or as a character (David, Eck 2006).
5) Text box (“TextView5”) contains the plus sign (+).
6) An input text box (“EditText”): this allows the pupils to enter the answer of summation two numbers, which appear in the screen and select any number from Arabic Hindi numerals that appear in the commands buttons below to display HessApp application.
7) Show the text message at the beginning of HessApp application by using “Toast.makeText” (السؤال الأول هدية ناتج الجمع٩) --The first question is gift for pupils: addition of two numbers is 9) to clarify the answer to the question.
8) Arabic Hindi numerals commands buttons: Here each button has software code in Java, where declared a variable (Src) which is to save any number of Arabic Hindi Numerals which the pupil enters when he press one of the buttons. For example, if a pupil wants to answer (٧ +٩) which equals (١٦), the pupil presses the button in which the text (١) first, when the pupil presses the button in which the text (٦), the process is carried out to save the text (١) in the variable (Src) and process concatenate (Manna, Zohar 2012) between variable (Src) and text (١) from left to right as it is clear in appendixes G (Java Code).

To explain that, if the entrance of three numerals for example (“٢٧٣”), will pressed command button (٢) and then press the command button (٧) the concatenate will be (“٢٧”) and then press the command button (٣), the concatenation will become between (“٣”) and (“٢٧”) from left to right to become the entrance text (“٢٧٣”).

1) Command Button delete (مسح): On this button pupil can delete and undo for any numeral if s/he wants to undo numerals entered in the place of

answer.

2) Command Button summation (جمع) : When press this command button there are some processes as follows:

   a) By the method offered in Java programming language provides us with a method called Math.random() way, which returns a randomly chosen double in the range 0.0 <= Math.random() < 1.0. (The computer actually calculates so-called “pseudorandom” numbers, which are not truly random but are random enough for most purposes (Arnold, Ken et al. 1996). This method (“Math.random()”) Java code is clear in appendixes G. This method (“Math.random()”) enables us to select an item (text) random number from ten text string elements, which in the text string {" ,"٨" , "٧" ,"٦" ,"٥" ,"٤" ,"٣" ,"٢" ,"١" ,"٠ ٩""} , where the selected item appears in Text box (“TextView3”) .

   b) The method (“Math.random()”) enables us to select an item (text) random number from ten text string elements , which in the text string {"٩" ,"٨" , "٧" ,"٦" ,"٥" ,"٤" ,"٣" ,"٢" ,"١" ,"٠"} , where the selected item appears in Text box (“TextView4”) which is clear in appendixes G.

   c) The method offered in Java programming language provides us with a function called “Integer.parseInt(str)” (Arnold, Ken et al. 1996). It works to convert the text Arabic Hindi numerals to Arabic numerals, which it is “Integer.parseInt(str) is a function call that attempts to convert the value of str into a value of type int.” It converted texts that appear in the figure3 (“TextView”(3)) and (“TextView”(4)) to integers to be summation for comparison after addition with the answer introduced by the pupil in the text input box. For example, if we assume that the pupil has to enter the answer which as shown in Figure 5.5:

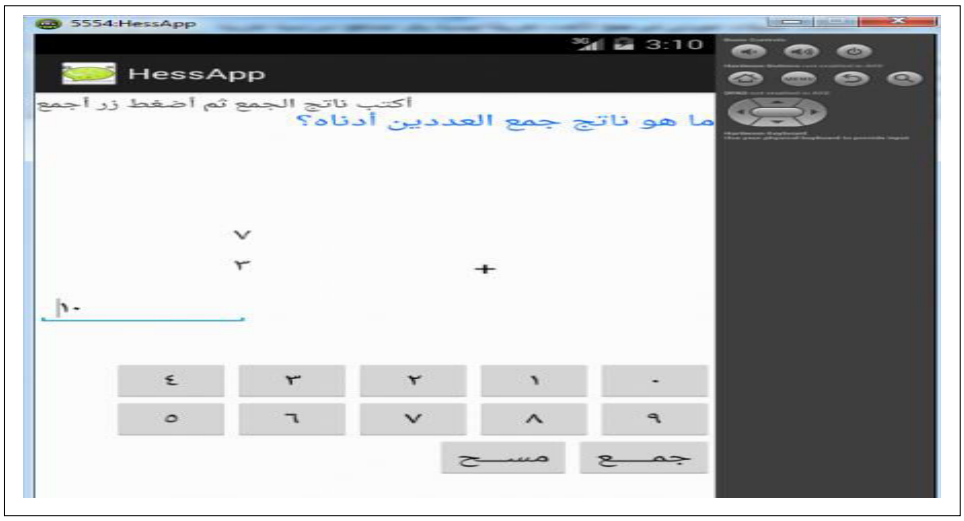

FIGURE 5.5: THE FOURTH SCREEN

In figure 5.5 the texts that appeared during HessApp application is (“٧”) and (“٣”). The answer entered in the text box ("EditText") is (“١٠“). When press the button (جمـع) the summation of texts (“٧”) and (“٣”) after converting these two text numerals to an integer number to (7) and (3), because the Java programming language does not support Arabic Hindi numerals, and Java programming language regarded these Arabic Hindi numerals as a text. Then took the answer of two numerals in the variable (Sum). Thereafter the text which is entered by the pupil (“١٠“) as answer will converting also to an integer number (10).

After converting to an integer numbers, HessApp application has done a comparison between the summations (Sum) and the answer entered from competitor. If the summation (Sum) is equal to the answer entered from competitor, there is a variable which will increase by one (1). If the answer is correct a motivational message appears (ممتـــاز إجـــابة صحيـــحةexcellent right answer) with hand clapping sound effect. (The Java code was explained in appendixes).

If the answer entered from pupil is not equal to the summation (Sum) there is a message appears (Sorry wrong answer عذرا إجابة خطأ) with sound effect for the answer wrong.

Thus, pupil continues to answer the questions one by one until it reaches the number of ten questions. If the correct answers are more than or equal to the number

(5) marks, the application directly closed the screen in Figure 5.4 and Figure 5.5 and open the screen in Figure 5.6.

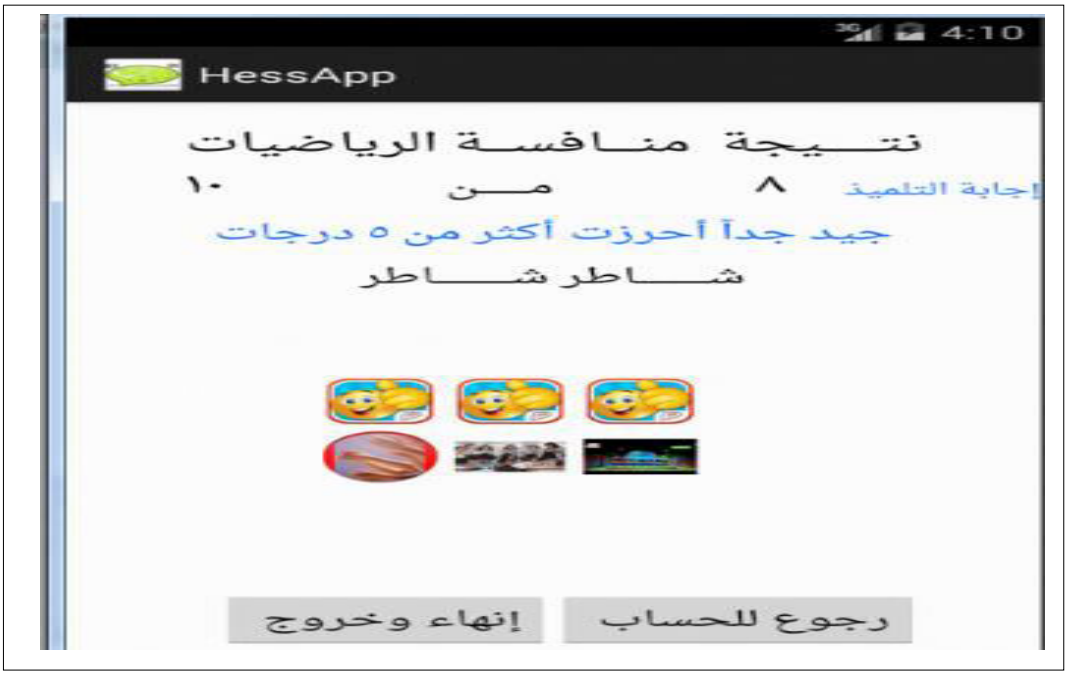

FIGURE 5.6: THE FIFTH SCREEN

In this screen figure 5.6 appear the result of arithmetic's competition (نتيجة منافسة الرياضيات) and clarify the answer achieved by more than or equal (5), and here in the figure5.6 above the answer (“٨”) 8 out of ("١٠") 10 marks. Stimulate the moral words as (Very well you won more than 5 degrees (جيد جدا أحرزت أكثرمن 5درجات)), and (Shater Shater) influential audio heard motivational pupil automatically with the appearance of the screen. Also, appear on the screen two commands button: First, ((رجوع للحساب) return Back) In the case of select this choice HessApp returns to the screen in Figure 5.5. Second, when selecting command button ((إنهاء وخروج) terminate and exit) the application will close definitively and get out of it.

If the pupil answers less than 5 degrees, the screen in Figure 5.7 is shown with the result achieved which is less than five degrees. For example, here (إجابة التلميذ 3 من10) answer pupil's answers 3 out of 10) and some motivational words to try again.

FIGURE 5.7: THE SIX SCREEN

Also an influential audio motivational is heard at the beginning of the screen. Beside, two command buttons are located on the screen doing as the same work and procedures in two commands buttons in figure 5.6.

5.3.4 The Screens of Difficult Competition (Figure 5.8)

This screen (Friesen, Jeff 2010) worked and running typical of screen in figure 5.8. The different here was in command button (جمع)—Summation—In the processes of selection random via (Math.random ()), the Arabic Hindi Numerals here from (1-99) = (٩٩ – ١). Used this method ("Math.random ()").

This method ("Math.random()") enabled us to select an item (text) random number from ten text string elements , which in the text string {"

١٨","١٧","١٦","١٥","١٤","١٣","١٢","١١","١٠","٩","٨","٧","٦","٥","٤","٣","٢","١","٠

٣٤","٣٣","٣٢","٣١","٣٠","٢٩","٢٨","٢٧","٢٦","٢٥","٢٤","٢٣","٢٢","٢١","٢٠","١٩","

٥٠","٤٩","٤٨","٤٧","٤٦","٤٥","٤٤","٤٣","٤٢","٤١","٤٠","٣٩","٣٨","٣٧","٣٦","٣٥","

٦٦","٦٥","٦٤","٦٣","٦٢","٦١","٦٠","٥٩","٥٨","٥٧","٥٦","٥٥","٥٤","٥٣","٥٢","٥١","

٨٢","٨١","٨٠","٧٩","٧٨","٧٧","٧٦","٧٥","٧٤","٧٣","٧٢","٧١","٧٠","٦٩","٦٨","٦٧","

٩٨","٩٧","٩٦","٩٥","٩٤","٩٣","٩٢","٩١","٩٠","٨٩","٨٨","٨٧","٨٦","٨٥","٨٤","٨٣","
٩٩",""} ,where the selected item appears in Text box (“TextView3”) .

Also, the method (“Math.random()”) enabled to select an item (text) random number from ten text string elements , which in the text string {"
١٨","١٧","١٦","١٥","١٤","١٣","١٢","١١","١٠","٩","٨","٧","٦","٥","٤","٣","٢","١","٠
٣٤","٣٣","٣٢","٣١","٣٠","٢٩","٢٨","٢٧","٢٦","٢٥","٢٤","٢٣","٢٢","٢١","٢٠","١٩","
٥٠","٤٩","٤٨","٤٧","٤٦","٤٥","٤٤","٤٣","٤٢","٤١","٤٠","٣٩","٣٨","٣٧","٣٦","٣٥","
٦٦","٦٥","٦٤","٦٣","٦٢","٦١","٦٠","٥٩","٥٨","٥٧","٥٦","٥٥","٥٤","٥٣","٥٢","٥١","
٨٢","٨١","٨٠","٧٩","٧٨","٧٧","٧٦","٧٥","٧٤","٧٣","٧٢","٧١","٧٠","٦٩","٦٨","٦٧","
٩٨","٩٧","٩٦","٩٥","٩٤","٩٣","٩٢","٩١","٩٠","٨٩","٨٨","٨٧","٨٦","٨٥","٨٤","٨٣","
٩٩",""}, where the selected item appears in Text box (“TextView4”).

This screen (Friesen, Jeff 2010) worked and running typical of screen in figure 5.7. The different here was in command button (جمع)—Summation—In the processes of selection random via (Math.random ()), the Arabic Hindi Numerals here from (1-99) =(٩٩ – ١). Used this method (“Math.random ()”).

This method (“Math.random()”) enabled us to select an item (text) random number from ten text string elements , which in the text string {"
١٨","١٧","١٦","١٥","١٤","١٣","١٢","١١","١٠","٩","٨","٧","٦","٥","٤","٣","٢","١","٠
٣٤","٣٣","٣٢","٣١","٣٠","٢٩","٢٨","٢٧","٢٦","٢٥","٢٤","٢٣","٢٢","٢١","٢٠","١٩","
٥٠","٤٩","٤٨","٤٧","٤٦","٤٥","٤٤","٤٣","٤٢","٤١","٤٠","٣٩","٣٨","٣٧","٣٦","٣٥","
٦٦","٦٥","٦٤","٦٣","٦٢","٦١","٦٠","٥٩","٥٨","٥٧","٥٦","٥٥","٥٤","٥٣","٥٢","٥١","
٨٢","٨١","٨٠","٧٩","٧٨","٧٧","٧٦","٧٥","٧٤","٧٣","٧٢","٧١","٧٠","٦٩","٦٨","٦٧","
٩٨","٩٧","٩٦","٩٥","٩٤","٩٣","٩٢","٩١","٩٠","٨٩","٨٨","٨٧","٨٦","٨٥","٨٤","٨٣","
٩٩",""} ,where the selected item appears in Text box (“TextView3”) .

Also, the method (“Math.random()”) enabled to select an item (text) random number from ten text string elements , which in the text string {"
١٨","١٧","١٦","١٥","١٤","١٣","١٢","١١","١٠","٩","٨","٧","٦","٥","٤","٣","٢","١","٠
٣٤","٣٣","٣٢","٣١","٣٠","٢٩","٢٨","٢٧","٢٦","٢٥","٢٤","٢٣","٢٢","٢١","٢٠","١٩","
٥٠","٤٩","٤٨","٤٧","٤٦","٤٥","٤٤","٤٣","٤٢","٤١","٤٠","٣٩","٣٨","٣٧","٣٦","٣٥","

٦٦","٦٥","٦٤","٦٣","٦٢","٦١","٦٠","٥٩","٥٨","٥٧","٥٦","٥٥","٥٤","٥٣","٥٢","٥١","
٨٢","٨١","٨٠","٧٩","٧٨","٧٧","٧٦","٧٥","٧٤","٧٣","٧٢","٧١","٧٠","٦٩","٦٨","٦٧","
٩٨","٩٧","٩٦","٩٥","٩٤","٩٣","٩٢","٩١","٩٠","٨٩","٨٨","٨٧","٨٦","٨٥","٨٤","٨٣","
٩٩",""}, where the selected item appears in Text box ("TextView4").

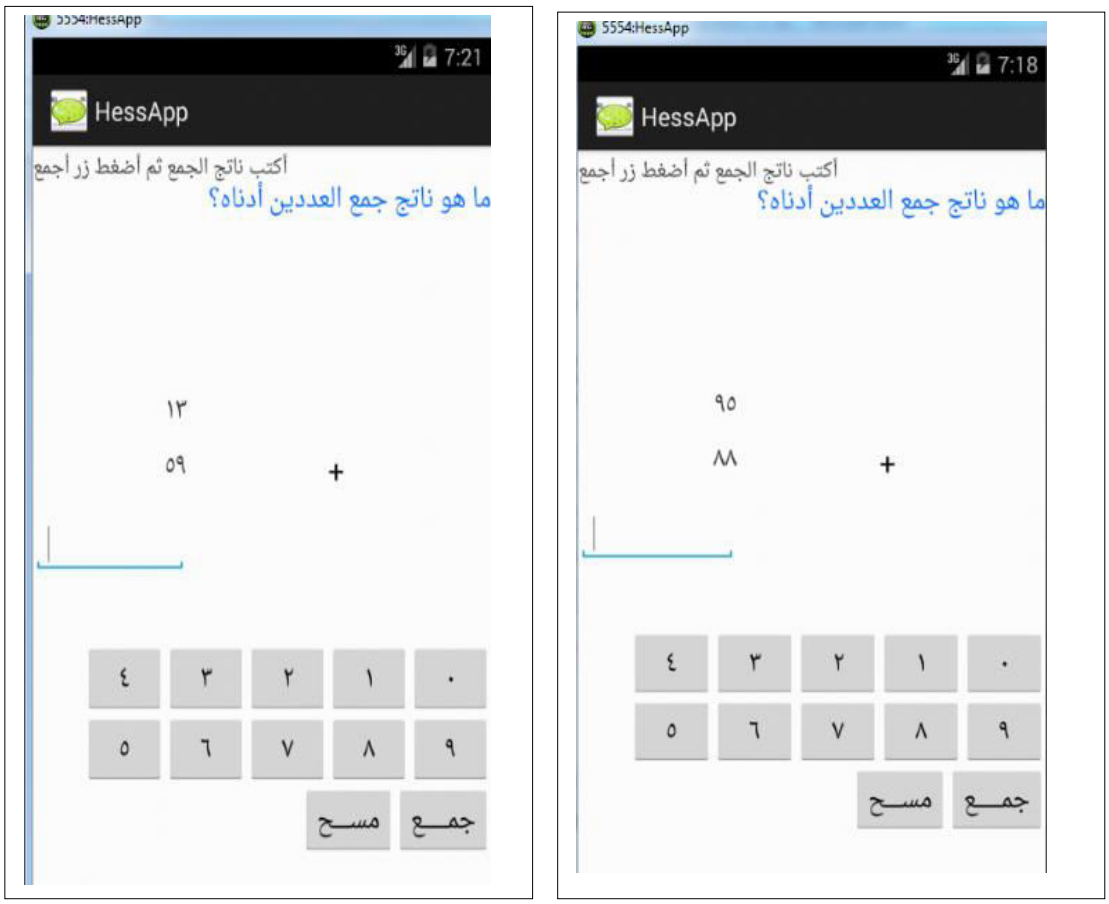

FIGURE 5.8: THE SEVEN SCREEN – DIFFICULT COMPETITION

5.4 Summary

The chapter is specified for building the instantiation model computational features and architectures i.e. how to design such a brand application on Android cellphone set. It focuses on using Arabic Hindi Numerals and Arabic numerals. Then the researcher shows the mechanism on which the whole program depends. It uses Java programming language to build the virtual device. The explanation uses screens to feature the developing events on the application. The chapter upcoming explains

the results of the application HessApp working on Android Smartphone's, and the evaluation analysis techniques used.

CHAPTER SIX

6 The Results

6.1 Introduction

This chapter presents the results of the application HessApp working on Android Smartphone's, and the evaluation and analysis of the improvements for 10 pupils who used this kind of technology. The statistics used is to evaluate the results of the pupils. In addition, evaluation of the results of examinations (Pre-test and post-test) on a sample of pupils.

This chapter contains the way which has been applied in the study. It explains that this research is based on a sample of the tools of statistical data collection procedures and the analysis.

The measures carried out by the researcher to evaluate the performance:

1) The mathematical evaluation of the application software competition in Arabic Hindi Numerals use Java SDK and AVD so as to achieve a better goal. The application HessApp has worked and run well in social ways for pupils.
2) Two low cost mobile phones (Smartphone's) are provided by the researcher to the pupils.
3) Experiment was performed in the application of arithmetic's competition on 10 pupils in first and second grade at primary level schools during two months.
4) The researcher tested (pre-test) the pupil's arithmetic's competition (HessApp) among pupils.
5) The researcher held a test (post-test) arithmetic's competition (HessApp) among pupils.

6) The final assessment has been done Arithmetic competition (HessApp application) during two months.

6.2 Population of the Study

Population of this study includes pupil's schools in Blue Nile State in Damazin city. The researcher divided the sample into three categories (طبـــــــقات) :

1) Low income school environment.
2) Pupils in their home.
3) Middle class school environment.

6.3 Techniques of data collection

The study has been used as tools and documentation for the collection of ancillary data. Data collected from teachers in primary schools, which we used HessApp application competition. Pupils played the game via the Android mobile devices. These data were collected from pupils to give a percentage of their responses ratio, average outcomes researcher used the mean and standard deviation (Johnson, Richard et al. 1992) (Weir, Bruce et al. 1984).

The researcher described in this section the method and the procedures to be followed in the implementation of this experiment, including a theoretical description of the society, and the method of preparing a tool to them. Also the researcher described the actions taken to verify the effectiveness and impact of the way that followed to be applied. The researcher used statistical tools and procedures under which data, results and extract analysis and specifically, a description of the curriculum including study section.

The study used leader-board (Papers) of the pupils during the competition via Android mobile devices, and collected these data from pupils to give their responses, for the means of results. The researcher used average and standard deviation for this experiment (Johnson, Richard et al. 1992) (Weir, Bruce et al. 1984).

6.4 The study population

The study population means the community overall study group of elements that the researcher is seeking to circulate them related to the problems studied results. The researcher composed the original study population consisted of all pupils at the elementary level in the Blue Nile state.

The study sample was selected at random from community of study. The researcher prepared a number of exams (10) and tests the pupils through two stages: the first phase was before the application of the experiment (control group) and the second was after they were given the experimental group. The pupils trained on the same exam may monitor tens of results obtained by competitors of the two groups before and after training. This exam has been under the supervision of Academic Teachers of those schools.

6.5 Study Tool

The researcher used pre-exam and post-exam to the same group to see the differences in the results and the effectiveness of this application (HessApp) in raising pupils' calculations skill.

Where this section contained a number (30) different questions regarding the different calculations (collection, subtract, multiply, divide).

6.6 The statistical methods used

To achieve the objectives of the study and to verify the hypothesis, the following statistical methods were used:

1) The frequency distribution of the answers (Fisher, Ronald et al. 1928) (Lotka, Alfred 1926).
2) Mean (Johnson, Richard et al. 1992).
3) The standard deviation (Bland, J. Martin et al. 1996).
4) Stability and honesty coefficient (Epstein, Seymour 1979).
5) T-test for the difference between the two means interrelated (Fraenkel, Jack et al. 1993).

For accurate results as possible, it has been using SPSS statistical software, which indicates a shortcut to the (SPSS) Statistical Package for Social Sciences (Nie, Norman et al. 1975) (Stevens, James 2012).

6.7 Test the validity of the study hypothesis

Hypotheses have been proved the following:

1) There are significant differences between the average scores of pupils in exams differences before and after the experiment.
2) The test of experiment has effectiveness in raising pupils' skills in the calculations.

6.8 Arithmetic mean and standard deviation

Table 6.1 shows the arithmetic mean and standard deviation of the scores of examination which recorded in the before and after the experiment.

Statistics	Before(Out of 30)	After(Out of 30)
Mean	21.2000	29.0000
Std. Deviation	3.46	1.25

Table 6.1: The arithmetic mean and standard deviation

Through the above table note that the standard deviation of the experiment before was (3.45) and the standard deviation after the experiment reached (1.25), and this is an important indicator of the homogeneity of grades achieved by the pupils after the experiment (Coakes, Sheridan et al. 2009).

6.9 The reliability and validity

Reliability and validity during the ongoing statistical (Amstadter, Bertram 1971) (Crocker, Linda et al. 1986) : means that the test gives a measure of the same results if used more than once in similar circumstances. It is also known that the stability and consistency of measurements that are obtained are also more accurate.

The validity (Roberts, Dennis et al. 1980) (Roberts, Dennis et al. 1982) is a measure used to determine the degree of sincerity of the participants through their answers on a particular measure, and is calculated by the correct results in many ways. It represents the easiest being the square root of the coefficient of stability and the value ranges of consistency between zero and one each.

Reliability and validity mathematics equation as follow:

Validity = $\sqrt{}$ Reliability(Merriam, Sharan 1998).

The researcher calculates the reliability of the scale used in the documents (test assessment of HessApp application) by Cronbach's alpha-coefficient equation (Gliem, Rosemary et al. 2003).

The results were as in the following table:

Table 6.2 shows the consistency of the grades pupils' coefficient through experiments before and after.

الصدق(Validity)	معامل الثبات(Reliability)
0.74	0.55

Table 6.2: The consistency of the grades pupils' coefficient

It seems from the results table 6.2 that all the degrees of reliability coefficients for registered pupils in the two experiments before and after was greater than (50%) indicating that the experience is characterized by reliability and validity to achieve the purposes of the study, and makes a sound and acceptable statistical analysis.

6.10Paired-Samples T Test

The Paired-Samples T Test procedure compares the means of two variables for a single group. The procedure computes the differences between values of the two variables for each case and tests whether the average differs from 0 (zero).

Associated with each paired test, (interval level of measurement or ratio level of measurement) are two quantitative variables selected. And to study the matched-pairs and to case-control, must respond to each test subject separately and are compared to the theme in the same case in the data file.

6.11 Assumptions

Researcher wrote the notes for each pair under the same conditions. Also, we should bear in mind the mean differences should be normally distributed between each variable; it can be equal or unequal.

Table 6.3 shows the statistical differences between the test scores pupils before and after the experiment (Box, George et al. 1978).

Paired Samples Test							
		Paired Differences			T	df	P_value
		Mean	Std. Deviation	Std. Error Mean			
Pair 1	before – after	7.80000	2.89828	.91652	-8.510-	9	.000

Table 6.3: The statistical differences between pre-test and post-test for pupils

In the table 6.3 note that the value of the test (t) is (8.51) and the p-value (0.000). The p-value less than the value of the level of statistical significance (5%), which indicates a statistically significant differences between the scores of pupils in pre and post examinations (Zwick, William et al. 1986).

That indicates the experiment achieved a success rate (95%), which means that the application (HessApp Numerals application) is effective in increasing the simple calculations skills for pupils. This confirmed that in a period of six 6 weeks the arithmetic's mathematics of pupils (children) has improved with a rate of 95%.

6.12 Outcomes of research

The results of this thesis are as follow:

1) HessApp Numerals Model: A software application that uses computational competition Arabic Hindi Numerals figures. It has proved that the pupils used Android mobile devices (smart phones) in first and second grade at the primary stage schools in Sudan.

2) The instantiation of the model: First used Arabic Hindi Numerals figures in the model. Second, the mechanism of how to use the Arabic Hindi Numerals figures for the plus sign (+) in the application of mathematics in other software competition.

3) HessApp Numerals Model has improved specifically in the way of mathematics summation operation in Arabic Hindi numerals to improve mathematics skills in elementary school pupils.

6.13 Teachers Comments

Teachers were also asked for their comments about the results. A number of teachers noted that the pupils who participated in the research also became more active in other subjects. The teachers also commented that many parents asked for copies of HessApp for their personal cell phones. After the completion of this research in formal schools, parents were free to contact the first author of this study for copies of HessApp.

1) Dr. Tanfafi who was basically a primary teacher confirmed that when he applied this HessApp application to his pupils at home, he found very great influence on them. He said if the ministry of Education applied this system in all schools that would be more beneficial for pupils.

2) Nafisa Elhadi and Tariq in the northern countryside by village Beajawi have commented on this application, "This application activates the pupils in other subjects". This means, the use of this application by pupils have increased their mind capabilities in other subjects. They proposed to apply the

application to the advanced classes and make it a little bit easier to fit their levels.

3) In Alrosers city, the second town in the state, there were some suggestions from some teachers in primary education (Awatif Arrayah and Salah Amin). They said if the government provided support to the Ministry of Education in order to use this application (HessApp) in all schools, the education in Sudan will be very excellent in the future.

4) Director of Primary Education in the Ministry of Education in Blue Nile state, commented, "We have to ensure that this project will be used in schools to enhance their levels and to improve pupils skills in mathematics after it was used and tested in their cell-phones" (attached to appendexes B and C).

5) The manager for basic schools stage, Mr. Mohammed Hassan Abdullah and teachers in the basic schools of Blue Nile state in Sudan has seen the application HNM. They have expressed their approval of the application and got the admiration. This application HNM will increase of the proceeds of perception and understanding of the pupils in the first grade and second basic schools. Besides, many teachers transferred (a copy) from this application HNM on their Smartphone's for their pupils (attached to appendexes B and C).

6) The manager for basic schools stage, Mr. Mohammed Hassan Abdullah and teachers in the basic schools of Blue Nile state in Sudan has seen the application HNM. They have expressed their approval of the application and got the admiration. This application HNM will increase of the proceeds of perception and understanding of the pupils in the first grade and second basic schools. Besides, many teachers transferred (a copy) from this application HNM on their Smartphone's for their pupils (attached to appendexes B and C).

7) In addition, after doing this research, another elementary school hosted the competition in simple mathematic processes like calculations (non-digital) the winner of this competition is one of the participants (pupil) in this research.

6.14 The seven characteristics for design science research HNM

There are seven characteristics for Design Science Research Methodology (HessApp) used in this research for information systems and IT solved the problems of this research (March, Smith et al. 1995):

1) DSR produced an available artifact in the form of a construct such as model, method or instantiation. HessApp Numerals Instantiation contains artifact by inserting Arabic Hindi numerals.
2) The objective of Design Science Research was developing technology based on solutions to the important and relevant problems. The main objectives of this research are to design HessApp Numerals model using Arabic Hindi numerals in arithmetic's competition.
3) The utility and efficacy of the artifact of HessApp Model application was been rigorously demonstrated.
4) There have been verifiable contributions and clear in the domain of search problem area in literature review in Chapter Two.
5) Rigorous methods (testing) are used in the construction and evaluation of the artifact. HessApp numerals model used methods and evaluted the artifact.
6) This research for an effective artifact (and components thereof) satisfying the rules of the problem area which are explained in the previous chapters.
7) Design science research (HessApp) is presented to both technologies (Android Smartphone's') oriented audiences (Schools Pupils) as well as management oriented audiences (March, Smith et al. 1995).

The three cycles (Hevner 2007), which lies in the Design of Science Research are used in this research (The relevance cycle, rigor cycle and design cycle). The three cycles helped the researcher to elicit the findings of this research. They are as follow:

The Relevance cycle initiates the design science research with the requirements such as Arabic Hindi Numerals for the research. The Rigor cycle draws on the vast knowledge base of scientific theories and engineering methods (Literature review). The Design cycle is a cycle of activities including the construction of the artifact (HessApp Numerals Instantation), the evaluation of the artifact, and feedback for the next iteration of the cycle.

6.14 Summary

In this chapter, the researcher presents the results. Then the study shows the evaluation and analysis of these outcomes. These statistical reports are given out of the pupils' pre/post tests using HessApp application. Smart phones are proved to be useful and beneficial in using such an easy technique of e-learning. Chapter seven concludes the whole thesis.

CHAPTER SEVEN

7 Conclusion

7.1 Introduction

This chapter concludes the thesis and gives some recommendations for future works in the promising area Information Technology in support of Mobile Learning and Education in a Developing Context.

HessApp Numerals Models is a model used Arabic Hindi numerals in arithmetic competition. It is built on a smart game of arithmetic competitions; generally it has complicated processes of mathematics in the application. However, the competition aims at simplicity and so as to be simple and applicable on smart mobile devices which support Android applications. Thus, this shows that mathematical competitions on cell phones would benefit the Arabic speaking world, and the model encourages primary schools pupils to compete with other pupils in arithmetic competitions. This would help pupils in the first and second grades to understand and recognize simple calculations such as summation of two integers.

Chapter 1 defines this problem formally and reviews the state of the art approaches.

Chapter 2 presented in the literature, arithmetic competition on cell-phone. In addition, presented overview of E-Learning and M-Learning studies. It covers the basics method of E-Learning and M-Learning studies, the types of feature based on M-Learning method. Besides, an overview of DSR design science research and DSR design science research cycles.

Chapter 3, Research Methodology: this chapter reviews the methodology used in this research in case of HessApp Numerals Model application. A methodology is generally a guideline for solving a research problem.

Chapter 4 proposes and explains how the calculations are set up and how Arabic Hindi Numerals are translated to in the correct way as integer's numbers in Java Programming language in more details.

Chapter 5 introduces HessApp Numerals Instantiation and the techniques used to design HessApp Numerals as a social and enjoyable way for summation two Arabic Hindi Numerals, also this chapter explains the important tools used to design the instantiation of HessApp Numerals Model to be applicable on Android Mobile devices.

Chapter 6 introduces the advantages of HessApp Numeral Model through analyzing the pupils' pre-test and post-test results to measure the pupils' understanding and progress through using SPSS tool. Particularly, for first and second grade levels of basic schools stages in Sudan. In addition to that, this chapter introduces statistical analysis in more details which led us to the finding of this thesis.

7.2 Important results

The important results of this thesis are as follow:

1) HessApp Numerals Model: A software application that uses computational competition Arabic Hindi Numerals figures. It has proved that the pupils used Android mobile devices (smart phones) in first and second grade at the primary stage schools in Sudan.
2) Of the important results that can be mentioned, a competition among pupils of second-graders and fourth-grade in Maj.Gen Yahya School in Blue Nile State has been conducted. The second grade pupils performed HessApp Numerals Model application in Arabic Hindi Numerals on Android mobile devices. The competition was on the quickness of the answer in the

summation of two integer Arabic Hindi numerals. The competition was won by the second-grade pupils who benefited from the speed of the response of the skills carried out in the application of HessApp Numerals Model.

3) Teachers' comments:

1. Dr. Tanfafi applied this HessApp application to his pupils at home; he found very great influence on them.
2. Nafisa Elhadi and Tariq ("This application activates the pupils in other subjects"). This means, the use of this application by pupils have increased their mind capabilities in other subjects.
3. Director of Primary Education in the Ministry of Education in Blue Nile state "We have to ensure that this project will be used in schools to enhance their levels and to improve pupils' skills in mathematics after it was used and tested in their cell-phones"(Attached to appendex Band C).

7.3 Future Research Directions

This thesis suggests many promising directions for future research in the field of Hindi Numerals in arithmetic competitions. In this section, we briefly discuss such directions in this promising area.

7.3.1 Directions in the area of Arabic Hindi Numerals in arithmetic competitions on Android mobile devices

There are some open points that are currently under discussion such as:

1) HessApp Numerals Model will be developed to focus on particular on Arithmetic competition application software using Arabic Hindi Numerals in Java and tools. The research proposes development in the arithmetic competition application, such as the XMPP (eXtensible Messaging and Presence Protocol) which will help us in this software to support linking between two mobile devices to be synchronized while using Arithmetic

competition application. Arithmetic Competitions will be between pupils to compete in doing various mathematics processes including adding, subtracting or other mathematic process. This application(HessApp) will be similar to WhatsApp application (Church, Karen et al. 2013) (O'Hara, Kenton et al. 2014).

2) The artifact will be the real contributions in the analysis of the log file which can be used-after development-in arithmetic competition application software HNM. The log file will keep the pupils' results of the competition. The researcher will develop mechanism of a log file so that the orders are arranged at the end. Then, at length each pupil can be connected to the Internet through his or her cell phones. Therefore, the log file will automatically will send the results of competitions between the pupils at a specific day to the teacher of Mathematics.

3) HessApp Numerals Model will be enhanced to carry out further arithmetic's processes such as (- , * , /) subtraction, multiplication and division through many Arabic Hindi Numerals including all processes in the same way as in (2) above.

7.4 Summary

This chapter sums up the study main points. It restates the previous chapters. After that, it explains the essential results, teachers' comments, future study cases for further researches and the references. The study documents and appendixes come at the end.

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Appendixes

Appendix A

In this part of the research was used some documents which are:

First containing the form describes the authority and approval by the people of the pupil contains the name of the pupil and family data and agreeing to make the game experience Mobile application calculations HessApp. Here have two samples used in the competition.

بسم الله الرحمن الرحيم

Sudan University of Science and Technology

College of Computer Science and Information Technology

Consent Form parents of the pupils and permission to conduct a scientific experiment

استمارة موافقة أولياء أمور التلاميذ وصلاحية إجراء تجربة علمية

SUST 1960

Age---------٧--------: العمر Name of pupil ----عبدالله محمد ----------: اسم التلميذ

Name of --: اسم ولي أمر التلميذ Father

Name of ---------------عائشة احمد عمر---------: اسم الوالدة Mother

Date ---1/1/2016-------١/١/٢٠١٦م-------: التاريخ

نحن أولياء أمر التلميذ أعلاه نوافق على إجراء تجربة في لعبة رياضية وحسابية بسيطة بواسطة تطبيقات الهاتف الجوال لتنمية قدرات التلميذ في العمليات الحسابية البسيطة الجمع والطرح.

We are guardians of the pupil above agree to conduct an experiment in arithmetic competition application and a simple calculation in mobile applications to enhance development of the capabilities of the pupil in simple arithmetic operations such as addition and subtraction.

الفترة المقترحة للتجربة فترة ....

The proposed period of the experiment four months.

Signature guardian------------ عائشة ------------: التوقيع ولي الأمر

Signature Mother------------ عائشة ------------: التوقيع الأم

محمد البشير محمد بابكر

Mohammed Elbasheir Mohammed Babekir

PhD Candidate طالب دكتوراة

بسم الله الرحمن الرحيم

Sudan University of Science and Technology

College of Computer Science and Information Technology

Consent Form parents of the pupils and permission to conduct a scientific experiment

استمارة موافقة أولياء أمور التلاميذ وصلاحية إجراء تجربة علمية

اسم التلميذ:---ابراهيم موسى دكتور--- Name of pupil ---العمر :Age----------

اسم ولي أمـر التلميذ:---موسى دكتور--- Name of ---------- Father

اسم الوالدة :---صاحبه بشير--- Name of ---------- Mother

التاريخ :---------- Date

نحن أولياء أمر التلميذ أعلاه نوافق على إجراء تجربة في لعبة رياضية وحسابية بسيطة بواسطة تطبيقات الهاتف الجوال لتنمية قدرات التلميذ في العمليات الحسابية البسيطة الجمع والطرح.

We are guardians of the pupil above agree to conduct an experiment in arithmetic competition application and a simple calculation in mobile applications to enhance development of the capabilities of the pupil in simple arithmetic operations such as addition and subtraction.

الفترة المقترحة للتجربة فترة .....

The proposed period of the experiment four months.

التوقيع ولي الأمر :---موسى دكتور--- ---------- Signature guardian

التوقيع الأم :---صاحبه--- ---------- Signature Mother

محمد البشير محمد بابكر

Mohammed Elbasheir Mohammed Babekir

طالب دكتوراة

PhD Candidate

Appendix B

This appendix contains a letter from Sudan University, Faculty of Computer Sciences to the Ministry of Education, the state of the scientific experience of the application of the Mobile-graders first and second.

SUDAN UNVIIVERSITY OF
SCIENCE & TECHNOLOGY
College of Computer Science
& Information Technology

جامعة السودان
للعلوم والتكنولوجيا
كلية علوم الحاسوب
وتقانة المعلومات

التاريخ: 2015/09/16م

السيد/ مدير إدارة مرحلة الأساس
بوزارة التربية والتعليم ولاية النيل الأزرق
حفظهم الله،،

السلام عليكم ورحمة الله تعالى وبركاته،،،

الموضوع: طلب الموافقة على تجربة تطبيق موبايل لمشروع دكتوراة على تلاميذ بمرحلة الأساس

بالإشارة للموضوع أعلاه، فإن الدارس/ **محمد البشير محمد بابكر** باحث في مرحلة الدكتوراة ويرغب بعمل تجربة مشروع دكتوراة في تطبيقات الموبايل التي يتم فيها إتخاذ المساعدة من التقنيات الحديثة للهاتف النقال في التعليم الإلكتروني والتي يمكن أن تسهم بتسهيل أكثر ودقة في التطبيقات الرياضية الأولية من عمليات حسابية جمع أو طرح أو ضرب أعداد وفق المنهج السوداني.

سيقوم الباحث بتحديد عينة من تلاميذ الفصل الأول أساس لعمل التجربة عملياً بإستخدام التطبيق عبر الموبايل لفترة شهرين أو ثلاثة أشهر للقيام باللعب في تطبيق الموبايل لجمع الأعداد وفق منهج الرياضيات للفصل الأول أساس.

يتوقع الباحث من هذا المشروع أن يزيد في زيادة المعرفة وحصيلة المعلومات كما أنه يمكن التلاميذ من المنافسة تحت إشراف أساتذتهم أو ذويهم. وعليه نرجو منكم مساعدته وتقديم يد العون له.

ولكم جزيل الشكر والتقدير ،،،

د.طلعت محي الدين وهبي
عميد الكلية

جامعة السودان للعلوم والتكنولوجيا
1 e SEP 2015
كلية الحاسوب وتقانة المعلومات

العنوان: السودان – الخرطوم – المقرن – رئاسة الجامعة
TEL:+249155660863 - Email:ccsit@sustech.edu

"We assure the important of this project to enhance and improve skills of pupils in mathematic subject after we showed HessApp and treated it in our cell-phones."

Appendix C

A letter from researcher to the Ministry of Education, the state of the scientific experience of the application of the Mobile-graders first and second.

بسم الله الرحمن الرحيم

جامعة السودان للعلوم والتكنولوجيا

كليـــة الدراســـــات العليـــــــا

كلية علوم الحاسوب وتقانة المعلومات

السيـــــــــــــــــد : وزير التربية والتعليم ولاية النيل الأزرق

السلام عليكم ورحمة الله تعالى وبركاته

الموضوع : طلب الموافقة على تجربة تطبيق موبايل لمشروع دكتوراة على تلاميذ بمرحلة الأساس

١. بالإشارة للموضوع أعلاه نرجو كريم تفضلكم بالموافقة لي بعمل تجربة مشروع دكتوراة في تطبيقات الموبايل التي يتم فيها إتخاذ المساعدة من التقنيات الحديثة للهاتف النقال في التعليم الإلكتروني والتي يمكن أن تسهم بتسهيل أكثر ودقة في التطبيقات الرياضية الأولية من عمليات حسابية جمع أو طرح أو ضرب أعداد وفق المنهج السوداني.

٢. سيقوم الباحث بتحديد عينة من تلاميذ الفصل الأول أساس لعمل التجربة عملياً بإستخدام التطبيق عبر الموبايل لفترة شهرين أو ثلاثة أشهر للقيام باللعب في تطبيق الموبايل لجمع الأعداد وفق منهج الرياضيات للفصل الأول أساس.

٣. يتوقع الباحث من هذا المشروع أن يزيد في زيادة المعرفة وحصيلة المعلومات كما أنه يمكن التلاميذ من المنافسة تحت إشراف أساتذتهم أو ذويهم.

محمد البشير محمد ابوبكر

"COMMENTS OF THE PUPLIC OFFICER MINSTIRY OF EDUACTION AND THE MINSTER OF BLUE NILE STATE OF EDUCATION"

Appendix D

This appendix contains notification to the schools for pupils in school to conduct the experiment on the part of pupils. This from Management of Basic Stage in Ministry of education

ولاية النيل الأزرق
وزارة التربية والتعليم
إدارة مرحلة الأساس
ولاية النيل الأزرق

النمرة : ٥٠/أ/١ التاريخ : ٢٠١٥/١٢/٢٢م

الأخ الكريم / مدير الإدارة التعليمية محلية الدمازين

الموضوع / الباحث في مجال تطبيقات الموبايل

نرجو التعاون مع الأخ /محمد البشير محمد بابكر في مجال تطبيقات الموبايل بتوجيه المدارس المبينة أدناه لتحديد وتعيين العدد المطلوب من الصف الأول أو الثاني لتنفيذ هذه التطبيقات والمدارس سيحددها الباحث .

المدارس هي :-

١/ أكاديمية اي بال للغات والترجمة وعلوم الحاسوب .

٢/ .....

٣/ .....

والله الموفق

وزارة التربية والتعليم - إدارة التعليم الأساس
ولاية النيل الأزرق

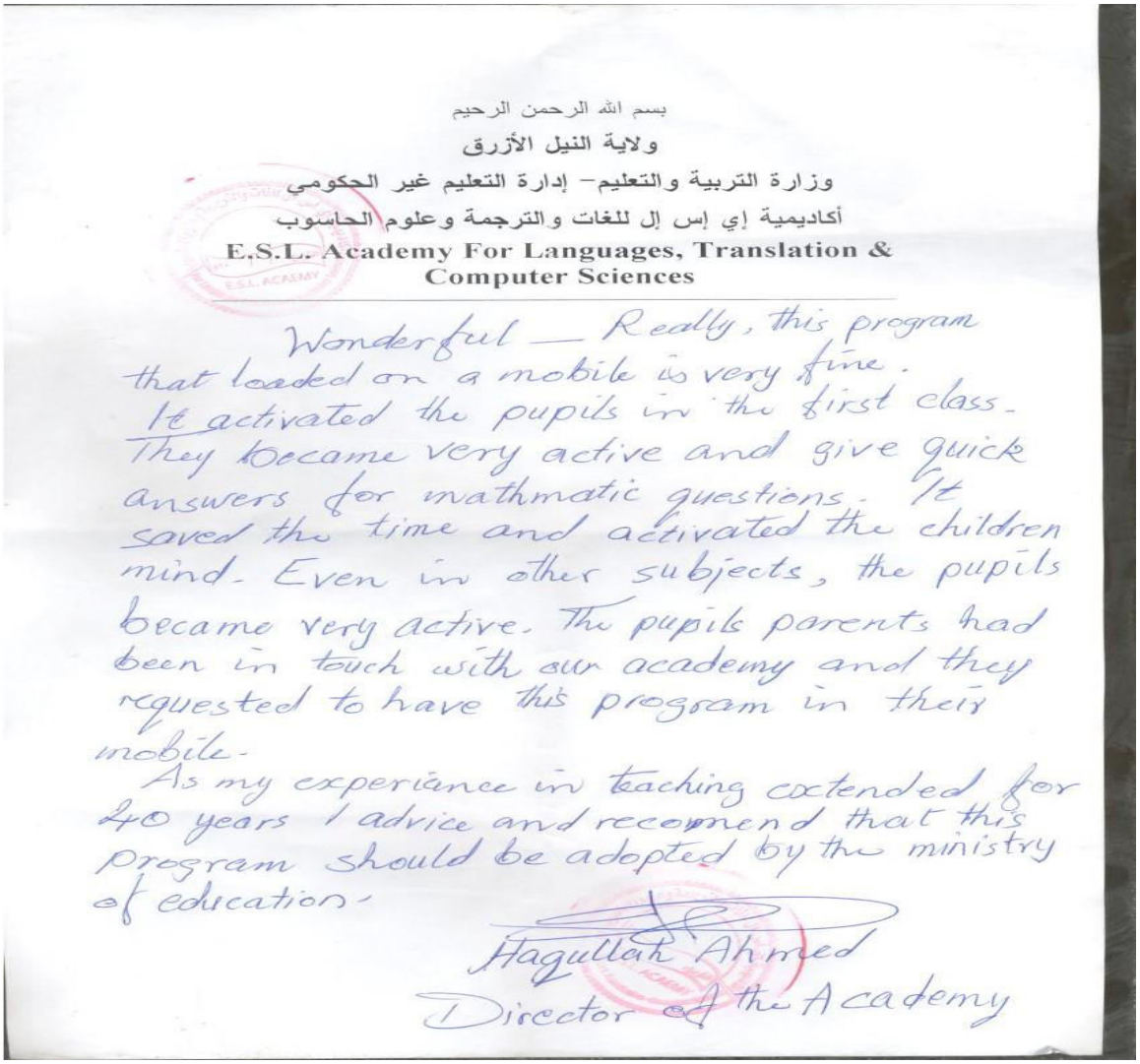
محمد الحسن عبد الله

مدير مرحلة الأساس

Appendix E

Comments from the teachers 1:

"Wonderful_ Really, this program that loaded on a mobile is very fine. It activated the pupils in the first class. They became very active and gave quick answers for mathematic questions. It saved the time and activated the children mind. Even in other subjects, the pupils became very active. The pupil's parents had been in touch with our academy and they requested to have this program in their mobile. As my experience in teaching extended for 40 years I advice and recommend that this program should be adopted by the ministry of education ".



بسم الله الرحمن الرحيم

ولاية النيل الأزرق

وزارة التربية والتعليم- إدارة التعليم غير الحكومي

أكاديمية إي إس إل للغات والترجمة وعلوم الحاسوب

E.S.L. Academy For Languages, Translation & Computer Sciences

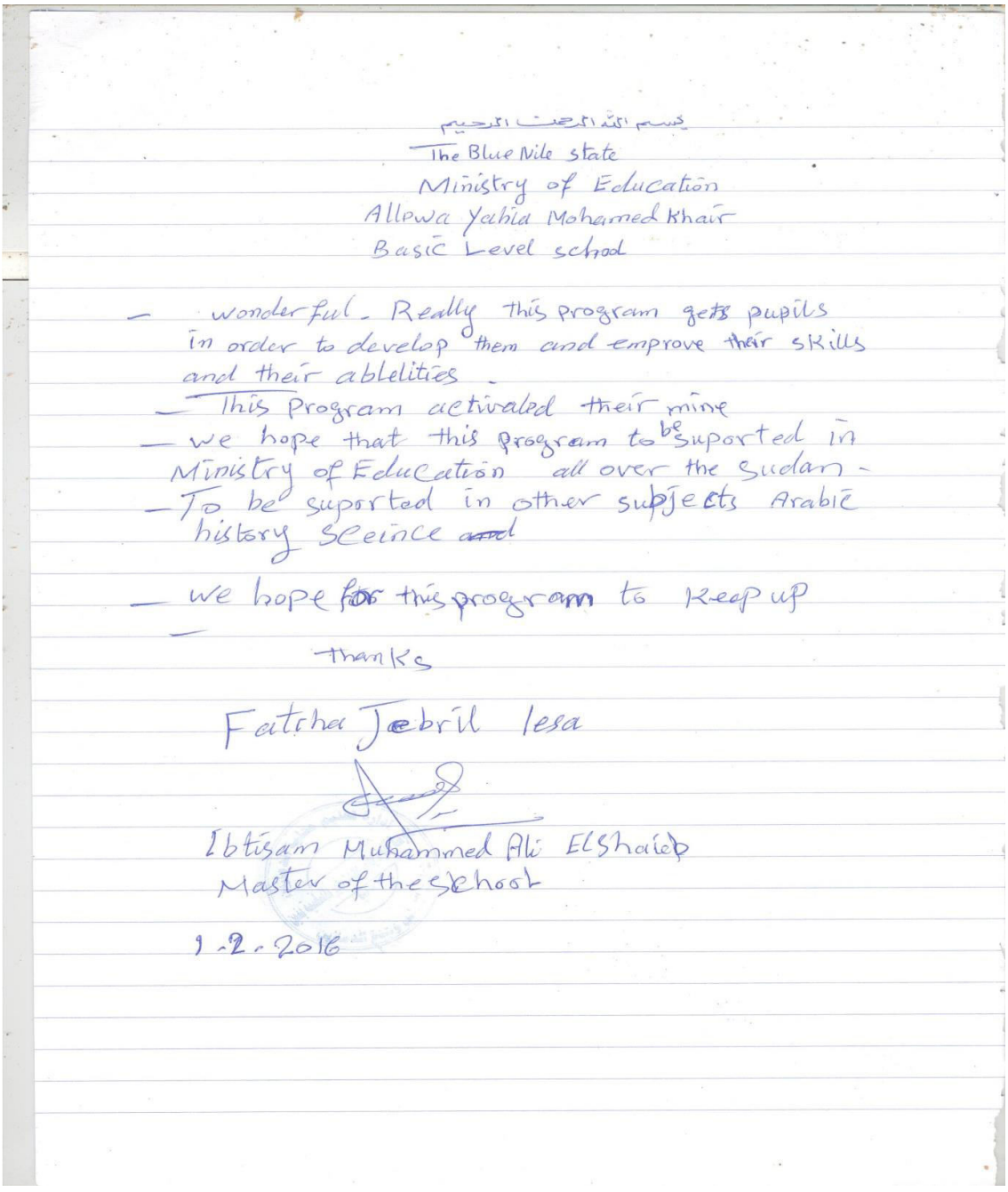
Wonderful — Really, this program that loaded on a mobile is very fine. It activated the pupils in the first class. They became very active and give quick answers for mathmatic questions. It saved the time and activated the children mind. Even in other subjects, the pupils became very active. The pupils parents had been in touch with our academy and they requested to have this program in their mobile.

As my experiance in teaching extended for 40 years I advice and recommend that this program should be adopted by the ministry of education.

Hagullah Ahmed

Director of the Academy

Comments from the teachers 2:



بسم الله الرحمن الرحيم

The Blue Nile state
Ministry of Education
Allewa Yahia Mohamed Khair
Basic Level school

- wonderful. Really this program gets pupils in order to develop them and emprove their skills and their ablelities.
- This program activated their mine
- we hope that this program to be suported in Ministry of Education all over the Sudan.
- To be suported in other subjects Arabic history Sceince and
- we hope for this progeram to keep up

Thanks

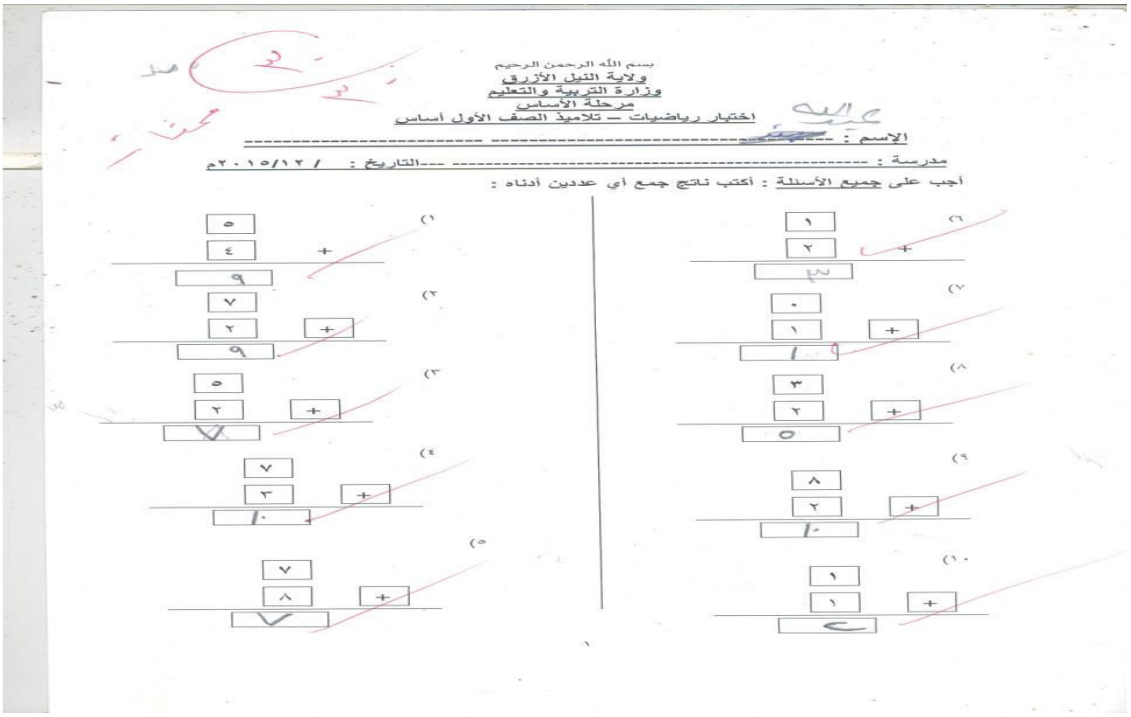
Fatcha Jebril Iesa

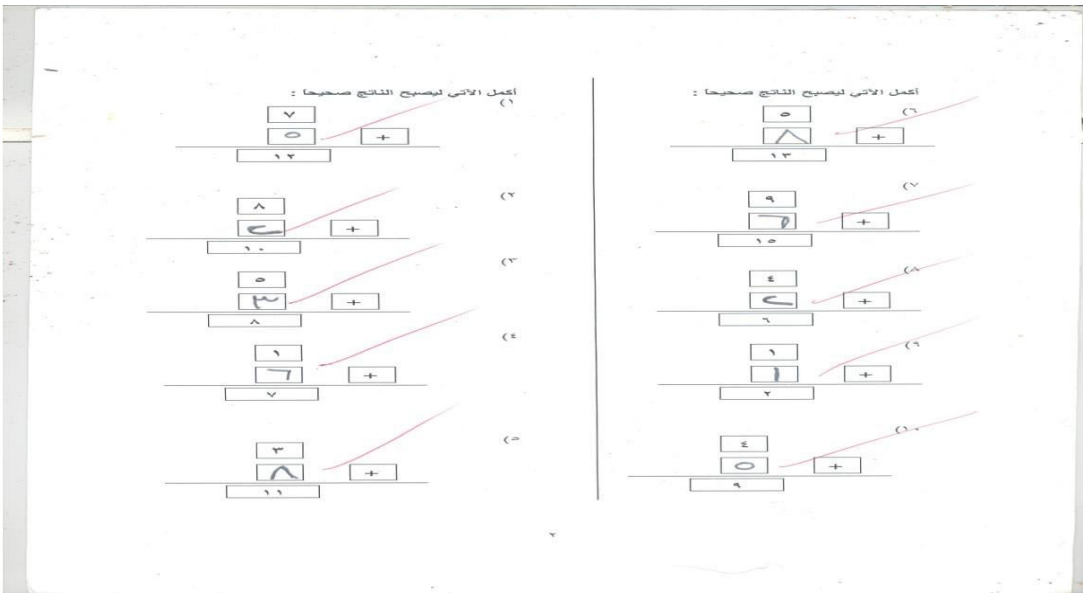
Ibtisam Muhammed Ali Elshaieb
Master of the school

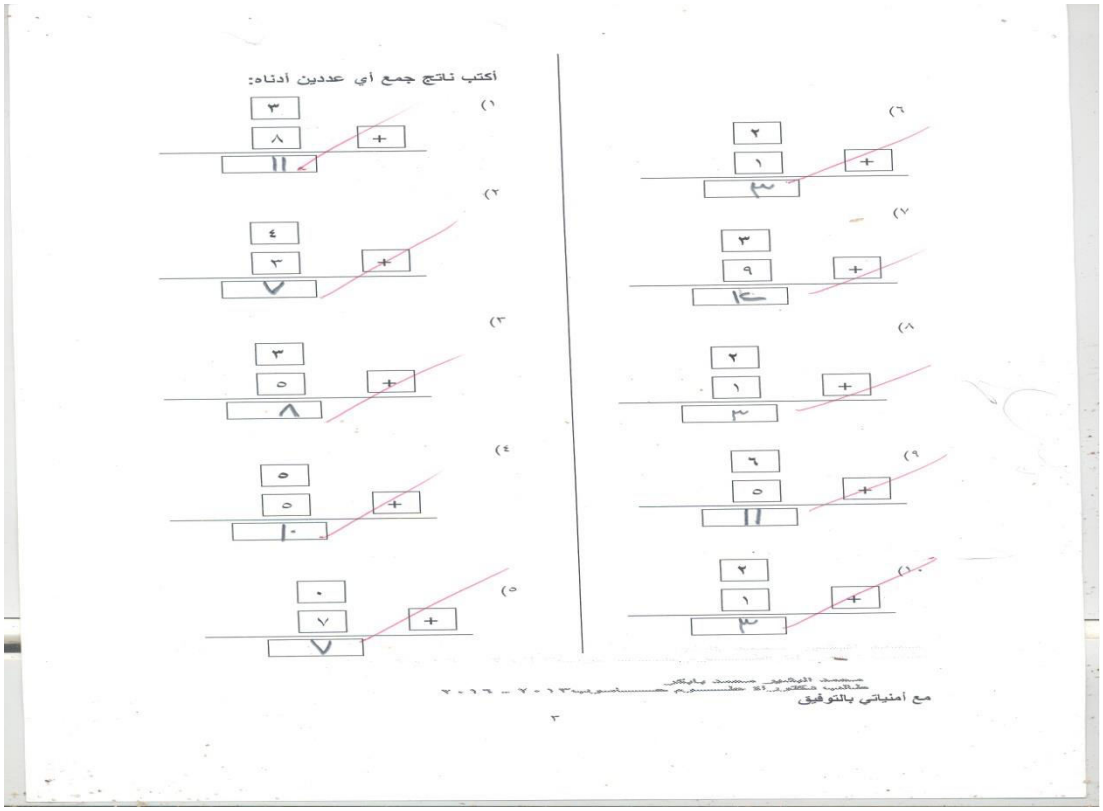
1-2-2016

Appendix F

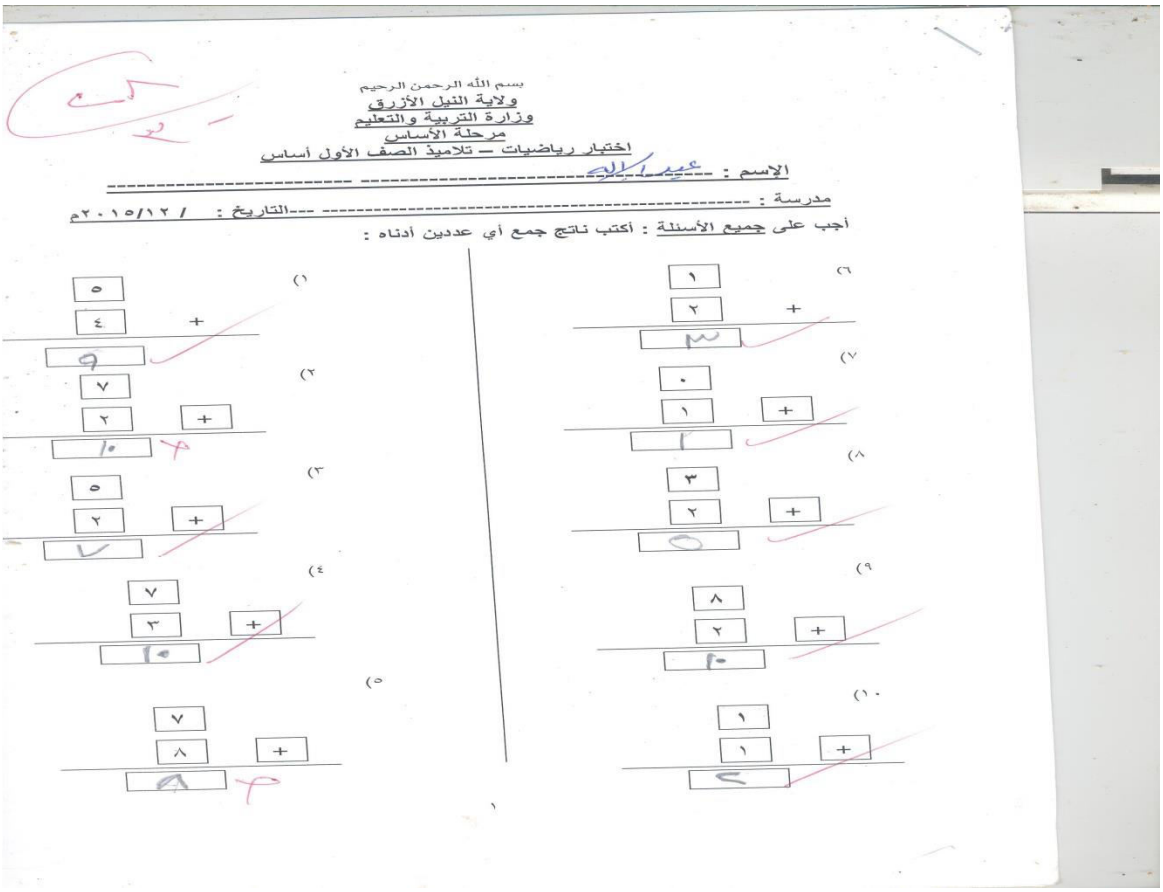
Here the draft samples of pre-tset and post-test to pupils with the review from teachers:







مع أمنياتى بالتوفيق



بسم الله الرحمن الرحيم

ولاية النيل الأزرق

وزارة التربية والتعليم

مرحلة الأساس

اختبار رياضيات – تلاميذ الصف الأول أساس

الإسم : عبد الله

مدرسة : ---------- ---التاريخ : / ١٢/ ٢٠١٥م

أجب على جميع الأسئلة : أكتب ناتج جمع أي عددين أدناه :

١) ٥ + ٤ = ٩

٢) ٧ + ٢ = ١٠

٣) ٥ + ٢ = ٧

٤) ٧ + ٣ = ١٠

٥) ٧ + ٨ = ١٥

٦) ١ + ٢ = ٣

٧) ٠ + ١ = ١

٨) ٣ + ٢ = ٥

٩) ٨ + ٢ = ١٠

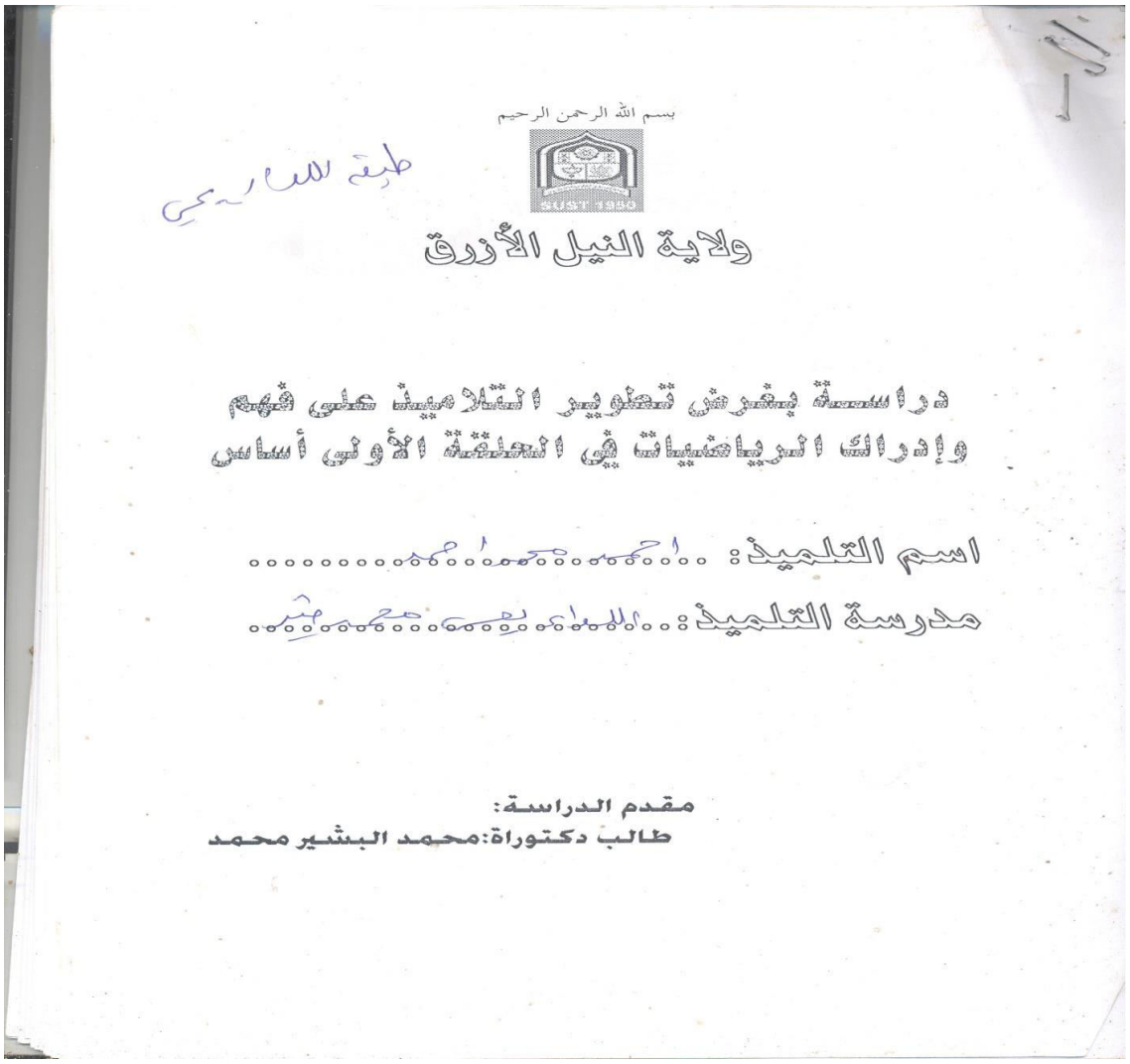
١٠) ١ + ١ = ٢

Appendix G

Dtata collection

Also, here is the draft of papers used to write the degree of pupils in any ten 10 consecutive questions: in about 10 toy tries in HessApp application. Which contains the date of the day and in any try (The pupils win ……. Out of 10 degree).

Samples of pupils who did HessApp competition application:


بسم الله الرحمن الرحيم

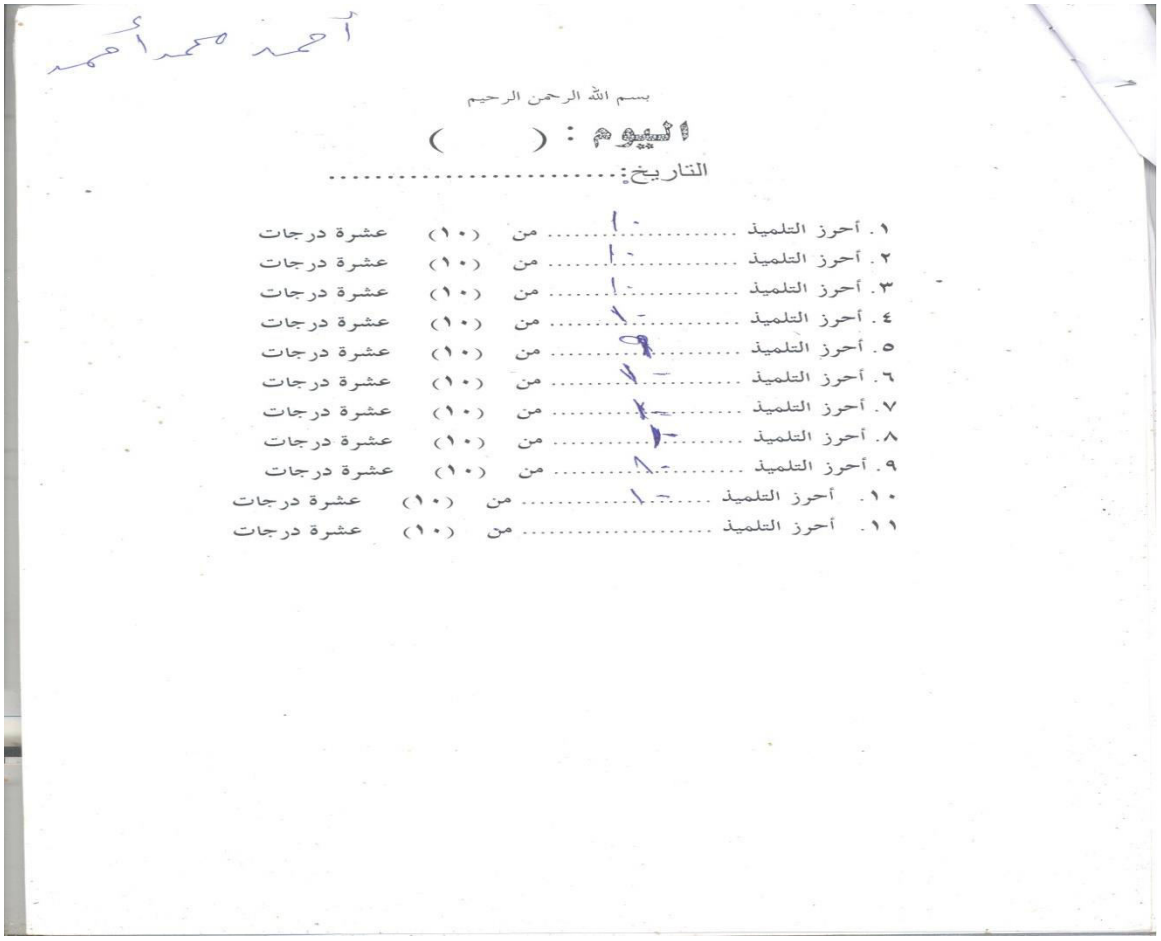
ولاية النيل الأزرق

دراسة بغرض تطوير التلاميذ على فهم
وإدراك الرياضيات في الحلقة الأولى أساس

اسم التلميذ: .....

مدرسة التلميذ: .....

مقدم الدراسة:
طالب دكتوراة: محمد البشير محمد



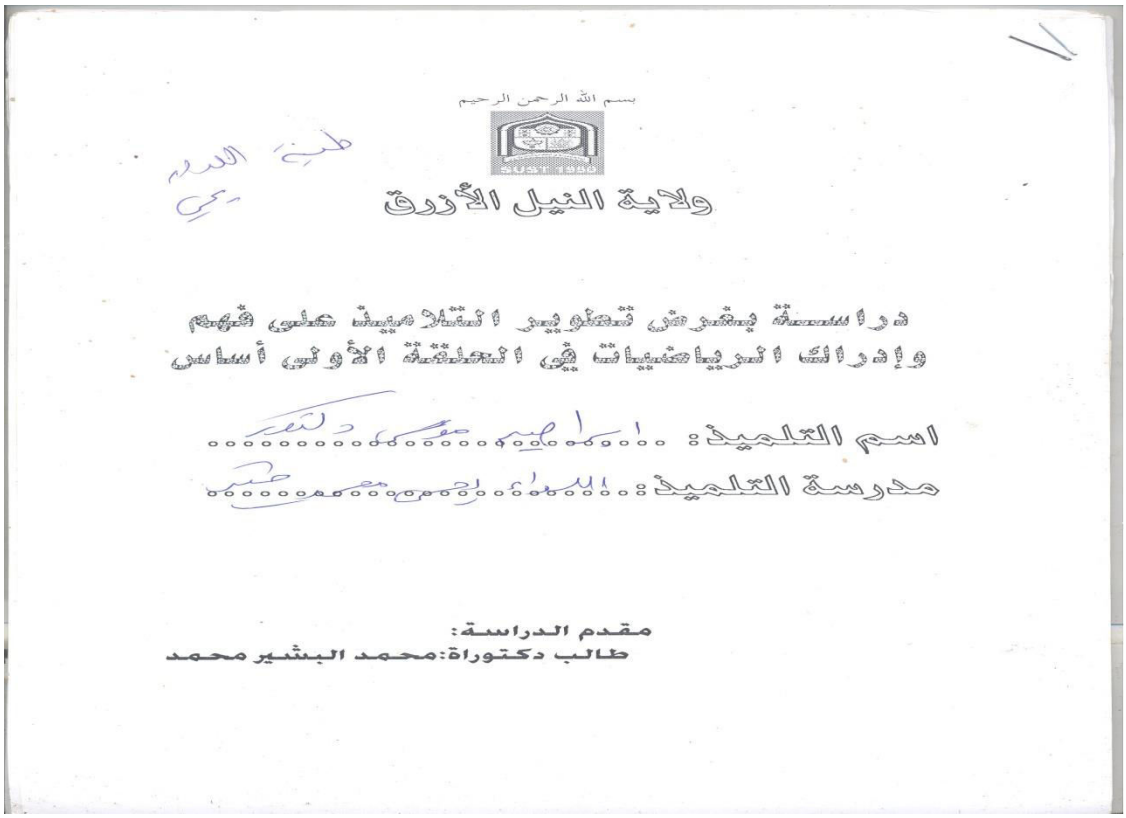
أحمد محمد أحمد

بسم الله الرحمن الرحيم

اليوم : ( )

التاريخ:.....

١. أحرز التلميذ ..... من (١٠) عشرة درجات
٢. أحرز التلميذ ..... من (١٠) عشرة درجات
٣. أحرز التلميذ ..... من (١٠) عشرة درجات
٤. أحرز التلميذ ..... من (١٠) عشرة درجات
٥. أحرز التلميذ ..... من (١٠) عشرة درجات
٦. أحرز التلميذ ..... من (١٠) عشرة درجات
٧. أحرز التلميذ ..... من (١٠) عشرة درجات
٨. أحرز التلميذ ..... من (١٠) عشرة درجات
٩. أحرز التلميذ ..... من (١٠) عشرة درجات
١٠. أحرز التلميذ ..... من (١٠) عشرة درجات
١١. أحرز التلميذ ..... من (١٠) عشرة درجات



بسم الله الرحمن الرحيم

ولاية النيل الأزرق

دراسة بغرض تطوير التلاميذ على فهم
وإدراك الرياضيات في المنطقة الأولى أساس

اسم التلميذ: .....

مدرسة التلميذ: .....

مقدم الدراسة:
طالب دكتوراة: محمد البشير محمد

بسم الله الرحمن الرحيم

اليوم : ( )

التاريخ: .....

١. أحرز التلميذ ..... من (١٠) عشرة درجات
٢. أحرز التلميذ ..... من (١٠) عشرة درجات
٣. أحرز التلميذ ..... من (١٠) عشرة درجات
٤. أحرز التلميذ ..... من (١٠) عشرة درجات
٥. أحرز التلميذ ..... من (١٠) عشرة درجات
٦. أحرز التلميذ ..... من (١٠) عشرة درجات
٧. أحرز التلميذ ..... من (١٠) عشرة درجات
٨. أحرز التلميذ ..... من (١٠) عشرة درجات
٩. أحرز التلميذ ..... من (١٠) عشرة درجات
١٠. أحرز التلميذ ..... من (١٠) عشرة درجات
١١. أحرز التلميذ ..... من (١٠) عشرة درجات

بسم الله الرحمن الرحيم

ولاية النيل الأزرق

دراسة بغرض تطوير التلاميذ على فهم وإدراك الرياضيات في المرحلة الأولى أساس

اسم التلميذ: .....

مدرسة التلميذ: .....

مقدم الدراسة:
طالب دكتوراة: محمد البشير محمد

عماد الدين محمد عبد الرحمن

بسم الله الرحمن الرحيم

اليوم: ( )

التاريخ: .....

١. أحرز التلميذ ..... من (١٠) عشرة درجات
٢. أحرز التلميذ ..... من (١٠) عشرة درجات
٣. أحرز التلميذ ..... من (١٠) عشرة درجات
٤. أحرز التلميذ ..... من (١٠) عشرة درجات
٥. أحرز التلميذ ..... من (١٠) عشرة درجات
٦. أحرز التلميذ ..... من (١٠) عشرة درجات
٧. أحرز التلميذ ..... من (١٠) عشرة درجات
٨. أحرز التلميذ ..... من (١٠) عشرة درجات
٩. أحرز التلميذ ..... من (١٠) عشرة درجات
١٠. أحرز التلميذ ..... من (١٠) عشرة درجات
١١. أحرز التلميذ ..... من (١٠) عشرة درجات

منطقة البحر الأحمر

بسم الله الرحمن الرحيم

SUST 1950

ولاية النيل الأزرق

دراسة بغرض تطوير التلاميذ على فهم وإدراك الرياضيات في الحلقة الأولى أساس

اسم التلميذ: ....عبدالله محمد [illegible]

مدرسة التلميذ:.......أكاديمية البحر الأحمر

مقدم الدراسة:
طالب دكتوراة:محمد البشير محمد

بسم الله الرحمن الرحيم

اليوم : (الثلاثاء)

التاريخ:.......٢٢/١٢/٢٠١٥

١. أحرز التلميذ ......٧...... من (١٠) عشرة درجات
٢. أحرز التلميذ ......٩...... من (١٠) عشرة درجات
٣. أحرز التلميذ ......٩...... من (١٠) عشرة درجات
٤. أحرز التلميذ ......٩...... من (١٠) عشرة درجات
٥. أحرز التلميذ ......٨...... من (١٠) عشرة درجات
٦. أحرز التلميذ ......٩...... من (١٠) عشرة درجات
٧. أحرز التلميذ ......٩...... من (١٠) عشرة درجات
٨. أحرز التلميذ ......٦...... من (١٠) عشرة درجات
٩. أحرز التلميذ ......٨...... من (١٠) عشرة درجات
١٠. أحرز التلميذ ......٩...... من (١٠) عشرة درجات
١١. أحرز التلميذ ......٨...... من (١٠) عشرة درجات

بسم الله الرحمن الرحيم

ولاية النيل الأزرق

دراسة بغرض تطوير التلاميذ على فهم وإدراك الرياضيات في الحلقة الأولى أساس

اسم التلميذ: ...الهادي..........................

مدرسة التلميذ: ...أكاديمية النجم الأحمر...

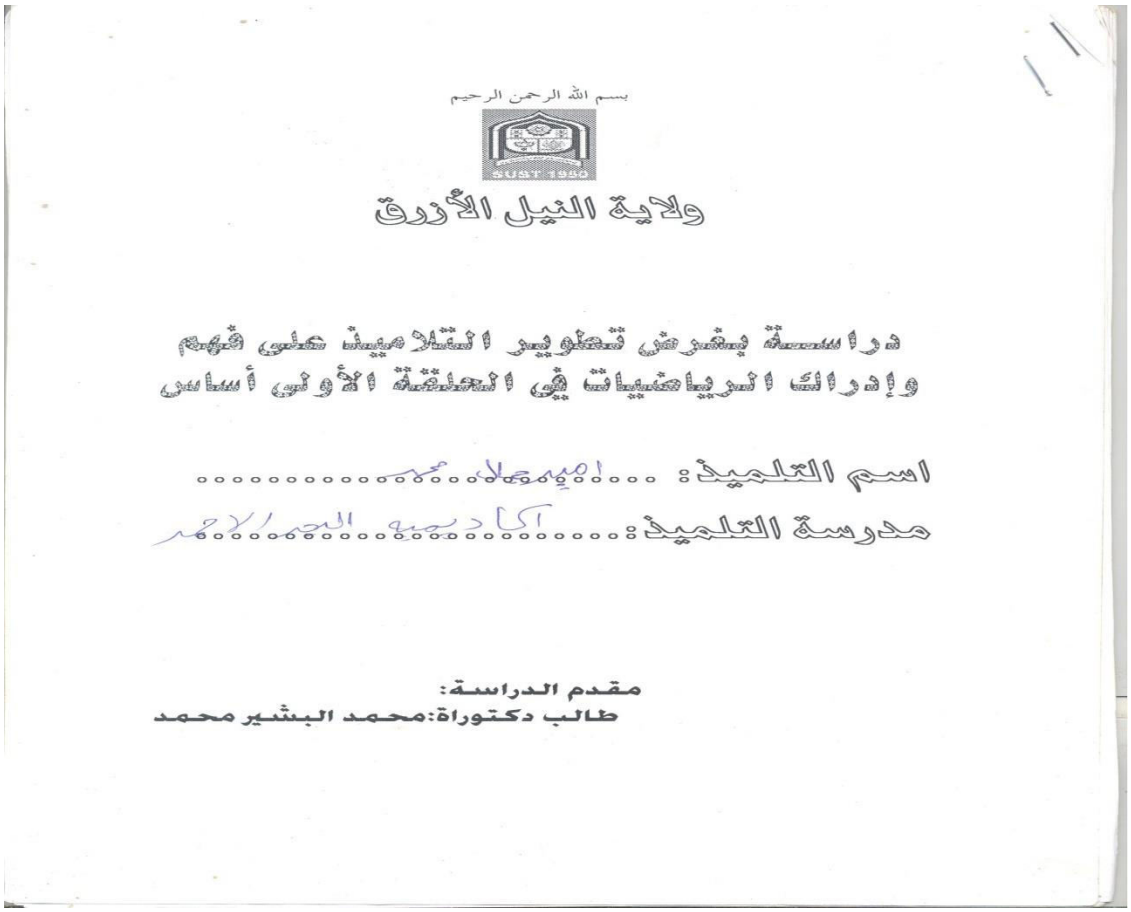
مقدم الدراسة:
طالب دكتوراة: محمد البشير محمد

بسم الله الرحمن الرحيم

اليوم : (الأحد)

التاريخ: ...٢٣/١٢/٢٠١٥م...

١. أحرز التلميذ ....٧........ من (١٠) عشرة درجات
٢. أحرز التلميذ ....٩........ من (١٠) عشرة درجات
٣. أحرز التلميذ ....٩........ من (١٠) عشرة درجات
٤. أحرز التلميذ ....٩........ من (١٠) عشرة درجات
٥. أحرز التلميذ ....٨........ من (١٠) عشرة درجات
٦. أحرز التلميذ ....٩........ من (١٠) عشرة درجات
٧. أحرز التلميذ ....٩........ من (١٠) عشرة درجات
٨. أحرز التلميذ ....٩........ من (١٠) عشرة درجات
٩. أحرز التلميذ ....١٠........ من (١٠) عشرة درجات
١٠. أحرز التلميذ ....٨........ من (١٠) عشرة درجات
١١. أحرز التلميذ ....٨........ من (١٠) عشرة درجات



بسم الله الرحمن الرحيم

ولاية النيل الأزرق

دراسة بغرض تطوير التلاميذ على فهم وإدراك الرياضيات في الحلقة الأولى أساس

اسم التلميذ: .....

مدرسة التلميذ: .....

مقدم الدراسة:

طالب دكتوراة: محمد البشير محمد

بسم الله الرحمن الرحيم

اليوم : (الثلاثاء)

التاريخ: ٢٢/١٢/٢٠١٥م

١. أحرز التلميذ ٧ من (١٠) عشرة درجات
٢. أحرز التلميذ ٩ من (١٠) عشرة درجات
٣. أحرز التلميذ ٩ من (١٠) عشرة درجات
٤. أحرز التلميذ ٨ من (١٠) عشرة درجات
٥. أحرز التلميذ ٩ من (١٠) عشرة درجات
٦. أحرز التلميذ ٩ من (١٠) عشرة درجات
٧. أحرز التلميذ ٨ من (١٠) عشرة درجات
٨. أحرز التلميذ ٨ من (١٠) عشرة درجات
٩. أحرز التلميذ ٦ من (١٠) عشرة درجات
١٠. أحرز التلميذ ٨ من (١٠) عشرة درجات
١١. أحرز التلميذ ٩ من (١٠) عشرة درجات

بسم الله الرحمن الرحيم

SUST 1950

ولاية النيل الأزرق

دراسة بغرض تطوير التلاميذ على فهم وإدراك الرياضيات في الحلقة الأولى أساس

اسم التلميذ: أروى [illegible]

مدرسة التلميذ: أكاديمية العمرين

مقدم الدراسة:
طالب دكتوراة: محمد البشير محمد

بسم الله الرحمن الرحيم

اليوم : (الاثنين)

التاريخ: [illegible]

١. أحرز التلميذ ......٧...... من (١٠) عشرة درجات
٢. أحرز التلميذ ......٥...... من (١٠) عشرة درجات
٣. أحرز التلميذ ......١٠...... من (١٠) عشرة درجات
٤. أحرز التلميذ ......٩...... من (١٠) عشرة درجات
٥. أحرز التلميذ ......٨...... من (١٠) عشرة درجات
٦. أحرز التلميذ ......٧...... من (١٠) عشرة درجات
٧. أحرز التلميذ ......١٠...... من (١٠) عشرة درجات
٨. أحرز التلميذ ......١٠...... من (١٠) عشرة درجات
٩. أحرز التلميذ ......٨...... من (١٠) عشرة درجات
١٠. أحرز التلميذ ......٩...... من (١٠) عشرة درجات
١١. أحرز التلميذ ......١٠...... من (١٠) عشرة درجات

بسم الله الرحمن الرحيم

SUST 1950

ولاية النيل الأزرق

دراسة بغرض تطوير التلاميذ على فهم وإدراك الرياضيات في الحلقة الأولى أساس

اسم التلميذ: ....

مدرسة التلميذ: ....

مقدم الدراسة:

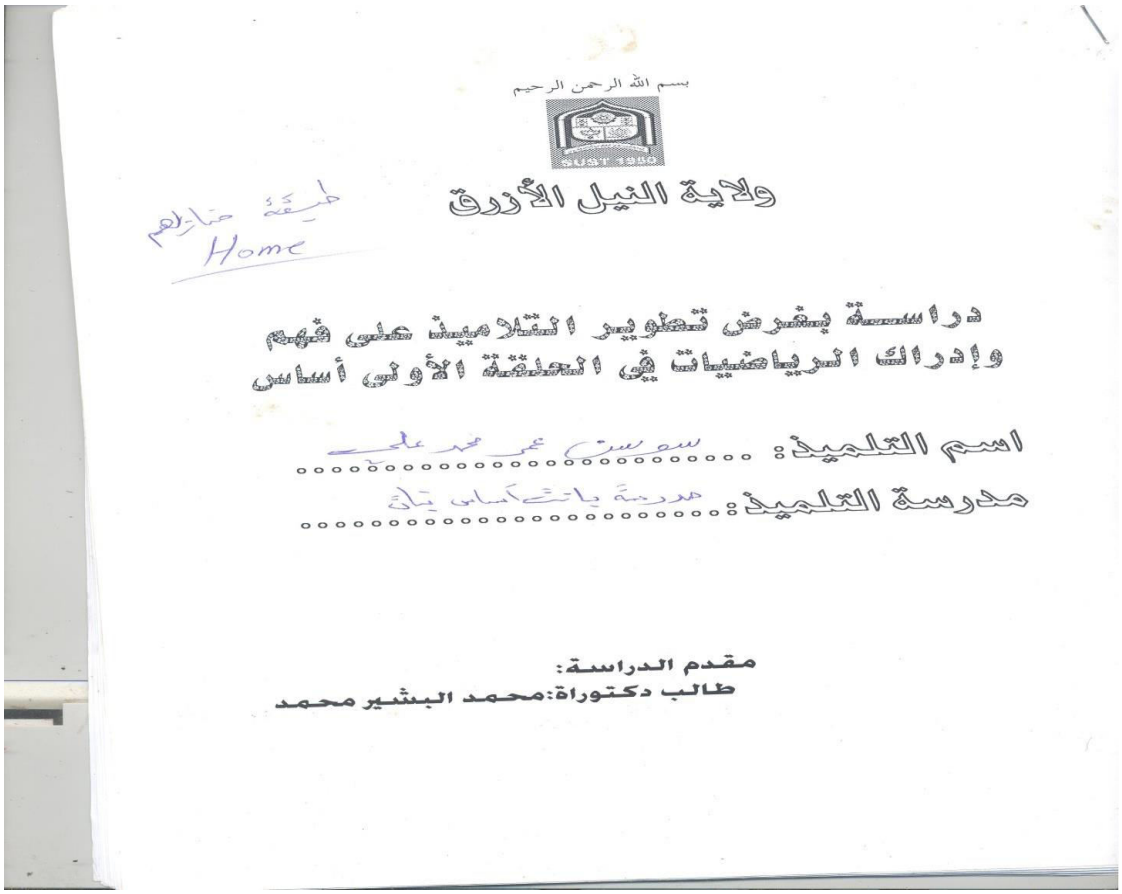
طالب دكتوراة: محمد البشير محمد

بسم الله الرحمن الرحيم

اليوم : (الاحد)

التاريخ: ١٤/١٢/٢٠١٥م

١. أحرز التلميذ ......١٠...... من (١٠) عشرة درجات
٢. أحرز التلميذ ......١٠...... من (١٠) عشرة درجات
٣. أحرز التلميذ ......٩...... من (١٠) عشرة درجات
٤. أحرز التلميذ ......١٠...... من (١٠) عشرة درجات
٥. أحرز التلميذ ......٩...... من (١٠) عشرة درجات
٦. أحرز التلميذ ......٨...... من (١٠) عشرة درجات
٧. أحرز التلميذ ......٧...... من (١٠) عشرة درجات
٨. أحرز التلميذ ......٦...... من (١٠) عشرة درجات
٩. أحرز التلميذ ......١٠...... من (١٠) عشرة درجات
١٠. أحرز التلميذ ......١٠...... من (١٠) عشرة درجات
١١. أحرز التلميذ ......٩...... من (١٠) عشرة درجات



بسم الله الرحمن الرحيم

ولاية النيل الأزرق

طريقة منازلهم
Home

دراسة بشرش تطوير التلاميذ على فهم وإدراك الرياضيات في المنقة الأولى أساس

اسم التلميذ: .....

مدرسة التلميذ: .....

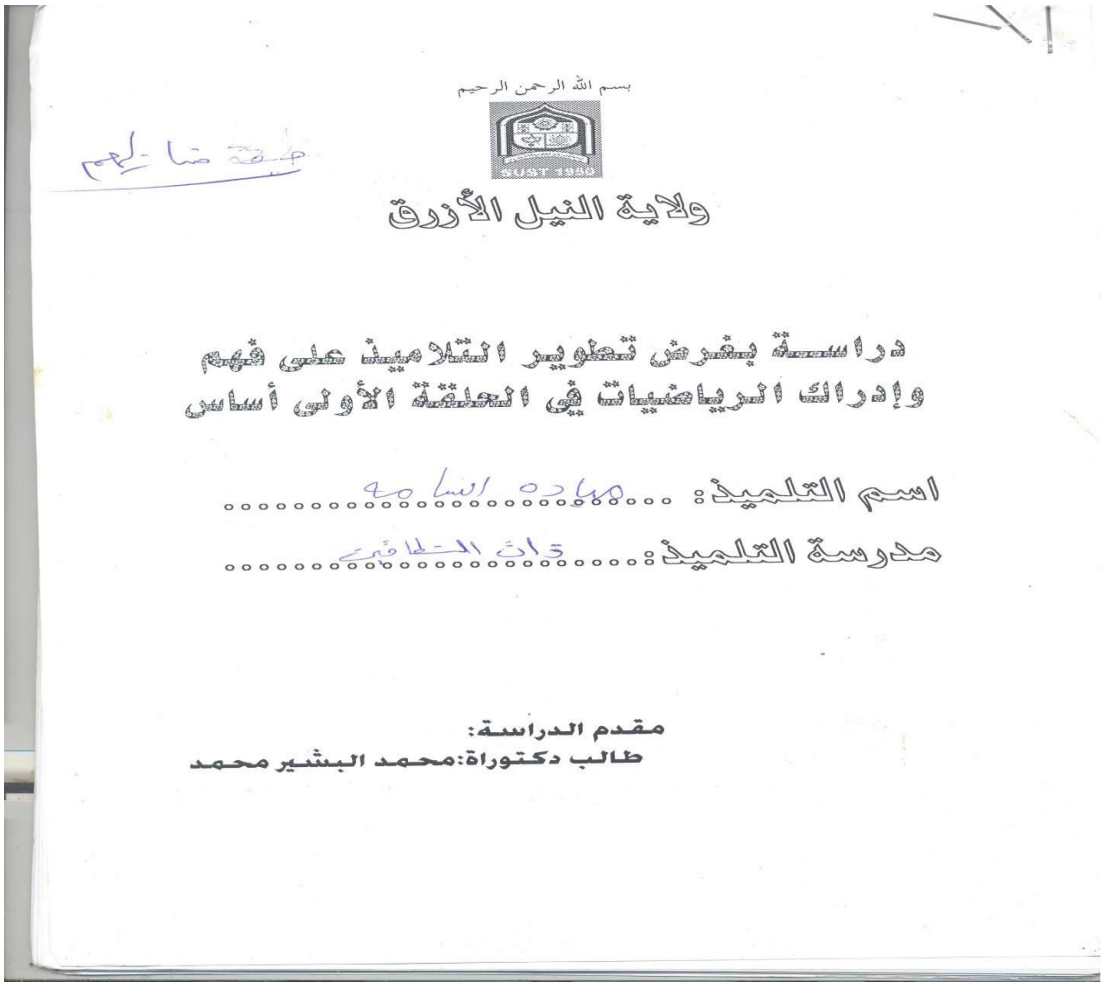
مقدم الدراسة:
طالب دكتوراة: محمد البشير محمد

بسم الله الرحمن الرحيم

اليوم : ( )

التاريخ: ..../..../....

١. أحرز التلميذ ..... من (١٠) عشرة درجات
٢. أحرز التلميذ ..... من (١٠) عشرة درجات
٣. أحرز التلميذ ..... من (١٠) عشرة درجات
٤. أحرز التلميذ ..... من (١٠) عشرة درجات
٥. أحرز التلميذ ..... من (١٠) عشرة درجات
٦. أحرز التلميذ ..... من (١٠) عشرة درجات
٧. أحرز التلميذ ..... من (١٠) عشرة درجات
٨. أحرز التلميذ ..... من (١٠) عشرة درجات
٩. أحرز التلميذ ..... من (١٠) عشرة درجات
١٠. أحرز التلميذ ..... من (١٠) عشرة درجات
١١. أحرز التلميذ ..... من (١٠) عشرة درجات



بسم الله الرحمن الرحيم

جامعة السودان للعلوم والتكنولوجيا
SUST 1990

ولاية النيل الأزرق

دراسة بشرق تطوير التلاميذ على فهم وإدراك الرياضيات في الحلقة الأولى أساس

اسم التلميذ: .....مياده اسامه.....

مدرسة التلميذ: .....دار السلام.....

مقدم الدراسة:
طالب دكتوراة: محمد البشير محمد

بسم الله الرحمن الرحيم

اليوم : (الأحد)

التاريخ: ٢٠/١٥/١٢/٢٠٢٠

١. أحرز التلميذ ..... ٨ ..... من (١٠) عشرة درجات

٢. أحرز التلميذ ..... ٨ ..... من (١٠) عشرة درجات

٣. أحرز التلميذ ..... ٩ ..... من (١٠) عشرة درجات

٤. أحرز التلميذ ..... ٦ ..... من (١٠) عشرة درجات

٥. أحرز التلميذ ..... ٩ ..... من (١٠) عشرة درجات

٦. أحرز التلميذ ..... ٩ ..... من (١٠) عشرة درجات

٧. أحرز التلميذ ..... ١٠ ..... من (١٠) عشرة درجات

٨. أحرز التلميذ ..... ٨ ..... من (١٠) عشرة درجات

٩. أحرز التلميذ ..... ٥ ..... من (١٠) عشرة درجات

١٠. أحرز التلميذ ..... ٨ ..... من (١٠) عشرة درجات

١١. أحرز التلميذ ..... ٧ ..... من (١٠) عشرة درجات

Appendix G

HessApp Numerals Model Implementation Codes

A) Xml Codes.

File : AndroidManifest.xml

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
   package="com.mohammed22sustechphd3.blog"
   android:versionCode="1"
   android:versionName="1.0" >

   <uses-sdk
      android:minSdkVersion="8"
      android:targetSdkVersion="18" />

   <application
      android:allowBackup="true"
      android:icon="@drawable/ic_launcher"
      android:label="@string/app_name"
      android:theme="@style/AppTheme" >
      <activity
         android:name="com.mohammed22sustechphd3.blog.Main"
         android:label="@string/app_name" >
         <intent-filter>
            <action android:name="android.intent.action.MAIN" />
            <category android:name="android.intent.category.LAUNCHER" />
         </intent-filter>
      </activity>
      <activity android:name=".Enterpupilsdata">
         <intent-filter>
            <action android:name="com.mohammed22sustechphd3.EnterpupilName"/>
            <category android:name="android.intent.category.DEFAULT" />
            </intent-filter>
         </activity>

      <activity android:name=".compete">
            <intent-filter>
            <action android:name="com.mohammed22sustechphd3.compete"/>
            <category android:name="android.intent.category.DEFAULT" />

            <data android:configChanges="keyboardHidden"/>

            </intent-filter>
            </activity>
      <activity android:name=".Competedif">
            <intent-filter>
            <action android:name="com.mohammed22sustechphd3.competedif"/>
```

```
            <category android:name="android.intent.category.DEFAULT" />

            <data android:configChanges="keyboardHidden"/>

            </intent-filter>
            </activity>
        <activity android:name=".pupilresults">
          <intent-filter>
            <action android:name="com.mohammed22sustechphd3.pupilresults"/>
            <category android:name="android.intent.category.DEFAULT" />

            <data android:configChanges="keyboardHidden"/>
             </intent-filter>
             </activity>

         <activity android:name=".pupilresult2">
          <intent-filter>
            <action android:name="com.mohammed22sustechphd3.pupilresult2"/>
            <category android:name="android.intent.category.DEFAULT" />

            <data android:configChanges="keyboardHidden"/>
             </intent-filter>
             </activity>

        <activity android:name=".pupilwrongresult">
           <intent-filter>
              <action android:name="com.mohammed22sustechphd3.pupilwrongresult"/>
            <category android:name="android.intent.category.DEFAULT" />

             </intent-filter>
             </activity>
             <activity android:name=".pupilwrongresult2">
           <intent-filter>
              <action android:name="com.mohammed22sustechphd3.pupilwrongresul2"/>
            <category android:name="android.intent.category.DEFAULT" />

             </intent-filter>
             </activity>
          </application>

</manifest>
```

File : activity_main.xml

```
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
   xmlns:tools="http://schemas.android.com/tools"
   android:layout_width="match_parent"
   android:layout_height="match_parent"
   android:paddingBottom="@dimen/activity_vertical_margin"
   android:paddingLeft="@dimen/activity_horizontal_margin"
   android:paddingRight="@dimen/activity_horizontal_margin"
   android:paddingTop="@dimen/activity_vertical_margin"
   tools:context=".Main" >
```

```
    <TextView
        android:id="@+id/add"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentRight="true"
        android:layout_alignParentTop="true"
        android:text="@string/HessApp" />

    <TextView
        android:id="@+id/pupilgrade"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignRight="@+id/add"
        android:layout_below="@+id/add"
        android:layout_marginTop="19dp"
        android:text="والثاني الأول الفصل لتلاميذ , الأعداد جمع على واللعب للمنافسات حساب تطبيق في بك مرحباً
أساس"
        android:textAppearance="?android:attr/textAppearanceMedium" />

    <Button
        android:id="@+id/enter"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/pupilgrade"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="17dp"
        android:text="دخول" />

    <ImageView
        android:id="@+id/imageView1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignLeft="@+id/add"
        android:layout_alignParentBottom="true"
        android:layout_marginBottom="103dp"
        android:src="@drawable/mohammed" />

    <TextView
        android:id="@+id/IsmTlmeez"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignRight="@+id/pupilgrade"
        android:layout_below="@+id/imageView2"
        android:text="Mohammed-E" />

    <ImageView
        android:id="@+id/imageView2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignLeft="@+id/pupilgrade"
        android:layout_alignTop="@+id/imageView1"
        android:layout_marginLeft="14dp"
```

```
        android:src="@drawable/laurie" />
    <TextView
        android:id="@+id/val2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignBaseline="@+id/IsmTlmeez"
        android:layout_alignBottom="@+id/IsmTlmeez"
        android:layout_alignLeft="@+id/pupilgrade"
        android:text="Dr.Laurie Butgereit" />
    <ImageView
        android:id="@+id/imageView3"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignLeft="@+id/enter"
        android:layout_below="@+id/val2"
        android:layout_marginTop="18dp"
        android:src="@drawable/hessapp" />
    <TextView
        android:id="@+id/textView5"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/enter"
        android:layout_toRightOf="@+id/imageView4"
        android:text="الزر هذا على أضغط للبدء" />
    <ImageView
        android:id="@+id/imageView4"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignLeft="@+id/enter"
        android:layout_below="@+id/enter"
        android:src="@drawable/hand" />

</RelativeLayout>
```

File : compete.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent" >
    <Button
        android:id="@+id/start1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentBottom="true"
        android:layout_alignParentRight="true"
        android:layout_marginBottom="134dp"
        android:text="٠" />

    <Button
        android:id="@+id/one"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
```

```
    android:layout_alignBaseline="@+id/start1"
    android:layout_alignBottom="@+id/start1"
    android:layout_toLeftOf="@+id/start1"
    android:text="١" />

<Button
    android:id="@+id/tow2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBaseline="@+id/one"
    android:layout_alignBottom="@+id/one"
    android:layout_toLeftOf="@+id/one"
    android:text="٢" />

<Button
    android:id="@+id/three3"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBaseline="@+id/tow2"
    android:layout_alignBottom="@+id/tow2"
    android:layout_toLeftOf="@+id/tow2"
    android:text="٣" />

<Button
    android:id="@+id/four4"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBaseline="@+id/three3"
    android:layout_alignBottom="@+id/three3"
    android:layout_toLeftOf="@+id/three3"
    android:text="٤" />

<Button
    android:id="@+id/eight8"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/one"
    android:layout_toRightOf="@+id/tow2"
    android:text="٨" />

<Button
    android:id="@+id/nighn9"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBaseline="@+id/eight8"
    android:layout_alignBottom="@+id/eight8"
    android:layout_alignParentRight="true"
    android:text="٩" />
```

```
<Button
   android:id="@+id/push"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignParentRight="true"
   android:layout_below="@+id/eight8"
   android:text="جمـــــــع" />

<Button
   android:id="@+id/delete"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignBaseline="@+id/push"
   android:layout_alignBottom="@+id/push"
   android:layout_toLeftOf="@+id/push"
   android:text="مســـــح" />

<Button
   android:id="@+id/six6"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignBaseline="@+id/seven7"
   android:layout_alignBottom="@+id/seven7"
   android:layout_toLeftOf="@+id/seven7"
   android:text="٦" />

<Button
   android:id="@+id/five5"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_above="@+id/delete"
   android:layout_toLeftOf="@+id/six6"
   android:text="٥" />

<TextView
   android:id="@+id/pupilgrade"
   android:layout_width="188dp"
   android:layout_height="31dp"
   android:layout_alignParentRight="true"
   android:layout_below="@+id/IsmTlmeez"
   android:layout_toRightOf="@+id/four4"
   android:text="أدناه؟ العددين جمع ناتج هو ما"
   android:textColor="#0066FF"
   android:textSize="@dimen/font_size" />

<TextView
   android:id="@+id/IsmTlmeez"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
```

```
    android:layout_alignParentRight="true"
    android:layout_alignParentTop="true"
    android:textAppearance="?android:attr/textAppearanceMedium" />

  <TextView
    android:id="@+id/val2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_above="@+id/pupilval"
    android:layout_alignLeft="@+id/three3"
    android:layout_marginBottom="22dp"
    android:text="العدد الثاني"
    android:textSize="@dimen/font_size" />

  <TextView
    android:id="@+id/value1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_above="@+id/val2"
    android:layout_alignRight="@+id/val2"
    android:layout_marginBottom="14dp"
    android:text="العدد الأول"
    android:textSize="@dimen/font_size" />
  <EditText
    android:id="@+id/pupilval"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_above="@+id/tow2"
    android:layout_alignRight="@+id/val2"
    android:layout_marginBottom="47dp"
    android:ems="10"
    android:configChanges="keyboardHidden"
    android:text="٠" >
    <requestFocus />
  </EditText>
  <Button
    android:id="@+id/seven7"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/one"
    android:layout_toLeftOf="@+id/one"
    android:text="٧" />
  <TextView
    android:id="@+id/addsign"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignTop="@+id/val2"
    android:layout_toRightOf="@+id/tow2"
    android:text="+"
```

```
    android:textAppearance="?android:attr/textAppearanceLarge" />
  <TextView
    android:id="@+id/textView1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBottom="@+id/IsmTlmeez"
    android:layout_alignLeft="@+id/Ismtlmeez2"
    android:text="@string/addd" />
  <TextView
    android:id="@+id/Ismtlmeez2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentLeft="true"
    android:layout_alignParentTop="true" />
</RelativeLayout>
```

File : enterpupilsdata.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
  android:layout_width="match_parent"
  android:layout_height="match_parent" >

  <TextView
    android:id="@+id/pupilgrade"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentRight="true"
    android:layout_alignParentTop="true"
    android:text="وفق الأعداد جمع على والعمل الأساس رياضيات في والتدريب للتمارين التطبيق هذا
بالسودان الأساس مرحلة منهج"
    android:textAppearance="?android:attr/textAppearanceMedium" />

  <ImageView
    android:id="@+id/imageView2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/pupilgrade"
    android:layout_toLeftOf="@+id/addsign"
    android:src="@drawable/ahmed" />

  <ImageView
    android:id="@+id/imageView1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignTop="@+id/imageView2"
    android:layout_toLeftOf="@+id/imageView2"
    android:src="@drawable/azza" />
```

```
<TextView
   android:id="@+id/addsign"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignParentRight="true"
   android:layout_alignTop="@+id/pupilName"
   android:text="التلميـذ اسم"
   android:textAppearance="?android:attr/textAppearanceMedium" />

<EditText
   android:id="@+id/pupilName"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_above="@+id/savebtn"
   android:layout_marginBottom="14dp"
   android:layout_toLeftOf="@+id/imageView2"
   android:ems="10"
   android:hint="التلميـذ اسـم أدخل" />

<Button
   android:id="@+id/savebtn"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignParentLeft="true"
   android:layout_centerVertical="true"
   android:text="حفـظ" />

<TextView
   android:id="@+id/IsmTlmeez"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignParentLeft="true"
   android:layout_below="@+id/savebtn"
   android:text="هي ما أسئلة عشرة كل في نعرف ثم متتالية أسئلة عشرة على يجيب أن التلميذ على
درجات عشرة مجموع من التلميذ أحرزها التي الدرجة"
   android:textAppearance="?android:attr/textAppearanceMedium"
   android:textColor="#0066FF"
   android:textSize="@dimen/font_size" />

<Button
   android:id="@+id/dificult"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignBaseline="@+id/start1"
   android:layout_alignBottom="@+id/start1"
   android:layout_alignRight="@+id/imageView4"
   android:text="صعب" />

<Button
```

```
    android:id="@+id/start1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_above="@+id/textView1"
    android:layout_alignRight="@+id/imageView2"
    android:text="سـهل" />

  <ImageView
    android:id="@+id/imageView4"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentBottom="true"
    android:layout_toLeftOf="@+id/start1"
    android:src="@drawable/hand" />

  <TextView
    android:id="@+id/textView1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentRight="true"
    android:layout_alignTop="@+id/imageView4"
    android:text="لبدء المنافسات الحسابية إختار أحد الأزرار"
    android:textAppearance="?android:attr/textAppearanceMedium" />

      </RelativeLayout>
```

File : competedif.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
  android:layout_width="match_parent"
  android:layout_height="match_parent" >

  <Button
    android:id="@+id/start1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentBottom="true"
    android:layout_alignParentRight="true"
    android:layout_marginBottom="134dp"
    android:text="٠" />

  <Button
    android:id="@+id/one"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBaseline="@+id/start1"
    android:layout_alignBottom="@+id/start1"
```

```
    android:layout_toLeftOf="@+id/start1"
    android:text="١" />

<Button
    android:id="@+id/tow2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBaseline="@+id/one"
    android:layout_alignBottom="@+id/one"
    android:layout_toLeftOf="@+id/one"
    android:text="٢" />

<Button
    android:id="@+id/three3"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBaseline="@+id/tow2"
    android:layout_alignBottom="@+id/tow2"
    android:layout_toLeftOf="@+id/tow2"
    android:text="٣" />

<Button
    android:id="@+id/four4"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBaseline="@+id/three3"
    android:layout_alignBottom="@+id/three3"
    android:layout_toLeftOf="@+id/three3"
    android:text="٤" />

<Button
    android:id="@+id/eight8"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/one"
    android:layout_toRightOf="@+id/tow2"
    android:text="٨" />

<Button
    android:id="@+id/nighn9"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBaseline="@+id/eight8"
    android:layout_alignBottom="@+id/eight8"
    android:layout_alignParentRight="true"
    android:text="٩" />

<Button
    android:id="@+id/push"
```

```
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentRight="true"
    android:layout_below="@+id/eight8"
    android:text="جمـــــــع" />

<Button
    android:id="@+id/delete"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBaseline="@+id/push"
    android:layout_alignBottom="@+id/push"
    android:layout_toLeftOf="@+id/push"
    android:text="مســـــح" />

<Button
    android:id="@+id/six6"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBaseline="@+id/seven7"
    android:layout_alignBottom="@+id/seven7"
    android:layout_toLeftOf="@+id/seven7"
    android:text="٦" />

<Button
    android:id="@+id/five5"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_above="@+id/delete"
    android:layout_toLeftOf="@+id/six6"
    android:text="٥" />

<TextView
    android:id="@+id/pupilgrade"
    android:layout_width="188dp"
    android:layout_height="31dp"
    android:layout_alignParentRight="true"
    android:layout_below="@+id/IsmTlmeez"
    android:layout_toRightOf="@+id/four4"
    android:text="أدناه؟ العددين جمع ناتج هو ما"
    android:textColor="#0066FF"
    android:textSize="@dimen/font_size" />

<TextView
    android:id="@+id/IsmTlmeez"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentRight="true"
    android:layout_alignParentTop="true"
```

```
   android:textAppearance="?android:attr/textAppearanceMedium" />

<TextView
   android:id="@+id/val2"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_above="@+id/pupilval"
   android:layout_alignLeft="@+id/three3"
   android:layout_marginBottom="22dp"
   android:text="العدد الثاني"
   android:textSize="@dimen/font_size" />

<TextView
   android:id="@+id/value1"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_above="@+id/val2"
   android:layout_alignRight="@+id/val2"
   android:layout_marginBottom="14dp"
   android:text="العدد الأول"
   android:textSize="@dimen/font_size" />

<EditText
   android:id="@+id/pupilval"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_above="@+id/tow2"
   android:layout_alignRight="@+id/val2"
   android:layout_marginBottom="47dp"
   android:ems="10"
   android:configChanges="keyboardHidden"

   android:text="٠" >

   <requestFocus />
</EditText>

<Button
   android:id="@+id/seven7"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_below="@+id/one"
   android:layout_toLeftOf="@+id/one"
   android:text="١" />

<TextView
   android:id="@+id/addsign"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
```

```
    android:layout_alignTop="@+id/val2"
    android:layout_toRightOf="@+id/tow2"
    android:text="+"
    android:textAppearance="?android:attr/textAppearanceLarge" />

  <TextView
    android:id="@+id/textView1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBottom="@+id/IsmTlmeez"
    android:layout_alignLeft="@+id/Ismtlmeez2"
    android:text="@string/addd" />

  <TextView
    android:id="@+id/Ismtlmeez2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentLeft="true"
    android:layout_alignParentTop="true" />

</RelativeLayout>
```

File : pupilresult2.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
  android:id="@+id/RelativeLayout1"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  android:orientation="vertical" >

  <TextView
    android:id="@+id/Answers"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentTop="true"
    android:layout_centerHorizontal="true"
    android:layout_marginTop="21dp"
    android:text="الرياضيات منـــافســـة نتـــــيجة"
    android:textAppearance="?android:attr/textAppearanceLarge" />

  <Button
    android:id="@+id/returncompete"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentBottom="true"
    android:layout_alignRight="@+id/Answers"
    android:layout_marginBottom="46dp"
    android:text="للحساب رجوع" />
```

```
<Button
   android:id="@+id/Exit"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignBaseline="@+id/returncompete"
   android:layout_alignBottom="@+id/returncompete"
   android:layout_toLeftOf="@+id/returncompete"
   android:text="وخروج إنهاء" />

<TextView
   android:id="@+id/textView3"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignBaseline="@+id/textView2"
   android:layout_alignBottom="@+id/textView2"
   android:layout_alignLeft="@+id/Answers"
   android:text="١٠"
   android:textAppearance="?android:attr/textAppearanceLarge" />

<TextView
   android:id="@+id/textView2"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignBottom="@+id/textView5"
   android:layout_alignRight="@+id/Exit"
   android:text="مـــــن"
   android:textAppearance="?android:attr/textAppearanceMedium" />

<TextView
   android:id="@+id/textView5"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignParentRight="true"
   android:layout_below="@+id/Answers"
   android:layout_marginTop="16dp"
   android:text="التلميذ إجابة"
   android:textColor="#0066FF" />

<TextView
   android:id="@+id/pupilgrade"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignBaseline="@+id/textView2"
   android:layout_alignBottom="@+id/textView2"
   android:layout_marginRight="16dp"
   android:layout_toLeftOf="@+id/textView5"
   android:text="عدد"
   android:textAppearance="?android:attr/textAppearanceLarge" />
```

```
<TextView
   android:id="@+id/textView6"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_below="@+id/pupilgrade"
   android:layout_centerHorizontal="true"
   android:layout_marginTop="16dp"
   android:text="درجات ٥ من أكثر أحرزت جداً جيد"
   android:textAppearance="?android:attr/textAppearanceMedium"
   android:textColor="#0066FF" />

<TextView
   android:id="@+id/textView4"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_below="@+id/textView6"
   android:layout_centerHorizontal="true"
   android:layout_marginTop="14dp"
   android:text="شـــــــــاطر شـــــــــاطر"
   android:textAppearance="?android:attr/textAppearanceMedium" />

<ImageView
   android:id="@+id/imageView3"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignLeft="@+id/textView2"
   android:layout_alignTop="@+id/imageView2"
   android:src="@drawable/good" />

<ImageView
   android:id="@+id/imageView4"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_centerVertical="true"
   android:layout_toLeftOf="@+id/imageView3"
   android:src="@drawable/good" />

<ImageView
   android:id="@+id/imageView2"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignTop="@+id/imageView4"
   android:layout_toRightOf="@+id/imageView3"
   android:src="@drawable/good" />

<ImageView
   android:id="@+id/imageView5"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
```

```
    android:layout_alignLeft="@+id/imageView2"
    android:layout_below="@+id/imageView2"
    android:src="@drawable/alwantafe" />

  <ImageView
    android:id="@+id/imageView1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/imageView3"
    android:layout_toRightOf="@+id/imageView4"
    android:src="@drawable/shater1" />

  <ImageView
    android:id="@+id/imageView6"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignLeft="@+id/imageView4"
    android:layout_alignTop="@+id/imageView1"
    android:src="@drawable/safga" />

      </RelativeLayout>
```

File : pupilresult.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
  android:id="@+id/RelativeLayout1"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  android:orientation="vertical" >

  <TextView
    android:id="@+id/Answers"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentTop="true"
    android:layout_centerHorizontal="true"
    android:layout_marginTop="21dp"
    android:text="الرياضيات منـــافســـة نتـــــيجة"
    android:textAppearance="?android:attr/textAppearanceLarge" />

  <Button
    android:id="@+id/returncompete"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentBottom="true"
    android:layout_alignRight="@+id/Answers"
    android:layout_marginBottom="46dp"
    android:text="للحساب رجوع" />
```

```
<Button
   android:id="@+id/Exit"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignBaseline="@+id/returncompete"
   android:layout_alignBottom="@+id/returncompete"
   android:layout_toLeftOf="@+id/returncompete"
   android:text="وخروج إنهاء" />

<TextView
   android:id="@+id/textView3"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignBaseline="@+id/textView2"
   android:layout_alignBottom="@+id/textView2"
   android:layout_alignLeft="@+id/Answers"
   android:text="١٠"
   android:textAppearance="?android:attr/textAppearanceLarge" />

<TextView
   android:id="@+id/textView2"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignBottom="@+id/textView5"
   android:layout_alignRight="@+id/Exit"
   android:text="مـــــن"
   android:textAppearance="?android:attr/textAppearanceMedium" />

<TextView
   android:id="@+id/textView5"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignParentRight="true"
   android:layout_below="@+id/Answers"
   android:layout_marginTop="16dp"
   android:text="التلميذ إجابة"
   android:textColor="#0066FF" />

<TextView
   android:id="@+id/pupilgrade"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignBaseline="@+id/textView2"
   android:layout_alignBottom="@+id/textView2"
   android:layout_marginRight="16dp"
   android:layout_toLeftOf="@+id/textView5"
   android:text="عدد"
   android:textAppearance="?android:attr/textAppearanceLarge" />
```

```
<TextView
   android:id="@+id/textView6"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_below="@+id/pupilgrade"
   android:layout_centerHorizontal="true"
   android:layout_marginTop="16dp"
   android:text="درجات ٥ من أكثر أحرزت جداً جيد"
   android:textAppearance="?android:attr/textAppearanceMedium"
   android:textColor="#0066FF" />

<TextView
   android:id="@+id/textView4"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_below="@+id/textView6"
   android:layout_centerHorizontal="true"
   android:layout_marginTop="14dp"
   android:text="شـــــــــاطر شـــــــــاطر"
   android:textAppearance="?android:attr/textAppearanceMedium" />

<ImageView
   android:id="@+id/imageView3"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignLeft="@+id/textView2"
   android:layout_alignTop="@+id/imageView2"
   android:src="@drawable/good" />

<ImageView
   android:id="@+id/imageView4"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_centerVertical="true"
   android:layout_toLeftOf="@+id/imageView3"
   android:src="@drawable/good" />

<ImageView
   android:id="@+id/imageView2"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignTop="@+id/imageView4"
   android:layout_toRightOf="@+id/imageView3"
   android:src="@drawable/good" />

<ImageView
   android:id="@+id/imageView5"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
```

```
    android:layout_alignLeft="@+id/imageView2"
    android:layout_below="@+id/imageView2"
    android:src="@drawable/alwantafe" />

  <ImageView
    android:id="@+id/imageView1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/imageView3"
    android:layout_toRightOf="@+id/imageView4"
    android:src="@drawable/shater1" />

  <ImageView
    android:id="@+id/imageView6"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignLeft="@+id/imageView4"
    android:layout_alignTop="@+id/imageView1"
    android:src="@drawable/safga" />

      </RelativeLayout>
```

File : pupilwrongresult.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
  android:id="@+id/RelativeLayout1"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  android:orientation="vertical" >

  <TextView
    android:id="@+id/Answers"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentTop="true"
    android:layout_centerHorizontal="true"
    android:layout_marginTop="21dp"
    android:text="الرياضيات منـــافســـة نتـــــيجة"
    android:textAppearance="?android:attr/textAppearanceLarge" />

  <TextView
    android:id="@+id/textView5"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentRight="true"
    android:layout_below="@+id/Answers"
    android:layout_marginTop="20dp"
    android:text="التلميذ إجابة"
    android:textColor="#0066FF" />
```

```
<TextView
   android:id="@+id/textView3"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignBaseline="@+id/textView2"
   android:layout_alignBottom="@+id/textView2"
   android:layout_alignLeft="@+id/Answers"
   android:text="١٠"
   android:textAppearance="?android:attr/textAppearanceLarge" />
<TextView
   android:id="@+id/textView6"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_below="@+id/pupilgrade"
   android:layout_centerHorizontal="true"
   android:layout_marginTop="16dp"
   android:text="٥درجات  من أقل أحرزت أخرى مـــرة حاول"
   android:textAppearance="?android:attr/textAppearanceMedium"
   android:textColor="#0066FF" />

<TextView
   android:id="@+id/textView4"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_below="@+id/textView6"
   android:layout_centerHorizontal="true"
   android:layout_marginTop="14dp"
   android:text="عـــــــذراً عـــــذراً"
   android:textAppearance="?android:attr/textAppearanceMedium" />


<Button
   android:id="@+id/returncompet"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignParentBottom="true"
   android:layout_alignParentRight="true"
   android:layout_marginBottom="25dp"
   android:layout_marginRight="27dp"
   android:text="للحســاب رجـوع" />

<Button
   android:id="@+id/exitend"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignBaseline="@+id/returncompet"
   android:layout_alignBottom="@+id/returncompet"
   android:layout_marginRight="14dp"
```

```
    android:layout_toLeftOf="@+id/returncompet"
    android:text="وخروج إنهاء" />

  <TextView
    android:id="@+id/pupilgrade"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignTop="@+id/textView5"
    android:layout_marginRight="24dp"
    android:layout_toLeftOf="@+id/textView5"
    android:text="عدد"
    android:textAppearance="?android:attr/textAppearanceLarge" />

  <TextView
    android:id="@+id/textView2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBottom="@+id/pupilgrade"
    android:layout_toLeftOf="@+id/returncompet"
    android:text="مـــــــن"
    android:textAppearance="?android:attr/textAppearanceMedium" />

  <TextView
    android:id="@+id/Ismtlmees"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentTop="true"
    android:layout_toRightOf="@+id/textView3"
    android:textAppearance="?android:attr/textAppearanceMedium" />

</RelativeLayout>
```

File : pupilwrongresult2.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
  android:id="@+id/RelativeLayout1"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  android:orientation="vertical" >

  <TextView
    android:id="@+id/Answers"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentTop="true"
    android:layout_centerHorizontal="true"
    android:layout_marginTop="21dp"
    android:text="الرياضيات منـــــافســـــة نتـــــيجة"
    android:textAppearance="?android:attr/textAppearanceLarge" />
```

```
<TextView
   android:id="@+id/textView5"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignParentRight="true"
   android:layout_below="@+id/Answers"
   android:layout_marginTop="20dp"
   android:text="التلميذ إجابة"
   android:textColor="#0066FF" />

<TextView
   android:id="@+id/textView3"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignBaseline="@+id/textView2"
   android:layout_alignBottom="@+id/textView2"
   android:layout_alignLeft="@+id/Answers"
   android:text="١٠"
   android:textAppearance="?android:attr/textAppearanceLarge" />
<TextView
   android:id="@+id/textView6"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_below="@+id/pupilgrade"
   android:layout_centerHorizontal="true"
   android:layout_marginTop="16dp"
   android:text="٥درجات  من أقل أحرزت أخرى مـــرة حاول"
   android:textAppearance="?android:attr/textAppearanceMedium"
   android:textColor="#0066FF" />

<TextView
   android:id="@+id/textView4"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_below="@+id/textView6"
   android:layout_centerHorizontal="true"
   android:layout_marginTop="14dp"
   android:text="عـــــــذراً عـــــذراً"
   android:textAppearance="?android:attr/textAppearanceMedium" />


<Button
   android:id="@+id/returncompet"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_alignParentBottom="true"
   android:layout_alignParentRight="true"
   android:layout_marginBottom="25dp"
```

```
    android:layout_marginRight="27dp"
    android:text="للحساب رجوع" />
  <Button
    android:id="@+id/exitend"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBaseline="@+id/returncompet"
    android:layout_alignBottom="@+id/returncompet"
    android:layout_marginRight="14dp"
    android:layout_toLeftOf="@+id/returncompet"
    android:text="وخروج إنهاء" />
  <TextView
    android:id="@+id/pupilgrade"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignTop="@+id/textView5"
    android:layout_marginRight="24dp"
    android:layout_toLeftOf="@+id/textView5"
    android:text="عدد"
    android:textAppearance="?android:attr/textAppearanceLarge" />
  <TextView
    android:id="@+id/textView2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignBottom="@+id/pupilgrade"
    android:layout_toLeftOf="@+id/returncompet"
    android:text="مـــــــن"
    android:textAppearance="?android:attr/textAppearanceMedium" />

  <TextView
    android:id="@+id/Ismtlmees"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentTop="true"
    android:layout_toRightOf="@+id/textView3"
    android:textAppearance="?android:attr/textAppearanceMedium" />

</RelativeLayout>
```

B) Java Codes:

1- **Main.java**

```
package com.mohammed22sustechphd3.blog;

import android.os.Bundle;

import android.app.Activity;

import android.content.Intent;

import android.view.Menu;
```

```
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.Button;
//import android.widget.TextView;
//import android.widget.Toast;

public class Main extends Activity {



   @Override
   public void onCreate(Bundle savedInstanceState) {
      super.onCreate(savedInstanceState);
      setContentView(R.layout.activity_main);

      Button enter = (Button)findViewById(R.id.enter);
      enter.setOnClickListener(new OnClickListener(){
                              @Override
                              public void onClick(View arg0) {

                                    Intent i = new
Intent("com.mohammed22sustechphd3.EnterpupilName");
                                    startActivity(i);
                                    finish();
                                     }

      } );

   }
   @Override
  public boolean onCreateOptionsMenu(Menu menu) {
      // Inflate the menu; this adds items to the action bar if it is present.
      getMenuInflater().inflate(R.menu.main, menu);
      return true;
   }
}
```

2- Enterpupilsdata.java

```
package com.mohammed22sustechphd3.blog;
import java.util.Locale;
import android.app.Activity;
import android.content.ContentValues;
import android.content.Context;
import android.content.Intent;
import android.database.sqlite.SQLiteDatabase;
import android.os.Bundle;
import android.view.View;
import android.view.View.OnClickListener;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;

public class Enterpupilsdata extends Activity {                    // implements
OnClickListener

        //public extends Activity  implements OnClickListener(){

        /** Called when the activity is first created. */
        private static final String SAMPLE_DB_NAME = "PupilInfo.db";
   private static final String tablename="PupilInfo";
   EditText texname,texage;
   Button save;
   SQLiteDatabase db;
   public static final String CONTENT1 = "PupilName";
   public static final String CONTENT2 = "PupilAge";


         @Override
           public void onCreate(Bundle savedInstanceState) {
              super.onCreate(savedInstanceState);
              setContentView(R.layout.enterpupilsdata);
```

```
        Button saved = (Button)findViewById(R.id.savebtn);
        texname=(EditText)findViewById(R.id.pupilName);
      //   texage=(EditText)findViewById(R.id.pupAge);
       //   findViewById(R.id.savebtn).setOnClickListener(this);
        //save=(Button)findViewById(R.id.savebtn);


    /*      db = openOrCreateDatabase("PupilInfor.db" ,
SQLiteDatabase.CREATE_IF_NECESSARY,null);
        db.setVersion(1);
        db.setLocale(Locale.getDefault());


       //Create table
        db.execSQL("CREATE TABLE IF NOT EXISTS "+tablename+" " +
              "( "+CONTENT1+" TEXT," +
              "  "+CONTENT2+" INTEGER ); ");  // PRIMARY KEY
AUTOINCREMENT            */


    /*      save.setOnClickListener(new View.OnClickListener() {


                    final   String pupilname=texname.getText().toString();
                    final int
age=Integer.parseInt(texage.getText().toString());
                    final   String sql1 = "INSERT INTO " +tablename+ " ("
+CONTENT1+ ", " +CONTENT2+ ")
                    VALUES(" +pupilname+  ",'" +age+ "')";
                     db.execSQL(sql1);

                      Toast.makeText(getBaseContext(),"inserted",
Toast.LENGTH_SHORT).show();

                    //  texname.setText("");
```

```
                //          texage.setText("");
                    }
            });

                                                        */
            saved.setOnClickListener(new OnClickListener(){

                                @Override
                                public void onClick(View v) {
                                        // TODO Auto-generated method stub

                                                createDB();
                                }
            });


            Button start = (Button)findViewById(R.id.start1);
                    start.setOnClickListener(new OnClickListener(){
                @Override
                                public void onClick(View v) {
                            Intent i = new
Intent("com.mohammed22sustechphd3.compete");

                                startActivity(i);
                                finish();
                                }

            } );

    Button startdif = (Button)findViewById(R.id.dificult);

    startdif.setOnClickListener(new OnClickListener(){
                @Override
                                public void onClick(View v) {
```

```
                    Intent dif = new
Intent("com.mohammed22sustechphd3.competedif");

                                startActivity(dif);

                                finish();
                }

            } );

        }
        private void createDB()
{
        final   String pupilname=texname.getText().toString();
             Toast.makeText(this, "تم حفـــظ البيانات ",
Toast.LENGTH_LONG).show();
                }
        }
```

3- Compete.java

```
package com.mohammed22sustechphd3.blog;
import android.app.Activity;
import android.content.Intent;
import android.media.MediaPlayer;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;

public class compete extends Activity {

        private String pupilname1;
        private int  NumeralOne;
        private int NumeralTow;
```

```
        private int  Sum;
        private String Src ;  //  for save current EDITITTEXT مربع نص التلميذ
        private int PupilEnter ;  //  for save current EDITITTEXT  تحويل مربع نص التلميذ
إلى عدد صحيح
        public TextView txtView, pupilname;
        private int  i = 0;
        private int  k = 0;

         @Override
           public void onCreate(Bundle savedInstanceState) {
              super.onCreate(savedInstanceState);
              setContentView(R.layout.compete);
              //   لإستقبال بيانات من شاشة إدخال بيانات التلميذ
   /*          // 1. get passed intent
              Intent intent = getIntent();
            // 2. get person object from intent
              Person person = (Person) intent.getSerializableExtra("person");
             // 3. get reference to person textView
              pupilname = (TextView)findViewById(R.id.IsmTlmeez);
             // 4. display name & age on textView
               pupilname.setText(person.toString());                */        // حتى هنا
لإسترجاع الاسم
              //  لإستقبال بيانات من شاشة الإجابة في حالة أقل من خمسة درجات
/*           //   if(person.toString()== null)   pupilname.setText("");
            // 1. get passed intent
              Intent ii = getIntent();
            // 2. get person object from intent
              Person2 person2 = (Person2) ii.getSerializableExtra("person2");
             // 3. get reference to person textView
              pupilname = (TextView)findViewById(R.id.Ismtlmeez2);
             // 4. display name & age on textView
               pupilname.setText(person2.toString());                          */


              Button zero =  (Button)findViewById(R.id.start1);      //  الرقـــــــــم
```

صفـــر

Button one = (Button)findViewById(R.id.one); // الرقم واحـــــــــــــــد

Button tow = (Button)findViewById(R.id.tow2); // الرقـــــم إثنيـــــــــــــــن

Button three = (Button)findViewById(R.id.three3); // الرقـــــــــم ثلاثـــــــــــــــــــــــــــة

Button four = (Button)findViewById(R.id.four4); // الرقـــــــــم أربعـــــــــــــــة

Button five = (Button)findViewById(R.id.five5); // لرقـــــــــــــــــم خمســـــــــــــــتة

Button six = (Button)findViewById(R.id.six6); // الرقـــــــــــــــــم ستـــــــــــــــة

Button seven = (Button)findViewById(R.id.seven7); // الرقـــــــــــــــــم سبعـــــــــــــــة

Button eight = (Button)findViewById(R.id.eight8); // الرقـــــــــــــــــم ثمانيـــــــــــــــة

Button nighn = (Button)findViewById(R.id.nighn9); // لرقـــــــــــتم تسعـــــــــــــــــــــــة

Button del = (Button)findViewById(R.id.delete); // للمســـــــــــــح والتراجـــــــــــع من جانب التلميذ

final TextView numOne = (TextView)findViewById(R.id.value1);

final TextView numTow = (TextView)findViewById(R.id.val2);

Button pushMe = (Button)findViewById(R.id.push);

final String[] Numerals = {"٠","١","٢","٣","٤","٥","٦","٧","٨","٩"};

final String[] Numerals2 = {"٠","١","٢","٣","٤","٥","٦","٧","٨","٩"};

final String[] numone1 = {"","","","","","","","","","","" }; // لتـــــخزين الرقم الأول في مصفوفة لإسترجاعها في الجدول

final String[] numtwo2 = {"","","","","","","","","","","" }; // لتـــــخزين الرقم الأو الثاني في مصفوفة لإسترجاعها في الجدول

final String[] pupilAns = {"","","","","","","","","","","" }; // لتخـــــــــتزين ما يدخله التلميـــــــــــــــذ

final TextView pupname = (TextView)findViewById(R.id.IsmTlmeez);

```
        pupilname1 = pupname.getText().toString();
        final  EditText pupilsval = (EditText)findViewById(R.id.pupilval);



        numOne.setText("٥");
        numTow.setText("٤");

            numone1[i] = numOne.getText().toString();
            numtwo2[i] = numTow.getText().toString();
    //      Toast.makeText(compete.this, "العـــدد الأول" + numone1[i],
Toast.LENGTH_LONG).show();

     //     Toast.makeText(compete.this, "العـــدد االثاني" + numtwo2[i],
Toast.LENGTH_LONG).show();


        pushMe.setOnClickListener(new View.OnClickListener() {


                @Override
                public void onClick(View v) {
                    i++;
                    // Toast.makeText(compete.this, " عـــــــــــــداد
الزيادة" + i, Toast.LENGTH_SHORT).show();


                    //final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                    Src      = pupilsval.getText().toString();
                    if (Src.equals(""))    Src = "0";

                    pupilAns[i] = Src ;              // تخـــــــــزين
إجـــــــــــابة التلمـــــــــــــــــــيذ
                //      Toast.makeText(compete.this, " إجـــــــــــــــــابة
التلميذ" + i +  pupilAns[i], Toast.LENGTH_SHORT).show();
```

```
                    PupilEnter =   Integer.parseInt(Src);
                    if(PupilEnter == Sum)     {
                            k++;
                            Toast.makeText(compete.this, " ممتـــاز إجـــابة
صحيـــــحة ", Toast.LENGTH_SHORT).show();
                            final  MediaPlayer appla =
MediaPlayer.create(compete.this,R.raw.applause);
                            appla.start();                          }

                    else     {
                            Toast.makeText(compete.this, " عـــــذراً
إجـــابة خـــــطـأ ", Toast.LENGTH_SHORT).show();
                            final  MediaPlayer fails =
MediaPlayer.create(compete.this,R.raw.fail);
                            fails.start();          }
                    pupilsval.setText("");
                    int rando =(int) (Math.random()*10);
                    int rando2 = (int) (Math.random()*10);
                    numOne.setText(Numerals[rando]);
                    numTow.setText(Numerals2[rando2]);

                    numone1[i] = numOne.getText().toString();     //
إدخـــــــــال العدد الأول داخل المصفوفة الأولى
                    numtwo2[i] = numTow.getText().toString();     //
إدخـــــــــال العدد الأول داخل المصفوفة الثانية
                //      Toast.makeText(compete.this, "العـــــدد" + i +
numone1[i], Toast.LENGTH_SHORT).show();
                //      Toast.makeText(compete.this, "العـــــدد" + i +
numtwo2[i], Toast.LENGTH_SHORT).show();

                    if (numOne.getText().toString() == "٠" )
                    {
                     NumeralOne = 0;
                    }    else   {
```

```
NumeralOne = Integer.parseInt(numOne.getText().toString());
}

if (numTow.getText().toString() == "٠" )
{    NumeralTow = 0;   }
else        {
NumeralTow = Integer.parseInt(numTow.getText().toString());    }

Sum = NumeralOne + NumeralTow;
if(i==10)
{
Toast.makeText(compete.this, " اتحصـــــــــــــلت على " + k +"١٠ مـــــــــن ", Toast.LENGTH_LONG).show();

if(k>=5)
{

// 1. create an intent pass class name or intnet action name
final Intent j = new Intent("com.mohammed22sustechphd3.pupilresults");
// 2. create person object
Grade  grade = new Grade();
final String tem;
if(k ==5)   { tem="٥";   grade.setGrade = tem;   } else   if(k ==6)  { tem="٦";   grade.setGrade = tem;   }else  if(k ==7)   { tem="٧";   grade.setGrade = tem;   }
else if(k ==8)   { tem="٨";   grade.setGrade = tem;   } else if(k ==9)   { tem="٩";   grade.setGrade = tem;   } else
if(k ==10)   { tem="١٠";   grade.setGrade = tem;   }

// grade.setGrade = k;
// 3. put Grade in intent data
j.putExtra("grade", grade);
/*  // 2. create person object
```

```
    TextView texname=(TextView)findViewById(R.id.IsmTlmeez);
    Person person = new Person();
    person.setName = texname.getText().toString();
  // 3. put person in intent data
    j.putExtra("person", person);                        */

    // 4. start the activity
                    startActivity(j);
                    finish();
                                }         //  endif

                                        if(k<5)
                                {

                                                final Intent g = new
Intent("com.mohammed22sustechphd3.pupilwrongresult");
                                        // 2. create Grade object
                                           Grade  grade = new Grade();
                                           final String tem2;
                                           if(k==0)   { tem2="٠";   grade.setGrade = tem2;
} else if(k==1)   { tem2="١";   grade.setGrade = tem2;   } else
                                                   if(k ==2)    { tem2="٢";   grade.setGrade =
tem2;   } else    if(k ==3)    { tem2="٣";   grade.setGrade = tem2;   }
                                                   else  if(k ==4)    { tem2="٤";
grade.setGrade = tem2;   }


                                                // grade.setGrade = k;
                                       // 3. put Grade in intent data
                                       g.putExtra("grade", grade);

                                     // 2. create person2 object
                                          Person2 person2 = new Person2();
                                          person2.setName2 = pupilname1;
                                         // person.setAge =
Integer.parseInt(texage.getText().toString());
```

```
// 3. put person2 in intent data
                g.putExtra("person2", person2);
            // 4. start the activity
                        startActivity(g);

                    finish();
                                }

                // Toast.makeText(compete.this, "
العـــــــــــــــــــــــــــــــــــــــــداد  وصل رقم 10" + Sum,
Toast.LENGTH_LONG).show();



                }
        //Toast.makeText(compete.this, "ناتج الجمع هو" + Sum,
Toast.LENGTH_LONG).show();

            }


        }) ;

    // for Button Numeral 0  الرقـــــــــــم صفـــر
        zero.setOnClickListener(new View.OnClickListener(){

            @Override
            public void onClick(View v0) {
                final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                Src        = pupilsval.getText().toString();
                pupilsval.setText( Src + "٠" );
            }
        });

// for Button Numeral 1   الرقم واحـــــــــــــــــــد
        one.setOnClickListener(new View.OnClickListener() {
```

```
                @Override
                public void onClick(View v1) {
                 final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                Src       = pupilsval.getText().toString();
                pupilsval.setText( Src + "١" );
                }
        } );
      // for Button Numeral 2    الرقـــم إثنيـــــــــــــــن
        tow.setOnClickListener(new View.OnClickListener() {
                @Override
                public void onClick(View v2) {
                        final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                        Src       = pupilsval.getText().toString();
                        pupilsval.setText( Src + "٢" );
                            }
        });
        // for Button Numeral 3    ا الرقـــــــــم ثلاثثـــــــــــــــــــــــــــــــــم
       three.setOnClickListener(new View.OnClickListener() {
                @Override
                public void onClick(View v3) {
                        final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                        Src       = pupilsval.getText().toString();
                        pupilsval.setText( Src + "٣" );
                }
        });
      // for Button Numeral 4     الرقـــــــــــم أربعـــــــــــــــــة
        four.setOnClickListener(new View.OnClickListener(){
                @Override
                public void onClick(View v4) {
                        final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                        Src       = pupilsval.getText().toString();
                        pupilsval.setText( Src + "٤" );
```

```
                }
        });
    // for Button Numeral 5  الرقـــــــــــــــــم خمســـــــــــــــــتة
        five.setOnClickListener(new View.OnClickListener(){
                @Override
                public void onClick(View v5) {
                        final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                        Src       = pupilsval.getText().toString();
                        pupilsval.setText( Src + "٥" );
                }
        });
    // for Button Numeral 6  الرقـــــــــــــــــم ستـــــــــــــــــة
        six.setOnClickListener(new View.OnClickListener(){
                @Override
                public void onClick(View v6) {
                        final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                        Src       = pupilsval.getText().toString();
                        pupilsval.setText( Src + "٦" );
                }
        });
    // for Button Numeral 7  الرقـــــــــــــــــم سبعـــــــــــــــــة
        seven.setOnClickListener(new View.OnClickListener(){
                @Override
                public void onClick(View v7) {
                        final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                        Src       = pupilsval.getText().toString();
                        pupilsval.setText( Src + "٧" );
                }
        });
 // for Button Numeral 8  الرقـــــــــــــــــم ثمانيـــــــــــــــــة
        eight.setOnClickListener(new View.OnClickListener(){

                @Override
```

```
                public void onClick(View arg8) {
                        final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                        Src        = pupilsval.getText().toString();
                        pupilsval.setText( Src + "٨" );
                }
        });
       // for Button Numeral 9 الرقـــــــــــتم تسعـــــــــــــــــــــــة
        nighn.setOnClickListener(new View.OnClickListener(){
                @Override
                public void onClick(View arg9) {
                        final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                        Src        = pupilsval.getText().toString();
                        pupilsval.setText( Src + "٩" );
                }
        });
// for Button Deletes للمســــــــــح
        del.setOnClickListener(new View.OnClickListener(){
                @Override
                public void onClick(View arg0) {
                        final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                 pupilsval.setText("");
                }
        });

         //  Intent i = new Intent( "com.mohammed22sustechphd3.compete");
          //  startActivityForResult(i,77);


           // TextView valu = (TextView)findViewById(R.id.value1);
         //    valu.setText("٧");

 //Class<RandString> str = RandString.class;
```

```
            if (numOne.getText().toString() == "٠" )
                    {
                     NumeralOne = 0;
                    }    else   {
NumeralOne = Integer.parseInt(numOne.getText().toString());
}

                    if (numTow.getText().toString() == "٠" )
                    {     NumeralTow = 0;   }
                    else         {
NumeralTow = Integer.parseInt(numTow.getText().toString());     }


           Sum = NumeralOne + NumeralTow;
Toast.makeText(compete.this, " ٩" + " هـــو الجمـــع هــدية ناتج الســؤال الأول",
Toast.LENGTH_SHORT).show();
                     }
}
```

4- <u>Competedif.java</u>

```
package com.mohammed22sustechphd3.blog;
import android.app.Activity;
import android.content.Intent;
import android.media.MediaPlayer;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;
public class Competedif extends Activity {

          private String pupilname1;
          private int  NumeralOne;
          private int NumeralTow;
          private int  Sum;
```

```
        private String Src ;  // for save current EDITITTEXT مربع نص التلميذذ
        private int PupilEnter ;  // for save current EDITITTEXT تحويل مربع نص التلميذ
إلى عدد صحيح
        public TextView txtView, pupilname;
        private int  i = 0;
        private int  k = 0;

         @Override
           public void onCreate(Bundle savedInstanceState) {
              super.onCreate(savedInstanceState);
              setContentView(R.layout.competedif);
              //  لإستقبال بيانات من شاشة إدخال بيانات التلميذ

              Button zero =  (Button)findViewById(R.id.start1);      //  الرقـــــــــم
صفـــر
              Button one =  (Button)findViewById(R.id.one);         //  الرقم
واحـــــــــــــــد
              Button tow =  (Button)findViewById(R.id.tow2);        //  الرقـــــم
إثنيـــــــــــــــن
              Button three =  (Button)findViewById(R.id.three3);    //  الرقـــــــــم
ثلاثثـــــــــــــــــــــــــــــــة
              Button four =  (Button)findViewById(R.id.four4);      //
الرقـــــــــــم أربعـــــــــــــــــة
              Button five =  (Button)findViewById(R.id.five5);      //
لرقـــــــــــــــــم خمســـــــــــــــتة
              Button six =  (Button)findViewById(R.id.six6);        //
الرقـــــــــــــــــم ستـــــــــــــــــة
              Button seven =  (Button)findViewById(R.id.seven7);      //
الرقـــــــــــــــــم سبعـــــــــــــــــة
              Button eight =  (Button)findViewById(R.id.eight8);      //
الرقـــــــــــــــــم ثمانيـــــــــــــــــة
              Button nighn =  (Button)findViewById(R.id.nighn9);    // لرقـــــــــــتم
تسعـــــــــــــــــــــة
              Button del =  (Button)findViewById(R.id.delete);      //  للمســـــــــــح
والتراجـــــــــــع من جانب التلميذ
```

```
final  TextView numOne = (TextView)findViewById(R.id.value1);
final  TextView numTow = (TextView)findViewById(R.id.val2);
Button pushMe =  (Button)findViewById(R.id.push);
                                        // THE FIRST ARRAY
final String[] Numerals =
{"٠","١","٢","٣","٤","٥","٦","٧","٨","٩","١٠","١١","١٢","١٣","١٤","١٥","١٦","١٧","
١٨","١٩","٢٠","٢١","٢٢","٢٣","٢٤","٢٥","٢٦","٢٧","٢٨","٢٩","٣٠","٣١","٣٢","٣٣","
٣٤","٣٥","٣٦","٣٧","٣٨","٣٩","٤٠","٤١","٤٢","٤٣","٤٤","٤٥","٤٦","٤٧","٤٨","٤٩","
٥٠"
                        ,"٥١","٥٢","٥٣",
"٥٤","٥٥","٥٦","٥٧","٥٨","٥٩","٦٠","٦١","٦٢","٦٣","٦٤","٦٥","٦٦","٦٧","٦٨","٦٩",
"٧٠","٧١","٧٢","٧٣","٧٤","٧٥","٧٦","٧٧","٧٨","٧٩","٨٠","٨١","٨٢","٨٣","٨٤","٨٥",
"٨٦","٨٧","٨٨","٨٩","٩٠","٩١","٩٢","٩٣","٩٤","٩٥","٩٦","٩٧","٩٨","٩٩"};
                                        // THE SECOND ARRAY
final String[] Numerals2 =
{"٠","١","٢","٣","٤","٥","٦","٧","٨","٩","١٠","١١","١٢","١٣","١٤","١٥","١٦","١٧","
١٨","١٩","٢٠","٢١","٢٢","٢٣","٢٤","٢٥","٢٦","٢٧","٢٨","٢٩","٣٠","٣١","٣٢","٣٣","
٣٤","٣٥","٣٦","٣٧","٣٨","٣٩","٤٠","٤١","٤٢","٤٣","٤٤","٤٥","٤٦","٤٧","٤٨","٤٩","
٥٠"
                        ,"٥١","٥٢","٥٣",
"٥٤","٥٥","٥٦","٥٧","٥٨","٥٩","٦٠","٦١","٦٢","٦٣","٦٤","٦٥","٦٦","٦٧","٦٨","٦٩",
"٧٠","٧١","٧٢","٧٣","٧٤","٧٥","٧٦","٧٧","٧٨","٧٩","٨٠","٨١","٨٢","٨٣","٨٤","٨٥",
"٨٦","٨٧","٨٨","٨٩","٩٠","٩١","٩٢","٩٣","٩٤","٩٥","٩٦","٩٧","٩٨","٩٩"};
final String[] numone1 = {"","","","","","","","","","","" };      //
لتـــــخزين الرقم الأول في مصفوفة لإسترجاعها في الجدول
final String[] numtwo2 = {"","","","","","","","","","","","" };      //
لتـــــخزين الرقم الأو الثاني  في مصفوفة لإسترجاعها في الجدول
final String[] pupilAns = {"","","","","","","","","","","","" };    //
لتخـــــــــتزين ما يدخله التلميـــــــــــــــــذ

final TextView pupname = (TextView)findViewById(R.id.IsmTlmeez);
pupilname1 = pupname.getText().toString();
final  EditText pupilsval = (EditText)findViewById(R.id.pupilval);

numOne.setText("٥");
numTow.setText("٤");
```

```
                numone1[i] = numOne.getText().toString();
                numtwo2[i] = numTow.getText().toString();
        //          Toast.makeText(compete.this, "العـــدد الأول" + numone1[i],
Toast.LENGTH_LONG).show();

         //         Toast.makeText(compete.this, "العـــدد االثاني" + numtwo2[i],
Toast.LENGTH_LONG).show();

            pushMe.setOnClickListener(new View.OnClickListener() {

                    @Override
                    public void onClick(View v) {
                        i++;
                        // Toast.makeText(compete.this, " عـــــــــــــداد
الزيادة" + i, Toast.LENGTH_SHORT).show();

                        //final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                        Src       = pupilsval.getText().toString();
                        if (Src.equals(""))     Src = "0";

                        pupilAns[i] = Src ;                 // تخـــــــــزين
إجـــــــــابة التلمـــــــــــــــــيذ
                    //      Toast.makeText(compete.this, " إجـــــــــــــــابة
التلميذ" + i +  pupilAns[i], Toast.LENGTH_SHORT).show();

                        PupilEnter =   Integer.parseInt(Src);
                        if(PupilEnter == Sum)     {
                            k++;
                            Toast.makeText(Competedif.this, " ممتـــاز
إجـــابة صحيـــحة ", Toast.LENGTH_SHORT).show();
                            final  MediaPlayer appla =
MediaPlayer.create(Competedif.this,R.raw.applause);
                            appla.start();                          }
```

```
                    else    {
                            Toast.makeText(Competedif.this, "عـــــذراً
إجـــابة خـــطـأ ", Toast.LENGTH_SHORT).show();
                            final  MediaPlayer fails =
MediaPlayer.create(Competedif.this,R.raw.fail);
                            fails.start();          }
                    pupilsval.setText("");
                    int rando =(int) (Math.random()*100);
                    int rando2 = (int) (Math.random()*100);
                    numOne.setText(Numerals[rando]);
                    numTow.setText(Numerals2[rando2]);

                    numone1[i] = numOne.getText().toString();    //
إدخـــــــــال العدد الأول داخل المصفوفة الأولى
                    numtwo2[i] = numTow.getText().toString();    //
إدخـــــــــال العدد الأول داخل المصفوفة الثانية
                //      Toast.makeText(compete.this, "العـــــدد" + i +
numone1[i], Toast.LENGTH_SHORT).show();
                //      Toast.makeText(compete.this, "العـــــدد" + i +
numtwo2[i], Toast.LENGTH_SHORT).show();

                    if (numOne.getText().toString() == "٠" )
                    {
                     NumeralOne = 0;
                    }   else   {
            NumeralOne = Integer.parseInt(numOne.getText().toString());
            }

                    if (numTow.getText().toString() == "٠" )
                    {     NumeralTow = 0;   }
                    else        {
            NumeralTow = Integer.parseInt(numTow.getText().toString());    }


            Sum = NumeralOne + NumeralTow;
            if(i==10)
```

```
                    {
                        Toast.makeText(Competedif.this, "
اتحصـــــــــــــــلت على " + k +"١٠ مـــــــــن ", Toast.LENGTH_LONG).show();

                        if(k>=5)
                    {

                            // 1. create an intent pass class name or
intnet action name
                final Intent j = new
Intent("com.mohammed22sustechphd3.pupilresult2");
       // 2. create person object
            Grade  grade = new Grade();
            final String tem;
                if(k ==5)    { tem="٥";   grade.setGrade = tem;   } else   if(k ==6)
{ tem="٦";   grade.setGrade = tem;   }else  if(k ==7)    { tem="٧";   grade.setGrade =
tem;   }
                        else if(k ==8)    { tem="٨";   grade.setGrade = tem;   } else
if(k ==9)    { tem="٩";   grade.setGrade = tem;   } else
                        if(k ==10)    { tem="١٠";   grade.setGrade = tem;   }

            // grade.setGrade = k;
    // 3. put Grade in intent data
    j.putExtra("grade", grade);
/*  // 2. create person object
    TextView texname=(TextView)findViewById(R.id.IsmTlmeez);
    Person person = new Person();
    person.setName = texname.getText().toString();
  // 3. put person in intent data
    j.putExtra("person", person);                    */

    // 4. start the activity
            startActivity(j);
            finish();
                    }        //  endif
```

```
if(k<5)
{

final Intent g = new
Intent("com.mohammed22sustechphd3.pupilwrongresul2");
// 2. create Grade object
Grade  grade = new Grade();
final String tem2;
if(k==0)   { tem2="٠";   grade.setGrade = tem2;
} else if(k==1)   { tem2="١";   grade.setGrade = tem2;   } else
if(k ==2)    { tem2="٢";   grade.setGrade =
tem2;   } else    if(k ==3)    { tem2="٣";   grade.setGrade = tem2;   }
else  if(k ==4)    { tem2="٤";
grade.setGrade = tem2;   }


// grade.setGrade = k;
// 3. put Grade in intent data
g.putExtra("grade", grade);

// 2. create person2 object
Person2 person2 = new Person2();
person2.setName2 = pupilname1;
// person.setAge =
Integer.parseInt(texage.getText().toString());
// 3. put person2 in intent data
g.putExtra("person2", person2);
// 4. start the activity
startActivity(g);

finish();
}

// Toast.makeText(compete.this, "
العــــــــــــــــــــــــــــــــــــــــداد وصل رقم 10" + Sum,
Toast.LENGTH_LONG).show();
```

```
                                    }
        //Toast.makeText(compete.this, "ناتج الجمع هو" + Sum,
Toast.LENGTH_LONG).show();

                                }



                            }) ;




        // for Button Numeral 0  الرقـــــــــم صفـــر
            zero.setOnClickListener(new View.OnClickListener(){

                                @Override
                                public void onClick(View v0) {
                                        final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                                        Src        = pupilsval.getText().toString();
                                        pupilsval.setText( Src + "٠" );
                                }
                    });

// for Button Numeral 1    الرقم واحـــــــــــــــــد
                    one.setOnClickListener(new View.OnClickListener() {
                                @Override
                                public void onClick(View v1) {
                                 final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                                Src        = pupilsval.getText().toString();
                                pupilsval.setText( Src + "١" );
                                }
```

```
        } );
    // for Button Numeral 2 الرقـــم إثنيـــــــــــــــن
      tow.setOnClickListener(new View.OnClickListener() {
                @Override
                public void onClick(View v2) {
                        final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                        Src       = pupilsval.getText().toString();
                        pupilsval.setText( Src + "٢" );
                            }
      });
      // for Button Numeral 3 ا الرقـــــــم ثلاثثـــــــــــــــــــــــــــــم
      three.setOnClickListener(new View.OnClickListener() {
                @Override
                public void onClick(View v3) {
                        final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                        Src       = pupilsval.getText().toString();
                        pupilsval.setText( Src + "٣" );
                }
      });
    // for Button Numeral 4 الرقـــــــــــم أربعـــــــــــــــــة
      four.setOnClickListener(new View.OnClickListener(){
                @Override
                public void onClick(View v4) {
                        final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                        Src       = pupilsval.getText().toString();
                        pupilsval.setText( Src + "٤" );
                }
      });
    // for Button Numeral 5 الرقـــــــــــــــــم خمســـــــــــــــــتة
      five.setOnClickListener(new View.OnClickListener(){
                @Override
                public void onClick(View v5) {
                        final  EditText pupilsval =
```

```
(EditText)findViewById(R.id.pupilval);
                        Src       = pupilsval.getText().toString();
                        pupilsval.setText( Src + "٥" );
                    }
            });
        // for Button Numeral 6    الرقـــــــــــــــــم ستـــــــــــــــــة
            six.setOnClickListener(new View.OnClickListener(){
                    @Override
                    public void onClick(View v6) {
                        final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                        Src       = pupilsval.getText().toString();
                        pupilsval.setText( Src + "٦" );
                    }
            });
        // for Button Numeral 7    الرقـــــــــــــــــم سبعـــــــــــــــة
            seven.setOnClickListener(new View.OnClickListener(){
                    @Override
                    public void onClick(View v7) {
                        final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                        Src       = pupilsval.getText().toString();
                        pupilsval.setText( Src + "٧" );
                    }
            });
 // for Button Numeral 8  الرقـــــــــــــــــم ثمانيـــــــــــــــــة
            eight.setOnClickListener(new View.OnClickListener(){

                @Override
                public void onClick(View arg8) {
                    final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                    Src       = pupilsval.getText().toString();
                    pupilsval.setText( Src + "٨" );
                }
            });
```

```
// for Button Numeral 9 الرقـــــــــــتم تسعـــــــــــــــــــــــة
nighn.setOnClickListener(new View.OnClickListener(){
        @Override
        public void onClick(View arg9) {
                final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                Src        = pupilsval.getText().toString();
                pupilsval.setText( Src + "٩" );
        }
});
// for Button Deletes للمســــــــــح
del.setOnClickListener(new View.OnClickListener(){
        @Override
        public void onClick(View arg0) {
                final  EditText pupilsval =
(EditText)findViewById(R.id.pupilval);
                pupilsval.setText("");
                }
});

 //  Intent i = new Intent( "com.mohammed22sustechphd3.compete");
   //  startActivityForResult(i,77);


   // TextView valu = (TextView)findViewById(R.id.value1);
 //    valu.setText("٧");

//Class<RandString> str = RandString.class;

if (numOne.getText().toString() == "٠" )
        {
         NumeralOne = 0;
        }    else   {
NumeralOne = Integer.parseInt(numOne.getText().toString());
}
```

```
                    if (numTow.getText().toString() == "٠" )
                    {     NumeralTow = 0;   }
                    else        {
        NumeralTow = Integer.parseInt(numTow.getText().toString());     }


                Sum = NumeralOne + NumeralTow;
        Toast.makeText(Competedif.this, " ٩" + " هـــو الجمـــع ناتج هــدية الســؤال الأول",
        Toast.LENGTH_SHORT).show();
                }
        }
```

5- Grade.java

```
package com.mohammed22sustechphd3.blog;
import java.io.Serializable;
public class Grade implements Serializable {

private static final long serialVersionUID = 1L;

 // getters & setters....

public String setName;

public String setGrade;

@Override
public String toString() {

        return " " + setGrade + " ";

}

}
```

6- Person.java

```
package com.mohammed22sustechphd3.blog;

import java.io.Serializable;

public class Person  implements Serializable {

        private static final long serialVersionUID = 1L;

        //private String name;
        //private int age;
```

```
        // getters & setters....

        public String setName;

        public int setAge;

        @Override
        public String toString() {
                return "التلميـــذ [الإســـم" + setName + ", العـــمـــر" + setAge + "]";
        }

/*      public String setName(String name) {
                return "Person [name=" + name + "]";

        }

        public String setAge(int age) {
                return "Person [ age=" + age + "]";

        }                                                   */
}
```

7- Person2.java

```
package com.mohammed22sustechphd3.blog;

import java.io.Serializable;

public class Person2 implements Serializable {

private static final long serialVersionUID = 1L;


        public String setName2;


        @Override
        public String toString() {
                return "" + setName2 + "";
        }

}
```

8- Pupilresults.java

```
package com.mohammed22sustechphd3.blog;

import android.app.Activity;

import android.content.Intent;

import android.media.MediaPlayer;

import android.os.Bundle;

import android.view.View;

import android.widget.Button;

import android.widget.TextView;
```

```
public class pupilresults extends Activity {
        public TextView txtView, pupilname;
        TextView pupilgrad;
         @Override
           public void onCreate(Bundle savedInstanceState) {
              super.onCreate(savedInstanceState);
              setContentView(R.layout.pupilresults);

            // 1. get passed intent
              Intent intent = getIntent();
           // 2. get person object from intent
              Grade grade = (Grade) intent.getSerializableExtra("grade");
            // 3. get reference to person textView
              pupilgrad = (TextView)findViewById(R.id.pupilgrade);
           // 4. display name & age on textView
              pupilgrad.setText(grade.toString());

          //  لإستقبال بيانات من شاشة إدخال بيانات التلميذ
 /*                  // 1. get passed intent
                     Intent J = getIntent();
                   // 2. get person object from intent
                     Person person = (Person) J.getSerializableExtra("person");
                    // 3. get reference to person textView
                     pupilname = (TextView)findViewById(R.id.Ismeltlmees1);
                    // 4. display name & age on textView
                      pupilname.setText(person.toString());                    */



              Button retur =  (Button)findViewById(R.id.returncompete);
              Button end =  (Button)findViewById(R.id.Exit);

              final  MediaPlayer nansy =
MediaPlayer.create(pupilresults.this,R.raw.shater);
              nansy.start();
```

```
        retur.setOnClickListener(new View.OnClickListener() {

                                @Override
                                public void onClick(View v) {
                                        Intent i = new
Intent("com.mohammed22sustechphd3.compete");
                                        startActivity(i);
                                        finish();
                                        nansy.stop();
                                }
                });

                end.setOnClickListener(new View.OnClickListener() {

                                @Override
                                public void onClick(View v) {
                                        finish();
                                        nansy.stop();
                                }
                 });
          }
}
```

9- pupilresult2.java

```
package com.mohammed22sustechphd3.blog;
import android.app.Activity;
import android.content.Intent;
import android.media.MediaPlayer;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;

public class pupilresult2 extends Activity {
        public TextView txtView, pupilname;
```

```
TextView pupilgrad;
 @Override
   public void onCreate(Bundle savedInstanceState) {
      super.onCreate(savedInstanceState);
      setContentView(R.layout.pupilresults);

    // 1. get passed intent
      Intent intent = getIntent();
   // 2. get person object from intent
      Grade grade = (Grade) intent.getSerializableExtra("grade");
    // 3. get reference to person textView
      pupilgrad = (TextView)findViewById(R.id.pupilgrade);
   // 4. display name & age on textView
      pupilgrad.setText(grade.toString());



      Button retur =  (Button)findViewById(R.id.returncompete);
      Button end =  (Button)findViewById(R.id.Exit);

      final  MediaPlayer nansy =
MediaPlayer.create(pupilresult2.this,R.raw.shater);
      nansy.start();

      retur.setOnClickListener(new View.OnClickListener() {

                              @Override
                              public void onClick(View v) {
                                    Intent i = new
Intent("com.mohammed22sustechphd3.competedif");
                                    startActivity(i);
                                    finish();
                                    nansy.stop();

                              }
      });
```

```
        end.setOnClickListener(new View.OnClickListener() {

                                    @Override
                                    public void onClick(View v) {
                                        finish();
                                        nansy.stop();
                                    }
                });
            }

}
```

10- pupilwrongresult.java

```
package com.mohammed22sustechphd3.blog;
import android.app.Activity;
import android.content.Intent;
import android.media.MediaPlayer;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;

public class pupilwrongresult extends Activity {
        public TextView txtView, pupilname  ;
        private String pupilname1;
        TextView pupilgrad;
        @Override
   public void onCreate(Bundle savedInstanceState) {
      super.onCreate(savedInstanceState);
      setContentView(R.layout.pupilwrongresult);

      // 1. get passed intent
      Intent g = getIntent();

      // 2. get person object from intent
      Person2 person2 = (Person2) g.getSerializableExtra("person2");

      // 3. get reference to person textView
```

```
pupilname = (TextView)findViewById(R.id.Ismtlmees);

// 4. display name & age on textView
pupilname.setText(person2.toString());
pupilname1 = pupilname.getText().toString();


// 1. get passed intent
Intent intent = getIntent();

// 2. get person object from intent
Grade grade = (Grade) intent.getSerializableExtra("grade");

// 3. get reference to person textView
pupilgrad = (TextView)findViewById(R.id.pupilgrade);

// 4. display name & age on textView
pupilgrad.setText(grade.toString());


Button returc =  (Button)findViewById(R.id.returncompet);
Button endex =  (Button)findViewById(R.id.exitend);

    final  MediaPlayer tacher = MediaPlayer.create(pupilwrongresult.this,R.raw.taecher);
    tacher.start();


returc.setOnClickListener(new View.OnClickListener() {

                        @Override
                        public void onClick(View v) {
                                Intent ii = new
Intent("com.mohammed22sustechphd3.compete");

                                // لتمرير التلميذ في مربع النص ليرجع يظهر مرة أخرى
                                // 2. create person2 object
                        Person2 person2 = new Person2();
                        person2.setName2 = pupilname1;
                       // person.setAge = Integer.parseInt(texage.getText().toString());
```

```
                // 3. put person2 in intent data
                        ii.putExtra("person2", person2);
                    // 4. start the activity
                            startActivity(ii);
                            finish();
                            tacher.stop();
                        }
            });

            endex.setOnClickListener(new View.OnClickListener() {

                        @Override
                        public void onClick(View v) {
                            finish();
                            tacher.stop();


                        }
             });
        }
            }
```

11- pupilwrongresult2.java

```
package com.mohammed22sustechphd3.blog;
import android.app.Activity;
import android.content.Intent;
import android.media.MediaPlayer;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;

public class pupilwrongresult2 extends Activity {
        public TextView txtView, pupilname  ;
        private String pupilname1;
        TextView pupilgrad;
        @Override
   public void onCreate(Bundle savedInstanceState) {
      super.onCreate(savedInstanceState);
      setContentView(R.layout.pupilwrongresul2);

      // 1. get passed intent
      Intent g = getIntent();

      // 2. get person object from intent
      Person2 person2 = (Person2) g.getSerializableExtra("person2");

      // 3. get reference to person textView
```

```
        pupilname = (TextView)findViewById(R.id.Ismtlmees);

        // 4. display name & age on textView
        pupilname.setText(person2.toString());
        pupilname1 = pupilname.getText().toString();


        // 1. get passed intent
        Intent intent = getIntent();

        // 2. get person object from intent
        Grade grade = (Grade) intent.getSerializableExtra("grade");

        // 3. get reference to person textView
        pupilgrad = (TextView)findViewById(R.id.pupilgrade);

        // 4. display name & age on textView
        pupilgrad.setText(grade.toString());


        Button returc =  (Button)findViewById(R.id.returncompet);
        Button endex =  (Button)findViewById(R.id.exitend);

            final  MediaPlayer tacher = MediaPlayer.create(pupilwrongresult2.this,R.raw.taecher);
            tacher.start();


        returc.setOnClickListener(new View.OnClickListener() {

                                    @Override
                                    public void onClick(View v) {
                                            Intent ii = new
Intent("com.mohammed22sustechphd3.competedif");

                                                    // أخرى مرة يظهر ليرجع النص مربع في التلميذ لتمرير
                                                    // 2. create person2 object
                                    Person2 person2 = new Person2();
                                    person2.setName2 = pupilname1;
                                   // person.setAge = Integer.parseInt(texage.getText().toString());
              // 3. put person2 in intent data
                                    ii.putExtra("person2", person2);
                                 // 4. start the activity
                                                    startActivity(ii);
                                                    finish();
                                                    tacher.stop();
                                    }
        });

        endex.setOnClickListener(new View.OnClickListener() {

                                    @Override
                                    public void onClick(View v) {
                                            finish();
                                            tacher.stop();
                                    }
         });


    }
```

```
}
```

12- PupliName.java

```
package com.mohammed22sustechphd3.blog;

import android.content.Context;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteDatabase.CursorFactory;
import android.database.sqlite.SQLiteOpenHelper;

public class PupliName extends SQLiteOpenHelper {
        public static final String DATABASE_NAME = "PupilName.db";
        public static final String TABLE_NAME    = "pupil_nameT";
        public static final String COL_1         ="ID";
        public static final String COL_2         = "NAME";
        public static final String COL_3         = "AGE";


        public PupliName(Context context) {
                super(context, DATABASE_NAME, null, 2);
                SQLiteDatabase dataname = this.getWritableDatabase();
        }

        @Override
        public void onCreate(SQLiteDatabase dataname) {

                 dataname.execSQL("create table" + TABLE_NAME +"(ID INTEGER PRIMARY
KEY AUTOINCREMENT, NAME TEXT,AGE INTEGER)" );
        }

        @Override
        public void onUpgrade(SQLiteDatabase dataname, int oldVersion, int newVersion) {
                dataname.execSQL(" DROP TABLE IF IT EXISTS " + TABLE_NAME);
                onCreate(dataname);
        }

}
```

13- RandString.java

```
        package com.mohammed22sustechphd3.blog;

        import java.util.ArrayList;

        import java.util.List;

        import java.util.Random;

        import android.app.Application;


        public class RandString extends Application {


                static final int SLEEP_TIME = 2 * 1000; //expressed in milliseconds


          static public void   main(String[] args) throws InterruptedException {
```

```
        List<String> list = new ArrayList<String>();
       //  String s = "١٢٣٤٥٦٧٨٩";
        list.add(".");
        list.add("١");
        list.add("٢");
        list.add("٣");
        list.add("٤");
        list.add("٥");
        list.add("٦");
        list.add("٧");
        list.add("٨");
        list.add("٩");
        Random rg = new Random();
        String randomElement;
        int listSize = list.size();

        if (listSize < 2)
            return;

       // while(true) {
            randomElement = list.get(rg.nextInt(listSize));
          //  System.out.println(randomElement);
       //     Thread.sleep(SLEEP_TIME);
       // }

            }
}
```