SUDAN UNIVERSITY OF SCIENCE & TECHNOLOGY

FACULTY OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

DEPARTMENT OF COMPUTER SYSTEMS AND NETWORKS

AUTOMATIC CHECK-IN AT AIRPORT

August 2014

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آيـــــــــــة

قال تعالى:

(يُؤْتِي الْحِكْمَةَ مَنْ يَشَاءُ وَمَنْ يُؤْتَ الْحِكْمَةَ فَقَدْ أُوتِيَ خَيْراً كَثِيراً وَمَا يَذَّكَّرُ إِلاَّ أُولُو الأَلْبَابِ)

البقرة{269}

الحمد لله

الحمد لله الذي خلق كل شي وقدّره, والحمد لله الذي له الأمر جميعا ومدبره, الحمد لله الأول لا شيء قبله, الحمد لله الآخر لا شيء بعده, الحمد لله الظاهر فوق كل شيء وقاهره, الحمد لله الباطن لا يخفى عليه شيء ومُبصره, الحمد لله مالك الملك كله وحاكمه, الحمد لله الحي الذي لا يموت, الحمد لله بعدد ما خلق,الحمد لله ملئ السموات وملئ ما حوت, الحمدلله ملئ الأرض وما حوت وما يمشي عليها وما هوساكن فوقها وتحتها, الحمدلله بعدد كلماته التي لاتنفذ, الحمد لله بسعة علمه الذي لا ينفذ, الحمد لله منذ ان كان وحده ولم يكن سواه احد, الحمد لله منذ ان خلق القلم وخلق السموات والأرض,الحمد لله حين أستوى على العرش,الحمد لله حين خلق آدم وسواه وكرمه على كثير ممن خلق, الحمد لله الذي علمه الأسماء وخلق له حواء, الحمد لله الذي أمر الملائكة بالسجود له, عليه,الحمد لله الذي جعله خليفة في الأرض الحمد لله الذي علمه التوبة فتاب.

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DEDICATION

BATOOL

To my live guidance, to my father (Khairy).

To My Lovely Mother, who is my heart that pulsates in my essence.

To my brothers and sisters especially my sister Suhaila Mohamed Alfatih .

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To my dear mother, the ornament of women, who cannot be described by articulated letters and connected words.

To the source of my happiness my sisters and brother.

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LIST OF TERMS

Term	Description
GUI	Graphical User Interface.
e-Gate	Electronic gate.
RFID	Radio Frequency Identification.
ODBC	Open Database Connectivity.
MYSQL	Open source relational database management system.
I/O	Input /Output.
ID	Identification.
e-commerce	Electronic commerce.
PC	Personal Computer.
RF	Radio frequency.
UAE	United Arab Emirates.
SSO	Single Sign-On.
URL	Uniform Resource Locator.
IT	Information Technology.
UML	Unified Modeling Language.

e-mail	Electronic mail.
DNATA	Dubai National Air Travel Agency.

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ABSTRACT

Electronic processes in all aspects of daily life can't be ignored, and that is because of the rapid progress in the world of technology, and the use of modern technology, and increasing conviction that they should be a pattern for achieving tasks quickly and easily, and a center of the development.

So we used all available techniques in this research to provide a system that applies the concept of electronic check in the airport; where the travelers can have e-cards used easily in traveling, just by passing them on the reader (RFID reader) to read the data and taking fingerprint to match identity. This process is done in an electronic gate(e-gate), and we used the Java language (JAVA) in this system, and server (MySQL server) to store and manage data.

One of the problems that lead to make the system is the queues in the airport in front of the accouter; The e-Gate will give us high efficiency in handling issues such as huge growth rates in passenger numbers, the use of fake passports and the reduction of time in completing passenger procedures at the counters to 12-14 seconds only, which is a record time.

The goal of this research to provide a system helps all travelers to travel easily and quickly without trouble and without loss of time in the queues.

المستخلص

لم يعد بالإمكان تجاهل العمليات الإلكترونية في جميع نواحي الحياة اليومية، وذلك بسبب التقدم السريع في عالم التقنية، وإستخدام وسائل التقنية الحديثة، وزيادة الإقتناع بضرورة كونها نمطاً لتنفيذ الأعمال بسرعة و سهولة ومركزاً للتطور.

لذلك تم إستخدام كل ما هو متاح من تقنيات في هذا البحث ليقدم نظام يطبق مفهوم التحقق الإلكتروني في المطار؛ حيث يمكَن النظام المسافرين بإمتلاك بطاقات إلكترونية تُستخدم في السفر بكل سهولة ويسر، فقط من خلال تمرير بطاقاتهم على القارئ (RFID reader) لقراءة البيانات وأخذ بصمة اليد لمطابقه الهويه. تتم هذه العملية في بوابة الكترونية، وقمنا بإستخدام لغة الجافا (JAVA) في كتابه النظام، وتم استخدام مخدّم (MySQL server) لتخزين وإدارة البيانات.

إن من المشاكل التي من أجلها تم تحديد فكرة النظام مشكلة الطوابير في المطار أمام عمليه التحقق من البيانات؛ فإن البوابة الإلكترونية تعطينا الكفاءة العالية في التعامل مع قضايا مثل معدلات نمو هائلة في أعداد المسافرين، واستخدام جوازات سفر مزورة والحد من الوقت في إنهاء إجراءات الركاب في 12-14 ثانية فقط، وهو وقت قياسي .

يهدف هذا البحث لتوفير نظام يساعد كل المسافرين علي السفر بسهولة وسرعة دون عناء ومن دون ضياع الزمن في الطوابير.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

There is no doubt that the scientific developments achieved by human in the twentieth century has an effective impact on the way of life in all contemporary societies, technology has contributed to this modern development by speeding data processing and storage, called and used in all calculations, statistical and analytical requirements to cope with life which also led to the speed completion of the tasks and the speed of business and achieving goals. With the beginning of the twenty-first century atheist and became incumbent on all the different institutions that are compatible with the conditions of modern life required by IT , so this sense of information technology has become a real weapon in all its forms to address the many challenges that we face as individuals and as a nation, and thus the national economy , Where he became a national goal of technological development and the real need for the growth of society and the development of the capacities of its members and good use of resources and protection. At the time it was developing these techniques had to be used in the nation benefit from the speed of completion of the work and save time and exploited at all useful.

Hence, from here show up the idea of e-Gate in airport as a means to develop the travel process which was done to carry a number of papers that can be lost and a lot of wasted time queues So as to make travel at airports simpler, easier and faster what can be.

1.2 PROBLEM STATE

Frequent travelers entering and exiting from Airports wait in a long queue to check their tickets, visa and get there boarding pass which causes a waste of time .They also carry a lot of papers with possible loss of these papers or to be rupture, which makes travel problems or sometimes causes loss of flight.

1.3 OBJECTIVES OF THE PROJECT

1. Reducing the time needed to complete the required procedures when traveling.
2. Reducing overcrowding at airport.
3. Reducing employment.
4. Reducing the loss of papers.

1.4 THE IMPORTANCE OF RESEARCH

Travelers do not need to wait in a long queue to get there boarding pass, if they use an e-Gate Card (you go to the e-Gate, swipe your card, touch the panel to match your fingerprint and you will finish in 5-10 seconds, saving your valuable time). And also they do not need to carry a bag so they can but their papers in it which can make them feel uncomfortable.

The system outcomes will be: improving the airport system by making a self-service kiosk that tests the ticket and user validity and gives the boarding pass and the luggage tags.

1.5 SCOPE

The research will cover the travel agency part of programming the RFID card and the airport chick-in part to test the validity of the ticket and traveler.

1.6 METHODOLOGY

The research follows the descriptive analytical method where analysis of the current system have been recording customer data using a computer and store their own data, and the research will convert the verification process of the traditional paper tickets to the process based on checking tickets which are stored in RFID cards.

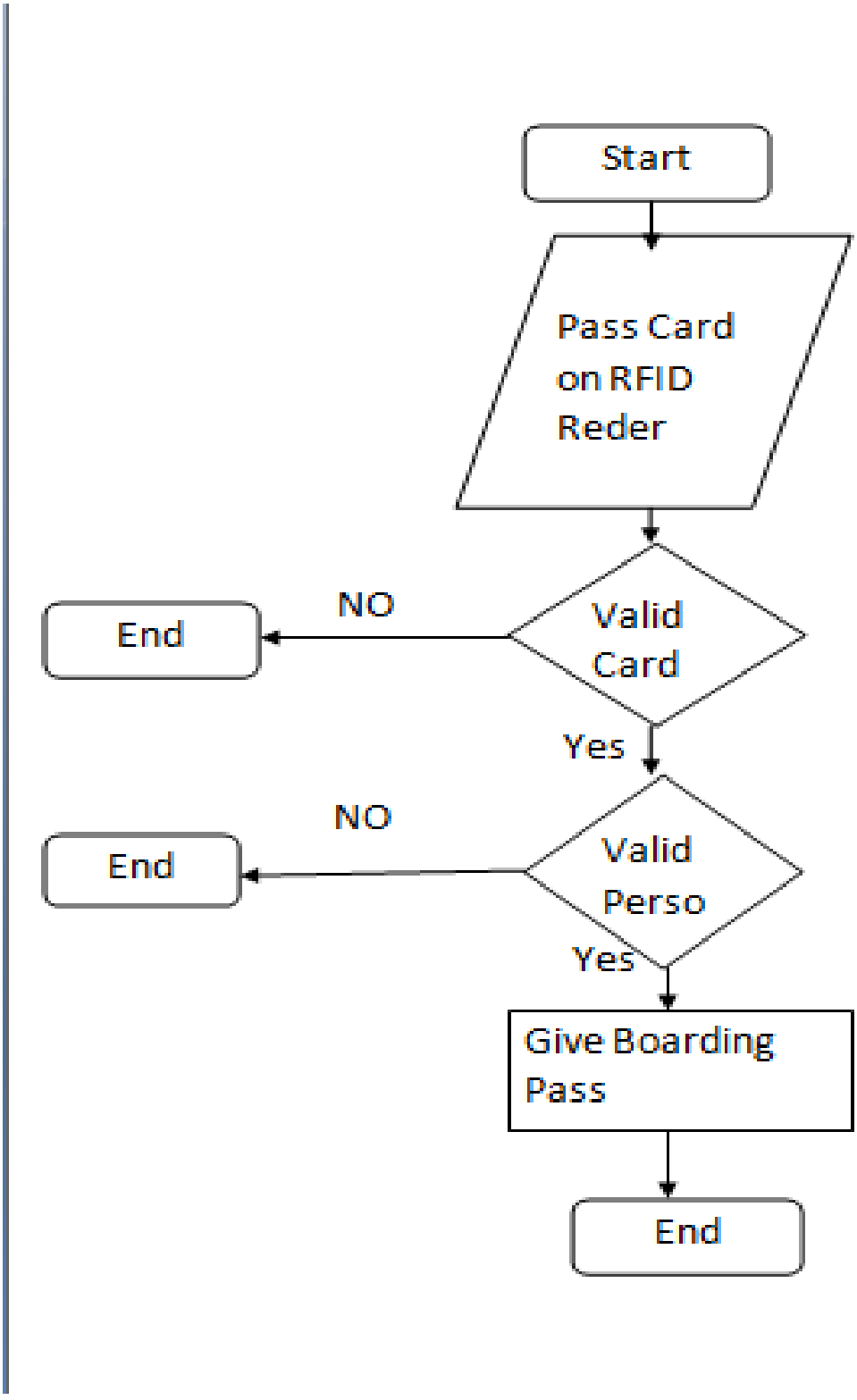


Figure (1.1) flow chart of the project.

1.7 TECHNIQUES AND TOOLS USED IN THE RESEARCH

1. RFID Reader.
2. RFID Cards.
3. Finger print reader.
4. Java.
5. ODBC connector.
6. MYSQL.
7. Enterprise Architect.
8. UML.
9. SUST Mail Server.
10. SUST SMS Server.

CHAPTER 2

BACKGROUND

PART ONE

THEORETICEL FRAEWORK

2.1 INTRODUCTION:

Technology has become an important element in the present age, so it had to be tapped to facilitate optimal exploitation operations that serve our everyday lives in all respects, whether scientific, political, economic and many others, whether individuals or institutions. So was the adoption of electronic payment as a technique for the idea of the project for its immense benefits in facilitating the payment and cancel the paperwork and save a lot of time and effort.

2.1.1 DEFINITION OF AUTOMATIC CHECK-IN:

Is a useful service that helps you in saving your time by receiving your boarding pass without check-in .

2.1.2 FACTORS THAT HELPED IN USE AUTOMATIC CHECK-IN:

1. Low cost of technology :

The cost of technology used in networks decreases costs day by day, which is evident from the fact that computers are now cheap and the Internet has Almost become widespread everywhere in the world almost.

2. Reduce operational cost and downloads:

Because of the low cost of the technology, we find that the cost of processing trade activities are becoming less different from the past. The reason behind this is the fact that traditional transaction is the loss of a lot of paper and time in the transactions.

2.1.3 AUTOMATIC CHECK-IN AT AIRPORT:

Is a way to examine the traveler's information through e-cards; to organize the screening process and reduce the time that was wasted without interest in trading manual examination [2].

This method uses e-cards and readers of their own; gives the officer the ability to scan the card data (the ticket and make sure of traveler identity) quickly. Where the traveler needs to pass his card on the reader located at the airport and then extracted traveler the boarding pass and then heading for the hall waiting for the aircraft with ease and without any delay.

In the past, the vetting process was done manually by airport staff, and some countries has been converted screening systems at airports of manual examination using magnetic cards manually but the system was more than electronically; where the traveler has to enter his card in the machine called reader and the selection of the proper place of the seat in the plane and then wait out the card with the boarding pass.

(Figure 2.1): Automatic check-in machine

2.1.4 RFID TECHNOLOGY

2.1.4.1 HISTORY:

In the past, the technique most commonly used in systems to identify the mechanism is the bar code, which was used heavily in all industrial systems and consumables; because they are cheap and available to read safe, but due to its dependence on the physical contact between the reader and the card became applied impractical in some applications, in addition to some defects such as:

1. Low volume of data that can be stored.
2. Each unit cannot be given a unique number for; where they are given a unique number for each class.
3. The need to confront the reader with the card.
4. Unable to read more than one card at the same time.
5. Unable to re-programming it.

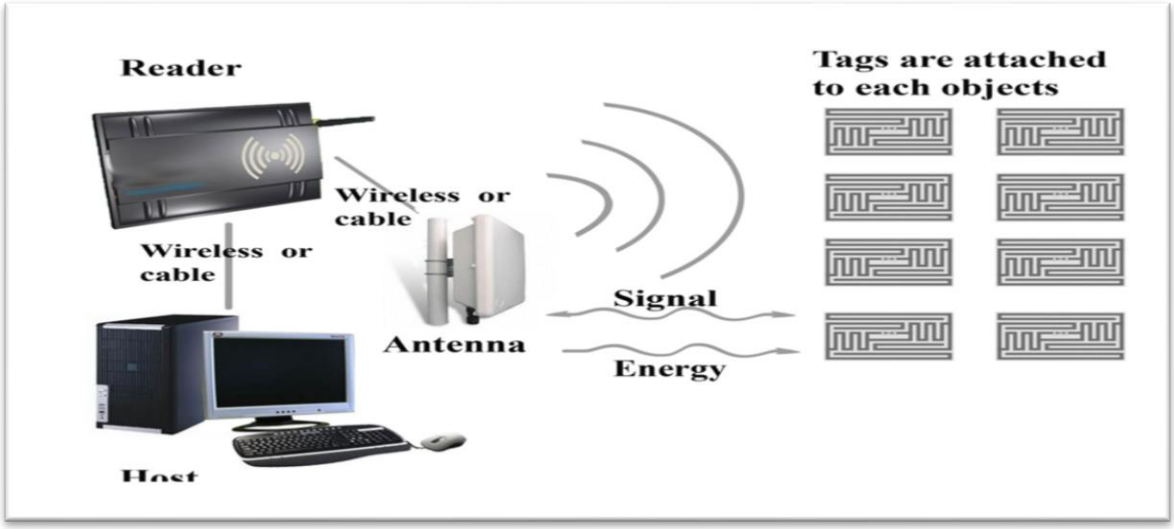
2.1.4.2 DEFINITION OF RFID:

wireless radio or identification using radio frequencies for a tell (Radio Frequency Identification) [3].

2.1.4.3 RFID COMPONENTS:-

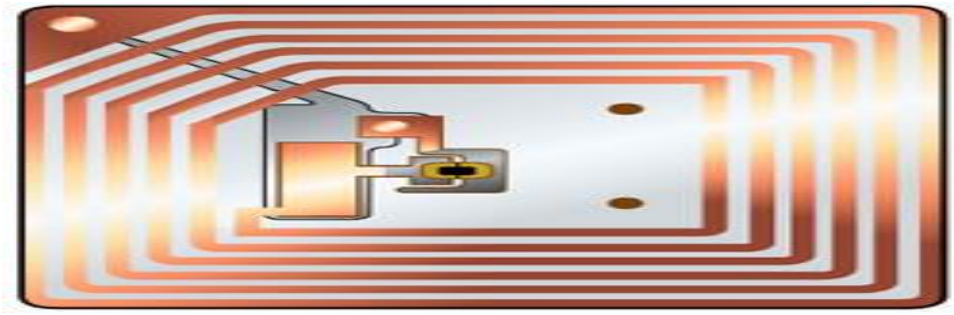
This technique consists of two main components:

1. Chips / Segments micro which are electromechanically issue a radio frequency (radio waves).
2. Readers which are capture data a certain range.



(Figure 2.2): RFID System

These slides are made of silicon and contain an antenna (Antenna) to send and receive waves / radio frequency, and contain some of the slides on the memories in small sizes for data storage.



(Figure 2.3) illustrates the components of the chip RFID.

2.1.4.4 TYPES OF RFID CHIPS :-

1. The active slide:

Contain an internal power source that can generate the energy needed to broadcast and receive frequencies at any moment to be the same size slides around the size of a coin, and with a relatively large memory (compared to other types) and high frequencies.

2. Slides inert:

Also called negative slides, do not contain a battery or power source, but fed electromagnetic waves from the reader with the capacity is weak because it

draws energy only when the reception and slow response.

3. Slides semi-inert (semi-passive): -

Contains internal batteries that last for a long time capacity, it is also faster than the chips inert and can lead active functions, even in the absence of the reader (for example, temperature recording).

2.1.4.5 WORKING PRINCIPLE:

Receiving antenna is located in the slide electromagnetic frequencies of the reader and the electronic circuit that operates in the slide and the information is transmitted and received by the reader and transmitted to a computer and there are computer programs to be processed and stored in databases.

Slides take different forms depending on applications, for example, they can be in the form of posters or in the form of key chains or pens can also be implanted under the skin, whether for humans or animals.

(Figure 2.4): cultivation slides in human body.

2.1.4.6 APPLICATION OF RFID :

RFID technology can be used in various applications including:

1. Tracking of goods and products.
2. Tracking luggage of travelers.
3. pricing and audit processes in sales and warehouses
4. locate the material.
5. Prevention of theft / impersonation.
6. Control access to protected places.

(Figure 2.5): Different types of segments of RFID

2.1.4.7 OVERLAPPING RFID: -

Affected by the RFID technology frequencies issued by the wireless transmission systems nearby; because they operate in frequencies over the joint, leading to interference with other systems.

This overlap can be avoided by using wireless devices with different frequencies, or to operate these devices at different times.

PART TWO

PREVIOS STUDIES

2.2 INTRODUCTION:-

Explains previous studies about automatic check-in at airport and some application use RFID.

2.2.1 IMPLEMENTATION OF RFID IN LIBRARY:

A library is a growing organism. As it grows in size the problems associated with the maintenance and security of the documents also grows. The researchers have always helped the librarian in solving their problems. To solve the problems of arranging documents in order they have given classification schemes. To solve the problems of searching documents they have given cataloging guidelines. To solve the problems of space and time they have taught librarians to digitize the documents and share over network. To automate the counter activities they gave us bar-codes. Bar-codes have served the librarians and libraries for a long time, and now it is slowly getting replaced by RFID.

The first paper discovers the technology, implementation methodologies, advantages and disadvantages of RFID in library.[1]

2.2.2 RFID TECHNOLOGY IN LIBRARIES:

The concept of RFID can be simplified to that of an electronic barcode and can be used to identify, track, sort or detect library holdings at the circulation desk and in the daily stock maintenance. This system, consist of smart RFID labels, hardware and software, provides libraries with more effective way of managing their collections while providing greater customer service to their patrons.

[1] http://front.cc.nctu.edu.tw/Richfiles/18368-ViewContentServelet.pdf

The technology works through flexible, paper-thin smart labels, approximately 2X2cm in size, which allows it to be placed inconspicuously on the inside cover of each book in a library's collection. The tag consists of an etched antenna and a tiny chip which stores vital bibliographic data including a unique access number to identify each item. This contrasts with a barcode label, which does not store any information, but merely points to a database. These smart labels are applied directly on library books and can be read with an RFID interrogator/scanner. Line of sight is not essential for reading the tags with the scanner, therefore, the books require much less human handling to be read and processed. Middleware or Savant software integrates the reader hardware with the existing Library Automation Software for seamless functioning of circulation.

The information contained on microchips in the tags affixed to library materials is read using radio frequency technology regardless of item orientation or alignment. It provides a contact less data link, without need for line of sight, for example, the documents in the shelves or cardboard boxes can be checked without removing or opening. RFID has no concerns about harsh environments that restrict other auto ID technologies such as bar codes. Tags have a discrete memory capacity that varies from 96 bits to 2kbytes. In addition to tags, an RFID system requires a means for reading or "interrogating" the tags to obtain the stored data and then some means of communicating this tag data to library information system.

RFID-based systems have been implemented for efficient document tracking purpose throughout the libraries that combine, easier and faster charging and discharging of documents, security of materials, inventorying, stock verification and shelf handling. RFID tag's transponders listen for a radio query from the reader and respond by transmitting their unique ID code. Most RFID tags have no batteries; they use the power from the initial radio signal to transmit their response.

(Figure 2.6): library System

2.2.3 RFID COMPONENTS:

Normally a RFID package for library consists of eight components: RFID tags, a self check-out station, a staff check-out station, a self-return book drop with an automatic check-in feature, a tagging station, a set of security gates, a shelf scanner for inventory and an administrative station. The self-checkout station allows patrons to borrow books without assistance from the library staff. The staff checkout station is used when patrons prefer staff assistance. The book drop allows returned books to be processed instantly by updating the database the moment the items pass through the chute. The shelving station speeds the process of sorting the returned books for re-shelving. The shelf scanner allows library staff to take inventory and find wrongly shelved books without having to pull the books off the stacks.

2.2.4 HOW TAGS COMMUNICATE:

The communication process between the reader and the tag is by wireless. The major differences between the different types of waves are the distances covered by one cycle of the wave and the number of waves that pass a certain point during a set time period. The wavelength is the distance covered by one cycle of a wave. The frequency is the number of waves passing a given point in one second. For any electromagnetic wave, the wavelength multiplied by the frequency equals the speed of light. The frequency of an RF signal is usually expressed in hertz (Hz).

Basically what happens is that when the reader is switched on it starts emitting a signal at the selected frequency band (in library HF is used with 13.56 MHz). Any corresponding tag in the vicinity of the reader will detect the signal and use the energy from it, to wake up and supply operating power to its internal circuits. Once the tag has decoded the signal as valid, it replies to the reader and indicates its presence by modulating (affecting) the reader field.

2.2.5 ADVANTAGES OF RFID SYSTEMS:

1. Rapid charging/discharging: The use of RFID reduces the amount of time required to perform circulation operations. The most significant time savings are attributable to the facts that information can be read from RFID tags much faster than from barcodes and that several items in a stack can be read at the same time. While initially unreliable, the anti-collision algorithm that allows an entire stack to be charged or discharged now appears to be working well.

2. Simplified patron self-charging/discharging: For patrons using self-charging, there is a marked improvement because they do not have to carefully place materials within a designated template and they can charge several items at the same time. Patron self-discharging shifts that work from staff to patrons. Staff is relieved further when readers are installed in book drops.

3. High reliability: The readers are highly reliable. Some RFID systems have an interface between the exit sensors and the circulation system to identify the items moving out of the library. Were a patron to run out of the library and not be intercepted, the library would at least know what had been stolen. If the patron card also has an RFID tag, the library will also be able to determine who removed the items without properly charging them. This is done by designating a bit as the "theft" bit and turning it off at time of charge and on at time of discharge.

4. High-speed inventorying: unique advantage of RFID systems is their ability to scan books on the shelves without tipping them out or removing them. A hand-held inventory reader can be moved rapidly across a shelf of books to read all of the unique identification information. Using wireless technology, it is possible not only to update the inventory, but also to identify items which are out of proper order.

5. Automated materials handling: Another application of RFID technology is automated materials handling. This includes conveyor and sorting systems that can move library materials and sort them by category into separate bins or onto separate carts. This significantly reduces the amount of staff time required to ready materials for reselling. Given the high cost of the equipment, this application has not been widely used.

6. Long tag life: Finally, RFID tags last longer than barcodes because nothing comes into contact with them. Most RFID vendors claim a minimum of 100,000 transactions before a tag may need to be replaced.

7. Fast Track Circulation Operation.

The use of RFID reduces the amount of time required to perform circulation operations. The most significant time savings are attributable to the facts that information can be read from RFID tags much faster than from barcodes.

2.2.6 DISADVANTAGES OF RFID SYSTEMS:

1. High cost: The major disadvantage of RFID technology is its cost.

2. Vulnerability to compromise: It is possible to compromise an RFID system by wrapping the household foil to block the radio signal. It is also possible to compromise an RFID system by placing two items against one another so that one tag overlays another. That may cancel out the signals. This requires knowledge of the technology and careful alignment.

3. Removal of exposed tags: The RFID Tags cannot be concealed in either spine or gutter of the books and are exposed for removal. If a library wishes, it can insert the RFID tags in the spines of all except thin books; however, not all RFID tags are flexible enough. A library can also imprint the RFID tags with its logo and make them appear to be bookplates, or it can put a printed cover label over each tag.

2.2.7 E-GATE CARD FOR DUBAI AND ABU DHABI:

Frequent travelers entering and exiting from Dubai International Airport do not need to wait in a long queue to get a passport stamped, if they use an eGate Card. You head to the eGate, swipe your card, touch the panel to match your fingerprint and you are through in 5-10 seconds, saving you valuable time.

2.2.8 CRITERIA AND DOCUMENTS FOR E-GATE CARD:

1. New eGate card holder's presence.
2. Original passport (with at least 6 month's validity).
3. Person must be either a UAE citizen or an expatriate holding a resident visa.
4. Passport photograph.

2.2.9 VALIDITY OF CARD:

The e-Gate Card is valid for two years. A similar procedure and fees are required for renewal.

2.2.10 AVAILABILITY OF E-GATE CARD:

1. Dubai Airport.
2. Abu Dhabi Airport and Al Ain Airport.
3. Dubai, Abu Dhabi and Al Ain Naturalization Departments.
4. From DNRD Jebel Ali Branch.
5. DNRD Abu Hail Office.
6. DNATA Dubai Airline Centre, Shaikh Zayed Road. Call 04 3166966 for information.
7. With an HSBC-Etihad Credit Card.

2.2.11 IDENTIFICATION CARD:

May be used A smart card, chip card, or integrated circuit card (ICC) is any pocket-sized card with embedded integrated circuits. Smart cards are made of plastic, generally polyvinyl chloride, but sometimes polyethylene terephthalate based polyesters, acrylonitrile butadiene styrene or polycarbonate. Since April 2009, a Japanese company has manufactured reusable financial smart cards made from pape.

Smart cards can provide identification, authentication, data storage and application processing Smart cards may provide strong security authentication for single sign-on (SSO) within large organizations.

2.2.12 BIOMETRIC PHYSICAL ACCESS CONTROL TO SUPPORT HIGH SECURITY REQUIREMENTS:

The BRS SAWIC system has been designed to meet the demanding security requirements of international airports. The solution is based on the TWIC guidelines issued by the US Transportation Security Administration and provides biometric fingerprint templates held on a PIV compatible smartcard with online authentication to an enterprise-wide physical access

control system (PACS).

The BRS BioLock + Smart Reader can operate in indoor environments or in outdoor environments exposed to the weather due to its IP65 rating.

The SAWIC smartcard uses the ISO/IEC 14443 contactless interface to provide both high transaction throughput and high data integrity.

(Figure 2.7) Biolock combined with smartcard reader

(Finger 2.8) smartcard reader.

2.2.12.1 SPECIFICATIONS:

FINGERPRINT READER

BRS BIOLOCK+ READER MODEL NO. BL0004V01

1. A touch type sensor utilizing RF scanning technology.
2. Supports communications via 10BaseT and Wiegand.
3. Installed on the non-secure side of the door while the secure I/O board (SIOB) is located on the secure side.
4. Connection between the SIOB and Reader head is encrypted by a secure pairing, and when broken can only be re-enabled by resetting the pairing from the secure s side of the building.
5. Single factor authentication involving 1:2 match between a presented fingerprint and a template stored on the smartcard is provided with a matching read speed of less than 1 second.
6. remote access and internal log accessible via internal web interface
7. NTP (Network Time protocol) and configurable TCP ports and IP address

2.2.13 SMARTCARD READER:

BRS SMART CARD READER MODEL NO. BL0045V01

1. 13.56MHz Contactless type smartcard.
2. Communication between the smart-card and Smart Card Reader complies with ISO/IEC 14443 (types A and B) and has data transfer rates of at least 106Kbps, 212Kbps and 424Kbps.
3. The ability to read and write to the smartcard is supported.
4. Reliable read range of up to 6cm when communicating.
5. In Mode 1, the Reader is configured with an attached blanking plate (BRS part number CP0022v01).

2.2.14 CARD SPECIFICATIONS:

BRS CONTACTLESS SMARTCARD MODEL NO. CP0115V01

1. 13.56 MHz contactless smartcard conforming to communications protocol ISO.
2. 14443/1-4 Types A or B.
3. Minimum of 64kb EEPROM user memory.
4. PIV compatible.
5. Blank white and printable.
6. Magnetic stripe not required.

2.2.15 SAUDI ARABIAN AIRPORTS INTRODUCE NEW E-GATE SYSTEM:

Two airports in Saudi Arabia, King Khaled International Airport in Riyadh and King Fahd International Airport in Dammam, will shortly implement a new e-gate system that will recognize and process foreigners as they are entering and exiting the country.

The introduction of the new system will help facilitate faster and safer immigration at the airports, allowing only five to seven seconds of processing per person at the electronic gate. This will eliminate the need to wait in long queues for an immigration officer to stamp and verify individual passports; alternatively, to grant clearance, they will now instruct people to punch their cards at the gates and press their index fingers on allocated pads that will identify the fingerprints. In terms of significance, the e-gates will help supplement the five percent annual increase of passengers using airports, a trend that is expected to continue over the next ten years. Therefore, the Passport Department in Saudi Arabia has announced that additional e-gate facilities will be added to the Kingdom shortly after the unveiling of the ones in Riyadh and Dammam.

2.2.16 COMPARISON BETWEEN E-GATE CARD FOR DUBAI/ABU DHABI AIRPORT AND SAUDI ARABIAN AIRPORTS:

When you enter the system Web portal at the airport in Dubai and Abu Dhabi, we noticed that the screening confidential process is through 5-10 and is due this command to capture an image of the fingerprint face and eye remotely through a high resolution camera and comparison instant between the image of the user and the image on the passport; comes so keep up with the growth within the large numbers of travelers, while at Two airports in Saudi Arabia, King Khaled International Airport in Riyadh and King Fahd International Airport in Dammam, this process is done through 5-7 seconds and is due to check through your recipes closets (fingerprints and fingerprints eye).

CHAPTER 3

TOOLS AND TICHNIQUES

3.1 INTRODUCTION

This chapter discusses the tools in order to create, analyze and test our project.

3.2 RFID READER

An RFID reader is basically a radio frequency (RF) transmitter and receiver controlled by a microprocessor. The reader, using an attached antenna, captures data from RFID enabled smart label tags, then passes the data to a computer for processing. A number of factors can affect the distance at which a tag can be read (the read range). The frequency used for identification, the antenna gain, the orientation and polarization of the reader antenna and the transponder antenna, as well as the placement of the tag on the object to be identified has an impact on the RFID system's read range.

An RFID system has a scanning device that is typically a handheld device, but can also be used with antennas that are fixed at certain key locations such as doorways to media storage areas. The scanner 'looks' for an RFID tag that has been programmed with a VOLSER number. The scanning antenna puts out radio-frequency signals in a relatively short range. This provides a means of communicating with the RFID tag and it provides the RFID tag with the energy to communicate. This is the reason that passive RFID tags do not need to contain batteries, and can therefore remain usable for very long periods of time.

3.3 RFID TAGS

An RFID tag is a microchip combined with an antenna in a compact package; the packaging is structured to allow the RFID tag to be attached to an object to be tracked.

The tag's antenna picks up signals from an RFID reader or scanner and then returns the signal, usually with some additional data (like a unique serial number or other customized information).

RFID tags can be very small - the size of a large rice grain. Others may be the size of a small paperback book.

3.4 FINGERPRINT

A fingerprint is an impression of the friction ridges found on the inner surface of a finger or a thumb.

The science of fingerprinting constitutes the only unchangeable and infallible means of positive identification known to man.

The reasons why fingerprints are used for identification purposes are outlined below. These premises are supported by scientific research in areas such as biology, embryology, anatomy and histology to name a few:

1. Ridge patterns and the details in small areas of friction ridges are unique and never repeated.
2. Friction ridges develop on the fetus in their definitive form before birth.
3. Ridges are persistent throughout life except for permanent scarring.
4. Friction ridge patterns vary within limits which allow for classification.

A device fingerprint or machine fingerprint or browser fingerprint is information collected about a remote computing device for the purpose of identification. Fingerprints can be used to fully or partially identify individual users or devices even when cookies are turned off.

Recently such fingerprints have proven useful in the detection and prevention of online identity theft and credit card fraud.

3.5 MySQL

Is a relational database management uses the method of the relationship between the tables , it is also a other language than procedural and thus differ from programming languages such as (java and C) where the languages non- procedural languages are specialized , the language of the deal and control with databases interconnected by dealing with data structures and make the process of data entry and deletion , sorting and searching , and so on , plus it's available under an open license , as they are designed around three concepts Head of speed , stability, and ease of learning.

3.5.1 MYSQL ADVANTAGES

1 . Compatibility with several types of database systems.
2 . Supported language (PHP) is very effective.
3 . Relatively easy to use.
4 . Advantage of speed.
5 . The broad scope of use.
6 . Open Source.

8 . With the suitability of the proposed system in terms of its support for the volume of data to function efficiently and effectively.

3.6 ODBC

In computing, ODBC (Open Database Connectivity) is a standard programming language middleware API for accessing database (DBMS). The designers of ODBC aimed to make it independent of database systems and operating; an application written using ODBC can be ported to other platforms, both on the client and server side, with few changes to the data access code.

ODBC accomplishes DBMS independence by using an ODBC driver as a translation layer between the application and the DBMS. The application uses ODBC functions through an ODBC driver manager with which it is linked, and the driver passes the query to the DBMS. An ODBC driver can be thought of as analogous to a printer or other driver, providing a standard set of functions for the application to use.

ODBC was originally developed by Microsoft during the early 1990s, and became the basis for the Call Level Interface (CLI) standardized by SQL Access Group in the Unix and mainframe world.

3.7 ENTERPRISE ARCHITECT

Is one of the tools used in software engineering computer-assisted, and is used in the design and analysis systems, and depends on its design language (UML)

3.7.1 FEATURES

1. The ability to manage and monitor the requirements of large and complex systems.

2. System design through the construction of independent models.

3. Deals with many programming languages such as Java , C and C + +.

3.8 UML

The Unified Modeling Language (UML) is a general-purpose modeling language in the field of software engineering. It provides a set of graphic notation techniques to create visual models of object-oriented software-intensive systems. It was developed by Grady Booch, Ivar Jacobson and James Rumbaugh at Rational

Software in the 1990s.[1] It was adopted by the Object Management Group (OMG) in 1997, and has been managed by this organization ever since. In 2000 the Unified Modeling Language was accepted by the International Organization for Standardization (ISO) as a standard for modeling software-intensive systems.

Unified Modeling Language (UML) combines techniques from data modeling (entity relationship diagrams), business modeling (work flows), object modeling, and component modeling. It can be used with all processes, throughout the software development life cycle, and across different implementation technologies.[2]

The Unified Modeling Language (UML) offers a standard way to visualize a system's architectural blueprints, including elements such as:

1. Activities.
2. Actors.
3. Business processes.
4. Database schemas.
5. Logical components.
6. Programming language statements.
7. Reusable software components.

3.9 JAVA

Java is a programming language developed for the first time by James Gosling at Sun Microsystems, which is now part of the of Oracle Corporation was published the first version in 1995 as part of Sun Microsystems' Java platform., And is a language specifically designed for use in a Distributed Environment of the Internet as is designed to operate on the principle (look and feel) as in C++ language, but easier to use than C++, and also used the principle of (OO). Java can be used to create complete applications that may run on a single computer or be distributed among (clients and servers) in the network.

3.10 SUST MAIL SERVER

SUST mail server is one of the many servers owned by Sudan University Of Science & Technology. It is used by their employee’s and student’s to send e-mails via the internet.

3.11 SUST SMS SERVER

SUST SMS server is an SMS server which indicated to server Sudan University of Science & Technology employee's and student's .The messages are sent using one of the Sudanese telecommunication companies.

3.12 AAA LOGO

Program for design logo at our company "EGO Airways ".

CHAPTER 4

SYSTEM DESCRIPTION AND ANALYSIS

PART ONE

DESCRIPTION OF THE PROPOSED SYSTEM

4.1.1 INTRODUCTION

This section describes the proposed system, the users and their interaction with the system.

4.1.2 SYSTEM DESCRIPTION

Entering the system by two kinds of users:

1. Traveler :

   This user can check-in in one of the flight by using his ticket which is saved in RFID card and match his finger-print for authentication.

2. Member:

   This can be a system manager, agent or airport user. In order to login to the system each user has to enter his name and password to match them with the data-base.

4.1.3 SYSTEM USERS

1-System manager and he can do the following:

1. Add new line.
2. Add new fight.
3. Cancel flight.
4. View passengers who did confirm booking in one of the flight.
5. View passengers who booked in one of the flight but didn't confirm booking.
6. Update price or date and time for one of flight, also he can add, view and delete users.

2-Agent

He is responsible for the traveler booking and confirms their booking.

3-Airport user

He is responsible for printing traveler's information that did check for the flight in order to but the names in the plane black-box.

4-Traveler:

He can check in one of the flight he can validate himself by his ticket card and his finger-print.

PART TWO

SYSTEM ANALYSIS

4.2.1 INTRODUCTION

This part contains analyzing the proposed system using the Unified Modeling Language (UML).

4.2.2 THE DIAGRAMS:

The figure number (4.1) is a use case diagram describes the users and what they can do in the system.

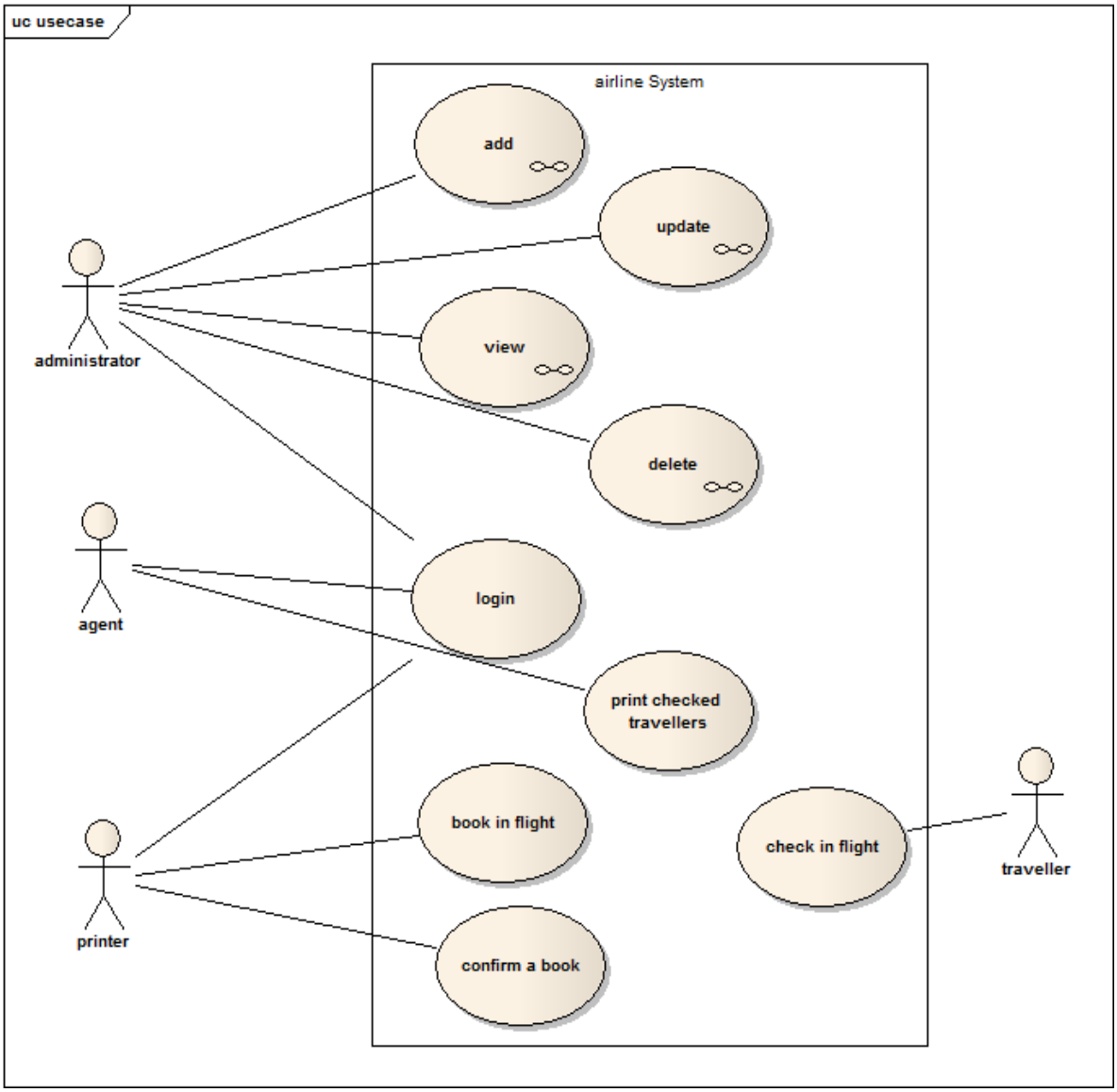


Figure (4.1): Use case Diagram

The figure number (4.2) is a sequence diagram describes the users login in the system.

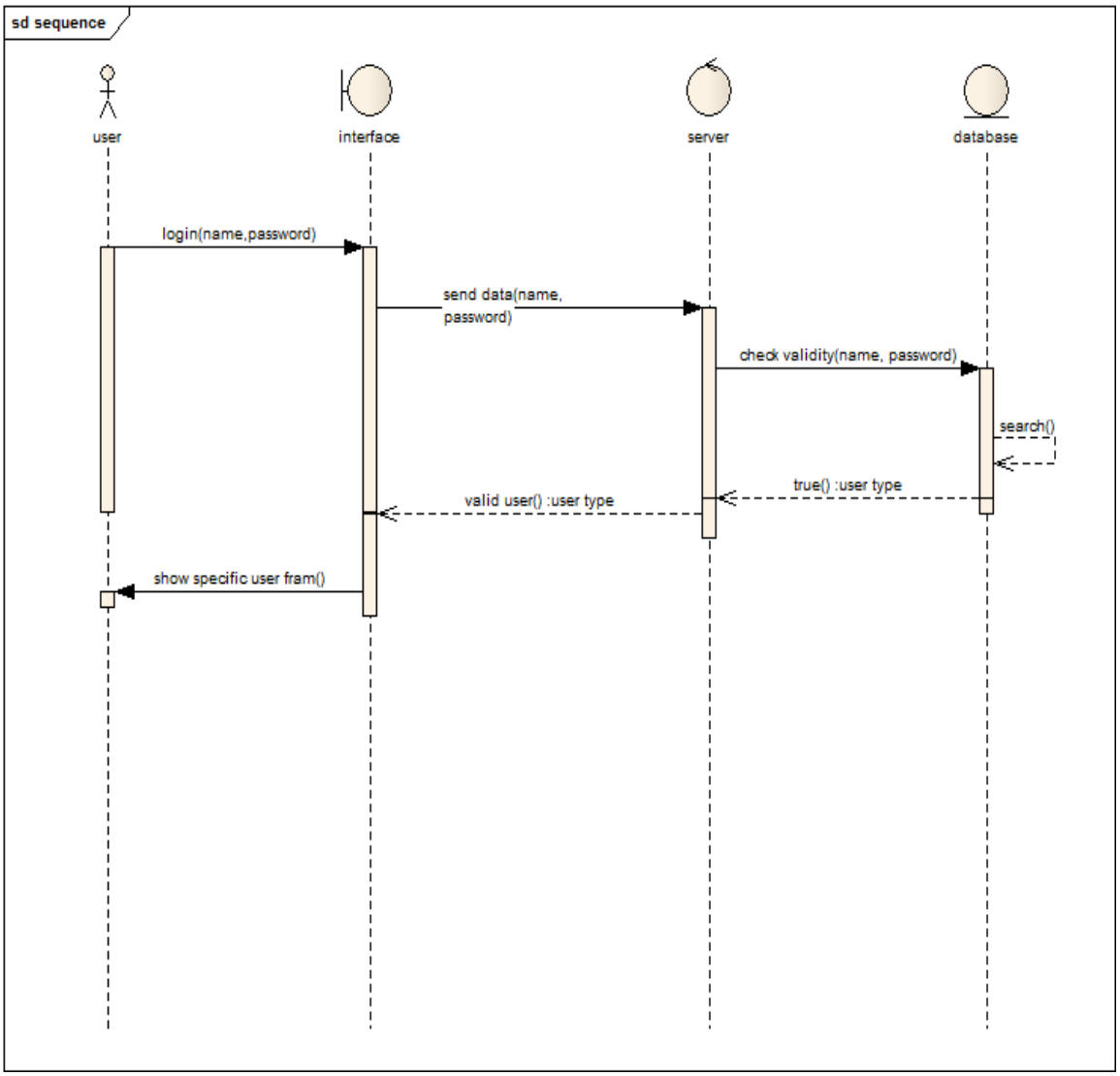


Figure (4.2): users login sequence diagram

The figure number (4.3) is a sequence diagram describes adding new line operation in the system.

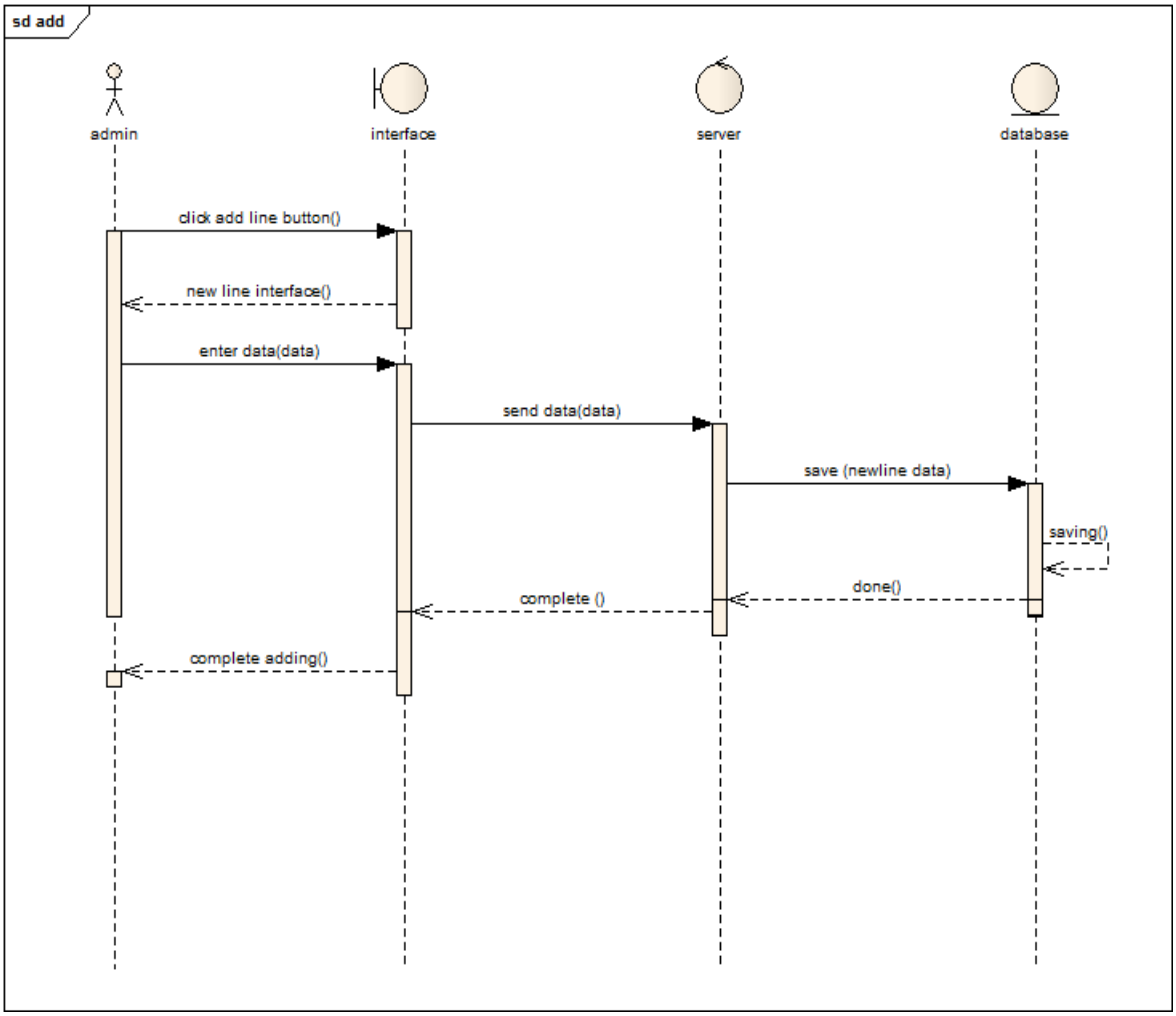


Figure (4.3): add new line sequence diagram

The figure number (4.4) is a sequence diagram describes booking sets operation in specific flight by the agency for passenger.

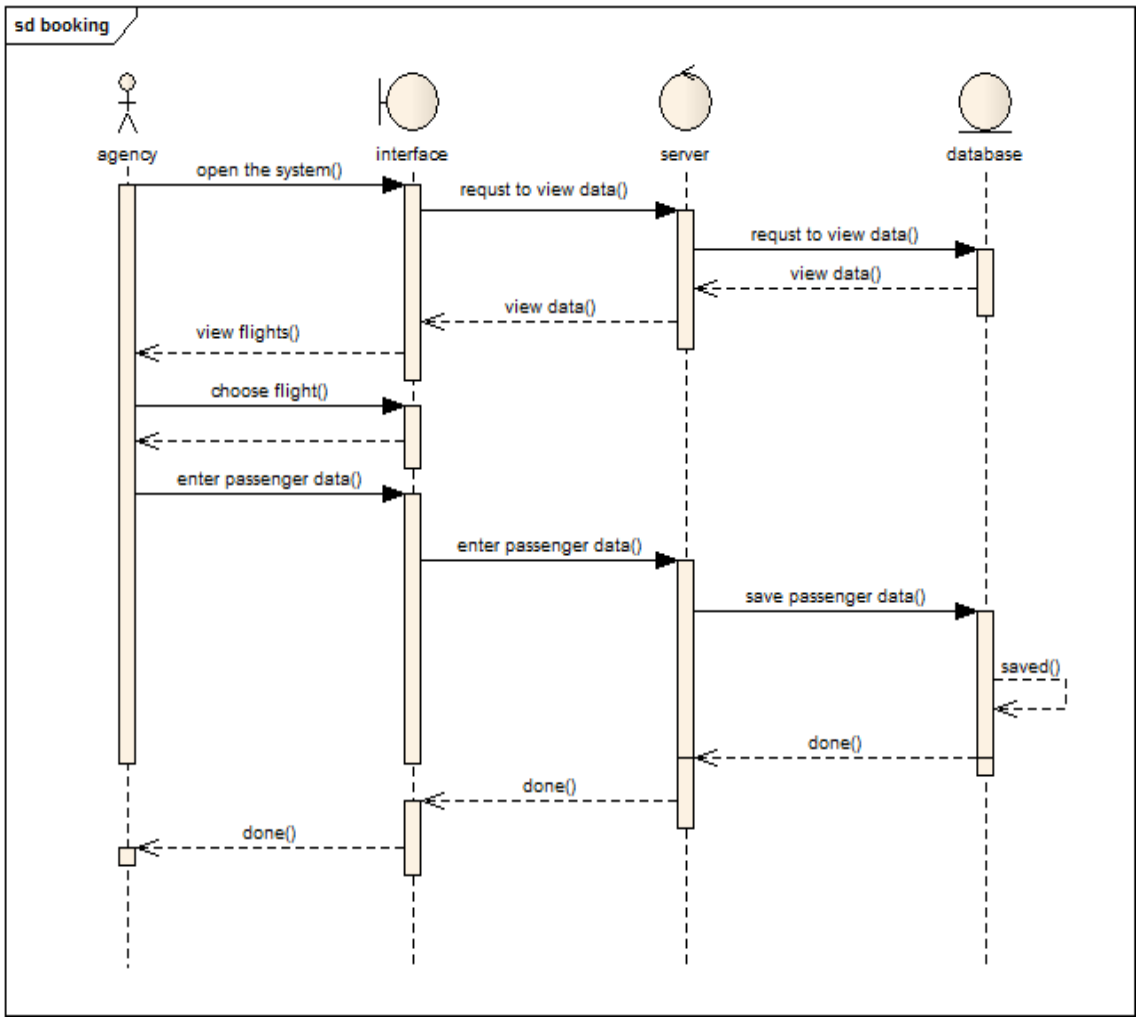


Figure (4.4): booking sets sequence diagram

The figure number (4.5) is a sequence diagram describes confirm operation after booked, by the agency for passengers.

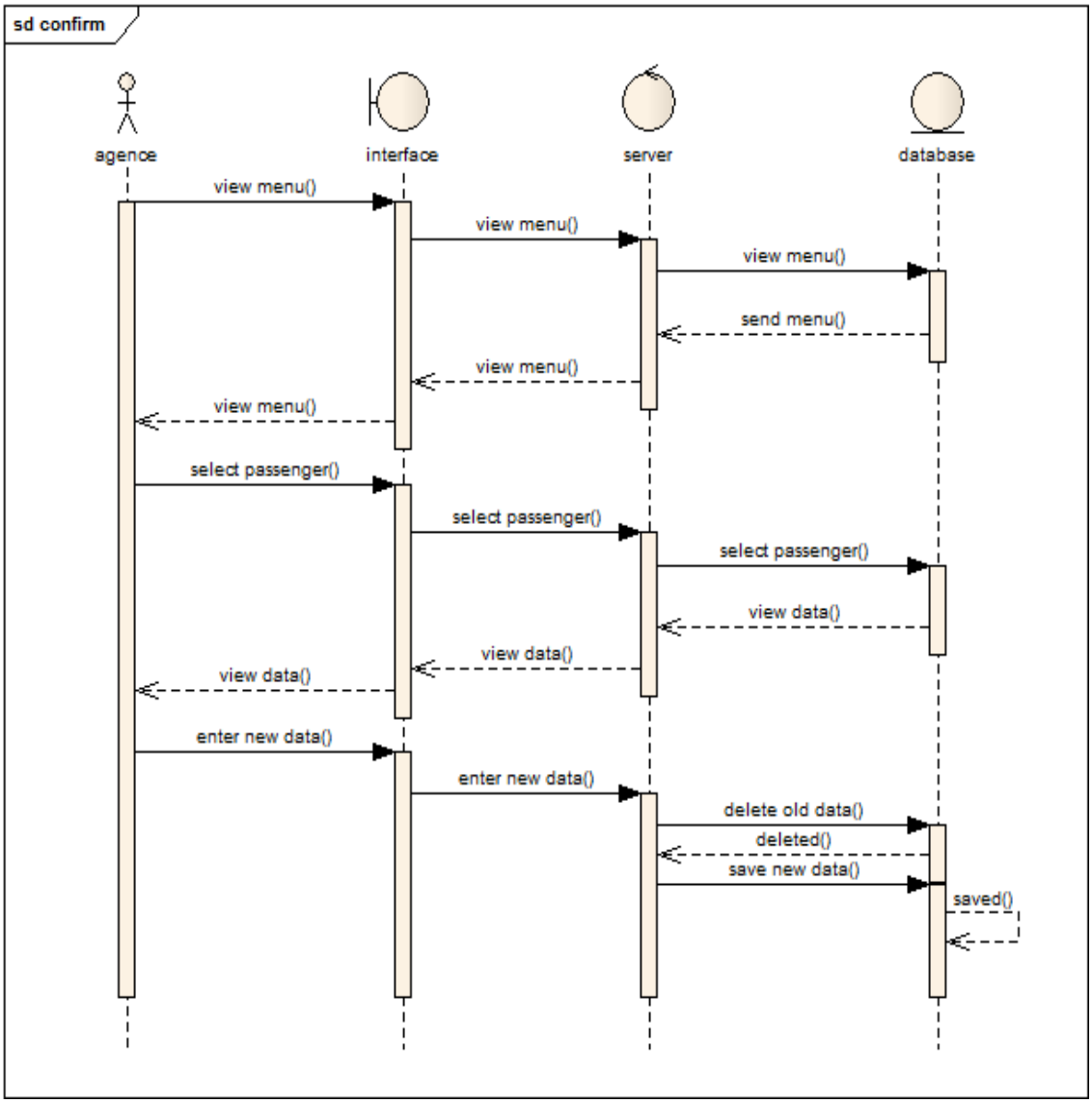


Figure (4.5): confirm booking sequence diagram

The figure number (4.6) is a sequence diagram describes check operation by the passengers.

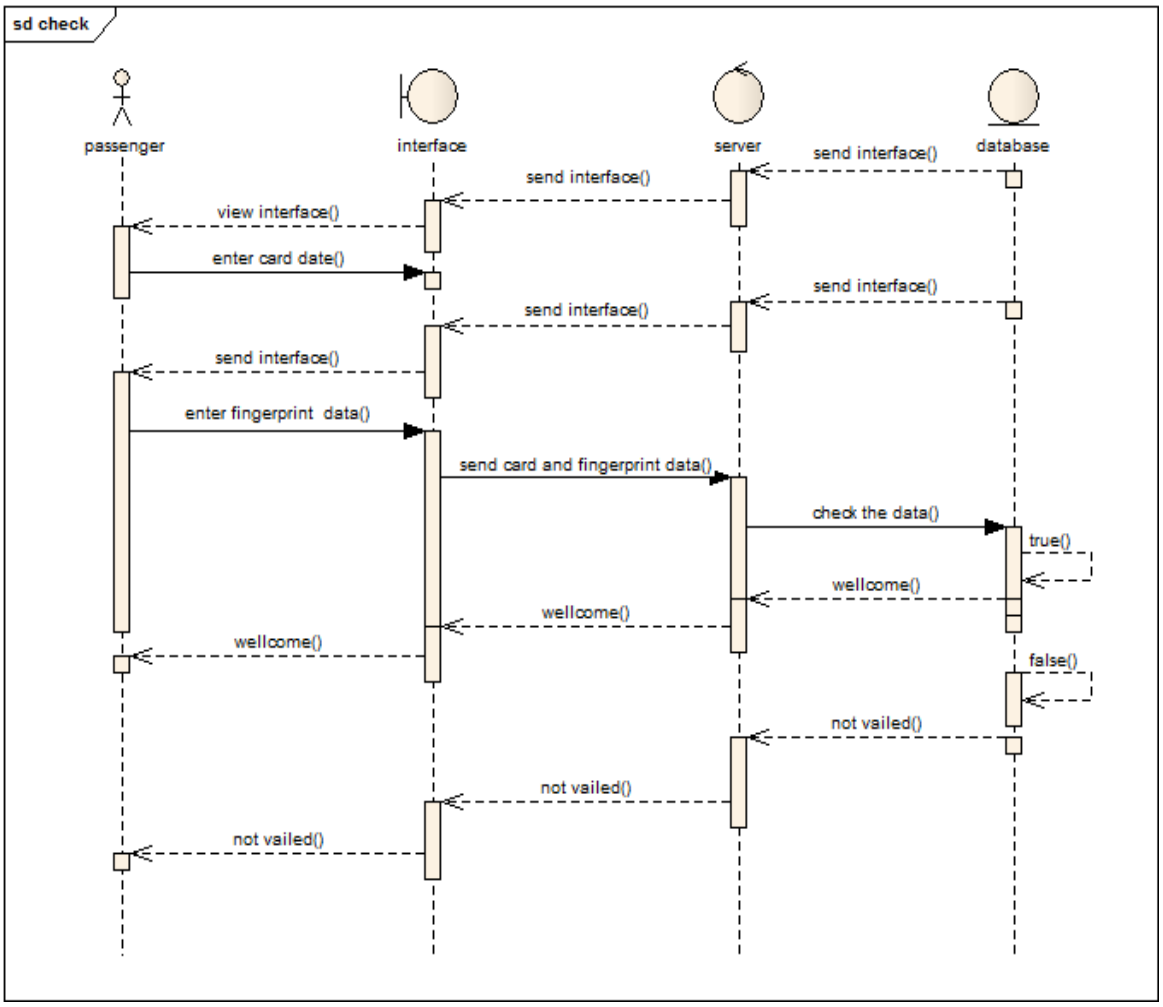


Figure (4.6): passenger check-in sequence diagram

The figure number (4.7) is a sequence diagram describes cancel flight operation by the admin for passengers.

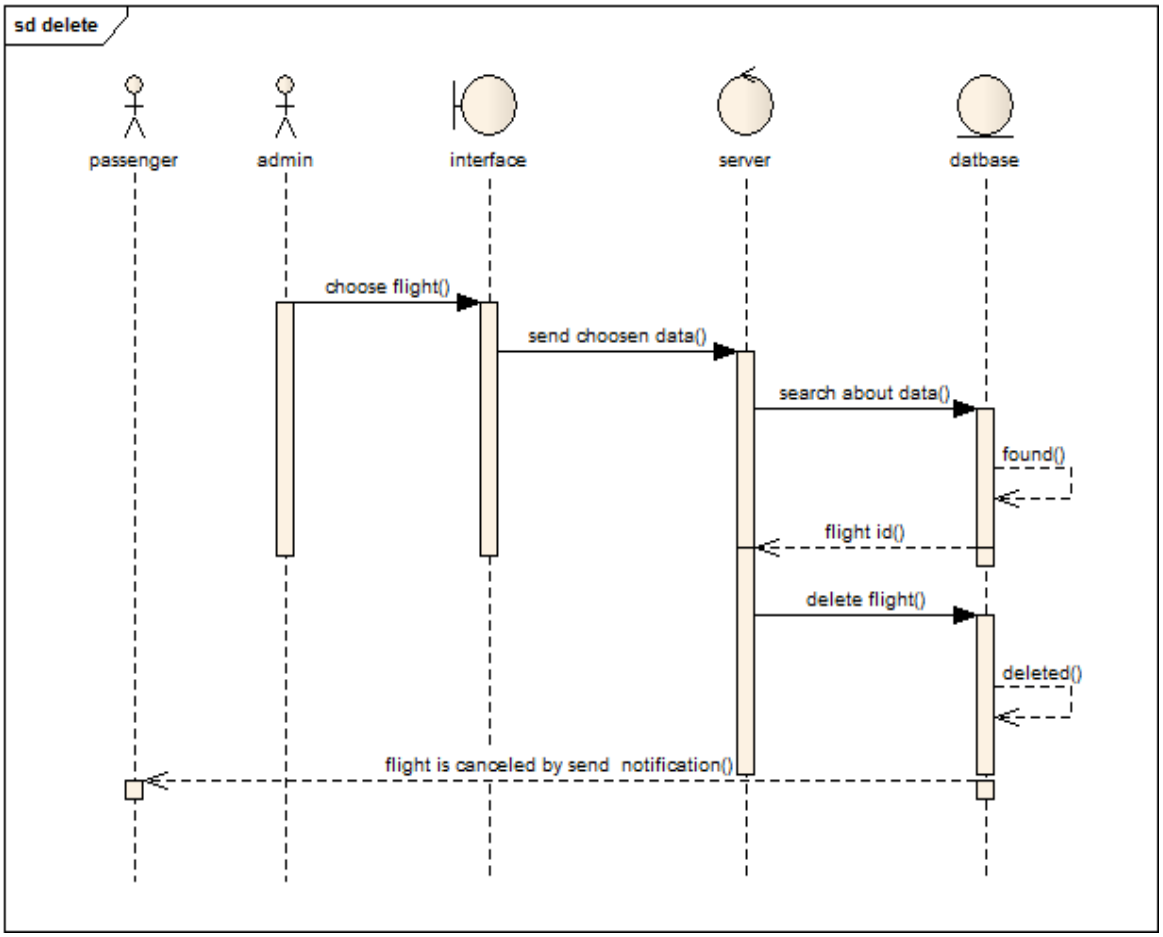


Figure (4.7): cancel flight sequence diagram

The figure number (4.8) is a deployment diagram describes the hardware and software in the system.

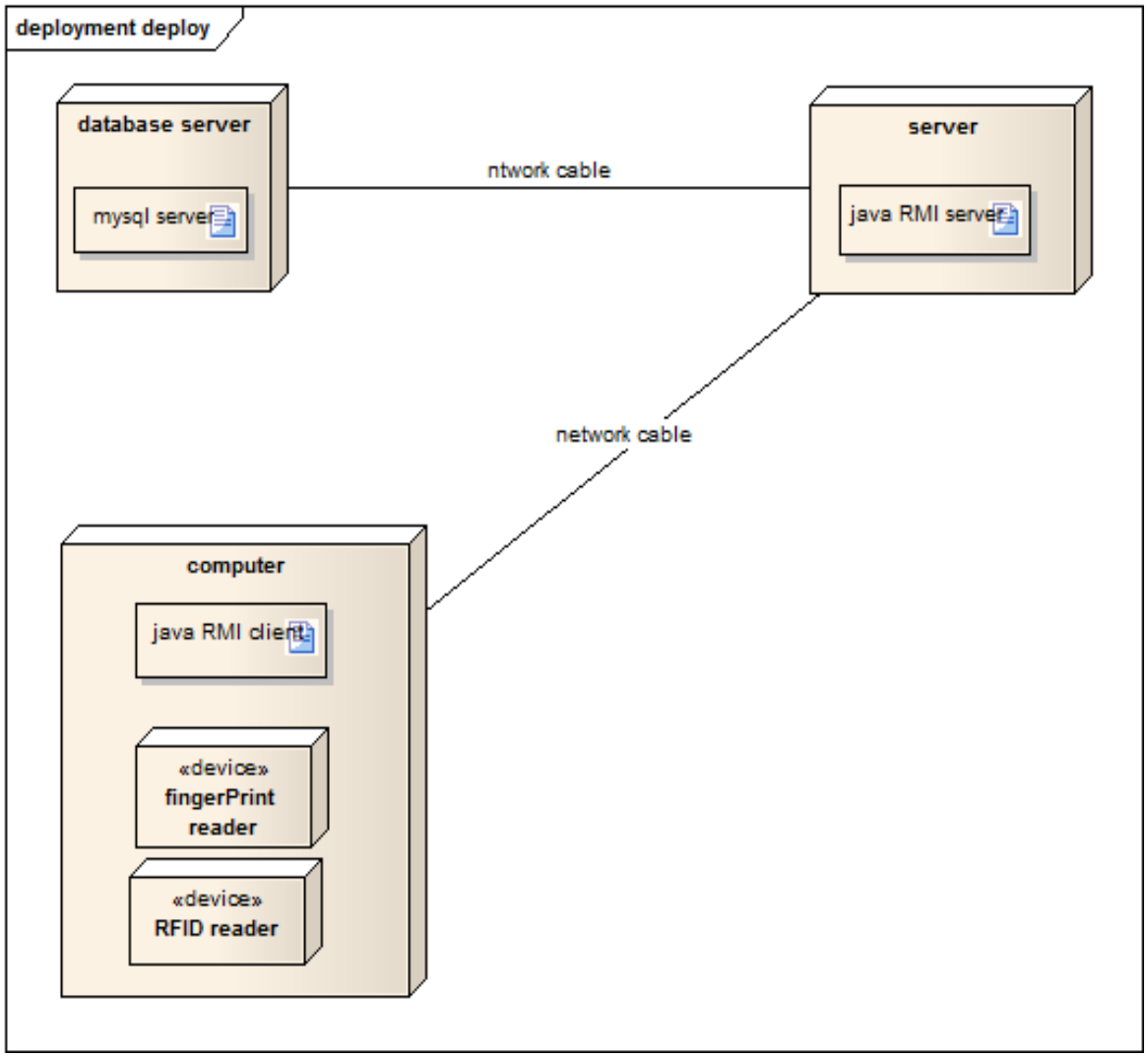


Figure (4.8): system deployment diagram

CHAPTER 5

IMPLEMENTION AND RESULTS

5.1 INTRODUCTION:

This section deals with explaining the methodology, and the way the system works in both the airport and the agency. This is to clarify the interaction between the travelers and the agency system, as well as interaction with the system at the airport, and to clarify the working of the system administrator to control the trips in the system; by displaying the screens used in the core of the proposed system.

5.2 SYSTEM INTERFACES:

The system consist of two subsystem, a system for system manager (Admin) and system for agency employee.

Figure(5.1) shows the login screen for the system administrator or agency employee, Which they enter the system by writing their user name and password

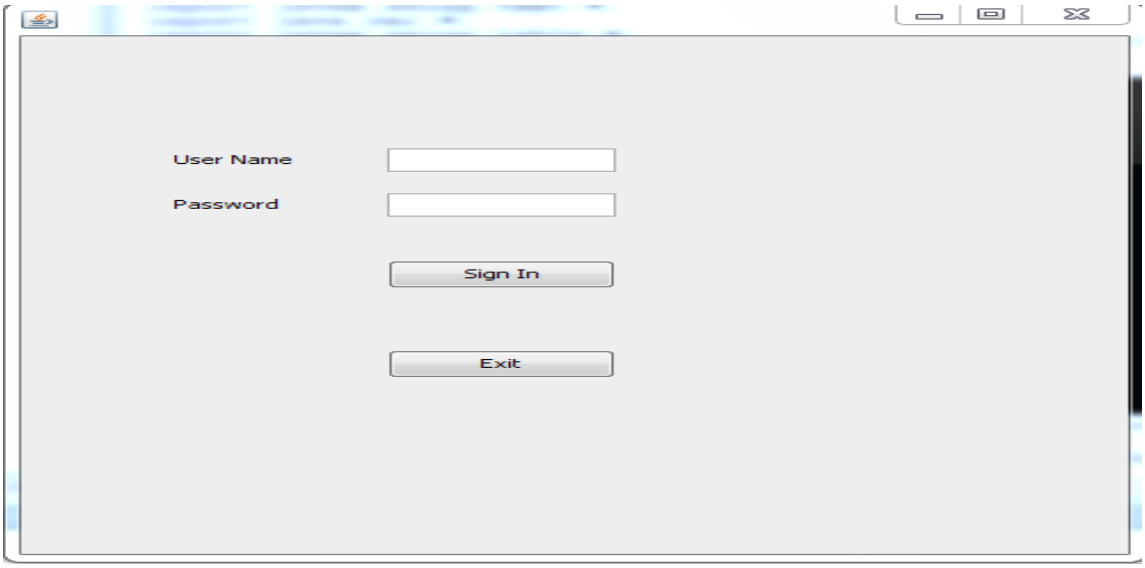
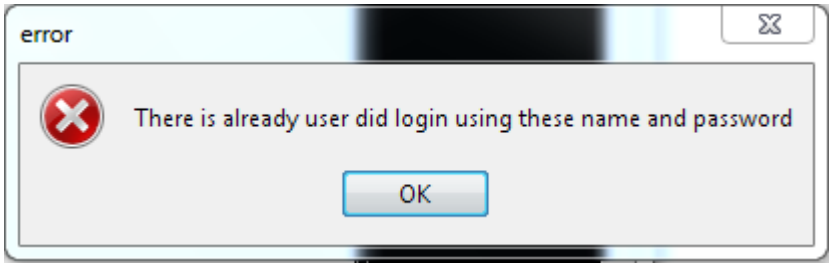


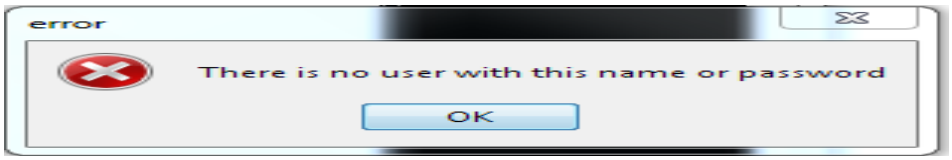
Figure (5.1): The login screen for the system manager and the agency employee .

Figure(5.2)Shows the error screen appears when already user login .



(Figure5.2): Error screen appears when already user login.

Figure(5.3)shows the error screen appears when no user with this name or password



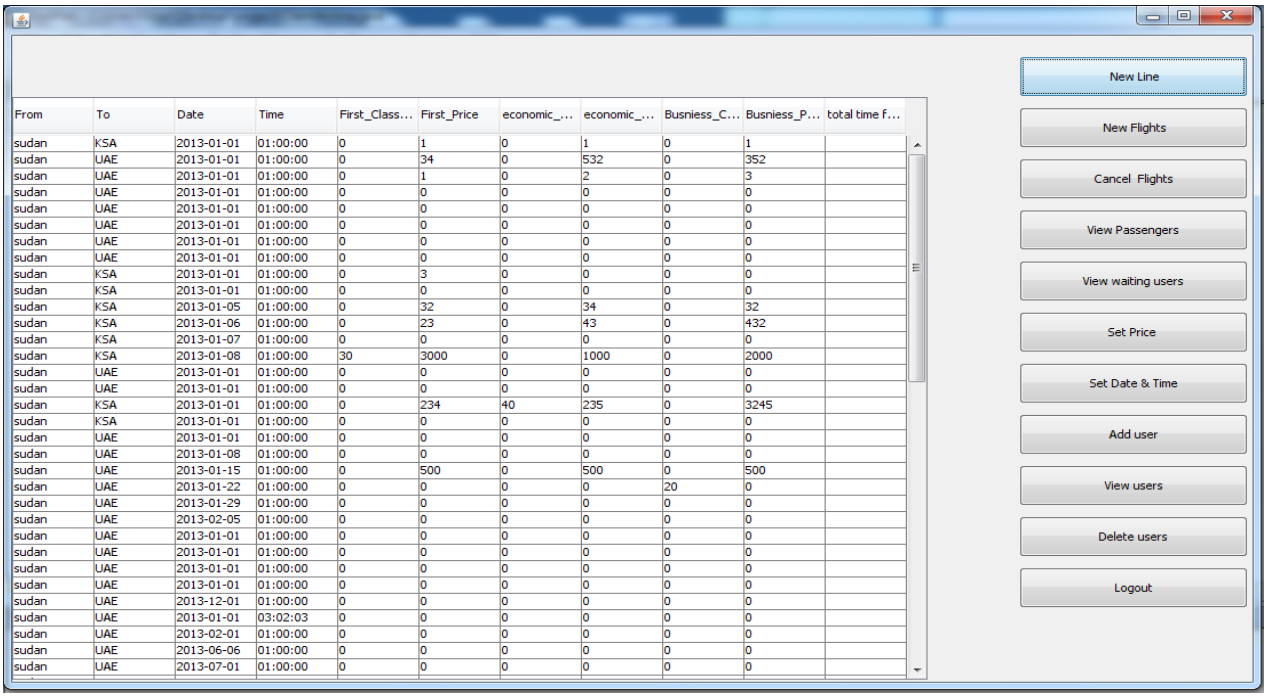
Figure(5.3): Error screen appears when no user with this name or password.

5.2.1 SYSTEM ADMINISTRARAOR:

The system administrator has the following privileges:

1. Add user (Admin, Agency, and Printer).
2. View user.
3. Delete user.
4. Add new line.
5. Add new flight.
6. Cancel flight.
7. View passengers.
8. View waiting passengers.
9. Set price.
10. Modify date and time of flight.

Figure(5.4) shows the system administrator privileges and displays the flights data



From	To	Date	Time	First_Class...	First_Price	economic_...	economic_...	Busniess_C...	Busniess_P...	total time f...
sudan	KSA	2013-01-01	01:00:00	0	1	0	1	0	1	
sudan	UAE	2013-01-01	01:00:00	0	34	0	532	0	352	
sudan	UAE	2013-01-01	01:00:00	0	1	0	2	0	3	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	KSA	2013-01-01	01:00:00	0	3	0	0	0	0	
sudan	KSA	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	KSA	2013-01-05	01:00:00	0	32	0	34	0	32	
sudan	KSA	2013-01-06	01:00:00	0	23	0	43	0	432	
sudan	KSA	2013-01-07	01:00:00	0	0	0	0	0	0	
sudan	KSA	2013-01-08	01:00:00	30	3000	0	1000	0	2000	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	KSA	2013-01-01	01:00:00	0	234	40	235	0	3245	
sudan	KSA	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-08	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-15	01:00:00	0	500	0	500	0	500	
sudan	UAE	2013-01-22	01:00:00	0	0	0	0	20	0	
sudan	UAE	2013-01-29	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-02-05	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-12-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	03:02:03	0	0	0	0	0	0	
sudan	UAE	2013-02-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-06-06	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-07-01	01:00:00	0	0	0	0	0	0	

Figure (5.4) The screen powers the system administrator and JTable displays the flight data.

5.2.1.1 ADD USER (ADMIN, AGENCY, PRINTER):

Figure(5.5)shows the screen appears when you choose to add a new user to the system, where the system administrator populates the fields shown in the picture.

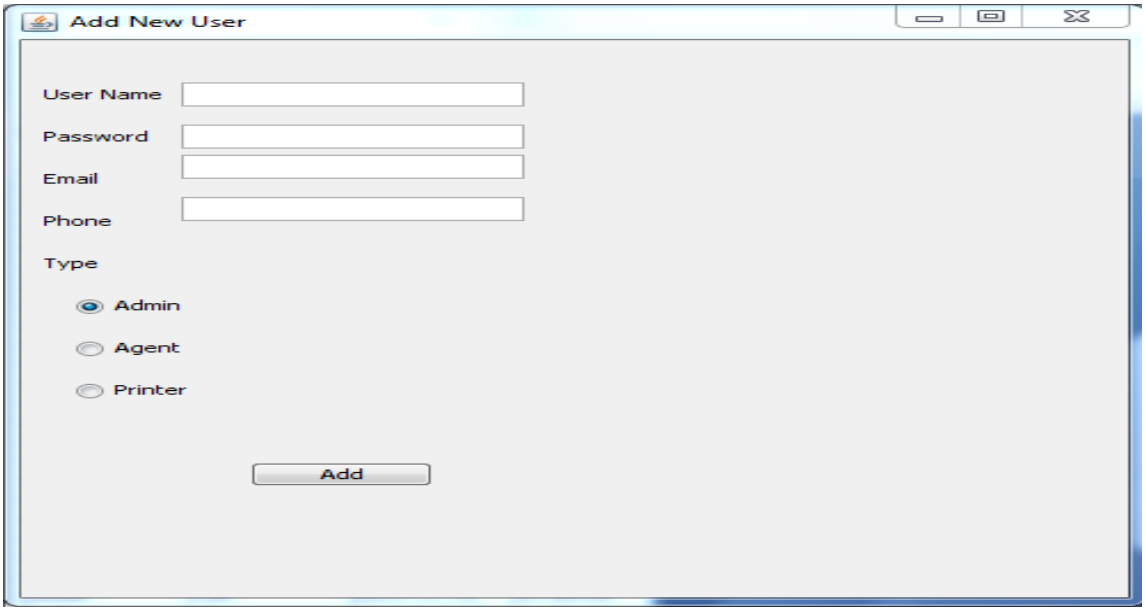
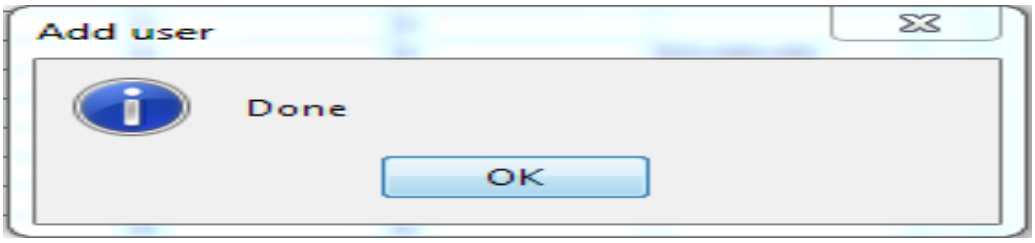


Figure (5.5): Add a new user to the system.

Figure (5.6) shows the screen that appears when you save the data correctly.



Figure(5.6): Data store confirmation screen.

Figure (5.7) shows the error screen that appears when you leave a textField in the registration list.

Figure (5.7): The wrong screen when there are empty textField in the registration list.

Figure (5.8) shows the error screen that appear when you enter numbers in the name field

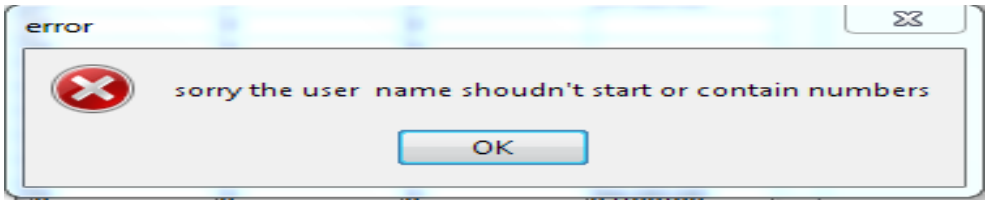
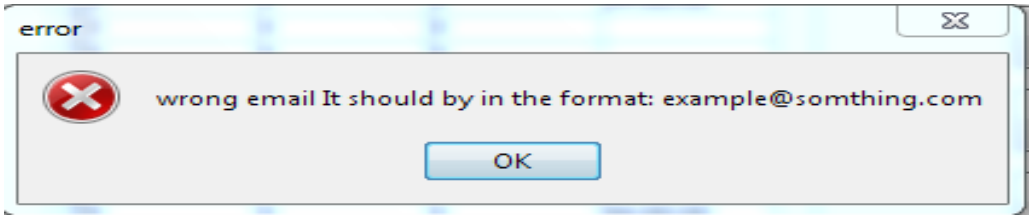


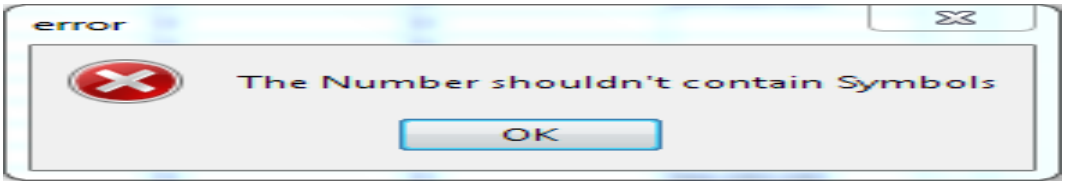
Figure (5.8): The wrong screen that appear when there are numbers in the name field.

Figure(5.9) Shows the error screen appears when the end of the email otherwise .com in the email textField.



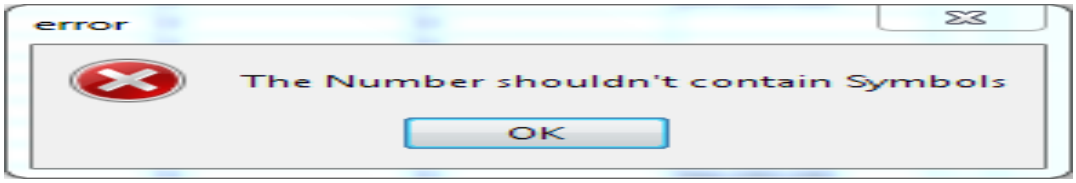
Figure(5.9): The wrong screen when there the end of the email otherwise .com in the email textField.

Figure(5.10) Shows the error screen appears when you enter letter in the phone field.



Figure(5.10): The wrong screen when there are letters in the phone field.

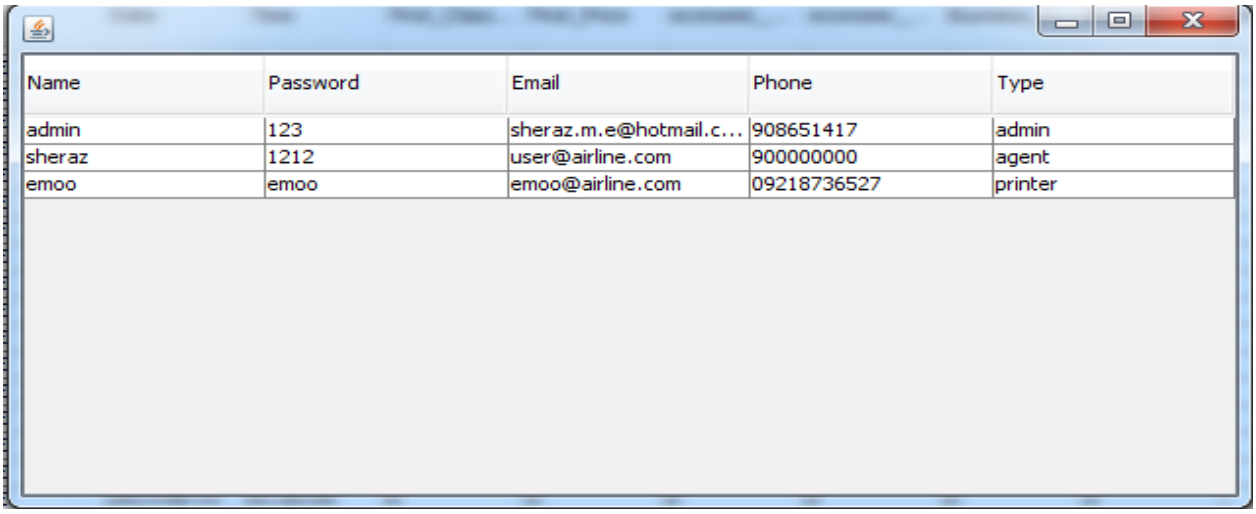
Figure(5.11)Shows the error screen appears when you add a user added before.



(Figure5.11): Error screen appears when you add a user who added who had before.

5.2.1.2 VIEW USER (ADMIN, AGENCY, PRINTER):

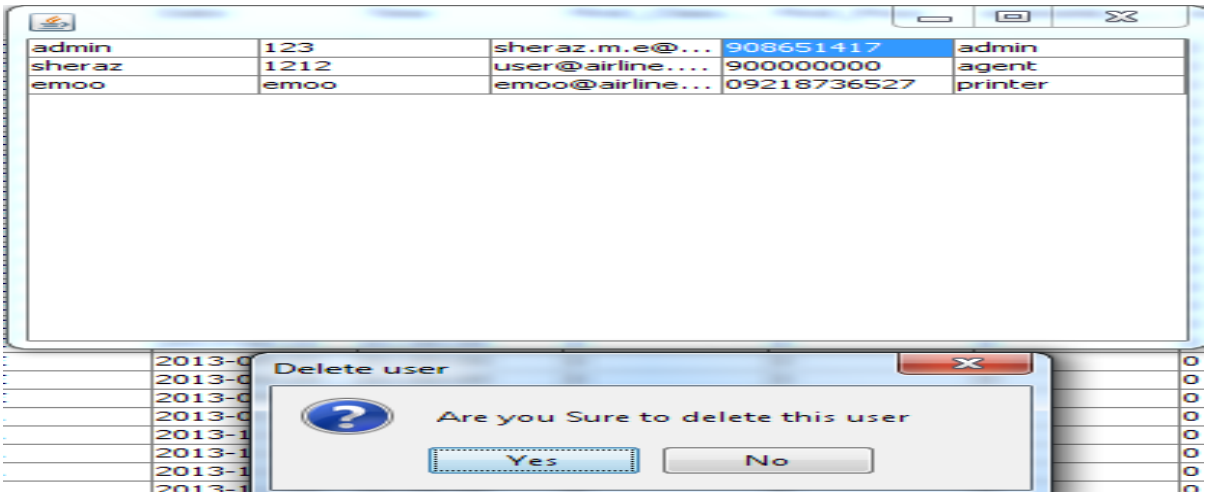
Figure(5.12): Display users in the system.



Figure(5.12): Users in the system.

5.2.1.3 DELETE USER (ADMIN, AGENCY, PRINTER):

Figure (5.13): delete users from the system.



Figure(5.13): Screen delete users from the system.

5.2.1.4 ADD NEW LINE:

Figure(5.14)shows the screen that appears when you choose to add a new line to the system,where the system administrator populates the fields shown in the picture below.

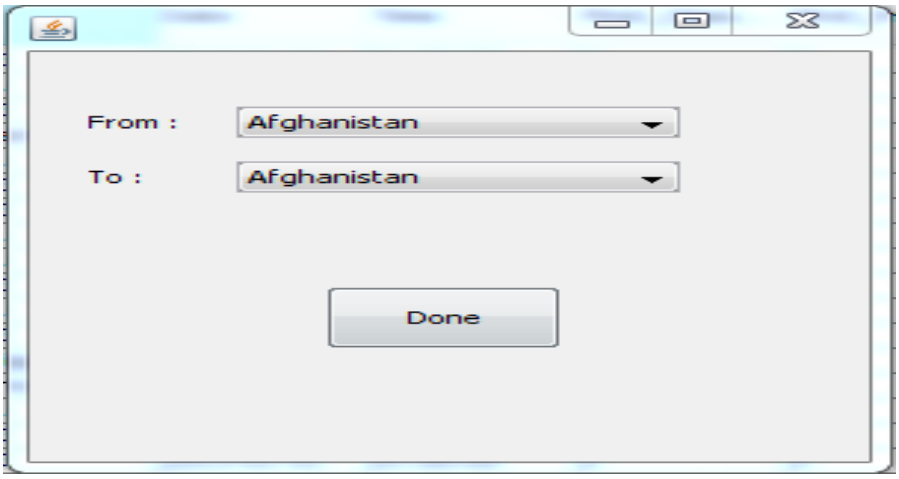


Figure (5.14): Add a new line to the system

Figure (5.15) shows the error screen that appear when you enter same country name.

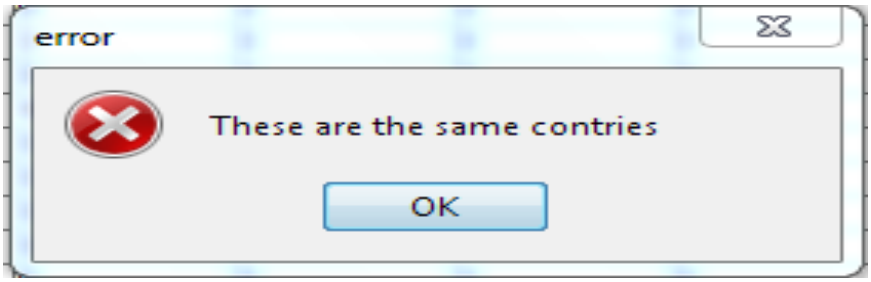
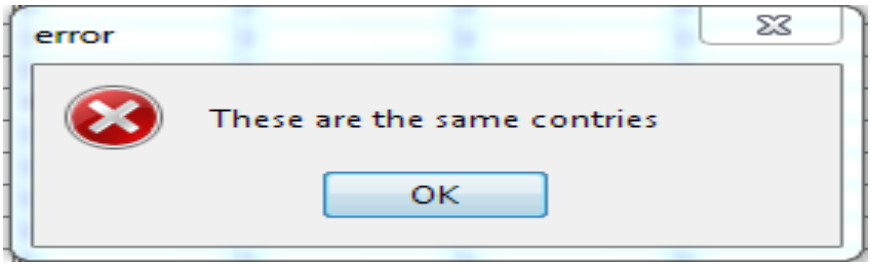


Figure (5.15): The wrong screen when you enter same country name.

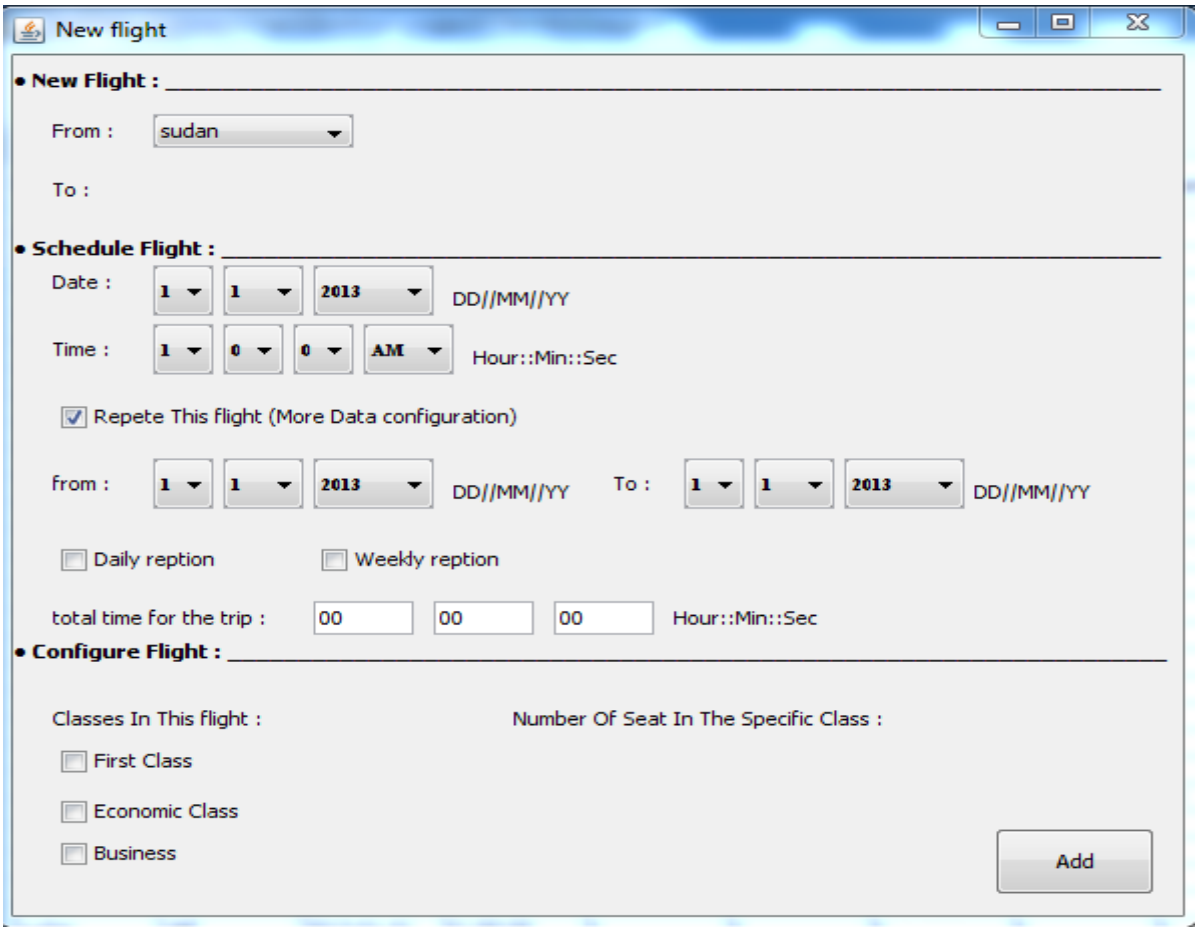
Figure(5.16) Shows the error screen appears when you enter exist line



Figure(5.16): The wrong screen when adding existing line.

5.2.1.5 ADD NEW FLIGHT:

Figure(5.17) Shows the screen appears when you choose to add a new flight to the system, where the system administrator populates the fields shown in the picture below.



Figure(5.17): Screen add a new flight to the system.

5.2.1.6 CANCEL FLIGHT:

Figure(5.18) Shows the screen appears when you choose cancel flight to the system, where the system administrator populates the shown in the picture below.

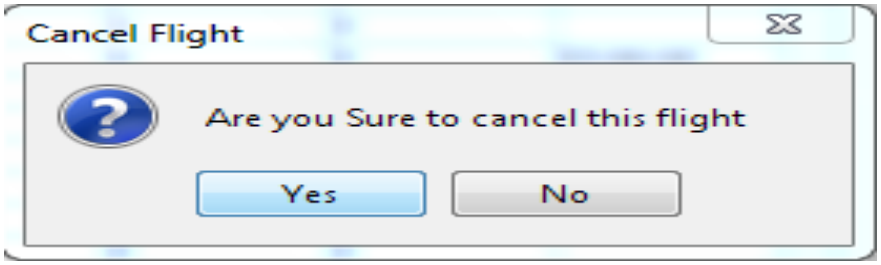


Figure (5.18): Screen cancel flight confirm

5.2.1.7 VIEW PASSENGER:

Figure (5.19)Displays confirming passenger screen.

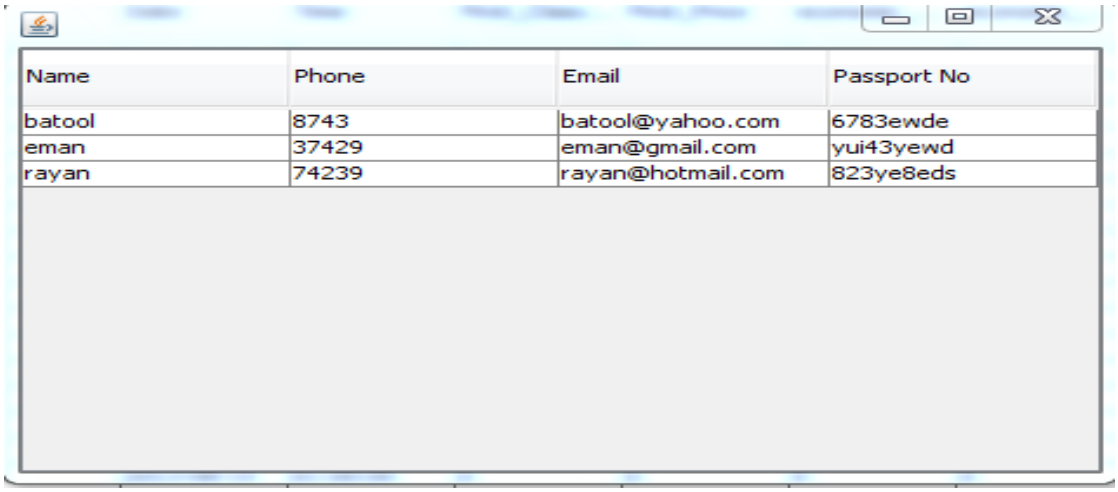


Figure (5.19): Screen view confirm passenger

Figure(5.20)The screen appears if the admin want to view the agency employee who book for this passenger.

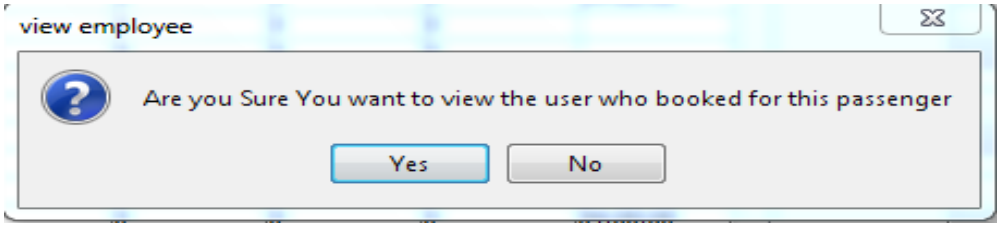


Figure (5.20) The screen when the admin want view the agency employee who book for this passenger .

(Figure 5.21): Display employee information who book to specific passenger.

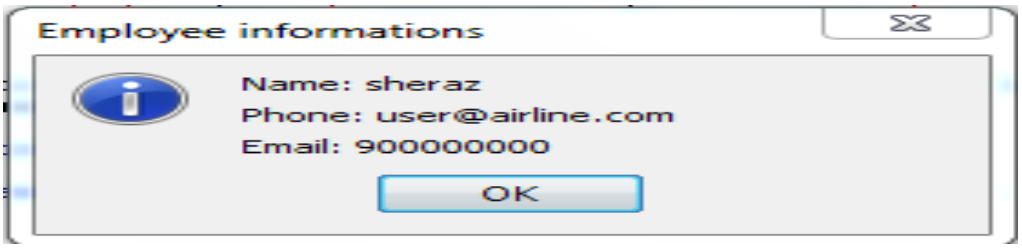


Figure (5.21): Screen view employee information who book to specific passenger.

5.2.1.8 VIEW WAITING PASSENGERS:

(Figure 5.22): Display waiting passenger.

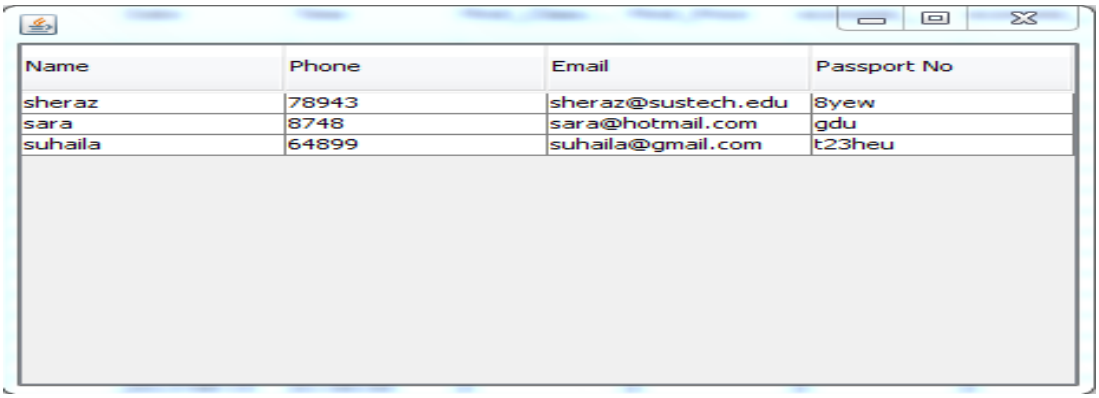


Figure (5.22): Screen view waiting passenger

5.2.1.9 SET PRICE:

Figure (5.23)shows the screen that appear when you choose to set price to seats, where the system administrator populates the fields shown in the picture below.

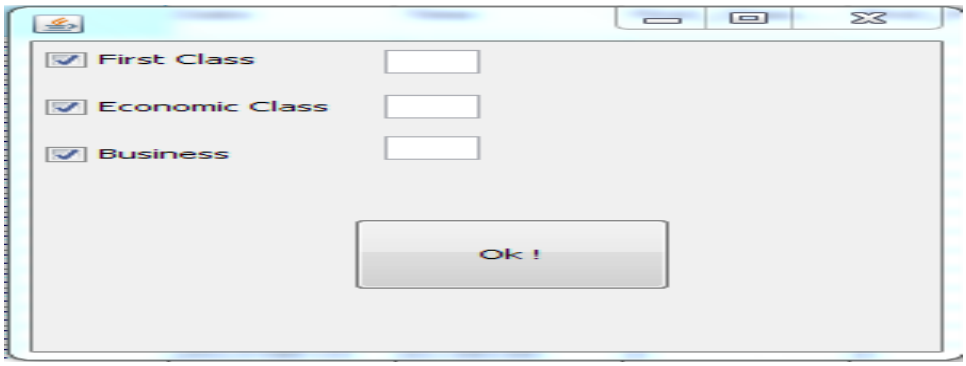
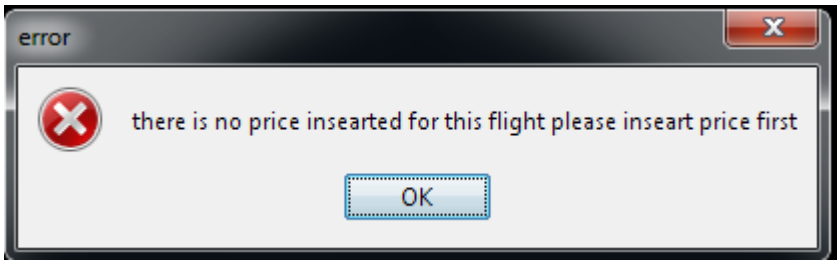


Figure (5.23): View set price to seats

Figure (5.24) Show when you click on button to set percentage on price to children or early reservation .

Figure (5.24): Set percentage.

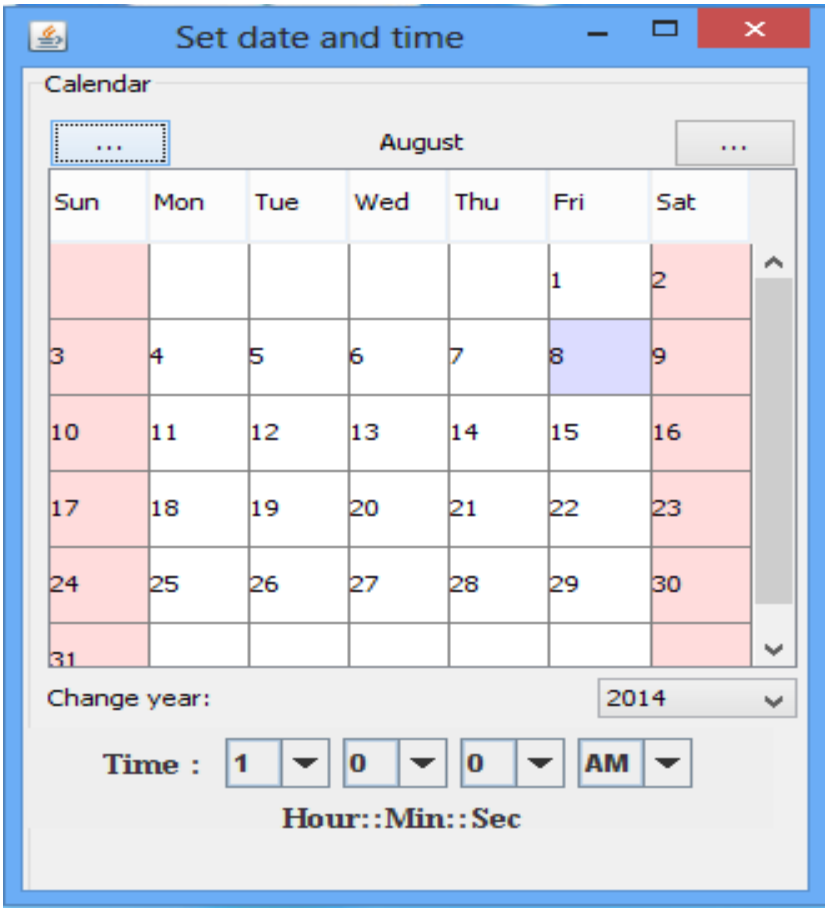
Figure(5.25) Show when the admin dose not enter the price on the this flight.



Figure(5.25): Not have price on this flight.

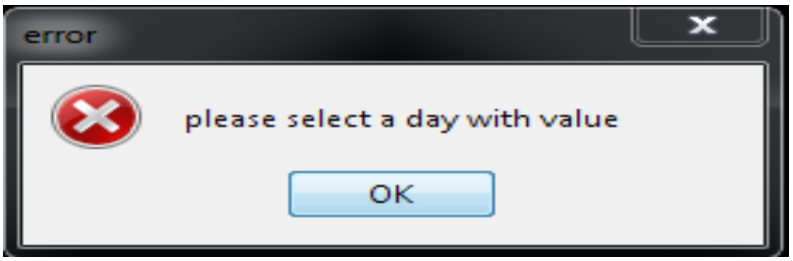
5.2.1.10 MODIFY DATE AND TIME OF FLIGHT:

Figure(5.26) shows the screen that appear when you choose to set date and time ,where the system administrator choose the day from the calendar and set the time shown in the picture below.



Figure(5.26): View set price to seats

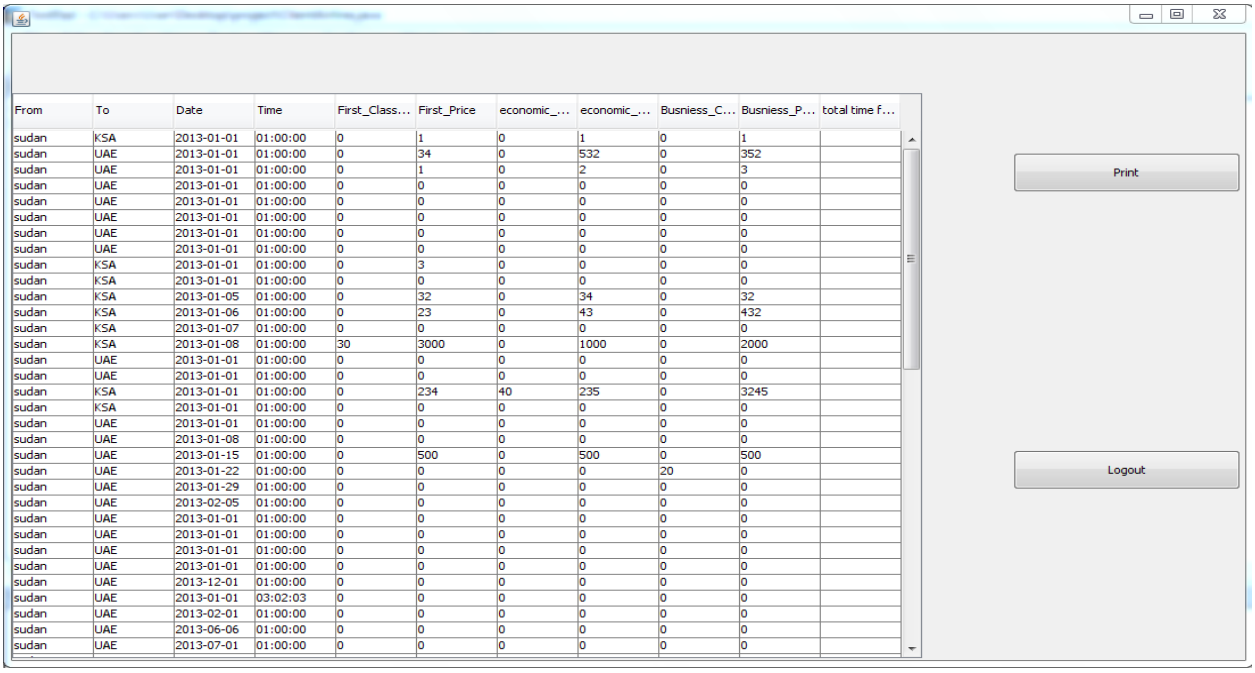
Figure(5.27) Show when you click on the empty day box.



Figure(5.27): When you click on the empty day box.

5.2.2 SYSTEM PRINTER:

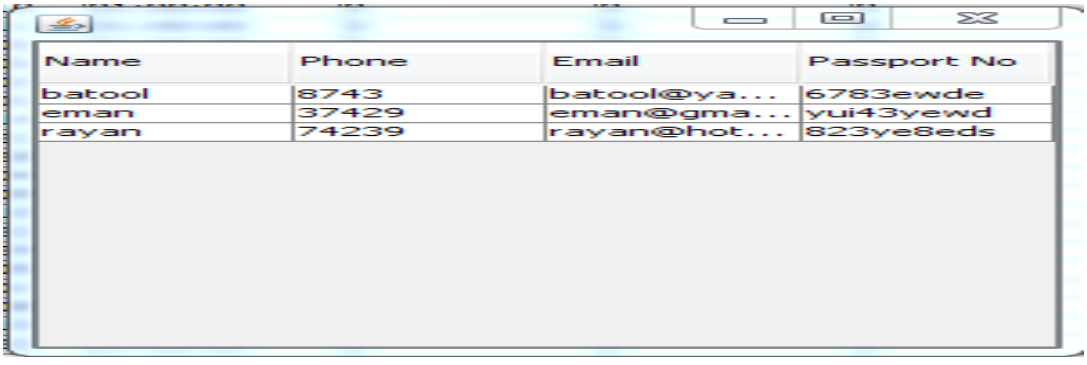
The system printer prints all passengers in a specific flight.



From	To	Date	Time	First_Class...	First_Price	economic_...	economic_...	Busniess_C...	Busniess_P...	total time f...
sudan	KSA	2013-01-01	01:00:00	0	1	0	1	0	1	
sudan	UAE	2013-01-01	01:00:00	0	34	0	532	0	352	
sudan	UAE	2013-01-01	01:00:00	0	1	0	2	0	3	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	KSA	2013-01-01	01:00:00	0	3	0	0	0	0	
sudan	KSA	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	KSA	2013-01-05	01:00:00	0	32	0	34	0	32	
sudan	KSA	2013-01-06	01:00:00	0	23	0	43	0	432	
sudan	KSA	2013-01-07	01:00:00	0	0	0	0	0	0	
sudan	KSA	2013-01-08	01:00:00	30	3000	0	1000	0	2000	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	KSA	2013-01-01	01:00:00	0	234	40	235	0	3245	
sudan	KSA	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-08	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-15	01:00:00	0	500	0	500	0	500	
sudan	UAE	2013-01-22	01:00:00	0	0	0	0	20	0	
sudan	UAE	2013-01-29	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-02-05	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-12-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-01-01	03:02:03	0	0	0	0	0	0	
sudan	UAE	2013-02-01	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-06-06	01:00:00	0	0	0	0	0	0	
sudan	UAE	2013-07-01	01:00:00	0	0	0	0	0	0	

Figure (5.28) Shows the screen powers the system printer.

(Figure 5.29): Display all passengers in specific flight.



Name	Phone	Email	Passport No
batool	8743	batool@ya...	6783ewde
eman	37429	eman@gma...	yui43yewd
rayan	74239	rayan@hot...	823ye8eds

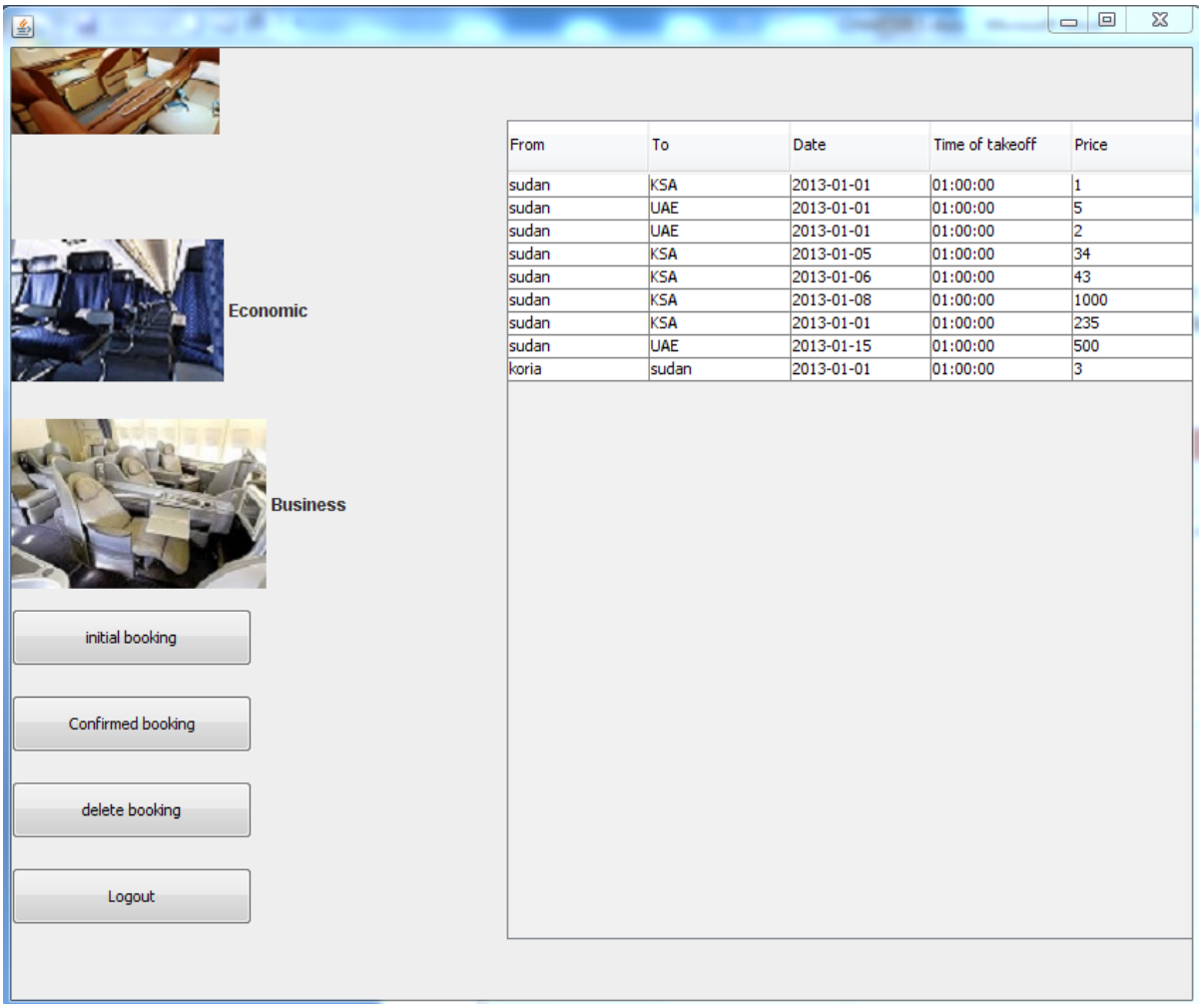
Figure(5.29) All passengers in specific flight.

5.2.3 AGENCY SYSTEM:

The agency employee has following privileges :

1. Initial booking to passenger.
2. Confirm booking to passenger.
3. Cancel passenger booking.

Figure(5.30) shows what the passenger chooses the flight by pressing on the type of the class you want to travel with it. Trips are then displayed in the system based on the type of the class, which was chosen in advance.



Figure(5.30) The screen powers the agency employee and JTable displays the flight data.

5.2.3.1 INITIAL BOOKING TO PASSENGER:

Figure (5.31) Shows the screen that appear when you choose to initial booking to passenger in the system, where the agency employee populates the fields shown in the picture below.

Figure (5.31): Initial booking to passenger

Figure (5.32) shows the screen appears when you click Escorts to add new passenger append to previous passenger, shown in the picture below.

Figure (5.32): Screen escorts booking

Figure (5.33) Shows the error screen appears when you enter numbers in the name field

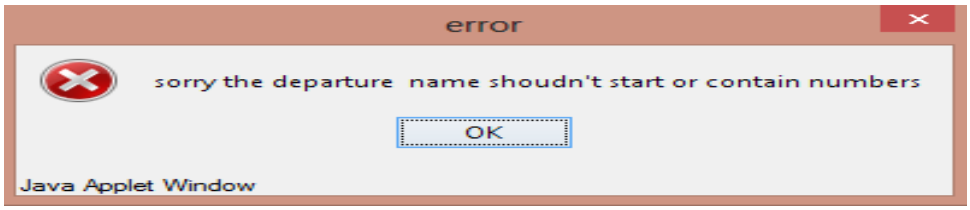


Figure (5.33): The error screen appears when there are numbers in the name field.

Figure (5.34) shows the error screen appears when the email is not written as example@somthing .com in the email textField.

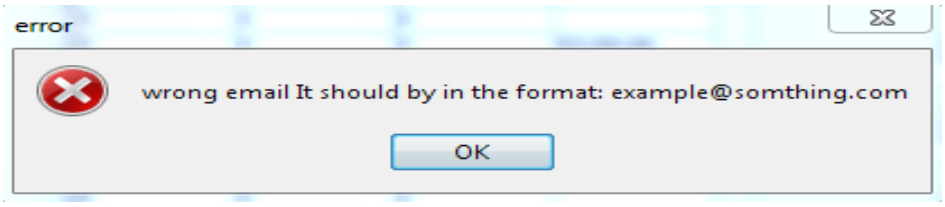


Figure (5.34): The error screen appears when entering wrong email.

Figure (5.35) shows the error screen appears when you enter a letter in the phone field.

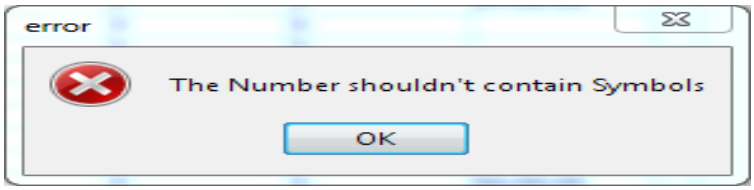


Figure (5.35): The wrong screen when there are letters in the phone field.

Figure (5.36) shows the error screen appears when you leave empty textField in the registration list.

Figure (5.36): The error screen when there are empty text Fields in the registration list.

Figure(5.37) Shows the screen that appears when you save the data correctly.

(Figure5.37): Initial booking has been successfully complete.

5.2.3.2 CONFIRM BOOKING TO PASSENGER:

Confirmation process in the agency requires entering the traveler's passport number to search for it in the table of initial reservation in the database after he was found asks traveler to put his forefinger on fingerprint scanner to scan it and passes the RFID card to read it’s number.

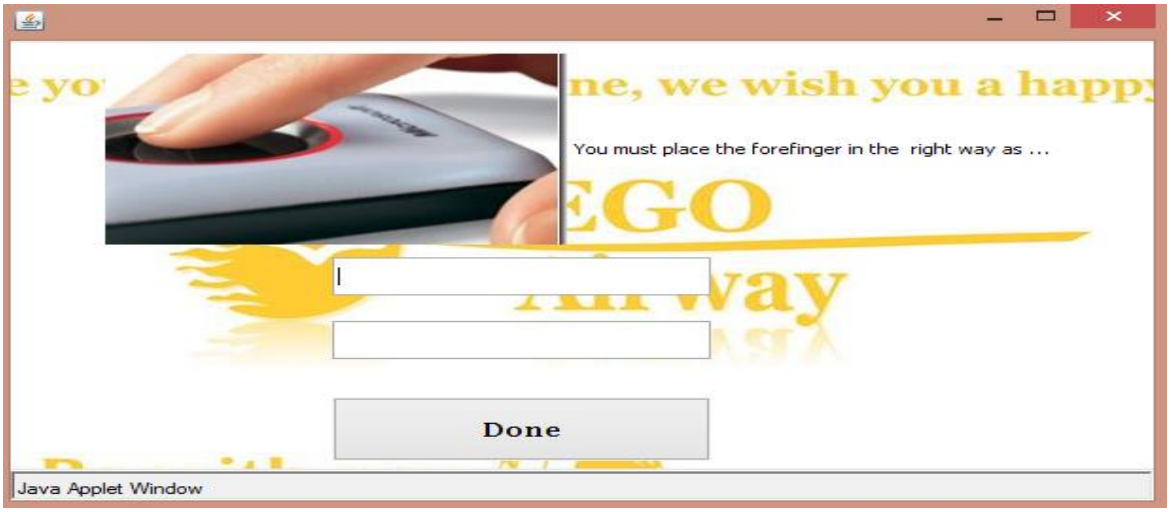


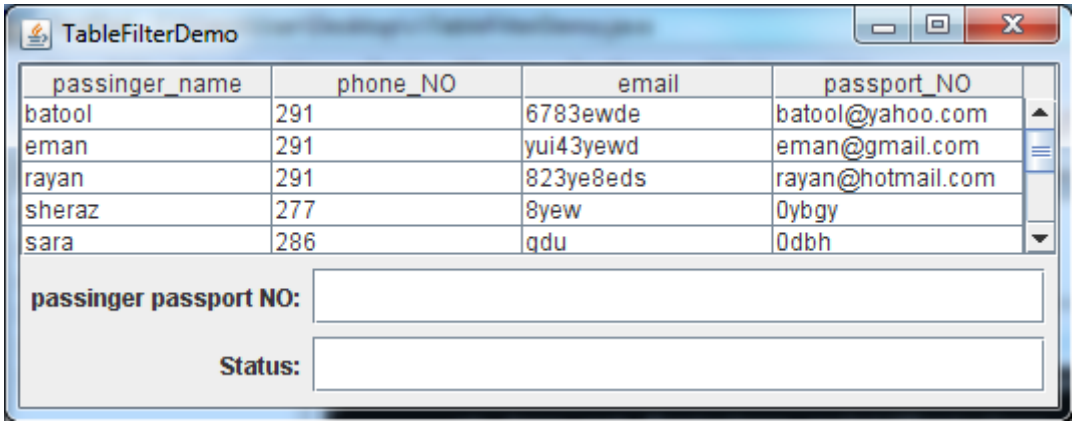
Figure (5.38): passenger confirm booking Screen.

Figure(5.39) Shows the screen that appears when you save the data correctly.

Figure (5.39): Confirm booking has been successfully complete.

5.2.3.3 DELETE BOOKING:

Figure (5.40) Delete process in the agency employee enters the traveler's passport number to search for it in the table of initial reservation in the database.



Figure(5.40): Screen search passenger by his passport number to delete him from initial booking

5.2.4 TRAVELAR:

Figure (5.41) shows the screen that takes the traveler's RFID card data in order to match them with the saved data.

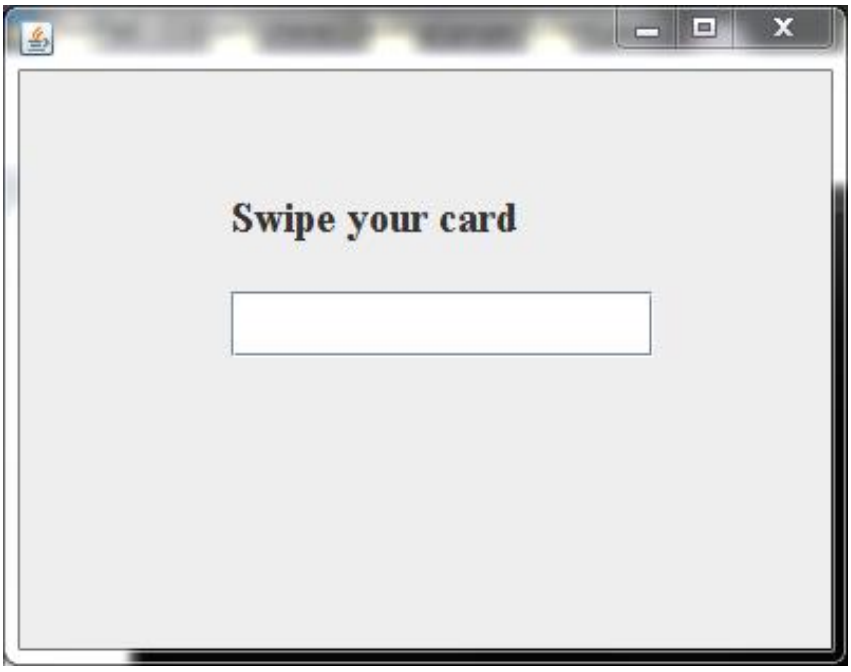
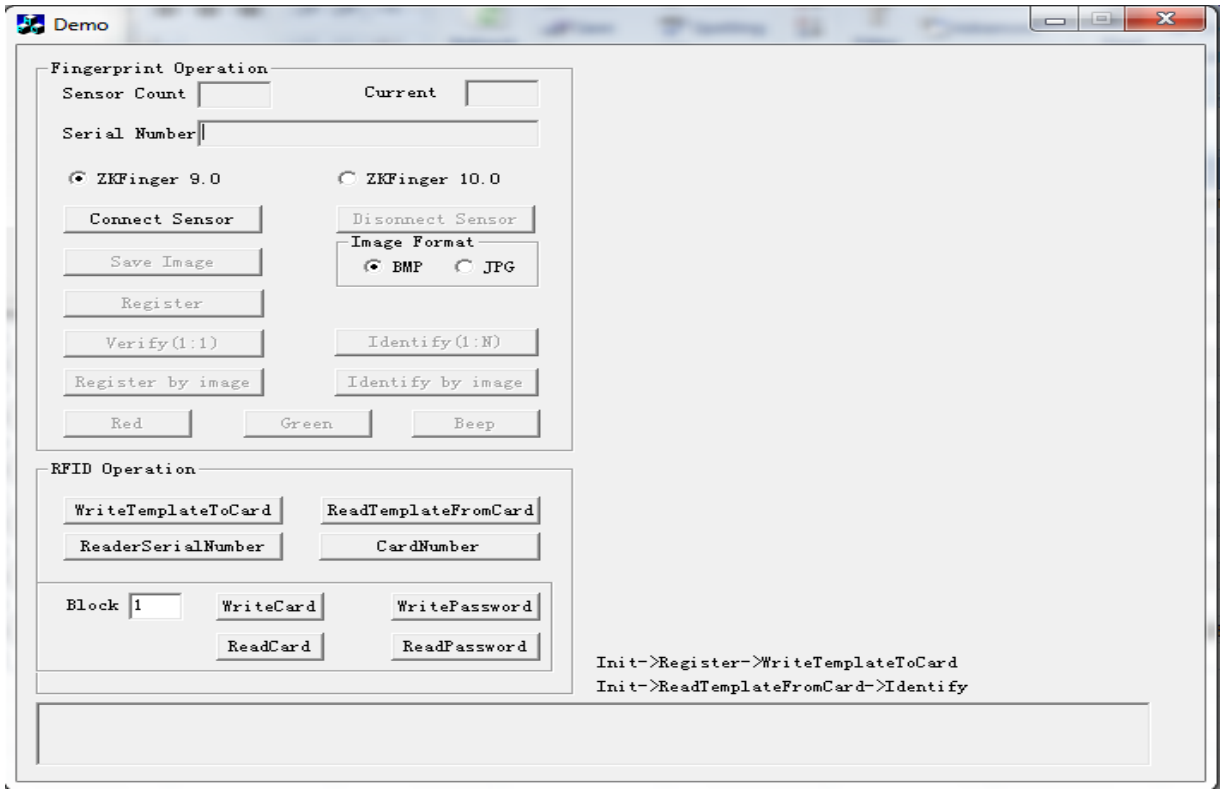


Figure (5.41) Show screen requesting RFID card swiping at the e-gate entrance.

Figure (5.42) Show the demo program screen which activate the fingerprint reader and the RFID reader.



Figure(5.42) fingerprint reader demo program.

Figure (5.43) Show screen to start matching the saved fingerprint with the one saved in the fingerprint demo folder.

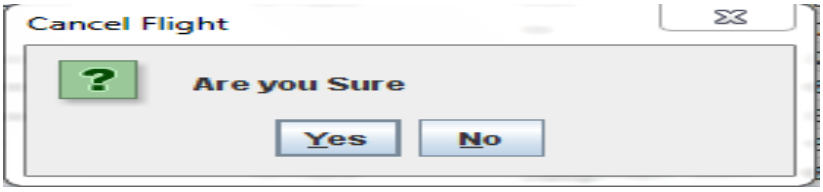


Figure (5.43) A message to start fingerprints matching.

Figure (5.44) Show screen appears when the fingerprints do not match.

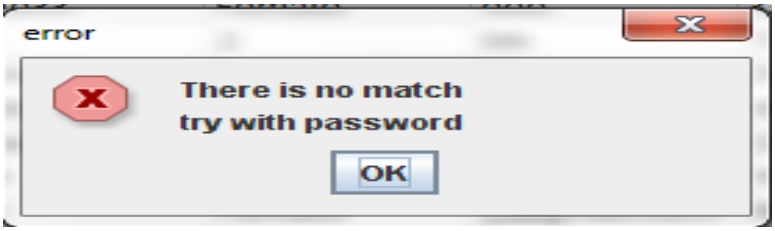


Figure (5.44) a message indicating lack of fingerprint matching.

Figure (5.45) screen shows textField to request the password as an alternative to fingerprint.

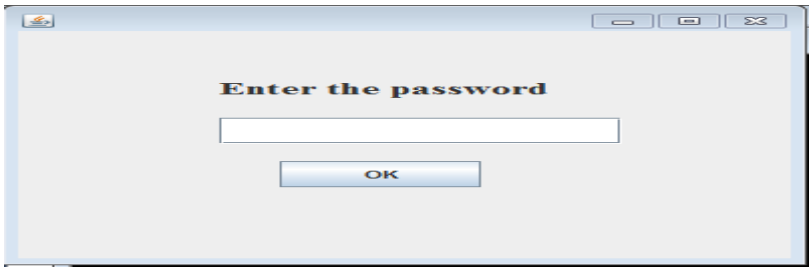


Figure (5.45) traveler's password as alternative to his fingerprint.

Figure (5.46) Show plane seats based on the traveler's reserved class type and also show reserved and available seats.

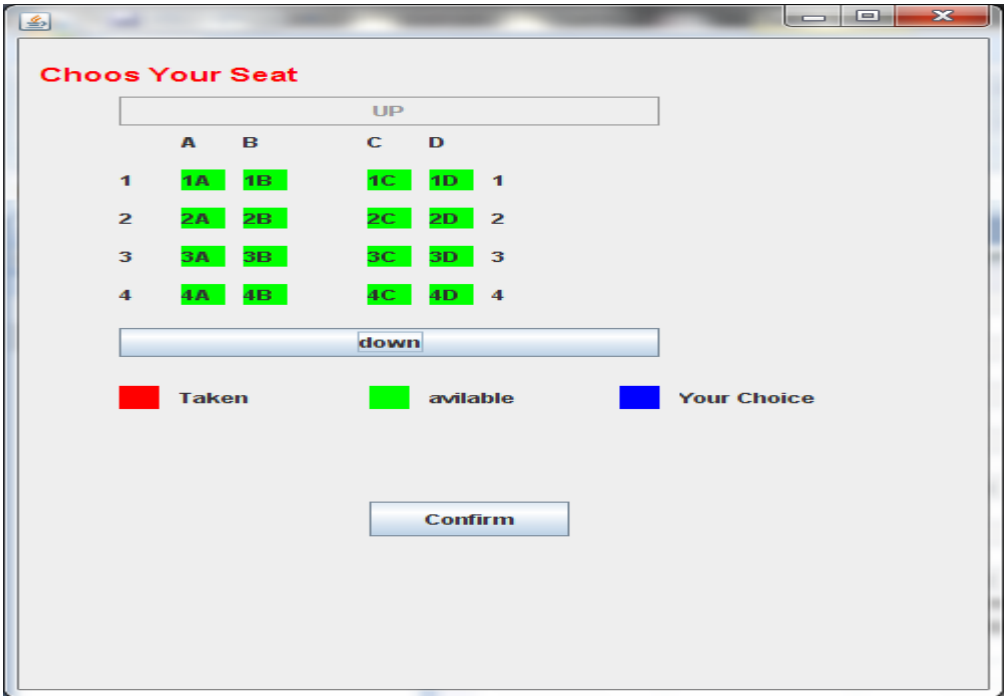


Figure (5.46) traveler's seat choosing operation.

Figure (5.47) shows the end of all the traveler's operations.

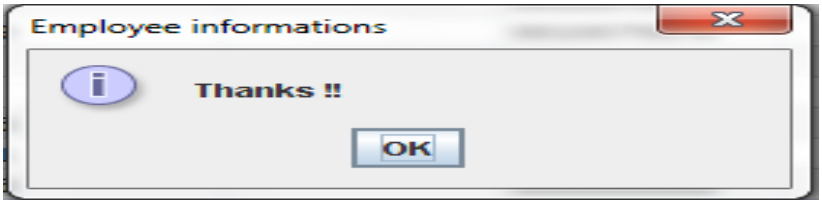


Figure (5.47) a message welcoming the traveler after the end of the operations.

CHAPTER 6

CONCLUSION AND RECOMMENDDATIONS

6.1 RESULTS

The results that we have achieved are the implementation of the system and conducting tests to verify the required functions have been reached, system processes the following:

1. Performing the travelers processes easily and quickly.
2. The process of checking the card easily.
3. The card can be re-used.

6.2 CONCLUSION

We have successfully achieve this research, which helps in the process of travel by adding a range of services that help facilitate the travel process for passengers instead of the traditional methods of travel.

6.3 RECOMMENDATIONS

1. Using a device to read the passport data.
2. Adding electronic travel scale for luggage weighing.
3. Adding security features to the system.
4. The possibility of extracting a new card in case of loss.
5. Adding special airport printer to the system for the use of the printer (the user who print the check-in travelers name for the black box).

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