T471

Project Title

Management Archiving System (MAS)
Study Case: (CD Archiving System)

Project ID:

JD10-JB02-00048

Team Work

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2009-2010

Management Archiving System

Abstract

In General an abstract is a brief idea about the project, but for us this will be a message we send to everyone ready to make the graduation project.

When we were ready to start doing our project we had in mind that we want to finish with the best possible grade. We didn't really care what we will gain from doing this. We started reading and tried to find a different and unique idea which made us spend long time until we came up with the idea of our project.

First we shall tell you what MAS is. Basically it's a program you can install in your computer and use the barcode scanner to arrange your huge number of CDs. It will help you organizing them; have full details about each one of them and much more.

The important message we want to bring up here that this project could be very interesting task if we think of it as something valuable we did on our own. You don't have to bring up a completely new idea. In fact all you need is to think of any idea in a different way and maybe add something new to it, but most important is a few words which are: MAS is a project we did from zero and we have many plans for future that we you might see it in the markets one day. It is a system that can be used not only for CDs and not using Barcode, but so many other ways as we will see later on.

Acknowledgement

After a very long year due to the hard work and new experience we have been through, we would like to dedicate this work to the great people who were by our side step by step until we reached to this day. To our families, our tutors, our colleagues, the employees in this university and even to the workers who have helped us inside and outside of the university we would like to put in your hands the product of our long and hard work. Thanks a lot whoever you were and where ever you are.

Dedication

I would like to thank Allah and then to those people who lightened my route. They were like a candle light that shine my way and they helped me and supported me so much. To them I gave the success of this work "in shaa Allah" to show how thankful I am to all they did. To my mother who did so much and were beside me whenever I needed, to my father who faced so much and gave me the correct advice at the right time, to my brothers, friends and relatives. I would like also to thank all my honored tutors in this university who supported me and spent their valuable time to teach me and reach me to this day and this level. Thanks a lot to everyone and I ask Allah to safe them in their life.

Mohammad Badahman

At this stage I know I have been working so hard for a few years to reach this level and it's time to graduate from this university with the degree of my dreams. I do remember all the good and bad times I spent to reach this day, but also I remember that there are people who were beside me all the time who supported me and pushed me when I needed to reach this day. It's so hard for me to talk about all of them because there are tutors, colleagues, and even friends who did give me the challenging soul which I really needed. For most and at this page I would like first to thanks Allah for all he gave me then I would like to send my thankful thoughts to my wonderful mother and wife who really were there for me all the time. I would like to thank Mr. Shaikhan Bawazeer who was like the soul of the students day after day. Finally I would like to thank my supervisor Dr. H. M. Al-Barhamtoshy who though me so many things in a very short period and was there for us to finish this project as perfect as possible.

AbdulHadi Bajammal

Contents

Page

Chapter One Introduction **9**
1.1 Introduction 9
1.2 Project Aims 9
1.3 Description of the Project 10
1.4 Questionnaire and results 13
Chapter Two Project Planning **15**
2.1 Plan of the Project 15
2.2 Literature search and bibliography 15
2.3 Equipment and software 17
2.3.1 System Software 17
2.3.2 System Hardware 18
Chapter Three Project Analysis **20**
3.1 Use Case 20
3.2 Data Description 22
3.3 DFD / Activity Diagrams 24
3.4 Sequences Diagrams 28
3.4.1 Adding new CD and Print barcode 28
3.4.2 User Entry to the System 29
Chapter Four Project Design **31**
4.1 Class Diagram 31
4.2 ER Diagram 34
4.3 Developing Method used 36
Chapter Five Project Implementation **40**
5.1 Programming Codes 40
5.1.1 Sample of Code 40
5.1.2 Entering the Program 43
5.1.3 Retrieving the CD's data and information 45
5.2 Debugging Errors 46
5.3 Sample Output Screens 48
5.3.1 Login Form 48
5.3.2 Main Form 48
5.3.3 Management CDs 49
5.3.4 Lend CDs 49
5.3.5 Borrowers 50
5.3.6 Browser CDs 51
5.3.7 System Setting 51

5.3.8 Support Center 52
Chapter Six Testing Stage 54
6.1 Software Validation 54
6.2 Accessing the System (Test and Debugging) 54
6.3 CDs Browsing (Test and Debugging) 55
6.4 CDs Management (Test and Debugging) 55
6.4.1 Testing 55
6.4.2 Edit Button Debugging 55
6.4.3 Add New Button Debugging 56
6.4.4 Borrowed CD Button Debugging 57
6.5 Run the Project 58
6.5.1 Print Screen When We Edit Management CDs 58
6.5.2 Print Screen When We Edit LendForm 58
6.5.3 Print Screen When We Edit Users 59
6.5.4 Print Screen When We Edit Barcode 59
6.5.5 Print Screen When We Print Preview Barcode Stickers 59
Chapter Seven Closure 61
7.1 Conclusion 61
7.2 Recommendation 62
7.3 Scope for Future Work 62
References and Bibliography 65
Appendix 1 How to Install MAS 67
Appendix 2 MAS Hardware Requirements 69
1- Barcode Scanner 69
2- HP Deskjet F4583 All-in-One Printer 69

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1

Chapter One
Introduction

Chapter One

Introduction

1.1 Introduction

Technology became a main part of our daily bases practices that you hardly find anyone doesn't use one or more types of technology. People use mobiles, computers, CD players and many others every day and for long time. Some people knows well how to handle their things and take care of them the way that fits them, but others find hard time to arrange their stuff and might lose so many things. One of the things that we use very often and so many times we lose them are our Compact Disks or as they known CD's.

No matter if we use CD's for music, documents or even for computers the main thing that we all have plenty of them and we come to time that we don't know which CD has what. We might reach to a level that it takes us very long time to find the required CD. For that we came with the idea of this project to arrange our CD's in a very good way and it will be very useful especially for those have tens or hundreds of them.

Moreover, we could give one or more CD's to someone then forget which one we gave or to who. What if I have about 100 music CDs and I want ONLY one song that I don't know where is it exactly? What shall I do? Where to look and long it will take? This program is the solution.

If you were a computer user, music collector or even movie's fan and you have plenty of CDs then our idea is the best to safe your time which you can spend on your enjoyment.

1.2 Project Aims

Usually people need to know what they will get from any system or program they will use before they even try it to see at least if they really need it or not. For that following there will be the aims of our project to show exactly how helpful and why would someone have such system:

1- It will store the information of the CD itself and the type of data and files inside it.

2- It will make a special identification for each CD that all you got to do is passing the CD under the reader and it will copy all the information needed then identify it the way you like.
3- It will give many ways in sorting and organizing your CDs like serial numbers or names or anything you like to do it uniquely.
4- Not only the name or ID of the CD, but even the type of information inside will be a click away from you.
5- Even if you want to be nice to your friends and lend them some of your great collection of CDs you will not worry that they or you will forget to return it because our program will remind you and even can send Massages to their mobiles if you like.
6- Some ideas might be close to our idea, but the very unique about our idea is using the Barcode reader which has wider range of uses that we can see everywhere.

1.3 Description of the Project

Let us say I have 100 song's CDs and I want a specific song, how am I going to find that song from looking at the CD only? Also if I have some software CDs how can I tell which one has a program that I use and want to find? What if I want to make a shelf or a box for my CDs which way I will arrange them? If I lend one or more CD to my friends, how can I tell which one took which and when they should return them?

So how can this system help doing all that? What is so special about it as long as most if not all CD's are original? What is the new idea with it? To answer all these questions look at Figure 1.1 below.

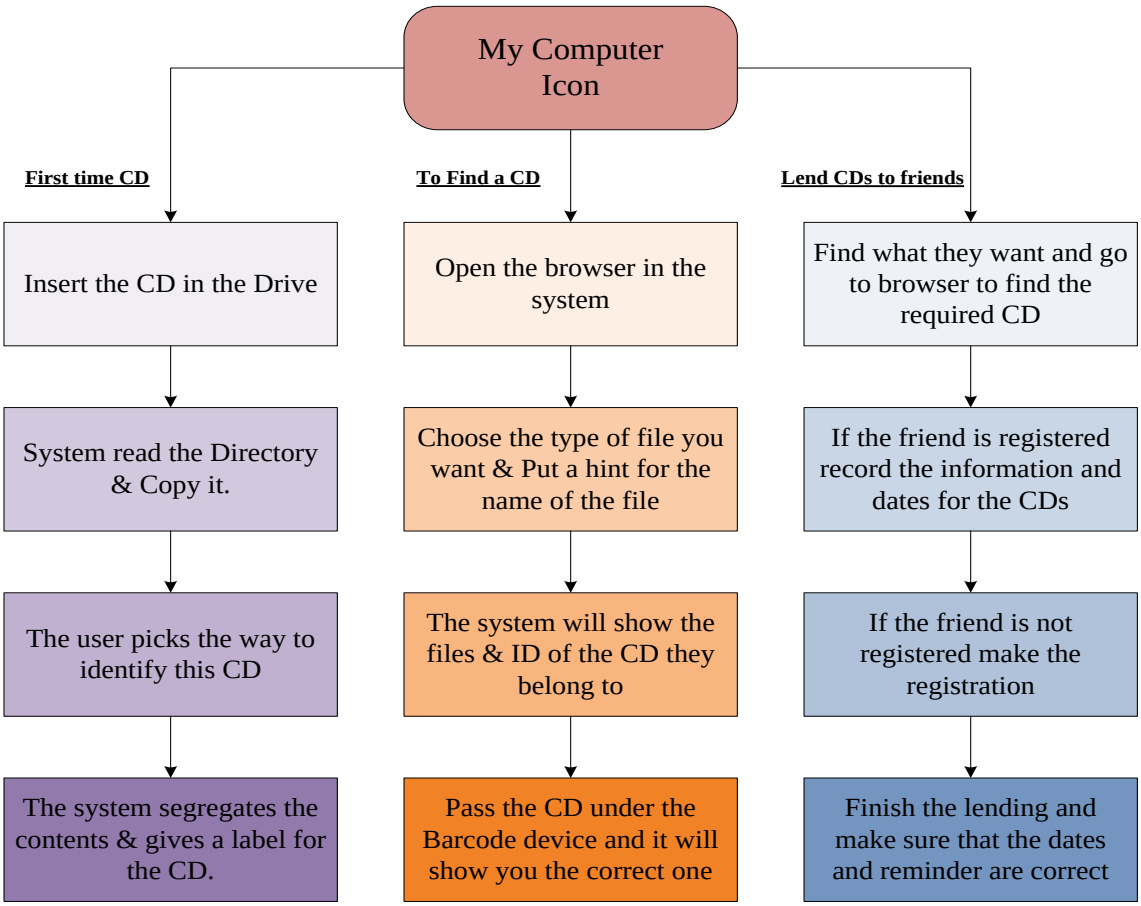

Figure 1.1: a diagram show the operation of the MAS

Some times when someone wants to build up such system he/she will have a target customer, but for us it is little different. Anyone who use computers and has CDs will be our target and doesn't matter if they organize their CDs well or not because such idea might be a big help for them in other ways.

To develop our project we will need some roles. As a start we will use the Life Cycle which is a description of all the events and activities in the life of a software system or product and the sequence in which they happen. After that we will follow the known technical activities for the development of software (Analyzing, Design, Implementation and Testing).

In Analysis level we will start with requirements elicitation to clear our project objectives. Usually those requirements are given from the costumer which will buy the software, but here we must add the requirements through public computer users using the following ways:

a- Spared out some forms of Questionnaire.

b- Collect Statistics from multi source.

c- Ask expert people for opinion and advices.

We will also make sure that we have the best schedule that fits our needs to comply with this project a head of the target dead line. The best thing about this system that there won't be much to spend other than the cost of the Barcode device due to the fact that most of the programs we will use will be downloaded either from the (MSDN Academic Alliance) or we already have them in our computers.

The design level might be the biggest step because we will be spending long time defining the tables, relationships, forms and reports. There will be different diagrams by use UML and tables have to be defined. Data storage, security and procedures have to be one of the most concerns during this stage.

In the Implementation level we will start the most important part of the project because during this level we will have to do the real programming, transferring data, installation, reviewing the work all over to be ready to finalize what we have done so far.

During the Testing level nothing much will be done other than testing the system and make any required correction needed. Maybe during that period we find some changes to be done so it's the right stage to do so.

1.4 Questionnaire and results

The questions	Completely agree	Agree	Don't know	Disagree	Completely disagree
Almost every house has at least one PC.	30	10	7	1	2
There are plenty of CDs in every house such as software, Audio, Video, etc…	32	8	2	5	3
So many people have hard time organizing their CDs do to the big quantity.	32	10	0	8	0
Some people don't know how to organize their CDs.	28	8	10	4	
Some people don't have a specific place to store their CDs.	31	8	11	0	0
Due to the fact that we don't organize our CDs we could lose or damage plenty of them.	35	2	6	5	2
Do you buy or copy CDs often during the month.	26	7	0	9	8
Do you lend your friends or relatives some of your CDs?	29	6	0	6	9
Do they return it on time or even return it at all?	30	4	2	7	7
Would you like to have a system that organizes your CDs?	37	6	1	5	1
Would you like this system to give you option of the way you safe your CDs?	39	6	2	3	0
Would you like the system to give you a list to record the borrowed CDs? To whom and when they were borrowed?	39	5	3	2	1
Would you like the system to remind you or them about the time they should return the CD?	42	2	4	2	0
Would you like the reminder to be a message on your desktop or even a message to their mobile?	42	5	1	2	0
Would you like the system to give you a search option which makes your search easier?	37	9	4	0	0
Would you buy such system remembering it will need also a small device for the barcode or RFID?	27	12	3	5	3
Would you spend 100-200 SR on such system?	27	11	7	2	3
Do you think it's a good idea to have such system in the PPC beside the PC?	18	13	0	14	5

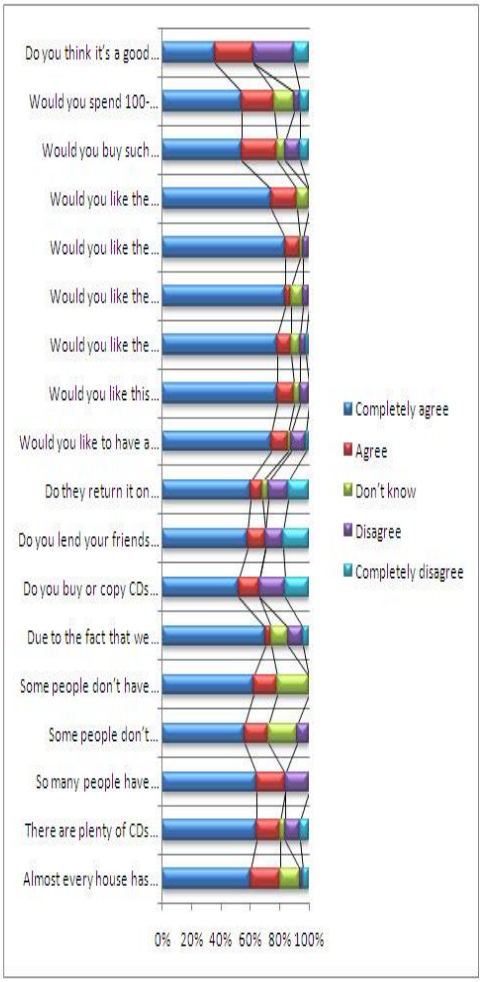

Figure 1.2: Our questionnaire and the results

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2

Chapter Two
Project Planning

Chapter Two

Project Planning

2.1 Plan of the Project

Figure 2.1 below will show the plan on Microsoft Project 2007 as required and following the calendar of T471 for fall 2010.

	Task Name	Duration	Start	Finish
1	Feasibility and Preparation Level	0 days	Tue 9/1/09	Tue 9/1/09
2	Meetings with partner for project	4 days	Tue 9/1/09	Fri 9/4/09
3	Searching for good technology.	14 days	Mon 9/7/09	Wed 9/23/09
4	Eid Holiday	7 days	Sat 9/19/09	Sat 9/26/09
5	Searching for programming languages	7 days	Sat 9/26/09	Sat 10/3/09
6	Collecting information about T471 rules	7 days	Sat 10/3/09	Sat 10/10/09
7	Analyzing and TMA-01 Level	0 days	Sat 10/10/09	Sat 10/10/09
8	Working on TMA-1.	14 days	Sat 10/10/09	Tue 10/27/09
9	Make Basic UML diagrams	21 days	Sat 10/24/09	Wed 11/18/09
10	Designing and TMA-02 Level	0 days	Sat 11/14/09	Sat 11/14/09
11	Sketches for the design	7 days	Sat 11/14/09	Sat 11/21/09
12	Hajj Holiday	14 days	Sat 11/21/09	Tue 12/8/09
13	Working on TMA2	14 days	Sat 12/5/09	Tue 12/22/09
14	Designing program interface	14 days	Sat 12/19/09	Tue 1/5/10
15	Work on Chapter one and two in report	7 days	Sat 1/2/10	Sat 1/9/10
16	Fall 2009-2010 Finals	14 days	Sat 1/9/10	Tue 1/26/10
17	Development and TMA-03 Level	0 days	Sat 1/23/10	Sat 1/23/10
18	Tables, forms and reports.	28 days	Sat 1/23/10	Mon 3/1/10
19	Doing TMA3	14 days	Sat 2/20/10	Tue 3/9/10
20	Implementation and TMA-04 Level	0 days	Sat 3/6/10	Sat 3/6/10
21	Prepar report	21 days	Sat 3/6/10	Wed 3/31/10
22	Doing TMA4	7 days	Sat 3/27/10	Sat 4/3/10
23	Testing the program & review the work.	14 days	Sat 4/3/10	Mon 4/19/10
24	Prepare all requirements for presentation.	7 days	Sat 4/17/10	Sat 4/24/10
25	Practice for presentation	7 days	Sat 4/24/10	Sat 5/1/10

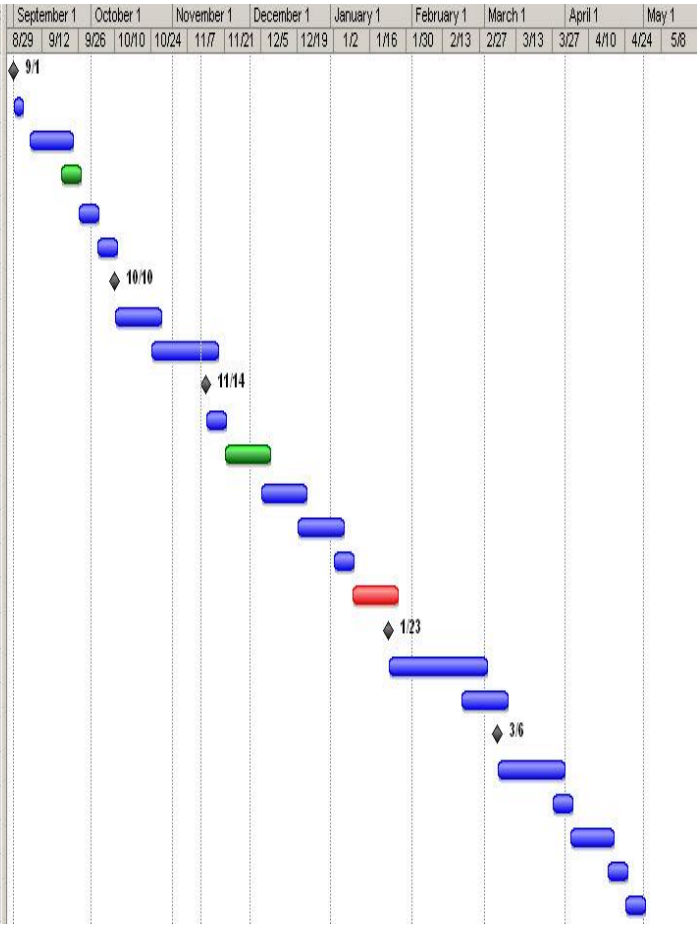

Figure 2.1: Plan on Microsoft Project.

2.2 Literature search and bibliography

Usually when someone wants to do any task they try to find some sources for the project or the task they want to perform. Sometimes they refer to books, friends, personal experience or even the WWW. We started our search for some sites that talk about graduation projects to gain some ideas and learn how to handle such projects. After we came up with our idea we started to look for some sites that give hints on how to plan a project. Also, we tried to look for sites that teach or give ideas about the ways that people could use to organize their CDs. Moreover, we looked for sites that teach programming

languages such as VB.net and ASP.net which helped up choose Visual basic as a programming language to build up our project. Due to the fact that we need to learn more about the Barcodes we also looked for some sites under that subject and we came up with very useful sites.

After all that search we ended up with big amount of websites and some books so we started to minimize them to end up with very few that we can really use in our project and following are the sites we decided to review to more familiar with the requirements of our project:

1- How to plan a project with DPG? (1)
2- How to Organize a Large CD Collection. (2)
3- Getting Started With Bar Codes: A Systematic Guide. (3)
4- Mastering Microsoft Visual Basic 2008. (4)
5- Visual Basic .NET Programming for Beginners. (5)

As an example of the references we used to perform this project we will talk about the following site that helped us so much to learn about the programming language that we will use to build up our system.

Visual Basic .NET Programming for Beginners:

As part of this question we should write about one document. We should write a summary about the document, in our case is a website talking about Visual Basic, as well as evaluating this document.

As long as we going to use VB as a programming language for our system we tried to look for good sites that teach us how to use VB and out of all the sites we visited we liked this the most. This website gave fourteen lessons starting with (getting started with Visual Basic.NET) and ending with (VB NET and Forms). After going through some of those lessons we found out that it was easy to learn VB.NET and we enjoyed working with it. Each of these lessons takes you step by step through the subject of the lesson. Moreover, it shows some print out of the part of the program that you need to work with and gives some codes that you can use to guarantee that you are at the right place to perform the required function or lesson.

Out of the name of the site or the publisher anyone can tell that gives tutorial and so far we can tell that the tutorial teaches VB.Net in a very good way, but that’s not all. The very good thing about this site that it gives tutorial for those new to computers in general and beginners to Microsoft Word, Excel and PowerPoint. Also it gives tutorial for PHP which is probably the most popular scripting language on the web and follows along with these tutorials; it will teach how to create a web site or even program using one of those

programming languages. The newest programming course in that site is the very popular Visual C# .NET.

After all those tutorials you can exam yourself in the exam section and even get a certificate in the program you choose. All those things made this website one of the best of the once we visited during our search for this project. Maybe the only thing that we didn't find in this site the video presentation which sometimes make it easy to understand the lesson as well as some weakness in some parts of the tutorials after you start getting to the advance level.

Finally, after we finish our project and graduate we will come back to this site and start learning the other programs they have and who knows maybe by that time they have even more programs.

2.3 Equipment and software

2.3.1 System Software

The program	version	The use of it
MS Visual Basic 2008.net	2008	We well use it to write code because it is an object-oriented programming language that can be viewed as an evolution of Microsoft's Visual Basic (VB).
MS SQL 2005	2005	Microsoft SQL Server is a relational model database server produced by Microsoft. Its primary query languages, we will use to establish Database for Our Project.
MS Office Visio 2007	2007	It will be used to show data groups and hierarchical relationships. We will use it to draw some Diagrams and tables.
Ms Office Word 2007	2007	It's the main base for doing our reports, questionnaire and even TMA.
Ms Office Excel 2007	2007	We will use it to do some charts that support us.
Ms Office PowerPoint 2007	2007	It is a presentation program that we will use for our presentation for final discussion.
Ms Office Project 2007	2007	It's software that we will use to draw our Plan that will help us to end project on time.
Adobe Photoshop (30 days trail)	CS3	We aspire to make amazing user interface for our project using this wonderful program.
StarUML	5.0.2.1570	It will be used to make diagrams and some tables.

2.3.2 System Hardware

The program	Description
Personal Computer	A computer which has XP windows or later as operating system, ram of 512 or higher, free memory of 2GB or higher, a CD Drive and PS/2 connection ports.
Normal or barcode printer	It will be sued to print the barcode labels which will be attached to the CDs.
Barcode scanner	It will be used to make barcodes. Also it will be the main component in our project.

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3

Chapter Three
Project Analysis

Chapter Three

Project Analysis

3.1 Use Case

Figure 3.1 below shows MAS Use case diagram. It explain how a person enter to MAS as user and from there can pick what to do next from the five main activities which are Management CDs, Bar-coding CD, Borrowers, Browser and Management lend CDs. When a user enters to Management CDs he can perform the following tasks:

1- Add New CD.
2- Classify CDs.
3- Edit CDs.
4- Delete CD.
5- Search in a CD.
6- Show CD contains.

A user can print Barcode or Search by Barcode when he enters to Bar-coding CD. When a user enters to Borrowers he can Manage Borrowers (add, edit or delete Borrowers). The user also can Search about any information in any CD via Browser. And user can manage lending the CDs in a separate section. When a person enters to MAS as Admin he has authority to enter MAS setting or Control in MAS Users, and Note. Through setting the admin can control the passwords, database, and reports while through Control MAS User the admin can add or delete users. MAS Admin interface contain authority on User interface.

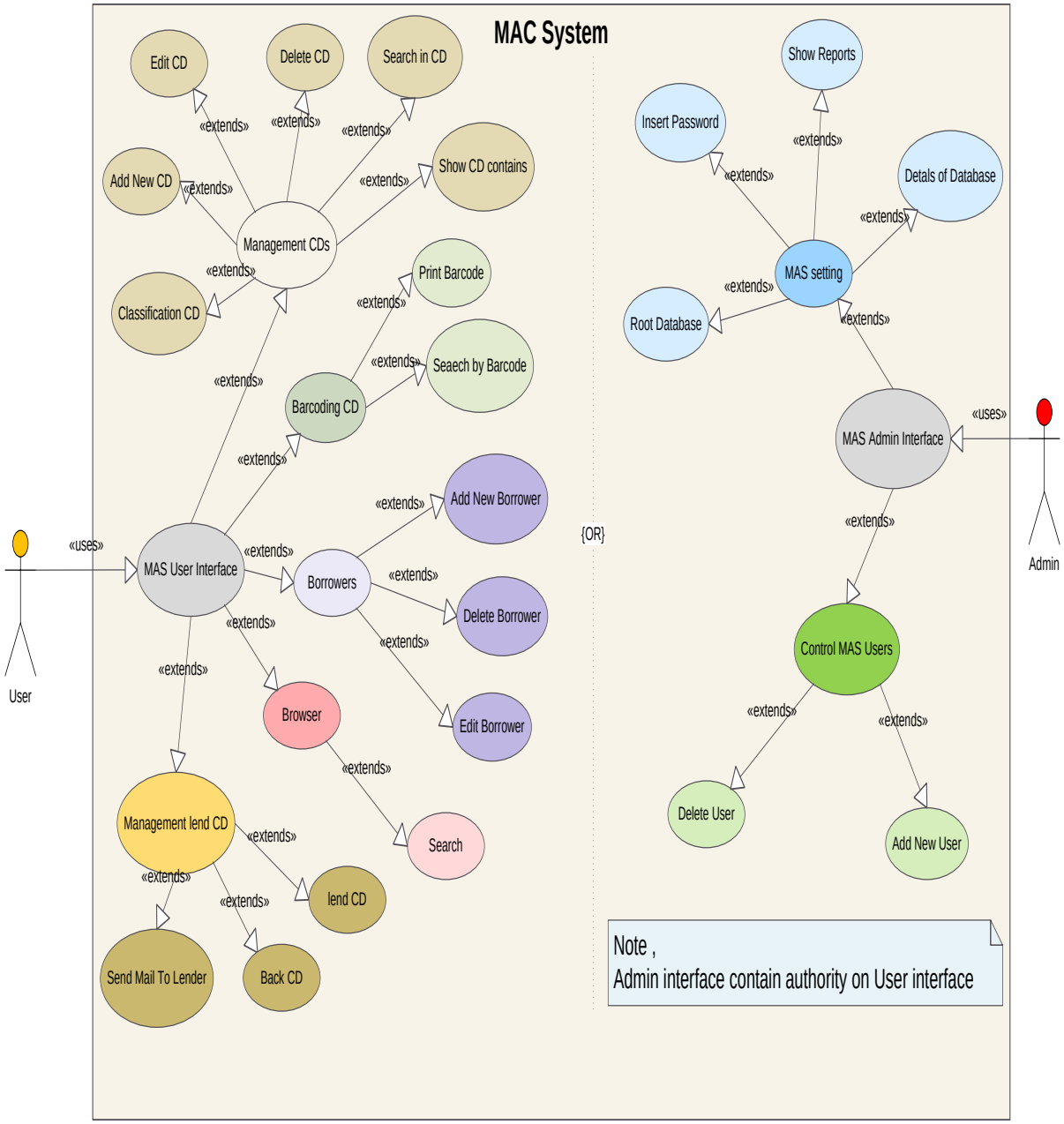

Figure 3.1: MAS Use Case Diagram

3.2 Data Description

Table 3.1 shows some of the data Requirements, type of data and classes as required for MAS. Through this table we can get an easy access to those requirement as well can tell what we need to change in case of further modifications in the future. Also can be counted as a good reference to show how strong is the Requirements which were used to build up this database.

Table3.1: Data Requirements

User	
UserID	Integer
UserName	String
Password	String
Password_Remember	String
UserTybe	String

Login	
UserNameBox	TextBox
PasswordBox	TextBox
Password	TextBox
RememberBox	LaeblBox

Browser	
CD_DataGrad	DataGrad
Files_DataGrade	DataGrad

ManagmentCDs	
CD_ID	Integer
CD_Tital	String
CD_Type	String
CD_Size	Integer
CD_Content_ Type	String
CD_Type	String
CD_IsLend	Boolean
CD_Lend	String
User_interCD	String

Intro	
PictureIntro	Picture
IntroTim	Timer

Main Form	
IfAdmin	Boolean
Note	String
NoteLabel	Label
Users_Butt	Button
SysSetting_Butt	Button
NotePicture	Button
Lend_CDs_Butt	Button
Baecode_Butt	Button
Browser_CDs_Butt	Button
Borrowers_Butt	Button
Managnt_CDs_Butt	Button
UserPicture	PictureBox
AdminPicture	PictureBox
FileIdLab	TextBox
AboutBut	Button
HelpBut	Button

S

D

Lend	
Borrowed_ID	Integer
ID_BorroerdName	String
Borrowed_Start_Date	DateAndTime
Borrowed_Finish_Date	DateAndTime
Borrowed_Submet_Date	DateAndTime

Barcode	
CD_ID	Integer
Barcode_No	Integer

S

D

Borrowed	
ID_BorroerdName	Integer
BorroerdName	String
Borroerd_Address	String
Borroerd_Email	String
Note	String

S

D

MAS_Support	
ErrMassage	String
ErrNomber	Integer

S

3.3 DFD / Activity Diagrams

Figure 3.2 below shows MAS class diagram. The main class is Main Form which transfers user to other tasks such as:

1- **ManagmentCDs Class** that a user can use it to add or remove CDs.
2- **My Settings Class** is the class responsible about the setting and database.
3- **Lend Class** which allow the user to control the borrowing and searching process for user and CDs. This class is the one connect between Browser Class and Borrowed Class.
4- **Browser class** almost same as Lend Class, but here it works for CDs only. Also, **Borrowed Class** works same way but for users.
5- **Barcode Class** is the one for handling barcodes generally.
6- **User Class** contains everything about users and how to control their information.
7- Finally, we have **MAS_Support, Intro,** and **Login classes** that from their names we can tell they are used for support, login to the system and intro to the system.

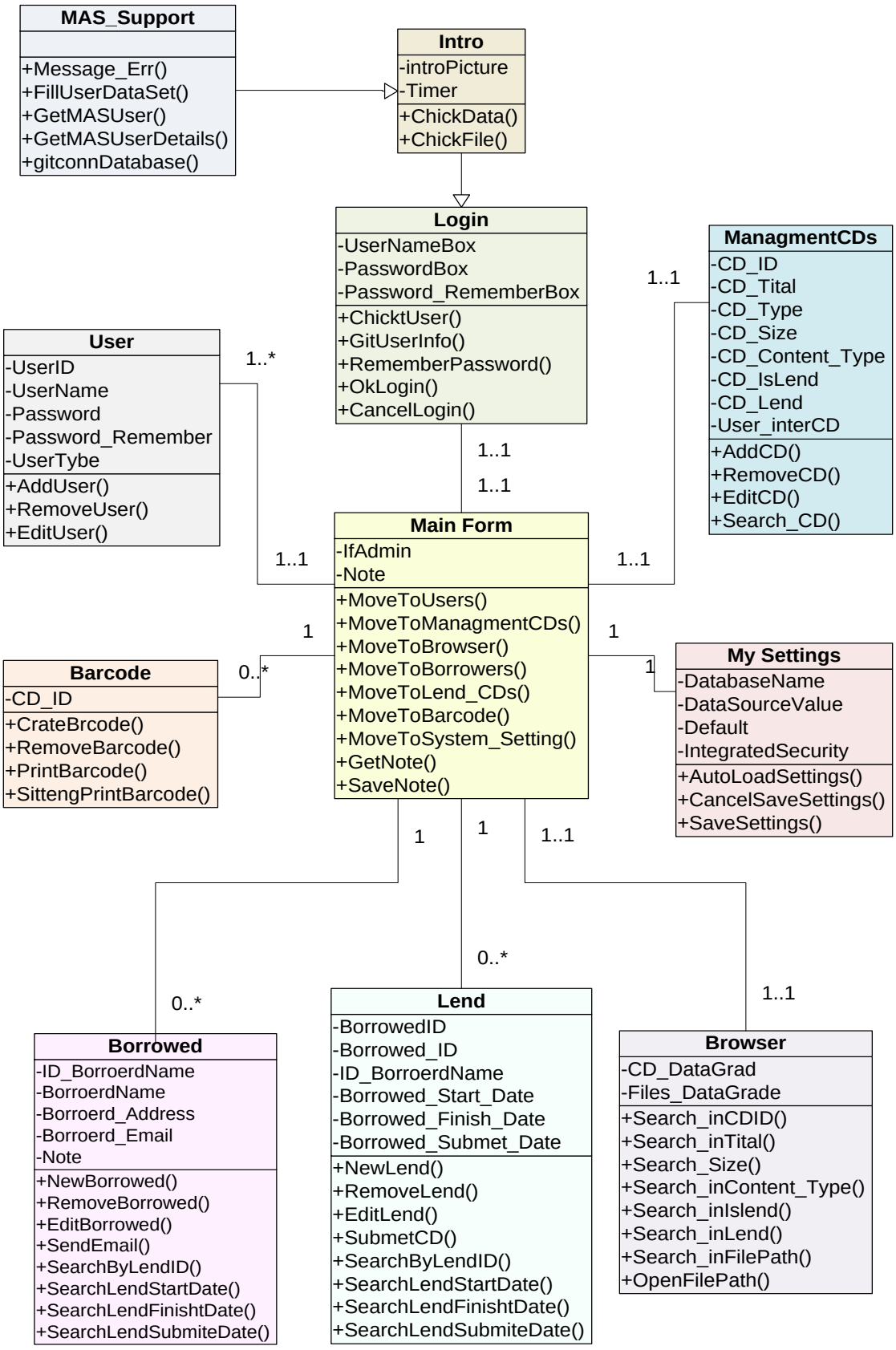

Figure 3.2: Class Diagram

Figure 3.3 explain the activity occurs within MAS system. Any person enters MAS System will have a user name and password. First, MAS request a user to enter a user name and password and if MAS find the name it will request the password. Second, if the user name found to be wrong then MAS direct the user to reenter the user name by showing a message saying that it was a wrong user name and asking to try again. Also, if the user name entered was correct while the password was wrong then MAS will do same procedure with the wrong user name. Finally, if both user name and password were correct MAS will direct the user to his area depending on the authority for that user which could be either admin or normal user.

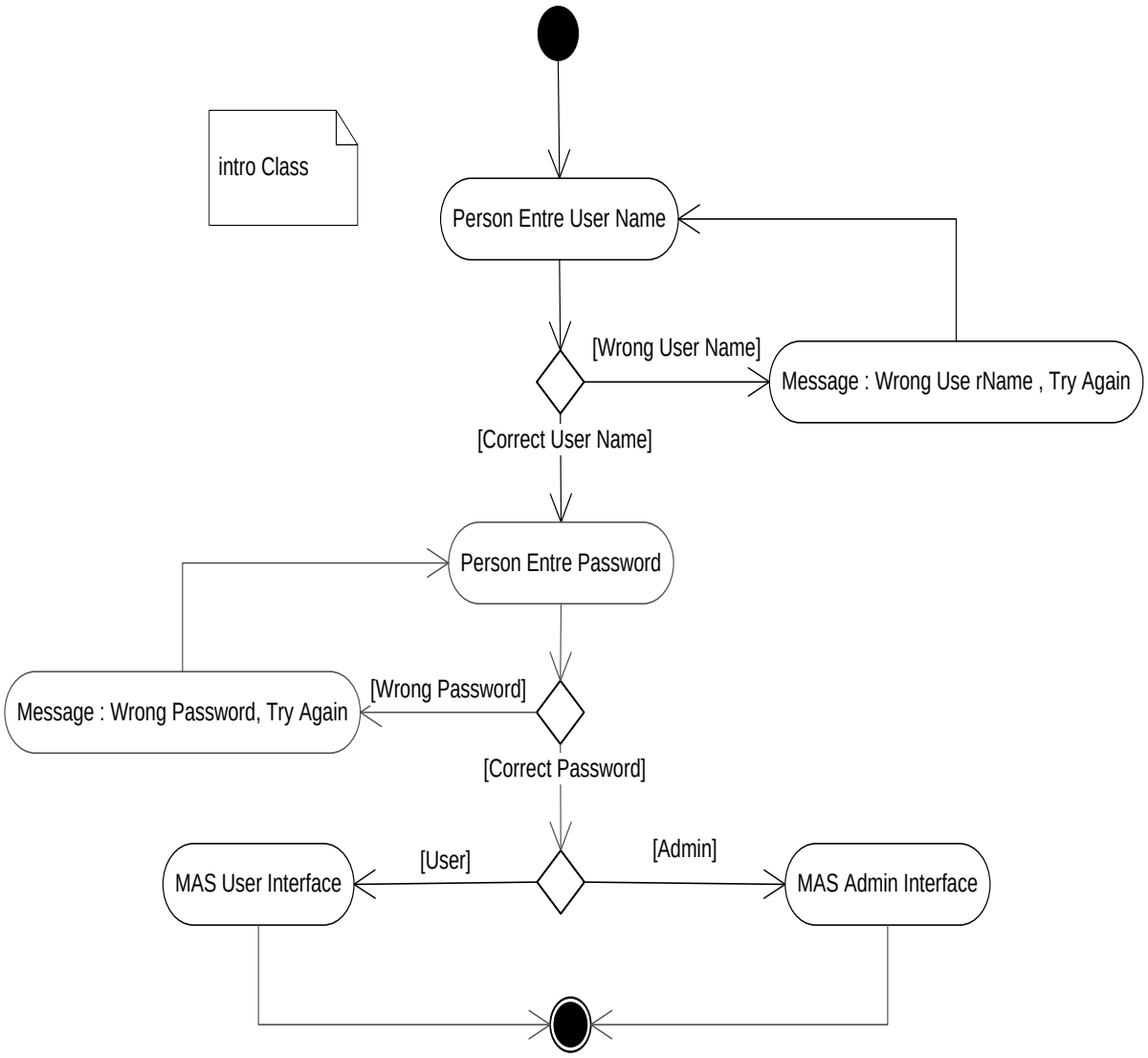

Figure 3.3: Interring to MAS Activity Diagram

Figure 3.4 explains the different steps for adding new CD starting from inserting the CD until ejecting it after everything finished. The activities here are divided between the user and MAS that a user should start by inserting the CD then open MAS in the location to add new CD. After that MAS starts archiving file names and paths then save the information and create the barcode.

The user then prints the barcode and sticks it on the required CD and we will end up with a MAS ready CD.

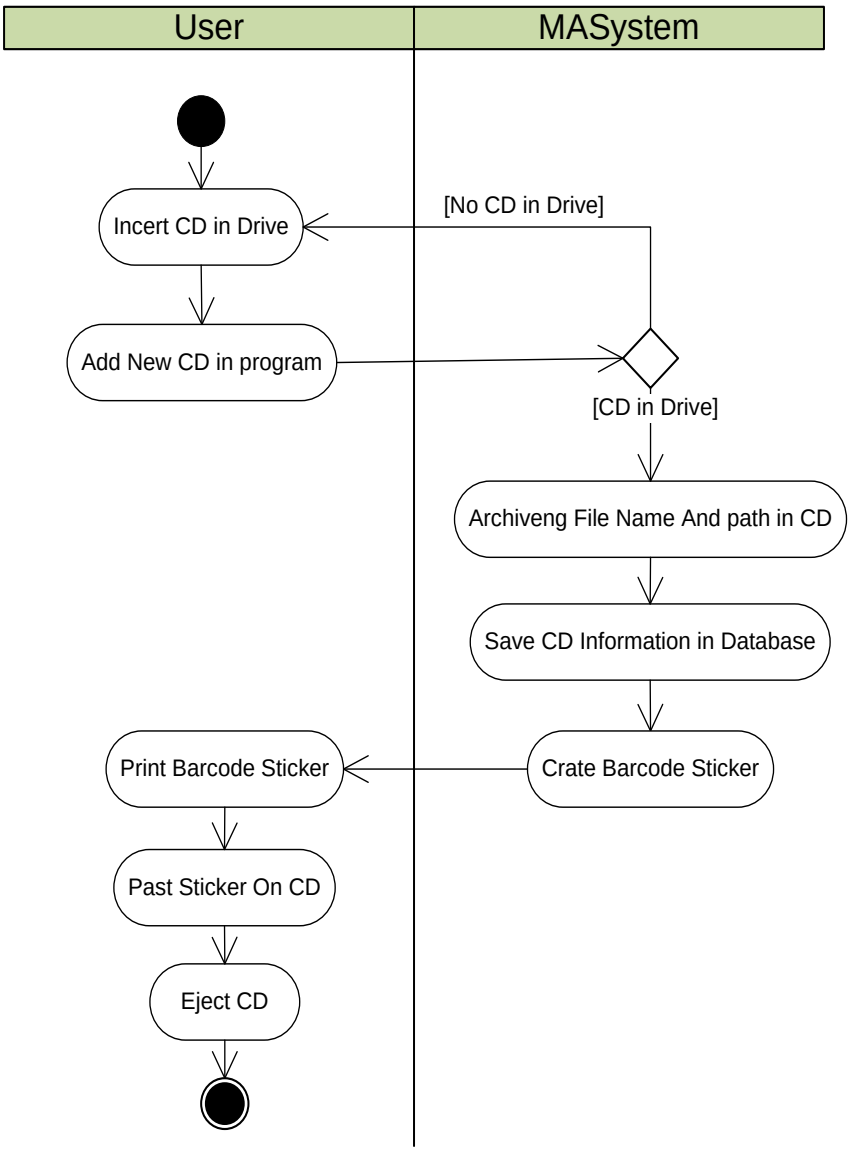

Figure 3.4: Add new CD in MAS Activity Diagram

3.4 Sequences Diagrams

3.4.1 Adding new CD and Print barcode

Figure 3.5 is the sequence diagram that explains MAS Sequences steps to add new CD and Printing barcode for CD. Those steps will be as follow:

1- From main class the user well go to ManagmentCDs.
2- ManagmentCDs will make many Sequence steps to add And Print Barcode CD.
3- At this level the user information will be retrieved and save his name as an input to the disk data.
4- The CD Drive will be checked to find the names of file paths inside the CD.
5- Following it will connect directly to database to get and save some information like user which enters CD, get CD Types or CD Content Type.
6- Finally, ManagmentCDs will save all CD information in Database. To print CD Barcode, ManagmentCDs class will provide CD ID for Barcode class which will connect to the printer and send the Barcode for it.

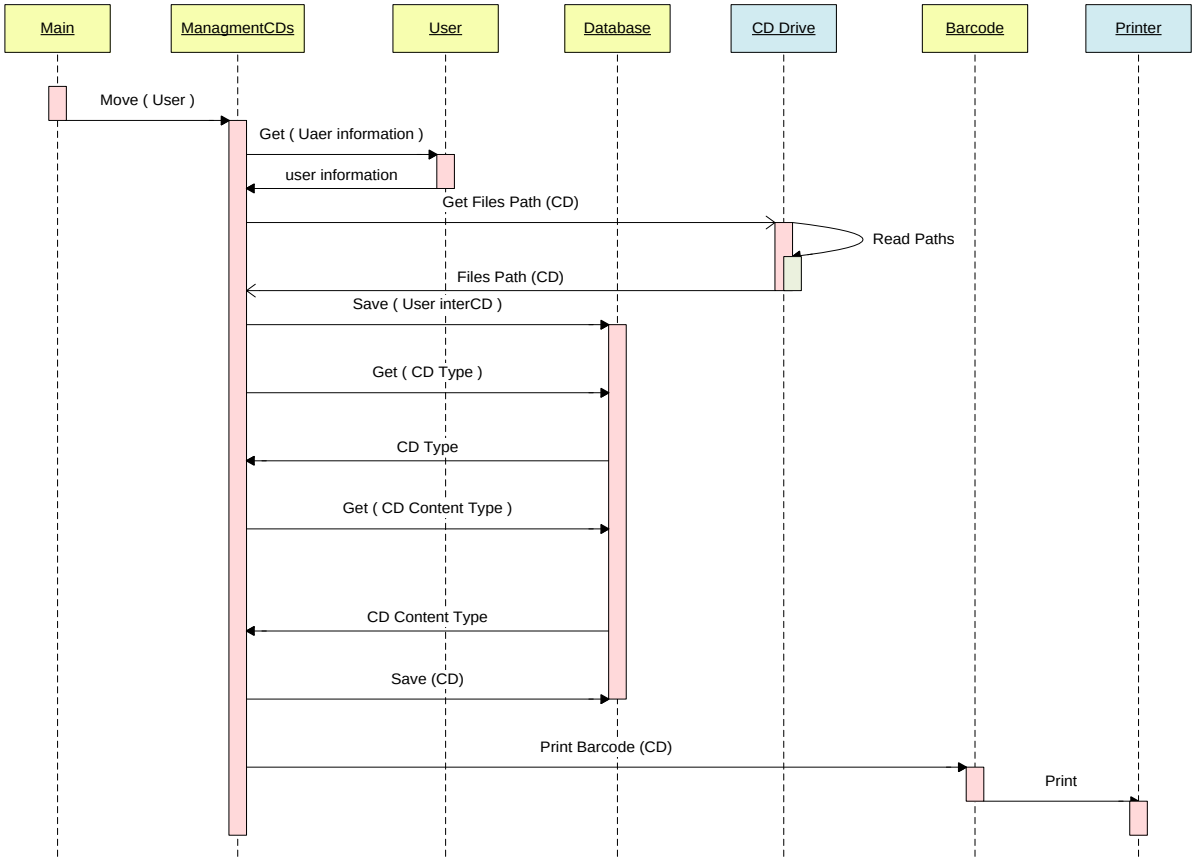

Figure 3.5: Add new CD and Print barcode Sequences Diagram

3.4.2 User Entry to the System

Figure 3.6 will show the steps a user has to take to enter the system which will be as follow:

1- When a user starts the program it will show an intro which will send the message "gitconnDatabase" to class "MAS_Support" which is responsible about the connection to make sure its valid.

2- After that, the user will be transferred to the class "Login" which had a list of all registered users.

3- When the user put the name and password it will be checked in the user's list and comber the name and password with the list.

4- When class "Login" find the user name and password in the list, it call all the data belong to that user which is then sent the user to the main interface of the program.

5- If there was an error in the user name or password the program will pop up an error message showing the user that there was an error and give the advice.

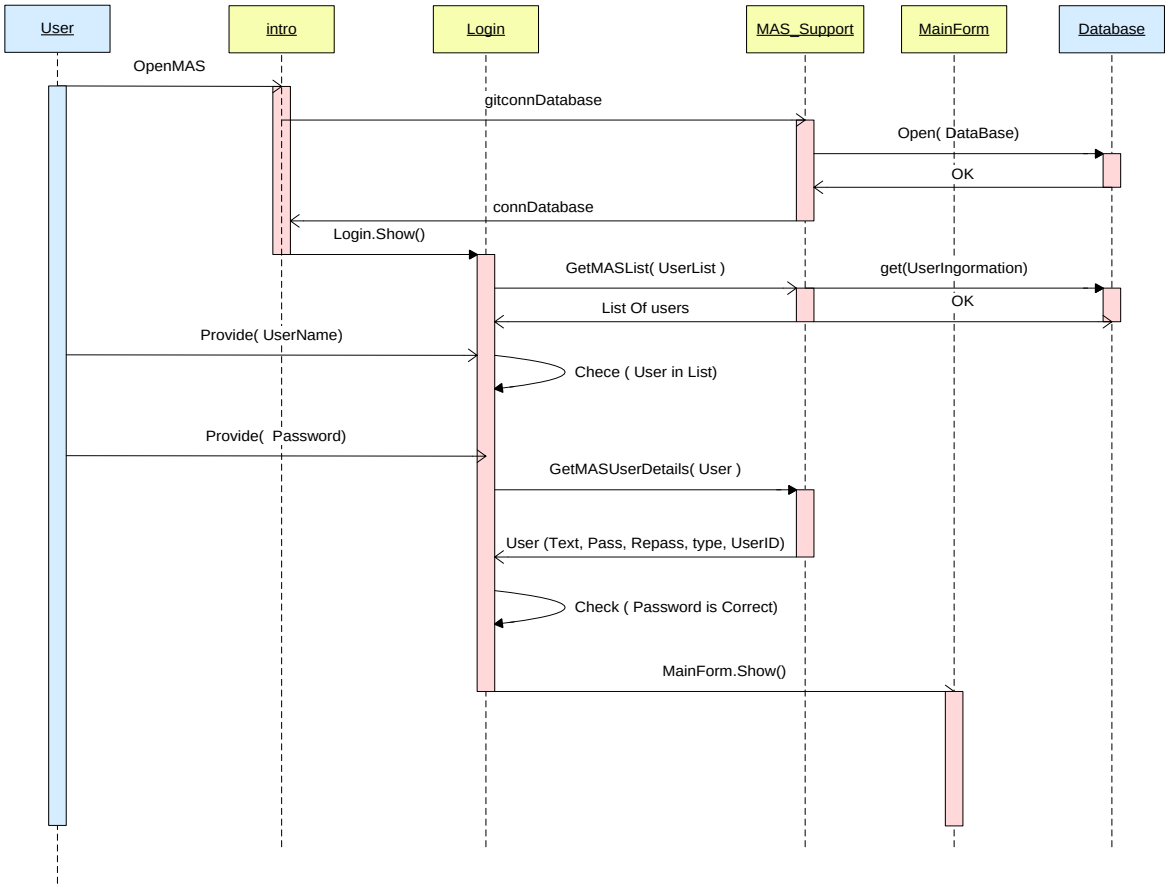

Figure 3.6: Entry of a user to the system

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4

Chapter Four
Project Design

Chapter Four

Project Design

4.1 Class Diagram

When we were ready to make our Class Diagram we had many ideas. We had many ways to connect the program's classes due to the big amount of class available in MAS. The main problem we faced was the repeating of the functions which will be counted as a common point between classes. To explain those points clearly we made up **Figure 4.1** which shows what we mean.

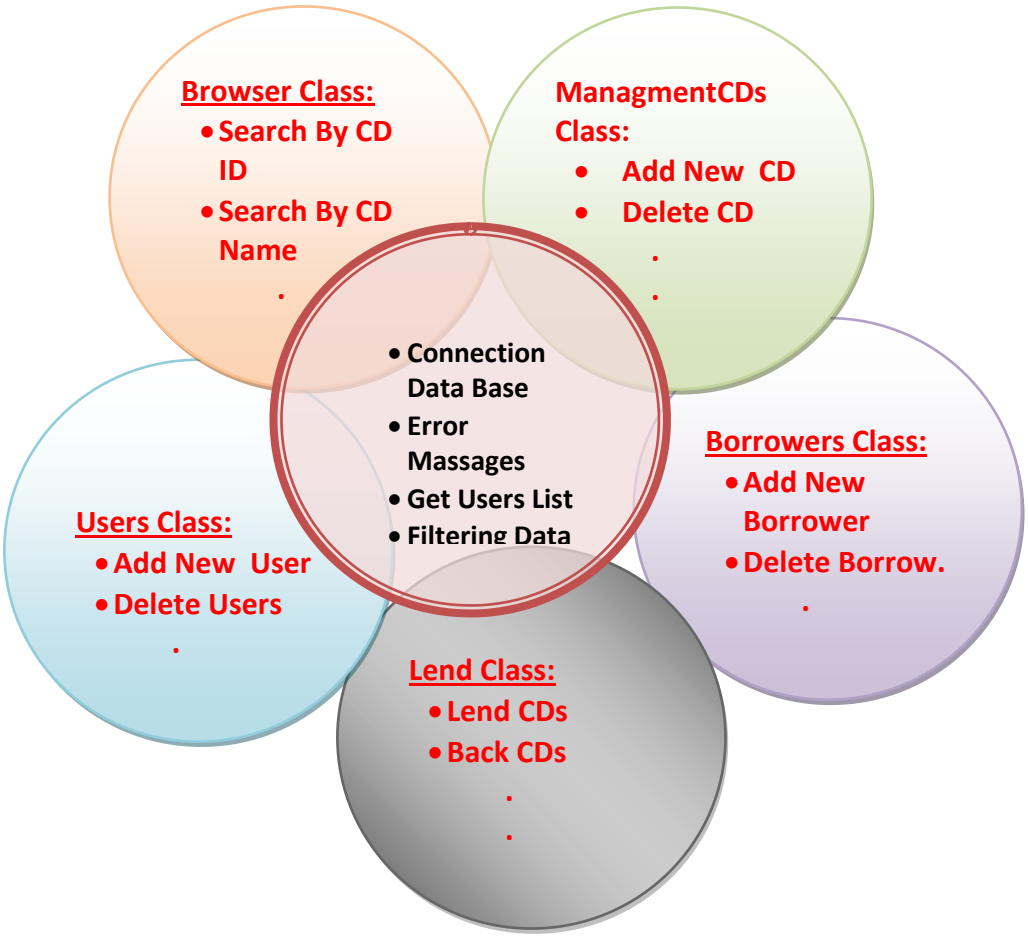

Figure 4.1: Entry of a user to the system

As we can see on the above figure there is a common area between many classes which could result in repeated functions. It's clear that some of the classes shown need to use error messages as results for some actions. That for, we made up "**MAS_Support**" which contain the common functions needed by the other classes. The above ideas gave us a clear vision about the way we should build up our class diagram which is shown in **figure 4.2**.

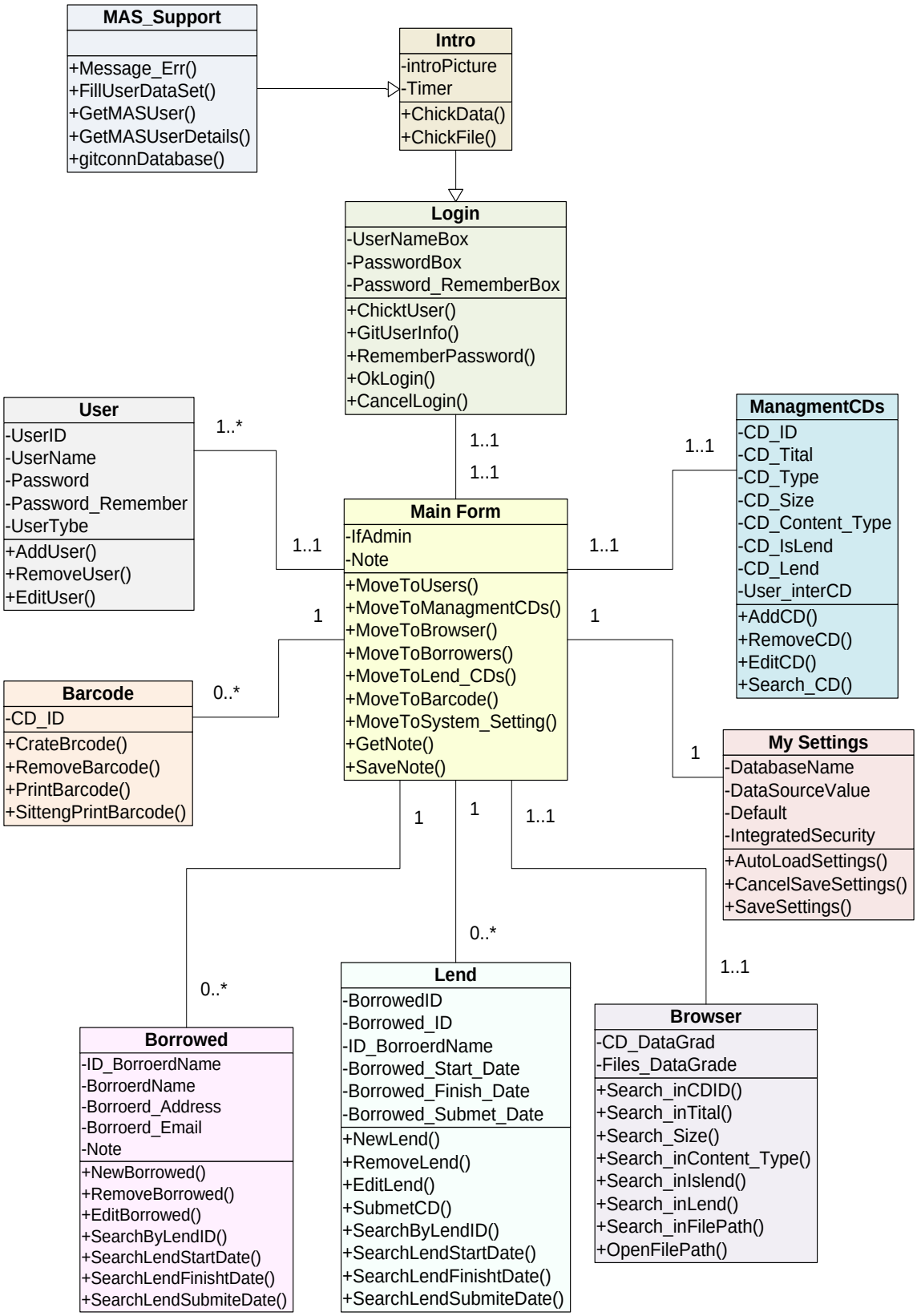

Figure 4.2: Class Diagram

Figure 4.2 above showing class diagram which we use it in MAS. The main class is Main Form. it transfer user to other tasks, like ManagmentCDs class which allow a user can add or remove CDs, go to Lend CDs from Lend class and add new borrowing person via Borrowed class. Sometimes the user needs to print barcodes which can be done via barcode class. Admin here has an authority to add new users in MAS via user class and can control MAS via "My Settings" class. We should mention that there are some classes running active in MAS background like “MAS_Support” which warehouse for Errors messages.

It is so hard to talk about each class separately, but we will give some examples about the classes we have:

1- **Intro Class:** it’s not an important thing to normal users, but for programmers it is like check point which works in the background and make a general check for database and required functions.
2- **Main Form Class:** it can be counted as the main gate to our system which gives the connection to the other classes.
3- **SystemSetting Class:** it’s a store for the functions or choices for the admin which is counted as a control panel to the system.
4- Specialized Classes:

There are mainly five classes that are specialized in performing specific functions only and they are:

a- <u>ManagmentCDs</u>: controlling or managing CDs such as add, remove, delete and etc.
b- <u>BorrowersForm</u>: controls people who borrow CDs from MAS holder such as add, delete and so on.
c- <u>LendForm</u>: controls the lending actions.
d- <u>Barcode</u>: responsible about controlling and printing barcodes.
e- <u>Inheritance & extend class</u>: as we can see in **figure 4.3** most classes depend on the inheritance technique from the supper class as follow:

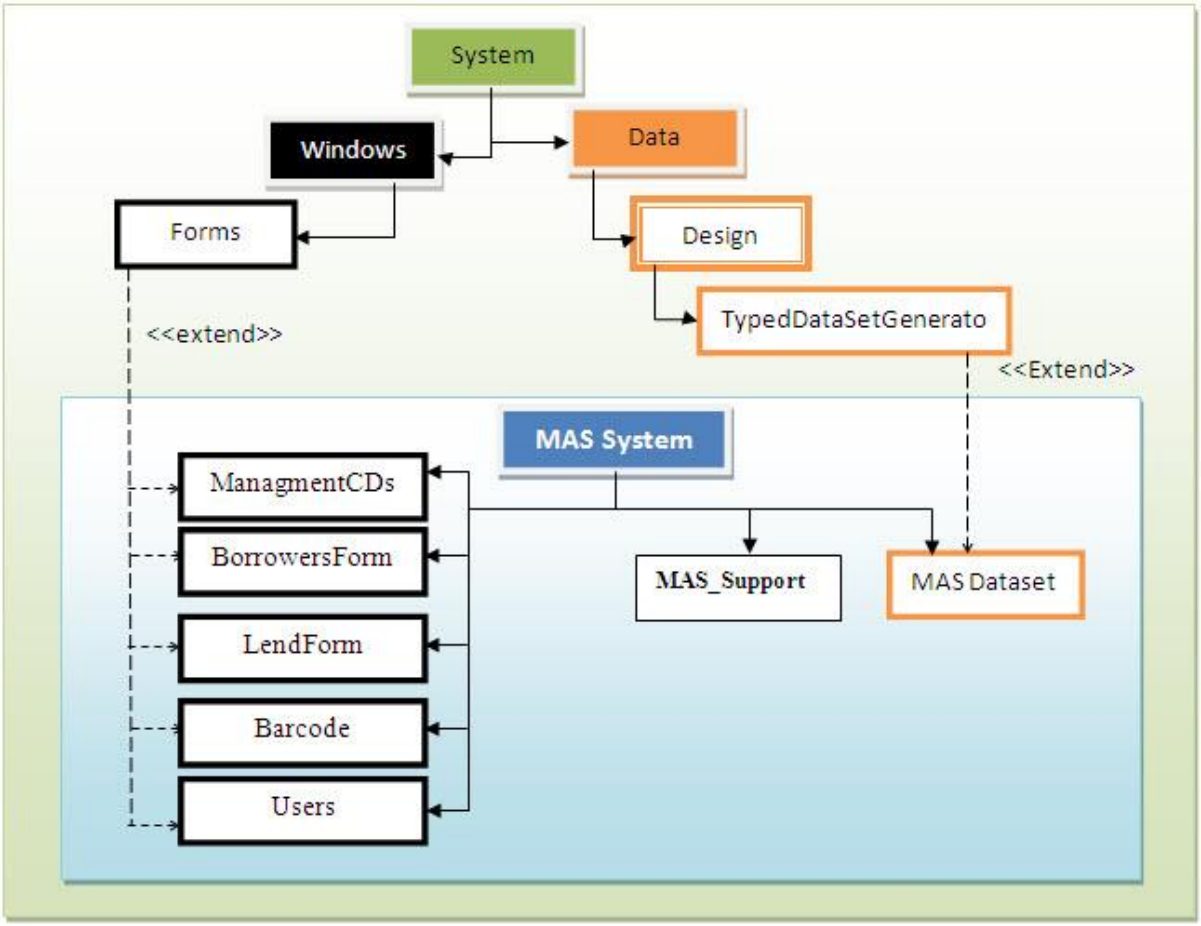

Figure 4.3: Inheritance flowchart

4.2 ER Diagram

To guarantee a very well built database we used "Microsoft SQL Server" which gave us unique functions to reach our goal through "SQL Server" such as:

1- Fast reaction.
2- Flexibility in using and building tables.
3- High performance.
4- The ease of connecting tables together.

Those points helped us and shortened the time to make our database especially after we found the final plan we want for it. As most of us know that it is not easy to connect tables together in a good way, so we had to go over some materials from CS490 to remind ourselves of some valuable information we might forgot.

The most important thing for us was reviewing the valid technique for "Data Normalization" which helped us to collect the information we need for our database which we can see in the **table 4.1** below. This table shows the headers or names for each field of the columns in our database.

Table 4.1: Database Field's Header at start

MAS Data		
CD_Tital	BorroerdName	Borrowed_Finish_Date
CD_Type	Borroerd_Address	Borrowed_Submet_Date
CD_Size	Borroerd_Email	UserName
CD_Type	Barcode_No	Password
CD_Lend	BorroerdName	Password_Remember
User_interCD	**Borrowed_Start_Date**	**UserTybe**

After that we started our Normalization procedures to reach the perfect details we need. Following the steps we took:

We made a column for each data type we have. Table 4.2 shows the different types for the CD_Type we had.

Table 4.2: Data types for CD_Type

CD_Type
DVD , Application
CD-R , Application
DVD , Video
CD-RW , Music
CD-RW , Application
DVD , Music
CD-R , Music
CD-R , Books

1- To satisfy (First normal form) we had to separate the table into two and we made a key for each component in a separate table which will be referred to in the main table we have.
2- From there we continue the rules of Normalization forms until we came up with the ER Diagram in **figure 4.4** below.

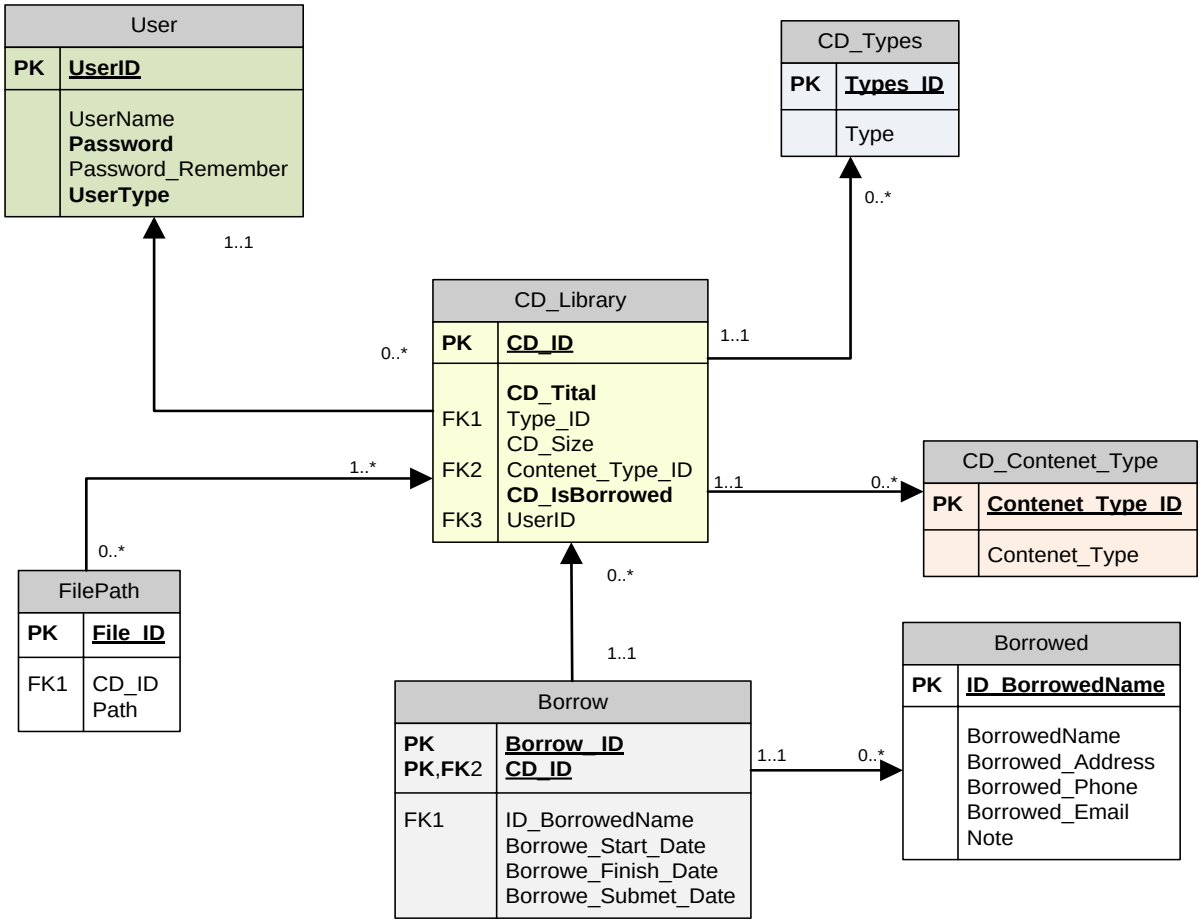

Figure 4.4: Data Base Diagram

We can see that Assembly packages contain more information about the various tables in database and associations between it, not only that, we can also see the Primary keys and foreign keys. The main table is CD_Library which contains the CD information, like CD name, CD Title Etc... CD_Library table is linked to other tables like User table, which contain MAS users and Admin passwords. Also we store names of borrowers in Borrowed Table.

4.3 Developing Method used

As a very important rule of making or building up any system or project there should be a developing method or model to follow. In M301 we studied different types of those models which gave us a verity of choices. As a start we got lost which one to use because each one has advantages and disadvantages. We thought about Spiral Model which incorporates prototyping and risk analysis, but it cannot cope with unforeseen changes and not clear in the way to analyze risk. Figure 4.5 was taking from M301 book to show the main idea of Spiral Model.

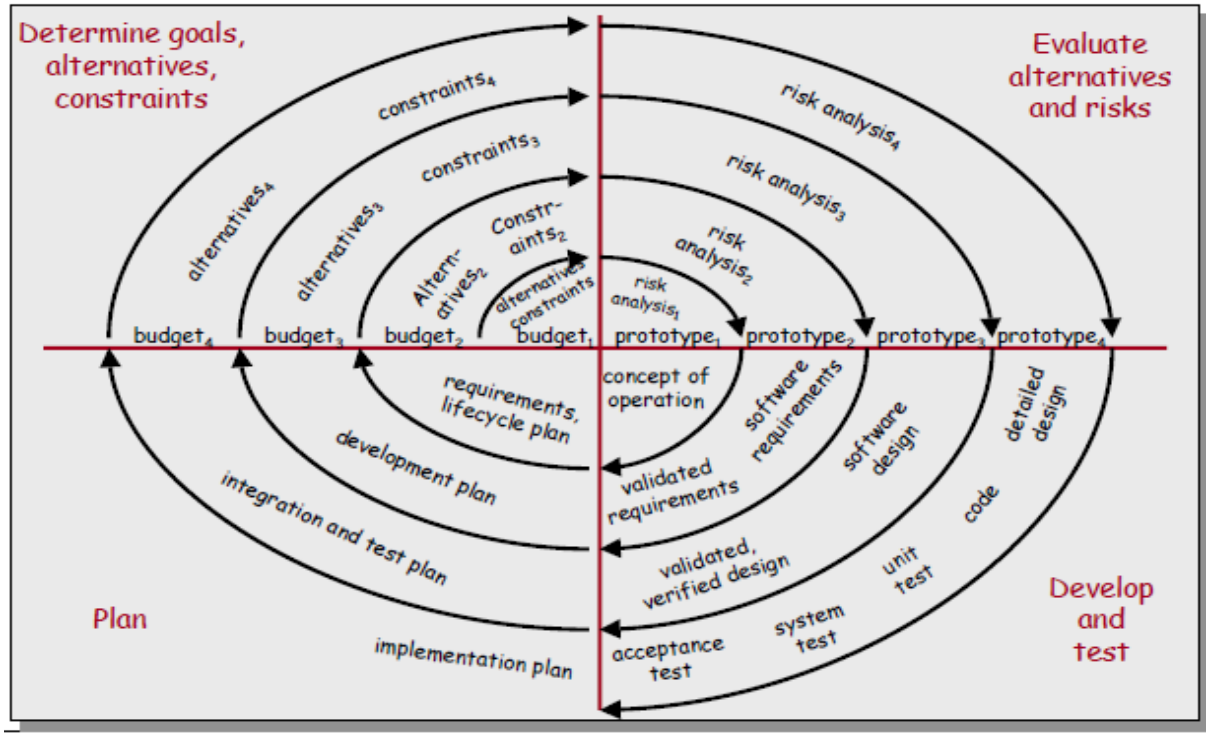

Figure 4.5: Spiral Model (6)

In fact we went over a few models and ended up to use the Waterfall Model because it fit our needs and the size of project we will make. As we can see in **figure 4.6** below we can come with the idea that Waterfall Model describes a process of stepwise refinement which is based on hardware engineering models as we have seen in M301.

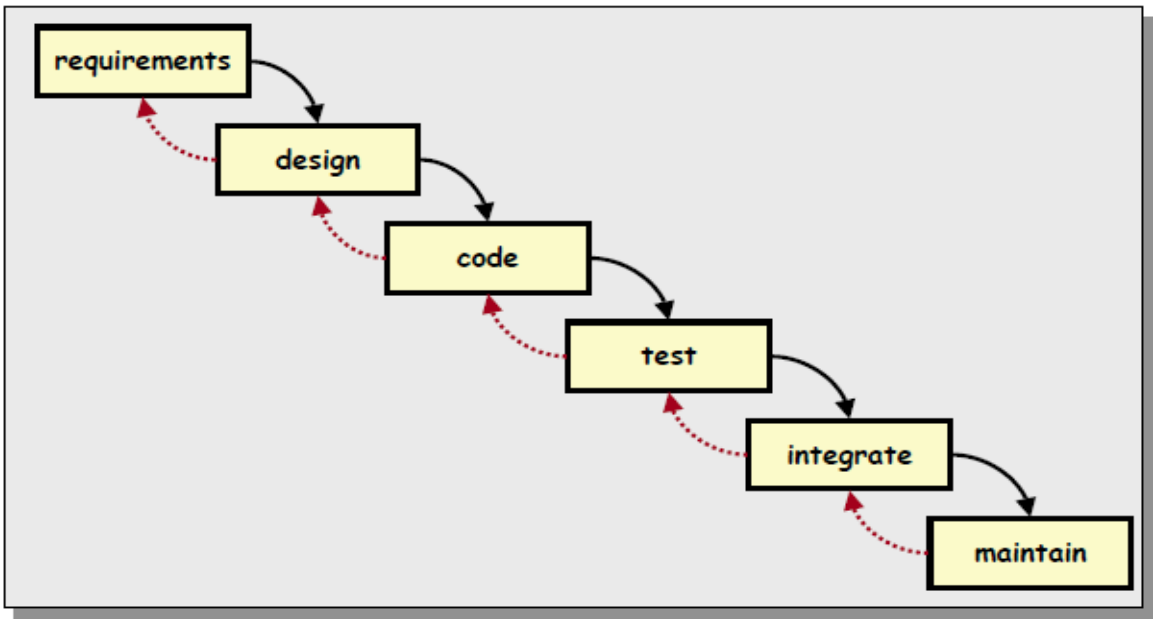

Figure 4.6: Waterfall Model (7)

When Waterfall Model used with software we can find out the following:

1- No fabrication step.
   a) Program code is just another design level.
   b) Hence, no ‘commit’ step - software can always be changed.

2- No body of experience for design analysis (yet).
   a) Most analysis (testing) is done on program code.
   b) Hence, problems not detected until late in the process.

3- Waterfall model takes a static view of requirements.
   a) Ignores changing needs.
   b) Lack of user involvement once specification is written.

4- Unrealistic separation of specification from design.

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5

Chapter Five
Project Implementation

Chapter Five

Project Implementation

5.1 Programming Codes

5.1.1 Sample of Code

MAS in general depend on communicating with the database and pull out the required data needed and deal with it. Also it can edit, add and delete data as required. Following we will see some examples of the important codes used in MAS:

The code responsible about communicating with the database is shows in **list 5.1** below.

List 5.1: Database Connection Code

```
'Imports Input/Output file, SqlClient,
Configuration,MASDataSet,MASDataSetTableAdapters And Configuration
'for connecting data base
' And To Use it in Function
Imports System.IO
Imports System.Data.SqlClient
Imports System.Configuration
Imports MAS.MASDataSet
Imports MAS.MASDataSetTableAdapters
'-----------------------------------------------------
' This class use to Support Our System by some Methods
Class MAS_Support
' Connection Database is use to create  Connection  MAS system with
Database
    Public Function gitconnDatabase()
        Dim connDatabase As New SqlConnection()
        connDatabase.ConnectionString = ("Data Source=" &
My.Settings.DataSourceValue & ";Initial Catalog=" &
My.Settings.DatabaseName & ";Integrated Security=" &
My.Settings.IntegratedSecurity)

        Try
            connDatabase.Open()
        Catch ex As SqlClient.SqlException
            Select Case ex.Number
                Case Is = 17 Or 40
                    ErrConnectionMessage = ex.Message
                    Message_Err(1006, ErrConnectionMessage)
                    My.Settings.SysSetting = 1
                    Return Nothing
                Case Is = 4060
                    ErrConnectionMessage = ex.Message
                    Message_Err(1005, ErrConnectionMessage)
                    My.Settings.SysSetting = 1
                    Return Nothing
                Case Else
                    ErrConnectionMessage = ex.Message
                    Message_Err(1002, ex.Number)
                    My.Settings.SysSetting = 1
                    Return Nothing
            End Select
        End Try
        Return connDatabase
    End Function
```

Lines 5-9:

I. We used Libraries Form Visual Studio Library as follow:

```
Imports System.IO
Namespace System.IO it Member of System.Core
```

The above library Controls files, folders and drives in the PC used for MAS.

II. The following two libraries communicate with database such as SQL Server which we used in MAS. It contains the important functions for communication as we can see in **figure 5.1**.

```
Imports System.Data.SqlClient
Imports System.Configuration
```

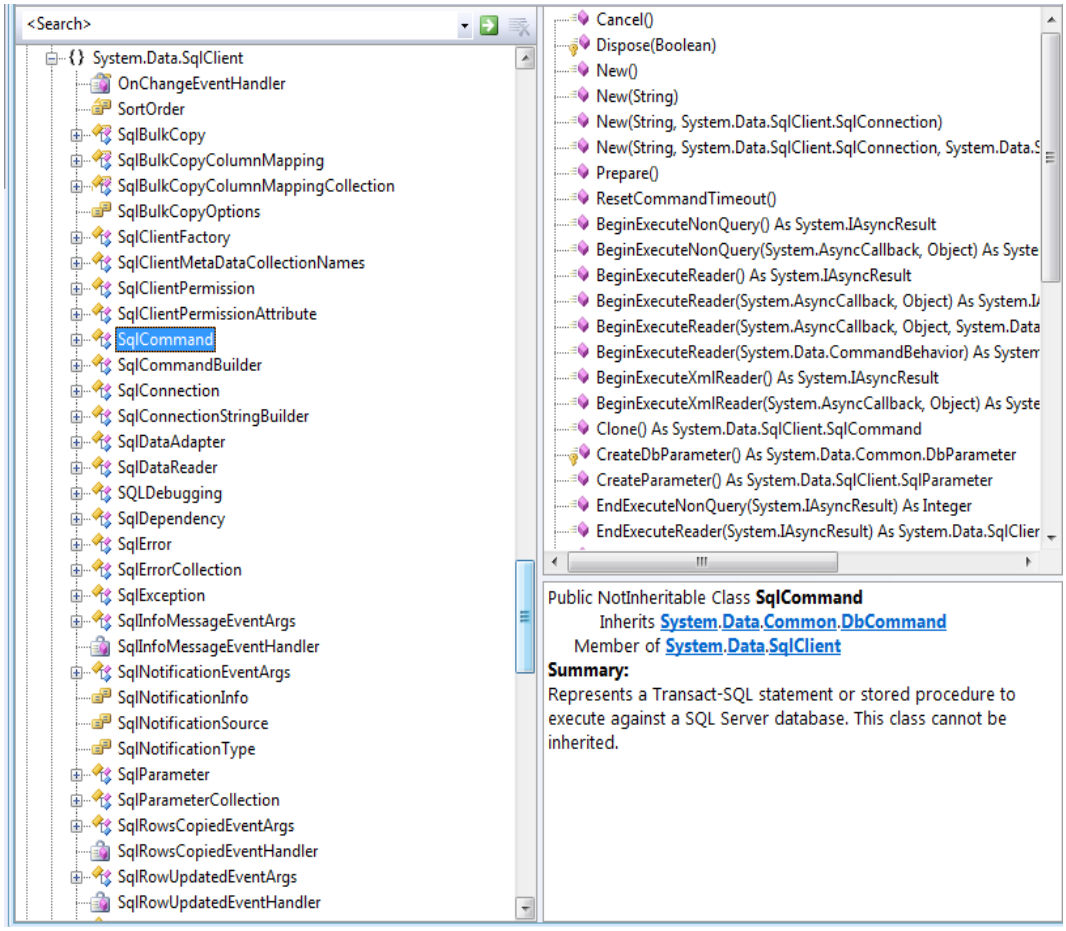


Figure 5.1: Libraries used in MAS

III. The following lines were used to communicate with "MASDataSet" and "MASDataSetTableAdapters" which contain "DataSet" for tables in our database

and "Adapters" which contain the required data to communicate with tables for performing specific tasks such as editing, deleting and adding.

```
Imports MAS.MASDataSet
Imports MAS.MASDataSetTableAdapters
```

Line 12:

This class use to Support Our System by some Methods.

Lines 14-18:

I. We put a function to communicate with our database that has the variable "connDatabase" and it is a class "SqlConnection" which Inherits from "System.Data.Common.DbConnection" and is a member of "System.Data.SqlClient".

II. Using "ConnectionString" we made a connection way which contains variables that we stored in "My.Settings". That was used in case the server which contains the database or its route was changed. Those variables are:

a. Data Source

It contains the server name and route which we can find in the variable "My.Settings.DataSourceValue" and its value is "\SQLEXPRESS".

b. Initial Catalog

It stores the name of the avilable database in the variable "My.Settings.DatabaseName" and its value is "MASdata".

c. Integrated Security

It stores security for entering database which is avialable in the variable "My.Settings.IntegratedSecurity" and its value is "True". Due to the previse we will end up with the common communication rule as follow:

```
connDatabase.ConnectionString = ("Data
Source=.\SQLEXPRESS;Initial Catalog=
MASdata;Integrated Security= True")
```

Lines 20-42:

I. We use the "Try" method to open the database through the code "connDatabase.Open()" which help to catch the errors we might face such as the errors in lines number 17+40.

II. Here we use a different function used for errors called “Message_Err” and send the error code “1006” and the error message in a variable named “ErrConnectionMessage”. This message appears if there was an error in the server’s route or any other error. We do the same with error code “4060” which appears when MAS cannot connect to the database inside the server either because of an error in the name of the database or if MAS could not open the database or read from it.

III. All other errors will be sent as error code “1002” which are errors appears when we cannot access the database or the server such as an error in the password of the database or lack of security.

IV. We have to mention that in all previous errors there is no return in from the function or we can say “Return Nothing” and that means there is no way to open the data. If there was no error and we could access the database then the function will return the variable “connDatabase”.

5.1.2 Entering the Program

The main class here which is responsible about allowing the user to MAS and check the ID and password is the class “Login”, but we have to know that to connect with database it uses a function which is available in the class “MAS_Support”. In the following lines we will see the function “OK” in class “Login”. **List 5.2** shows the full code.

List 5.2: Entering the Program Code

```
    Public Class Login
Inherits System.Windows.Forms.Form
    Dim Support As New MAS_Support
Private Sub OK_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles OK.Click
        'If UsernameTextBox is EmPty
        If UsernameTextBox.Text = "" Then
            Support.Message_Err(1001, "Username")
            Exit Sub
        ElseIf PasswordTextBox.Text = "" Then
            'If UsernameTextBox is EmPty
            Support.Message_Err(1001, "Password")
            Exit Sub
        End If
        Dim FindUserInList As Integer
        FindUserInList =
UserList.FindString(UsernameTextBox.Text)
```

```
18          'FindUserInList will return by -1 if con not find user
19  in the list
20          If FindUserInList <> -1 Then
21              'connect ti Support cals and call GetMASUserDetails
22  by pass (UsernameTextBox.Text, Pass, repass, type) value
23              Support.GetMASUserDetails(UsernameTextBox.Text,
24  Pass, repass, type, UserID)
25              ' Test Pass Value if True ?
26              If PasswordTextBox.Text = Pass.Text Then
27                  MainForm.Show()
28                  Me.Hide()
29              Else
30                  'If Pass Is wrong
31                  Support.Message_Err(1004, PasswordTextBox.Text)
32              End If
33          Else
34              'If Username Is wrong
35              Support.Message_Err(1003, UsernameTextBox.Text)
36          End If
37      End Sub
38
39
```

Lines 1-3:

Create Class Login which Inherits from “System.Windows.Forms.Form”.

Line 5:

This line creates new support variable which is new cope of “MAS_Support” class.

Lines 7-8:

Those lines have the function that occurs when we press the bottom “OK”.

Lines 10-17:

There is a check to make sure that the text boxes used for the user name and password are not empty. If any of them left empty an error message code “1001” will appear for the user through the function “Message_Err” which is available in class “MAS_Support”.

Lines 18-39:

I. Make a new numerical variable called “FindUserInList” which contain the number of users were entered in “UsernameTextBox” in the list “UserList”.

II. If there was no user found it will return a value “-1” to pop up the error message code “1003” for the user to notify him that the username was wrong.

III. If the username was found in the list then all his information will be retrieved by the function “GetMASUserDetails”. It then return the following values:

   a. Pass which is the password for that username.

b. Repass which is a reminder of the password.

c. Type: is the type of user as normal user or admin.

d. UserId: is the ID of the user.

IV. After that there will be a check to make ssure that the password entered in the text box “PasswordTextBox” is identical to the one in MAS. If it was correct the user will be transferred to the class “MainForm”.

V. If the password was not correct an error message code “1004” will pop up.

5.1.3 Retrieving the CD’s data and information

Here we will see **list 5.3** which contain the code used to retrieve the data and information of the CD. We will not explain as we did in the previous codes, but we just put it to show how the code went.

List 5.3: Entering the Program Code

```
Private Sub GetInfoBut_Click(ByVal sender As System.Object, ByVal e As System.EventArgs)
Handles GetInfoBut.Click
    Dim CDTitle, CDSize As String
    CDTitle = ""
    CDSize = ""
    PathDataGridView.Rows.Clear()
    If DriveList.Text <> "" Then
      If My.Computer.FileSystem.GetDriveInfo(DriveList.Text).IsReady = False Then
        Support.Message_Err(1008, "Drive Is Not Ready")
        Exit Sub
      End If
      Dim Max As Integer = 0
      Try
        With ProgressBar1
          .Minimum = 1
          For Each fondfile As String In My.Computer.FileSystem.GetFiles(DriveList.Text,
FileIO.SearchOption.SearchAllSubDirectories, "*.*")
            Max = Max + 1
          Next
          .Maximum = Max
          .Value = 1
          .Step = 1
        End With
        For Each fondfile As String In My.Computer.FileSystem.GetFiles(DriveList.Text,
FileIO.SearchOption.SearchAllSubDirectories, "*.*")
          Dim t As String = "" ' t = Name File
          '///// All This code will git the name of file from Path
          ' r = Conter total (\) in Path
          ' s =Length Path
          ' x =Conter Path name
          ' y = Nomber last (\)
          Dim r, s, x, y As Integer
          s = fondfile.Length()
          x = 1
```

```
35                  While x < s
36                     If fondfile(x) = "\" Then
37                        r = r + 1
38                        y = x
39                     End If
40                     x = x + 1
41                  End While
42                  y = y + 1
43                  While y <> s
44                     t &= fondfile(y)
45                     y = y + 1
46                  End While
47                  PathDataGridView.Rows.Add(fondfile, t)
48                  ProgressBar1.PerformStep()
49               Next
50
51               Support.GitCdInformation(DriveList.Text, CDTitle, CDSize)
52               CDTitleTextBox.Text = CDTitle
53               CDSizeTextBox.Text = CDSize
54
55            Catch ex As Exception
56               Support.Message_Err(1008, ex.Message)
57            End Try
58         End If
59
60      End Sub
```

5.2 Debugging Errors

While writing the code for our system we tried to review each one to make sure we don't have any errors when we run the code. Even though we did our best, but as we all know it is so hard to guarantee a code with no errors even if the person was professional. We started using the Debugging Tool which we find in Visual Studio 2008. That tool gives us the ability to check the code line by line or through the error message. Following we will see some examples of the errors we faced and the correct code.

First error we got is below in **figure 5.2** and below the figure there is a table explaining everything.

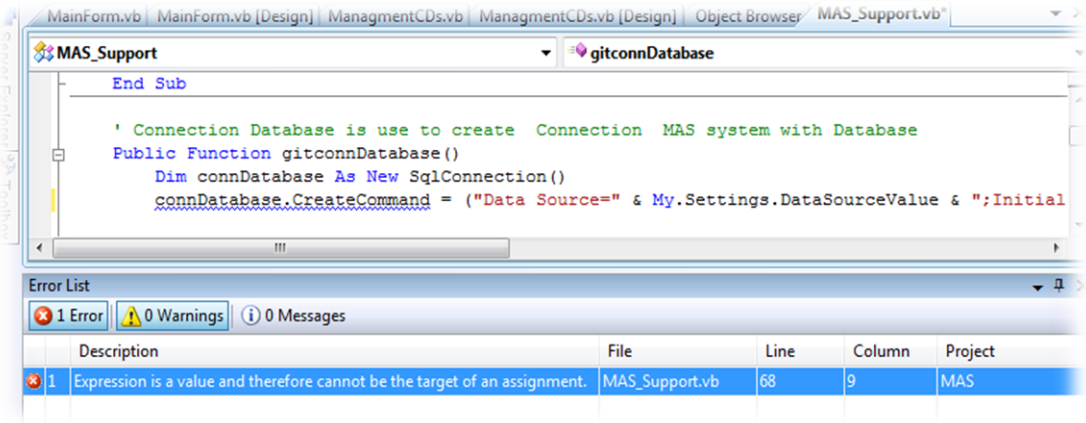


Figure 5.2: First Example for error

Error	connDatabase.CreateCommand
Explanation	Expression is a value and therefore cannot be the target of an assignment
Error Site	D:\MAS OLD\MAS\MAS\MAS_Support.vb Line No. 68 Column No. 9 Project: MAS
Correction	connDatabase.ConnectionString

Figure 5.3 shows us the second error we will put here as an example and the same as above all explanation regarding that error will be in the table following.

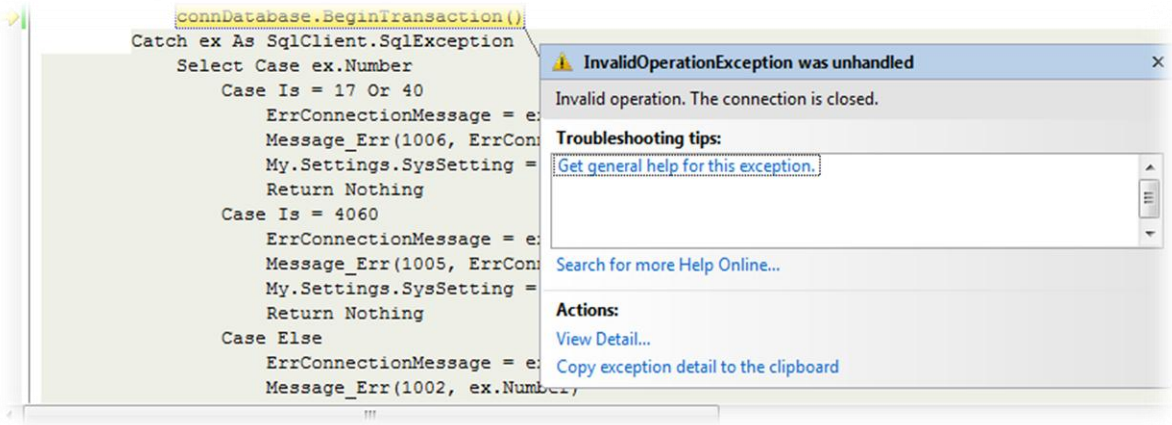
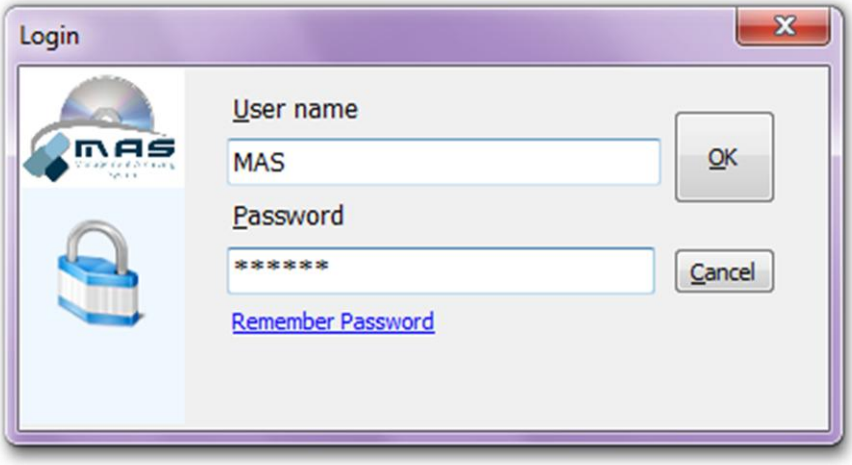


Figure 5.3: First Example for error

Error	connDatabase.CreateCommand
Explanation	Invalid operation. The connection is closed.
Error Site	D:\MAS OLD\MAS\MAS\MAS_Support.vb Line No. 71 Column No. 13 Project: MAS
Correction	connDatabase.Open()

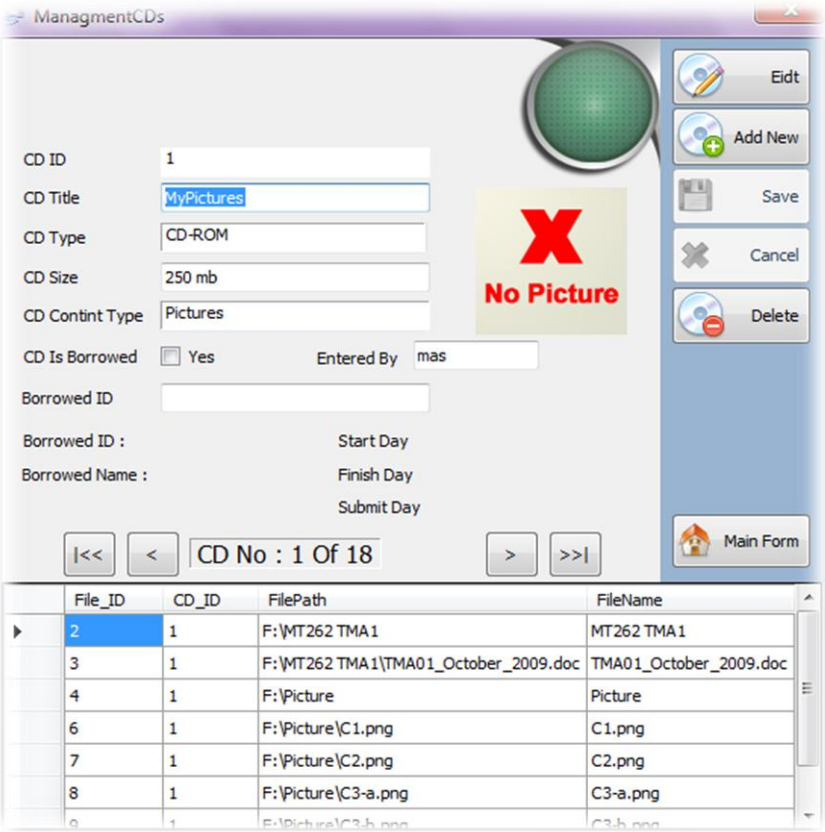
5.3 Sample Output Screens

5.3.1 Login Form

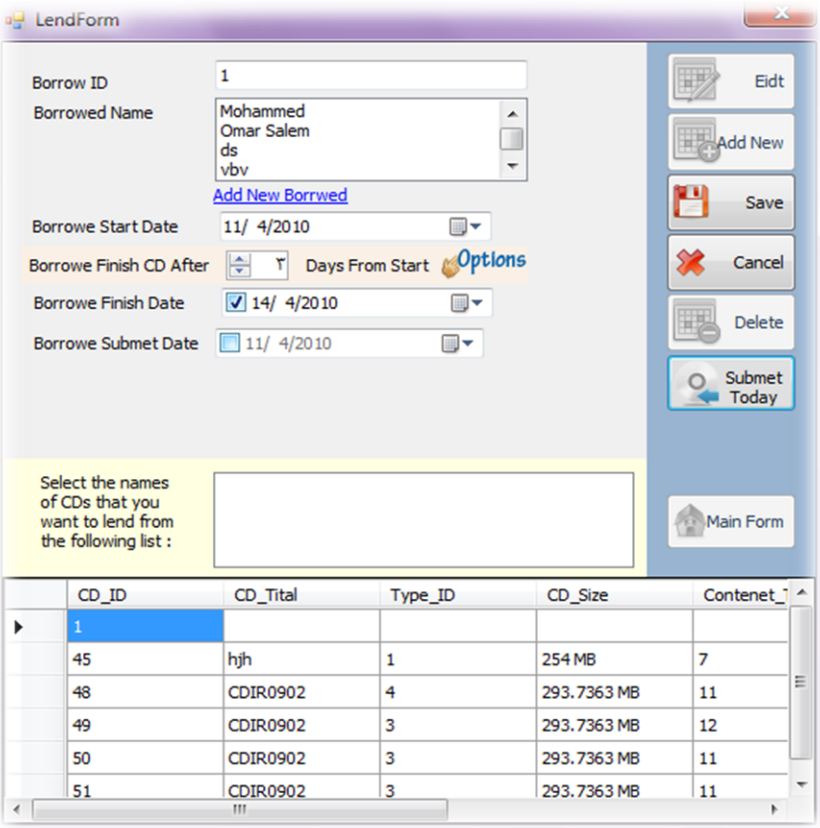


5.3.2 Main Form

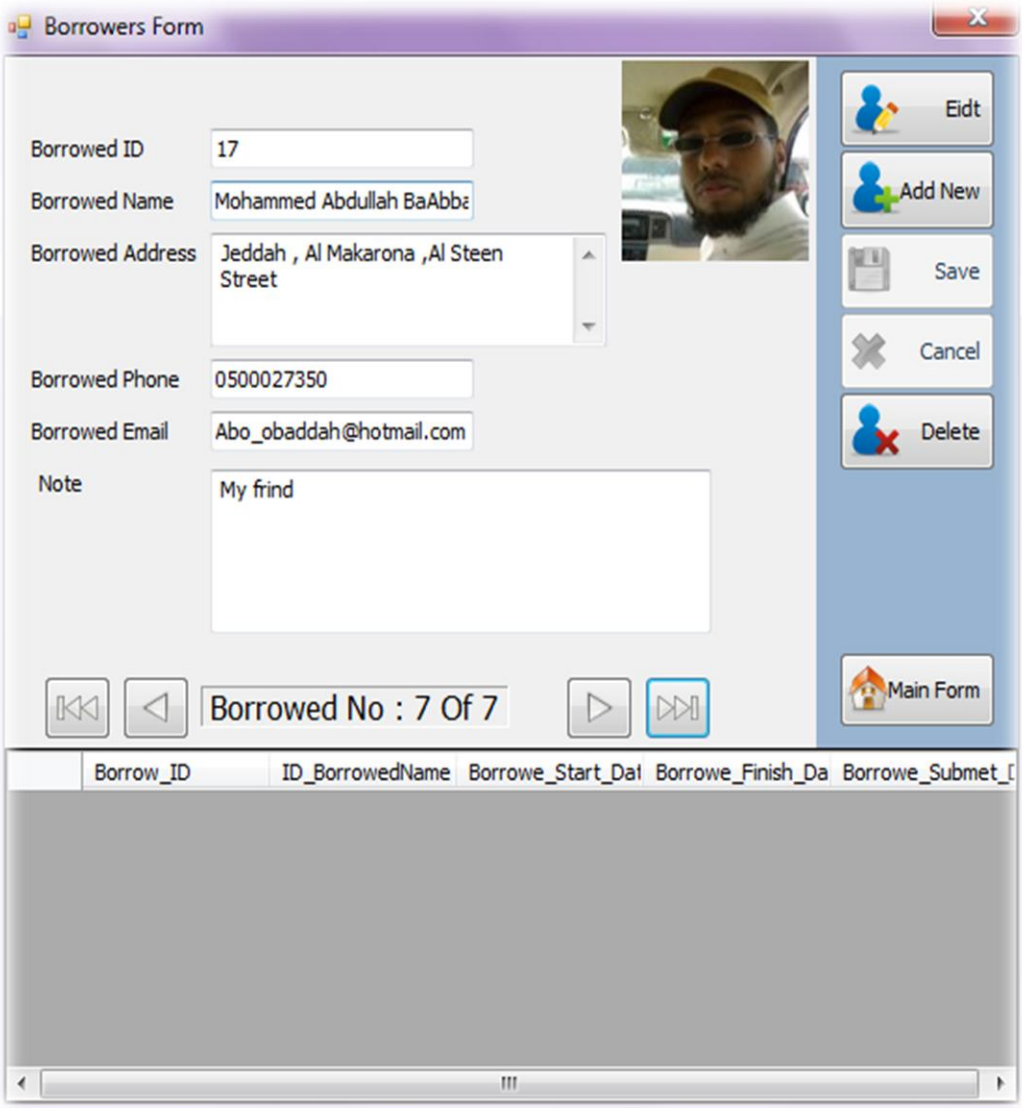
5.3.3 Management CDs



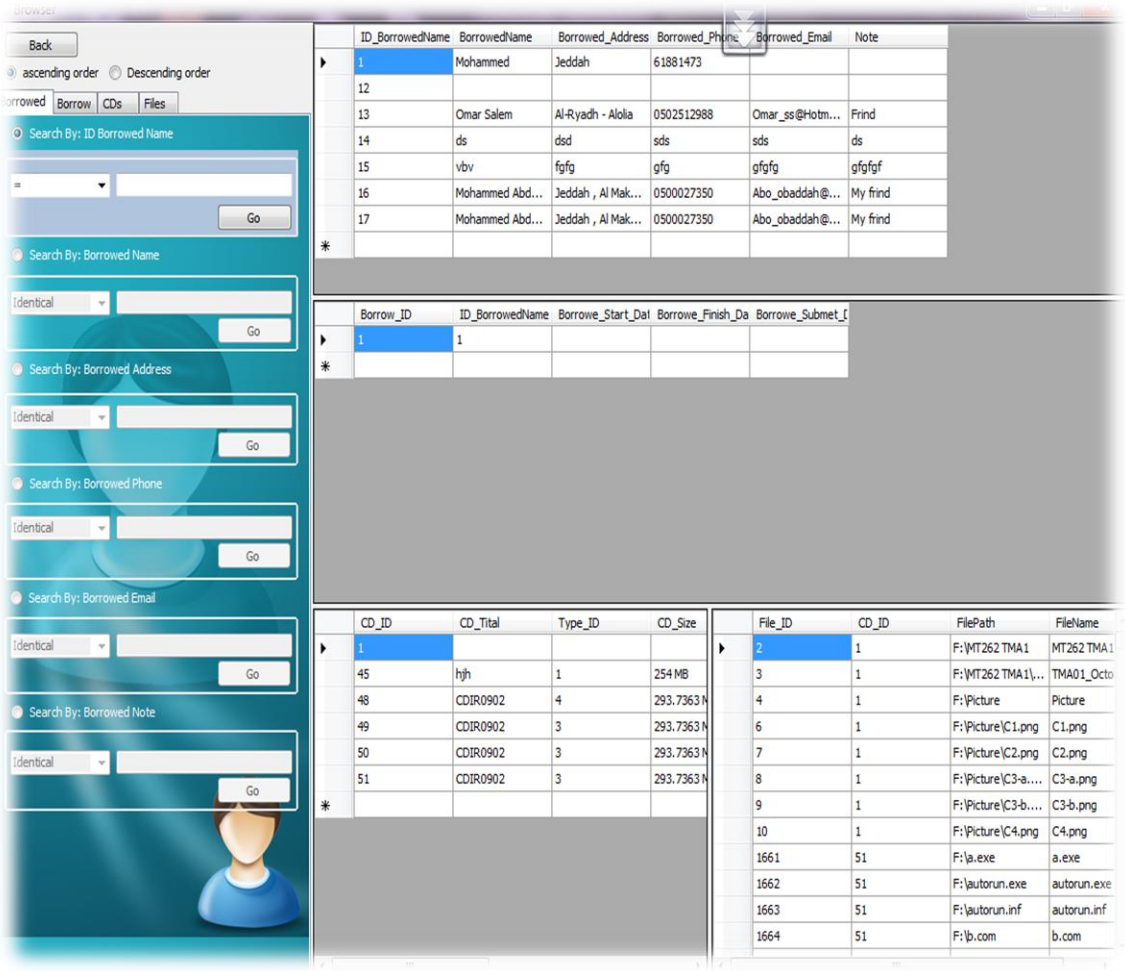
5.3.4 Lend CDs



5.3.5 Borrowers

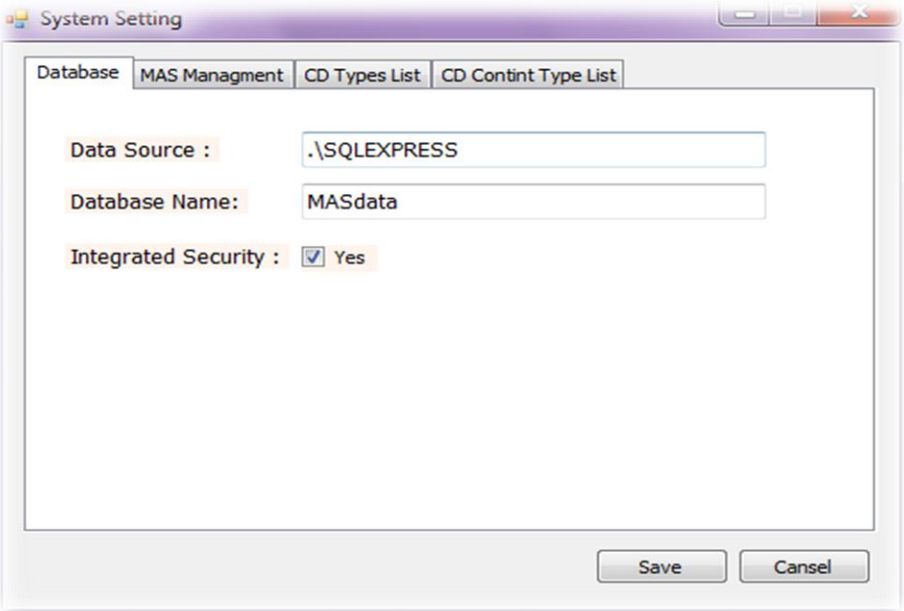


5.3.6 Browser CDs



5.3.7 System Setting

This Form is open for Admin Only.



5.3.8 Support Center

Here you can read about error messages, FAQ, take some video training and finally learn some about MAS.

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6

Chapter Six
Testing Stage

Chapter Six

Testing Stage

6.1 Software Validation

One of the main stages in building any system or program is to validate it to make sure it gives the required goals and have the ability to be modified if as needed.

To validate our system we went through many steps as follow:

1- Testing: we performed many test at each part of the program to make sure it is working good.
2- Debugging: where ever there was an error we had to perform the debugging to make sure we correct the error and that part of the system working good.
3- Version updating: after testing and debugging a special stage we make sure to update the version of the system to the new level.

6.2 Accessing the System (Test and Debugging)

6.2.1 Testing

Table 6.1 shows the results of testing the access to the system. As we can see that all tests went ok under the column "results". As long as it shows "positive" it means that no errors found here.

Table 6.1: accessing the system test's results

Test	Result
1-Run System	✓ Positive
2- Initialization intro Form	✓ Positive
3- Intro Picture	✓ Positive
4- Check connection to database in Background form	✓ Positive
5- Move to Login Form	✓ Positive
6- Initialization Login Form	✓ Positive
7- Verification of user name	✓ Positive
8- Show Error Massage when Entering Wrong user name	✓ Positive
9- Verification Password	✓ Positive
10- Show Error Massage when Entering Wrong Password	✓ Positive
11- performance of Cancel button	✓ Positive
12- performance of OK button	✓ Positive

6.3 CDs Browsing (Test and Debugging)

6.3.1 Testing

Same as previous test, this test went ok as we can see in **table 6.2** all performed test came with positive results to tell us that it is working well.

Table 6.2: CDs browsing test's results

Test	Result
1- Initialization Browser CDs Form	✓ Positive
2- Search in Borrowed	✓ Positive
3- Search in Borrow	✓ Positive
4- Search in CDs	✓ Positive
5- Search in Files	✓ Positive
6- Performance of back button	✓ Positive

6.4 CDs Management (Test and Debugging)

6.4.1 Testing

Unlike other tests, this test resulted in some errors and we can see them in **table 6.3** under result's column. There are three test require debugging which we will see later on.

Table 6.3: CDs Management test's results

Test	Result
1- Initialization Management CDs Form	✓ Positive
2- Lend Signal	✓ Positive
3- Performance of Edit button	×Negative
4- Performance of Add New button	×Negative
5- Performance of Save button	✓ Positive
6- Performance of Cancel button	✓ Positive
7- Performance of Delete button	✓ Positive
8- Performance of Borrowed CD button	×Negative
7- Performance of Main Form button	✓ Positive

6.4.2 Edit Button Debugging

Figure 6.1 shows a print out of the debugging results. We can see the highlighted line where the error located and on the lower right side we can see the note for that error.

```
Me.MASTableAdapterManager.UpdateAll(Me.MASDataSet)
Me.CD_LibrariesTableAdapter.Update(Me.MASDataSet.CD_Libraries)
Me.CD_LibrariesTableAdapter.Fill(Me.MASDataSet.CD_L

Me.BorrowTableAdapter.Update(Me.MASDataSet.Borrow)
Me.BorrowTableAdapter.Fill(Me.MASDataSet.Borrow)
```

SqlException was unhandled

The UPDATE statement conflicted with the FOREIGN KEY constraint "FK_CD_Libraries_CD_Types". The conflict occurred in database "MASdata", table "dbo.CD_Types", column 'Type_ID'. The statement has been terminated.

Figure 6.1: Edit Button error prints out.

Following **table 6.4** will show the error, explanation of it, the error site and the correction. It is a way to make it easy to see all required information in an easy way.

Table 6.4: Edit Button Error Information

Error	SqlException
Explanation	The statement has been terminated.
Error Site	Edit button in (Management CDs Form)
Correction	Change in CDTybeList

In **figure 6.2** we will see the required correction and the location of it.

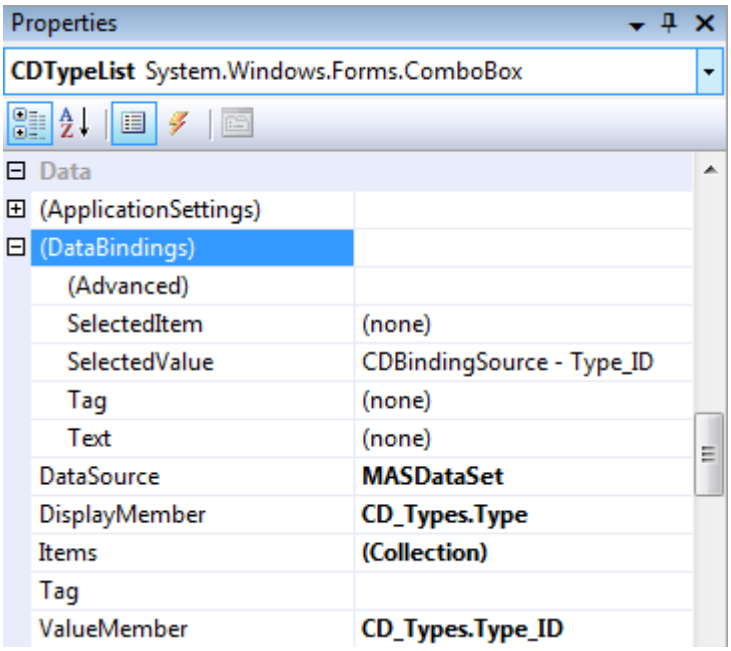


Figure 6.2: Correction of Edit Button Error

6.4.3 Add New Button Debugging

As we have seen in the previous debugging. Here **Figure 6.3** will show the error, **table 6.5** shows error's information and correction.

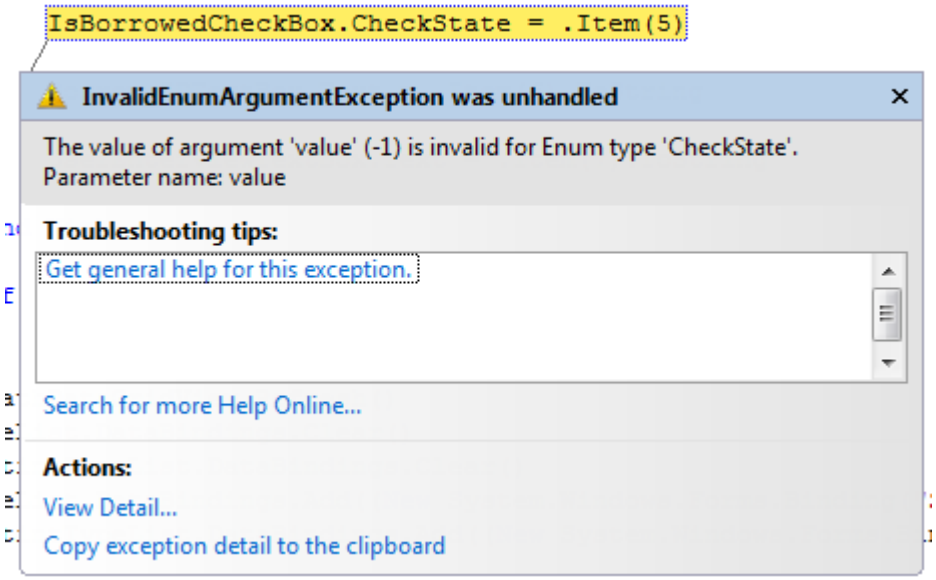


Figure 6.3: Add New Button error prints out.

Table 6.5: Add New Button Error Information

Error	The value of argument 'value' (-1) is invalid for Enum type 'CheckState'. Parameter name: value
Explanation	
Error Site	Add button in (Management CDs Form)

Correction	Insert If statement
	If .Item(5) = 1 Then
	IsBorrowedCheckBox.CheckState = CheckState.Checked
	Else
	IsBorrowedCheckBox.CheckState = CheckState.Unchecked
	End If

6.4.4 Borrowed CD Button Debugging

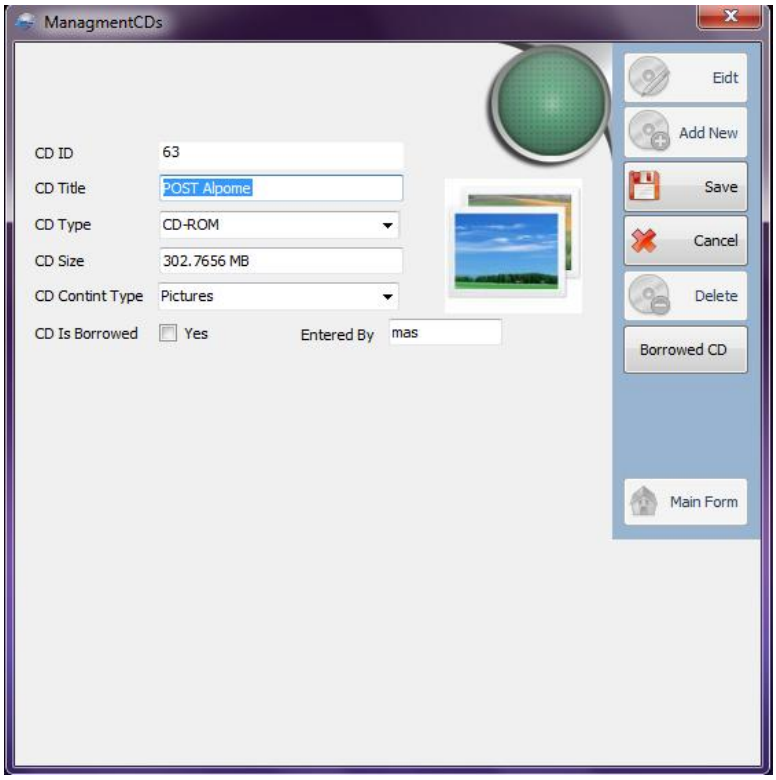
Table 6.6 shows the full information needed for this error.

Table 6.6: Borrowed CD Button Error Information

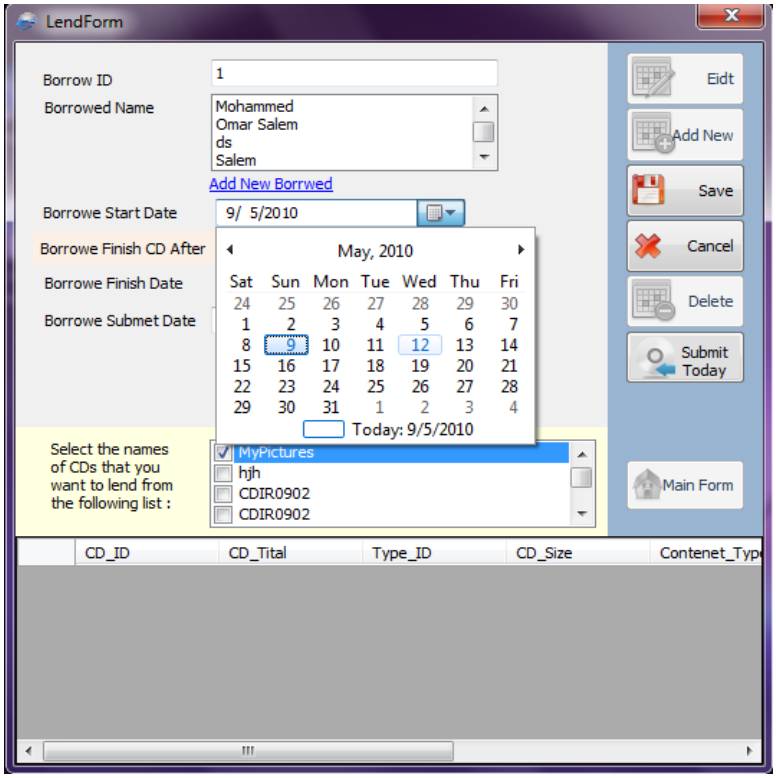
Error	'Go to Lend And Open New row BorrowersForm.Show() LendForm.ComeFromManagmentCDsForm(True) BorrowersForm.MainBut.Enabled = False BorrowersForm.AddBut.PerformClick()
Explanation	Borrowed CD button in (Management CDs Form) Move User To BorrowersForm to Add New Borrowers Not to Lend form!!
Error Site	Borrowed CD button in (Management CDs Form)
Correction	Replace BorrowersForm with LendForm LendForm.Show() LendForm.ComeFromManagmentCDsForm(True) LendForm.MainBut.Enabled = False LendForm.AddBut.PerformClick()

6.5 Run the Project

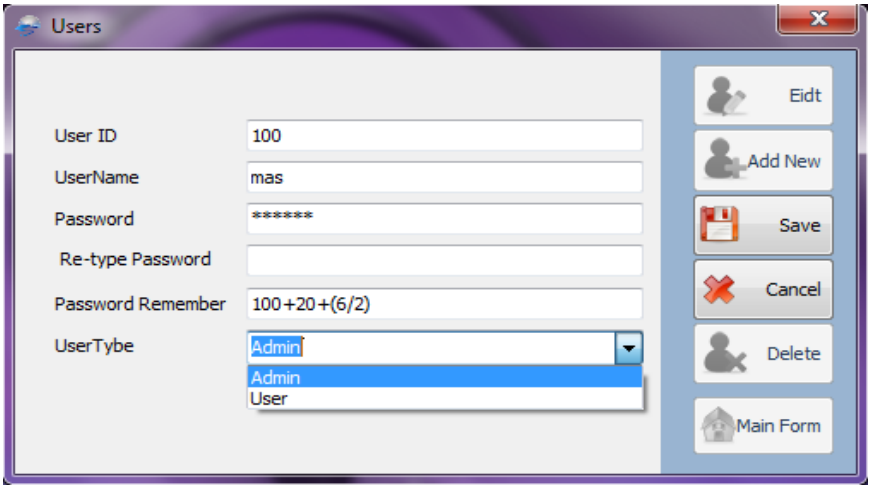
6.5.1 Print Screen When We Edit **Management CDs**



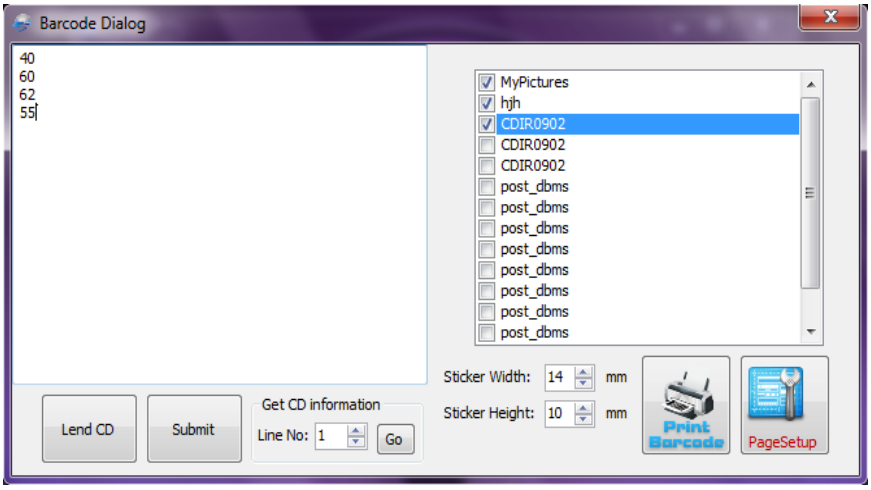
6.5.2 Print Screen When We Edit **LendForm**



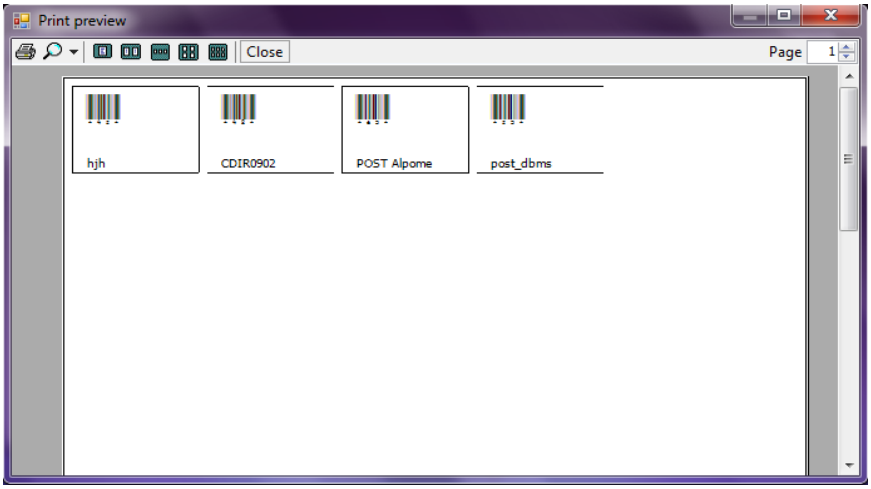
6.5.3 Print Screen When We Edit **Users**



6.5.4 Print Screen When We Edit **Barcode**



6.5.5 Print Screen When We Print Preview Barcode Stickers



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Management Archiving System

7

Chapter Seven
Closure

Chapter Seven

Closure

7.1 Conclusion

To work in a project is a challenging case that might be very successful or face big failure, but to know that project is graduation project a person has no other than working hard and do the best to guarantee very successful graduation. For us it was little different because we didn't take it as a graduation project only, but also as something we want to do for ourselves and be proud of it no matter how big or small was it.

Before we start working we spent long time collecting information and trying to come up with very special idea. We collected all required information and came up with a few ideas, but did not decide which idea to pick until we met our supervisor who told us that MAS is a very nice idea as a project.

MAS is a Management Archiving System used to segregate and organize your collection of CDs no matter how many a person could have. The idea of this project basically is to have a full organized archive for all your CD. It will help you segregate the CDs in any way you like and make an easy access for each one. It will also help you organize the way you lend CDs to friends and control the way you want them to return it as well giving you reminder about the date and time they should return it. Some people might think it's a normal idea, but when they know that this system uses barcode to do most of that then they will know what is so special about our system.

All you got to do is insert the CD in the drive and the program will get names and types for the content of this CD then it will ask about the way you want to identify the CD. After that it will allow you to print a barcode label for the CD in a way to choose. When you want to lend one or more CDs to a friend you will have easy way of search to reach to the wanted CDs as well scanning the CD label will show you the correct one fast. Moreover, it can give you a notice about the time your friend should return the CDs and allow you to keep track of all your CDs not to lose or misplace any of them.

7.2 Recommendation

Under this part we have so many things to say in different ways, but we will try to minimize and give short explanation for our recommendation to you. We will give some about the way to do a project, others about how to control it and finally about the idea of a project.

Most students think of the project only as graduation and want to finish it so fast with minimum work possible. If you have the same idea then be sure that you will never do so because day after day you will face new things that you didn't really prepare for. To do a very professional graduation project we advise you to put in mind the following:

1- Make sure that the team members are ready to work hard and as a team. Whenever a member will depend on others about his/her work then things will start going down and problems will appear. Each one should take care of the tasks they have to do and work hard to finish them the best way they could. They should have very good understanding of the wishes, needs and mentality of the other members.

2- Start preparation early and get all you need even before the course starts, so when it's time to do a stage you will be a head of time in case anything could delay the work in the future.

3- Plan your project stages as we have learnt in AOU subjects and try to use your knowledge as much as possible which will show your talent and shorten the hard work on you.

4- Review your work from time to time to make sure you are working regarding the plan and no mistakes in between.

5- Don't make this project die to be forgotten right after you graduate. Try to work on it and you might be able to make some good business using it.

6- Finally, do it right the first time and don't leave anything for tomorrow.

7.3 Scope for Future Work

As we said many times before that we started this work as a graduation project, but as this stage we have some good plans for the future. Just to give idea of what we have in mind we will say:

1- Reviewing the system over and over and give it as freeware to people and ask for their feedback. This will help discovering the strong and weak points in the system.

2- Will add new functions to the system and upgrade the version of it as required.
3- During our search for this project we have read about FRID which is a very nice and modern technology that we will have in mind.
4- We might try to use MAS not only for CDs, but we will try to find ways to use it for other things such as books.

It's not easy to say what is in our mind so simply, but what we really want to say that we will work harder and be more creative to reach the best and we will never give up.

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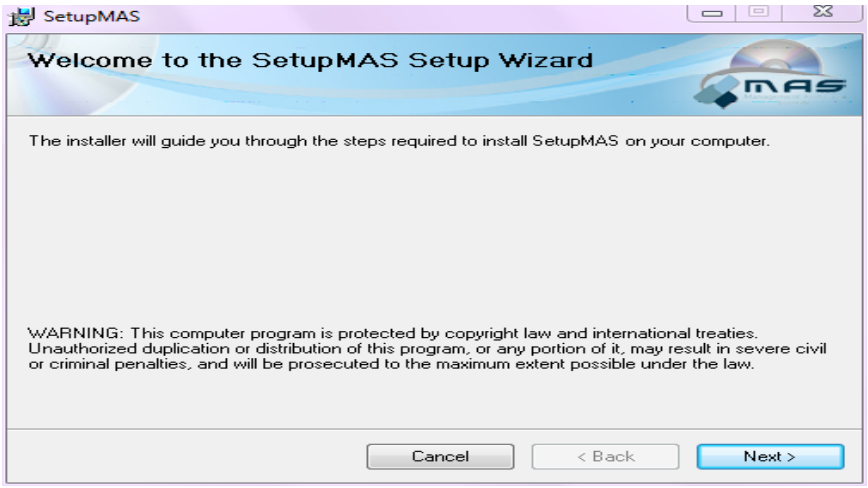
Appendices

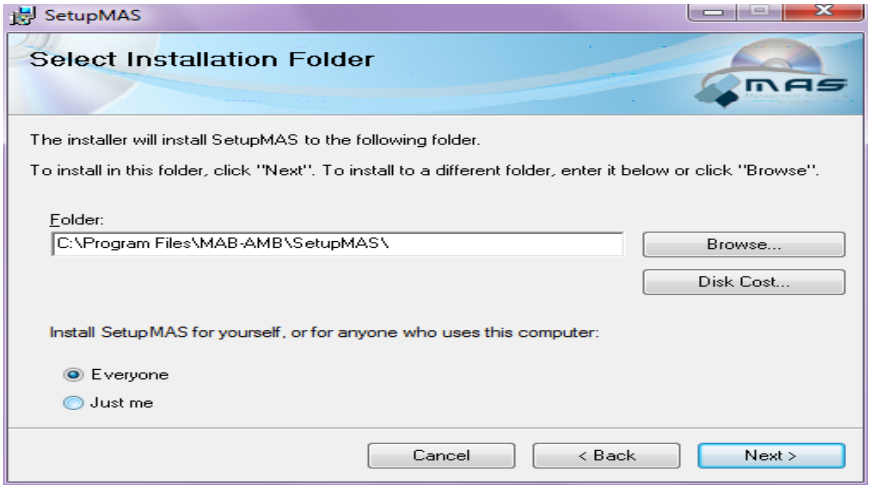
Appendix 1

How to Install MAS

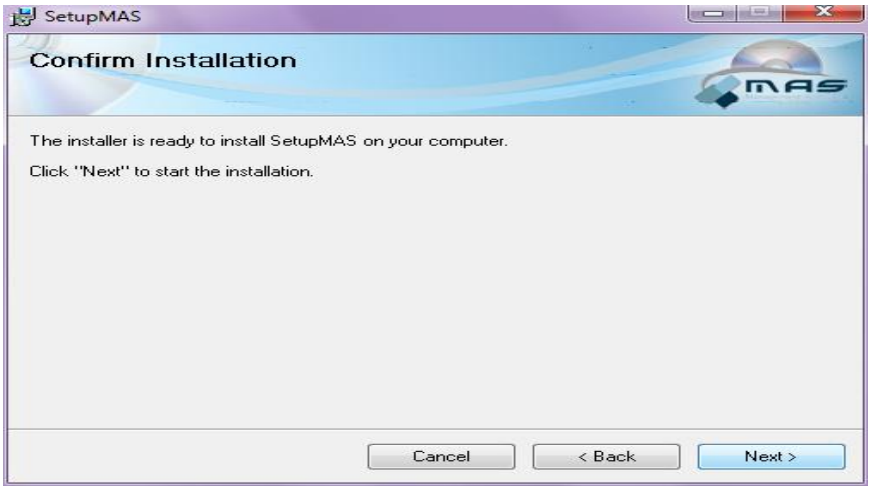
1- Insert MAS CD in the drive and from there find the file (SetupMAS). Click on that file and you will see the picture below. Click next to go to the picture after.

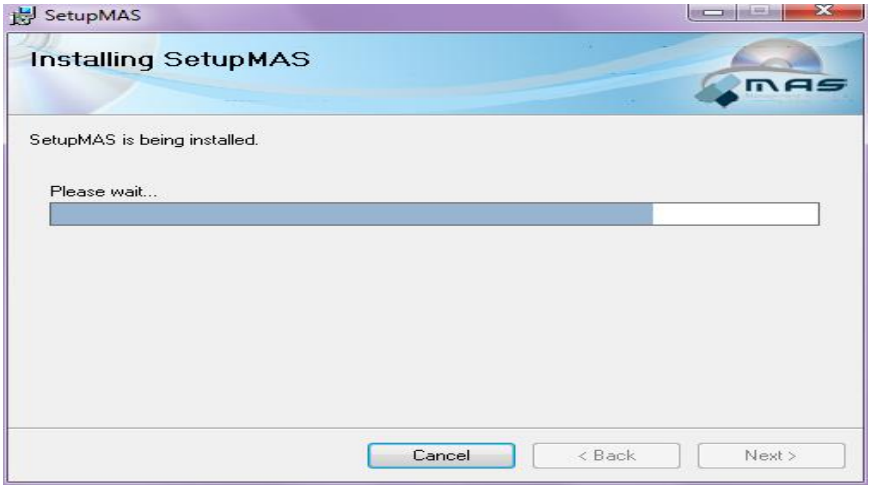


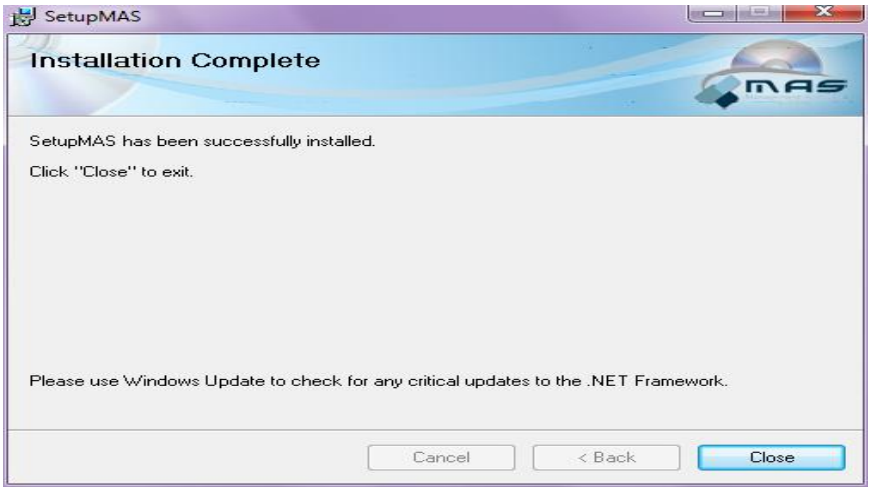
2- Here choose the location to install MAS and who can use MAS on that PC. Click next to go to the picture after.



3- Here click next to confirm installation and rest until installation is finished then from last picture click close then you will be ready to use MAS.







Appendix 2

MAS Hardware Requirements

We Used PSC QS6000 Plus Barcode Scanner And Printer HP4583 To Print Barcode And Read it, But you can Used Any Barcode Scanner can read Code Font And Any Desktop Printers Can Print A4 Page.

1- Barcode Scanner

PSC QS6000 Plus Barcode Scanner

Great Performance is Now Even Better.

The QuickScan QS6000 Plus handheld scanner offers great performance at a very affordable price. With a high first pass read rate and the best speed-to-read of any scanner in its class, the QS6000 Plus speeds retail checkout. And its 13" / 33 cm depth-of-field with 100% UPC labels extends the user's working range.

With a high visibility option, utilizing a 650nm laser diode, the user can target and read bar codes even in bright light conditions due to the scanner s inherent tolerance of high ambient light conditions. Plus, PSC s advanced electronics perform well even when reading low contrast labels with poor edge definition.

2- HP Deskjet F4583 All-in-One Printer

Functions	
Functions	Print, copy, scan
AIO multitasking supported	Yes

Printing specifications	
Print speed black (draft, A4)	Up to 28 ppm
Print speed colour (draft, A4)	Up to 22 ppm
Print speed colour (draft, 10x15 photo)	As fast as 26 sec
Print speed footnote	Dependent upon type, print mode and approximate figures. Exact speed will vary depending on the system configuration, software program and document complexity.
Duty cycle (monthly, A4)	Up to 3000 pages
Print technology	HP Thermal Inkjet
Print quality black (best)	Up to 600 dpi
Print quality colour (best)	Up to 4800 x 1200 optimised dpi colour when printing from a computer on selected HP photo papers and 1200 input dpi
Number of print cartridges	2 (1 each black, tri-colour)