



**Sudan University of sciences and technology
College of computer science and information technology**

E-Commerce via Mobile Application

**A Thesis submitted in partial fulfillment of the requirements for the
degree of B.S.C(Honors) in computer science**

April 2017

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Presented By :

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Signature.....

الاية

(يَا أَيُّهَا الَّذِينَ آمَنُوا إِذَا تَدَايَنْتُمْ بِدِينٍ إِلَىٰ أَجَلٍ مُّسَمًّى فَاكْتُبُوهُ وَلْيَكْتُب بَيْنَكُمْ بِالْعَدْلِ وَلَا يَأْبَ كَاتِبٌ أَنْ يَكْتُبَ
كَمَا عَلَّمَهُ اللَّهُ فَلْيَكْتُبْ وَلْيُمْلِلِ الَّذِي عَلَيْهِ الْحَقُّ وَلْيَتَّقِ اللَّهَ رَبَّهُ وَلَا بِيخْسٍ مِنْهُ شَيْئًا فَإِن كَانَ الَّذِي عَلَيْهِ الْحَقُّ سَفِيهًا
أَوْ ضَعِيفًا أَوْ لَا يَسْتَطِيعُ أَنْ يُمِلَّ هُوَ فَلْيُمْلِلْ وَلِيُّهُ بِالْعَدْلِ وَاسْتَشْهِدُوا شَهِيدَيْنِ مِنْ رَجَالِكُمْ فَإِن لَّمْ يَكُونَا رَجُلَيْنِ
فَرَجُلٌ وَامْرَأَتَانِ مِمَّن تَرْضَوْنَ مِنَ الشُّهَدَاءِ أَن تَضِلَّ إِحْدَاهُمَا فَتُذَكِّرَ إِحْدَاهُمَا الْأُخْرَىٰ وَلَا يَأْبَ الشُّهَدَاءُ إِذَا مَا
دُعُوا وَلَا تَسْأَمُوا أَن تَكْتُبُوهُ صَغِيرًا أَوْ كَبِيرًا إِلَىٰ أَجَلِهِ ذَلِكُمْ أَقْسَطُ عِنْدَ اللَّهِ وَأَقْوَمُ لِلشَّهَادَةِ وَأَدْنَىٰ أَلَّا تَرْتَابُوا إِلَّا
أَن تَكُونَ تِجَارَةً حَاضِرَةً تُدِيرُونَهَا بَيْنَكُمْ فَلَيْسَ عَلَيْكُمْ جُنَاحٌ أَلَّا تَكْتُبُوهَا وَأَشْهِدُوا إِذَا تَبَايَعْتُمْ وَلَا يُضَارَّ كَاتِبٌ وَلَا
شَهِيدٌ وَإِن تَفْعَلُوا فَإِنَّهُ فُسُوقٌ بِكُمْ وَاتَّقُوا اللَّهَ وَيُعَلِّمُكُمُ اللَّهُ وَاللَّهُ بِكُلِّ شَيْءٍ عَلِيمٌ)

(282 البقرة)

صدق الله العظيم

الحمد

اللهم لك الحمد الذي أنت أهله على نعم ما كنت قط لها أهلاً متى أزددت تقصيراً تزدني تفضلاً كأني بالتقصير أستوجب الفضلا الحمد لله في سري وفي علني والحمد لله في حزني وفي سعدي الحمد لله عمّا كنت أعلمه والحمد لله عمّا غاب عن خلدي الحمد لله من عمت فضائله وأنعم الله أعبت منطق العدد فالحمد لله ثمّ الشكر يتبعه والحمد لله عن شكري وعن حمدي اللهم إن نعمك كثيرة علينا لا نحصيها ولا نحصي ثناء عليك ولا نقدر وأنت سبحانك كما أثبتت على نفسك وأنت سبحانك غني عن العالمين. سبحانك يا ربنا لك الحمد والشكر حمداً كثيراً طيباً مباركاً فيه.

الاهداء

الي كل مكن اضاء بعلمه عقل غيره
واهدي بالجواب الصحيح حيرة
فاظهر بسماحته تواضع العلماء
وبرحابته سماحه العارفين

اهدي هذا العمل المتواضع الي ابي الذي لم يبخل علي يوما بشئ
والي امي التي زودتني بالحنان والمحبه
اقول لهم: انتم وهبتموني الحياه والامل
والنشأه علي الشغف وحب الاطلاع والمعرفه
والي اخوتي واسرتي جميعا
ثم الي كل من علمني حرفا سنا برقه يضيء الطريق امامي

الي اهلي وعشيرتي
الي اساتذتي
الي زملائي وزميلاتي
كان له الدور الاعظم فيما وصلنا اليه ونخص بالذكر الاستاذ الفاضل
د. هشام عبدالله منصور
اليكم جميعا اهدي هذا العمل

الشكر والعرفان

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Abstract

With the proliferation of smart phones (cell phones), trade has been moved to another level as electronic commerce has become a source of income for many countries.

This mobile application was built to develop an e-commerce system in Sudan which involve e-commerce and cash payment to e-commerce and electronic payment , access to the system of e-commerce via mobile application by the user from anywhere any time and will be user friendly and providing all the information about products .

Application enables the customers to search and book flights on the product (price, description, and amount).

المستخلص

مع انتشار الأجهزة الذكية (الهواتف الخليوية) تم نقل التجارة إلى مستوى آخر حيث أصبحت التجارة الإلكترونية مصدر دخل لكثير من الدول وتم انشاء هذا التطبيق لتطوير نظام التجارة الإلكترونية في السودان من تجارة إلكترونية ودفع نقدي إلى تجارة إلكترونية ودفع إلكتروني. وستكون امكانية الوصول الى مشروع نظام تطبيق التجاره الالكترونيه من قبل المستخدم من أي مكان وفي اي وقت. وسيكون مشروع نظام تطبيق التجاره الالكترونيه سهل الاستعمال ويوفر جميع المعلومات عن المنتجات و يمكن العملاء من البحث وشراء المنتجات ، ويوفر كذلك معلومات عن المنتجات (المبلغ, وصف المنتج, الكمية).

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CHAPTER ONE
INTRODUCTION

1.1 Introduction

In this chapter we define the concept of e-commerce and mobile payment after that the problem statement and our proposed solution to solve this problem and the project objectives and some expected research outcomes.

1.2 E-Commerce

E Commerce stands for electronic commerce and caters to trading in goods and services through the electronic medium such as internet, mobile or any other computer network. It involves the use of Information and Communication Technology (ICT) and Electronic Funds Transfer (EFT) in making commerce between consumers and organizations, organization and organization or consumer and consumer. With the growing use of internet worldwide, Electronic Data Interchange (EDI) has also increased in humungous amounts and so has flourished e-commerce with the prolific virtual internet bazaar inside the digital world which is rightly termed as e-malls.

All you need is an Internet connection and a bank account. With e-commerce then, you can buy almost anything you would like without actually touching the product physically and ask the seller how many times before you place the final order. Here is a beautiful picture depicting how human life has evolved to adapt to the digital world and thus online trading. As Amazon, E-bay, Napthol, are some of the most popular e-commerce websites.

1.3 Payment via mobile

Mobile payment, also referred to as mobile money, mobile money transfer, and mobile wallet generally refer to payment services operated under financial regulation and performed from or via a mobile device. Instead of paying with cash, cheque, a consumer can use a mobile phone to pay for a wide range of services and digital or hard goods. Although the concept of using non-coin-based currency systems has a long history, it is only recently that the technology to support such systems has become widely available.

1.4 Problem statement

- 1.4.1. Avoid congestion and the possibility of buying in non-holidays.
- 1.4.2. Many brokers and fear of them.
- 1.4.3. Sometimes sites provide products that are not available in the market.
- 1.4.4. Wasting time searching for a product that is unavailable or available at a high price

1.5 Methodology

- 1.5.1 Information gathering from AMAROUS company.
- 1.5.2 Reviewing previous studies.
- 1.5.3 Analysis using Unified Modeling Language.
- 1.5.4 Fixing problems on previous studies.

1.6 Proposed solution

Developing a mobile application that extent behavior of e-commerce on Odoo and integrate the mobile application with payment provider.

1.7 Aims and Objectives

- 1.7.1 To evaluate the current state of the E-commerce using mobile in Sudan.
- 1.7.2 To provide a solution that provide mobile application to fulfill e-commerce activities.
- 1.7.3 To validate effectiveness of the proposed solution.

CHAPTER TWO

OVERVIEW OF E-COMMERDE VIA MOBILE APPLICATION

2 Overview of E-commerce via Mobile Application

2.1 Mobile commerce

Mobile commerce is a term that describes on line sales transactions that use wireless electronic devices such as laptops, mobile phones. These wireless devices interact with computer networks that have the ability to make purchases on line. Any cash disbursement is referred to as an e-commerce transaction.

2.2 Mobile Application

The use of smart phones has become increasingly popular and has caused revolutionary changes in consumer behaviors. Consumers can easily find and cheaply purchase products and services by engaging in shopping mobile applications.

Mobile applications has many benefits and advantages. The most useful mobile applications collect product data from several retailers. They sort collected data to allow consumers to perform side-by-side comparisons of different merchants' prices so they can find the best deals.

Mobile commerce includes mobile media and content, retail, travel, coupons/deals, and services. According to Shop.org/Forrester Research (May 2011), 91% of US online retailers have instituted or have begun development of mobile strategies

Many studies on mobile application have primarily focused on the adoption of mobile commerce.

2.3 Mobile Payment

Mobile payment generally refers to payment services operated under financial regulation and performed from or via a mobile device. Instead of paying with cash, a consumer can use a mobile phone to pay for a wide range of services

2.3.1 Samsung pay

The application is available for Android devices only, Samsung Pay allows users to use their phones to pay in stores. What makes Samsung pay for the effort and time of the user that using a technology called Magnetique Secure Transmutation, Samsung Bay allows the phone to mimic the physical card, allowing you to pay anywhere you normally pay with a credit card. This means that Samsung pay does not require companies to be participating merchants for users to use the application to make payments.

2.3.2 Goto Billing

The goto billing mobile payment application is one of the best mobile payment apps in the market today, designed to easily accept credit card, e Check and cash payments in a quick and secure manner. It provides complete tracking of transactions, real-time reports of payment activity through robust integration with the goto Billing payment platform and gateway.

This is one of the top mobile payment apps for merchants as it provides functionality to swipe or manually enter e Checks, credit cards and cash from a customer from any device. Goto Billing provides an inexpensive and effective way to accept payments while on the go without paying the super high fees of aggregators. It is very easy to get your own merchant account for increased savings and faster funding times.

2.4 Previous studies:

2.4.1 Sudan Open Market (alsoug.com)

The open market site is one of the largest websites in Sudan specialized in free classified ads and electronic marketing allows users to search easily ,and is only a broker between the seller and the buyer for free without any commission. So user can search for the desired item in the list of ads in Site and send your inquiries to the advertiser in the event of an advertisement in the desired item through: comments, chat, or telephone. user can also add your own advertisements for goods you want to sell or service you wish to provide, and will be contacted by interested subscribers user can add paid services to your ads to increase the number of views on them, and to show them more to the users of the site: ad highlighting service, instant republishing service.

It can be ordered through the website and makes it easy for customers to communicate with their customers through e-mail and other means of Internet connection.

also know their opinions about the products and can work at any time even if there is no headquarters for the company. because it can sell and buy through the Internet and that reduces the number of customers because the e-marketing opens new markets for your products and easy to preview by displaying on the website and shows you results in a short time and earns you New customers in a fast time and get information about any commodity and its features because of the strong spread of the Internet and you can also get the item from anyone who was an individual or institution.

In the open Sudan market you cannot pay online and also cannot complete the sales and purchase without the need of the buyer to go to the place of the item

2.4.2 Wadi On line Shopping (application)

Is a comprehensive on line store for all the famous international products. You can find many different types of goods, just browse and request what you want and shipping to your address directly, as the store guarantees you ease of use, simplicity of demand, speed of delivery and delivery. With very easy payment methods, such as payment after receive ..,the application ensures you get a lot of new commodities in various fields and the application provides advantages, it eliminates any fatigue that may suffer because of shopping and ask what you want. The application interface and the way the goods are organized make the search easy and ask what you want simple you can easily pay through your cards or choose the payment feature after receiving, and you can choose to display the goods as you like. also you can find goods by number of sales or by price to make it easier to find the best offers.the possibility to replace the item within 14 days if

you do not like ,there is no contact between the customer and the seller and the customer service is bad so you cannot get quick answers and there is also a problem in the product delivery service

2.4.3 Kazyon

Electronic and well-known stores, known application is the solution estimated to be reviewed through a diverse menu of electronic stores in Saudi Arabia, which operates under many and varied categories such as: cooking, baked goods, e-marketing and e-solutions and services academic and imaging supplies of women and design, printing, planning events, cars, real estate and furniture The decoration and handicraft industries and other groups Kazyon Market is “Egyptian application” in Egypt. Kazyon works to provide basic products at the best price to fight inflation. Kazyon Market is an Egyptian joint stock company, that support’s Egyptian economy.For delivery, can check if this service is available in your area and call directly the respective storn There in not search cabability in the application, and number of products is limited and uncategorized in addition to that customer service is too bad accordint to the costumers view..

2.4.4 OLX

The OLX app is a funny, cool and easy way to buy and sell things around you. OLX is the marketplace to buy, sell and connect sellers to buyers (Chat, call or text the seller to close the deal), OLX sellers can sell their personal and commercial products easily, Buyers can browse thousands of daily-added listings for both new and secondhand products and choose smartly.the search is by location you can find sellers in your country, city and neighborhood.no online payment in OLX application and there is complexity in finding specific products.

Later we have a table that showing comparison between core shop(our app) and other applications in previous studies .

Comparisons	Sudan Open Market	Wadi On line Shopping	Kazyon	OLX	Core shop
Ease of use	T	T	T	F	T
Multiple payment methods	F	T	T	F	T
Customer service	T	F	F	T	T
Delivery Services	T	F	F	T	F
design	F	T	T	T	T

table (2.1) T able explain compression between core shop and other applications

CHAPTER THREE

TOOL AND TECHNIQUES

3.1 Introduction

This chapter is about tools and techniques that we use in this project, tools that give us the ability to achieve the aims of our project. Then we are going to see the basic techniques that improved level of security in our system and explore them in depth.

3.2 Used Tool

3.2.1 Ionic Framework

Ionic Framework is an open source SDK it's built on top of AngularJS, it enables developers to build performant, high-quality mobile apps using familiar web technologies (HTML, CSS, and JavaScript).

Ionic is focused mainly on the look and feel, or the UI interaction, of an app. This means that it's not a replacement for PhoneGap or your favorite JavaScript framework. Instead, Ionic fits in well with these projects, in order to simplify one big part of your app development process: the front-end.

3.2.2 AngularJS

AngularJS is a JavaScript framework. It can be added to an HTML page with a `<script>` tag. AngularJS extends HTML attributes with Directives, and binds data to HTML with expressions. AngularJS is a MVC framework that defines numerous concepts to properly organize your web application. Your application is defined with modules that can depend from one to the others. It enhances HTML by attaching directives to your pages with new attributes or tags and expressions in order to define very powerful templates directly in your HTML. It also encapsulates the behavior of your application in controllers which are instantiated thanks to dependency injection.

Thanks to the use of dependency injection, AngularJS helps you structure and test your JavaScript code very easily.

3.2.3 Cordova

Apache Cordova is an open-source mobile development framework. It allows you to use standard web technologies - HTML5, CSS3, and JavaScript for cross-platform

development. Applications execute within wrappers targeted to each platform, and rely on standards-compliant API bindings to access each device's capabilities such

as sensors, data, network status, etc.

3.2.4 Node.js

Node.js is an open source server framework, Node.js is free, Node.js runs on various platforms (Windows, Linux, Unix, Mac OS X, Android, etc.), Node.js uses JavaScript on the server.

Node.js uses asynchronous programming!

-Here is how Node.js handles a file request:

- Sends the task to the computer's file system.

- Ready to handle the next request.

When the file system has opened and read the file, the server returns the content to the client.

Node.js eliminates the waiting, and simply continues with the next request.

Node.js runs single-threaded, non-blocking, asynchronously programming, which is very memory efficient.

3.2.5 ERP

Enterprise Resource Planning (ERP) is business process management software that allows an organization to use a system of integrated applications to manage the business and automate many back office functions. Odoo ERP is powerful open source platform for the business applications which have a suite of closely integrated applications that was build to cover all business areas. The idea of this

research is to design and developing an odoo platform tool that help the Odoo developers to create an odoo modules in a fast, easy and flixable way.

3.2.5.1 Advantages

- The software is highly flexible as it can be customized to suit your business requirements.
- You get a cost-effective solution.
- No-Vendor Lock In.
- Enjoy constant updates.
- It offers wide functionality.
- Being highly modular.

3.2.6 Python

It's interpreted object-oriented high-level programming language with dynamic semantics, simple and easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance, and supports modules and packages.

3.2.6.1 Advantages

- Presence of Third Party Modules
- Extensive Support Libraries.
- Open Source and Community Development.
- Learning Ease and Support Available.

- User-friendly Data Structures.
- Productivity and Speed.

3.2.7 PostgreSQL

PostgreSQL is one of the most powerful and easy to use database management systems. It has strong support from the community and is being actively developed with a new release every year. PostgreSQL supports the most advanced features included in SQL standards. Also it provides NoSQL capabilities, and very rich data types and extensions. All that makes PostgreSQL a very attractive solution in various kinds of software systems.

3.2.7.1 Advantages

Better support than the proprietary vendors.

The source code is available to all at no charge.

PostgreSQL is available for almost every brand of Unix (34 platforms with the latest stable release), and Windows compatibility is available via the Cygwin framework.

There are many high-quality GUI Tools available for PostgreSQL from both open source developers and commercial providers.

3.2.8 ORM

Object-relational mapping, in the purest sense, is a programming technique that supports the conversion of incompatible types in object-oriented programming languages, specifically between a data store and programming objects. You can use an ORM framework to persist model objects to a relational database and retrieve

them, and the ORM framework will take care of converting the data between the two otherwise incompatible states.

3.2.8.1 Advantages

Productivity,The data access code is usually a significant portion of a typical application.

Application design,a good ORM tool designed by very experienced software architects will implement effective design patterns that almost force you to use good programming practices in an application.

you can easily reuse the data objects in a variety of applications.

Application Maintainability,All of the code generated by the ORM is presumably well-tested, so you usually don't need to worry about testing it extensively

3.2.9 JSON_RPC

JSON (JavaScript Object Notation) is a lightweight data-interchange format. It is easy for humans to read and write. It is easy for machines to parse and generate. It is based on a subset of the JavaScript Programming Language,JSON is a text format that is completely language independent but uses conventions that are familiar to programmers of some languages, These properties make JSON an ideal data-interchange language.

3.2.9.1 Advantages

- JSON gives us a format that can be readily converted to known and fairly standard data structures across platforms and languages.
- Making the goal of cross platform and cross language RPC very simple.

- JSON-RPC describes several object shapes and expectations around the exchange of those objects.

3.2.10 TORNADO

Tornado is a Python web framework and asynchronous networking library, originally developed at FriendFeed. By using non-blocking network I/O, Tornado can scale to tens of thousands of open connections, making it ideal for long polling, WebSockets, and other applications that require a long-lived connection to each user.

3.2.10.1 Advantages

- its high performance.
- it can handle a large number of clients at the same time) that affects other servers.
- Tornado comes with built-in support and finds solutions for most of the tedious aspects of Web development like templates, localisation, signed cookies, etc.
- Tornado offers real time services and supports a large number of concurrent connections.

CHAPTER FOUR

ANALYSIS AND DESIGN

4.1 The UML diagrams

4.1.1 Use Case

This diagram is function description of tools and its major processes, which provides description of who use the system and what kinds of interactions to expect within the tool.

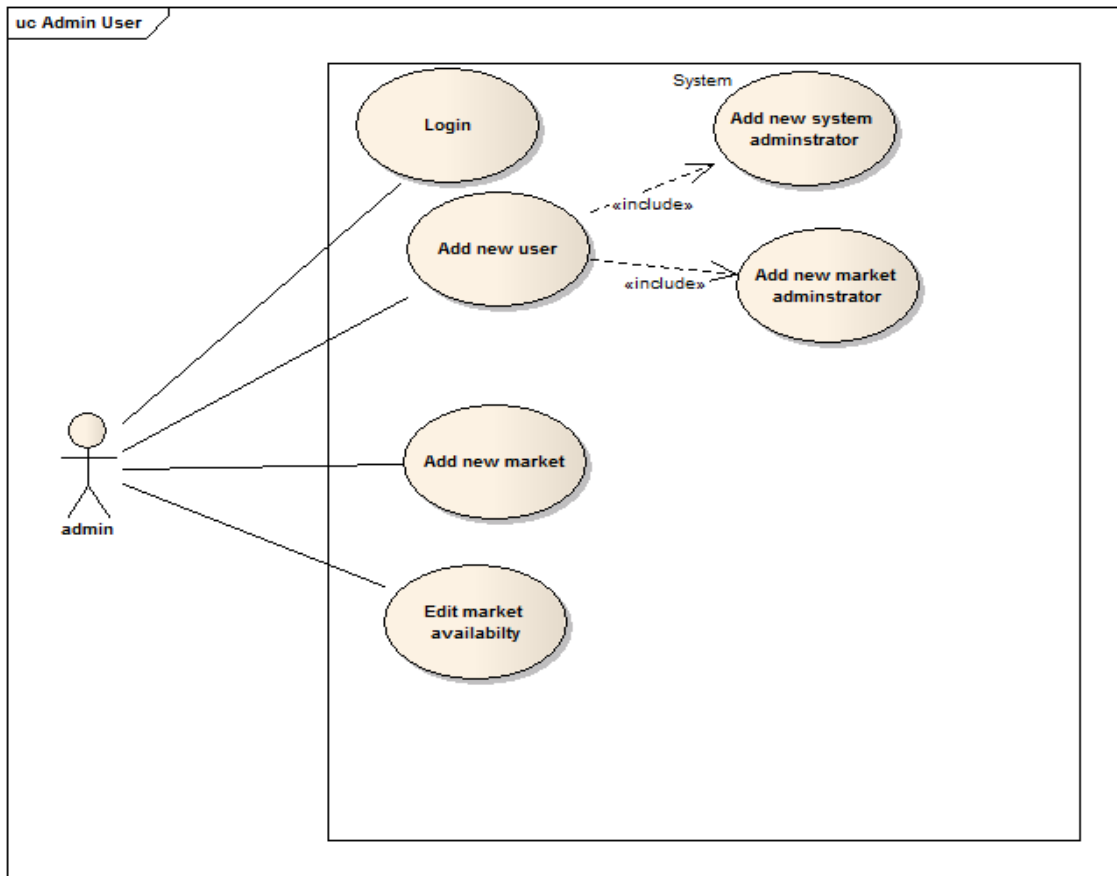


Figure (4.1) Admin user

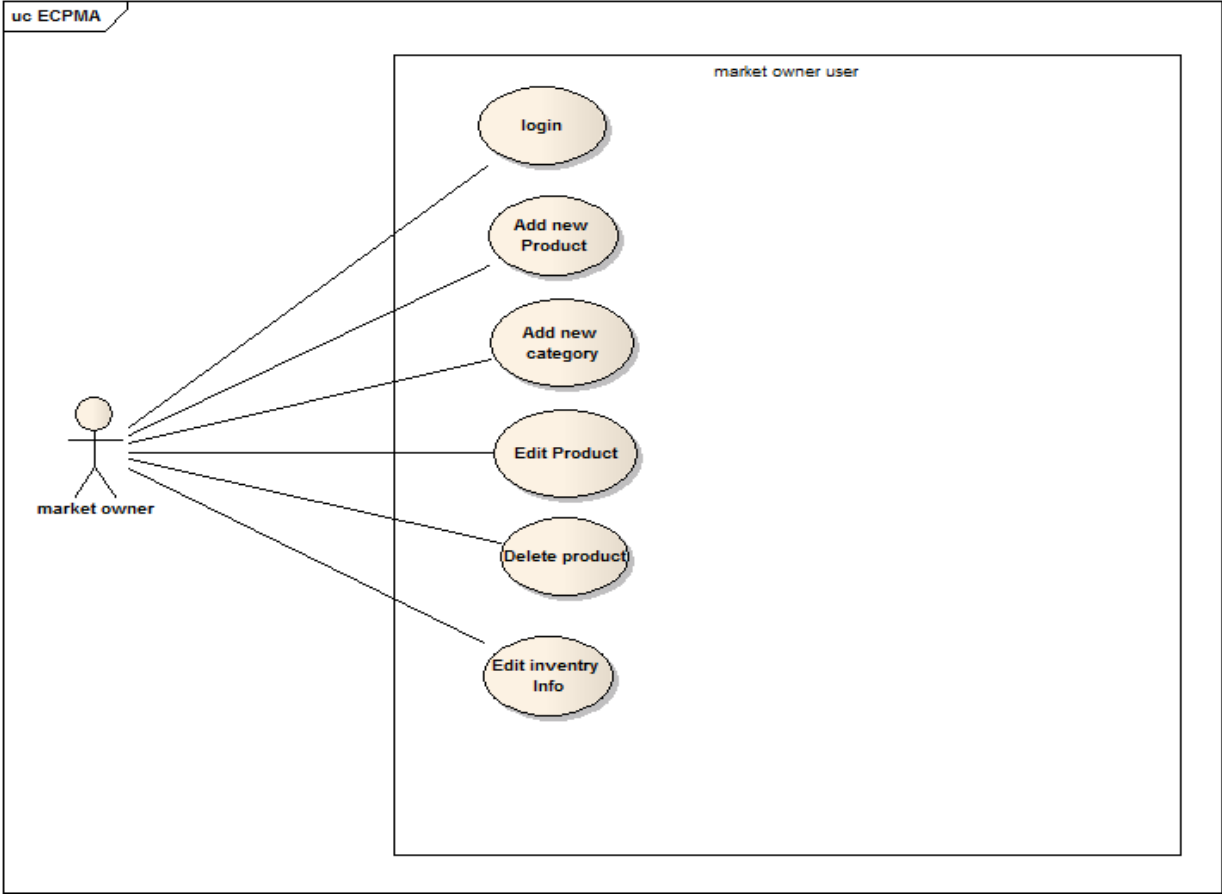


Figure (4.2) Market owner

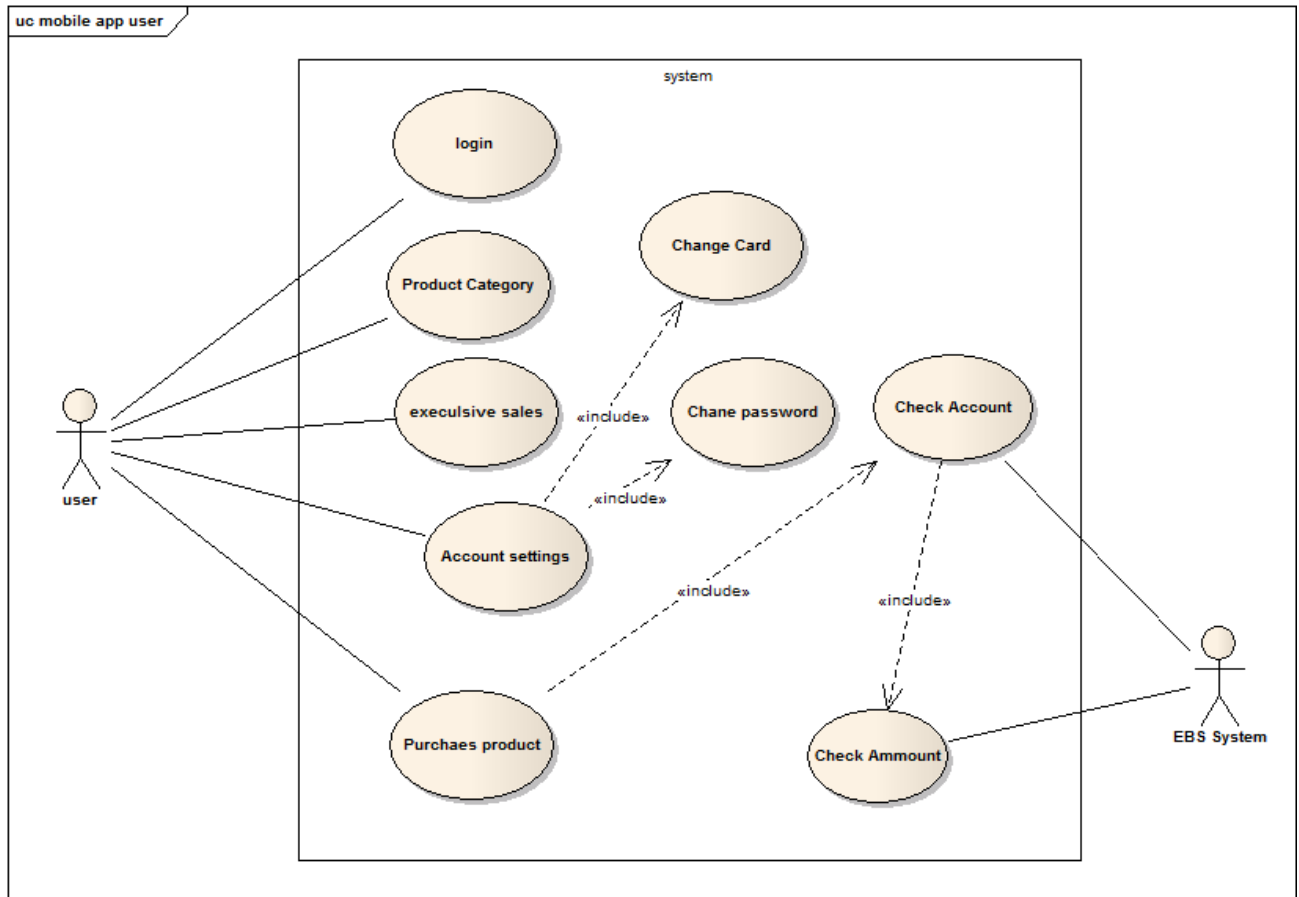


Figure (4.3) Mobile app user

4.1.2 Sequence diagram

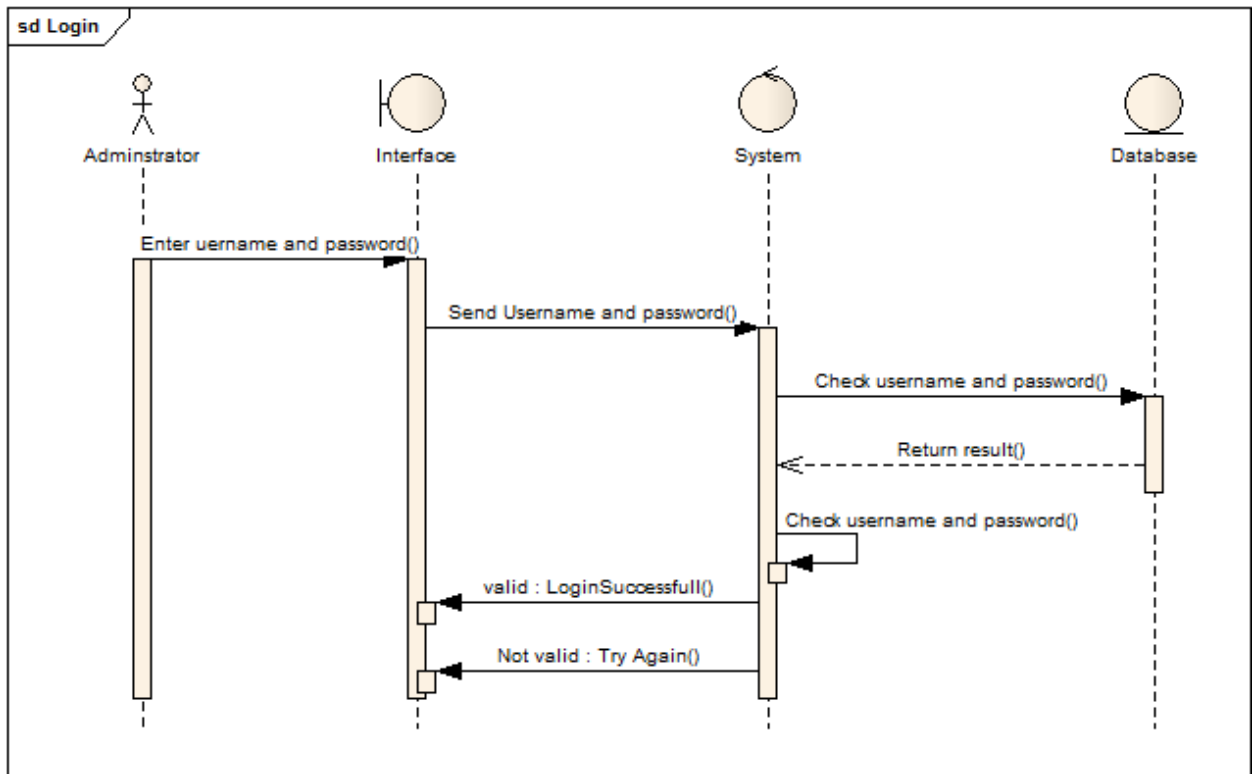


Figure (4.4) Login

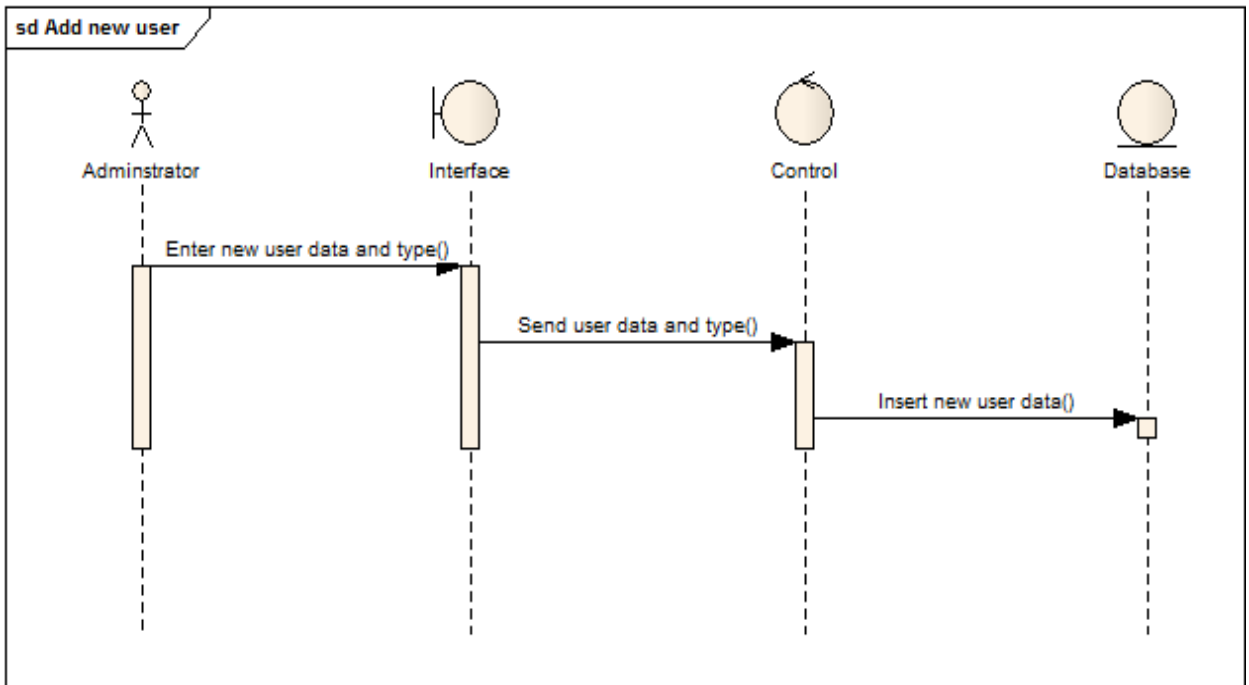


Figure (4.5) Add new user

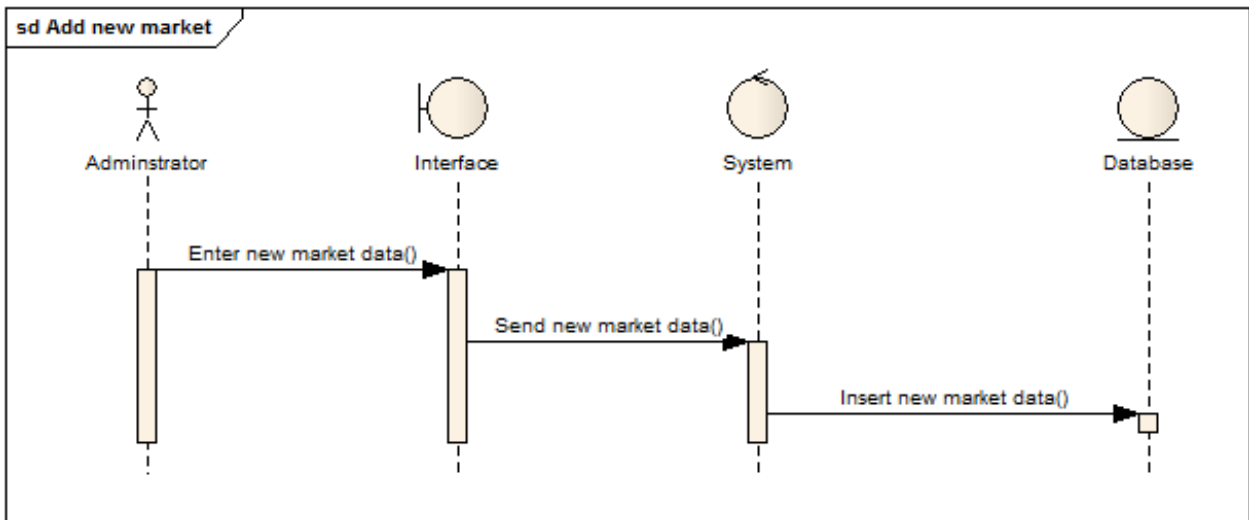


Figure (4.6) Add new market

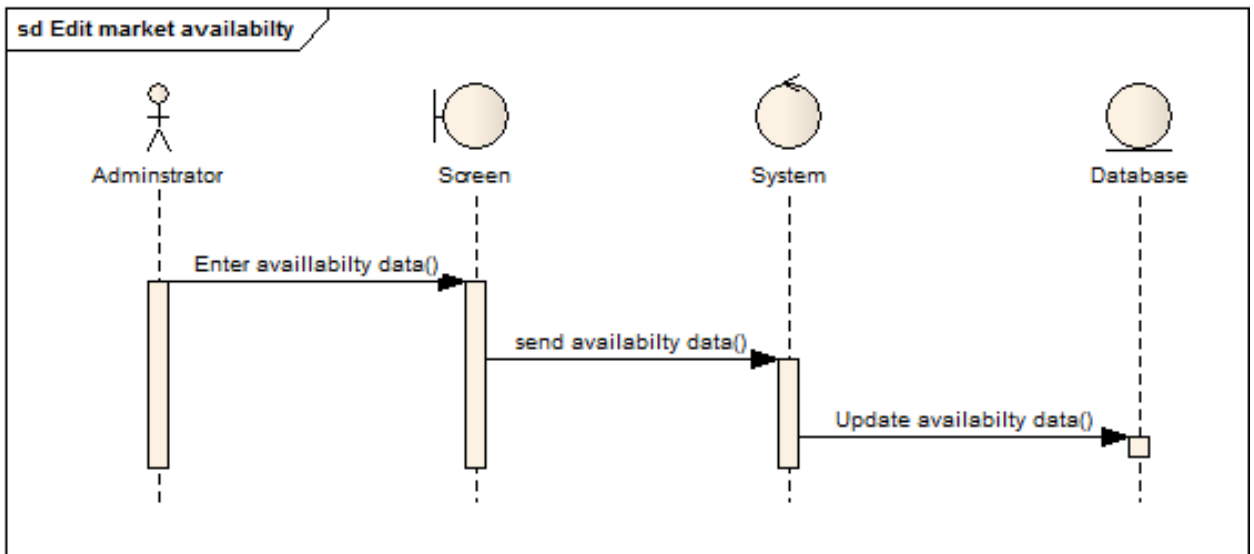


Figure (4.7) Edit market availability

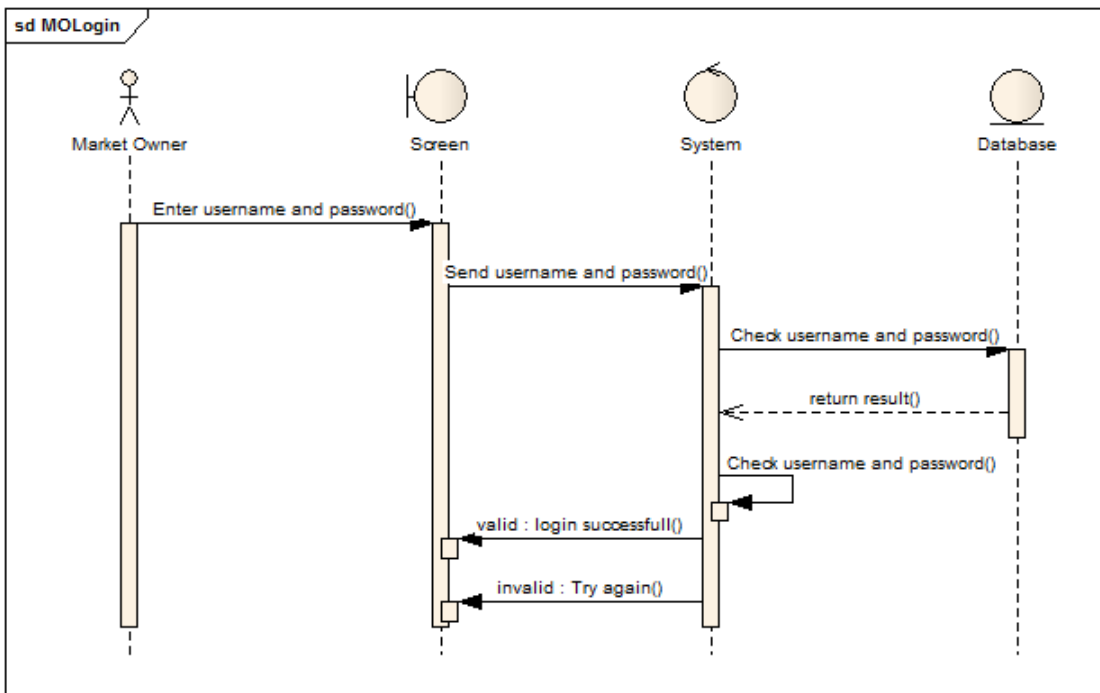


Figure (4.8) Market owner login

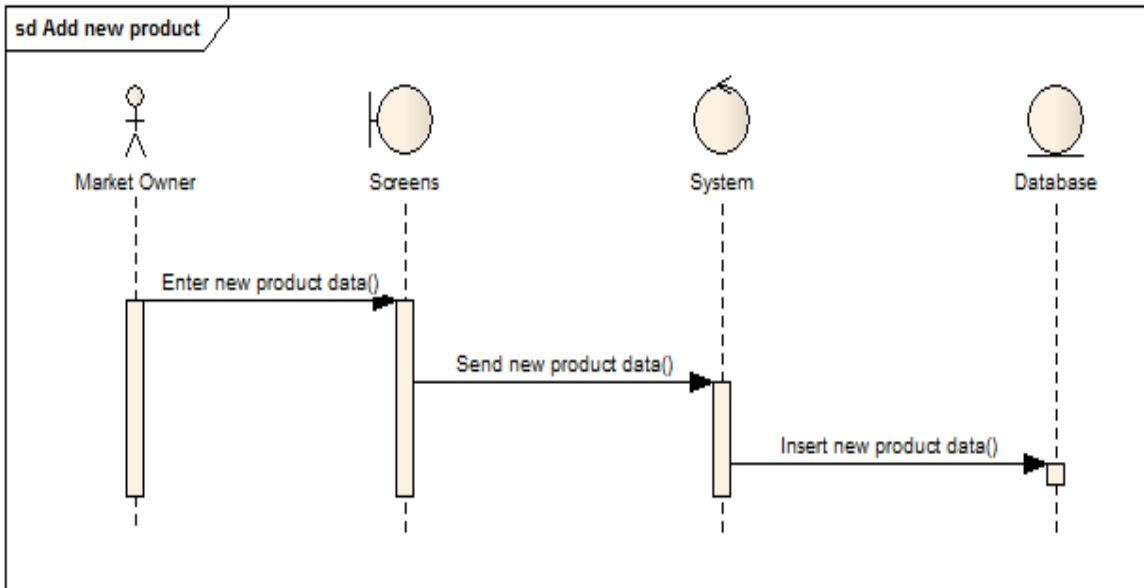


Figure (4.9) Add new product

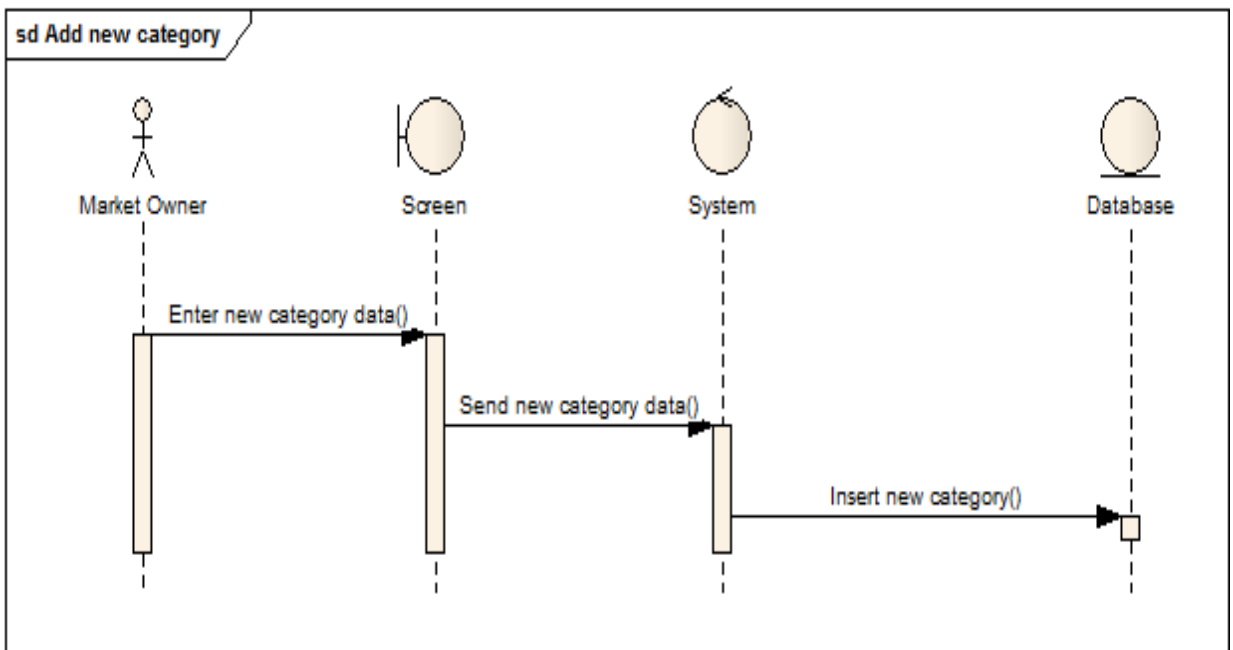


Figure (4.10) Add new categories

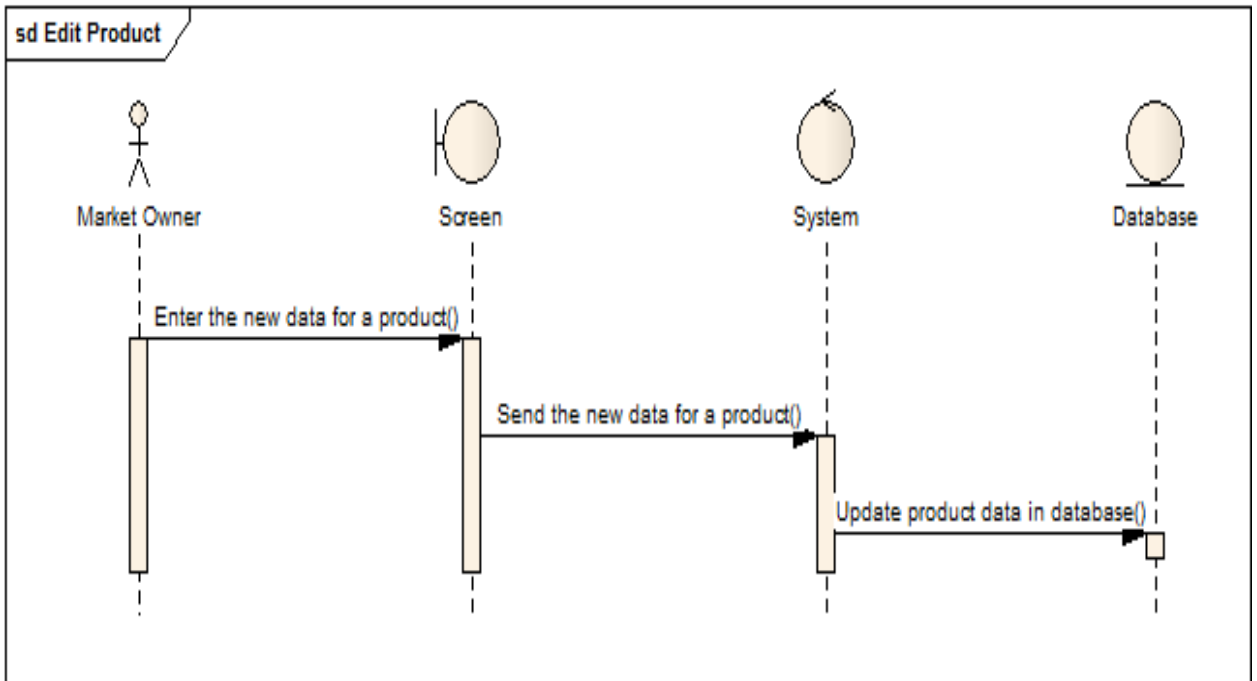


Figure (4.11) Edit product

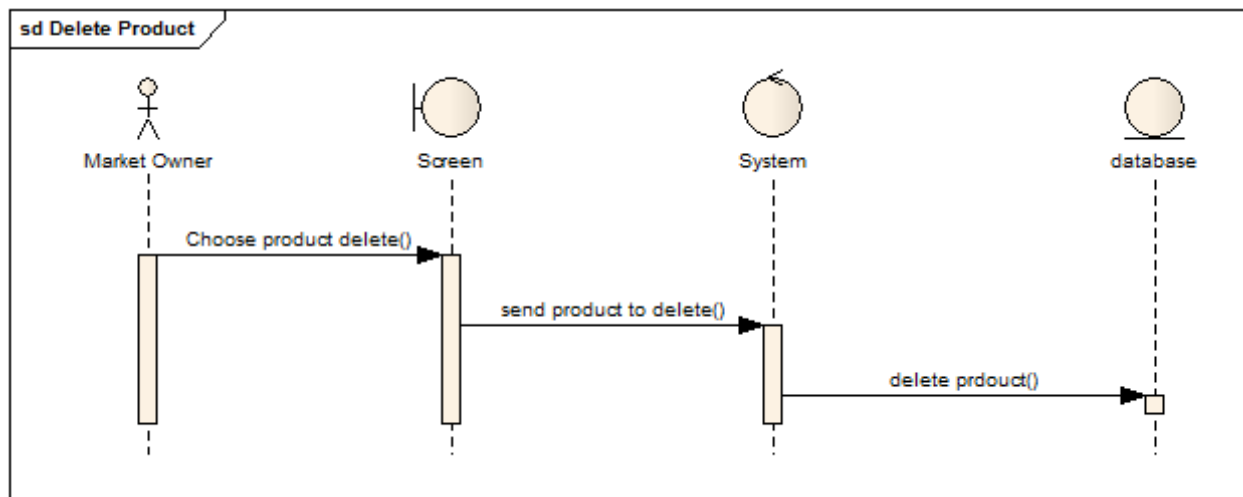


Figure (4.12) Delete product

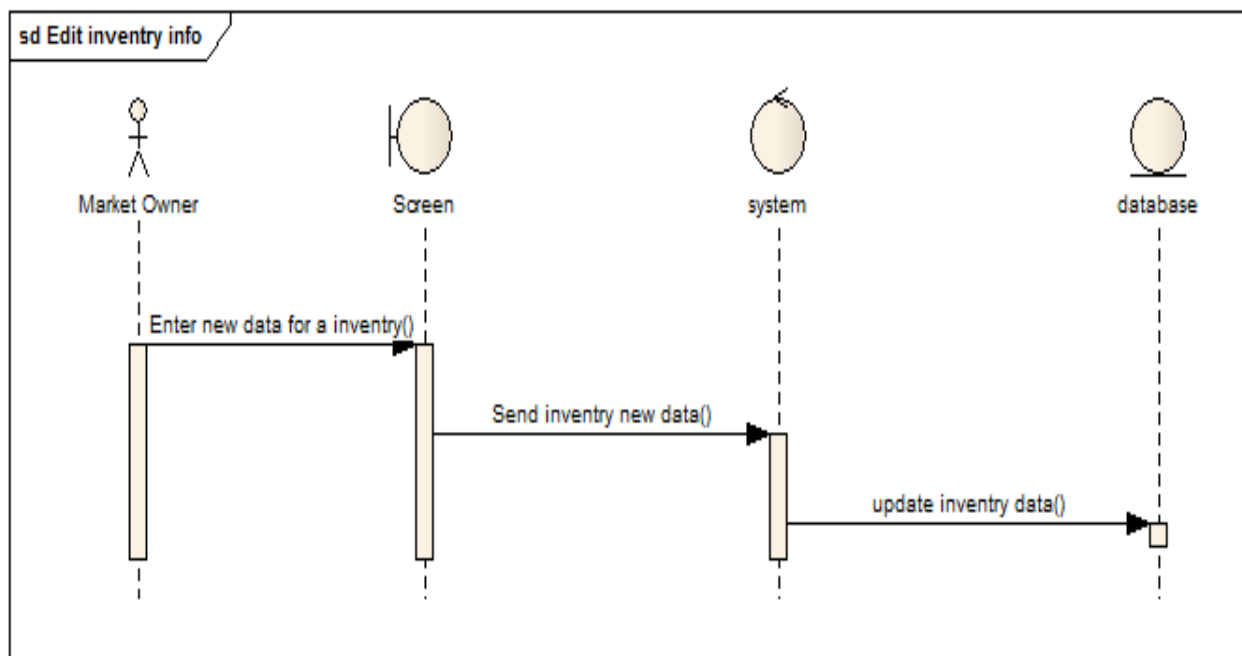


Figure (4.13) Edit inventory information

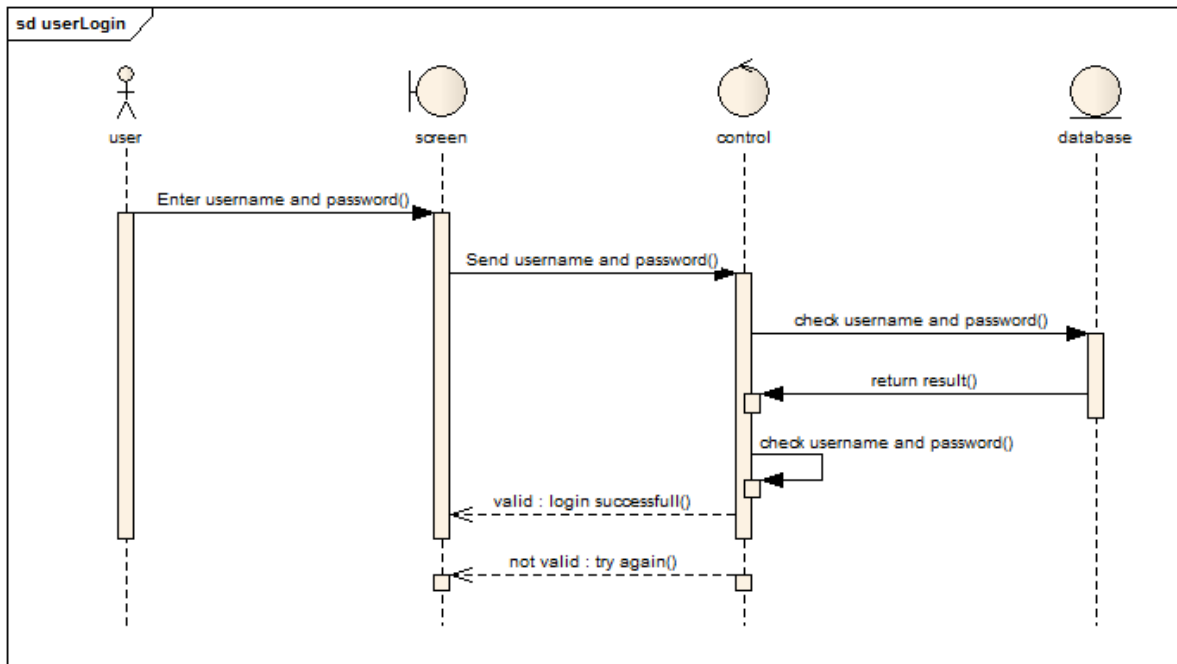


Figure (4.14) User login

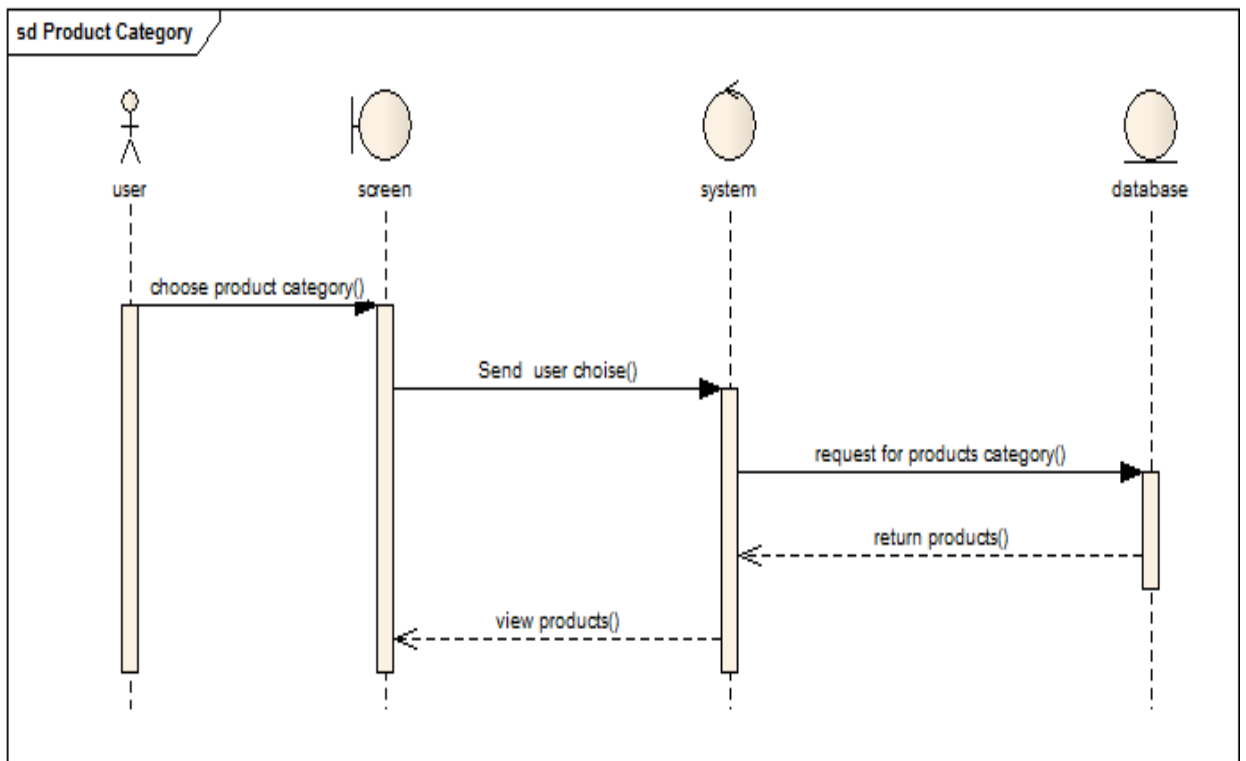


Figure (4.15) Product categories

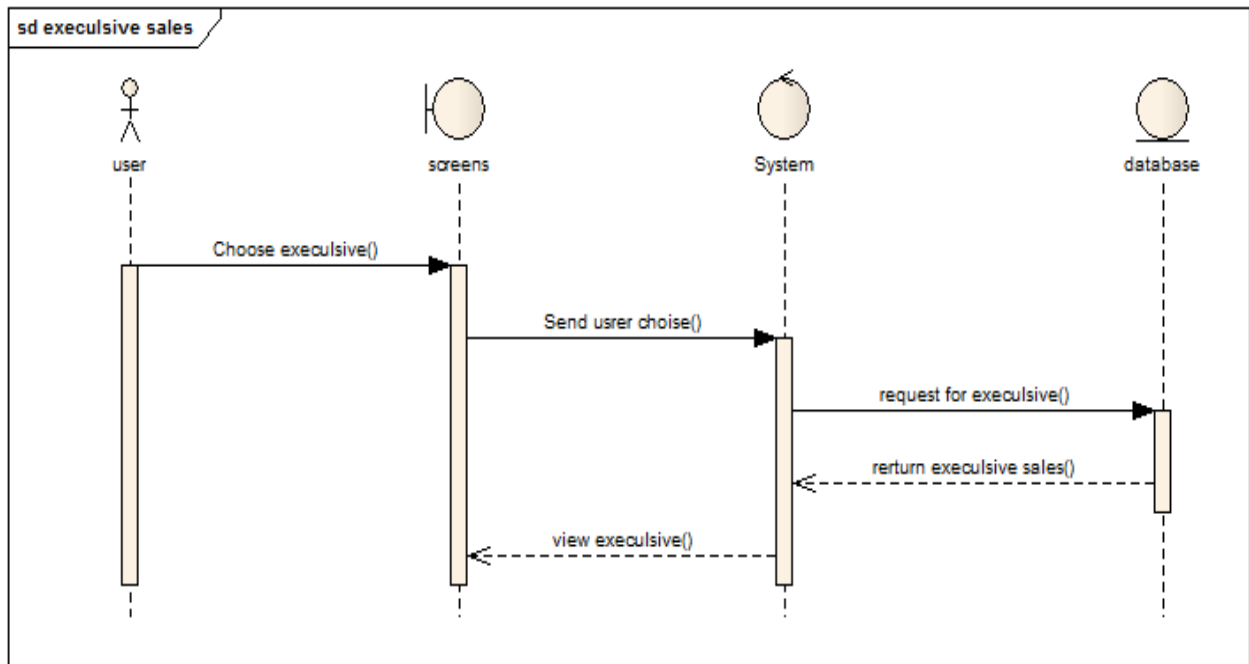


Figure (4.16) Executive sales

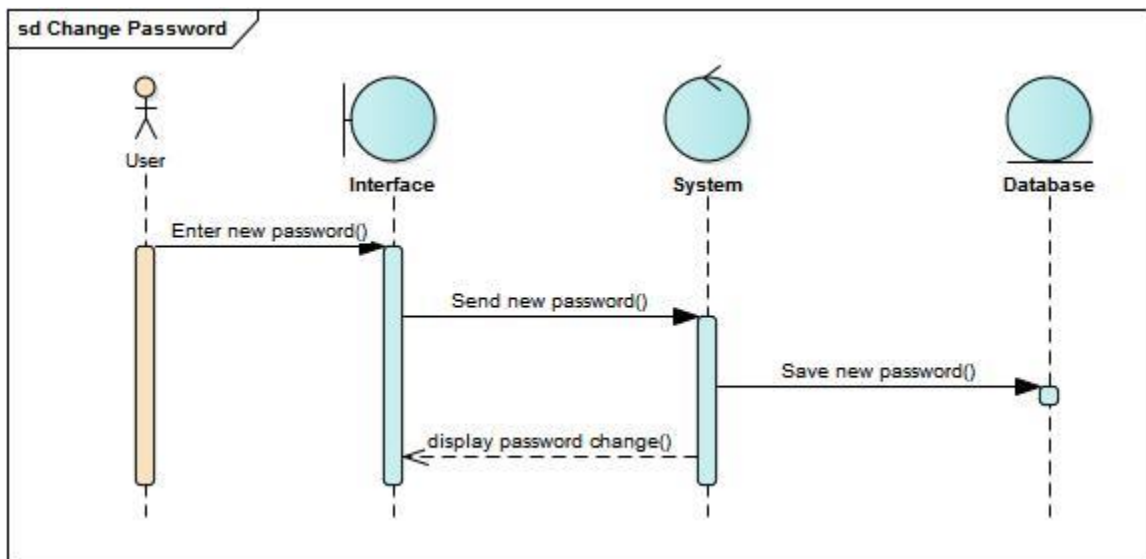


Figure (4.17) Change password in account setting

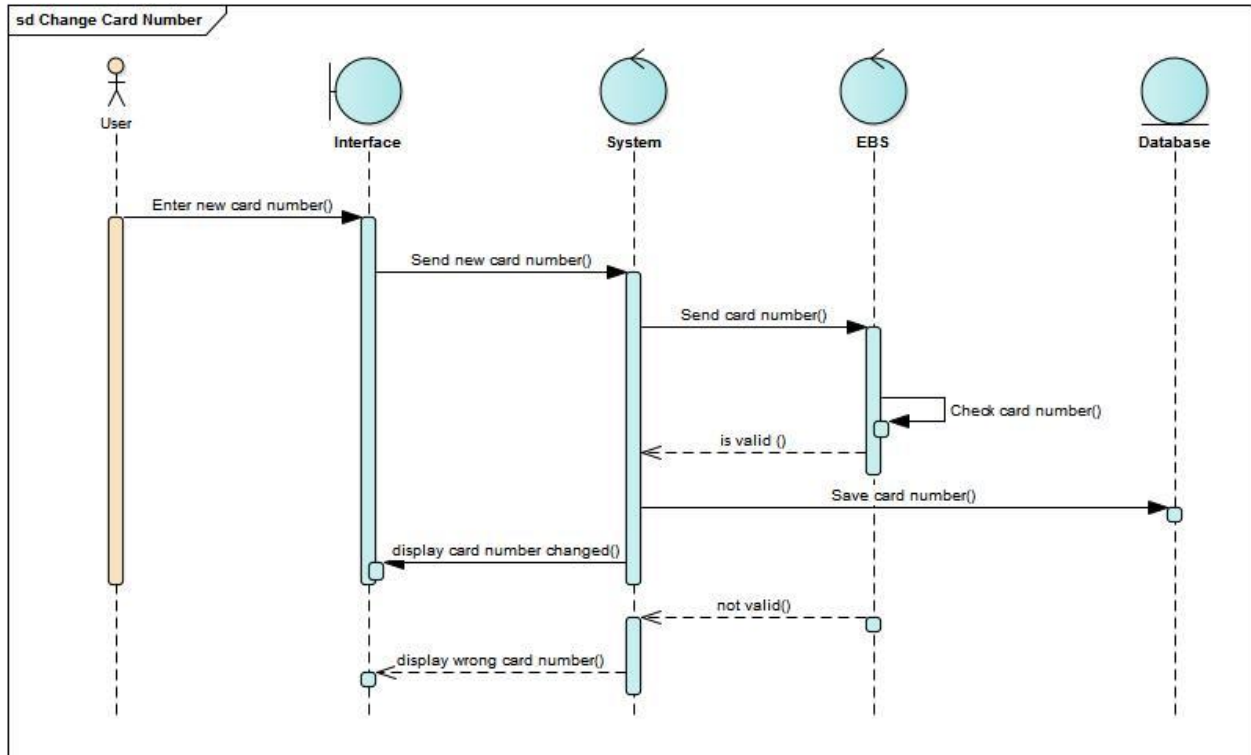


Figure (4.18) Change card number in account setting

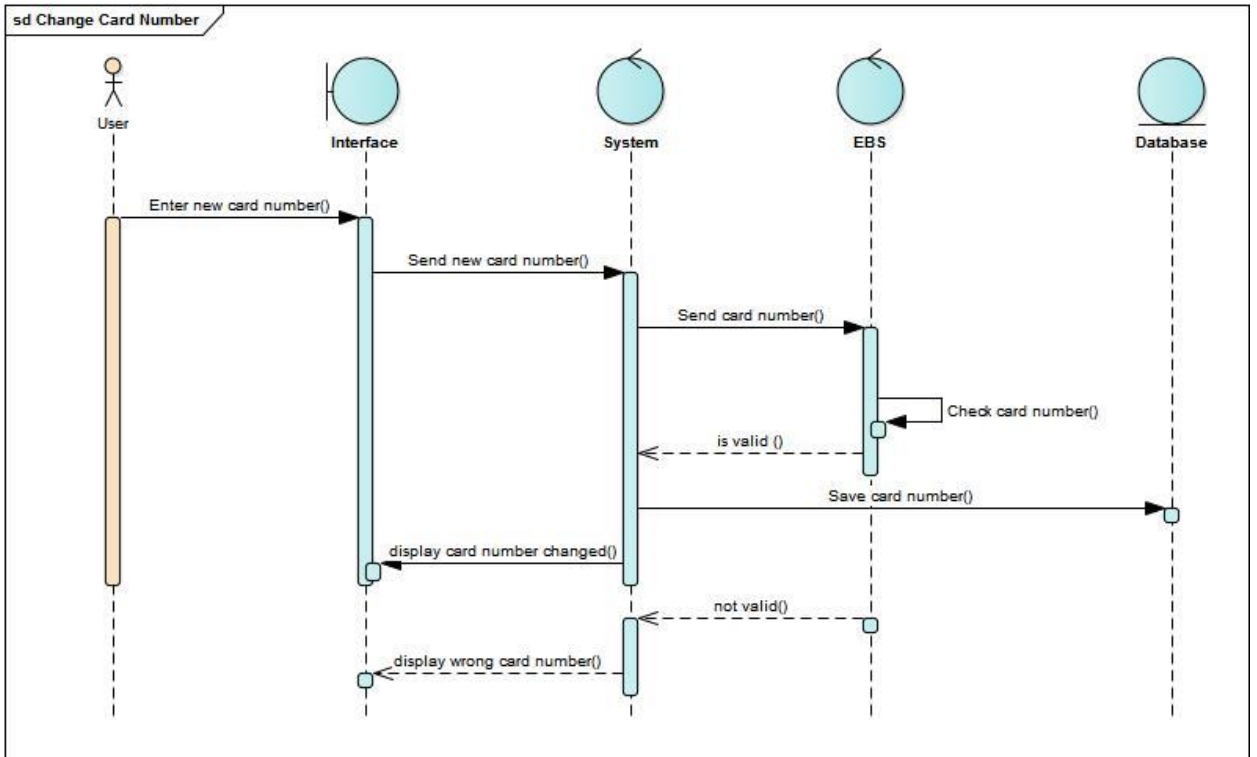


Figure (4.19) Purchase product

4.1.3 Activity diagram

Describe activities and flows of data of decisions between activities, and provides a very broad view of business process, and useful in showing workflow connection and describing behavior that has a lot of parallel processing.

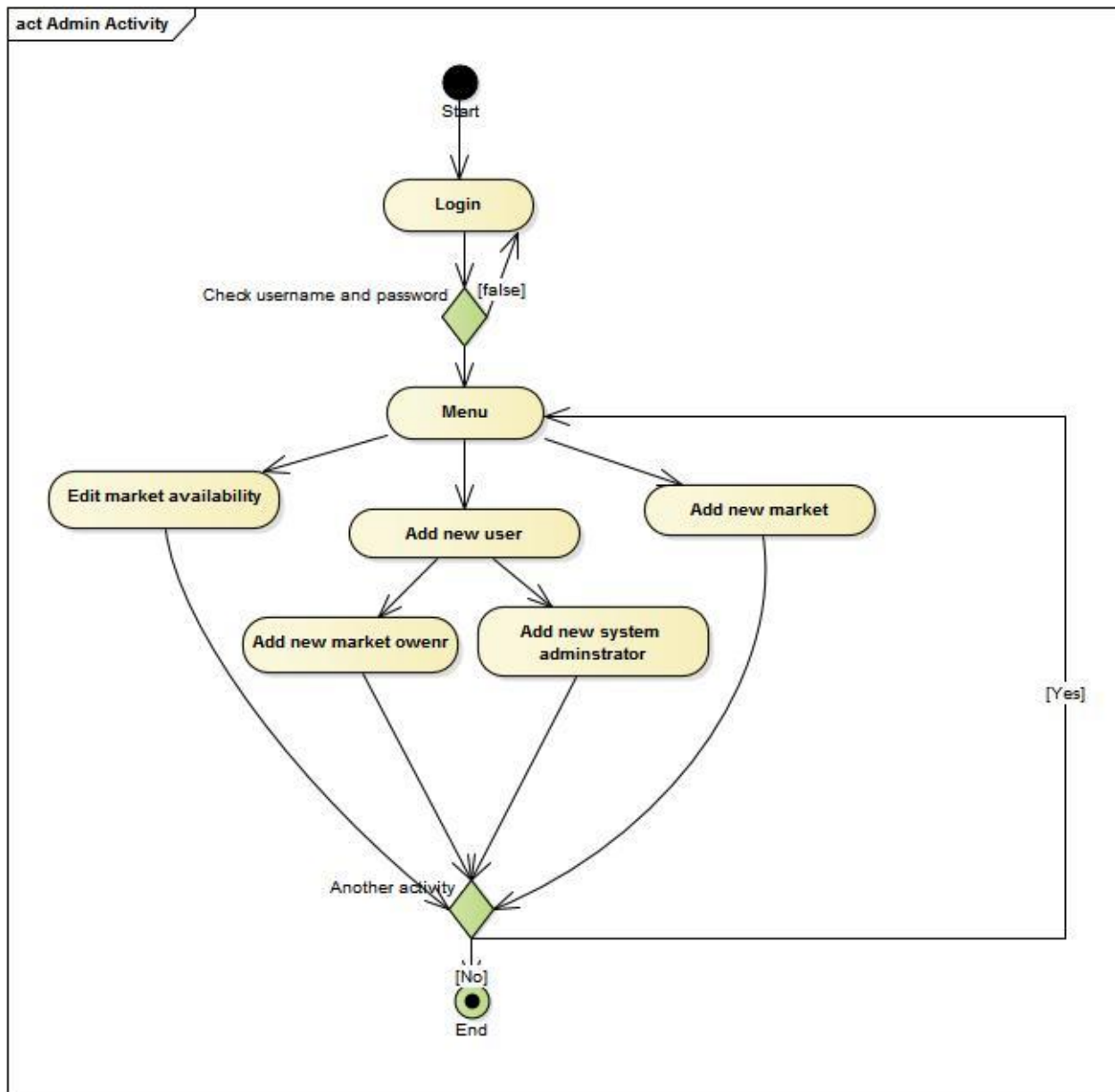


Figure (4.20) Admin activity

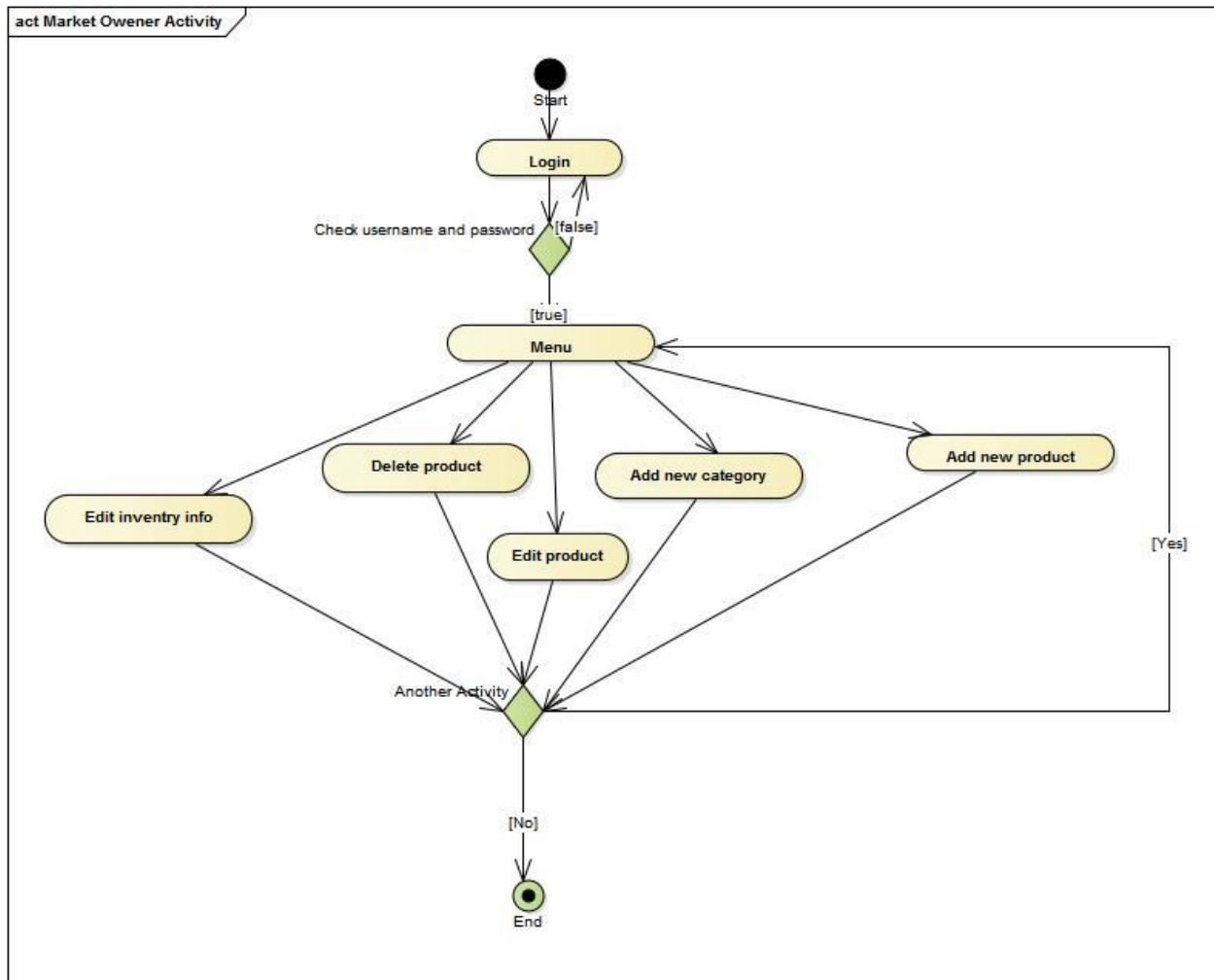


Figure (4.21) Market owner activity

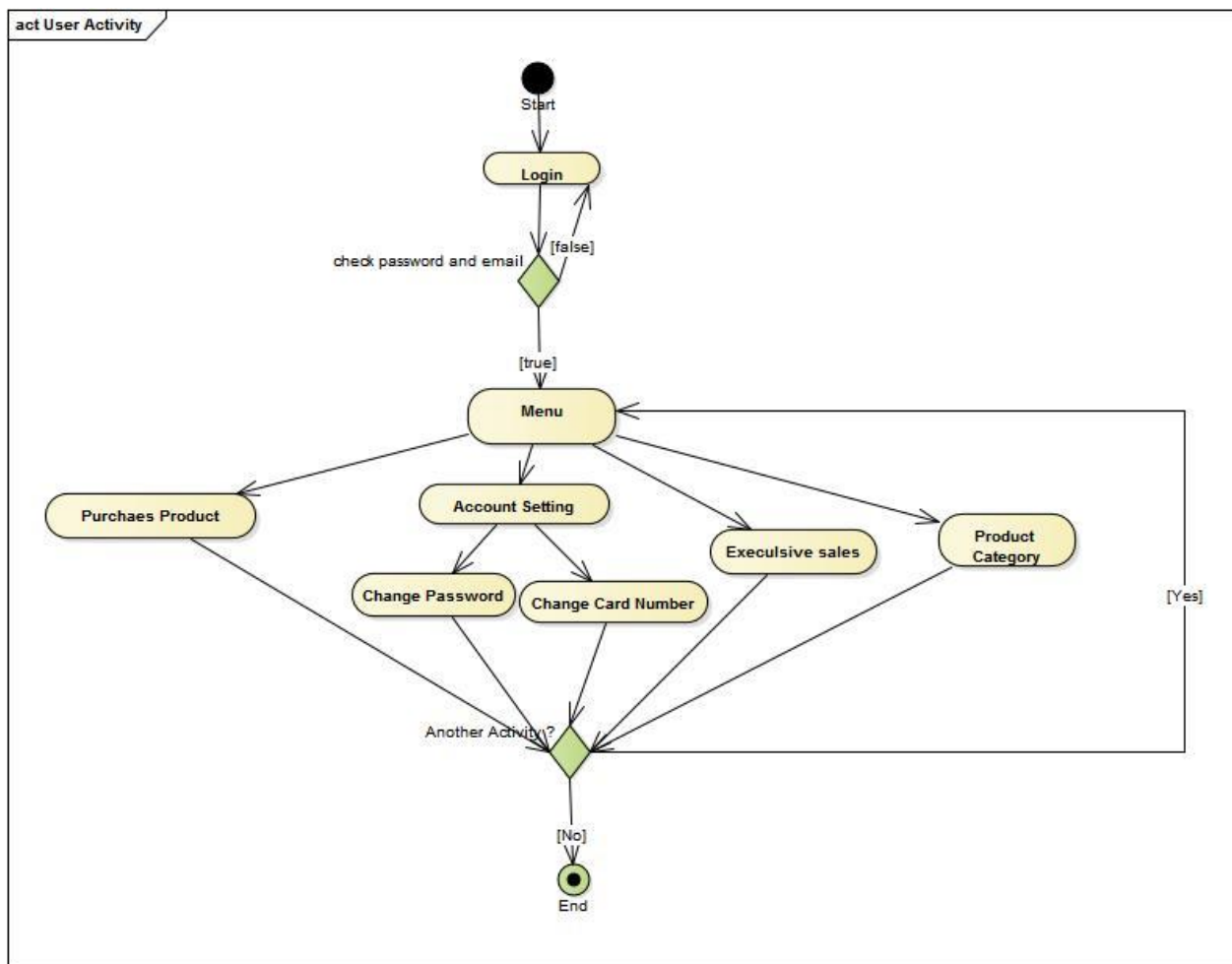


Figure (4.22) User activity

CHAPTER FIVE
IMPLEMENTATION

5.1 Implementation

We implement a mobile application that provides some services and information to the user and clients, and we focus on improving payment process, to provide the user with secure access to the required products.

We improve the payment level by applying authentication to the system by using user card PIN and password.

When the user comes to register an account in the system admin takes his card PIN and card password, and then stores them within user information in the database.

Then when the user wants to log in to his account the system retrieve the card PIN and verify it with the card PIN in the database, if the verification is valid then the system takes the user to the login page to enter his user name and password and verify them by compare them to user's information in the database, if he entered the right user name and password then user can have access to his account, but if the card PIN verification result is invalid the system keeps the user in the main page and will not give him authority to log in to the system. This will show in figure (4.1) and figure (4.2).So if there someone knows the user name and password, no one can access his account because the verification use unique static card PIN for every user device and vice versa.

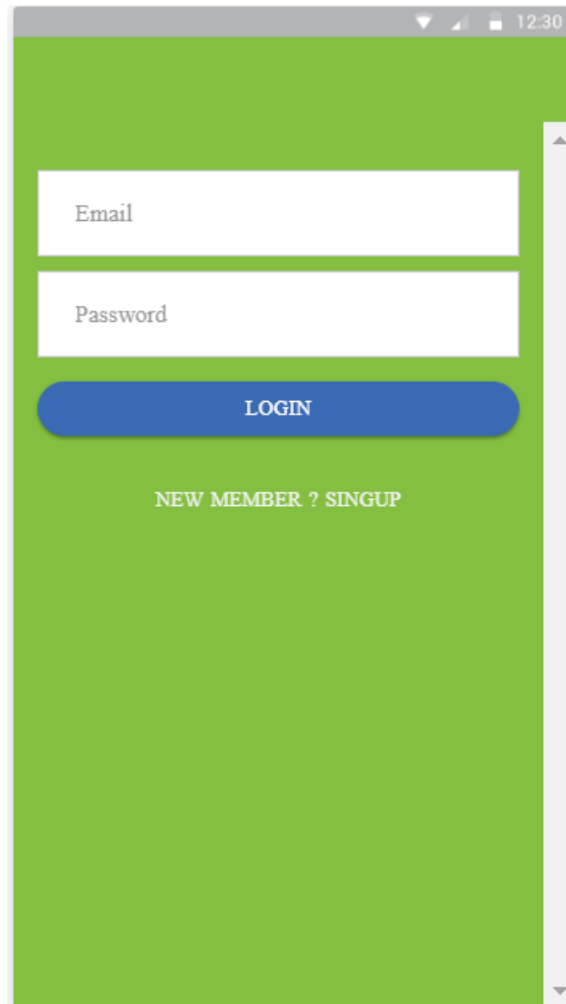


Figure (5.1) Login page

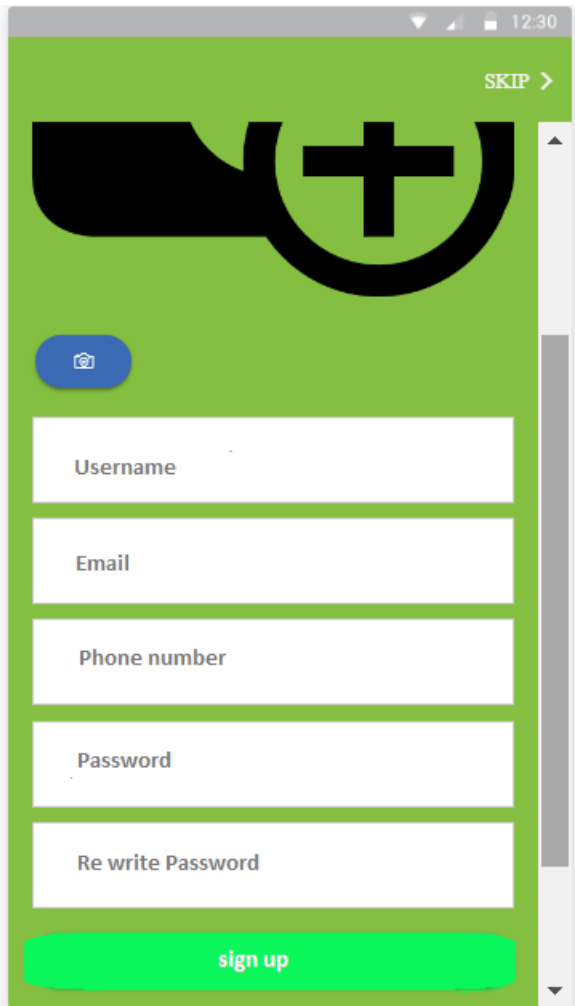


Figure (5.2) Registration page

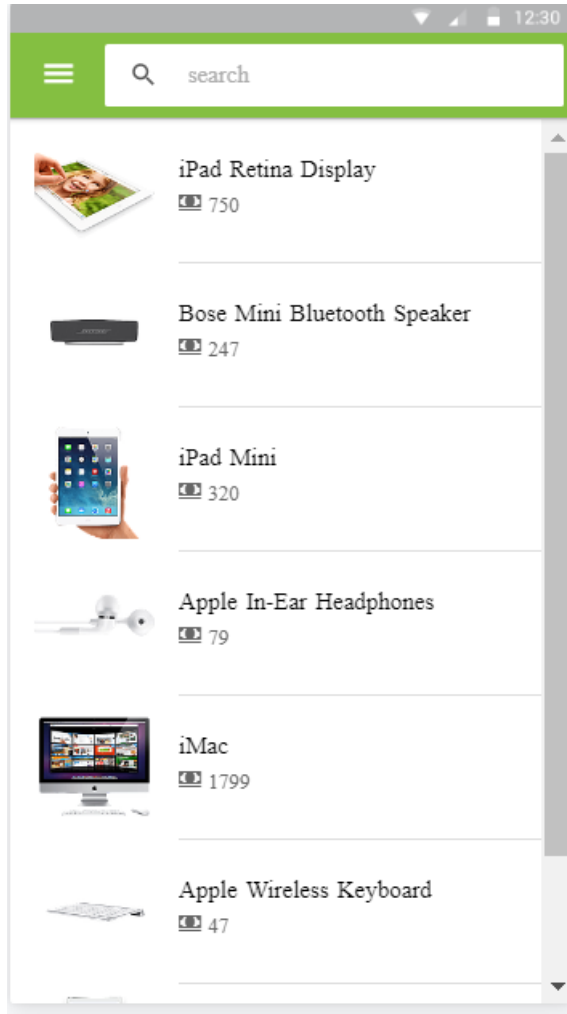


Figure (5.3) Products page

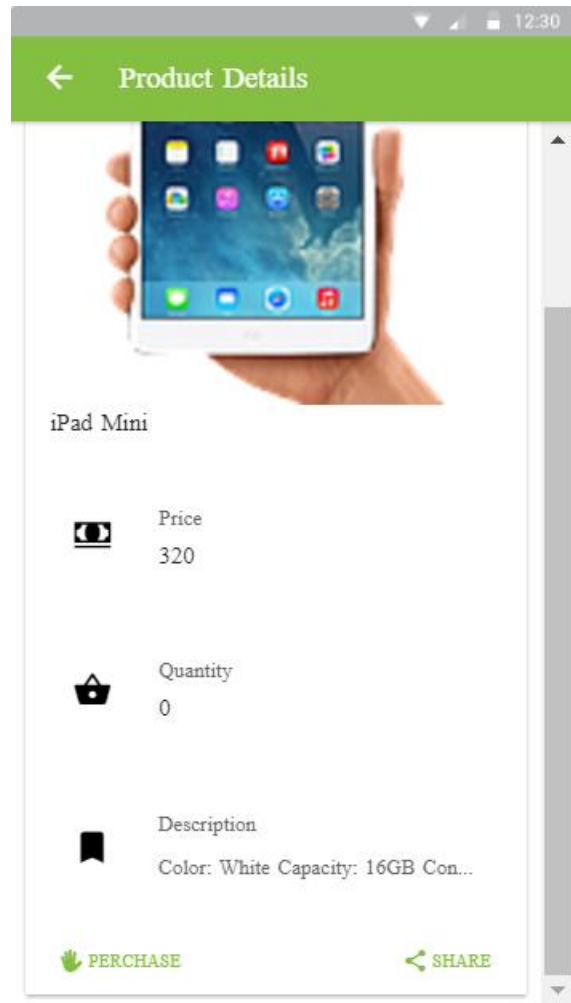


Figure (5.4) Products details page

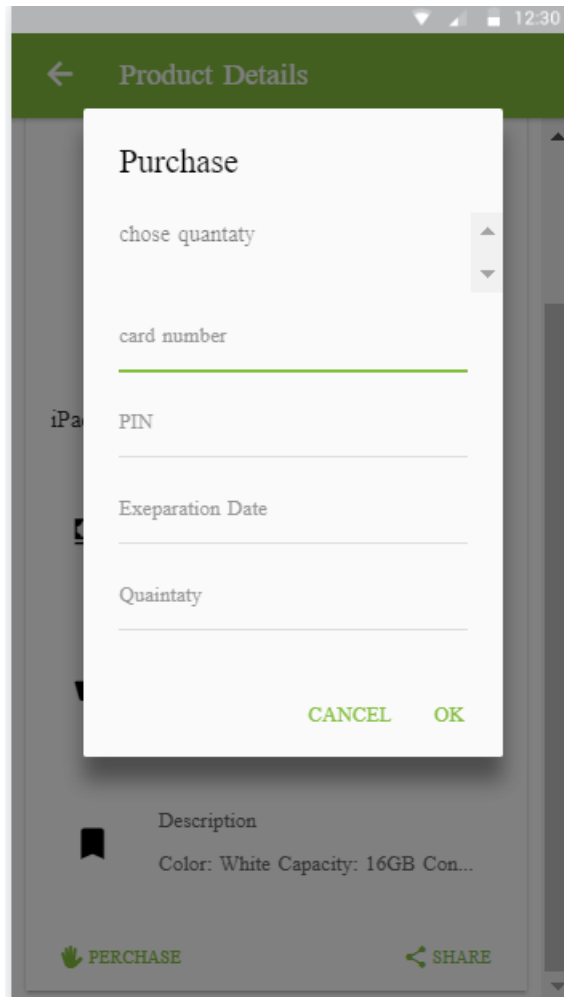


Figure (5.5) Purchase process page



Figure (5.6) Admin information page



Figure (5.7) Menu page

CHAPTER SIX

RESULT AND RECOMMENDATION

6.1 Result

- 6.1.1. Complete transactions in a short period of time at any time.
- 6.1.2 Direct dealing between the parties.
- 6.1.3. All that is suitable for people with limited income
- 6.1.4. Contribute to reducing the shadow market.

6.2 Recommendations

- 6.2.1 Add the delivery service to the project.
- 6.2.2 Develop more channel of payment to the applications such as MBOK.
- 6.2.3 Add new products and expand the project.
- 6.2.4 Support IOS in mobile app
- 6.2.5 To be run in production environment.

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