

**ANALYSIS, DESIGN AND
IMPLEMENTATION OF A SMALL
BUSINESS MANAGEMENT
SYSTEM**

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ANALYSIS, DESIGN AND IMPLEMENTATION OF A SMALL BUSINESS MANAGEMENT SYSTEM

By

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DEDICATION

To my friends and family for their unconditional love and unlimited support!

ABSTRACT

Faculty of Economics and Administrative Sciences

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The use of computers and technology has become very important nowadays, not only because they make our life easier, but also they play a crucial role in the business area and other areas as well. Our generation cannot see life without computers or internet since we are using them extensively in our daily activities such as homework, projects, research, social media etc. But the older generation is trying to fit in this new era as well by trying to learn the basic computer programs because they see that computers can help in improving their job results by performing a lot of operations faster and more accurately than humans can.

In Albania the number of small business, mainly grocery shops is very large. But this businesses mostly operate without having clear and accurate financial data about their daily activities, since the money that is collected from the sales or the accumulated customers' debts (those customers who buy on credit and promise to pay later) is generally written by hand in a notebook. Such a way of keeping track of sales or revenue makes it very difficult for the owners of the grocery shops to learn what the net profit is at the end of the day. The main idea of this thesis is to create a web-based system named SBMS (Small Business Management System) that will try to solve this problem by making it easier for the owner of the shop to maintain clear and precise financial data for the daily activities.

This thesis will provide the analysis, design and implementation of SBMS. This web application primarily focuses on the main activities of a small grocery shop such as keeping

track of the sales, supply, accounts receivable (which includes the amount of money expected to be collected in the future from customers that bought the products and promised later payment), accounts payable (which includes the amount of money that this business owes to his suppliers for products bought and not yet paid), daily information regarding sales and revenue generated, and a monthly income statement which is a clear and easy understandable financial statement that computes the net profit during the given month after deducting the expenses incurred. The application is intended to be very user friendly in order for every person regardless of their knowledge of computer usage to be able to use it easily.

SBMS brings a lot of benefits to the owners of small business not only because it simplifies their works and makes it more accurate and precise, but it also helps them in learning the real amount of money they earned at the end of the month after subtracting taxes and other expenses.

Keywords: small business, software system, management, financial data

ABSTRAKT

Fakulteti i Ekonomisë dhe Shkencave Administrative

Udhëheqës: Igli Hakrama

Përdorimi i kompjuterave dhe teknologjisë është bërë një pjesë e rëndësishme e jetës së njeriut në ditët e sotme sepse ato e lehtësojnë jetën tonë dhe luajnë një rol të pazëvendësueshëm në fushën e biznesit dhe në fusha të tjera. Gjenerata jonë nuk e shikon dot jetën pa kompjutera ose internet duke qenë se ne i përdorim gjerësisht ato në aktivitetet tona të përditshme si detyra, projekte, punë kërkimore, rrjete sociale etj. Gjenerata më e vjetër gjithashtu po përpiqet të behet pjesë e epokës së kompjuterave duke u përpjekur të mësojë programet kompjuterike bazike pasi ato shohin se kompjuterat mund të përmirësojnë rezultatet e punëve të tyre duke performuar një sërë veprimesh më shpejt dhe më saktë sesa njeriu.

Në Shqipëri numri i bizneseve të vogla, kryesisht dyqaneve ushqimore të lagjes është shumë i madh. Këto biznese përgjithësisht operojnë pa pasur të dhëna të pasqyruara saktë për aktivitetet financiare ditore, duke qenë se paratë e mbledhura nga shitjet ose borxhet e klientëve (klientët që e marrin mallin dhe premtojnë se do të paguajnë më vonë) në të shumtën e rasteve shkruhen me dorë në një bllok. Një mënyrë e tillë e të ruajturit të të dhënave për shitjet e bën shumë të vështirë për pronarin e dyqanit ushqimor të mësojë fitimin neto në fund të ditës/muajit. Ideja kryesore e kësaj teme është të krijojmë një aplikacion web-i i quajtur SBMS (Small Business Management System) i cili ka si qëllim të zgjidhë këtë problem duke bërë të mundur krijimin e lehtësirave për pronarët e dyqaneve të vogla në mbajtjen e të dhënave të sakta financiare të aktivitetëve ditore.

Në këtë tezë do të analizohet, dizenjohe dhe implementohet sistemi i SBMS. Ky system do të fokusohet kryesisht në aktivitetet kryesore të një dyqani të vogël ushqimor siç janë: mbajtja e shitjeve, furnizimeve, parave që priten të mblidhen në të ardhmen (borxhet e klientëve që nuk kanë paguar për mallin e blerë), paratë që do të paguhen në të ardhmen (borxhet që ka dyqani tek furnitoret për mallin e blerë dhe ende te papaguar), informacion ditor lidhur me shitjet, dhe një pasqyrë të ardhurash mujore për të përcaktuar në mënyrë të qartë dhe lehtësisht të kuptueshme nga pronari i dyqanit fitimin neto në fund të muajit. Ky system do të jetë shumë i lehtë në përdorim në mënyrë që të përdoret gjerësisht, pavarësisht sesa të avancuara janë dijet e përdoruesit në fushën kompjuterike.

SBMS i sjell shumë përfitime pronarëve të dyqanave të vogla të lagjes pasi ai e bën më të lehtë dhe më të saktë punën e tyre dhe gjithashtu i ndihmon në përcaktimin e saktë të fitimit mujor neto pas zbritjes së taksave dhe shpenzimeve të tjera.

Fjalë kyçe: biznes i vogël, sistem softuerik, menaxhim, të dhëna financiare

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Thank you!!!

DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Epoka University or other institutions.

Nafi Xhafa

19 June 2014

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LIST OF ABBREVIATIONS / NOTATIONS / GLOSSARY OF TERM

NOTATIONS / GLOSSARY OF TERMS

SBMS – Small Business Management System

HTML – Hyper Text Markup Language

CSS – Cascading Style Sheet

PHP – HyperText PreProcessor

FPDF – Free Portable Document Format

MySQL – My Structured Query Language

JSON – JavaScript Object Notation

OS – Operating System

PC – Personal Computer

UI – User Interface

IT – Information Technology

XML – Extensible Mark-up Language

BI – Business Intelligence

BIS – Business Intelligence Systems

IQ – Information Quality

IS – Information System

SME – Small Medium Enterprises

VSB – Very Small Business

MIS – Management Information System

ICT – Information and Communication Technology

Chapter 1 INTRODUCTION

Technology has been developing with gigantic steps in the recent times. Considering the first digital computer ENIAC and today's computers it can be easily seen how much has technology evolved. Technology is spread and used extensively in every possible field and aspect of our life. Even though for some people it may seem that technology has reached its limit, the fact is that improvements and new discoveries are being made frequently which make it possible to believe that technology will continue to thrive and develop itself beyond the human imagination.

Technology has changed human lives in all the ways possible [1]. Focusing on the use of computers since they are one of the main representatives of the technology burst: a computer generally means *a programmable machine*. The two principal characteristics of a computer are: it responds to a specific set of instructions in a well-defined manner and it can execute a prerecorded list of instructions (a program)¹. Recently computers have become smaller and affordable to almost every family with a moderate level of income. Looking through the evolution of computers it is easily seen that computers today are extremely faster and perform much better than the computers before. They are equipped with a lot of programs designed to help people through their work and activities. Computers have diminished the activities done by humans, meaning that computers perform most of the actions since they are faster and more accurate, while humans mostly have the task to give the instructions and supervise the work.

¹ Definition of the term computer from www.webopedia.com

Computers are used in almost every field of life. They are used in military, government organizations, hospital devices, engineering, statistics, business, universities, office works, for personal usage, and the list goes on and on. From the experience it is seen that the usage of computer programs not only has simplified, but also has increased the efficiency of the work performed.

The idea of this thesis is to create a web-based system for managing the small businesses in Albania. According to the Law No.8957 “For the Small and Medium Enterprises” it is stated that “A small enterprise is defined as an enterprise which employs fewer than 50 persons and whose annual turnover and/or annual balance sheet total does not exceed 50 million ALL” [2]. According to INSTAT in 2012 the enterprises with 1-4 employed (such as the small neighborhood grocery shops) dominate the market, by constituting 90.2 percent of the total number of enterprises in Albania [3].

Motivation

Considering that the number of small businesses in Albania is so high, while the way of managing them is quite primitive given the evolution of technology, it would be effective to implement a system that would help the owners of these businesses to manage their financial activities in a more accurate and efficient way. The motivation behind this is that even though it is the 21st century where almost all the families own at least a personal computer, the owners of small businesses in Albania do the calculations of costs and revenues by hand.

It becomes very tricky to keep track of the sales and the costs by taking notes in a notebook. This way of managing not only is time-consuming, but is not efficient at all, given that it

allows for a higher probability in making errors during the calculations, by forgetting some essential revenues or costs incurred and in resulting in a non-reliable income statement. On the other hand by means of computers and a specific system created especially for managing these financial activities, the owners of the small grocery shops are able to determine the net profit (which is their primary concern), very easily, just with the click of a button. The system would be able to do all the calculations and perform faster by reducing the burden of making all the calculations by hand. Another problem that these businesses face is managing the debts of their customers or keeping track of the debts that they have to their suppliers. In Albania still exist the procedure of buying the goods and paying for them later. More and more often, especially in this time of crisis, the regular customers may ask to get the products and promise to pay later. In such cases it is very difficult to keep track of such accounts payable or receivable by hand and considering them as revenue or cost in the moment they incur rather than the moment they are collected in cash. It is quite impossible for the owner of the shop to determine the total revenue generated in the end of the day by looking back and forth in the notebook when instead the system would be a much more convenient mean by performing all the calculations and displaying the results faster and in a reliable way.

In order to solve the problems listed above in this thesis will be analyzed designed and implemented a web-based system called Small Business Management System.

What is SBMS?

This system is a web-based system and its scope is to make it easier for the owners of the small grocery shops to manage their financial activities and to view the revenues, costs, net

profit or other financial data. This system is designed to have only one user which is the owner of the business (considering the fact that SBMS is specifically to be implemented for the small neighborhood grocery shops where generally the owner is also the cashier). It is designed to give the user has the ability to create and print invoices for the customers of the shop and determine the type of payment, weather the payment is being done at the moment of purchase or later in future. This information is also reflected in the printed invoice such that invoices to be paid later would also include the name and surname of the customer with the purpose of making it clear and leaving no place to misunderstanding. The customers would show the invoice when they come in to pay their debts. In this way the customer and the owner would be clear for the amount of debt. Other than printing invoices SBMS is designed to enable the user in managing the supplies, adding in inventory the products bought, either currently existing products or new ones. In the same way as with invoices the user would be able to determine the method of payment, if it was done in cash or on credit. The system is intended to enable the user in viewing the daily financial information which would display the number of invoices printed, invoices paid in cash and those to be paid later, the revenue generated during the day more specifically the amount of money collected in cash and the accounts receivable or the money collected from the debts paid in that day, the supplies bought and paid in cash and those to be paid later, the debts you paid to your suppliers and the total amount of cash that should be in the till/cash desk. SBMS also allows the user to manage the accounts payable and receivable by entering the transactions related with the amounts of accounts receivable collected or account payable paid. To have a clear view of the sales incurred during a specific month or period of time, SBMS is planned to display in the form of a column graph the

daily/monthly/yearly according to the time period selected by user. In this way the user is able to determine the days that generated more revenues and the ones that generated less. And last but not least the system enables to create a monthly income statement to calculate net profit of the entire month after subtracting all the expenses incurred from the revenues collected. The user is able to print the income statement and have it in paper other than in electronic form.

The entire web-system is based on the way the small businesses operate in Albania and all the calculations in getting the financial results that are displayed to the user are done using the appropriate mathematical and accounting rules.

Chapter 2 LITERATURE REVIEW

In this section there will be will observed and summarized the most important paper or studies related with computerizing or implementing IT solutions to the small business. Mostly the studies are conducted in foreign countries which have a different economical position and a different structure of the small businesses, but still these papers are useful in describing the importance and need of implementing computing practices in the small businesses.

Implementing or combining the IT Solutions with the business is a topic that has been discussed years before in other foreign countries. The reason is that with the development of technology and computers and the success seen in using them in different areas, business people wanted to take advantage as well. Thus it was proposed to adapt some IT solutions for businesses. Firstly they were implemented in large businesses which had reached a certain economical level and after noting the positive effect that computerizing had on these businesses it was decided to try it also for the small business as well. Before jumping directly in making the actual systems some studies were done results of which generally showed that using computers improves the performance of the business.

Aleš Popovič, Tomaž Turk, and Jurij Jaklič studied the business value that was generated by implementing business intelligence system [4]. After seeing the advances in the business intelligence area, the interest for applying the business intelligence systems in the organizations was increased. IT had been transforming the nature of products, processes, companies and industries and it was important to know how it could create competitive advantages for the businesses. Business Intelligence Systems is an IT investment that

supports the decision process at the analytical level and its key factor is improvement in the information process. It is implemented by the software vendors to suit the products for their customers and it allows for easy access to business data. According to White (2005) BIS analyze business operations and produce information to help business users understand, improve and optimize business operations. The areas which are related with BIS are represented in the following figure:



Figure 1. Broad concept of the term BI

Three studies were conducted in Slovenian organizations in 2005 about the BIS, how these organizations perceived business value of BIS and the ways of assessing it. The results of these studies showed that BIS and its maturity influence the Information Quality (IQ) and that management expects the “right answers” from BIS

James Y.L.Thong tried to adapt an integrated model of information systems in small businesses [5]. For this purpose he made a survey in 166 small business the results of which showed that small business which had certain CEO, innovation and organizational characteristics were more likely to adopt the information systems. This study also showed

that CEO and innovation characteristics play a strong role in the decision to adopt IS, but not in the extent of this adoption, while organizational characteristic is mainly the indicator of this extension. Small businesses whose CEOs are innovative and have knowledge about the IS are more prone to invest in implementing them because they know the benefits of IS adoption, some of which include the organizational efficiency and effectiveness. On the other hand it is important for the adaption of IS that they are considered to be beneficial for the small business by applying better alternatives to practices currently in use. The IS should comply with the norms and needs of the business in order for them to be integrated in the best way possible. Another important conclusion that this study determined is that the implementation of IS should be easy in usage and understanding in order to achieve the highest benefits.

Another study also tried to gain insights about the adoption of information technology in Small and Medium- sized enterprises, but different from the study above, this one also focuses in the risks faced and the reasons to failure. Some of the risks in implementing IT have consequences that impact negatively in the business profitability and survival. According to Love (2005) who studied the case of Australian SMEs, IT risks refers to failure in achieving some or all of the benefits of using IT because of:

- Implementation costs being higher than expected
- Technical systems performance significantly below the estimate
- Incompatibility of the system with selected hardware and software.

This study conducted by Ghobakhloo M., Sabouri M. S, Hong T. S., and Zulkifli N. concluded that the failures or dissatisfactions resulting from implementing IT solutions to small or medium-sized enterprises usually are the results of the following reasons [6]:

- Inappropriate connection of adopted IT to the enterprise strategies;
- Inadequate realization of organizational issues;
- Inadequate realization of end users necessities;
- Lack of required resources (knowledge, skills, financial, managerial);
- Inadequate teaching and preparation of end users;
- Business size and fund limitations to employ IT specialists;
- Unqualified management in highly centralized CEO structures;
- Inappropriate government assistance role and supportive regulation;
- Dissatisfaction with IT created competitive advantages due to improper interactions with competitors, suppliers and customers;
- Particular characteristics of organization, culture, and family involvement in business.

It is important to highlight these reasons because by taking good care of them and trying to solve those problems, it is possible to decrease the risk of failure.

Prashant Palvia, Dwight B. Means, Jr., and Wade M. Jackson mainly focused in computing in very small businesses, which are businesses that have less than 50 employees, in USA [7]. They created and tested an econometric model with “use of computers” as dependent variable and independent variables such as: USE (dummy variable equal to 1 if the business is using computers or 0 otherwise), AMTUSE (use in hours per day), SWUSE (the number of software packages and/or information systems used by the business), RAMTUSE (measures whether or not the usage exceeds the mean of 4.55 hours), RSWUSE (a binary variable, equal to 1 if the firm used more than one software package). To build this model they sent 950 questionnaires to VSB of which only 164 were completed and usable for the

econometric model construction. The result after developing this model showed that the use, the amount of use, or type of use of computers in VSBs is hardly determined by profitability of the business. However the use of computers is influenced by the business size, the skills of the owner in computing area and the age of the business. But as computers are used in VSB, the extent of their usage is determined by the size and age of the business rather than the computing skills of the owner. This is an indicator that owner starts to get used to computers and his skills are no longer a problem.

L.Munasinghe and D.P.W.Jayawardena studied the success factors in applying the information technology in small and medium scale industries in Sri Lanka [8]. This study showed that IT applications in the small and medium businesses have the following benefits:

- *Accuracy* (the system provides accurate information when the data collection, entry and processing are organized systematically so as to generate precise information consistently)
- *Completeness* (when all the information necessary to make a decision is provided, it is said to be complete. However, more than what is required should not be provided.)
- *Conciseness* (when data is appropriately summarized, so as to highlight exceptions to normal planned activities, it is said to be concise.
- *Timeliness* (when the information is provided within the required time range to make a decision, it is timely. Also the information with specific shelf-life would become obsolete if not provided in time.)

- *Relevance* (information is relevant when each manager is provided with what he needs to know.)
- *Cost-effectiveness* (the value of information to the manager should justify its cost.)

Also they determined the potentials areas for IT development which were: Production Planning and Control, Inventory Management, Sales and Marketing, Financial Accounting, Cost and Management Accounting, Payroll Preparation, Strategic Planning etc. To assess the present level of MIS in Sri Lanka Small and Medium businesses, the success of implementing them and the factors that influence this implementation, L.Munasinghe and D.P.W.Jayawardena selected a sample of 152 small and medium scale enterprises, 10 of which were used in the model construction. Some of the results related with the success of implementing the Management Information system in the business area we mentioned above are the following:

Functional Area	Overall Success (%)
Production Planning and Control	14
Inventory Control	32
Sales and Marketing	27
Financial Accounting	75
Cost and Management Accounting	38
Payroll Preparation	98
Strategic Planning	7

Figure 2. Overall Success (%) of MIS by potential area

From the study it was also shown that the three factors that influence mostly the implementation of Management Information Systems in Small and Medium Enterprises are the commitment shown by the manager, the computer awareness of the manager and the overall company level of computer knowledge. In the case of small grocery shops in

Albania the manager is in the same time the owner and the primary user of the SBMS system that is designed for implementation, thus the above should apply as well for the case of Albania.

The study conducted in Singapore for the resource constraints and the implementation of the information systems in small businesses, by James Y.L. Thong [9] identifies three main types of resource constraints: time constraint, financial constraint, and expertise constraint. To achieve a high level of success in implementation of the IS in the small business in Singapore this study suggested that the business should make efforts in lowering the resource barriers such as: *technical expertise constraints*. This means that small business should engage IT vendors for the implementation of their IS. It is also important that the user of this system should know the system well and this can be accomplished by providing some sessions of lecture or training. The second resource barrier is *financial constraints*. Small businesses should attempt to allocate the necessary financial resources needed in implementing their IS. The best alternative is not trying to go after the lowest cost IT product which doesn't support their needs, or products which have shown to be ineffective, rather they should opt for programs which satisfy best their needs and requirements. The third resource barrier is *time constraints*. It is important to find the appropriate time by the potential user of the system to help in the implementation of the IS since they know best what are the requirements needed to be met in order to provide a better solution for the business practices in the financial activities. It is important to highlight that the small business used for this case are rather large compared with the small business in Albania. Their number of employees doesn't exceed 100, and their fixed assets should not be larger than US\$ 7.2million. Still this study was included in the literature review because the result

of it are important for this thesis since almost the same constraints apply in the small businesses in Albania as well.

After deriving all the positive effects and benefits of using IS in small business from the studies listed above, another paper will be brought on focus which shows the negative effects of implementing IS to small businesses. Paul B.Cragg and Malcolm King [10] showed through the usage of a case study evidence that the negative effects of implementing IS to the small business have nothing to do with the performance rather they absorb managerial time in IS growth. There are two factors associated with IS growth: – influence of market conditions and – owner’s wish for firm growth. As it is seen these negative effects are not directly correlated with the usage of IS to small business, rather they are a consequence of external factors. By putting in balance all the positive effects that IS brings to small businesses with the negative effects written above, it is clear that implementing a computerized system to support the business practices is better than not implementing it at all. The risk that are taken in using such systems is very small when compared to all the benefits that are gained if using them.

Albanian Perspective

K. Sevrani and R. Bahiti have written a paper which studies the ICT in small and medium enterprises in Albania [11]. In this paper is shown that the numbers of small business in Albania is very high and their role in the Albanian economy in general is crucial. According to their study, support by ICT is a key factor in making the Small and Medium Enterprise grow further. In this paper rather than focusing only in the advanced IT system (which is our primary area of concern) it is explained also the importance of communication, internet,

e-business etc. in making the business have a higher performance. It is stated that the Albanian Government gives a crucial role to the development of the information society and the use and deployment of ICT in the country since it considers that it has a high priority in increasing the living standards and achieving an economic growth. The ICT sector in Albania has had a considerable growth during the recent years. Mostly the ICT products are imported from abroad, but still there exists the tendency of adapting them to the local needs. Given the benefits that ICT can bring to SME, Albania has been slow in adapting it when compared to other countries of Europe. One of the causes is the lack of dynamism between ICT firms and SMEs outside of the ICT sector. ICT firms have not created goods and services suitable for the SMEs in the past because SMEs demand for such products has been low. This mainly happened because of the low knowledge that the owners of the SMEs have for the improvements and benefits that technology can bring to their business. On the other hand they are a bit suspicious in implementing new practices, and have more confidence in their old methods of doing business. This is normal because of the fear of change. Another reason is that the available ICT products in the market are expensive and complex and most of them are designed for larger firms and not for SMEs. Also the literacy of SME owners has diminished the implementation of such ICT systems thus is needed a simple and efficient system that is suitable for the computer knowledge that these users have. This paper actually identifies the problems rather than giving solutions to them. It concludes that effort should be made by the IT vendors in providing products that fulfill best the requirements of the SME owners. On the other hand awareness of the SME owner should be increased related with the benefits of using information technology systems in their business practices.

The software that currently exist in the market are usually for larger enterprises than for small ones. From a research made, in Albania there exists a software called *uManage* [12] that focuses in the management of the products and invoices, supplies and suppliers, users and clients, entering the expenses and providing reports for the sales and the inventory. This was the only product similar to the SBMS system of this thesis, but it doesn't provide the functionalities related with debts (accounts payable and receivable which are so important since they happen extensively), daily information for the sales, revenue generated and in and out-flows of cash from the cash drawer, a graphical representation of the sales in order to provide the ability of determining the days that generate more income, and neither does it create the income statement which is the most helpful tool in determining the net profit for the month.

Other software packages exist as well but their primary focus is in managing the invoices or inventories. Such software are: Software application for shops/bars/restaurants [13], Alpha 7, Bilanci etc.

Chapter 3 BUSINESS ANALYSIS

In this section will be described the web-based system for the Small Business Management from the business point of view. Firstly it will be analyzed why is the need of creating such a system in Albania. As it was mentioned previously from the data generated by the 2012 Business Register [3] issued by INSTAT², it results that the number of active enterprises in Albania at the end of 2012 is 106'837 of which the enterprises with 1-4 employed dominate in number and constitute 90.2%. There are different forms of the small enterprises currently operating in Albania, but in this thesis focuses in implementing a system that serves to the small neighborhood grocery shops. The main motivation is that knowing the net profit and other financial data helps the owners of these shops to determine the ongoing performance of their business. The current practice that the owners of these grocery shops are using is by writing the data by hand in the notebook. This practice not only is old-fashioned but it doesn't provide true and helpful results at the end of the month. Firstly it is impossible for the owner to write one by one in the notebook the total of all the invoices issued during one day. This happens primarily because the time available is not in his favor especially when there are two or more clients in the shop directly one after the other. This means that some of the data will be missing and not calculated in the end of the day when the owner wants to determine all the revenues generated during that day. Apart from that, as it was mentioned in the introduction part as well, there are a lot of customers who don't pay for their goods at the moment they buy them. In such cases the possibility of misunderstandings gets higher. The owner should write the data when the sale occurs (because that is the actual day when revenue is generated, and not the day when the money

² ISTAT stands for Instituti i Statistikave and it is the primary institution for providing the statistical service in Albania.

is collected). Mistakes in calculating the revenues happen in such cases because the owner considers the revenue as it is generated the day he collects the money, since he counts them while counting the money in the cash drawer at the end of the day. This gives an untruthful financial data for the owner who might get the feeling that this was a good business day since more revenue was generated. Another issue arising from this practice is that misunderstandings might arise between the customer and the owner of the shop. More specifically, sometimes time might pass, and the customer might not remember having bought the items on credit or he might not remember the total of the items he bought on credit. And, when the owner of the shop asks for the money the customer might deny having bought them. One solution to this problem is applying a software that keeps track of these transactions. Such a solution is designed by SBMS which tries to give small or better to say zero chances of such misunderstanding to arise. This is because when the invoice is printed (is better to print two invoices, one for the customer and one for the owner) it registers the name of the customer and the date of the transaction together with the type of payment apart from other standard data. It provides a clear evidence to be shown to the customer when owner asks for his money. The same thing also happens with the accounts payable, or the money that owner should pay to his suppliers for the products bought, but not yet paid. On the other hand by keeping notes in the notebook the owner cannot calculate the profit at the end of the month, or he could by keeping a lot of data and calculating all of them one by one when the month finishes after subtracting the expenses. This way of doing the calculations gives more chances to errors. Performing such a process apart from placing a heavy burden and wasting the owner's valuable time (Benjamin Franklin wrote in his book *Advice to a Young Tradesman, Written by an Old One (1748)*,

“Time is money”), does not guarantee reliable results. SBMS on the other hand is designed to allow the user view the net profit just by clicking a button. This manner saves time and provides a reliable source for the financial data.

Another point which is to bring to focus was the report on the Income Statement that is possible to be generated using SBMS. The reason why businesses use financial statements is because they provide information that is useful in making investments and credit decisions [18]. Also financial statements provide information that is useful in assessing the amount, timing, and uncertainty of future cash flows as well as information related with business resources (assets) and how they change over time. Income statement is one of the types of financial statements. It is an activity statement that shows details and results of the company’s profit-related activities for a period of time [18]. SBMS is planned to print only this financial statement because it is the one that is most useful for the type of small business which it was first intended for. There is no need for generating a Balance Sheet, or Trial Balance, or keeping entries of financial transactions in a General Journal. What the owners of such businesses want to know at the end of the month, is what is their revenue for the month, what are the expenses and what is the final net profit. Their financial-knowledge background is not too advanced, and even if the system provided more types of financial statements the users wouldn’t be able to analyze or comprehend them. Thus as it was stated since the beginning, SBMS is intended as a system that is easy and user-friendly so that every owner of the small grocery shop is able to use it without any effort despite of his financial-knowledge background.

The main mathematical formulas that are to be used during the implementation of this system.

- *N*: number of invoices

$N = N + 1$ (for every invoice that is printed, the value of *N* is increased by 1)

- *P*: price of product, *Q*: quantity

$Total = P * Q$ (to calculate the total value of the items bought the price of the item is multiplied with the quantity and in this way for all the products in the invoice. At the end all of them are added to provide the Invoice Total).

- *AR*: account receivable

Amount: is the amount of account receivable for a specific transaction

$AR = AR + Amount$ (every time a product is sold on credit, this amount is added to the total account receivable variable)

- *AP*: account payable

Amount: is the amount of account payable for a specific transaction

$AP = AP + Amount$ (every time a product is bought on credit from the suppliers, this amount is added to the total account payable variable)

- *Total*: is the total from an invoice

To calculate all the sales of the day the invoices totals issued that day are added:

$Total_1 + Total_2 + Total_3 + \dots$

- *Total*: is the total from an invoice paid in cash

To calculate the cash generated during the day the totals of the invoices paid in cash during that day are added $Total_1 + Total_2 + Total_3 + \dots$

Total: is the total from an invoice not yet paid

To calculate the revenue generated for which the owner has not yet collected the totals of the invoices issued on credit during that day are added: $Total_1 + Total_2 + Total_3 + \dots$

- *Total*: is the total the owner paid in cash to one supplier for the products bought

To calculate the cash you withdrawn to pay supplies during the day, the totals for all the supplies paid in cash are added: $Total_1 + Total_2 + Total_3 + \dots$

Total: is the total the owner has to pay to one supplier for the products bought on credit

To calculate the costs generated from the products bought on credit for that day the totals for all the supplies paid on credit are added: $Total_1 + Total_2 + Total_3 + \dots$

- *Total*: is the total amount of cash in the cash drawer

Total_{cash}: is the is the total amount of cash generated from the sales in cash

Total_{receivable}: is the is the total amount of cash collected from customers debts

Total_{payable}: is the is the total amount of cash used to pay the debts to the suppliers

To calculate the total amount of money in the cash drawer the following is done:

$$Total = Total_{cash} + Total_{receivable} - Total_{payable}$$

Chapter 4 SOFTWARE ANALYSIS AND DESIGN

4.1 System Analysis

SBMS is a system that will be used by the owners of the small neighborhood grocery shops to manage their financial activities.

This system allows the manager to deal with the basic functionalities that he has to deal with during his daily activities. When the web-based system is opened, the user is asked to enter his username and password and if the data entered is validated the user is able to proceed with any function that the system disposes. If the data entered is not valid, the user is required to enter them again in order to proceed. Once the user is logged in the system he is shown the homepage of the system where he is able to select any of the different options listed in the menu and also the explanation of what those option enable the user to do. The first option in the menu is Invoices. After clicking invoices the user is able to make an invoice. He can enter the products by entering the names, the system directly reads the database and displays the suggestions listing all the products that start with those letters. If a product is selected automatically the barcode of the product is displayed in the barcode field. The user then enters the quantity of the product and click on Add button. If the data entered by the user is valid, in the right side of the page will be listed all the products that are on the invoice, if data is invalid a pop up message will be displayed showing the appropriate message. When finished the user may select to Print or Cancel Invoice. If he wants to cancel the invoice a confirmation box will appear and according to user choice it will do the appropriate actions. If user clicks on print invoice he is asked to enter the type of payment which can either be Cash or Later Payment. If cash is selected the system displays the pdf format of the invoice where the user can directly give instruction to the

printer for printing. In the same time the system saves in the database the transaction occurred and decreases the amount of the products available in the shop. If later payment is selected, the user is asked to enter the clients name and surname and then the system displays the pdf format of the invoice where is also specified the name and surname of the customer. The system also enters the transaction in the appropriate table containing the accounts receivable. (Every invoice is identified by its unique ID). The next choice in the menu is the Supply. By clicking on it the user enters the products that are bought from the suppliers. He can select two types of input methods if the product is new or currently available in the grocery shop. If the product is new all the information related with the product such as: barcode, name, category, description, price bought, price sold, and quantity must be entered. (Every product is identified by its unique barcode). If the product is currently available in the grocery shop the user is asked only to enter the barcode, quantity, price bought and price sold. The user is then asked to determine the method of payment for the product bought, if they were bought with cash or on credit. According the user's selection the system proceeds with the appropriate actions as in Invoice and does the appropriate changes in the database. Daily info displays in the screen all the financial information of the current day such as: number of invoices issued in total, number of invoices paid in cash and those paid on credit, total amount of sales, amount of sales (ALL) paid in cash and amount of sales as account receivable, money collected during that day from the customers debts, money paid during that day to the suppliers for the debts incurred before, total supplies bought divided by those paid in cash and those issued on credit and the amount of cash that should be in the cash drawer. If the user selects Accounts Receivable he is asked to enter the invoice id and the amount of money that the customer

paid. The system does the appropriate changes in the database. The same method applies for Account Payable. When the user selects the Sales option he is asked to enter the time period and the system displays in the screen the graphical representation of the daily sales during the specified period. Income Statement enables the user to print in the pdf format the financial statement that lists the revenues and expenses and then calculates the net profit. The user is asked to enter the month and all the expenses during that month and the system does all the rest. And lastly the user is able to manage his account information. He is able to view, edit or log out from the system. When he selects View Account Info he is displayed in tabular form all the information of his account such as: name, surname, username, password and gender. When he selects Edit Account Info he is able to edit the information (system displays error message when data entered is not in the format that it should be). When the user selects the Log out button he logs out from the system.

4.2 Functional Requirements

In this section we describe the operations and the activities that the system is able to perform. They show the services that the system provides, how it reacts to the inputs given and how it behaves in the particular situations [20]. The user functionalities are shown in Table 1. The system identifies each product in the grocery shop by its unique barcode and the invoices by their unique invoice id. The status of the accounts receivable or payable will change the moment that money is collected or paid respectively. SBMS is a web-based system which is accessible through a PC or a Laptop.

4.2.1 Usability Requirements

- The interface should be easy for people with not much computer background
- The Graphical User Interface should be user-friendly
- System will contain a simple manual of usage that explains the functionalities of the program and how to use them.
- If any error occurs will display in the screen how to proceed.
- User can undo their actions for most of functionalities

4.2.2 Performance Requirements

- The server must be able to respond under 2 seconds of time from the request.
- The SBMS must be available and functional all the time
- The system must be very quick to reflect all the updates in the database as the inventory or other data change.
- The inventory for each product should be appropriately increased or decreased when a product enters the grocery shop or is sold under 1 second.

4.2.3 Security Requirements

- The database can be accessed only by the user after he enters the valid username and password.
- The system must validate the username and password in order for the user to log in the system.
- Before canceling an invoice the system displays a pop-up confirmation
- The system does not allow the input of the data that is not in the valid and will display

the appropriate error message and instruct the user for the format of the data to be entered.

4.2.4 Interface Requirements

- When the user is inside the system the homepage should be displayed first allowing the user to choose any option from the main menu.

4.2.5 Functions

The functions that are completed by the SBMS are the following:

Log in	User is able to log into the system
Log out	User is able to log out from the system
View Account Info	User is able to view his account information
Edit Account Info	User is able to edit the information of his account
Add Product	User is able to add a product in the invoice
Cancel Invoice	User is able to cancel one invoice
Print Invoice	User is able to print the invoice in the pdf format
Determine type of payment	Able determine the type of payment for the invoice or the supplies bought
Enter supplies	User is able to add the supplies bought in the inventory of the shop
Daily Report	User is able to print a daily report related with the financial transactions occurred during the day
Manage Accounts Receivable	User enters the amounts of money collected from the debts of its customers
Manage Account Payable	User enters the amounts of money he withdrew from the cash drawer to pay the debts to this suppliers
View Sales	User is able to view the daily sales of a specific period

	in a graphical format
Generate Income Statement	User is able to generate an Income Statement for a given month

Table 1. User Functionalities in SBMS System

4.3 Non-Functional Requirements

Non-Functional Requirements represent the constraint of the services or functions offered by the system such as timing constraints, constraints on the development process, standards, etc. Often apply to the system as a whole rather than individual features or services. [20]

4.3.1 Hardware Requirements

- A server is a must in order to hold the database that contains the information for all the products, invoices and other financial transactions data and to perform the user requests.

4.3.2 Reliability

- The system should be available at any time that the computer is switched on and the web-based system is run.
- There should be a backup for the information stored in the database so if anything goes wrong all the data can be restored.
- The system should be fast and interactive and also the data should be updated very quickly in the database.
- The inventory should be synchronized with the database.

4.3.3 Supportability Requirements

- The names of the categories to be selected from the menu are easily understood, so the user won't have difficulties in choosing them for his desired functionalities.
- The code will have lots of comments explaining what it does.

4.3.4 Security Requirements

- The data entered such as username and login such are filtered in order to provide security from unauthorized access.

4.3.5 Availability Requirements

- The system should be available all the time 24/7, any time that the user wants to access it.

4.3.6 Compliance Requirements

- The web-based system should be compliant to any computer, PC or laptop, independent of the OS that these devices are using.

4.4 System Requirements

- Each product which is in the database is identified by a unique barcode.
- Every invoice generated by the user is registered in the database and identified by a unique id.
- When an Account Receivable is collected or an Account Payable is paid the status of

- these transactions in the database will be updated accordingly.
- For every product sold or bought the inventory will decrease or increase accordingly.
 - The format of the invoice printed depends on the type of the invoice, if it is paid in cash or issued on credit.
 - The system will display the daily sales after retrieving them from the database using the date constraint in a graphical format.
 - The system will display error messages for any action that goes wrong and also describing how the user should proceed.

4.5 UML Diagrams

In this section are provided the UML diagrams for the SBMS System. UML is one of the most applied languages used for specifying, visualizing and constructing the components of a software system. Below are shown the main types of the UML diagrams such as:

4.5.1 Use Case Diagram

Use case show the interactions between the external actors and the system used to reach some specific goal or accomplish some functionalities. The use case for the SBMS is the following:

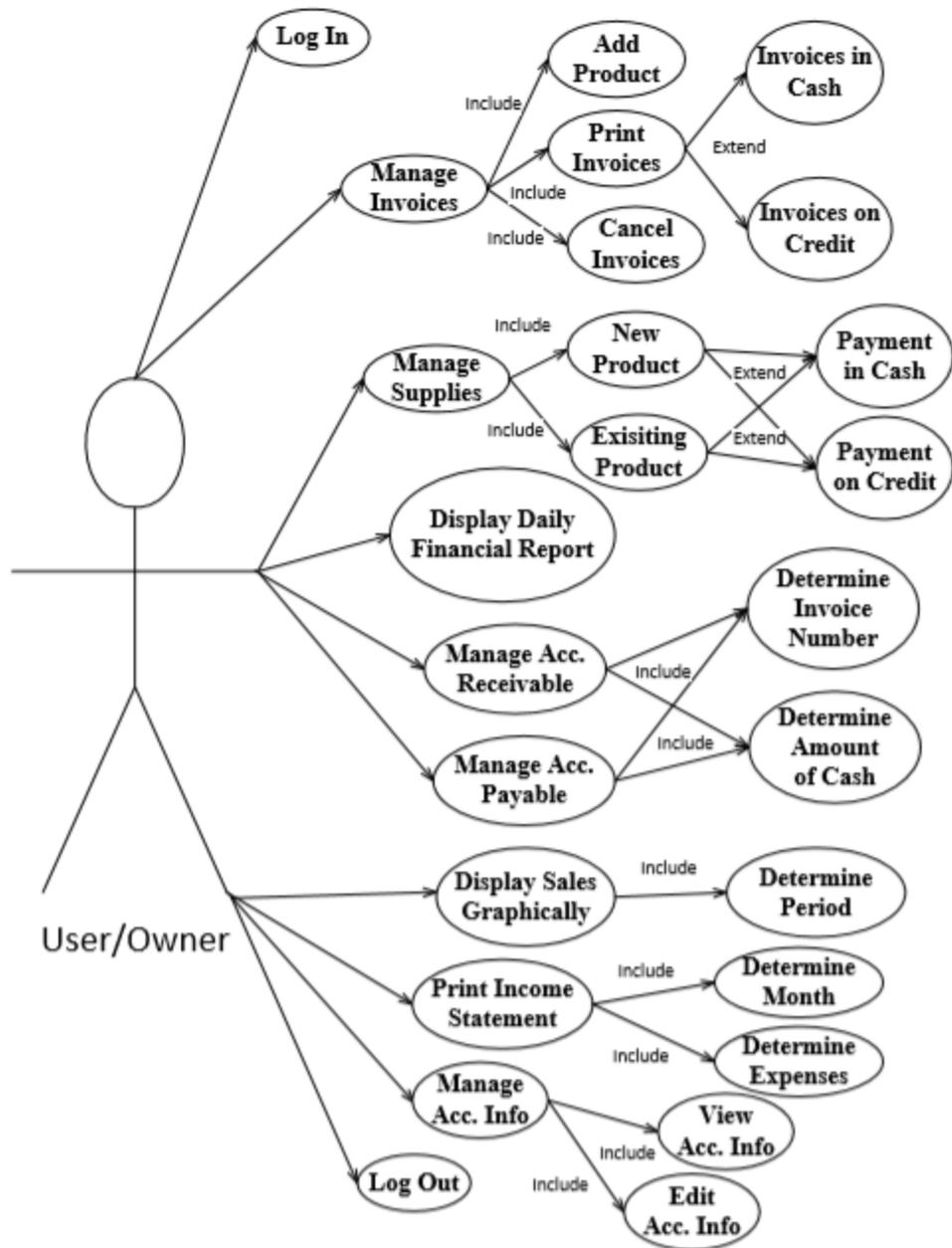


Figure 3. General Use Case of the entire system

The use case above shows the functionalities that the actors can perform in this system. In this case there is only one actor (since there is only one user of SBMS). The user/owner of the grocery shop can perform the following activities: he can login and logout, manage invoices by adding products, printing, or cancelling them, manage supplies by entering new or existing products in the inventory, display daily financial reports, managing accounts payable and receivable, displaying the sales in a graphical form, printing the income statement and managing the account/profile information more specifically viewing or editing the profile information.

4.5.2 Activity Diagram

This is a type of UML diagram that provides a diagrammatic representation of the ordering of activities [21].

The below figure is the invoice activity diagram. This activity shows that the user logs in the system when the data he entered is validated, if not he turns in the starting point. If he select the Invoice category he is able to add product, print invoice or cancel invoice. If he adds a product he should enter the barcode and quantity which are checked if are inputted correctly or not. If not the system notifies the user and rdisplays the same page giving the opportunity to reenter the data, if data is in the correct form, the product is added to the invoice. When the Print invoice is selected the user should select the type of payment. If payment is in cash, the system displays directly the invoice as a pdf, if payment is on credit the user should first enter the name and surname of the client and then the system displays the invoice as a pdf. When cancel invoice is selected, the system ask the user to confirm

the cancellation. If user affirms it then the invoice is canceled, if the user does not affirm the cancelation the invoice is not cancelled.

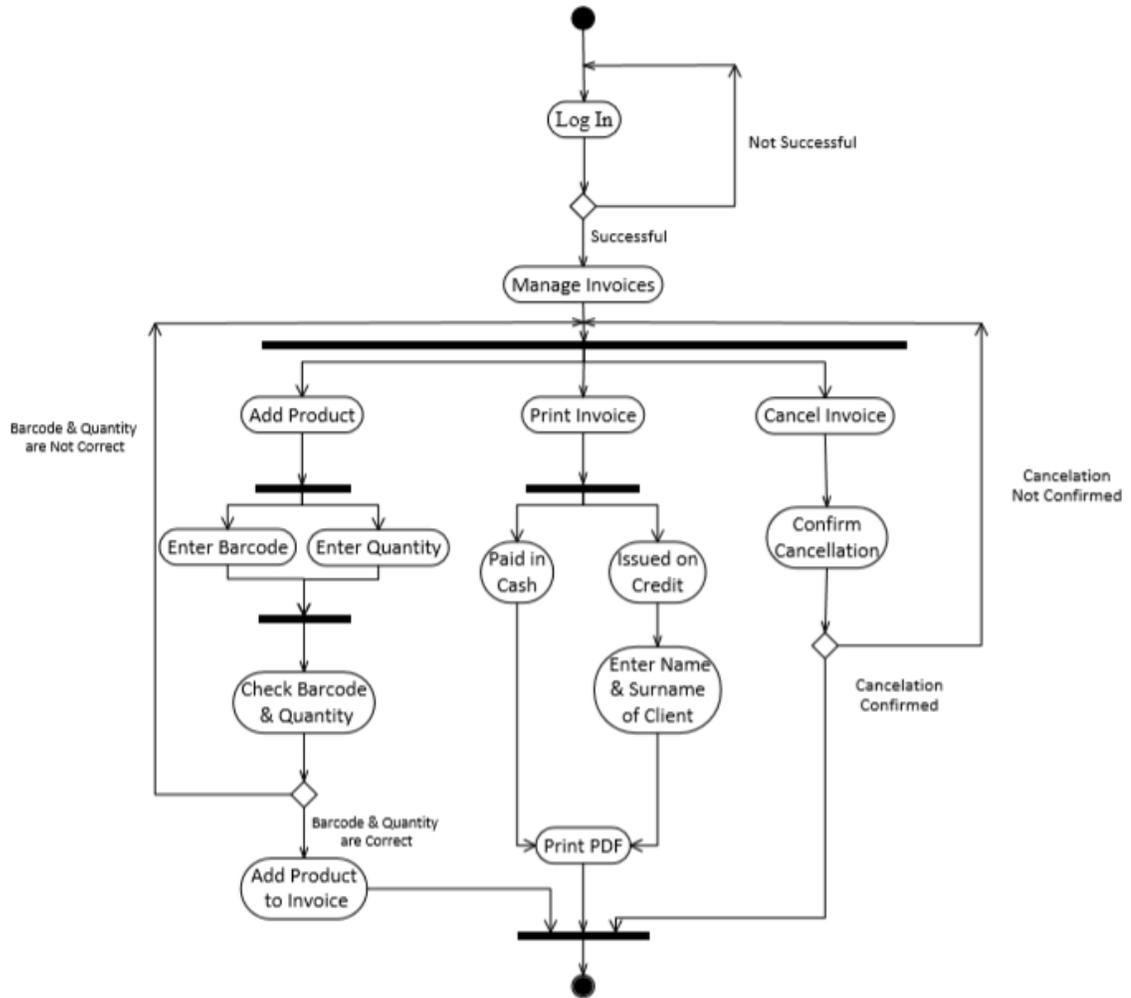


Figure 4. Invoice Activity Diagram

4.5.3 State Diagram

Shows a sequence of system states during a performance of a task [21].

Below is shown the state diagram of managing invoices. Firstly the system is in idle state. Then the system starts performing the invoices. When the user selects Add Product, the system passes in the validation of data state where if the data is valid, the system returns to

idle state and if not the system returns to the manage invoice state. When user selects Cancel Invoice the system is in confirm cancel state. In either case when the user chooses to cancel the invoice or not, the systems returns to idle state. When user selects the print invoice, the system is in the state of selecting the type of payment. If it is cash the system passes to the generate pdf state, if it is on credit, the system passes to the state of validating the data entered. If the data is valid the system goes to the generate pdf state, if not it return to the select payment state.

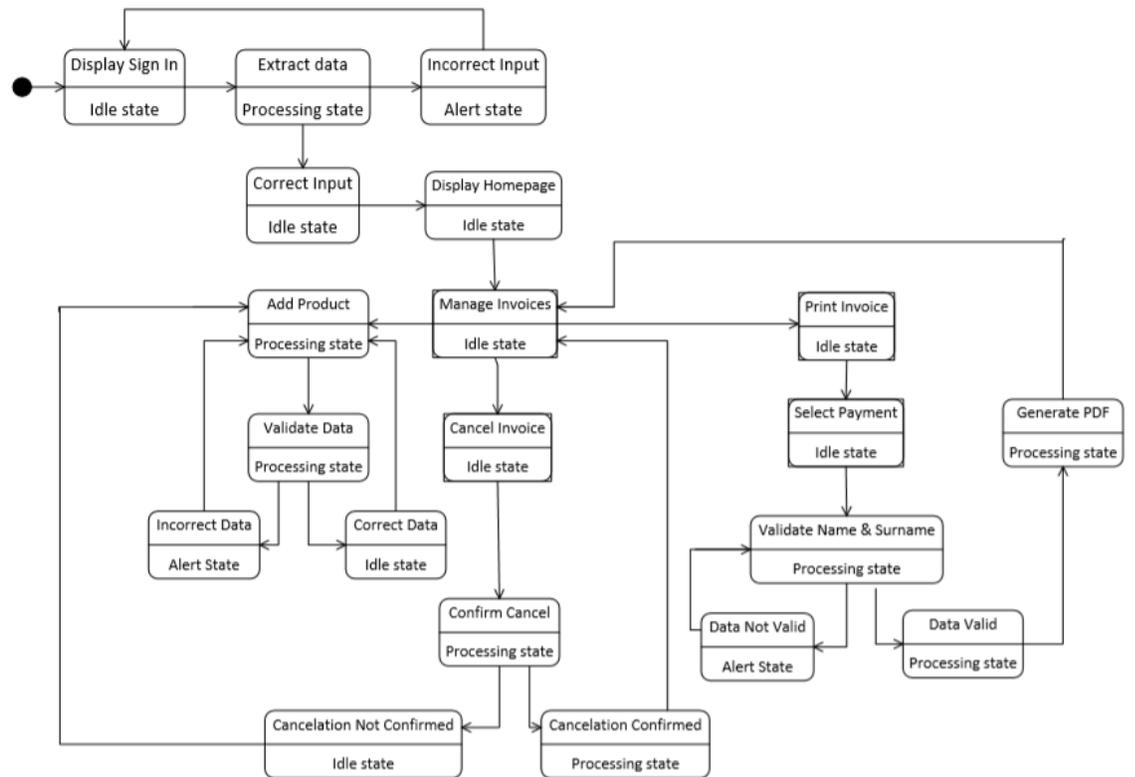


Figure 5. Invoice State Diagram

4.5.4 Sequence Diagram

Shows the sequence of actions during the performance of a task. It shows the interactions between objects and the usage of different methods to get or return data. [21]

The below sequence diagram shows that firstly the system gets the input data from the user. When the data is validated, the user is logged in the system. When the user clicks on add product, the system retrieves barcode and quantity data from the user. Then the system validates the data by checking on the database. If data is valid the product is added in the bill (database table), and then the system displays it to the screen for the user to see. When the user clicks on print invoice, the transaction is registered in the invoice table of the database and then the data in the bill is cleared. The appropriate changes in the quantities of the products are made. Then the system notifies the user and displays the pdf version of the invoice.

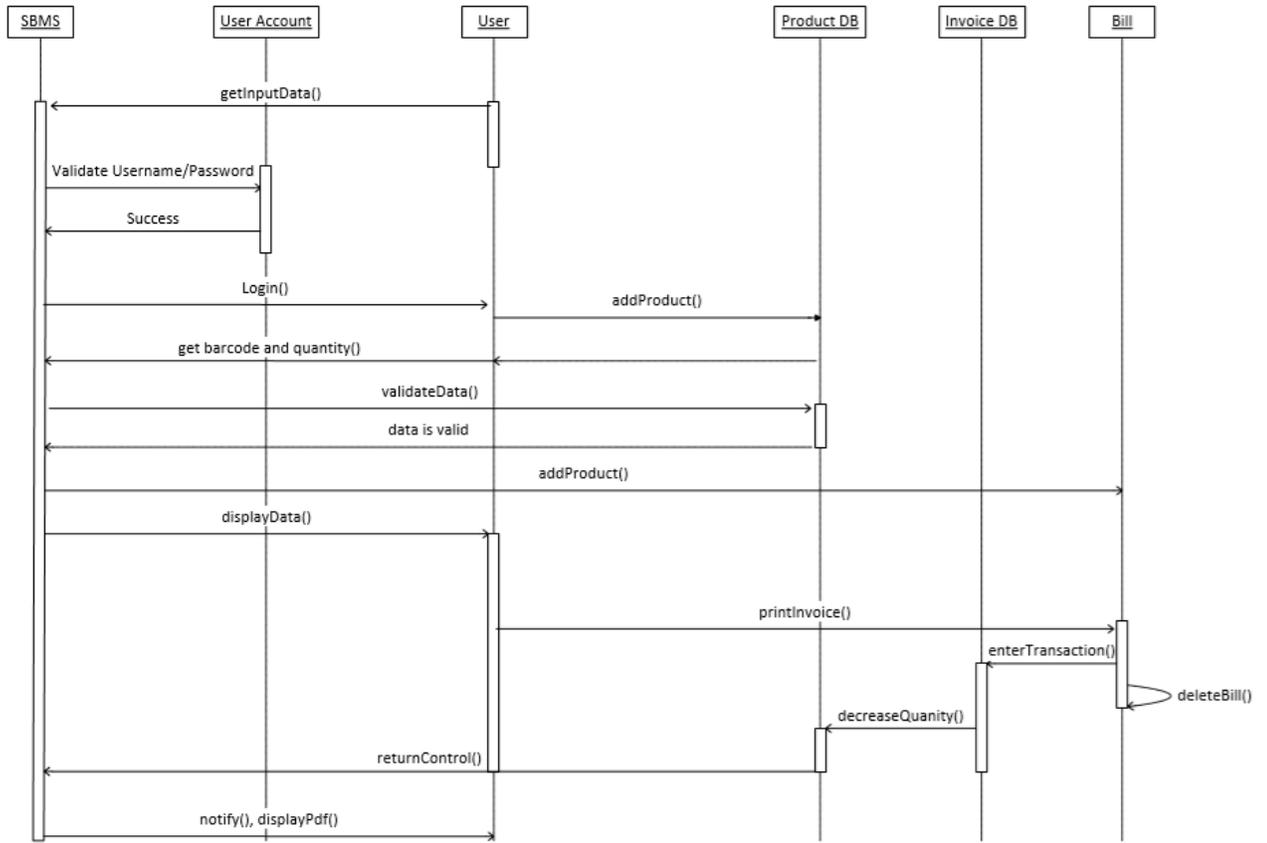


Figure 6. Print Invoice paid in Cash Sequence Diagram

4.5.5 Class Diagram

Shows the classes with their attributes and methods [21].

The below class diagram has 11 main classes which are: Main Interface, Main Menu, Log in, Database, User, Bill, Invoice, Products, Accounts, Accounts Receivable and Accounts Payable. Each of the classes has its own attributes and methods for example user attributes are: name, surname, username, password and gender while user methods are addProduct(), printInvoice(), cancelInvoice(), etc. Classes are connected with each other through associations. For example User class is associated with Invoice class through a one to many

association meaning that one user can generate many invoices. The other associations are visible in the diagram below.

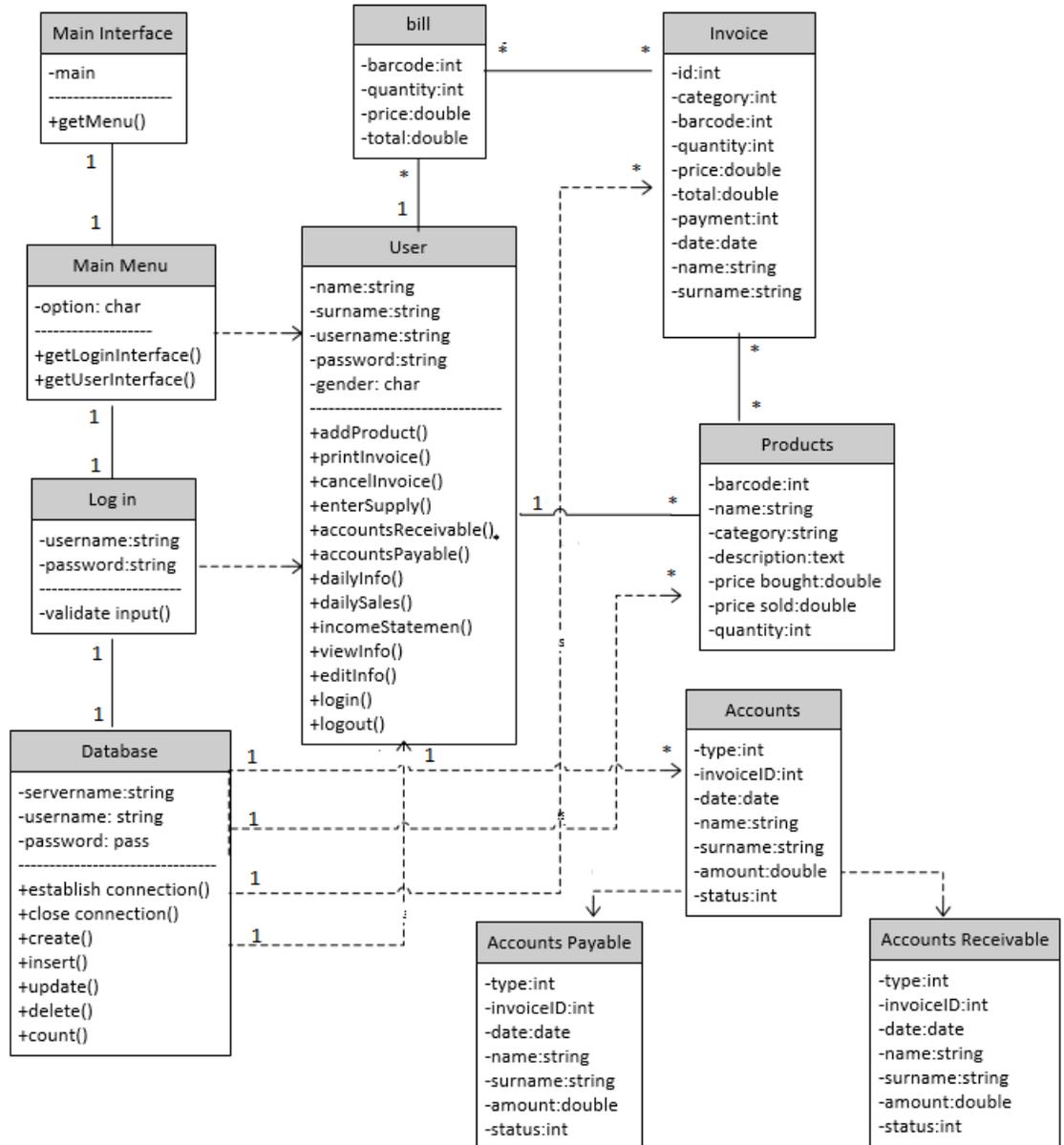


Figure 7. Class Diagram

4.5.6. Component Diagram

Shows the software components of a system and their relationships with each other. [21]

The component diagram below shows that SBMS is composed of mainly 6 components. SBMS stays in the top of this hierarchy and it includes the Controller and the User Interface. This component is closely related with Invoices, Supplies, Accounts and Profile Data. All these components are related with Main Initializer component which contains the files and the database, session and user configuration credentials.

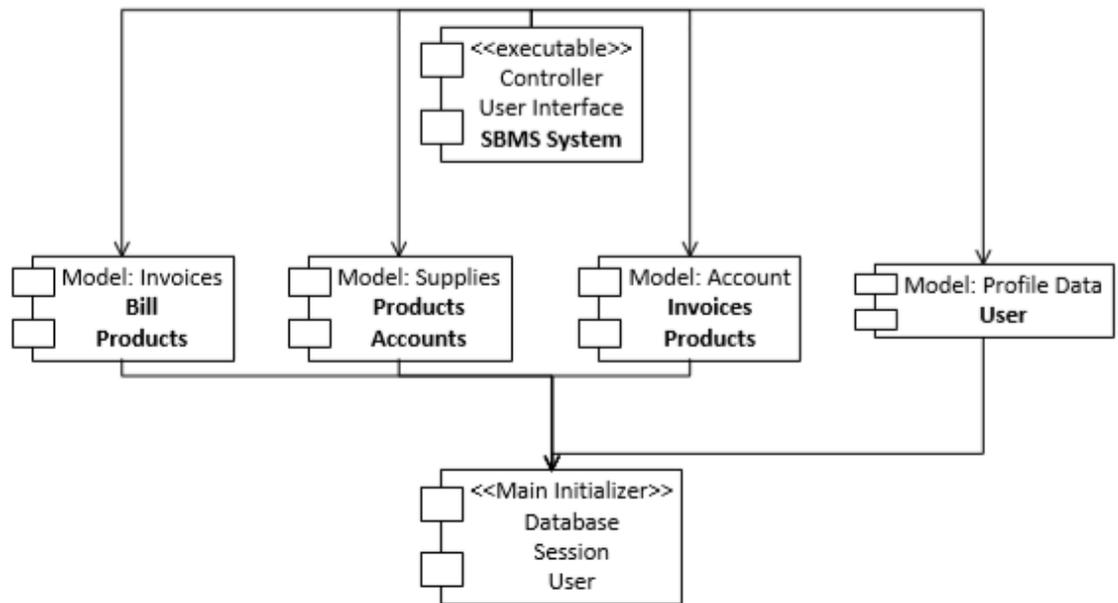


Figure 8. Component Diagram

4.5.7 Deployment Diagram

Shows the physical relationship between software and hardware in a system [21].

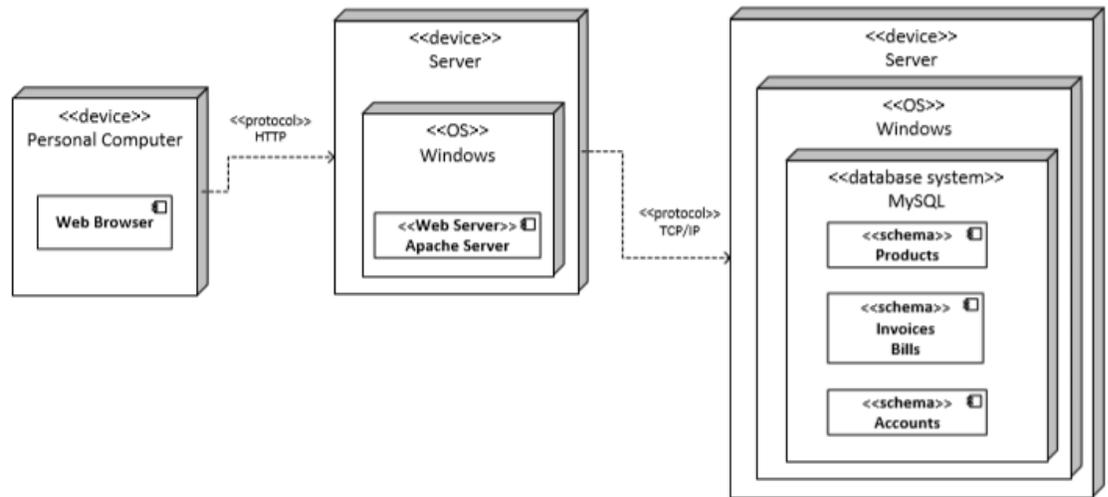


Figure 9. Deployment Diagram

The above deployment diagram shows that there are three main nodes in the SBMS system. The user send a HTTP request from the web-based application in its personal computer to the server. The server analyses the request and if there is the need of any computation done by MySQL database, it sends the request there using a secure and reliable TCP/IP protocol. Then the response is shown to the user in a nice and user-friendly interface.

The other UML diagrams can be found in Appendix A.

Chapter 5 IMPLEMENTATION

SBMS is a web-based system. The languages used in implementing this system are mostly HTML, JavaScript and PHP. HTML is the language that is displayed to the user, JavaScript runs on the client side while PHP runs on the server side. To support this system the following requirements are needed:

1. HTTP/HTTPS supported network
2. Server to respond to requests
3. HTML
4. PHP
5. JavaScript
6. MySQL database
7. Object Oriented
8. CSS

HTML is very useful in displaying in the browser the data to the user. It is compatible with all the browser (Chrome, Internet Explorer, Mozilla etc.). JavaScript is very important in providing functionalities to our code. Mostly we use JavaScript to make the web-based system more interactive. PHP is crucial in this project since it the language which runs in the server and makes possible the interaction with the databases where all of our data is found. MySQL is an open source database software which makes it very easy for us to enter and retrieve data.

5.1 SBMS implementation

After making the analysis and design of the system some insights about the system implementation are provided. One of the main and most crucial parts of the system is the

database. In order to make the database as optimal as possible Normalization is used in the tables with the purpose of reducing useless data and redundancy. It is tried to create as less tables as possible in order not to load and put a burden in the database because that would result in a slower system. The database view of SBMS system is the following:

#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
<input type="checkbox"/>	1 type	int(11)			No	None		
<input type="checkbox"/>	2 date	date			No	None		
<input type="checkbox"/>	3 invoiceID	int(11)			No	None		
<input type="checkbox"/>	4 name	varchar(20)	latin1_swedish_ci		No	None		
<input type="checkbox"/>	5 surname	varchar(20)	latin1_swedish_ci		No	None		
<input type="checkbox"/>	6 amount	double			No	None		
<input type="checkbox"/>	7 status	int(1)			No	None		

Figure 10. Table account in the database

				barcode	quantity	price	total
<input type="checkbox"/>				3	10	30	300
<input type="checkbox"/>				1	2	170	340

Figure 11. Table bill in the database

#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
<input type="checkbox"/>	1 id	int(11)			No	None		
<input type="checkbox"/>	2 category	int(11)			No	None		
<input type="checkbox"/>	3 barcode	int(11)			No	None		
<input type="checkbox"/>	4 quantity	int(11)			No	None		
<input type="checkbox"/>	5 price	double			No	None		
<input type="checkbox"/>	6 total	double			No	None		
<input type="checkbox"/>	7 payment	int(11)			No	None		
<input type="checkbox"/>	8 date	date			No	None		
<input type="checkbox"/>	9 name	varchar(20)	latin1_swedish_ci		No	None		
<input type="checkbox"/>	10 surname	varchar(20)	latin1_swedish_ci		No	None		

Figure 12. Table invoice in the database

	barcode	name	category	description	priceb	prices	quantity
<input type="checkbox"/> Edit Copy Delete	1	redbull	drink	energy drink	150.45	170	50
<input type="checkbox"/> Edit Copy Delete	3	sfungjer	jo ushqimore	sherben per te lare enet	22	30	50
<input type="checkbox"/> Edit Copy Delete	2	snickers	chocolate	sweet	450	550	40

Figure 13. Table products in the database

	name	surname	username	password	gender
<input type="checkbox"/> Edit Copy Delete	Igli	Hakrama	admin	adm12	M

Figure 14. Table user in the database

The server side scripting as is mentioned above is implemented by using PHP. Almost all of the code uses PHP scripting, but below is shown the PHP code used in creating sessions which are important for logging in and out the system and also some PHP code used for protection of the system from MySQL injection.

```
<?php
session_start();
if(!isset($_SESSION['username']) || !isset($_SESSION['password'])) {
    session_destroy();
    header('Location: index.php');
    exit;
}
?>
```

So in the beginning of each PHP page a new session is started and then is checked to see if the username and password variable Sessions are set or not. If they are set (they are set when the user provides the correct password and username) this means that the user is already logged in do he has authorized access to proceed with the desired operations. When they are not set SBMS immediately destroys the newly created session and direct the user to the login page.

In the other figure below is shown part of the PHP code for protecting the system from any MySQL injection that a unauthorized user might enter in order to hack the system. For this reason are used the PHP function stripslashes() and mysql_real_escape_string. In this way the data are filtered and are more reliable.

```
// name, surname, username, password and gender sent from form
$name=$_REQUEST['name'];
$surname=$_REQUEST['surname'];
$username=$_REQUEST['username'];
$password=$_REQUEST['password'];
$gender=$_REQUEST['gender'];

// To protect MySQL injection
$name = stripslashes($name);
$surname = stripslashes($surname);
$name = mysql_real_escape_string($name);
$surname = mysql_real_escape_string($surname);
$username = stripslashes($username);
$password = stripslashes($password);
$username = mysql_real_escape_string($username);
$password = mysql_real_escape_string($password);
$gender = stripslashes($gender);
$gender = mysql_real_escape_string($gender);
```

In order to make the SBMS system more user friendly and with a nice interface and effect CSS is used extensively for designing the page, but also in adding colors and effects to the buttons or text-fields.

The below picture shows a part of the CSS code used for the designing the system. Menu is used as a container to hold all the categories in the menu and it is designed in the way was thought to be more suitable and easily to access. The other one below show the changes that will happen to a hyperlink object inside the menu container. As it is seen from the code, when the mouse is passed over this hyperlink object, the color of the text changes, the text becomes bold and uppercased.

```

menu {
    display: block;
    background-color: #E0ECF8;
    margin-top: 5px;
    margin-bottom: 5px;
    margin-right: 0px;
    margin-left: 0px;
    padding-top: 10px;
    padding-bottom: 10px;
    padding-left: 30px;
    font-family: Arial, Helvetica, sans-serif;
}

menu item a{
    padding-right:20px;
    text-decoration:none;
    color:#6CC;
}

menu item a:hover {
    color: #086A87 ;
    font-weight: bold;
    text-transform: uppercase;
}

bord {
    display: block;
    background-color: #E0F2F7;
    height: 5px;
}

```

MySQL is used widely in this system in order to interact with the database. Below I have shown some of the MySQL statements that are most used in this system.

```

if (!empty($barcode) && !empty($quantity) && $quantity <= $available) {
    if ($num_rows==1) {
        $price=$row['prices'];
        $total=($quantity*$price);
        $sql2="INSERT INTO bill (`barcode`, `quantity`, `price`, `total`)
VALUES ('$barcode', '$quantity', '$price', '$total')";
        mysql_query($sql2);
    }
}

```

In this piece of code it is shown that some data will be inserted in a table. More specifically, the data specified in the VALUES section will be inserted accordingly in the table bill.

```
$sql="SELECT * FROM products WHERE barcode='$barcode'";  
$result = mysql_query($sql);  
$num_rows = mysql_num_rows($result);
```

In the code above the database selects all entries from a given table (name if the table is saved as a variable) which have the barcode equal to the value of variable \$barcode.

A lot of JavaScript functions are used in this system one of which is the code for autocomplete. In this system, when the user starts typing the name of the product, the system directly checks the data in the database and displays all the data matching the first characters as a list. When the user selects one of them, the system automatically enters (autocompletes) the barcode of that product in another field. Part of that code is shown below:

```
<script type="text/javascript">  
$(document).ready(function(){  
var ac_config = {  
source: "search.php",  
select: function(event, ui){  
$("#name").val(ui.item.name);  
$("#barcode").val(ui.item.barcode); },  
minLength:1 };  
$("#name").autocomplete(ac_config); });  
</script>
```

Object Oriented is mostly used in connecting with the database such as is shown below:

```
<?php  
class Database {
```

```

var $host;
var $user;
var $pass;
var $data;
var $con;
var $db;
var $currentDate;

public function controls()
{
    $this->host="localhost";
    $this->user="sbms";
    $this->pass="sbmsnafi";
    $this->data="thesis_sbms";
}

public function connection()
{
    $this->con = mysql_connect($this->host,$this->user,$this->pass);
}

```

In the code above is shown part of a PHP file which uses Object Oriented technique in connecting with the database. All the functions are written in different file, and then when needed, this .php file is included.

In this system, for creating and displaying PDF files is included an external library called FPDF. This is a free PHP class and it can be used to generate PDF files by using PHP code.

5.2 Demonstration

The below figure is the screenshot of the system for adding new product inventory in the shop. The user must input all the fields below in order to register the new product in the database.

Figure 15. Adding new product supply Screenshot

The below is the system screenshot for viewing the sales in the graphical format. The user must enter the date period by selecting in the calendar as it is asked by the system.

Figure 16. Enter date period to view the graphical representation of sales

SBMS-Small Business Management System

[Home](#) [Invoice](#) [Supply](#) [Daily Info](#) [Accounts Receivable](#) [Accounts Payable](#) [Sales](#) [Financial Statement](#) [Account](#)

Daily Sales between dates 15/06/2014 and 21/06/2014



[Print Graph](#)

Figure 17. The graph representing sales of a specific date period

Chapter 6 CONCLUSIONS AND FUTURE WORK

The great number of small business which currently operate in Albania is an index showing that the future of these businesses is important for our country, because they constitute the largest portion of business types operating here nowadays. Since the way how the owners of the small neighborhood grocery shops is not in accordance with the development of today's technology (the usage of which might benefit the small businesses in a lot of ways), it is useful to implement a management system dedicated only for the small grocery shops. The studies have shown that implementing such IT systems to the business brings a lot of gain and advantages for the future success of the business, especially now that the cost of PC is decreased a lot recently. The primary gains are *speed and efficiency* (the work is performed faster and in a more efficient way), *document generation* (just by pressing the button the user can generate reports or documents of his need), *timely data* (when data is entered manually, the user is sure of accuracy of the last hand data, while with a computerized system he can retrieve old data and be almost 100% sure of their reliability) [19] etc.

Implementing an IT system which will make easier and more reliable handling and managing financial data is an important step in developing the future of the small businesses and their opportunities to grow further. By using this system the owner of the small neighborhood grocery shop is able to deal with the invoices (weather they are on cash or no credit), to handle the supplies (weather they are paid in cash or on credit), deal with the accounts receivable and payable (managing the money related with debts at the moment they incur and when they are paid), have daily activity reports regarding the revenues and other specific information needed to get the idea of all the transactions

occurred during the day and the amount of cash that is expected to be in the cash drawer, viewing the daily revenues of a specific period in a graphical form which shows clearly the days with more or less sales, and also generating a monthly Income Statement which will show the net profit after subtracting all the expenses.

SBMS was thought and created as a web-based system, meaning that it can be accessed only through a PC or a Laptop. In the future this system may be implemented also based on the mobile technologies, since the usage of smartphones in the recent years has reached a boom and is developing with gigantic steps at the moment. Of course it is not expected that the app for this system would support all the functionalities that the web-based system currently has rather it would enable the owner to view the daily information, or generate a report or a graph displayed in the screen of his smartphone even when the owner is not in the shop. Such apps will not include managing invoices because such a practice rather than making the app more complex, is pointless.

In the future it is considered making possible to upload such a system in the cloud. In this way the owners of small businesses may access their system everywhere by having an internet access connection. And lastly SBMS is specifically created for small neighborhood grocery shops and all the functionalities are based on the needs and the requirements that these shops have. It is expected to develop it further according to the user needs or adapt it for other types of small businesses as well such as: a boutique, a bookstore, a bakery, a pastry shop, a hairdressing salon etc. The main functionalities are expected to be the same, rather some changes or adding to the existing system will be implemented in accordance to the business requirements.

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Appendix A UML DIAGRAMS

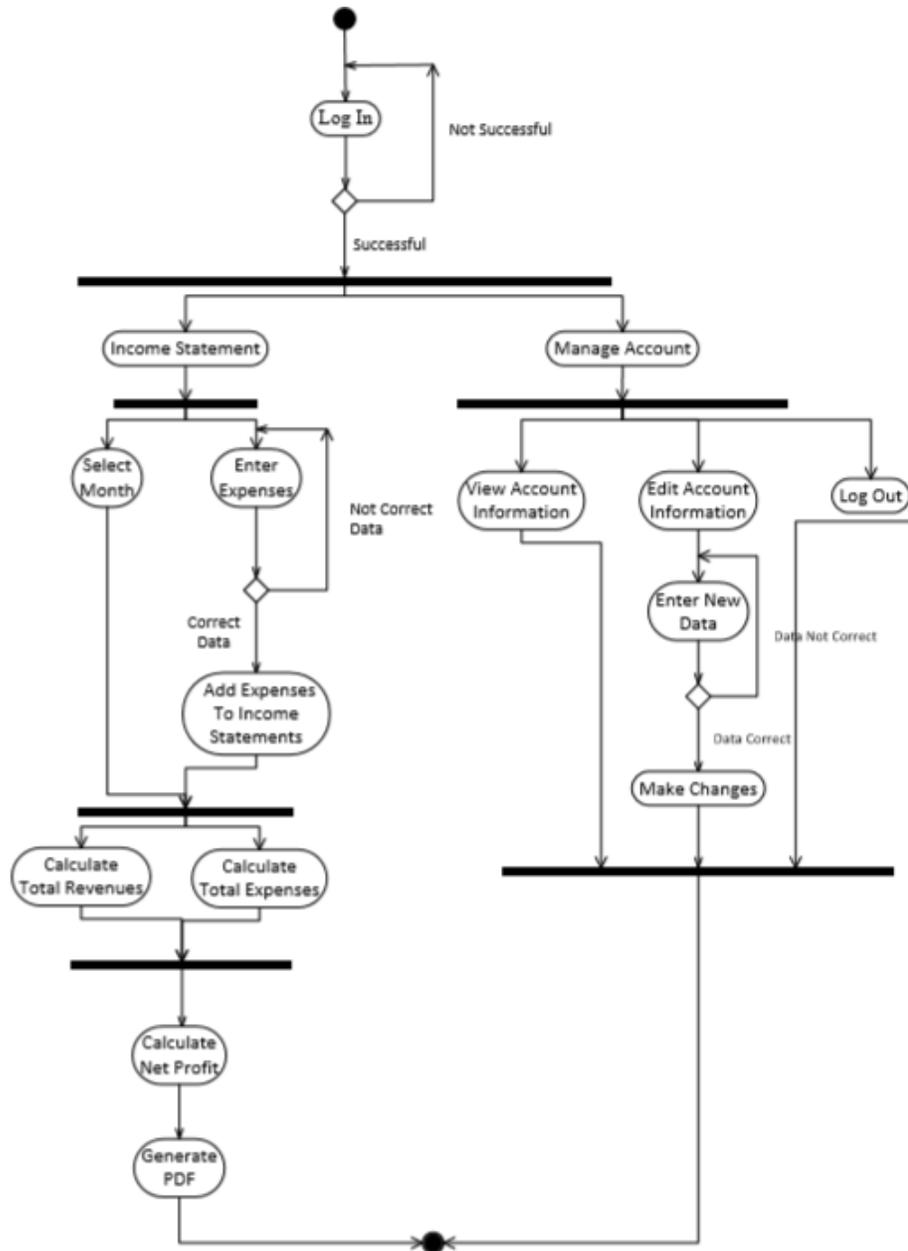


Figure 18. Income Statement and Account Information Activity Diagram

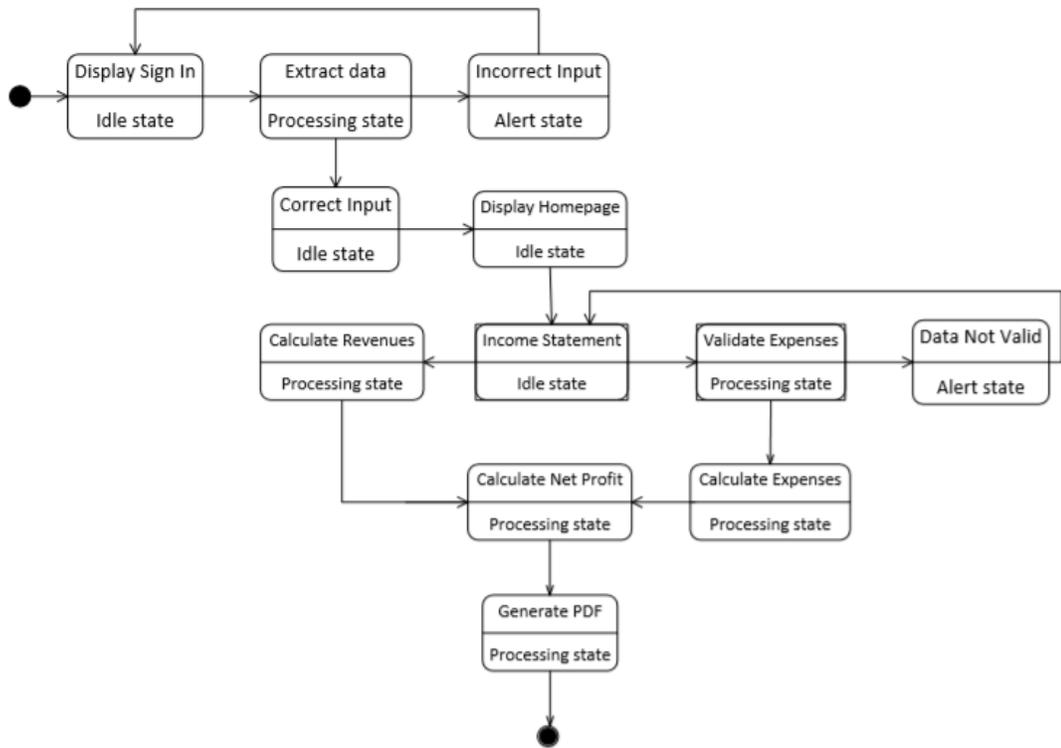


Figure 19. Income Statement Activity Diagram

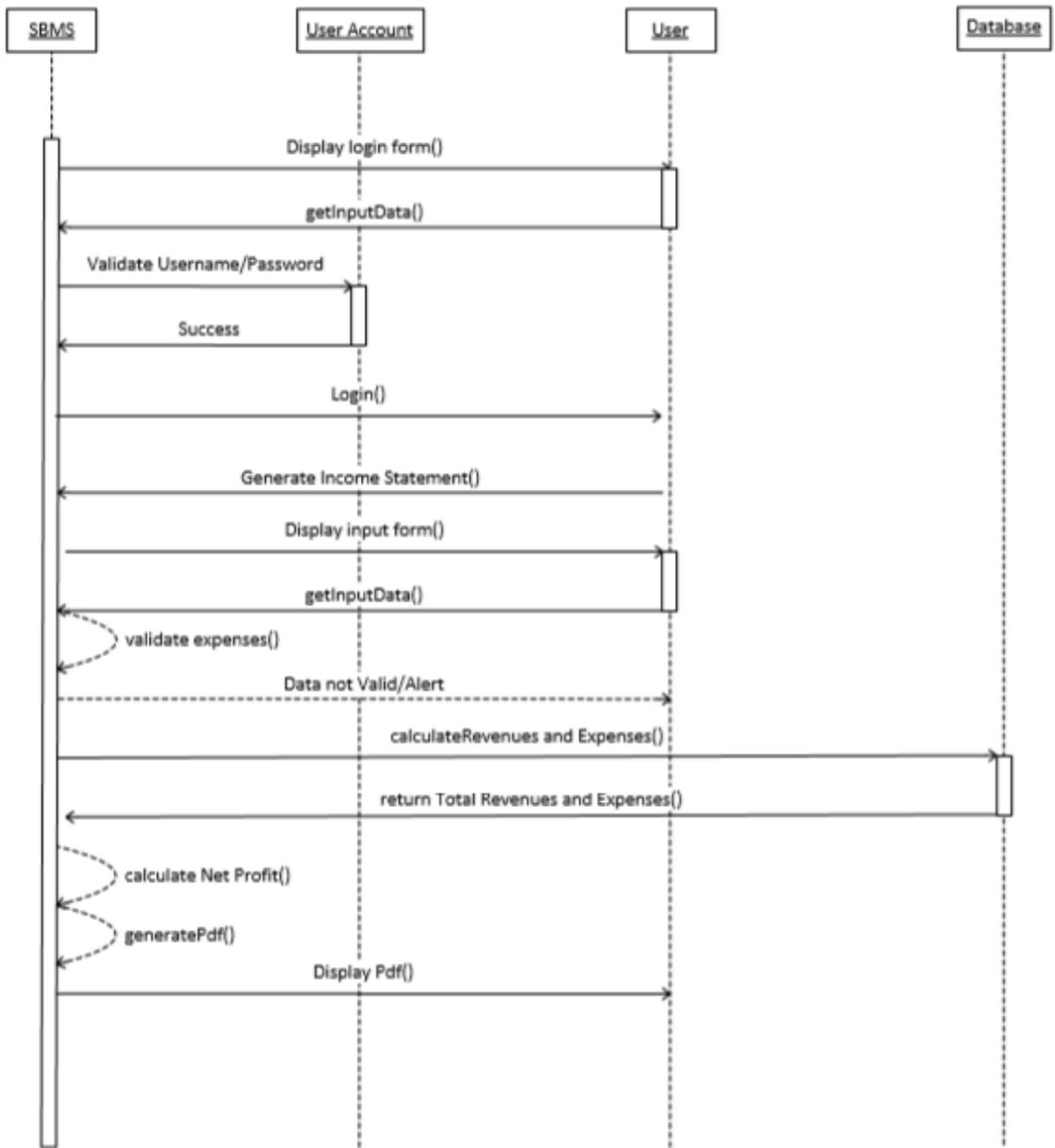


Figure 20. Income Statement Sequence Diagram

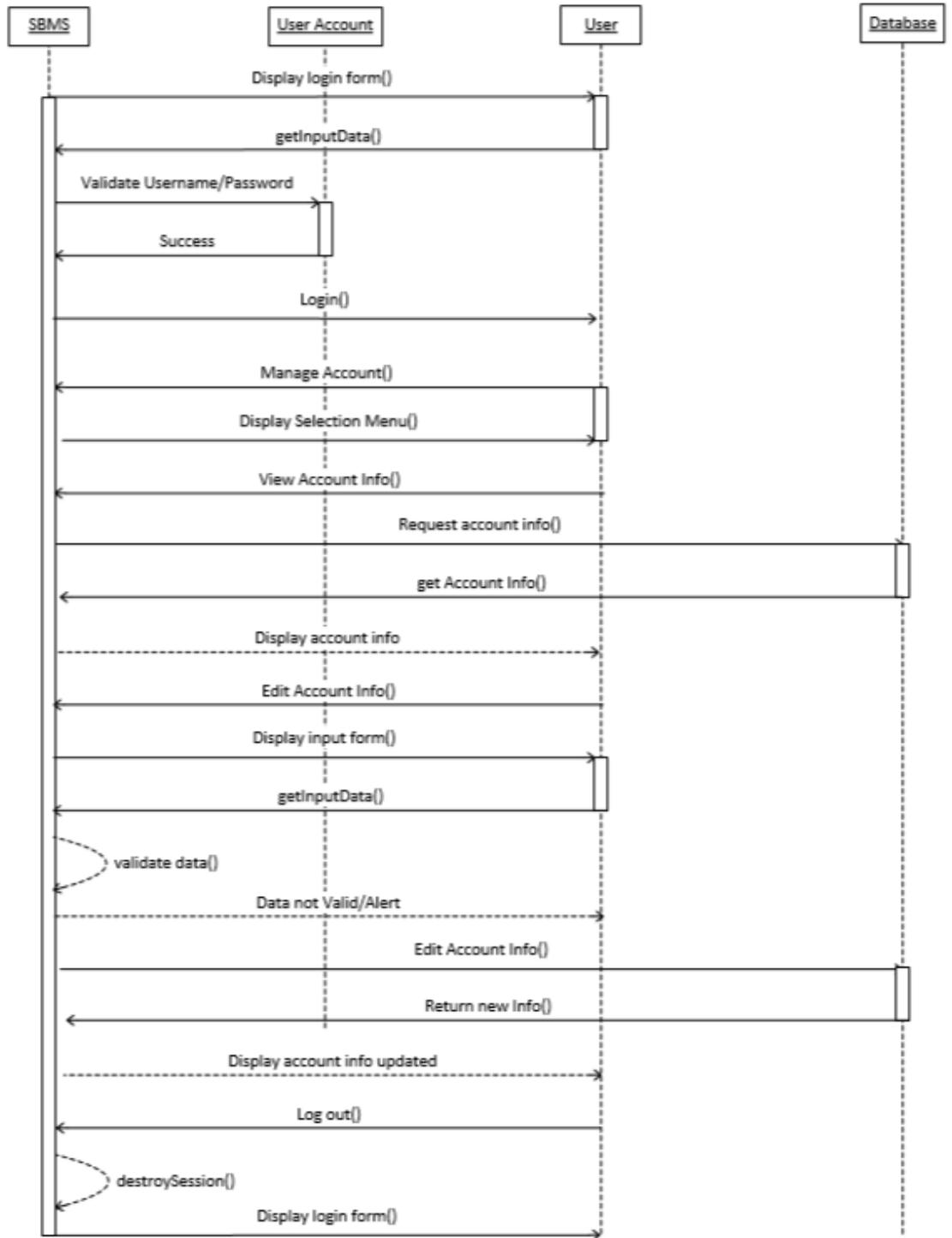


Figure 21. Manage Account Income Statement

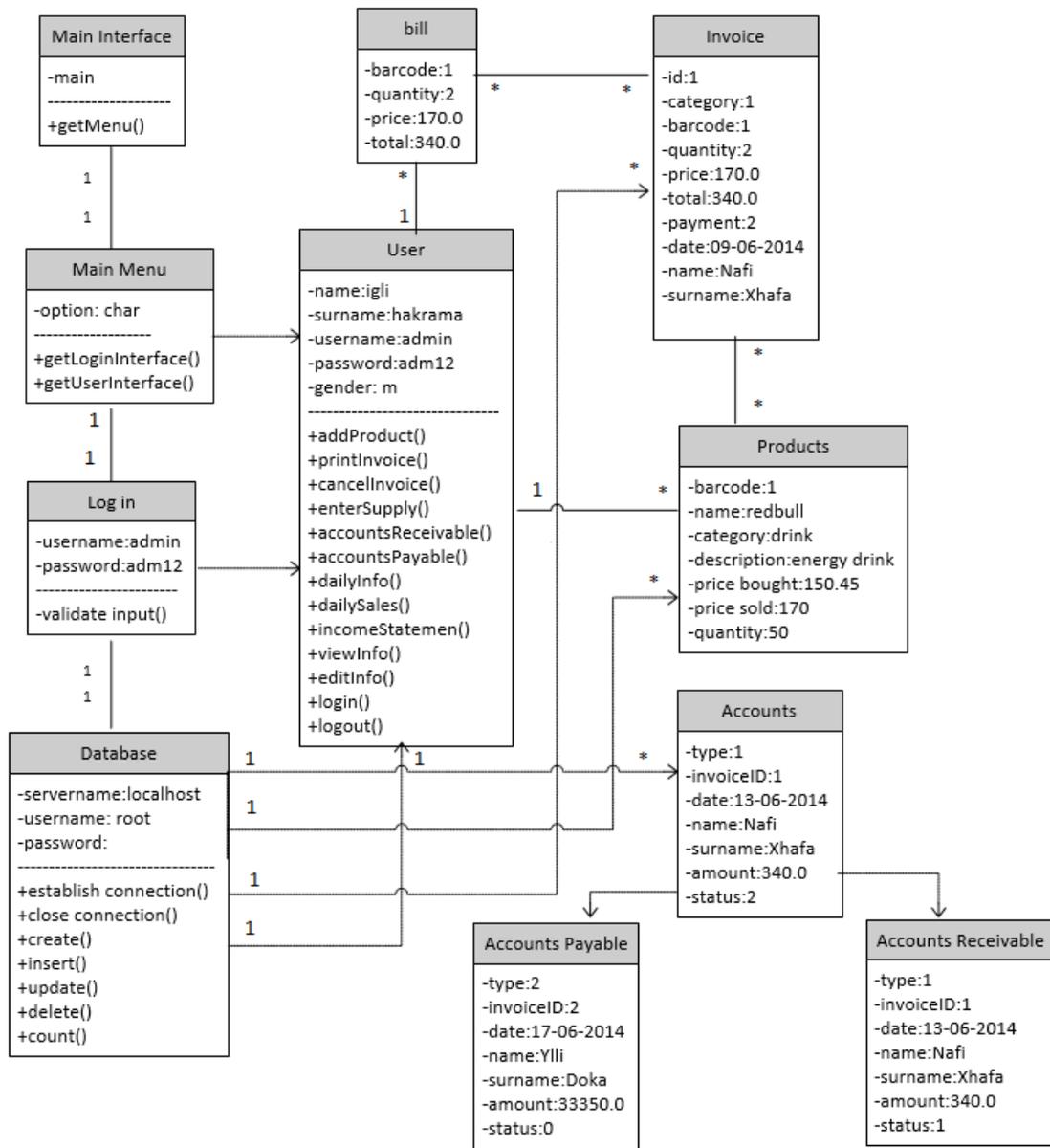


Figure 22. Object Diagram

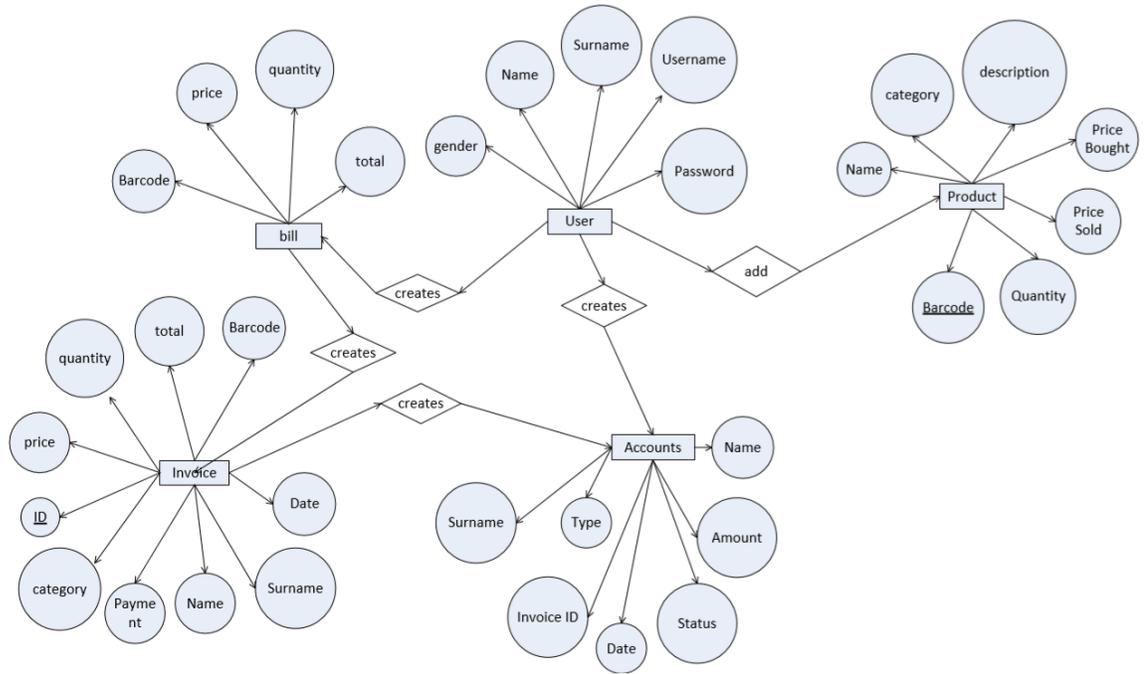


Figure 23. ER Diagram

Appendix B SBMS SCREENSHOTS

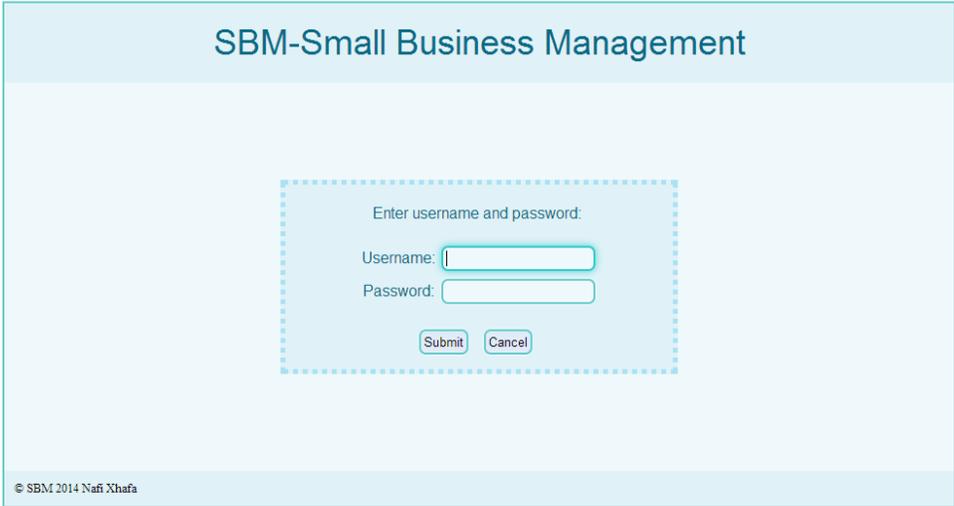


Figure 24. System screenshot

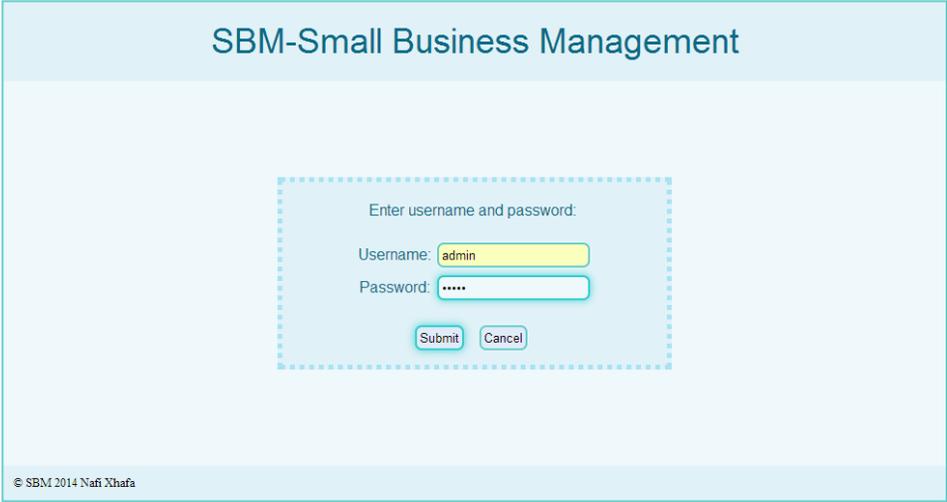


Figure 25. System screenshot



Figure 26. System screenshot

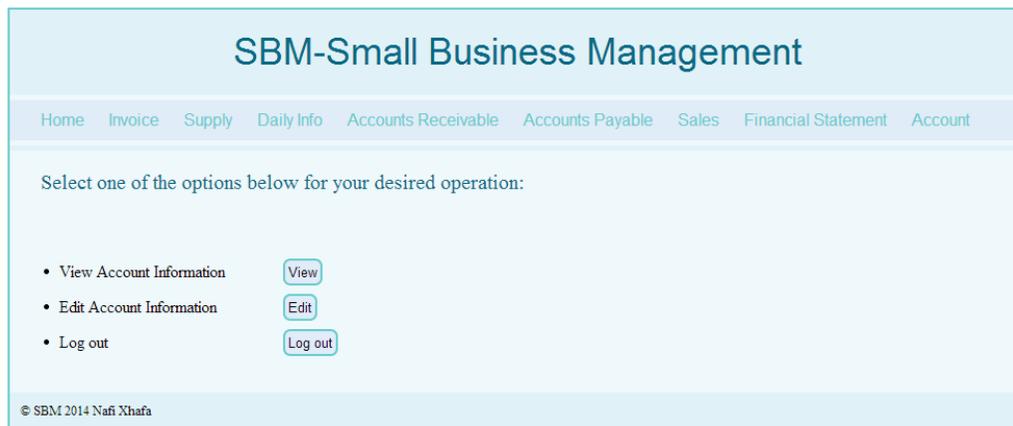


Figure 27. System screenshot



Figure 28 System screenshot

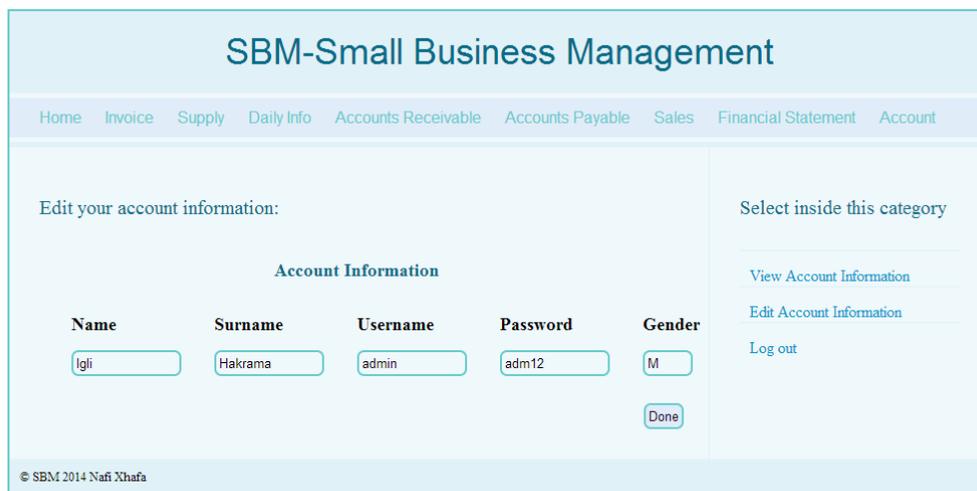


Figure 29. System screenshot

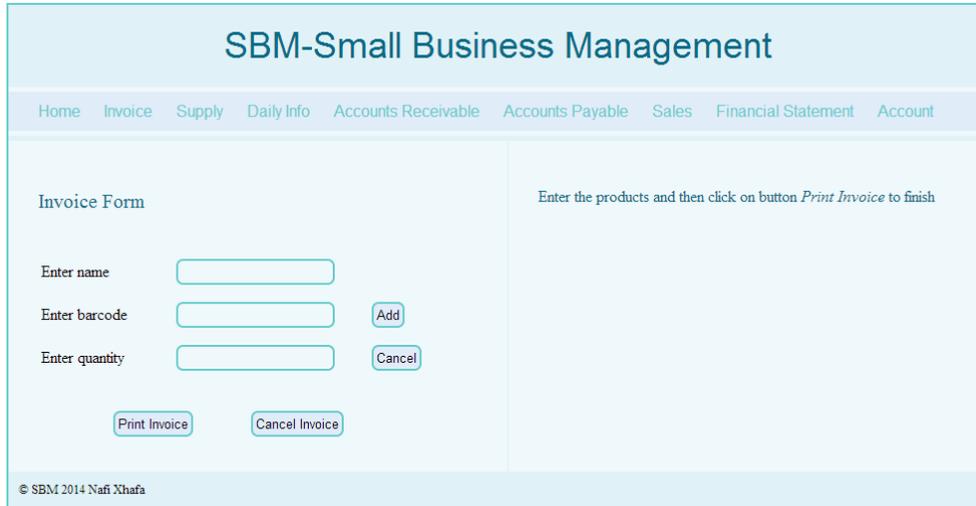


Figure 30. System screenshot

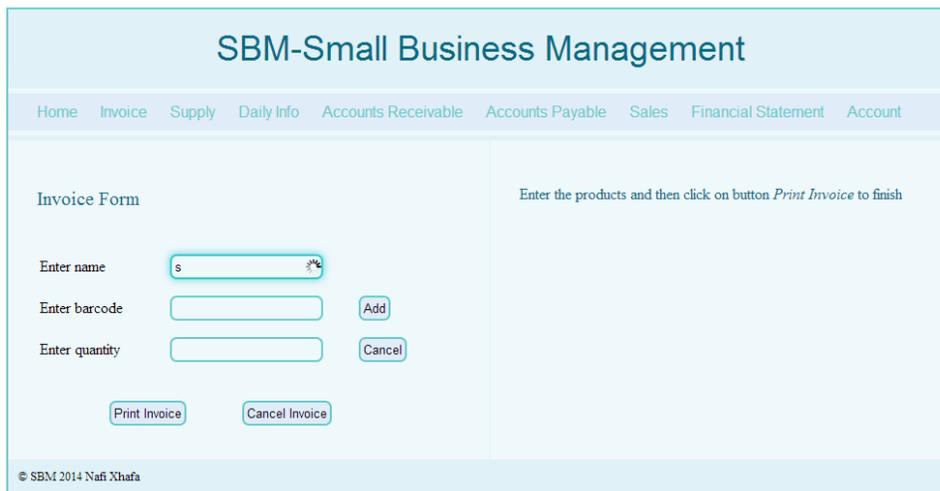


Figure 31. System screenshot

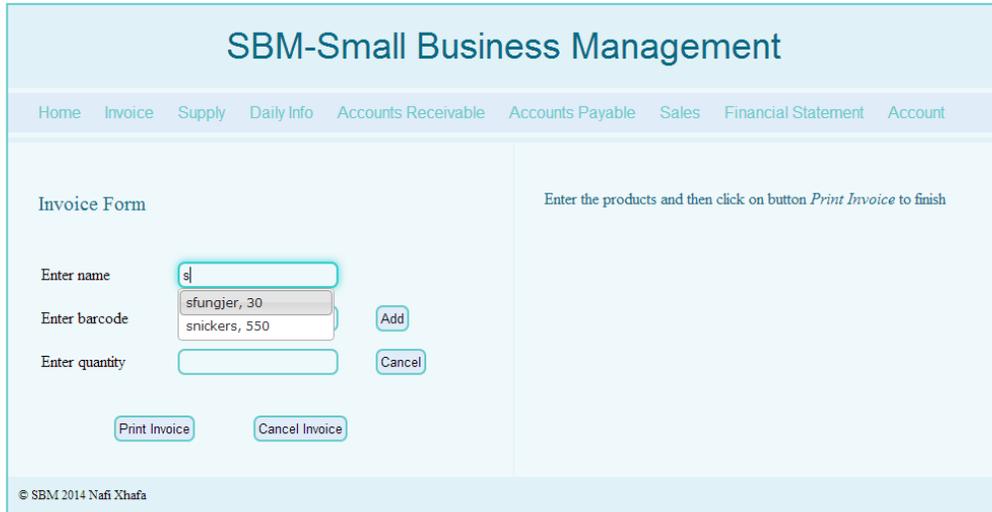


Figure 32. System screenshot

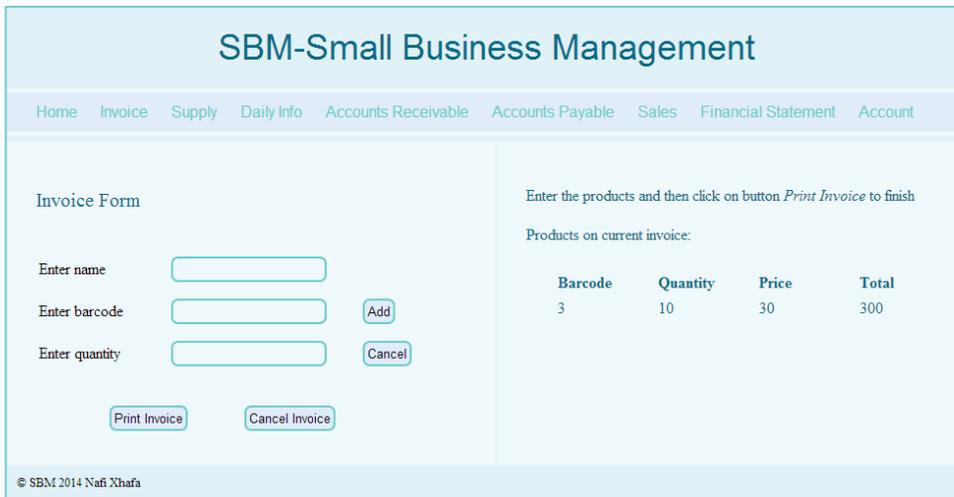


Figure 33. System screenshot

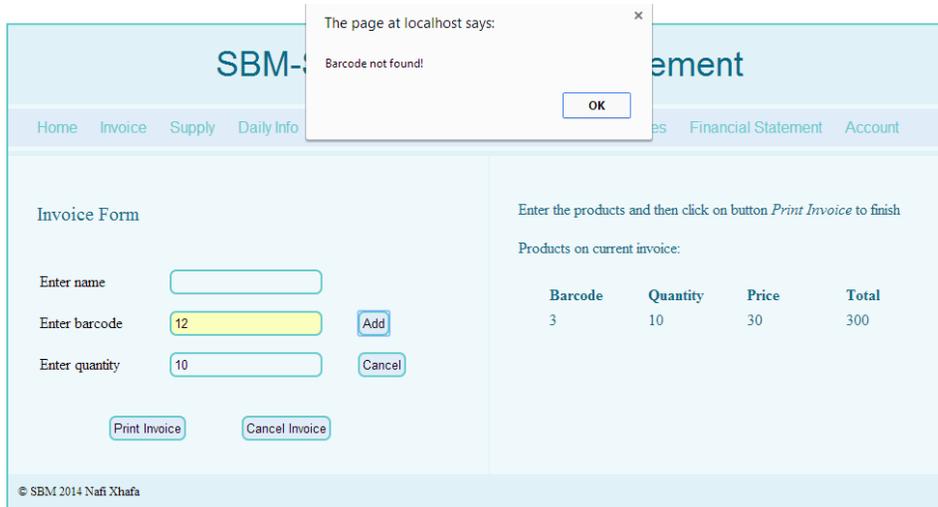


Figure 34. System screenshot

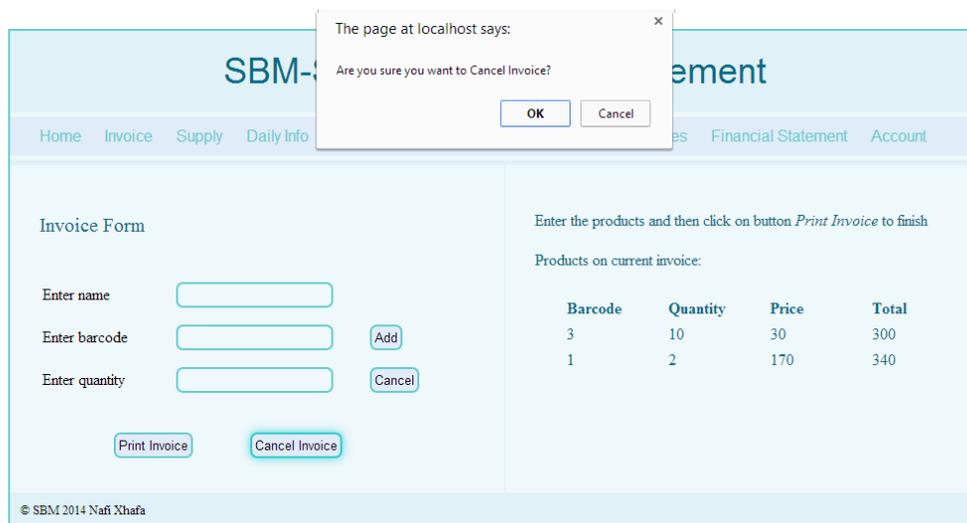


Figure 35. System screenshot