

M/J  
2015

# Computing Project

Music Album Selling System

Oxford International School

Candidate Name: **Abidur Rahim**

Centre Number: **BD009**

Candidate Number: **3293**

Abidur Rahim  
BD009  
3293



<b>CONTENTS</b>		
<b>SECTION</b>	<b>NAME</b>	<b>PAGE</b>
<b>(b)</b>	<b>Definition, investigation and analysis</b>	<b>3 to 20</b>
	(i) <i>Definition – nature of the problem</i>	3
	(ii) <i>Investigation and analysis</i>	4
<b>(c)</b>	<b>Design</b>	<b>21 to 39</b>
	(i) <i>Nature of the solution</i>	21
	(ii) <i>Intended benefits</i>	37
	(iii) <i>Limits of the scope of the solution</i>	38
<b>(d)</b>	<b>Software development, programming, testing and installation</b>	<b>40 to 95</b>
	(i) <i>Development</i>	40
	(ii) <i>Programming</i>	57
	(iii) <i>Testing</i>	68
	(iv) <i>Installation</i>	90
<b>(e)</b>	<b>Documentation</b>	<b>96 to 123</b>
	(i) <i>System maintenance documentation</i>	96
	(ii) <i>User guide</i>	109
<b>(f)</b>	<b>Evaluation</b>	<b>124 to 130</b>
	(i) <i>Discussion of the degree of success in meeting the original objectives</i>	124
	(ii) <i>Evaluation of the client's and user's response to the system</i>	128

## **(b) Definition, investigation and analysis**

### **(I) DEFINITION – NATURE OF THE PROBLEM**

#### ***Background of the business***

“Paradox Music” is an old-fashioned music store located at 23/A, Mazar Road, Mirpur-1, Dhaka. It has been running for almost five years with the support of a wealthy owner, a devoted manager, two cashiers, and five other staff members. It is one of the few places in the city where only English music CD albums are sold. This is since the owner of the shop once had his own band. His love for music drove him to open up a music shop. The business simply involves ordering albums from abroad and selling them. The shop stays open from 9:00 AM to 10:00 PM except on national holidays. During this time, the employees help the customers look for and pick albums from stands arranged in order of the artist’s name. Once the customer has found the desired album, it is handed to the cashier who makes a record of the sell and receives the payment. A receipt is written down by hand for the customer to keep and a carbon copy of this is kept by the shop. At the end of the day, all the carbon copies of the receipts are used to update the master stock table, which is written by hand. Not only is this process time-consuming, but also prone to errors.

#### ***How I got involved***

I have been a music lover since as long as I can remember. The owner of the shop is my father’s college friend. So, I know the owner personally. I also happen to be one of the oldest and most regular customers of Paradox Music. The manager and staff all know me very well. I have been there long enough to realize that the number of customers there was increasing day by day. I began to notice that the manual system the shop used had become outdated and incapable of handling the increased number of customers. Customers, including myself, were forced to wait in long queues to buy their album. Having seen the predicament, I thought I should do something for the shop. So, I went to the cashier and asked him if he would like to upgrade the system. He liked the idea and told me to make an appointment with the manager and have a chat with him about this matter.

## (II) INVESTIGATION AND ANALYSIS

### INVESTIGATING, RECORDING FINDINGS, AND ANALYZING

#### *Interview application*

At first I went to all the staff members and asked them if they would prefer a computerized system. All of them said they would love it. They were desperately in need of something that was user-friendly and faster than the current system. I got an appointment with the manager at 1:30 PM at his office (which was located inside the store) two days after my requested interview. It seemed like a good idea to hand out questionnaires to the customers as well as the staff. This way, I got a through idea of what the new system needed to bear.

**Interview Request**

Abidur Rahim,  
36/D, Mazar Road,  
Mirpur-1,  
Dhaka.

3th January 2015

Mr. Husain Ali,  
Manager,  
Paradox Music,  
23/A, Mazar Road,  
Mirpur-1,  
Dhaka.

Dear Mr. Ali,

In relation to the investigation of your current manual system, I will have to carry out interviews, so as to get a better view of your system, in the near future. You will be the first one to be interviewed. I will then arrange for the distribution of questionnaires to get feedback from the customers.

Therefore, I am asking for your permission to conduct this interview. Please confirm your approval and a date for the interviews.

Thank you.

Yours sincerely,

*Abidur*

Abidur Rahim

My interview of the manager went as follows.

### The Manager's Interview

**What type of methods are you currently using to run the store?**

Our system is currently manual and involves the use of a number of registers which are filled in manually. The employees have habituated themselves to the system themselves and can do the filing to my content.

**What type of problems is arising from the use of the current system?**

As you have seen, this system is time-consuming. There is little security and backup. Sometimes, there are mistakes in the registers. Searching is tough, and the handwriting occasionally makes it worse. The registers themselves take up too much space and are hard to work with.

**How are you coping with these problems?**

I am trying my best and so are the employees. All the records are double-checked in the morning before the shop opens, but bad handwriting makes this process slow. I cannot blame them, however, since we are always in a rush. We put the registers in a closet and lock it up before we close the shop. It seems that more employees don't really mean more efficiency in a small shop like ours. We try our best to make everything in the register clear-cut, but these temporary solutions aren't really satisfying me. This system can no longer be taken for granted.

**How easy it is to create reports for management? Do you keep backups for a data recovery policy?**

Unfortunately, because searching is a very time-consuming, reports are quite difficult to create. We do not keep backups. This is simply because it takes too much effort to manage and does not provide us a considerable benefit. I think increasing the number of employees for just this task will result in an unnecessary increase in cost.

**Do you want to computerize the existing system, and if you do, what would the requirements have to be?**

Of course, I'd love to upgrade! The current system is becoming a bother, especially with the number of records becoming too great to handle. I want a system that is very user-friendly, one which minimizes the chances of incorrect data input. It should also be able to produce reports from the searches that have to be made easier. I want it to be able to manage and process huge

amounts of data fast, accurately, and with minimum human help. I would also like not to have receipts any more.

### What security features do you want?

I want to password-protect the system and keep secure backups so that the data does not go into the wrong hands. The software may have features that prevent the data from being deleted accidentally. The system can also be amendable. Besides this, I do not have much choice of design.

It is clear from this interview that the system needs to be upgraded, and the manager approves of this. The main problems discovered here are:

- Security concerns about data safety
- Backups are not kept
- Searching is a rigorous and time-consuming process
- Eliminate the requirement of receipts

Another reliable method of fact-finding is the questionnaire. 100 questionnaires were distributed randomly to customers and they were asked to fill them up to the best of their recent knowledge. The results are shown below.

Result of Questionnaire		
Question	Option	Votes
<b>Do you think the shop is facing problems serving you?</b>	Yes	52
	No	9
	Fairly	39
<b>How quickly are the calculations done?</b>	Long time	65
	Quickly	9
	Fair	24
<b>Does it take a long time to perform a simple query?</b>	Yes	34
	No	18
	Fair	48
<b>Is the handwriting on your receipt recognizable?</b>	Unrecognizable	24
	Clear	32
	Understandable	44
<b>Do you find any errors in the transaction or calculation?</b>	Yes	6
	No	36
	Sometimes	68
<b>Have you ever noticed the staff distracted or slow in his job?</b>	Yes	4
	No	84
	Sometimes	12

<b>Do you appreciate the shop's current rewarding system?</b>	Yes	<b>61</b>
	No	<b>18</b>
	Fair	<b>21</b>
<b>What suggestion do you have about how we can improve the current system?</b>	New System	<b>67</b>
	More Workers	<b>24</b>
	Change Shop	<b>12</b>
	Others	<b>3</b>

The verdicts that can be reached from the questionnaire are:

*"Do you think the shop is facing problems serving you?"*

- Most of the customers are **not satisfied** with the **services** being provided.

*"How quickly are the calculations done?"*

- The majority think that the **calculations** take a **long time** to do.

*"Does it take a long time to perform a simple query?"*

- It seems most customers are more or less satisfied with the query feedback of the shop. They usually find the album they are looking for. So, this is not a significant problem.

*"Is the handwriting on your receipt recognizable?"*

- The **handwriting** is **not satisfactory**. This issue needs to be addressed.

*"Do you find any errors in the transaction or calculation?"*

- Most of the customers have come across errors. This is a serious issue with the current system.

*"Have you ever noticed the staff distracted or slow in his job?"*

- It appears that although the staffs try to give it their best, they still aren't able to keep all the customers happy.

*"Do you appreciate the shop's current rewarding system?"*

- Most seem happy with the discounts and offers they receive. This is not a problem.

*"What suggestion do you have about how we can improve the current system?"*

- Almost all of the customers feel the **system needs to be upgraded**.

A sample filled-in questionnaire can be found at the end of this coursework.

It can be seen that the manager and the majority of the customers would like an upgrade of the system. After my fact finding I sent the manager a confirmation report.

## Feasibility Study for Paradox Music

Mr. Husain Ali,  
Manager.

Based on the fact-finding exercise I have undertaken during the past week, I have noticed the following.

The present system has various shortcomings, like:

1. Inadequate security and reliability of data
2. Inability to monitor outdated products
3. Inefficiency in serving customers

I concluded that there is an urgent need to redesign the shop system. I indeed agree that computerization will help to lessen the present problems.

Time schedule: The Gantt chart gives an idea of the time-frame during which the new system can be implemented and become operational.

Cost of the new system:

Most of the money required to make the new system will go towards purchasing the computer hardware which will bear the database management system. This will be a normal desktop computer. For further information regarding the cost, you are more than welcome to contact me for the full software and hardware costs.

Sir, these are my recommendations and should you agree to proceed with the new system, please sign this document.

Also, do not hesitate to contact me please, should you need any further clarifications.

Thanking you in advance,

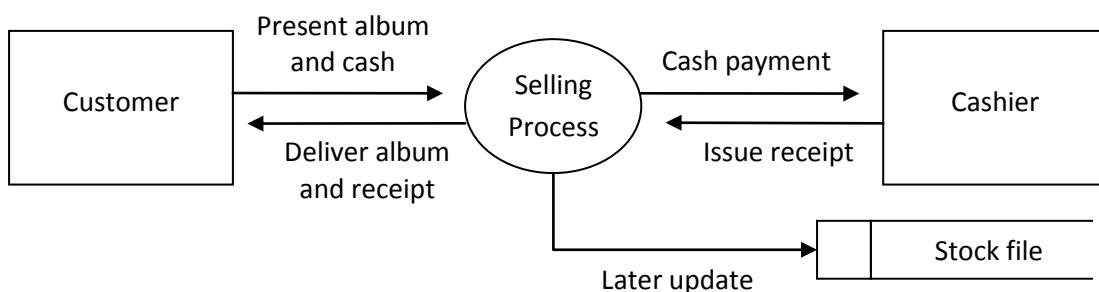
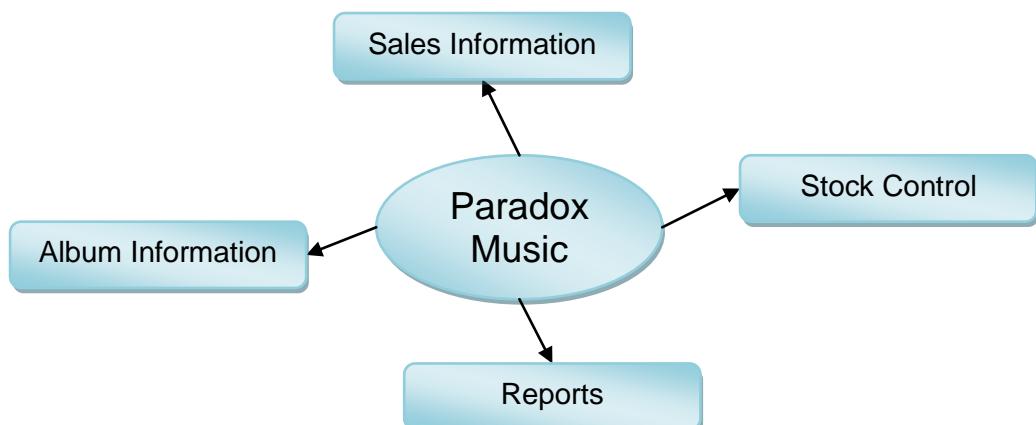
To sign

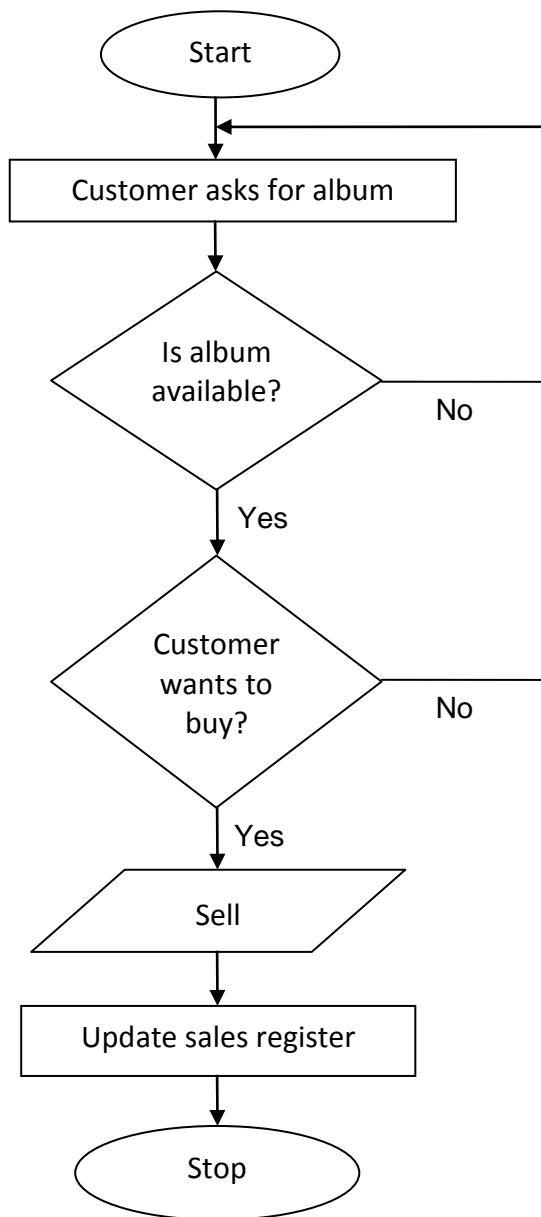
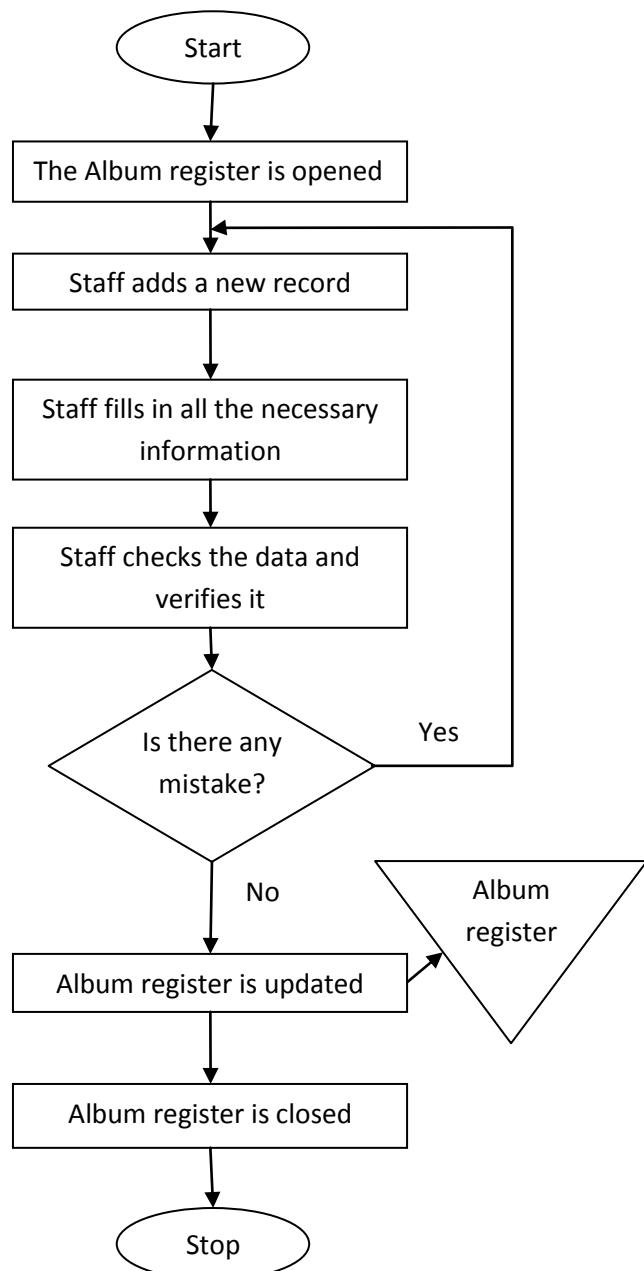
*Abidur*  
Abidur Rahim (Mr.)

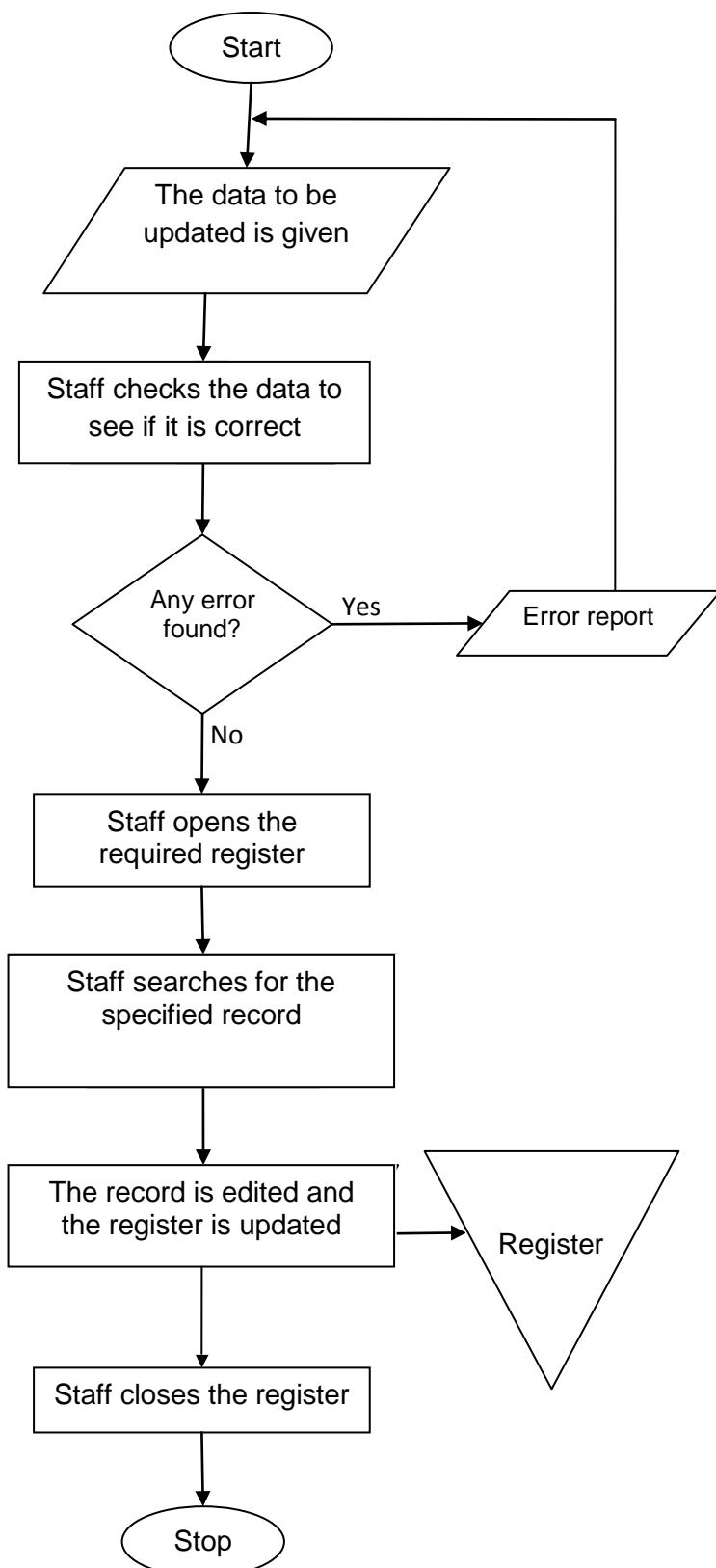
*Husain Ali*  
Mr. Husain Ali  
Manager

## **How the existing system works**

The existing system is quite simple. It involves two employees and two registers. One register holds the stock information and the other holds the sales information. Whenever a customer buys an album, his/her name and contact number is taken. This information is inputted into the sales register, along with the name of the album, the quantity, the subtotal, the discount, the VAT, etc. This process does not take long, but the rush may cause the information to be entered wrongly and in unclear handwriting. The album register is also updated later on with the help of this information. This whole process is done in pen and paper. Photocopies are not made very frequently, but extra care is taken of the two registers. Whenever the album stock hits less than 10, a phone call is made to the suppliers. The customers are given a receipt after they buy an album. A defect in the album CD is extremely rare, but when one is brought back, the customer brings his/her receipt and the product is exchanged if it was sold within the last week. The main jobs that are done are given below:

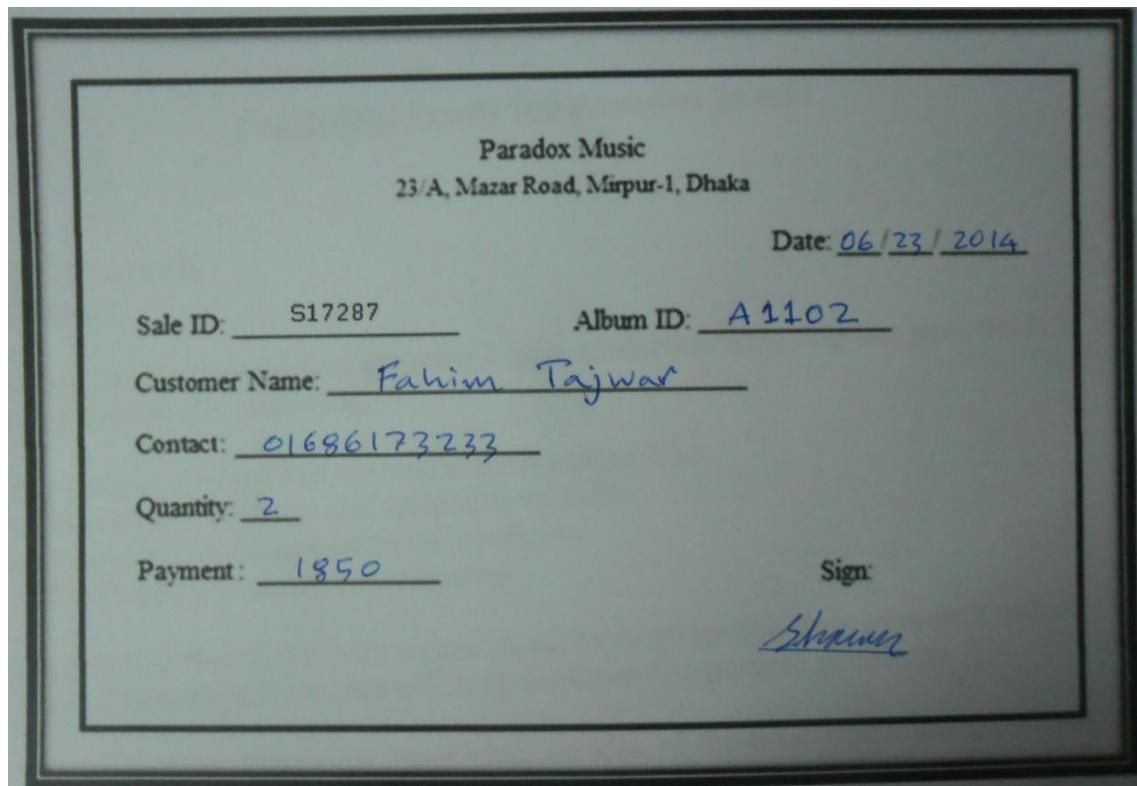


**Selling a product****Adding a new record**

**Amending a register**

### The receipt

When an album is bought, a receipt is given to the customer that looks like the following:



The carbon copy of the receipt is then later used to update a master stock table. The format of the stock table is:

Sale Code	Customer Name	Contact Number	Album ID	Quantity	Date	Payment
S17286	Siam Ahmed	01195299129	A1043	1	05/23/2014	900
S17287	Fahim Tajwar	01686173233	A1102	2	06/23/2014	1850
S17288	Adnan Bin Rashid	01762511293	A1089	1	06/23/2014	1050
S17289	Tanvir Mahtab	01759387017	A1053	1	06/23/2014	950

## The problem and solution

The Problem	Description	Possible Solution
The increasing number of registers.	Over time the number of registers is increasing as more and more data need to be stored especially from new sells.	Computerize the system and give it a lot of storage capacity.
Backups	Since the data in the registers are so large, it is hard to keep backups.	Secure backups will have to be kept in the computerized system, which will be easier.
Searches	Searching registers is painstaking work. It is near impossible to sort the data in a way different from the original.	A fast search option has to be included in the new system.
Input errors	In rush hours, it is possible for the employees to mistake the input, especially in calculations.	Putting in validation and/or verification rules in the new system.
Bad handwriting	When the number of customers increases, the information is inputted in a hurry. This usually causes the writing to become unclear.	Using clear fonts in the computerized system.
Security	It is possible for anyone to view the content of the registers and potentially edit them.	Passwords have to be kept in the new system. The input boxes also need to be locked by default.
The registers could get lost.	With the huge number of registers, there is a definite possibility of it being misplaced. The loss of a single register will cause problems within the whole system.	Using a single database in the computerized system for each type of information will be enough.
Editing	Editing a single record in the register might have an influence on all the others.	The computerized system has to be made flexible.
Cost	New registers have to be bought constantly, as well as writing utensils, etc.	The system has to be made "paperless" using a computerized system.
Boredom	The employees are getting tired of the new system which needs extensive work to manage.	A computerized system can help relieve the pressure on employees.
Inefficiency	This system doesn't make use of resources efficiently.	The modern and efficient way has to be used.
Hard to handle	The sheer amount of data makes it difficult to work out.	A solution can be a database management system.

## EVALUATION OF EXISTING SOLUTION

### *The advantages*

1. It is efficient when there are few customers.
2. Staffs do not need to be trained.
3. It can be implemented quickly.
4. If the business is large, it decreases the operational cost.
5. The employees working together leads to fewer mistakes.
6. The system is flexible and does not corrupt.
7. Taking care of the system (buying registers, etc.) is easy.

### *The disadvantages*

1. The overall cost is high.
2. Takes up too much space.
3. A lot of employees are needed for the system to work efficiently.
4. Validation and verification of records is time-consuming.
5. It is difficult to organize the data in a customized way.
6. It minimizes data security.
7. It is completely dependent on man.
8. This system is very slow as it is hard to manipulate.
9. It is not user-friendly to the staff.
10. The customers find this system irritating as they have to wait longer.
11. Searching records is very hard work.

### *Possible improvements*

The efficiency of the system can be improved with temporary measures like:

1. Increasing the number of employees working with the registers so that the records can be rechecked faster.
2. Photocopying the registers as a means of backup.
3. Increasing the number cashier and records for each purpose.
4. Creating a separate room only for registers.
5. Omitting or combining fields in the register.
6. The customers can be asked to fill in their information themselves.
7. The data can be filled up pencil to avoid mistakes better.

However, these are temporary measures that might only slightly improve the efficiency. Permanent measures need to be taken in order to diminish these problems.

## DESCRIPTION OF OTHER POSSIBLE SOLUTIONS

### *The options*

Solution	Accuracy	Time Required To			Cost Required To	
		Implement	Service	Update	Implement	Run
Hiring more staff	Better	Little	Quite good	Quite good	High	High
Expanding business	Same	More	Not so good	Not so good	High	Not so much
Using staff and computers	Much better	Not much	Not so good	Quite good	Not much	Not so much
Computerize whole system	Best	Most	Best	Best	High	Not so much

### *Using more staff*

Increasing the number of people working with the registers can significantly increase the amount of accuracy by reducing the amount on each one. It does not take time to implement but can be very costly. Increasing the number of cashiers can, however, cause the data to become scrambled and mixed up.

Its advantages are:

1. Faster customer service, data capture and update.
2. Distribution of tasks will reduce pressure on employees and cause fewer mistakes.
3. Cooperation between workers will reduce boredom and tiredness.

Its disadvantages are:

1. It makes has a high implementation cost.
2. It will have a higher running cost.
3. It diminishes marginal return.
4. It makes the data accuracy moderate and mistakes are observed in data retrieval.

### *Expanding the business*

The business increasing can lead to making more money and reducing the cost of the system to run. But this will not help reduce the problem of the manual system.

Its advantages are:

1. The running cost will probably reduce as per the theory of lowering average cost in higher trade.
2. It provides more methods to upgrade the system.

Its disadvantages are:

1. It takes a long time to implement.
2. Expanding is very expensive.
3. It produces more data, which reduces accuracy.
4. Customer service is reduced as it will take a long time.
5. Updating will also take a long time.

### ***Using staff and computers to collect data***

This involves using computers partially and asking customers to write their information themselves. This will improve accuracy, but the problem is that this would be cost-ineffective.

Its advantages are:

1. Implementation does not take too much time.
2. The system's accuracy is good.
3. Customer service is increased by a considerable rate.

Its disadvantages are:

1. The running cost is high.
2. Implementation cost is high.
3. Number of staffs is still not reduced.
4. Data will still be hard to manage.

### ***Computerize whole system***

Although this has implementation problems, this is the best solution as it provides the best all-round and permanent solution to the problems being caused by the current system. This solution will be chosen.

Its advantages are:

1. Accuracy is excellent, as computers do not make mistakes.
2. Customer service is fast.
3. Update, searching is easy and fast.
4. Maintenance cost is medium.

Its disadvantages are:

1. Implementation cost is high.
2. It may take time to implement.

## ***Why the fully computerized solution?***

As a permanent solution that will help eliminate the problems caused by the existing system, computerization is the best option. Although the cost is high and implementation will be time consuming; after implementation, this will provide the maximum number of benefits. This solution is the simplest, most cost-efficient, non-space-consuming and secure, as was desired by the manager, staff, and customers. This choice is logical, will save money, reduce processing time, enable interactive and faster searching, generate reports, calculate accurately, correct and forsake mistakes with validation and verification checks, reduce the need for more staff, store large amounts of data in an organized and systematic way, and will also be user-friendly.

## **USER REQUIREMENTS**

### ***Objectives to be achieved***

Business terms:

1. Reduce **paperwork** by diminishing the use of registers as far as possible.
2. Provide that the data in the **fields** is accurate and easy to work with.
3. The new system needs to be more **cost-beneficial** than the older system.
4. Large numbers of **records** should not cause handling problems.
5. **Stability** should not be harmed by, say, recovery after data loss.
6. Minimize the physical **space** occupied by the system.
7. Make as many processes as possible faster so that **time** can be saved.
8. Limit the number of **workers** needed to manage the system efficiently.
9. The system should not be eligible to frequent **updates**.
10. System **setup and implementation** should be quick and easy.
11. Increase the system's **efficiency** level.
12. Increase **customer satisfaction**.

General computer-related terms:

13. Provide a **user-friendly** interface that can manipulate and edit data easily.
14. Set up **validation** rules so that mistakes can be avoided easily.
15. Enable faster, more accurate **search**.
16. Make simple, clear, quick, and easy **reports** that can be printed out.
17. Automatically generate unique **IDs**.
18. Improve data **security** and **backup** capability.
19. **Organize** the records in an orderly way.

Summing it up:

Altogether, the following points need to be considered:

- The system needs to be more cost-beneficial than the older system.
- The storage space of the new system must be less than that of the existing.
- The new system must be faster than the current system and able enough to save working time.
- The interface should be user-friendly.
- The system itself needs to be efficient.
- Outputs should be achieved with minimum effort.
- The system has to have a high amount of reliability and security.

## HARDWARE REQUIREMENTS

The minimum hardware requirements for the computerized system are:

Hardware	Purpose
Pentium 4 processor and CPU	Running the software
192 MB of RAM	Running the software
A display card	Visual display
15" average resolution VDU	Visual display
A 500 MB hard disk drive	Storage
A mouse and a keyboard	Input
A pen drive	Backup
An average resolution printer	Report printouts

However, this will not provide optimum performance. For the best output, the following configuration will be used:

Hardware	Reason
A Dual Core processor, CPU 2.26 GHz	<ul style="list-style-type: none"> <li>• It has a faster performance.</li> <li>• It can better cope up better with the software.</li> </ul>
2 GB of RAM	<ul style="list-style-type: none"> <li>• So that a lot of data can be handled at once.</li> <li>• To make system processes faster.</li> </ul>
A display card	<ul style="list-style-type: none"> <li>• For visual display.</li> <li>• So that the VDU can be connected.</li> </ul>
Sound card and speakers	<ul style="list-style-type: none"> <li>• To get sound outputs from the software.</li> <li>• So that albums can be tested.</li> </ul>
15" medium resolution monitor	<ul style="list-style-type: none"> <li>• To get proper display of the software.</li> <li>• So that color can be seen clearly.</li> </ul>
40 GB hard disk drive	<ul style="list-style-type: none"> <li>• To store huge amounts of data.</li> <li>• It can even carry a backup.</li> </ul>
A mouse and a keyboard	<ul style="list-style-type: none"> <li>• To input data.</li> <li>• To select data options.</li> </ul>
A laser printer	<ul style="list-style-type: none"> <li>• To achieve good quality report printouts.</li> <li>• To enable color prints with decorations.</li> </ul>
A CD-ROM and writer	<ul style="list-style-type: none"> <li>• To get permanent backups that will run easy.</li> <li>• To test albums.</li> <li>• To install necessary software.</li> </ul>
A pen drive	<ul style="list-style-type: none"> <li>• To keep temporary backups.</li> <li>• So that data can be transported if necessary.</li> </ul>

## SOFTWARE REQUIREMENTS

### *The software choice*

Software	Advantage	Disadvantage	Cost
Spreadsheet	Large amounts of data can be viewed at once. Simulations, like the impact on the store's profit if a new policy is adopted, can be made easily.	Many of the big calculations have to be done by entering long, complex formulas.	Low
Database Management System	Huge amounts of data can be kept in an organized manner.	It will not perform specific tasks until programmed to do so.	Low
Customized software	The program will only perform tasks the store requires, thus increasing efficiency.	Many of the new and unfamiliar features in the program will have to be taught to the users.	High

### **The description**

It would be wise to use a database package to store data and a programming language to create interfaces at the front-end rather than using either only the database software or only the programming language, since neither of them can alone completely fulfill the needs of Paradox Music. Database software like FoxPro, Oracle, and Microsoft Access are available for use. But the best choice would be Microsoft Access since it comes with the MS Office suite and the store will find it handy to purchase MS Office for other purposes as well. Since the number of customers, the number of albums, and the number of transactions per day are, relatively, small, Microsoft Access will be the appropriate database choice. Microsoft Visual Basic can be used as the front-end program, since it requires a minimum amount of programming and is GUI based. Using the little coding in VB, many of the programming for the data handling part can be done easily compared to high-level languages like C, C++, and Java.

So, Microsoft Visual Basic and Microsoft Access will be used together. MS Access will be the data holder and Visual Basic will be the manipulator of the data. Microsoft Windows XP will be used as the operating system, because both Microsoft Access and Microsoft Visual Basic run well Windows XP. It is one of the most user-friendly operating systems. Anti-virus software will also be installed to protect the data from viruses, etc.

Therefore, a program will be written in Microsoft Visual Basic since many of the tasks that need to be done are not well or properly facilitated by the commercial software packages. Some sorts of tasks can be done a little more easily if a program is written rather than bought. Visual Basic is an easy language with short, uncomplicated codes. ADODC, Data Environments, Login Dialogs, etc. make the programming task a lot easier as these functions are built-in.

## (c) Design

### (I) NATURE OF THE SOLUTION

#### OVERVIEW INCLUDING AN AGREED SET OF OBJECTIVES

After all the fact-finding and analysis, I sent the manager a report containing all the objectives, in short, that are required to be satisfied. This was agreed on and signed.

**OBJECTIVE REPORT**

**Summary of objectives to be satisfied for Paradox Music**

Mr. Husain Ali,  
Manager,  
Paradox Music

The following is the set of objectives, in brief, that are to be satisfied:

- Reduce the need for paperwork and registers as far as possible
- Backing up data must become easier and security improved
- Data should be validated automatically before being saved
- Searching and creating reports should be fast, simple and easy
- The new system should be user-friendly and cost-beneficial
- Create unique IDs automatically
- Large amounts of data can be handled and edited.

In signing this contract, Mr. Husain Ali, manager of "Paradox Music", has approved to employ Abidur Rahim to create a computerized system satisfying the above specifications. The analyst, Abidur Rahim, will not be responsible, by this document, for fulfilling any other needs or requirements nor will be held liable for any updates needed for the system in the future.

To sign

*Abidur*  
Abidur Rahim (Mr.)

*Husain Ali*  
Mr. Husain Ali  
Manager

The complete list of objectives is given below.

*Business terms:*

1. Reduce **paperwork** by diminishing the use of registers as far as possible.
2. Provide that the data in the **fields** is accurate and easy to work with.
3. The new system needs to be more **cost-beneficial** than the older system.
4. Large numbers of **records** should not cause handling problems.
5. **Stability** should not be harmed by, say, recovery after data loss.
6. Minimize the physical **space** occupied by the system.
7. Make as many processes as possible faster so that **time** can be saved.
8. Limit the number of **workers** needed to manage the system efficiently.
9. The system should not be eligible to frequent **updates**.
10. System **setup** and **implementation** should be quick and easy.
11. Increase the system's **efficiency** level.
12. Increase **customer satisfaction**.

*General computer-related terms:*

13. Provide a **user-friendly** interface that can manipulate and edit data easily.
14. Set up **validation** rules so that mistakes can be avoided easily.
15. Enable faster, more accurate **search**.
16. Make simple, clear, quick, and easy **reports** that can be printed out.
17. Automatically generate unique **IDs**.
18. Improve data **security** and **backup** capability.
19. **Organize** the records in an orderly way.

In brief, the software will have to be able to:

1. Keep track of the stock and sales information (**objective number 4 and 11**).
2. Do large calculations quickly (**objective number 7**).
3. Produce reports on demand (**objective number 16**).
4. Handle large amounts of data (**objective number 4**).
5. Keep security tight (**objective number 18**).
6. Make validation checks (**objective number 14**).
7. Make the user feel relaxed (**objective number 13**).

The main software will be a relational database management system (RDBMS). The database itself will be created and stored in database management software, MS Access. The interface of the software will be created using MS Visual Basic 6. This will provide the user interface and also allow validation as well as the production of reports. The operating system that will allow the application software to run will be MS Windows XP.

### The time schedule

Section	Stage	Start	Finish
Definition, investigation and analysis	Define a problem Investigate the current system Record findings Analyse findings Identify problems/inefficiencies with current system Specify requirements: user, hardware, software	07/01/2015	21/01/2015
Design	Overview including an agreed set of objectives Output design Input design Data structures/model Process model Test plan	22/01/2015	18/02/2015
Software development, programming, testing and installation	Software development Programming Testing a software solution Planning for installation and use Client and user testing	19/02/2015	11/03/2015
Documentation	System Maintenance Documentation User Guide	12/03/2015	25/03/2015
Evaluation	Evaluate results against the agreed set of objectives Evaluate the results of client and user testing	26/03/2015	08/04/2015

Altogether, this is scheduled to take 91 days.

### The Gantt chart

Phase	Weeks												
	1	2	3	4	5	6	7	7	8	10	11	12	13
Definition, investigation, and analysis	■	■											
Design			■	■	■	■							
Software development, testing, and implementation							■	■	■				
Documentation									■	■			
Evaluation											■	■	

## OUTPUT DESIGN

Query options should be available for the following parameters:

- From the Album table,
  - Album ID
  - Album Title
  - Album Artist
- From the Sales table,
  - Sale Code
  - Customer Name
  - Sold Album ID.

The report for records in the Album table will look identical regardless of the search parameter. The same goes for queries for records in the Sales table.

The design of the output report for a record in the Album table will look like:

<b>Paradox Music</b> 23/A, Mazar Road, Mirpur-1, Dhaka.
Date: ___/___/___
AlbumID: _____
AlbumName: _____
AlbumArtist: _____
AlbumReleased: _____
AlbumSongs: _____
AlbumTime: _____
AlbumLabel: _____
AlbumPrice: _____
AlbumStock: _____
AlbumGenre: _____

The report for the Sales table will look similar:

**Paradox Music**  
23/A, Mazar Road, Mirpur-1, Dhaka.

Date: \_\_\_/\_\_\_/\_\_\_

SaleCode: \_\_\_\_\_  
SaleDate: \_\_\_\_\_  
AlbumID: \_\_\_\_\_  
CustomerName: \_\_\_\_\_  
CustContact: \_\_\_\_\_  
Quantity: \_\_\_\_\_  
Sub Total: \_\_\_\_\_  
Discount: \_\_\_\_\_  
VAT: \_\_\_\_\_  
NetPayment: \_\_\_\_\_

## INPUT DESIGN

The forms that will have to be created in MS VB 6 are:

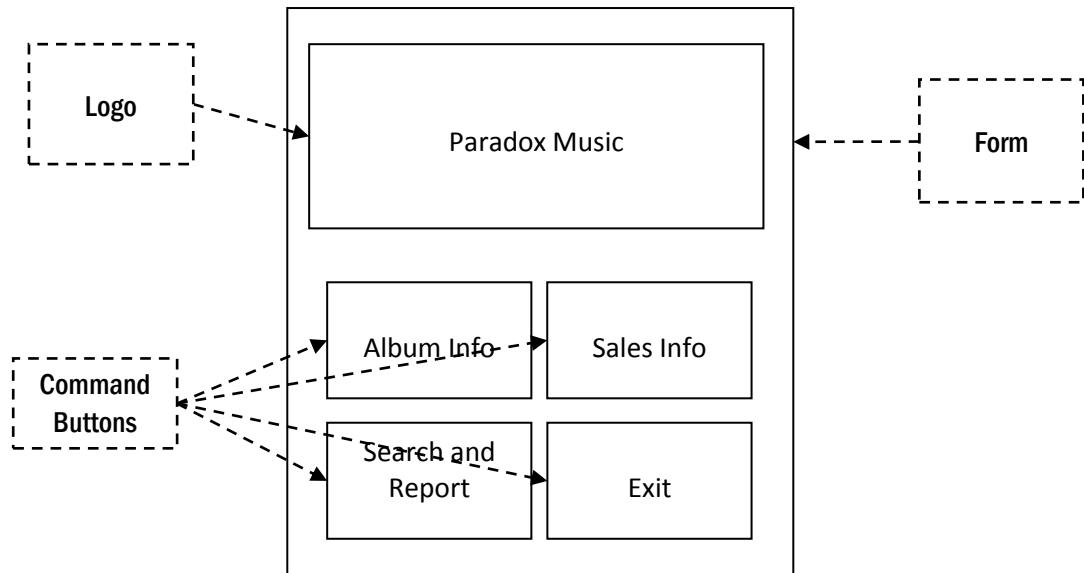
- **Login:** This will pop up first and will ask for the username and password. The user will be given access to the rest of the program if and only if these details are entered correctly. This provides a security measure.
- **Main:** This will allow the user to select and access the other forms.
- **Album:** This form will allow the user to view, input, and edit the data present in the Album table. This includes all the records of all the albums available, as well as stock details.
- **Sales:** This form allows the user to input the sales information. Older transactions can also be views and edited as required.
- **Search:** This will allow queries to be made and reports created of any and multiple numbers of records.

## Individual forms

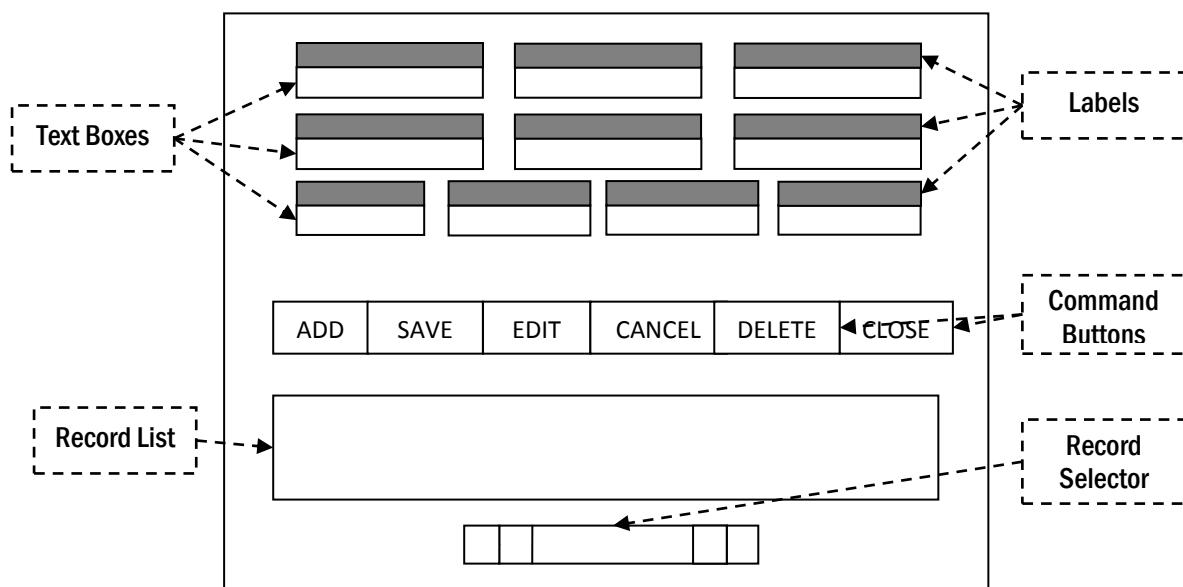
A description of some components:

- Command buttons: They execute a particular instruction when clicked. This may range from changing to a different form to enabling edit, saving records, deleting records, etc.
- Textboxes: They allow data to be entered into the database.

### The prototype home form (objective 13)

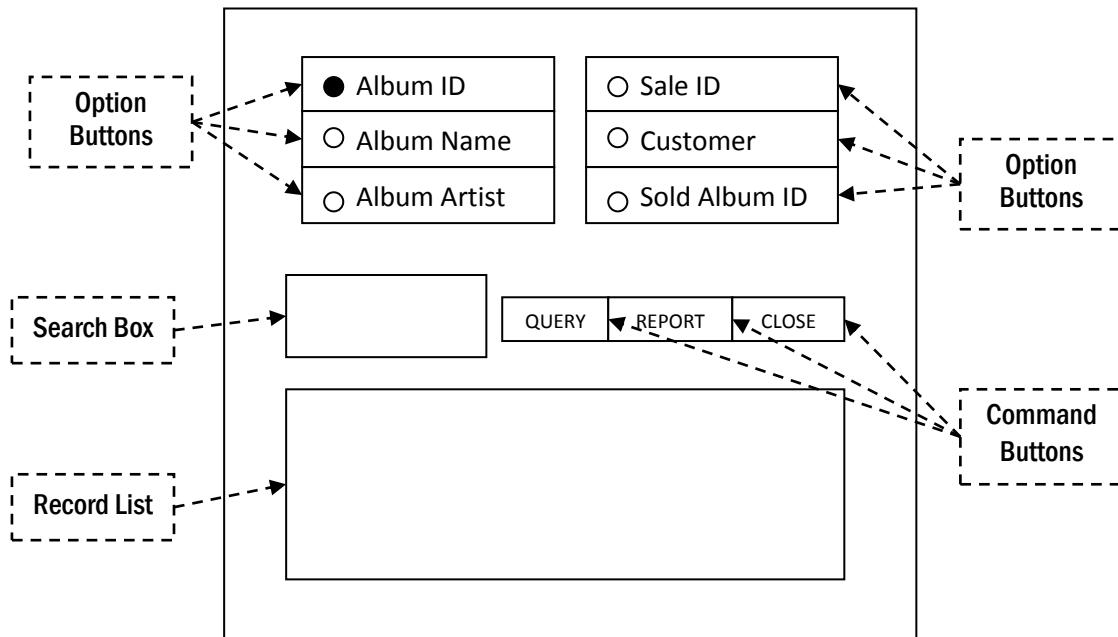


### The prototype sale and album forms (objective 13)

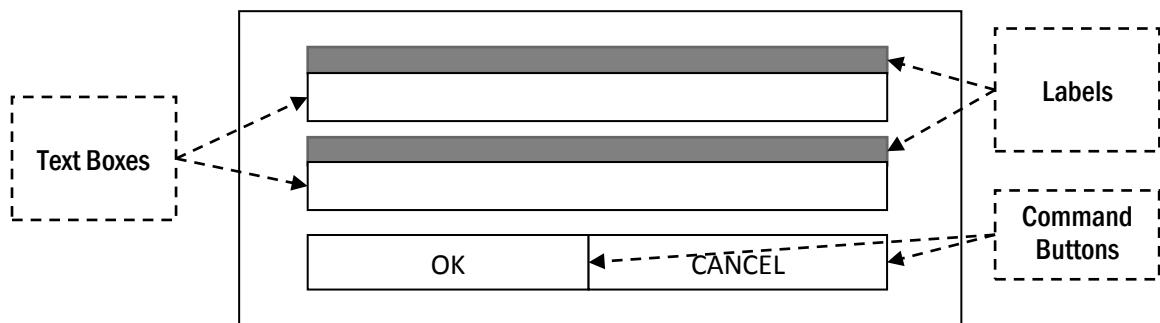


### **The prototype search form (objective 15)**

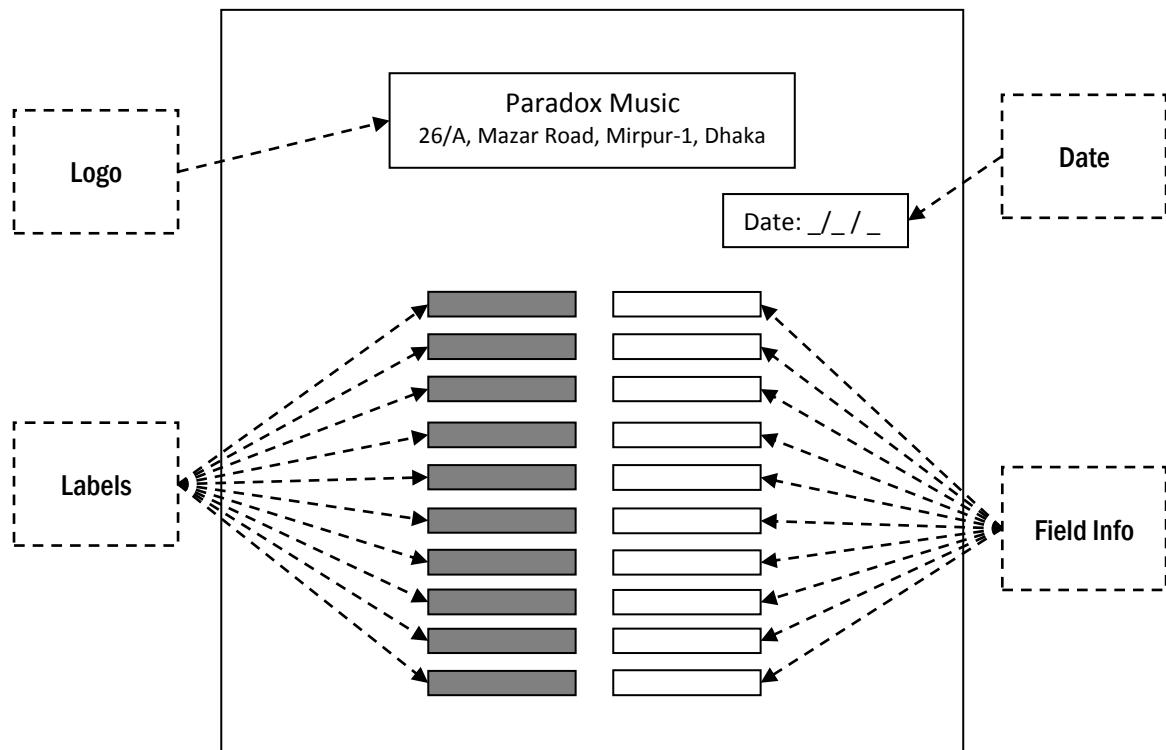
Any of the options can be selected by clicking on the option beside them.



### **The prototype login form (objective 18)**



## The prototype report (objective 16)



## DATA STRUCTURES/MODEL

### Data structure of the album fields

Field Name	Data Type	Size	Description	Example
AlbumID (primary key)	Text	5	The unique ID given to each album. It is the primary key. This has the format A####.	A1023
AlbumName	Text	35	The title or name of the album.	A Thousand Suns
AlbumArtist	Text	25	The artist (singer/creator) of the music album.	Linkin Park
AlbumGenre	Lookup Wizard	15	The type of music. There are only a limited number of possibilities and thus a drop-down can be used.	Rock
AlbumSongs	Number	2	The number of songs in the album.	12
AlbumTime	Time	5	The total play time of the album.	49:26
AlbumReleased	Date	10	The date the album was released.	09/26/2009
AlbumLabel	Text	30	The record company of the album.	Universal Records
AlbumPrice	Currency	6	The unit price of the album in BDT.	950
AlbumStock	Number	4	The number of CDs of the album still present in the shop.	29

### Description of the sales fields

Field Name	Data Type	Size	Description	Example
SaleCode (primary key)	Text	6	The unique ID given to each sale. It is the primary key. This has the format S#####.	S14532
CustomerName	Text	30	The name of the customer who bought the album. No numbers are allowed in this field.	Richard Parker
CustContact	Text	11	The customer's phone number. Cannot contain any alphabets.	01718272391
SaleDate	Date	10	The date of the sale.	02/30/2014
AlbumID (foreign key)	Text	5	The Album ID of the album being sold. This is a foreign key.	A1264
Quantity	Number	3	The number of that album being sold. Has to be a positive integer.	2
SubTotal	Currency	6	The AlbumPrice multiplied by the Quantity.	1900
Discount	Currency	6	The discount on the album. This is input in percentage out of 100. Depends on the customer and also the Quantity.	25.5 (giving 485 as the discount)
VAT	Currency	6	The VAT of the album. This is 1.5% of the SubTotal.	285
NetPayment	Currency	6	The SubTotal plus VAT minus Discount.	1700

### Description of the user fields

Field Name	Data Type	Size	Description	Example
UserID	Text	10	The user name that is required to sign in and consequently access the program.	Manager
Password	Text	15	The password corresponding to that UsedID. Note that this field is case sensitive.	Note123

## Relationships

Normalization is the process of organizing data in a database. This includes creating tables and establishing relationships between those tables according to rules designed both to protect the data and to make the database more flexible by eliminating redundancy and inconsistent dependency.

The **flat file** of this database would be:

**Paradox Music** ( SaleCode, CustomerName, CustContact, SaleDate, AlbumID, AlbumName, AlbumArtist, AlbumGenre, AlbumSongs, AlbumTime, AlbumReleased, AlbumLabel, AlbumPrice, AlbumStock, Quantity, SubTotal, Discount, VAT, NetPayment )

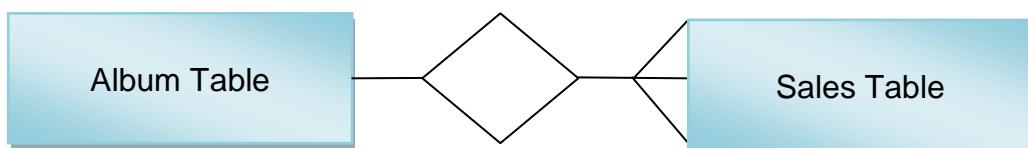
It can be seen that this will cause a lot of data redundancy. So, it should be normalized. The **first normalization** is as follows:

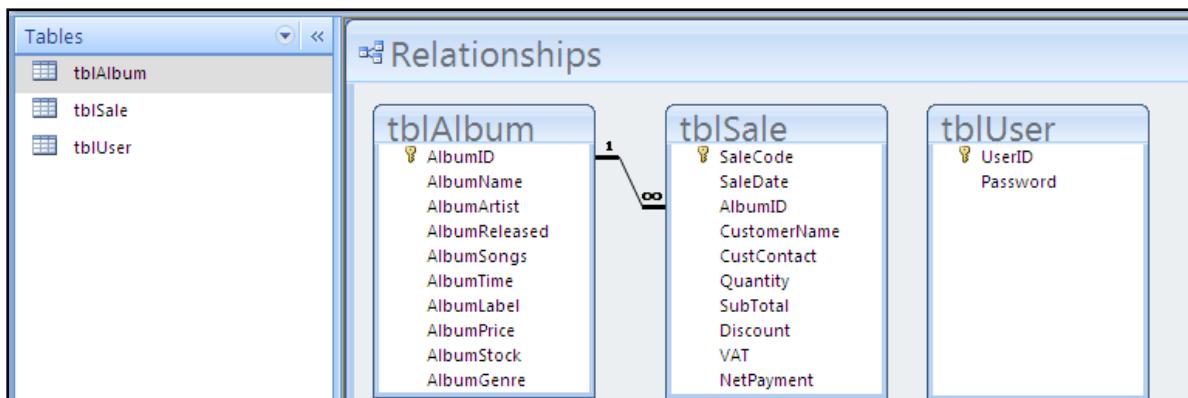
**tblAlbum** ( AlbumID, AlbumName, AlbumArtist, AlbumGenre, AlbumSongs, AlbumTime, AlbumReleased, AlbumLabel, AlbumPrice, AlbumStock )

**tblSale** ( SaleCode, CustomerName, CustContact, SaleDate, Quantity, SubTotal, Discount, VAT, NetPayment )

The tables can be normalized further. However, this has **not** been done. This is because of the following. The only information being stored about the customer is their name and contact number. Creating another table for this will not be very efficient. It will increase the number of tables and thus cause further unnecessary complications. The store has always kept up to the first normalization and the employees have gotten used to this. The employees have to get used to the change if this is done. Further normalization was not one of the objectives of the new system. Additionally, the contact number of the customer can change, and they may not inform us about this change and thus there is a risk of the data becoming outdated. Therefore, no further normalization will be done.

As one music album can be bought by many people, there is a relationship between the album table and the sales table. The “Album ID” field is present in both tables.

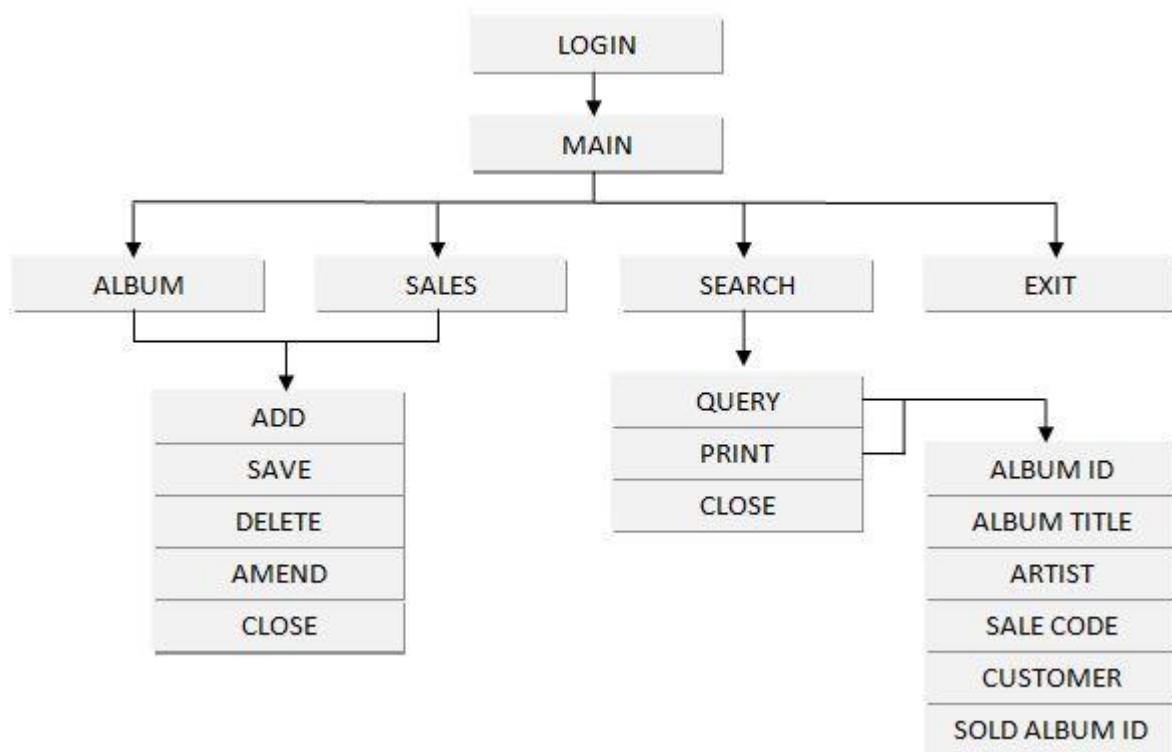




The above is a prototype of the database showing relationships.

### **Process model**

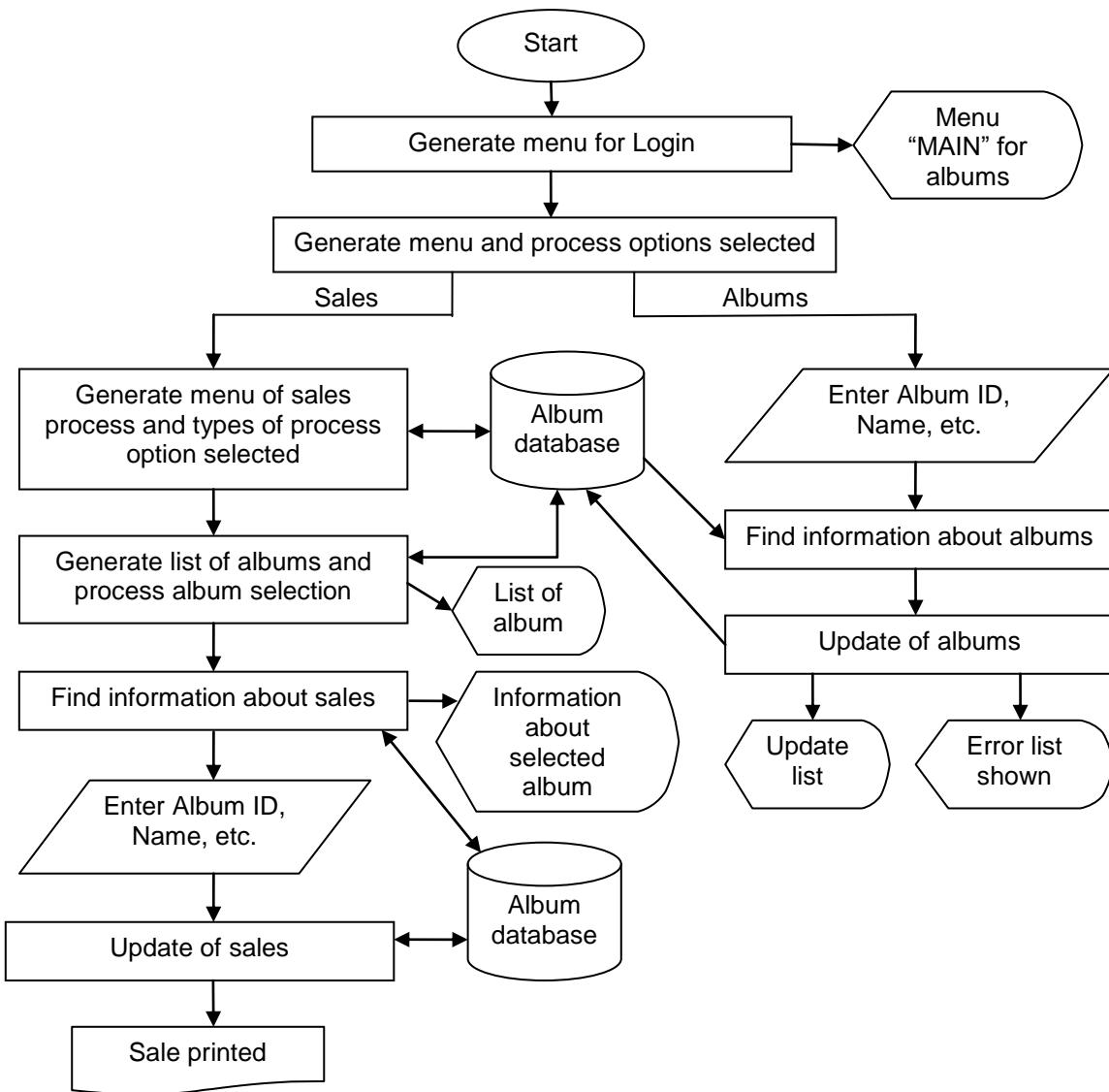
A drop down can be used to visualize the whole program:

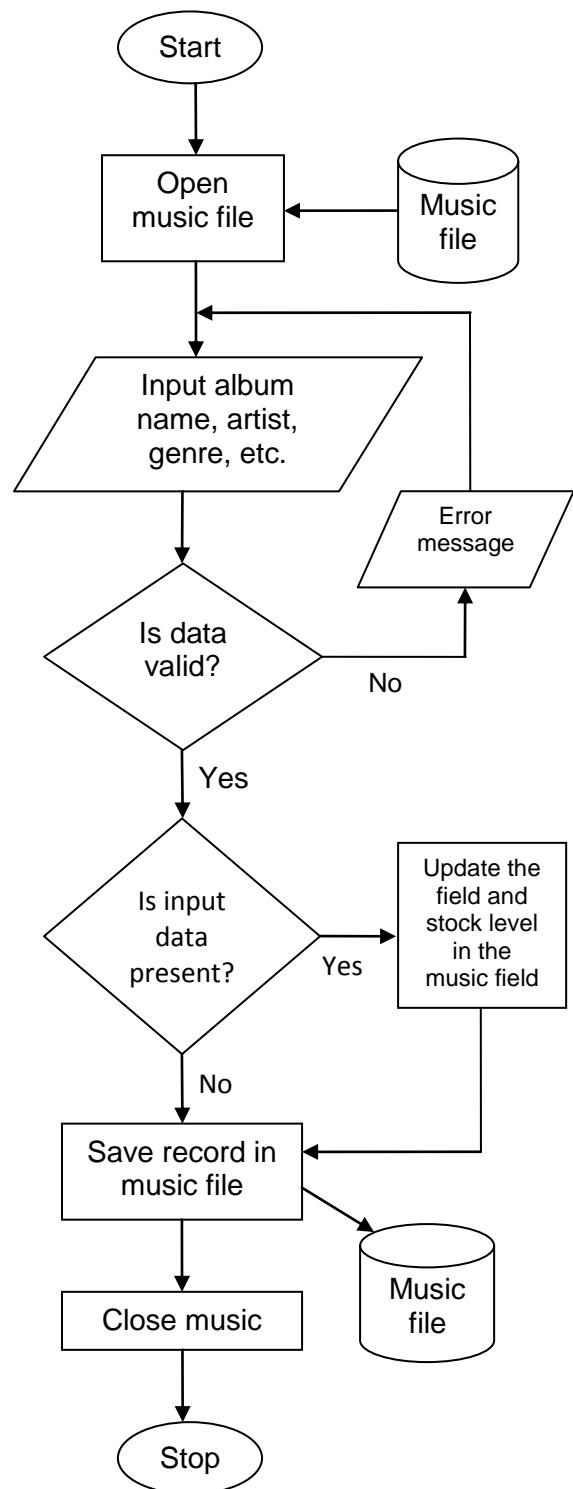
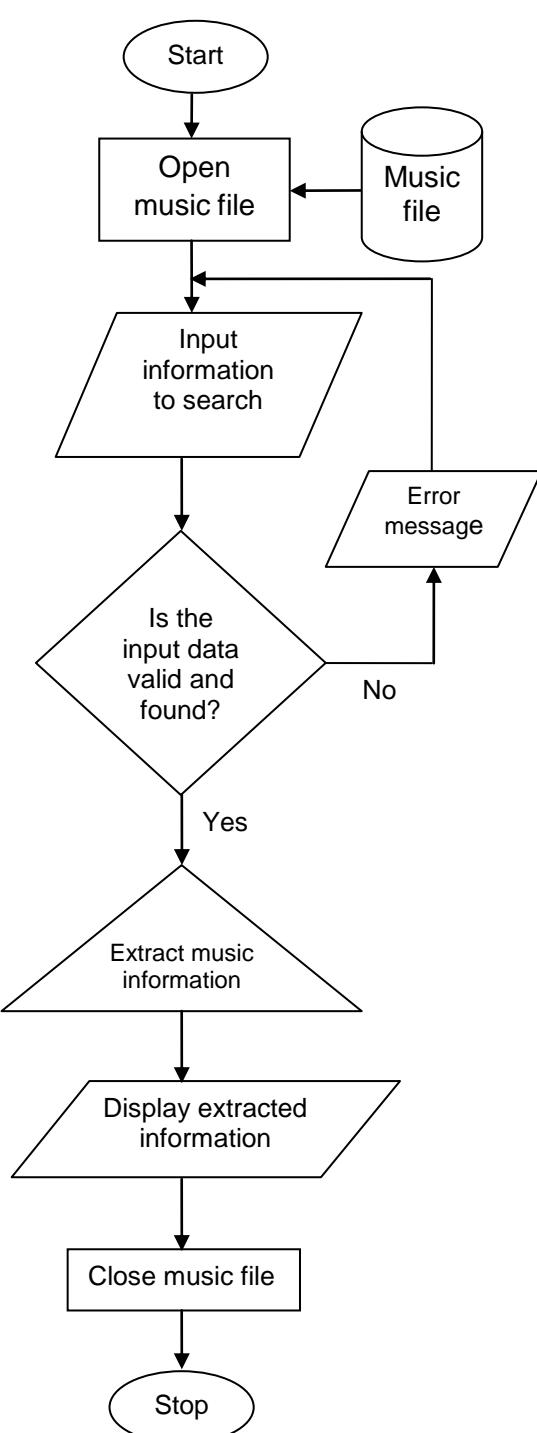


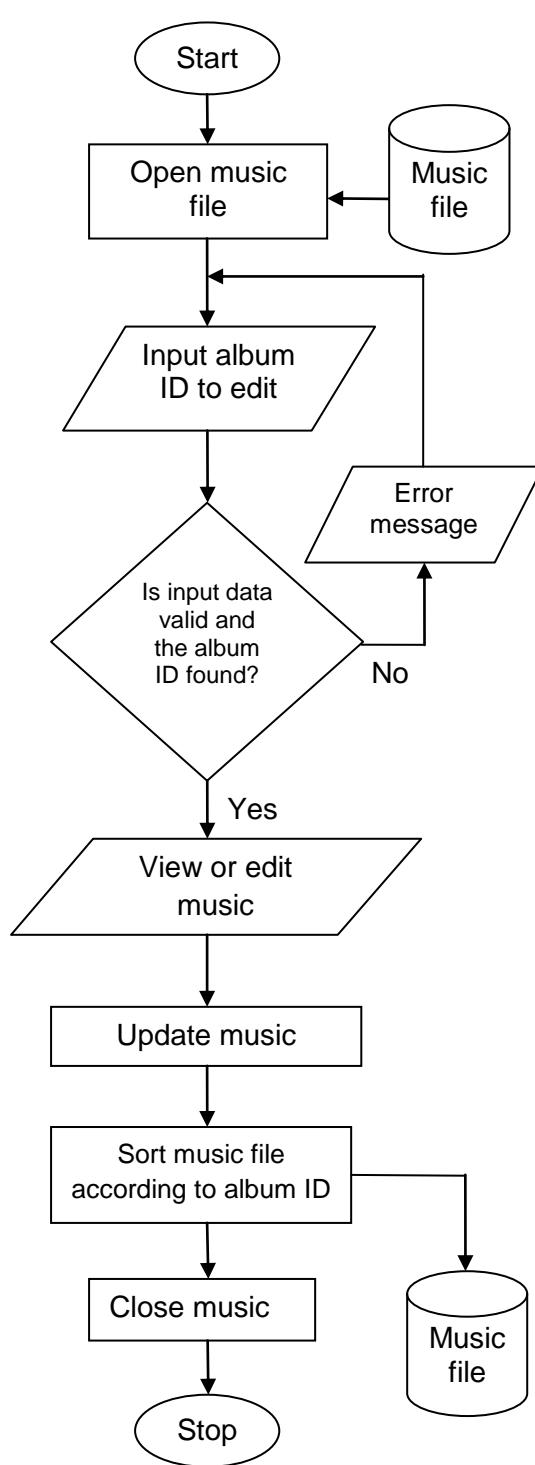
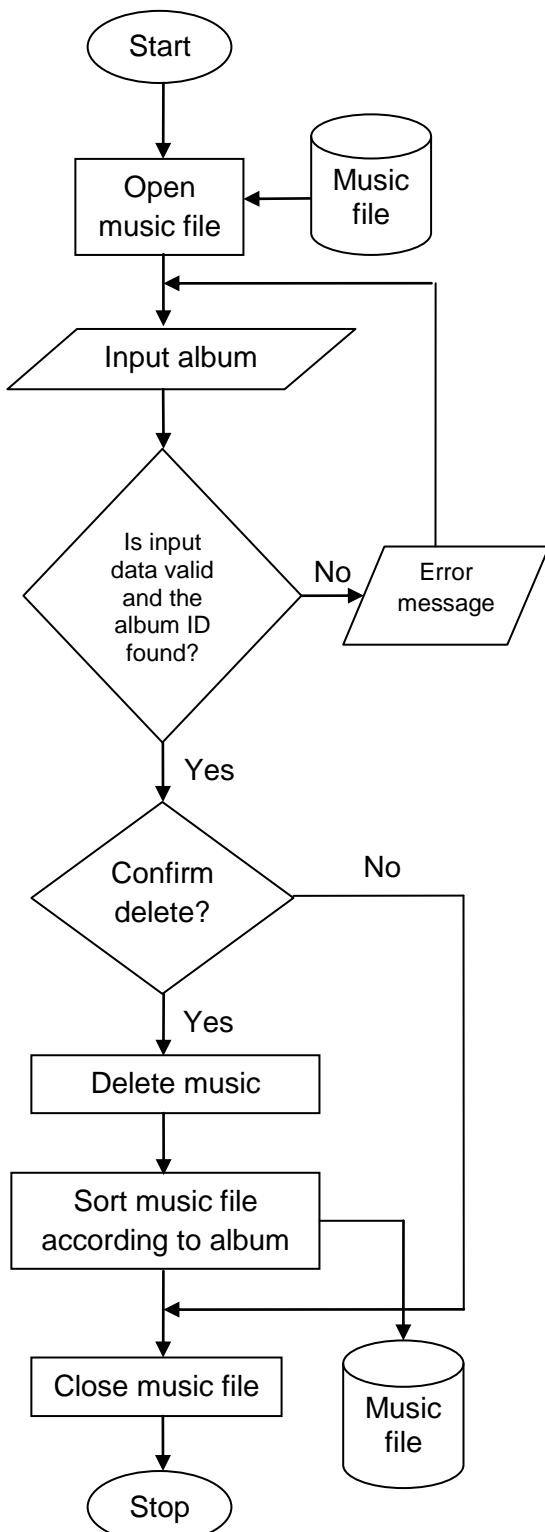
## SYSTEMS FLOWCHART

### *The system*

The following is the system flowchart of the proposed system.



**Adding a new record****Searching for a record**

***Editing a record******Deleting a record***

## The SQL statement

```
SELECT *
FROM tblAlbum
WHERE Field = ?
```

*To select all fields  
From the Album table  
Where AID (Album ID) is a parameter for search*

## The formulas used

- VAT = SubTotal \* 0.15
- DiscountMoney = SubTotal \* ( Discount / 100 )
- NetPayment = SubTotal + VAT - DiscountMoney

## A module test

Before	After												
<p><b>Album Info</b></p> <p>Album ID: A1001</p> <p>Add Save Delete</p> <table border="1"> <thead> <tr> <th>AlbumID</th> <th>AlbumName</th> <th>AlbumArtist</th> </tr> </thead> <tbody> <tr> <td>A1001</td> <td>Vice Versa</td> <td>Switchfoot</td> </tr> </tbody> </table> <p>[Navigation buttons: &lt;&lt; Select &gt;&gt;]</p>	AlbumID	AlbumName	AlbumArtist	A1001	Vice Versa	Switchfoot	<p><b>Album Info</b></p> <p>Album ID: A1002</p> <p>Add Save Delete</p> <table border="1"> <thead> <tr> <th>AlbumID</th> <th>AlbumName</th> <th>AlbumArtist</th> </tr> </thead> <tbody> <tr> <td>A1001</td> <td>Vice Versa</td> <td>Switchfoot</td> </tr> </tbody> </table> <p>[Navigation buttons: &lt;&lt; Select &gt;&gt;]</p>	AlbumID	AlbumName	AlbumArtist	A1001	Vice Versa	Switchfoot
AlbumID	AlbumName	AlbumArtist											
A1001	Vice Versa	Switchfoot											
AlbumID	AlbumName	AlbumArtist											
A1001	Vice Versa	Switchfoot											
<i>'to make the "Add" form'</i> <pre>adcAlbum.Recordset.MoveLast AID = Right(txtAID, 4) adcAlbum.Recordset.AddNew txtAID.Text = "A" + CStr(AID + 1)</pre>													

## TEST PLAN

Testing needs to be done to make sure the software behaves as expected. If it does not, it needs to be debugged. Input, output and execution will all be checked.

The following table is for **objective numbers 2 and 14**. It will be used to see if the input validations work.

Test No.	Field	Test Data	Test Data Type	Reason	Expected Result
1	CustomerName	Abidur Rahim	Normal	To accept normal values	Accepted
		123	Abnormal	To reject abnormal values	Rejected
2	CustContact	8392134	Normal	To accept normal values	Accepted
		99999999999	Extreme	To accept extreme values	Accepted
		11111111111	Abnormal	To reject abnormal values	Rejected
3	AlbumGenre	Metal	Normal	To accept normal values	Accepted
		123	Abnormal	To reject abnormal values	Rejected
4	AlbumReleased	09/09/2010	Normal	To accept normal values	Accepted
		09/2010/09	Abnormal	To reject abnormal values	Rejected
5	AlbumStock	17	Normal	To accept normal values	Accepted
		0	Extreme	To accept extreme values	Accepted
		-4	Abnormal	To reject abnormal values	Rejected
6	SaleCode	S18208	Normal	To accept normal values	Accepted
		A123	Abnormal	To reject abnormal values	Rejected
7	AlbumLabel	Hollywood	Normal	To accept normal values	Accepted
			Abnormal	To reject abnormal values	Rejected
8	AlbumTime	44:53	Normal	To accept normal values	Accepted
		ab:cd	Abnormal	To reject abnormal values	Rejected

The following table will be used to check the normal execution of tasks and forms in the software. It will help achieve **objectives 9, 13 and 19**.

Test No.	Test	Expected Result
9	The “Add” button in the Sales form.	Execution
10	The “Save” button in the Album form.	Execution
11	The “Amend” button in the Album form.	Execution
12	The “Cancel” button in the Sales form.	Execution
13	The “Delete” button in the Sales form	Execution
14	The “Back to Main” button in the Album form.	Execution
15	The “Search and Report” button in the main screen.	Execution
16	The “OK” button in the Login form.	Execution
17	The “Exit” button in the Main form.	Execution
18	The “Query” button in the Search form.	Execution
19	The “Print” button in the Search form.	Execution

The following table will be used to check the software's outputs. It will make sure I have fulfilled **objectives 7, 15 and 16**.

Test No.	Test	Test Data	Test Data Type	Expected Result
20	The query option in Search form with Album ID as the search parameter.	A1023	Normal	The record gets displayed.
21	The print option in Search form with Album ID as the search parameter.	A1023	Normal	The data report gets displayed.
22	The query option in Search form with Sale Code as the search parameter.	S10014	Normal	The record gets displayed.
23	The print option in Search form with Sale Code as the search parameter.	S10014	Normal	The data report gets displayed.
24	The query option in Search form with Sale Code as the search parameter.	Sabcde	Abnormal	Nothing gets displayed.
25	The print option in Search form with Sale Code as the search parameter.	Sabcde	Abnormal	The data report is empty.

## (II) INTENDED BENEFITS

It is true that the current system has some advantages. The staffs are used to the system and all the materials required to maintain this system are easily available. The new system will be expensive to set up. However, the benefits of the new system greatly outweigh these drawbacks.

Some of the advantages of the new system will be:

- Information here will have a higher chance of being correct and easier to understand because the large amounts of data will be stored in an organized way.
- The data will be much easier to back up.
- The requirement of a username and password will greatly increase security.
- Searching will be much faster and reports will be neater, simpler, and easy to create.
- Data manipulation, as well as input and output, will be faster and easier, as the software will be user-friendly.
- Its running cost will be lower because paper and other stationeries will be saved and less space will be taken up.
- Customer satisfaction will increase as they will have to wait less long on queues.

### (III) LIMITS OF THE SCOPE OF THE SOLUTION

Some of the limitations of the new system are:

- The system does not allow Electronic Point of Sale (EPOS).
- The database is completely and only stored on the computer. Therefore, a system crash would cause major, though temporary, problems.
- This system only supports that a person buys only one type of album at a time. Multiple receipts have to be created if a customer buys different albums at one given time.
- The system does not allow the recognition of barcodes.
- There are a limited number of records that the database can hold. This is 8999 for albums and 89999 for sales.
- The database is not fully normalized.

#### ***Size approximation***

An approximate increase in size of the database per year is calculated below.

Field Name	Data Type	Size (in bytes)
AlbumID ( <i>primary key</i> )	Text	5
AlbumName	Text	35
AlbumArtist	Text	25
AlbumGenre	Lookup Wizard	15
AlbumSongs	Number	2
AlbumTime	Time	5
AlbumReleased	Date	10
AlbumLabel	Text	30
AlbumPrice	Currency	6
AlbumStock	Number	4
		<b>Total: 137</b>
SaleCode ( <i>primary key</i> )	Text	6
CustomerName	Text	30
CustContact	Text	11
SaleDate	Date	10
AlbumID ( <i>foreign key</i> )	Text	5
Quantity	Number	3
SubTotal	Currency	6
Discount	Currency	6
VAT	Currency	6
NetPayment	Currency	6
		<b>Total: 89</b>
UserID	Text	10
Password	Text	15
		<b>Total: 25</b>

Assuming 100 new albums are added per year, 100 sales are made per day, and the store remains open 350 days of the year, the **approximate size** is,

$$\begin{aligned}\text{Total bytes} &= (137 * 100) + (89 * 100 * 350) + (15 * 1) \\ &= 3128715\end{aligned}$$

$$\begin{aligned}\text{After overhead} &= 3128715 * 1.1 \\ &= 3441586.5\end{aligned}$$

$$\begin{aligned}\text{In kilobytes} &= 3441586.5 / 1024 \\ &= 3360.92\end{aligned}$$

$$\begin{aligned}\text{In megabytes} &= 3360.92 / 1024 \\ &= 3.2821\end{aligned}$$

Therefore, the approximate size is **3.28 MB**.

## **(d) Software development, programming, testing and installation**

### **(I) DEVELOPMENT**

#### ***The description***

In general, the database was made in Microsoft Office Access 2007. The data is held by this program. The software was made in Microsoft Visual Basic 6.0 with the help of codes. This software manipulates the data in the database, but it does not directly hold it. An ADODC is used to connect the database (which is in the ".mdb" format) with the software. The tables and fields were all made in Access. When the database in the software is updated, it automatically updates the access database as they are the same database.

The reason for using Access together with Visual Basic is that though both are the best choices for this business, neither one can fulfill all the demands itself. Access does not have all the necessary features that are required. It was not made for commercial use, and therefore, has its drawbacks, when it comes to making a system such as ours, if we use it alone. Its security is especially bad, and data input is not very user-friendly. Visual Basic cannot hold or make a database on its own. So, the database was simply connected to the program written in Visual Basic and all the demands were satisfied.

#### ***Database development***

To create the database, the following steps were followed:

1. Open Microsoft Access from the "All Programs" menu after clicking the "Start" button on the taskbar.
2. Select "Blank database" from the new blank database section.
3. Specify a filename, (e.g. Paradox Music) and save it to the desired location (e.g. D:\Paradox Music) and click create.
4. Click "Create" tab and select Table Design and put all the field names, their respective data types and other specifications.
5. Specify the primary key then close the table and save it with appropriate name (e.g. tblAlbum).
6. Repeat steps 4 and 5 for each table.

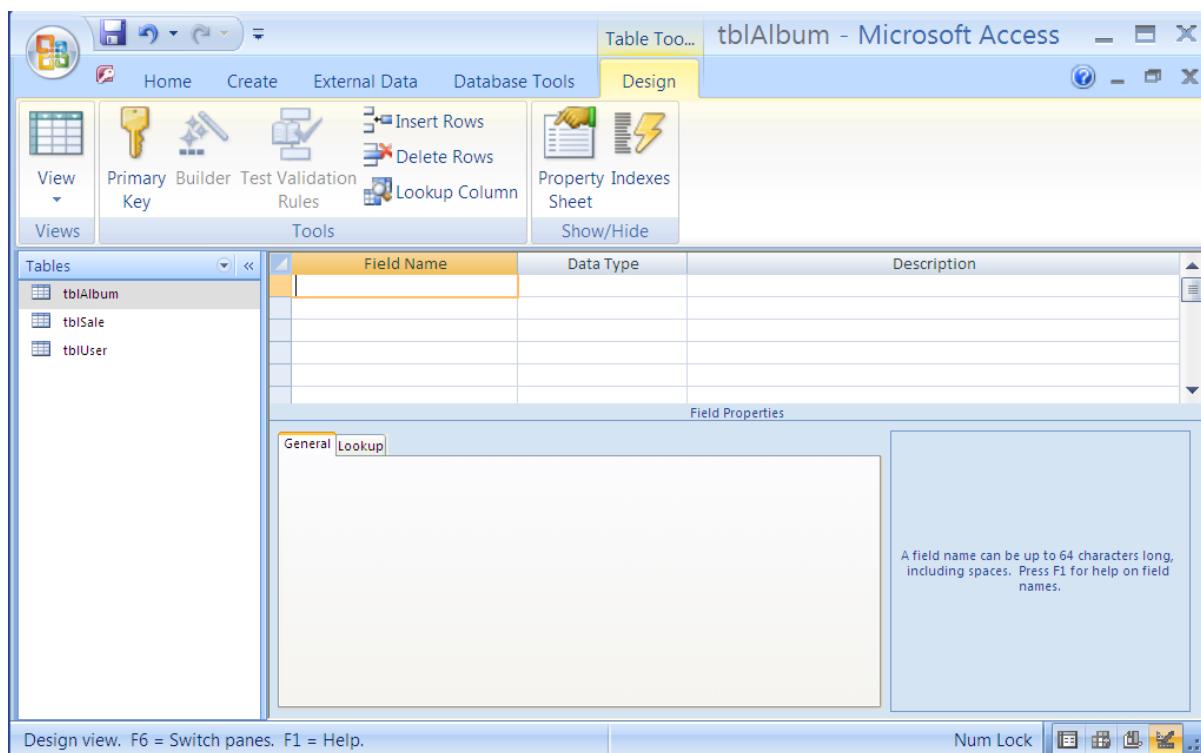


Fig: the database before development

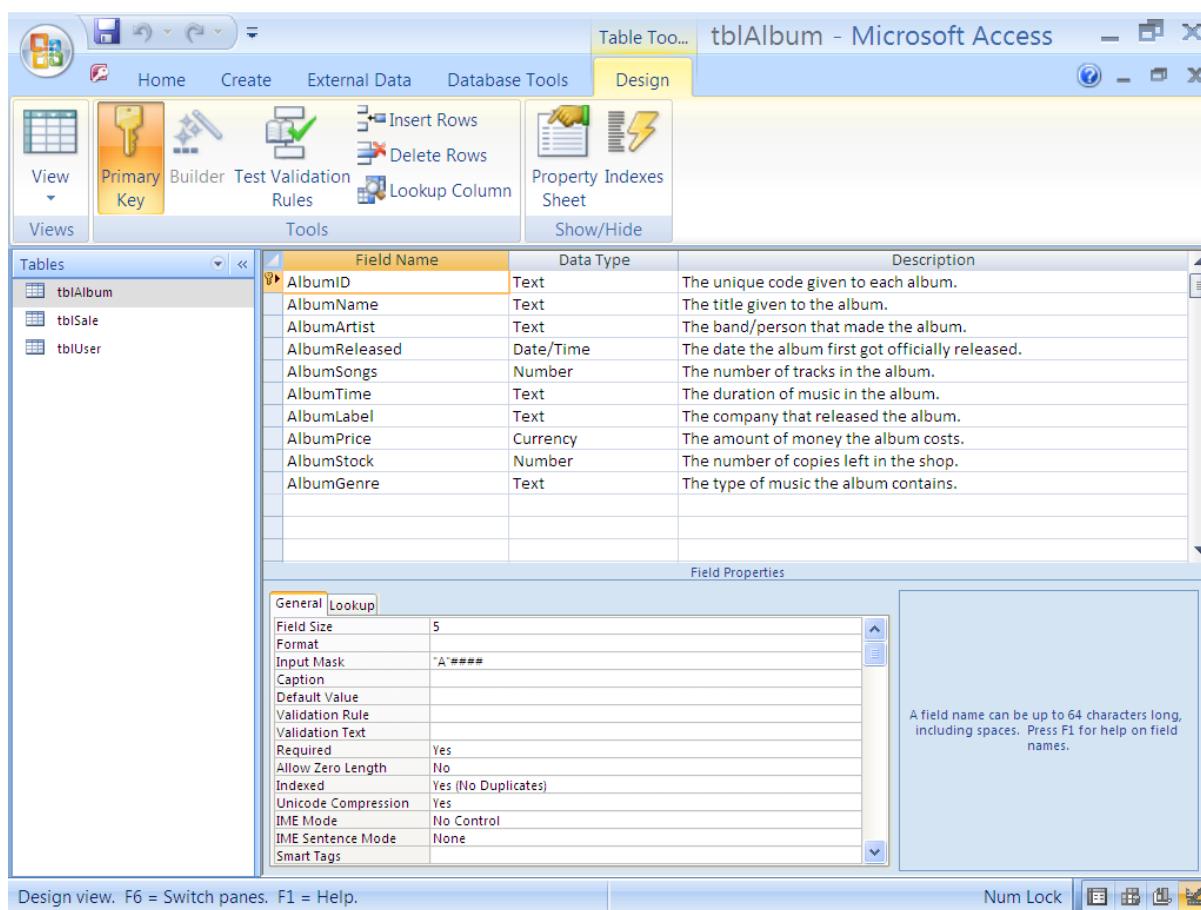


Fig: the database after the fields were made (in design view); Album ID is the primary key

| Candidate Name: **Abidur Rahim** | Centre Number: **BDo09** | Candidate Number: **3293** |

Fig: the database after the fields were created but before records were entered

AlbumID	AlbumName	AlbumArtist	AlbumReleaseDate	AlbumLength	AlbumTime	AlbumLabel	AltRating	Albu	AlbumGenre
A1001	Daughtry	Daughtry	9/21/2006	12:43:26	RCA	1.5	45		Alternative
A1002	Leave This Town	Daughtry	7/14/2009	14:45:26	RCA	1.5	45		Rock
A1003	Leave This Town: The	The Daughtry	7/6/2010	6:25:39	RCA	1	45		Rock
A1004	Life Turns Electric	Finger Eleven	9/21/2010	10:32:12	Wind-Up	1.5	45		Alternative
A1005	Them vs. You vs. Me	Finger Eleven	3/6/2007	11:40:23	Wind-Up	1.5	45		Rock
A1006	The Greyest of Blues	Finger Eleven	7/25/2000	11:41:10	Wind-Up	1.5	45		Rock
A1007	A Thousand Suns	Linkin Park	9/14/2010	16:47:56	Warner Bros.	1.5	45		Alternative
A1008	Dreaming Out Loud	OneRepublic	11/20/2007	13:57:25	Mosley/Interscope	1.5	45		Rock
A1009	Dear Agony	Breaking Benjamin	11/2/2009	11:41:52	Hollywood Records	1.5	45		Rock
A1010	Away From The Sun	3 Doors Down	2/3/2003	12:46:57	Universal-Island Rec	1	45		Rock
A1011	Seventeen Days	3 Doors Down	2/8/2005	12:44:29	Universal	1.3	45		Rock
A1012	Life Starts Now	Three Days Grace	9/22/2009	12:43:25	Jive	1.3	45		Rock
A1013	AB III	Alter Bridge	11/9/2010	16:66:07	ALTER BRIDGE RECO	1.5	45		Rock
A1014	Blackbird	Alter Bridge	10/9/2007	13:59:17	Universal Republic	1.5	45		Rock
A1015	One-X	Three Days Grace	6/25/2006	12:43:40	Jive	1.5	45		Pop
A1016	Break the Spell	Daughtry	11/21/2011	12:43:45	RCA	1.5	45		Rock
A1017	Comatose	Skillet	10/3/2006	11:41:33	Lava	1.5	45		Alternative
A1018	Collide	Skillet	11/18/2003	11:48:38	Lava Records	1.5	45		Religious
A1019	Invincible	Skillet	2/1/2000	12:52:38	Ardent Records	1.5	45		Rock
A1020	Ardent Worship	Skillet	9/29/2000	10:51:33	Ardent Records	1.5	45		Religious
A1021	Finger Eleven	Finger Eleven	6/17/2003	12:46:25	Wind-Up	1.5	45		Rock
A1022	Alien Youth	Skillet	8/28/2001	12:53:14	Ardent Worship	1.5	45		Rock

Fig: the database after some records were saved

The other tables (tblSale and tblUser) were created and some records added in the same way.

This screenshot shows the Microsoft Access application in Design view for the 'tblAlbum' table. The ribbon at the top has 'Table Tools' selected and 'Design' highlighted. On the left, there's a 'Tables' pane showing three tables: 'tblAlbum', 'tblSale', and 'tblUser'. The main area displays the table structure with nine fields: AlbumID (Text), AlbumName (Text), AlbumArtist (Text), AlbumReleased (Date/Time), AlbumSongs (Number), AlbumTime (Text), AlbumLabel (Text), AlbumPrice (Currency), and AlbumStock (Number). Below this is a detailed view of the 'AlbumID' field's properties. The 'General' tab shows settings like Field Size (5), Format (A #####), Input Mask (A#####), Required (Yes), and Allow Zero Length (No). The 'Field Properties' window on the right provides a tooltip: 'A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.'

Fig: The design view of the “Album” table

This screenshot shows the Microsoft Access application in Datasheet view for the 'tblAlbum' table. The ribbon at the top has 'Table Tools' selected and 'Datasheet' highlighted. The 'Font' toolbar is visible, showing 'Calibri' and '11'. The main area displays the table data with 22 records. The columns are: Album (dropdown menu), AlbumName, AlbumArtist, AlbumRe (dropdown menu), Albu (dropdown menu), Albu (dropdown menu), AlbumLabel, Alt (dropdown menu), Albu (dropdown menu), and AlbumGenre. A tooltip at the bottom left says 'The unique code given to each album.' The status bar at the bottom right shows 'Record: 25 of 25'.

Fig: The “Album” table with records saved

**Fig: The design view of the “Sales” table**

The screenshot shows the Microsoft Access application in Design view for the 'tblSale' table. The ribbon at the top has 'Table Tools' selected under 'Design'. The 'Primary Key' button is highlighted in the 'Tools' tab. The main area displays the table structure with 10 fields: SaleCode, SaleDate, AlbumID, CustomerName, CustContact, Quantity, SubTotal, Discount, VAT, and NetPayment. Each field has its data type, description, and properties defined. A tooltip for the 'Field Name' column indicates it can be up to 64 characters long, including spaces.

Field Name	Data Type	Description
SaleCode	Text	The unique code given to the sell.
SaleDate	Date/Time	The date of purchase of the album(s).
AlbumID	Text	The ID of the album that was sold.
CustomerName	Text	The name of the person who has bought the album(s).
CustContact	Text	The customer's phone number.
Quantity	Number	The number of albums sold to the customer.
SubTotal	Currency	The initial price of the album(s).
Discount	Currency	The amount of money reduced from the usual price.
VAT	Currency	The album's Value Added Tax (VAT).
NetPayment	Currency	The amount of money the customer has paid.

**Fig: The “Sale” table with a few records saved**

The screenshot shows the Microsoft Access application in Datasheet view for the 'tblSale' table. The ribbon at the top has 'Table Tools' selected under 'Datasheet'. The table contains five records with the following data:

SaleCode	SaleDate	AlbumID	CustomerName	CustContact	Quantity	SubTc	Discount	VAT	NetPayment
S10001	2/24/2012	A1008	Siam Ahmed	01191706256	2	1.5	0.05	0.025	1.3
S10002	1/17/2012	A1005	Adnan Bin	01716524982	2	3	0	0.45	3.45
S10003	1/19/2012	A1005	Fahad	01191706253	2	3	0	0.45	3.45
S10004	2/12/2012	A1001	Saif	01712121221	2	3	0.3	0.45	3.15
S10005	3/11/2012	A1004	Abidur	01233515579	4	6	0	0.9	6.9

The screenshot shows the Microsoft Access application window in Design view. The ribbon at the top has 'Design' selected. The left pane shows tables: 'tblAlbum', 'tblSale', and 'tblUser'. The main area displays the 'tblUser' table structure with two fields: 'UserID' (Text) and 'Password' (Text). A context menu is open over the 'UserID' field, showing options like 'General' and 'Lookup'. The 'General' tab is selected, showing properties such as Field Size (10), Required (Yes), and Indexed (Yes (No Duplicates)). A tooltip provides information about field names. The status bar at the bottom indicates 'Design view. F6 = Switch panes. F1 = Help.'

Field Name	Data Type	Description
UserID	Text	
Password	Text	

**Fig: The design view of the “User” table**

The screenshot shows the Microsoft Access application window in Datasheet view. The ribbon at the top has 'Table Tools' selected. The left pane shows tables: 'tblAlbum', 'tblSale', and 'tblUser'. The main area displays the 'tblUser' table with one record: 'UserID' is 'admin' and 'Password' is '\*\*\*\*\*'. The status bar at the bottom indicates 'Datasheet View'.

UserID	Password
admin	*****

**Fig: The “User” table with a record stored**

The database was designed based on these data structures:

Field Name	Data Type	Size	Description	Example
AlbumID ( <i>primary key</i> )	Text	5	The unique ID given to each album. It is the primary key. This has the format A#####.	A1023
AlbumName	Text	35	The title or name of the album.	A Thousand Suns
AlbumArtist	Text	25	The artist (singer/creator) of the music album.	Linkin Park
AlbumGenre	Lookup Wizard	15	The type of music. There are only a limited number of possibilities and thus a drop-down can be used.	Rock
AlbumSongs	Number	2	The number of songs in the album.	12
AlbumTime	Time	5	The total play time of the album.	49:26
AlbumReleased	Date	10	The date the album was released.	09/26/2009
AlbumLabel	Text	30	The record company of the album.	Universal Records
AlbumPrice	Currency	6	The unit price of the album in BDT.	950
AlbumStock	Number	4	The number of CDs of the album still present in the shop.	29

Field Name	Data Type	Size	Description	Example
SaleCode ( <i>primary key</i> )	Text	6	The unique ID given to each sale. It is the primary key. This has the format S#####.	S14532
CustomerName	Text	30	The name of the customer who bought the album. No numbers are allowed in this field.	Richard Parker
CustContact	Text	11	The customer's phone number. Cannot contain any alphabets.	01718272391
SaleDate	Date	10	The date of the sale.	02/30/2014
AlbumID ( <i>foreign key</i> )	Text	5	The Album ID of the album being sold. This is a foreign key.	A1264
Quantity	Number	3	The number of that album being sold. Has to be a positive integer.	2
SubTotal	Currency	6	The AlbumPrice multiplied by the Quantity.	1900
Discount	Currency	6	The discount on the album. This is input in percentage out of 100. Depends on the customer and also the Quantity.	25.5 (giving 485 as the discount)
VAT	Currency	6	The VAT of the album. This is 1.5% of the SubTotal.	285
NetPayment	Currency	6	The SubTotal plus VAT minus Discount.	1700

Field Name	Data Type	Size	Description	Example
UserID	Text	10	The user name that is required to sign in and consequently access the program.	Manager
Password	Text	15	The password corresponding to that UsedID. Note that this field is case sensitive.	Note123

The relationship between the tables can also be created by going to the “Relations” option in the “Database Tools” tab. Tables are added by selecting and clicking “Add”. Drag-and-drop is used to join the field from the first table to another. The completed relationship is shown.

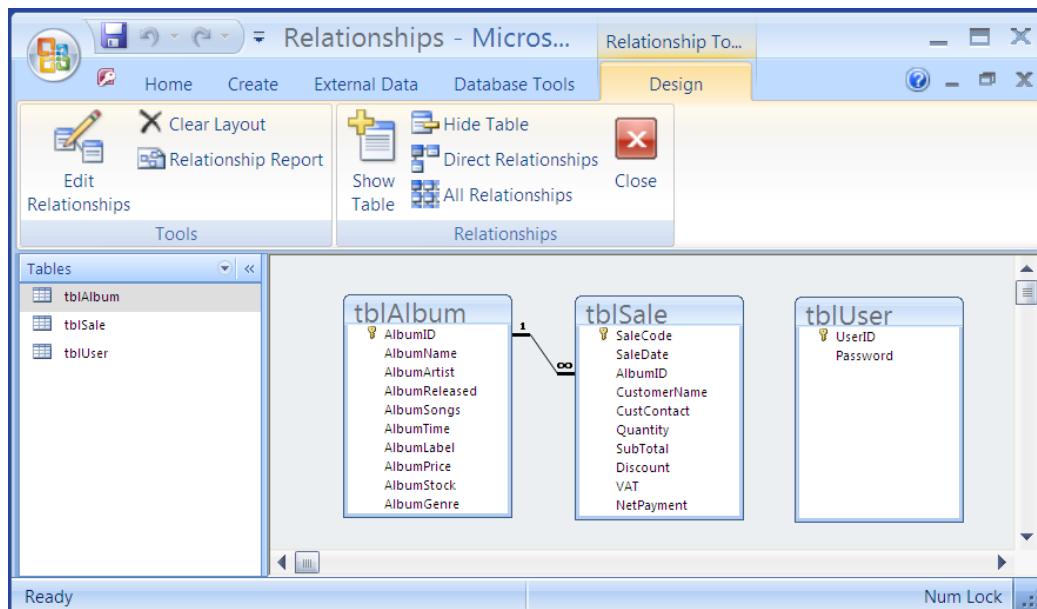


Fig: the relationship between the three tables

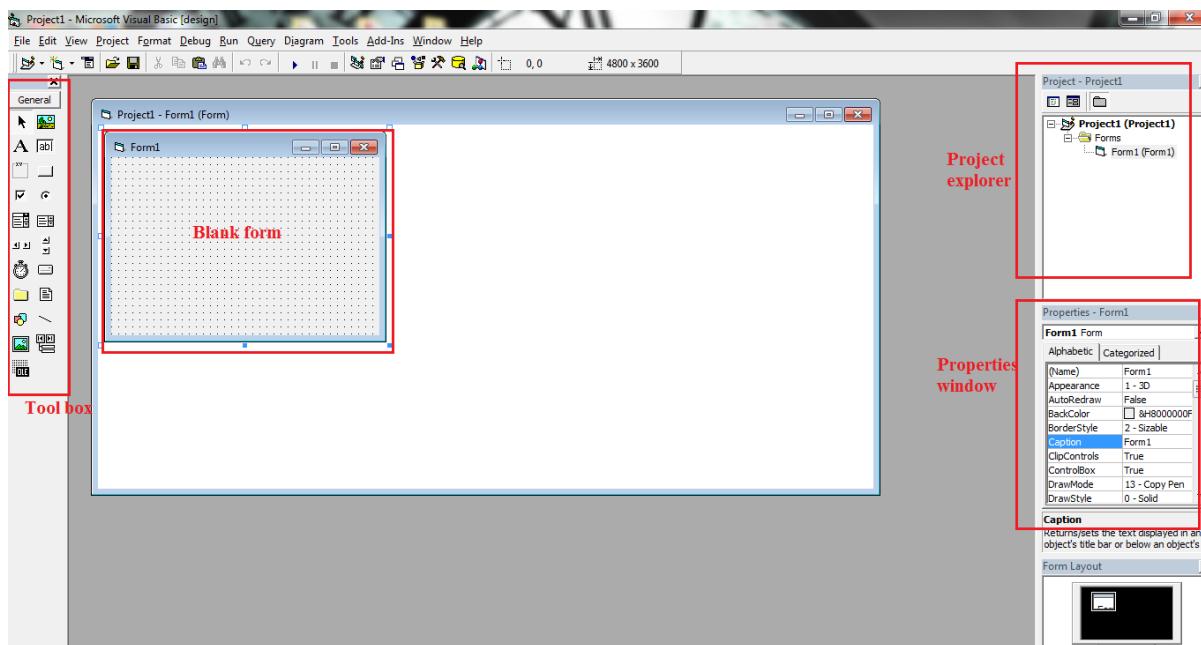
## The system

The system makes it easy to manipulate the data in it. Each field has its own text box where only data of that particular field can be entered. These are locked by default and can only be unlocked by clicking the “Amend” button to edit the data of that field. Clicking the “Add” button creates a new record and unlocks the text boxes. The “Cancel” and “Save” buttons locks them again to avoid accidental data input.

The data is organized in all the tables according to their respective primary keys. The primary keys are all unique and differentiate each record from all others. The stock information is shown in the Album form and the sales information is shown in the Sale form. This keeps the records stored in an organized manner. Even the search results are displayed according to the primary key (either Album ID or Sale Code, depending on the search parameters).

Before a report can be made and printed, a search will have to be made. Searches can be made on any one of six provided parameters. The result of the search is displayed in a data grid in terms of the records’ primary key. When the result has to be printed, the “Print” button is clicked and a printable data report is generated, which displays all the results of the search. The date of search is also automatically printed.

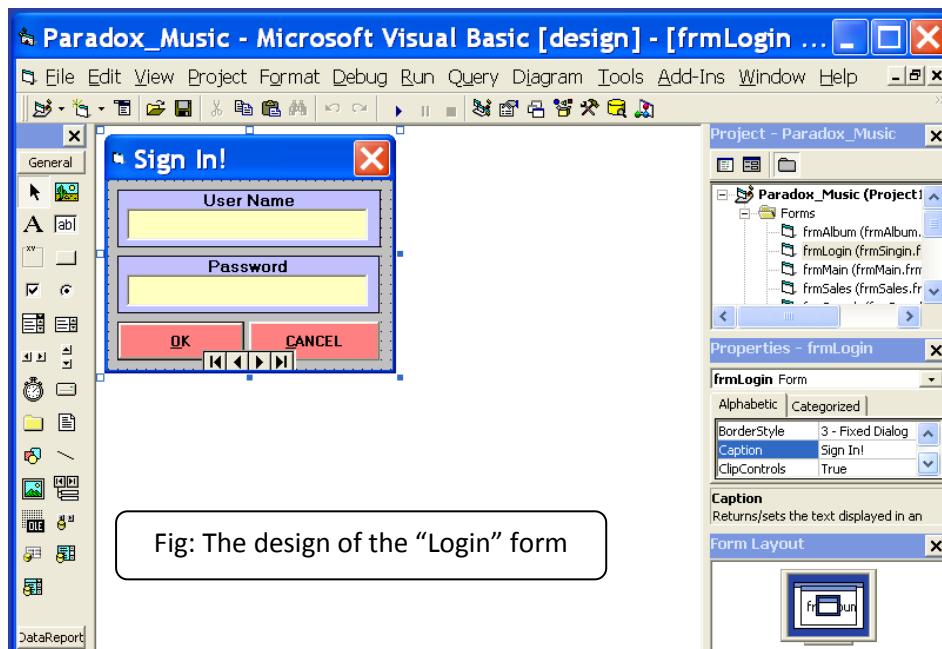
When Visual Basic is started the blank project looks like this.



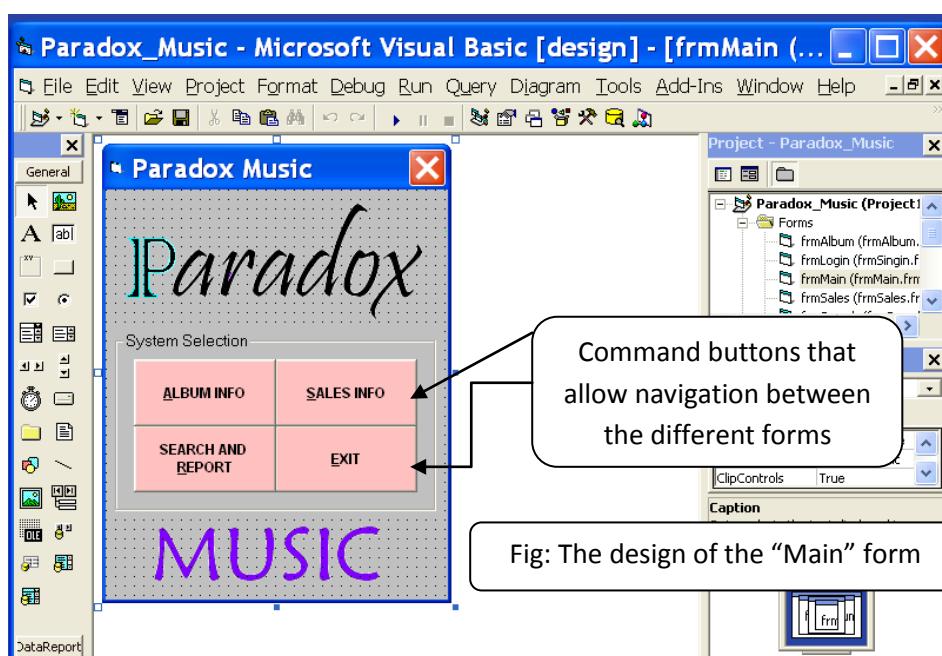
A description of the objects in the tool box is as follows.

Icon	Tool Name	What This Tool Does
	Pointer	Selects objects
	Picture box	Draws a box to display graphics
	Label	Draws a box to display text
	Text box	Draws a box that can display text and let the user type in text
	Frame	Groups two or more objects together
	Command button	Draws a command button
	Check box	Draws a check box
	Option (or radio)	Draws a radio button
	Combo box	Draws a combo box
	List box	Draws a list box
	Horizontal scroll bar	Draws a horizontal scroll bar
	Vertical scroll bar	Draws a vertical scroll bar
	Timer	Places a timer on a form
	Drive list box	Draws a drive list box that displays all the disk drives available
	Directory list box	Draws a directory list box that displays a directory on a particular disk Drive
	File list box	Draws a file list box that displays files in a specific directory
	Shape	Draws a geometric shape such as a circle or a square
	Line	Draws a line
	Image box	Draws a box to display graphics
	Data control	Draws a control to link a program to a database file
	OLE	Draws a box to insert an OLE object

## Form design



User name and password is required to sign in. This increases security, as in the objectives.



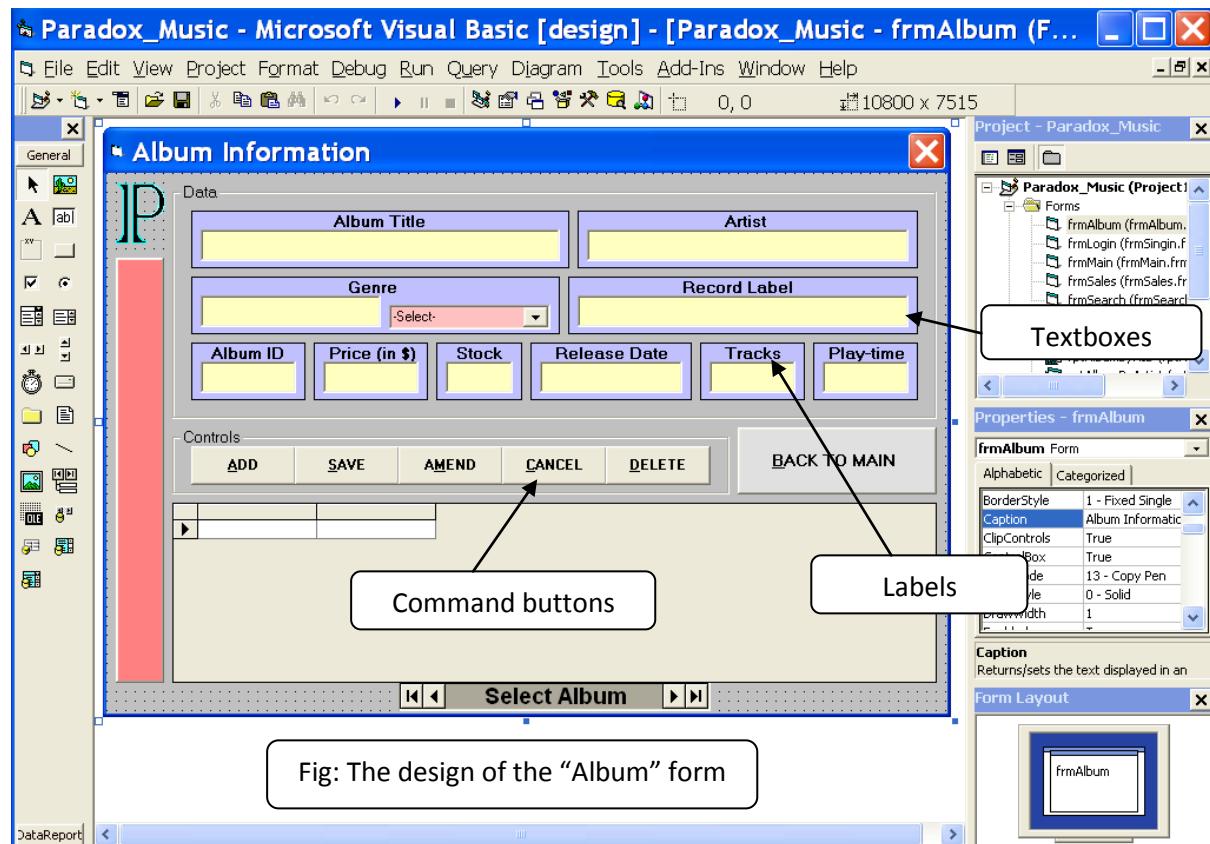


Fig: The design of the “Album” form

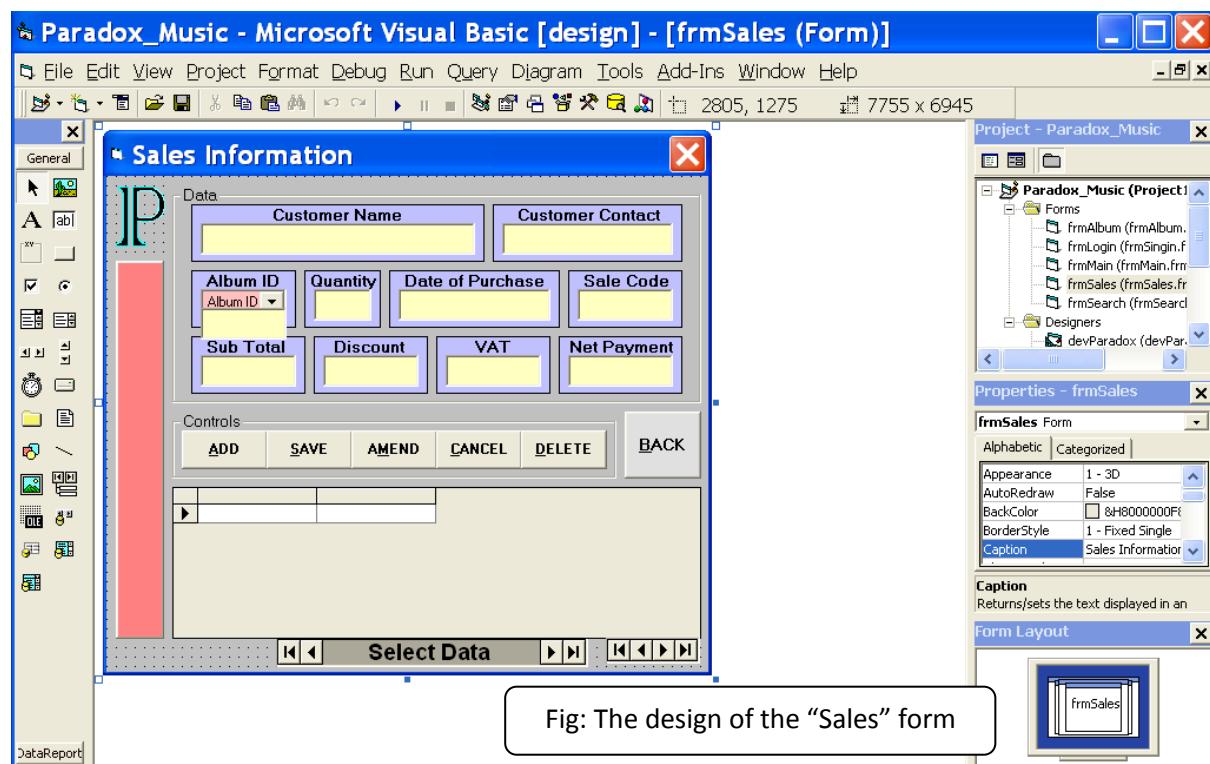
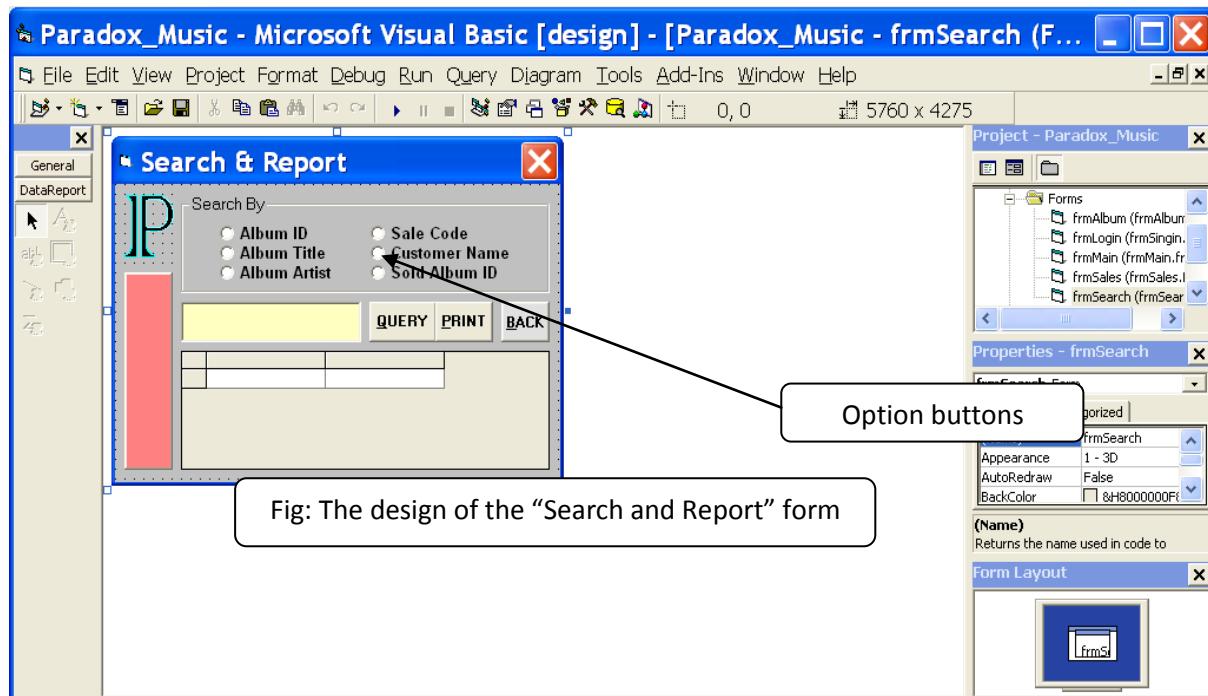
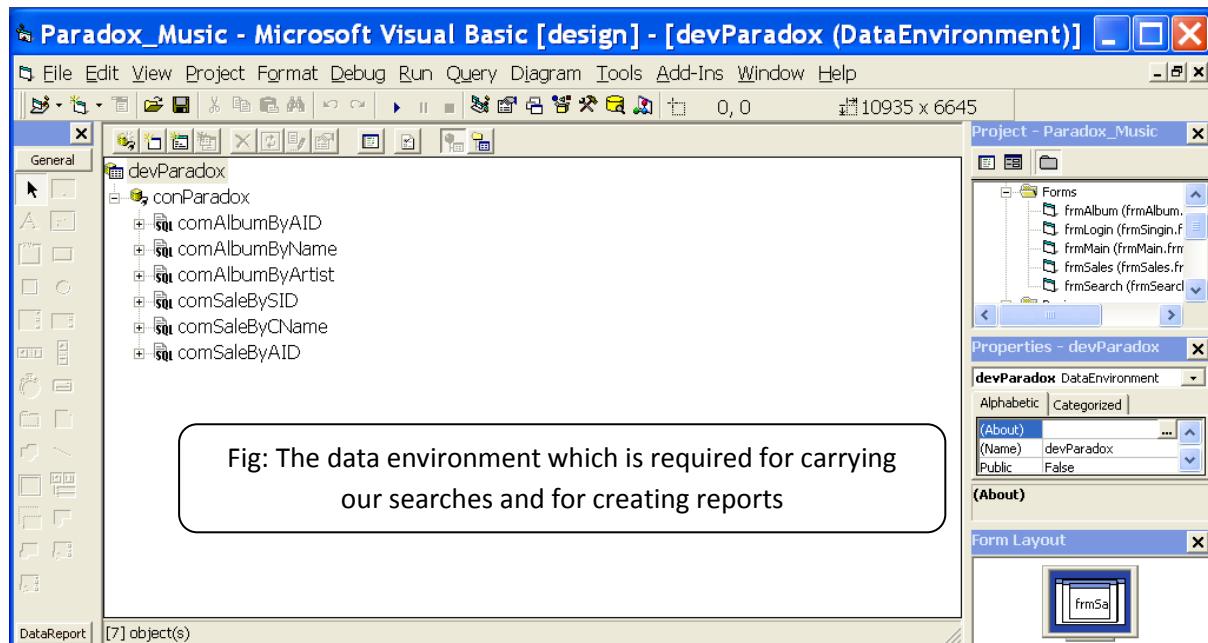
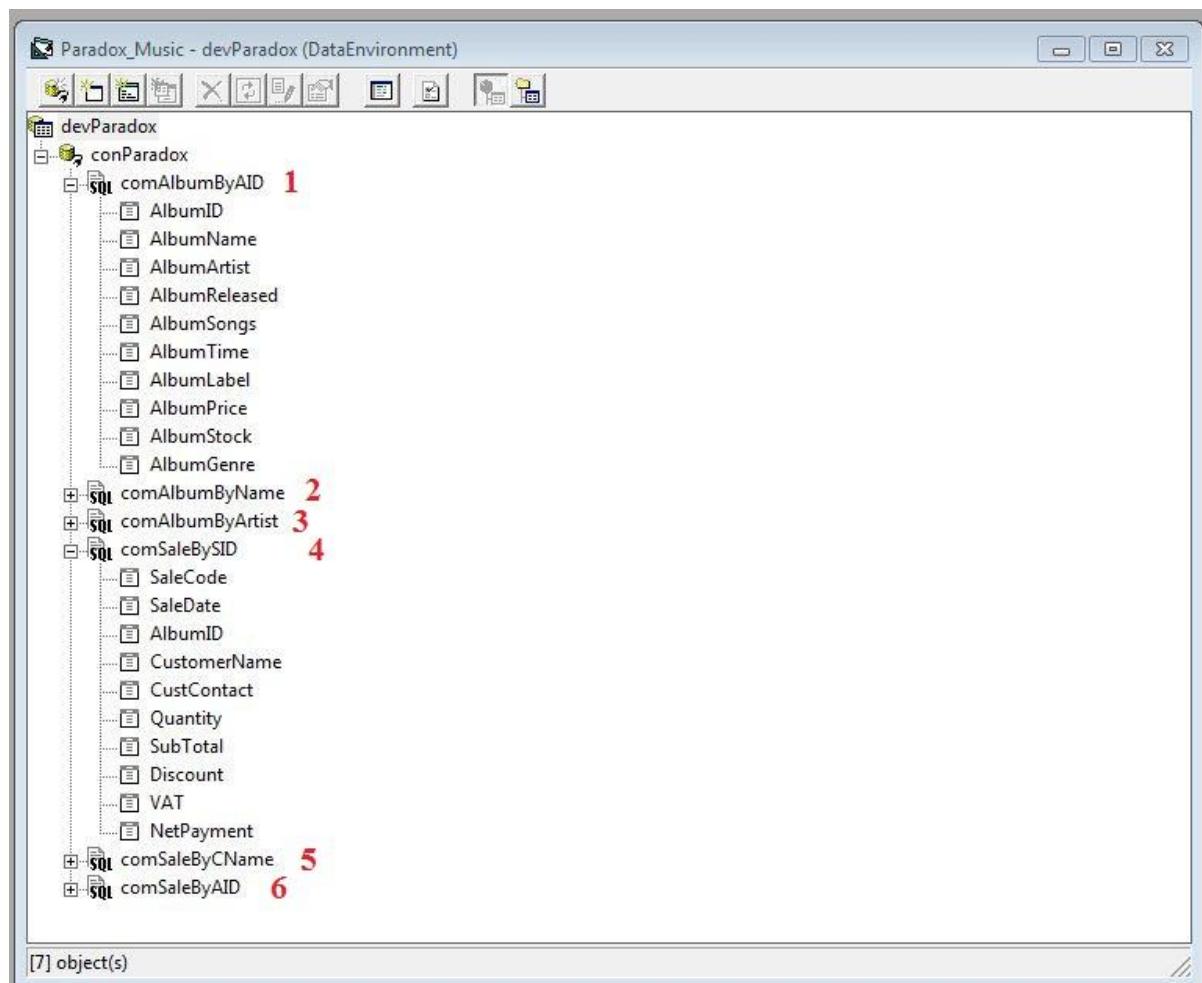
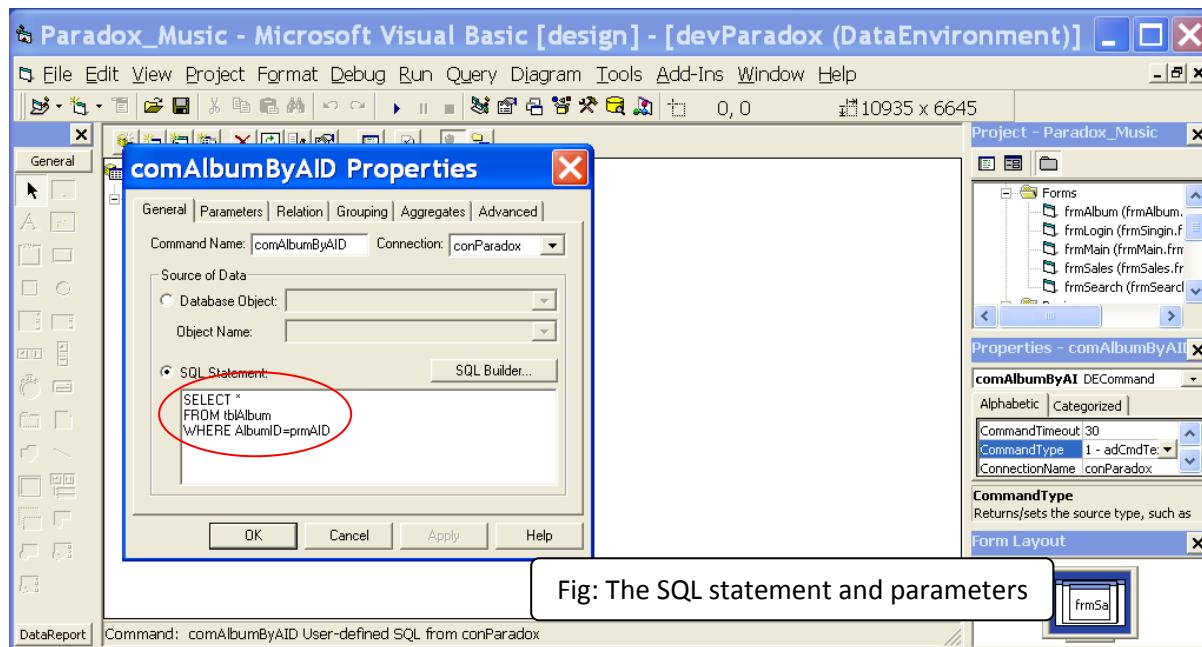


Fig: The design of the “Sales” form



## Searches and reports





All the SQL statements used are given below. The numbers follow the diagram above:

| Candidate Name: **Abidur Rahim** | Centre Number: **BDo09** | Candidate Number: **3293** |

1. **comAlbumByID:** This command is connected to the “AlbumID” field in the “tblAlbum” table.

```
SELECT * FROM tblAlbum WHERE AlbumID=prmAID
```

2. **comAlbumByName:** This command is connected to the “AlbumName” field in the “tblAlbum” table.

```
SELECT * FROM tblAlbum WHERE AlbumName=prmName
```

3. **comAlbumByArtist:** This command is connected to the “AlbumArtist” field in the “tblAlbum” table.

```
SELECT * FROM tblAlbum WHERE AlbumArtist=prmArtist
```

4. **comSaleBySID:** This command is connected to the “SaleCode” field in the “tblSale” table.

```
SELECT * FROM tblSale WHERE SaleCode=prmSID
```

5. **comSaleByCName:** This command is connected to the “CustomerName” field in the “tblSale” table.

```
SELECT * FROM tblSale WHERE CustomerName=prmCName
```

6. **comSaleByAID:** This command is connected to the “AlbumID” field in the “tblSale” table.

```
SELECT * FROM tblSale WHERE AlbumID=prmSaleAID
```

All the reports have a structure similar to the one below:

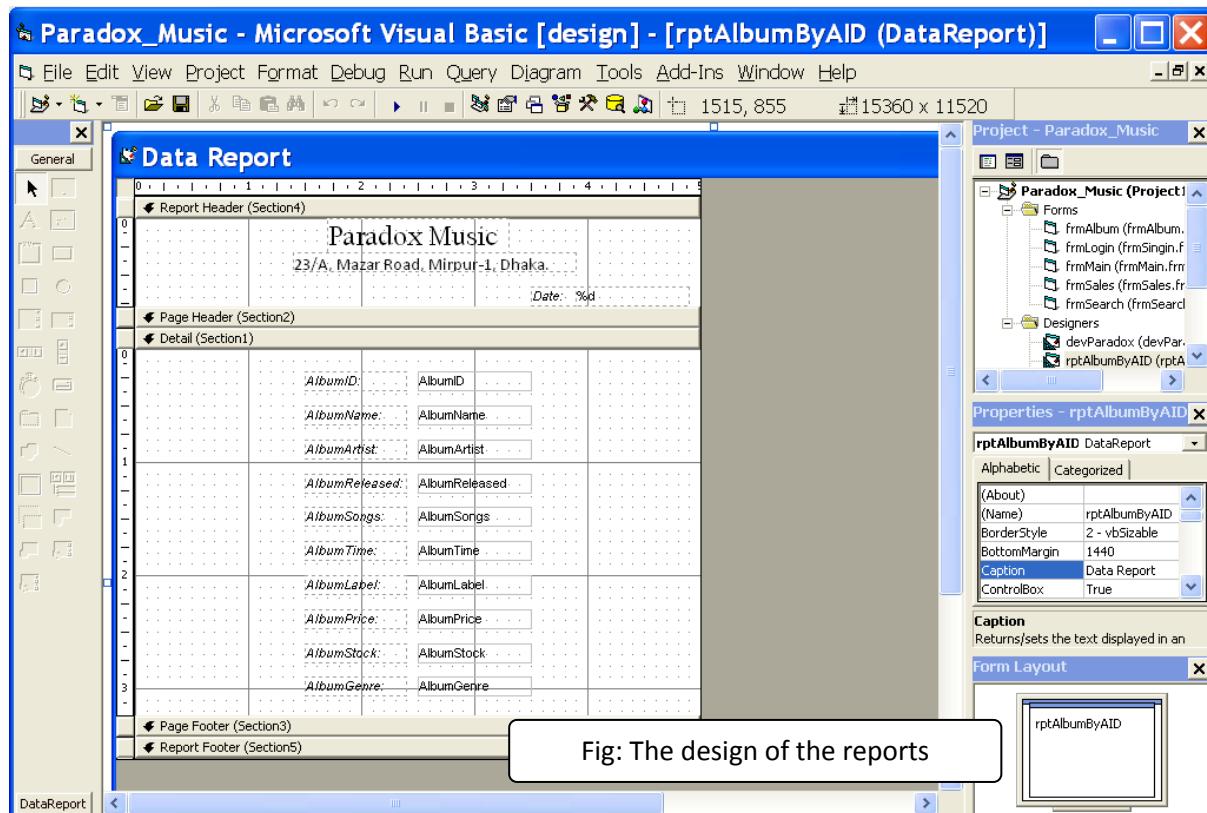
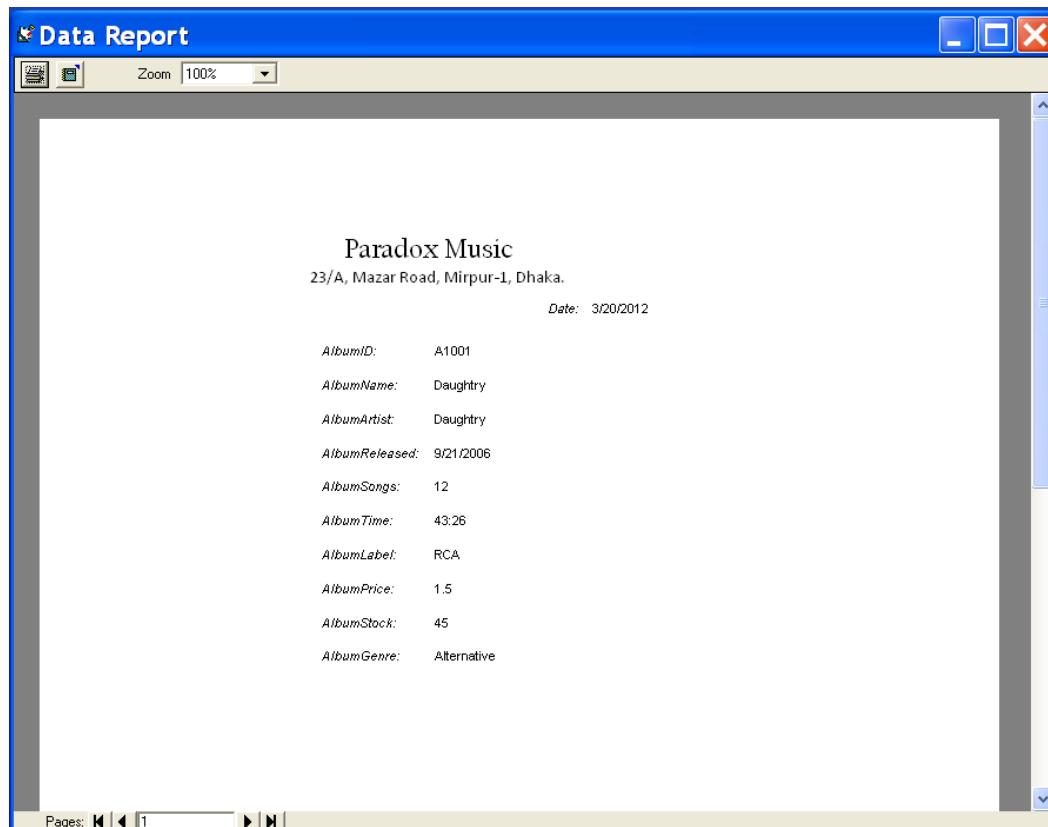
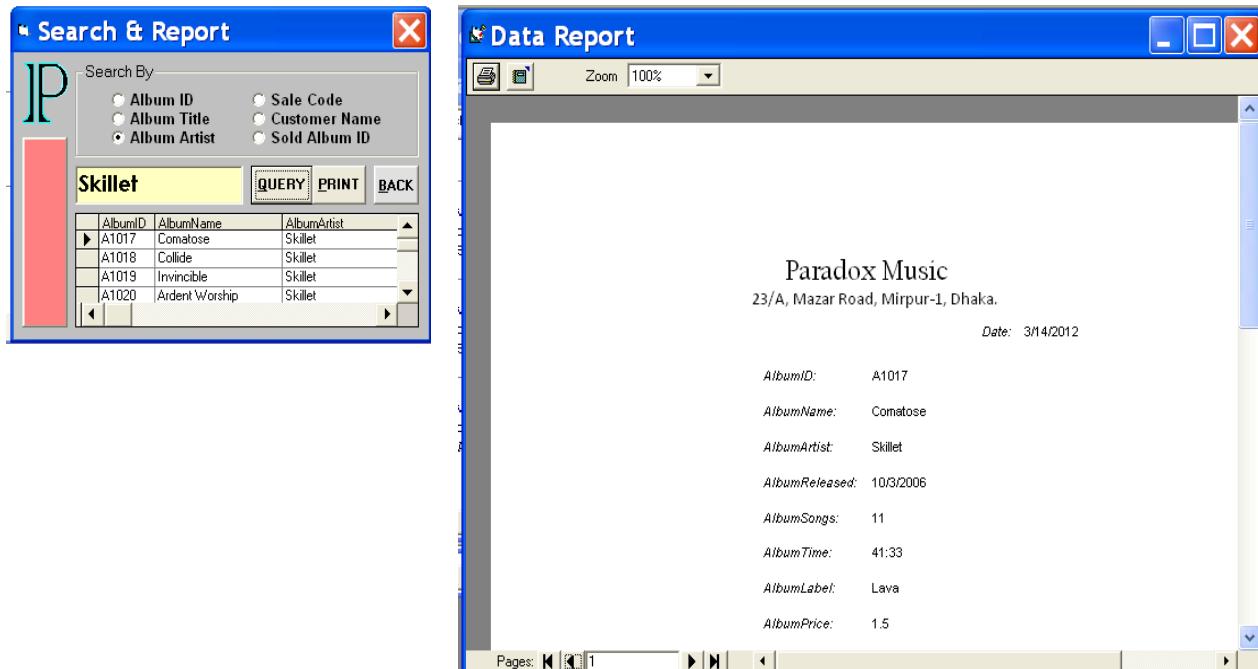


Fig: The design of the reports

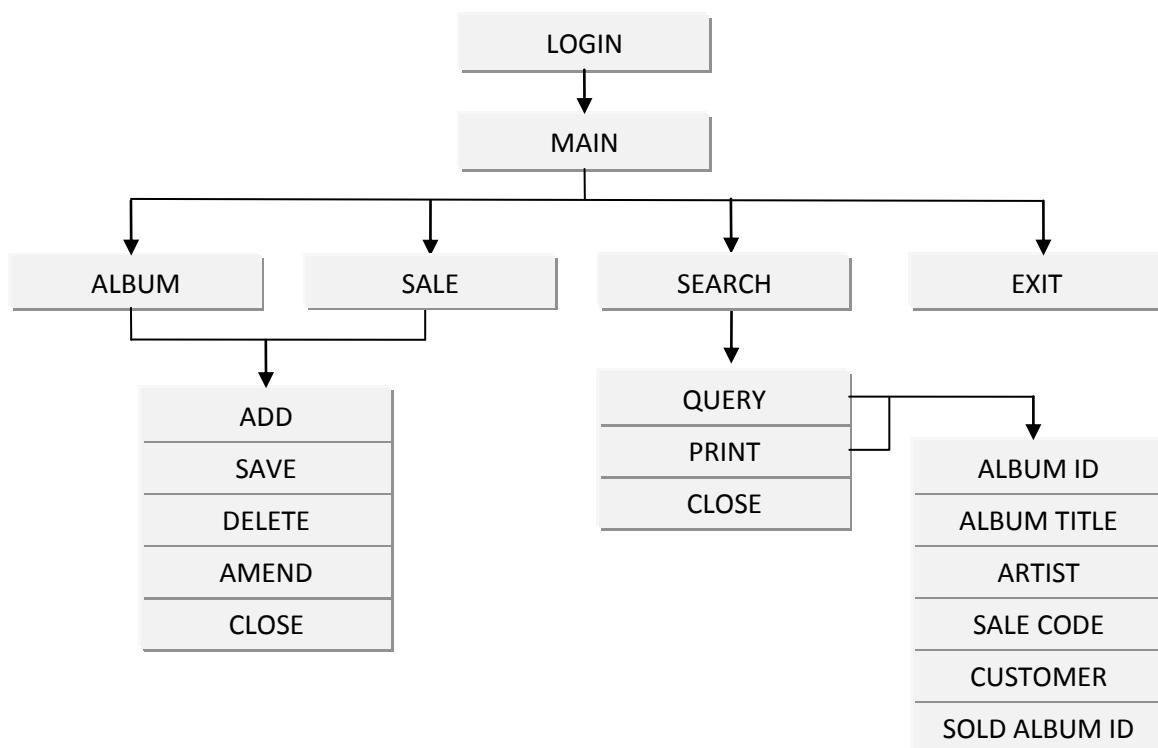


## A search and report test

A search was made for all albums available from the band “Skillet”. The results were then used to generate a report. The report took up two pages and included information of all the available albums.



## ERD description

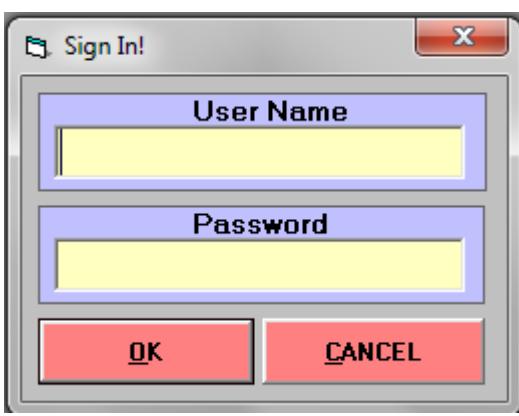


When the program is opened, the security form comes. It asks for a Username and Password. It only lets the user access the database management program once the correct Username and Password is entered. It then displays the main (home) form. From there, the user can view and edit the databases, perform a search, or quit the application. The functions available for the databases include adding a new record, saving a record, amending a record, or deleting a record. The user can also go back to the main form. The Search form holds options for querying, printing, and going back to the main form. The query can be made from the parameters of the Album ID, the album title, the album's artist, the Sale Code of a sell, a customer's name, and the Album ID of the album that was sold.

## (II) PROGRAMMING

After the forms were designed, I went to work on writing the codes.

### *The codes*

Login form codes	Main form codes
 <pre data-bbox="192 1417 743 2014"> Private Sub cmdCANCEL_Click()     'to close the application End End Sub  Private Sub cmdOK_Click()     'check for correct password     If txtUserName =         adcLogin.Recordset.Fields("User         ID").Value And txtPassword =         adcLogin.Recordset.Fields("Pass         word").Value Then         MsgBox "Login         Successful!", vbInformation,         "Welcome"         Unload Me         frmMain.Show     Else </pre>	 <pre data-bbox="767 1715 1335 2014"> Private Sub cmdExit_Click()     'to exit the application, "EXIT" End End Sub  Private Sub cmdSales_Click()     'to open the "SALES INFO" form     Unload Me     frmSales.Show </pre>

```

    MsgBox "Invalid User
Name and/or Password, try
again!", , "Login"
    txtPassword.SetFocus
End If
End Sub

```

End Sub

```

Private Sub cmdSearch_Click()
    'to open the "SEARCH AND REPORT"
    form
Unload Me
frmSearch.Show
End Sub

```

```

Private Sub cmdStock_Click()
    'to open the "ALBUM INFO" form
Unload Me
frmAlbum.Show
End Sub

```

### Album form codes

### Sales form codes

```

Private Sub cboGENRE_Click()
    'to sync the genre text box and
    the genre combo box
txtGENRE.Text = cboGENRE.Text
End Sub

```

```

Private Sub cmdADD_Click()
    'to unlock the text boxes
txtAID.Locked = False
txtANAME.Locked = False
txtARTIST.Locked = False
txtGENRE.Locked = False
txtRELEASED.Locked = False
txtSONGS.Locked = False
txtLABEL.Locked = False
txtPRICE.Locked = False
txtSTOCK.Locked = False
txtTIME.Locked = False
    'to generate AIDs automatically
adcAlbum.Recordset.MoveLast
AID = Right(txtAID, 4)
adcAlbum.Recordset.AddNew
txtAID.Text = "A" + CStr(AID +
1)
    'to write the date
automatically

```

```

Private Sub cboAID_Change()
    'to sync the AID combo box and text
    box
    adcAlbum.Recordset.Bookmark =
cboAID.SelectedItem
    txtAID.Text = cboAID.Text
End Sub

```

```

Private Sub cmdBack_Click()
    'to go back to the Main form
Unload Me
frmMain.Show
End Sub

```

```

Private Sub cmdChange_Click()
    'to unlock the text boxes so that
    they can be edited
txtSID.Locked = False
txtCNAME.Locked = False
txtAID.Locked = False
txtDATE.Locked = False
txtNUMBER.Locked = False

```

```

txtRELEASED.Text = Date
'to select the first text box
txtANAME.SetFocus
End Sub

Private Sub cmdCANCEL_Click()
'to cancel the input
adcAlbum.Refresh
'to lock the text boxes again
txtAID.Locked = True
txtANAME.Locked = True
txtARTIST.Locked = True
txtGENRE.Locked = True
txtRELEASED.Locked = True
txtSONGS.Locked = True
txtLABEL.Locked = True
txtPRICE.Locked = True
txtSTOCK.Locked = True
txtTIME.Locked = True
End Sub

Private Sub cmdClose_Click()
'to go back to the Main form
Unload Me
frmMain.Show
End Sub

Private Sub cmdDELETE_Click()
'to delete the selected record
varL = MsgBox("Are you sure you
want to delete this record?", vbYesNo, "Update")
If varL = vbYes Then
    adcAlbum.Recordset.Delete
    MsgBox "Record deleted
successfully.", vbInformation, "Update"
End If
End Sub

Private Sub cmdEDIT_Click()
'to unlock the text boxes so
that the record can be edited
txtAID.Locked = False
txtANAME.Locked = False
txtARTIST.Locked = False
txtGENRE.Locked = False
txtRELEASED.Locked = False
txtSONGS.Locked = False
txtLABEL.Locked = False
txtPRICE.Locked = False
txtSTOCK.Locked = False
txtTIME.Locked = False
End Sub

```

```

txtCONTACT.Locked = False
txtSUBTOTAL.Locked = False
txtDISCOUNT.Locked = False
txtVAT.Locked = False
txtTOTAL.Locked = False
txtAID.Visible = False
End Sub

Private Sub cmdDone_Click()
'to cancel the input
adcSale.Refresh
'to lock the text boxes again
txtSID.Locked = True
txtCNAME.Locked = True
txtAID.Locked = True
txtDATE.Locked = True
txtNUMBER.Locked = True
txtCONTACT.Locked = True
txtSUBTOTAL.Locked = True
txtDISCOUNT.Locked = True
txtVAT.Locked = True
txtTOTAL.Locked = True
txtAID.Visible = True
End Sub

Private Sub cmdErase_Click()
'to delete the selected record
varL = MsgBox("Are you sure you
want to delete this record?", vbYesNo, "Update")
If varL = vbYes Then
    adcSale.Recordset.Delete
    MsgBox "Record deleted
successfully.", vbInformation, "Update"
End If
End Sub

Private Sub cmdNew_Click()
'to unlock the text boxes
txtSID.Locked = False
txtCNAME.Locked = False
txtAID.Locked = False
txtDATE.Locked = False
txtNUMBER.Locked = False
txtCONTACT.Locked = False
txtSUBTOTAL.Locked = False
txtDISCOUNT.Locked = False
txtVAT.Locked = False
txtTOTAL.Locked = False
txtAID.Visible = False
'to automatically produce a new
Sale Code
adcSale.Recordset.MoveLast
SID = Right(txtSID, 5)

```

<pre> Private Sub cmdSAVE_Click()     'to save the record     adcAlbum.Recordset.Save     MsgBox "Record saved successfully!", vbInformation,     "Update"     'to lock the text boxes again     txtAID.Locked = True     txtANAME.Locked = True     txtARTIST.Locked = True     txtGENRE.Locked = True     txtRELEASED.Locked = True     txtSONGS.Locked = True     txtLABEL.Locked = True     txtPRICE.Locked = True     txtSTOCK.Locked = True     txtTIME.Locked = True End Sub  Private Sub txtAID_KeyPress(KeyAscii As Integer)     'to validate the "Album ID" field     If KeyAscii = 13 Then         If txtAID Like "A####" Then             txtPRICE.SetFocus         Else             MsgBox "The 'Album ID' field is invalid!", vbCritical,             "Input Error"         End If     End If End Sub  Private Sub txtANAME_KeyPress(KeyAscii As Integer)     'to validate the "Album Title" field     If KeyAscii = 13 Then         If (txtANAME.Text = "") Or         (Len(txtANAME.Text) &gt; 35) Then             MsgBox "The 'Album Title' field is invalid!", vbCritical,             "Input Error"         txtANAME.Text = ""         Else             txtARTIST.SetFocus         End If     End If End Sub  Private Sub txtARTIST_KeyPress(KeyAscii As </pre>	<pre> adcSale.Recordset.AddNew txtSID.Text = "S" + CStr(SID + 1) txtDATE.Text = Date     'to select the first text box     txtCNAME.SetFocus End Sub  Private Sub cmdOK_Click()     'to save the record     adcSale.Recordset.Save     'to lock the text boxes     txtSID.Locked = True     txtCNAME.Locked = True     txtAID.Locked = True     txtDATE.Locked = True     txtNUMBER.Locked = True     txtCONTACT.Locked = True     txtSUBTOTAL.Locked = True     txtDISCOUNT.Locked = True     txtVAT.Locked = True     txtTOTAL.Locked = True     txtAID.Visible = True     'to inform the user that the record was saved     MsgBox "Record saved successfully!", vbInformation,     "Update" End Sub  Private Sub txtAID_KeyPress(KeyAscii As Integer)     'to validate the "Album ID" field     If KeyAscii = 13 Then         If txtAID Like "A####" Then             txtSUBTOTAL.SetFocus         Else             MsgBox "The 'Album ID' field is invalid!", vbCritical, "Input Error"         End If     End If End Sub  Private Sub txtCNAME_KeyPress(KeyAscii As Integer)     'to validate the "Customer Name" field     If KeyAscii = 13 Then         If (txtCNAME.Text = "") Or         (IsNumeric(txtCNAME.Text) = True)         Or (Len(txtCNAME.Text) &gt; 30) Then             MsgBox "The 'Customer Name' field is invalid!", vbCritical, "Input </pre>
---	---

```

Integer)
'to validate the "Artist" field
If KeyAscii = 13 Then
  If (txtARTIST.Text = "") Or
  (Len(txtARTIST.Text) > 25) Then
    MsgBox "The 'Artist' field is
    invalid!", vbCritical, "Input
    Error"
    txtARTIST.Text = ""
  Else
    txtGENRE.SetFocus
  End If
End If
End Sub

Private Sub
txtGENRE_KeyPress(KeyAscii As
Integer)
'to validate the "Genre" field
If KeyAscii = 13 Then
  If (txtGENRE.Text = "") Or
  (IsNumeric(txtGENRE.Text) =
  True) Or (Len(txtGENRE.Text) >
  15) Then
    MsgBox "The 'Genre' field is
    invalid!", vbCritical, "Input
    Error"
  Else
    txtLABEL.SetFocus
  End If
End If
End Sub

Private Sub
txtLABEL_KeyPress(KeyAscii As
Integer)
'to validate the "Record Label"
field
If KeyAscii = 13 Then
  If (txtLABEL.Text = "") Or
  (Len(txtLABEL.Text) > 30) Then
    MsgBox "The 'Record Label'
    field is invalid!", vbCritical,
  "Input Error"
    txtLABEL.Text = ""
  Else
    txtPRICE.SetFocus
  End If
End If
End Sub

Private Sub
txtPRICE_KeyPress(KeyAscii As
Integer)
'to validate the "Price" field

```

```

Error"
txtCNAME.Text = ""
Else
txtCONTACT.SetFocus
End If
End If
End Sub

Private Sub
txtCONTACT_KeyPress(KeyAscii As
Integer)
'to validate the "Customer Contact"
field
If KeyAscii = 13 Then
  If (txtCONTACT.Text = "") Or
  (IsNumeric(txtCONTACT.Text) =
  False) Or (Len(txtCONTACT.Text) >
  11) Or (Val(txtCONTACT.Text) < 0)
Then
  MsgBox "The 'Customer Contact'
  field is invalid!", vbCritical,
  "Input Error"
  txtCONTACT.Text = ""
  Else
    txtNUMBER.SetFocus
  End If
End If
End Sub

Private Sub
txtDATE_KeyPress(KeyAscii As
Integer)
'to validate the "Date of Purchase"
field
If KeyAscii = 13 Then
  If (txtDATE.Text = "") Or
  (Len(txtDATE.Text) > 10) Then
    MsgBox "The 'Date of Purchase'
    field is invalid!", vbCritical,
  "Input Error"
    txtDATE.Text = ""
  Else
    txtNUMBER.SetFocus
  End If
End If
End Sub

Private Sub
txtDISCOUNT_KeyPress(KeyAscii As
Integer)
'to validate the "Discount" field
If KeyAscii = 13 Then
  If (txtDISCOUNT.Text = "") Or
  (IsNumeric(txtDISCOUNT.Text) =
  False) Or (Len(txtDISCOUNT.Text) >
  11) Or (Val(txtDISCOUNT.Text) < 0)
Then
  MsgBox "The 'Discount' field is
  invalid!", vbCritical,
  "Input Error"
  txtDISCOUNT.Text = ""
  Else
    txtNUMBER.SetFocus
  End If
End If
End Sub

```

```

If KeyAscii = 13 Then
    If (txtPRICE.Text = "") Or
    (IsNumeric(txtPRICE.Text) =
    False) Or (Len(txtPRICE.Text) >
    5) Or (Val(txtPRICE.Text) < 0)
    Then
        MsgBox "The 'Price' field is
        invalid!", vbCritical, "Input
        Error"
        txtPRICE.Text = ""
        Else
            txtSTOCK.SetFocus
        End If
    End If
End Sub

Private Sub
txtRELEASED_KeyPress(KeyAscii As
Integer)
'to validate the "Release Date"
field
If KeyAscii = 13 Then
    If txtRELEASED Like
    "#/#/#/#/#/" Then
        txtSONGS.SetFocus
    Else
        MsgBox "The 'Release Date'
        field is invalid!", vbCritical,
        "Input Error"
        txtRELEASED.Text = ""
    End If
End If
End Sub

Private Sub
txtSONGS_KeyPress(KeyAscii As
Integer)
'to validate the "Tracks" field
If KeyAscii = 13 Then
    If (txtSONGS.Text = "") Or
    (IsNumeric(txtSONGS.Text) =
    False) Or (Len(txtSONGS.Text) >
    2) Or (Val(txtSONGS.Text) < 0)
    Then
        MsgBox "Tracks' field is
        invalid!", vbCritical, "Input
        Error"
        txtSONGS.Text = ""
    Else
        txtTIME.SetFocus
    End If
End If
End Sub

Private Sub

```

5) Then  
 MsgBox "The 'Discount' field is  
 invalid!", vbCritical, "Input  
 Error"  
 txtDISCOUNT.Text = ""  
 Else  
 txtDISCOUNT.Text = txtSUBTOTAL  
 \* (txtDISCOUNT / 100)  
 txtTOTAL = (Val(txtSUBTOTAL) +  
 Val(txtVAT)) - Val(txtDISCOUNT)  
 End If  
End If  
End Sub

```

Private Sub
txtNUMBER_KeyPress(KeyAscii As
Integer)
'to validate the "Quantity" field
If KeyAscii = 13 Then
    If (txtNUMBER.Text = "") Or
    (IsNumeric(txtNUMBER.Text) = False)
    Or (Len(txtNUMBER.Text) > 3) Or
    (Val(txtNUMBER.Text) < 1) Then
        MsgBox "The 'Quantity' field is
        invalid!", vbCritical, "Input
        Error"
        txtNUMBER.Text = ""
    Else
        txtSUBTOTAL.Text =
        adcAlbum.Recordset.Fields("AlbumPri
        ce").Value * txtNUMBER
        txtDISCOUNT.Text = 0
        txtVAT.Text = txtSUBTOTAL * 0.15
        txtTOTAL = Val(txtSUBTOTAL) +
        Val(txtVAT)
    End If
End If
End Sub

Private Sub
txtSID_KeyPress(KeyAscii As
Integer)
'to validate the "Sale Code" field
If KeyAscii = 13 Then
    If txtSID Like "S#####" Then
        txtCNAME.SetFocus
    Else
        MsgBox "The 'Sale Code' field is
        invalid!", vbCritical, "Input
        Error"
        txtSID.Text = ""
    End If
End If
End Sub

```

```

txtSTOCK_KeyPress(KeyAscii As
Integer)
'to validate the "Stock" field
If KeyAscii = 13 Then
  If (txtSTOCK.Text = "") Or
  (IsNumeric(txtSTOCK.Text) =
False) Or (Len(txtSTOCK.Text) >
4) Or (Val(txtSTOCK.Text) < 0)
Then
  MsgBox "The 'Stock' field is
invalid!", vbCritical, "Input
Error"
  txtSTOCK.Text = ""
  Else
  txtRELEASED.SetFocus
  End If
End If
End Sub

Private Sub
txtTIME_KeyPress(KeyAscii As
Integer)
'to validate the "Time" field
If KeyAscii = 13 Then
  If Left(txtTIME.Text, 2) > 99
Then
  MsgBox "The 'Play-time' field
is invalid!", vbCritical,
"Input Error"
  txtTIME.Text = ""
  Else
  cmdSAVE.SetFocus
  End If
End If
End Sub

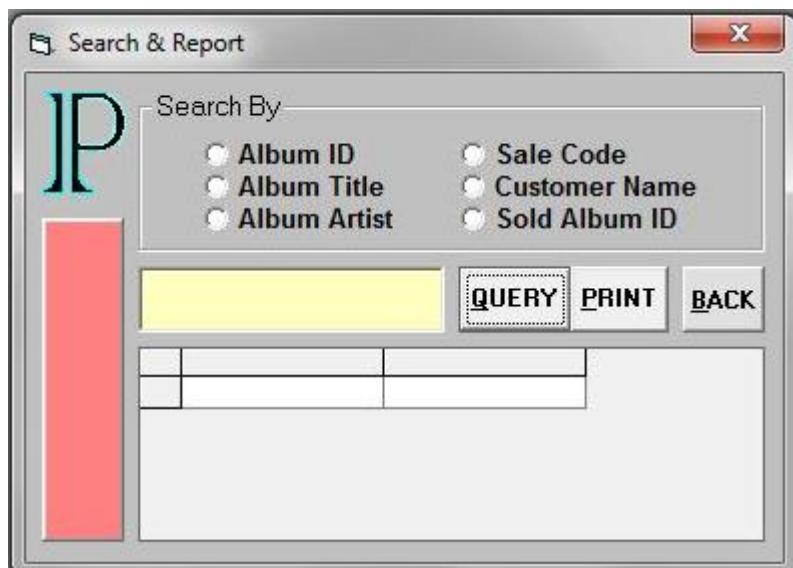
Private Sub
txtSUBTOTAL_KeyPress(KeyAscii As
Integer)
'to validate the "Subtotal" field
If KeyAscii = 13 Then
  If (txtSUBTOTAL.Text = "") Or
  (IsNumeric(txtSUBTOTAL.Text) =
False) Or (Len(txtSUBTOTAL.Text) >
5) Then
  MsgBox "The 'Sub-Total' field is
invalid!", vbCritical, "Input
Error"
  txtSUBTOTAL.Text = ""
  Else
  txtDISCOUNT.SetFocus
  End If
End If
End Sub

Private Sub
txtTOTAL_KeyPress(KeyAscii As
Integer)
'to validate the "Net Payment"
field
If KeyAscii = 13 Then
  If (txtTOTAL.Text = "") Or
  (IsNumeric(txtTOTAL.Text) = False)
Or (Len(txtTOTAL.Text) > 5) Then
  MsgBox "The 'Net Payment' field
is invalid!", vbCritical, "Input
Error"
  txtTOTAL.Text = ""
  Else
  cmdSAVE.SetFocus
  End If
End If
End Sub

Private Sub
txtVAT_KeyPress(KeyAscii As
Integer)
'to validate the "VAT" field
If KeyAscii = 13 Then
  If (txtVAT.Text = "") Or
  (IsNumeric(txtVAT.Text) = False) Or
  (Len(txtVAT.Text) > 5) Then
  MsgBox "The 'VAT' field is
invalid!", vbCritical, "Input
Error"
  txtVAT.Text = ""
  Else
  txtTOTAL.SetFocus
  End If
End If
End Sub

```

### The Search and Report form codes



```

Private Sub cmdClose_Click()
    'to display the Main form; the "BACK" button
    Unload Me
    frmMain.Show
End Sub

Private Sub cmdPrint_Click()
    'to produce a printable report of the searches; the "PRINT" button

    'for search by "Album ID"
    If optAID.Value = True Then
        If devParadox.rscomAlbumByAID.State = adStateOpen Then
            devParadox.rscomAlbumByAID.Close
        End If
        devParadox.comAlbumByAID (txtSearch.Text)
        rptAlbumByAID.Show
    End If

    'for search by "Album Title", i.e. AlbumName
    If optAName.Value = True Then
        If devParadox.rscomAlbumByName.State = adStateOpen Then
            devParadox.rscomAlbumByName.Close
        End If
        devParadox.comAlbumByName (txtSearch.Text)
        rptAlbumByName.Show
    End If

    'for search by "Album Artist"
    If optArtist.Value = True Then
        If devParadox.rscomAlbumByArtist.State = adStateOpen Then
            devParadox.rscomAlbumByArtist.Close
        End If
        devParadox.comAlbumByArtist (txtSearch.Text)
        rptAlbumByArtist.Show
    End If

```

```

End If

'for search by "Customer Name"
If optCName.Value = True Then
    If devParadox.rscomSaleByCName.State = adStateOpen Then
        devParadox.rscomSaleByCName.Close
    End If
    devParadox.comSaleByCName (txtSearch.Text)
    rptSaleByCName.Show
End If

'for search by "Sale Code"
If optsID.Value = True Then
    If devParadox.rscomSaleBySID.State = adStateOpen Then
        devParadox.rscomSaleBySID.Close
    End If
    devParadox.comSaleBySID (txtSearch.Text)
    rptSaleBySID.Show
End If

'for search by "Sold Album ID"
If optSoldAID.Value = True Then
    If devParadox.rscomSaleByAID.State = adStateOpen Then
        devParadox.rscomSaleByAID.Close
    End If
    devParadox.comSaleByAID (txtSearch.Text)
    rptSaleByAID.Show
End If

End Sub

Private Sub cmdQuery_Click()

'to perform a search

'for search by "Album ID"
If optAID.Value = True Then
    If devParadox.rscomAlbumByAID.State = adStateOpen Then
        devParadox.rscomAlbumByAID.Close
    End If
    devParadox.comAlbumByAID (txtSearch.Text)
    With grdQuery
        .DataMember = "comAlbumByAID"
    End With
End If

'for search by "Album Title", i.e. AlbumName
If optAName.Value = True Then
    If devParadox.rscomAlbumByName.State = adStateOpen Then
        devParadox.rscomAlbumByName.Close
    End If
    devParadox.comAlbumByName (txtSearch.Text)
    With grdQuery
        .DataMember = "comAlbumByName"
    End With
End If

```

```
End If

'for search by "Album Artist"
If optArtist.Value = True Then
    If devParadox.rscomAlbumByArtist.State = adStateOpen Then
        devParadox.rscomAlbumByArtist.Close
    End If
    devParadox.comAlbumByArtist (txtSearch.Text)
    With grdQuery
        .DataMember = "comAlbumByArtist"
    End With
End If

'for search by "Sale Code"
If optsID.Value = True Then
    If devParadox.rscomSaleBySID.State = adStateOpen Then
        devParadox.rscomSaleBySID.Close
    End If
    devParadox.comSaleBySID (txtSearch.Text)
    With grdQuery
        .DataMember = "comSaleBySID"
    End With
End If

'for search by "Customer Name"
If optCName.Value = True Then
    If devParadox.rscomSaleByCName.State = adStateOpen Then
        devParadox.rscomSaleByCName.Close
    End If
    devParadox.comSaleByCName (txtSearch.Text)
    With grdQuery
        .DataMember = "comSaleByCName"
    End With
End If

'for search by "Sold Album ID"
If optSoldAID.Value = True Then
    If devParadox.rscomSaleByAID.State = adStateOpen Then
        devParadox.rscomSaleByAID.Close
    End If
    devParadox.comSaleByAID (txtSearch.Text)
    With grdQuery
        .DataMember = "comSaleByAID"
    End With
End If

End Sub
```

## Is the new system satisfactory?

Objective	How Achieved
More user-friendly	The new system helps the user interact with the data easily.
Can be backed-up easily	Magnetic disks are used to keep backups. These disks can hold large amounts of while occupying minimum space.
Access security	The software asks for a username and password before it starts displaying the records.
Saves storage space	A hard disk with good a storage capacity is used. Other disks can easily be bought if required.
Easier searches	All the user has to do is simply select which field he wants to search with and input the data. The software does the rest.
Cost-efficient	Excess paper and stationary do not have to be bought. The two employees that worked behind the registers are more than enough for the new system. After the hardware and software are bought, there will not be much that needs to be bought.
Fewer input errors	Validation checks are made on the data to help insure there are no mistakes in the records.
Easily understandable reports and records	As everything is done on the computer, there will be no handwriting problem.
Reduces pressure on employees	The new system is a lot easier to work with. It significantly reduces the amount of work required to input records.
Saves time	Since everything is computerized tasks, which usually took a long time to do in the manual system, are now done almost effortlessly. If the employees can adapt a fast typing speed, even data input will be faster than before.
Accurate and reliable	The information in the computerized system has almost no errors. It is concluded that the computerized system can do complicated tasks with ease, and therefore, was the right choice of upgrade.

## (III) TESTING

### TESTING PLAN

The following table is for objective numbers 2 and 14. It will be used to see if the input validations work.

Test No.	Field	Test Data	Test Data Type	Reason	Expected Result
1	CustomerName	Abidur Rahim	Normal	To accept normal values	Accepted
		123	Abnormal	To reject abnormal values	Rejected
2	CustContact	8392134	Normal	To accept normal values	Accepted
		99999999999	Extreme	To accept extreme values	Accepted
		11111111111	Abnormal	To reject abnormal values	Rejected
		111111111			
3	AlbumGenre	Metal	Normal	To accept normal values	Accepted
		123	Abnormal	To reject abnormal values	Rejected
4	AlbumReleased	09/09/2010	Normal	To accept normal values	Accepted
		09/2010/09	Abnormal	To reject abnormal values	Rejected
5	AlbumStock	17	Normal	To accept normal values	Accepted
		0	Extreme	To accept extreme values	Accepted
		-4	Abnormal	To reject abnormal values	Rejected
6	SaleCode	S18208	Normal	To accept normal values	Accepted
		A123	Abnormal	To reject abnormal values	Rejected
7	AlbumLabel	Hollywood	Normal	To accept normal values	Accepted
			Abnormal	To reject abnormal values	Rejected
8	AlbumTime	44:53	Normal	To accept normal values	Accepted
		ab:cd	Abnormal	To reject abnormal values	Rejected

The following table will be used to check the normal execution of tasks and forms in the software. It will help achieve objectives 9, 13 and 19.

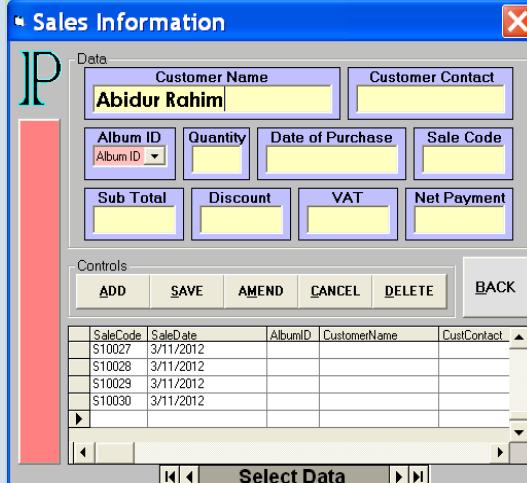
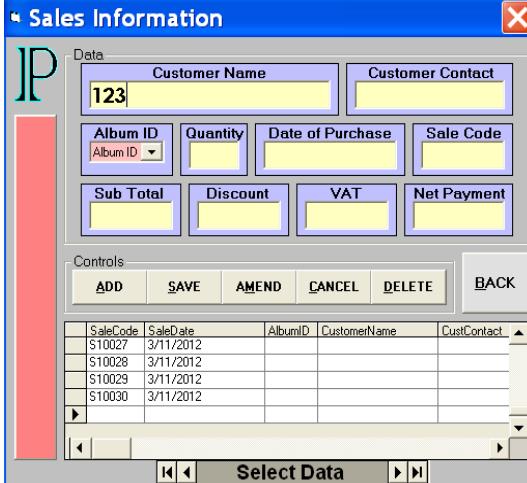
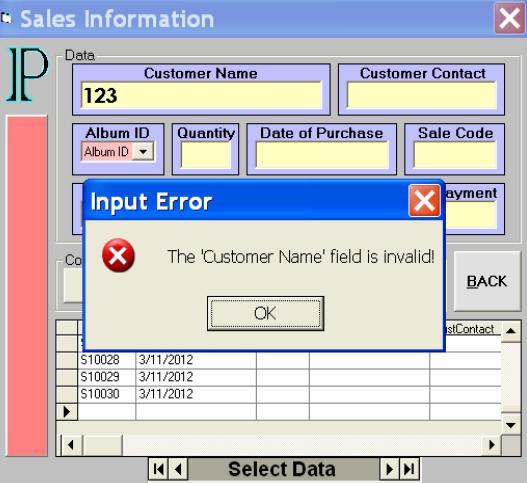
Test No.	Test	Expected Result
9	The “Add” button in the Sales form.	Execution
10	The “Save” button in the Album form.	Execution
11	The “Amend” button in the Album form.	Execution
12	The “Cancel” button in the Sales form.	Execution
13	The “Delete” button in the Sales form	Execution
14	The “Back to Main” button in the Album form.	Execution
15	The “Search and Report” button in the main screen.	Execution
16	The “OK” button in the Login form.	Execution
17	The “Exit” button in the Main form.	Execution
18	The “Query” button in the Search form.	Execution
19	The “Print” button in the Search form.	Execution

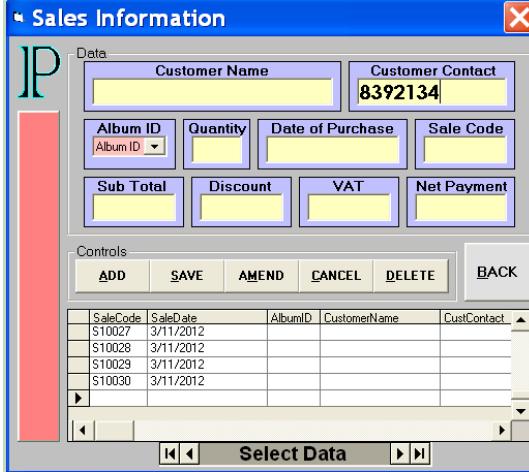
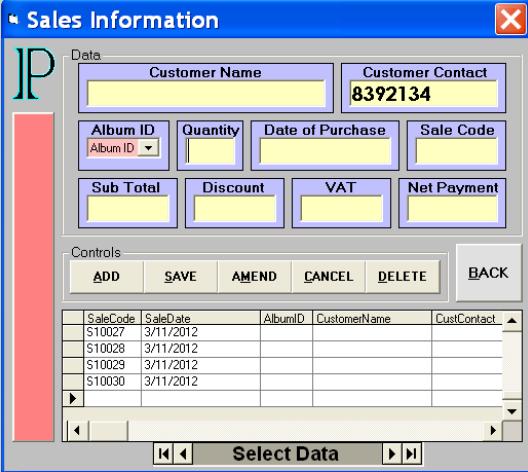
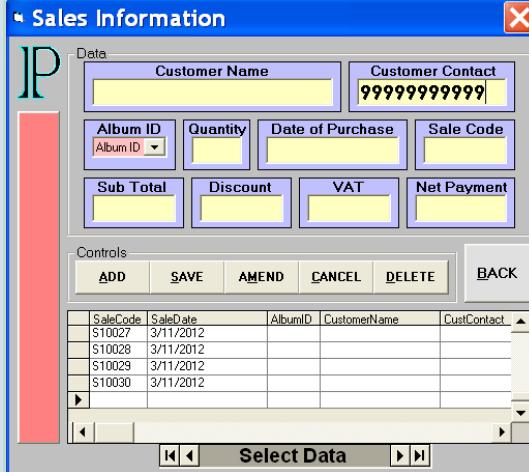
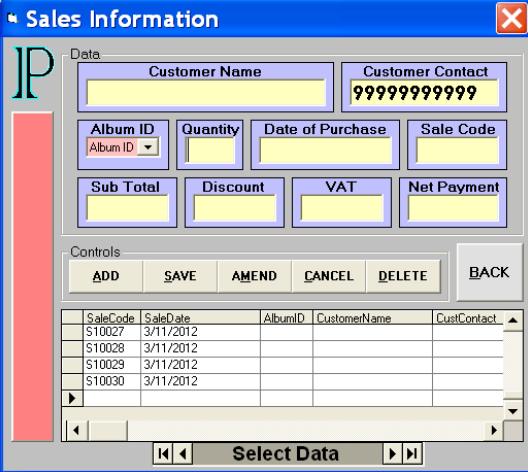
The following table will be used to check the software's outputs. It will make sure I have fulfilled **objectives 7, 15 and 16**.

Test No.	Test	Test Data	Test Data Type	Expected Result
20	The query option in Search form with Album ID as the search parameter.	A1023	Normal	The record gets displayed.
21	The print option in Search form with Album ID as the search parameter.	A1023	Normal	The data report gets displayed.
22	The query option in Search form with Sale Code as the search parameter.	S10014	Normal	The record gets displayed.
23	The print option in Search form with Sale Code as the search parameter.	S10014	Normal	The data report gets displayed.
24	The query option in Search form with Sale Code as the search parameter.	Sabcde	Abnormal	Nothing gets displayed.
25	The print option in Search form with Sale Code as the search parameter.	Sabcde	Abnormal	The data report is empty.

## TEST RESULTS

### The functional test for inputs

Test No.	Field	Test Data	Test Data Type	Reason	Expected Result	Actual Result																																																													
Tests 1 to 8 can be linked to objectives 2 and 14																																																																			
1	CustomerName	Abidur Rahim	Normal	To accept normal values	Accepted	Accepted																																																													
		123	Abnormal	To reject abnormal values	Rejected	Rejected																																																													
Before Validation				After Validation																																																															
 <p>Sales Information</p> <p>Data</p> <table border="1"> <tr><td>Customer Name</td><td>Customer Contact</td></tr> <tr><td>Abidur Rahim</td><td></td></tr> <tr><td>Album ID</td><td>Quantity</td><td>Date of Purchase</td><td>Sale Code</td></tr> <tr><td>Sub Total</td><td>Discount</td><td>VAT</td><td>Net Payment</td></tr> </table> <p>Controls</p> <p>ADD SAVE AMEND CANCEL DELETE BACK</p> <p>SaleCode SaleDate AlbumID CustomerName CustContact</p> <table border="1"> <tr><td>S10027</td><td>3/11/2012</td><td></td><td></td><td></td></tr> <tr><td>S10028</td><td>3/11/2012</td><td></td><td></td><td></td></tr> <tr><td>S10029</td><td>3/11/2012</td><td></td><td></td><td></td></tr> <tr><td>S10030</td><td>3/11/2012</td><td></td><td></td><td></td></tr> </table> <p>Select Data</p>	Customer Name	Customer Contact	Abidur Rahim		Album ID	Quantity	Date of Purchase	Sale Code	Sub Total	Discount	VAT	Net Payment	S10027	3/11/2012				S10028	3/11/2012				S10029	3/11/2012				S10030	3/11/2012				 <p>Sales Information</p> <p>Data</p> <table border="1"> <tr><td>Customer Name</td><td>Customer Contact</td></tr> <tr><td>Abidur Rahim</td><td></td></tr> <tr><td>Album ID</td><td>Quantity</td><td>Date of Purchase</td><td>Sale Code</td></tr> <tr><td>Sub Total</td><td>Discount</td><td>VAT</td><td>Net Payment</td></tr> </table> <p>Controls</p> <p>ADD SAVE AMEND CANCEL DELETE BACK</p> <p>SaleCode SaleDate AlbumID CustomerName CustContact</p> <table border="1"> <tr><td>S10027</td><td>3/11/2012</td><td></td><td></td><td></td></tr> <tr><td>S10028</td><td>3/11/2012</td><td></td><td></td><td></td></tr> <tr><td>S10029</td><td>3/11/2012</td><td></td><td></td><td></td></tr> <tr><td>S10030</td><td>3/11/2012</td><td></td><td></td><td></td></tr> </table> <p>Select Data</p>			Customer Name	Customer Contact	Abidur Rahim		Album ID	Quantity	Date of Purchase	Sale Code	Sub Total	Discount	VAT	Net Payment	S10027	3/11/2012				S10028	3/11/2012				S10029	3/11/2012				S10030	3/11/2012			
Customer Name	Customer Contact																																																																		
Abidur Rahim																																																																			
Album ID	Quantity	Date of Purchase	Sale Code																																																																
Sub Total	Discount	VAT	Net Payment																																																																
S10027	3/11/2012																																																																		
S10028	3/11/2012																																																																		
S10029	3/11/2012																																																																		
S10030	3/11/2012																																																																		
Customer Name	Customer Contact																																																																		
Abidur Rahim																																																																			
Album ID	Quantity	Date of Purchase	Sale Code																																																																
Sub Total	Discount	VAT	Net Payment																																																																
S10027	3/11/2012																																																																		
S10028	3/11/2012																																																																		
S10029	3/11/2012																																																																		
S10030	3/11/2012																																																																		
 <p>Sales Information</p> <p>Data</p> <table border="1"> <tr><td>Customer Name</td><td>Customer Contact</td></tr> <tr><td>123</td><td></td></tr> <tr><td>Album ID</td><td>Quantity</td><td>Date of Purchase</td><td>Sale Code</td></tr> <tr><td>Sub Total</td><td>Discount</td><td>VAT</td><td>Net Payment</td></tr> </table> <p>Controls</p> <p>ADD SAVE AMEND CANCEL DELETE BACK</p> <p>SaleCode SaleDate AlbumID CustomerName CustContact</p> <table border="1"> <tr><td>S10027</td><td>3/11/2012</td><td></td><td></td><td></td></tr> <tr><td>S10028</td><td>3/11/2012</td><td></td><td></td><td></td></tr> <tr><td>S10029</td><td>3/11/2012</td><td></td><td></td><td></td></tr> <tr><td>S10030</td><td>3/11/2012</td><td></td><td></td><td></td></tr> </table> <p>Select Data</p>	Customer Name	Customer Contact	123		Album ID	Quantity	Date of Purchase	Sale Code	Sub Total	Discount	VAT	Net Payment	S10027	3/11/2012				S10028	3/11/2012				S10029	3/11/2012				S10030	3/11/2012				 <p>Sales Information</p> <p>Data</p> <table border="1"> <tr><td>Customer Name</td><td>Customer Contact</td></tr> <tr><td>123</td><td></td></tr> <tr><td>Album ID</td><td>Quantity</td><td>Date of Purchase</td><td>Sale Code</td></tr> <tr><td>Sub Total</td><td>Discount</td><td>VAT</td><td>Net Payment</td></tr> </table> <p>Input Error</p> <p>The 'Customer Name' field is invalid!</p> <p>OK</p> <p>Controls</p> <p>ADD SAVE AMEND CANCEL DELETE BACK</p> <p>SaleCode SaleDate AlbumID CustomerName CustContact</p> <table border="1"> <tr><td>S10027</td><td>3/11/2012</td><td></td><td></td><td></td></tr> <tr><td>S10028</td><td>3/11/2012</td><td></td><td></td><td></td></tr> <tr><td>S10029</td><td>3/11/2012</td><td></td><td></td><td></td></tr> <tr><td>S10030</td><td>3/11/2012</td><td></td><td></td><td></td></tr> </table> <p>Select Data</p>			Customer Name	Customer Contact	123		Album ID	Quantity	Date of Purchase	Sale Code	Sub Total	Discount	VAT	Net Payment	S10027	3/11/2012				S10028	3/11/2012				S10029	3/11/2012				S10030	3/11/2012			
Customer Name	Customer Contact																																																																		
123																																																																			
Album ID	Quantity	Date of Purchase	Sale Code																																																																
Sub Total	Discount	VAT	Net Payment																																																																
S10027	3/11/2012																																																																		
S10028	3/11/2012																																																																		
S10029	3/11/2012																																																																		
S10030	3/11/2012																																																																		
Customer Name	Customer Contact																																																																		
123																																																																			
Album ID	Quantity	Date of Purchase	Sale Code																																																																
Sub Total	Discount	VAT	Net Payment																																																																
S10027	3/11/2012																																																																		
S10028	3/11/2012																																																																		
S10029	3/11/2012																																																																		
S10030	3/11/2012																																																																		
<p>The code used in the "Customer Name" box is:</p> <pre>Private Sub txtCNAME_KeyPress(KeyAscii As Integer) If KeyAscii = 13 Then     If (txtCNAME.Text = "") Or (IsNumeric(txtCNAME.Text) = True) Or (Len(txtCNAME.Text) &gt; 30) Then         MsgBox "The 'Customer Name' field is invalid!", vbCritical, "Input Error"         txtCNAME.Text = ""     Else</pre>																																																																			

	<pre> txtCONTACT.SetFocus End If End If End Sub </pre>						
<b>2</b>	CustContact	8392134	Normal	To accept normal values	Accepted	Accepted	
		999999999999	Extreme	To accept extreme values	Accepted	Accepted	
		1111111111 1111111111	Abnormal	To reject abnormal values	Rejected	Rejected	
		<i>Before Validation</i>					
							
							

SaleCode	SaleDate	AlbumID	CustomerName	CustContact
S10027	3/11/2012			
S10028	3/11/2012			
S10029	3/11/2012			
S10030	3/11/2012			

The code used in the “Customer Contact” box is:

```
Private Sub txtCONTACT_KeyPress(KeyAscii As Integer)
If KeyAscii = 13 Then
    If (txtCONTACT.Text = "") Or (IsNumeric(txtCONTACT.Text) = False) Or (Len(txtCONTACT.Text) > 11) Or (Val(txtCONTACT.Text) < 0) Then
        MsgBox "The 'Customer Contact' field is invalid!", vbCritical, "Input Error"
        txtCONTACT.Text = ""
    Else
        txtNUMBER.SetFocus
    End If
End If
End Sub
```

<b>3</b>	AlbumGenre	Metal	Normal	To accept normal values	Accepted	Accepted
		123	Abnormal	To reject abnormal values	Rejected	Rejected

*Before Validation*

AlbumID	AlbumName	AlbumArtist	AlbumReleased	AlbumSong	AlbumTint	AlbumLabel
A1018	Colide	Skillet	11/18/2003	11	48:38	Lava Records
A1019	Invincible	Skillet	2/1/2000	12	52:38	Ardent Records
A1020	Ardent Worship	Skillet	9/29/2000	10	51:33	Ardent Records
A1021	Finger Eleven	Finger Eleven	6/17/2003	12	46:25	WindUp
A1022	Alen Youth	Skillet	8/28/2001	12	53:14	Ardent Worship
A1023	Time of My Life	3 Doors Down	7/19/2011	12	41:30	Universal Republic

*After Validation*

AlbumID	AlbumName	AlbumArtist	AlbumReleased	AlbumSong	AlbumTint	AlbumLabel
A1018	Colide	Skillet	11/18/2003	11	48:38	Lava Records
A1019	Invincible	Skillet	2/1/2000	12	52:38	Ardent Records
A1020	Ardent Worship	Skillet	9/29/2000	10	51:33	Ardent Records
A1021	Finger Eleven	Finger Eleven	6/17/2003	12	46:25	WindUp
A1022	Alen Youth	Skillet	8/28/2001	12	53:14	Ardent Worship
A1023	Time of My Life	3 Doors Down	7/19/2011	12	41:30	Universal Republic

The code used in the "Genre" box is:

```

Private Sub txtGENRE_KeyPress(KeyAscii As Integer)
If KeyAscii = 13 Then
    If (txtGENRE.Text = "") Or (IsNumeric(txtGENRE.Text) = True) Or (Len(txtGENRE.Text) > 15) Then
        MsgBox "The 'Genre' field is invalid!", vbCritical, "Input Error"
    Else
        txtLABEL.SetFocus
    End If
End If
End Sub

```

The code used in the “Genre” box is:

```

Private Sub txtGENRE_KeyPress(KeyAscii As Integer)
If KeyAscii = 13 Then
    If (txtGENRE.Text = "") Or (IsNumeric(txtGENRE.Text) = True) Or (Len(txtGENRE.Text) > 15) Then
        MsgBox "The 'Genre' field is invalid!", vbCritical, "Input Error"
    Else
        txtLABEL.SetFocus
    End If
End If
End Sub

```

4

	AlbumReleased	09/09/2010	Normal	To accept normal values	Accepted	Accepted
		09/2011/09	Abnormal	To reject abnormal values	Rejected	Rejected

Before Validation

After Validation

| Candidate Name: Abidur Rahim | Centre Number: BDo09 | Candidate Number: 3293 |

AlbumID	AlbumName	AlbumArtist	AlbumReleased	AlbumSong	AlbumTime	AlbumLabel
A1018	Colide	Skillet	11/18/2003	11	48:38	Lava Records
A1019	Invincible	Skillet	2/1/2000	12	52:38	Ardent Records
A1020	Ardent Worship	Skillet	9/29/2000	10	51:33	Ardent Records
A1021	Finger Eleven	Finger Eleven	6/17/2003	12	46:25	WindUp
A1022	Alien Youth	Skillet	8/28/2001	12	53:14	Ardent Worship
A1023	Time of My Life	3 Doors Down	7/19/2011	12	41:30	Universal Republic

The code used in the “Release Date” box is:

```
Private Sub txtRELEASED_KeyPress(KeyAscii As Integer)
If KeyAscii = 13 Then
    If txtRELEASED Like "##/#/#/###" Then
        txtSONGS.SetFocus
    Else
        MsgBox "The 'Release Date' field is invalid!", vbCritical,
        "Input Error"
        txtRELEASED.Text = ""
    End If
End If
End Sub
```

5

AlbumStock	17	Normal	To accept normal values	Accepted	Accepted
	0	Extreme	To accept extreme values	Accepted	Accepted
	-4	Abnormal	To reject abnormal values	Rejected	Rejected

Before Validation

After Validation

AlbumID	AlbumName	AlbumArtist	AlbumReleased	AlbumSong	AlbumTime	AlbumLabel
A1018	Colide	Skillet	11/18/2003	11	48:38	Lava Records
A1019	Invincible	Skillet	2/1/2000	12	52:38	Ardent Records
A1020	Ardent Worship	Skillet	9/29/2000	10	51:33	Ardent Records
A1021	Finger Eleven	Finger Eleven	6/17/2003	12	46:25	WindUp
A1022	Alien Youth	Skillet	8/28/2001	12	53:14	Ardent Worship
A1023	Time of My Life	3 Doors Down	7/19/2011	12	41:30	Universal Republic

Candidate Name: Abidur Rahim | Centre Number: BDo09 | Candidate Number: 3293 |

AlbumID	AlbumName	AlbumArtist	AlbumReleased	AlbumSong	AlbumTime	AlbumLabel
A1018	Colde	Skillet	11/18/2003	11	48:38	Lava Records
A1019	Invincible	Skillet	2/1/2000	12	52:38	Ardent Records
A1020	Ardent Worship	Skillet	9/29/2000	10	51:33	Ardent Records
A1021	Finger Eleven	Finger Eleven	6/17/2003	12	46:25	WindUp
A1022	Alien Youth	Skillet	8/28/2001	12	53:14	Ardent Worship
A1023	Time of My Life	3 Doors Down	7/19/2011	12	41:30	Universal Republic

AlbumID	AlbumName	AlbumArtist	AlbumReleased	AlbumSong	AlbumTime	AlbumLabel
A1018	Colde	Skillet	11/18/2003	11	48:38	Lava Records
A1019	Invincible	Skillet	2/1/2000	12	52:38	Ardent Records
A1020	Ardent Worship	Skillet	9/29/2000	10	51:33	Ardent Records
A1021	Finger Eleven	Finger Eleven	6/17/2003	12	46:25	WindUp
A1022	Alien Youth	Skillet	8/28/2001	12	53:14	Ardent Worship
A1023	Time of My Life	3 Doors Down	7/19/2011	12	41:30	Universal Republic

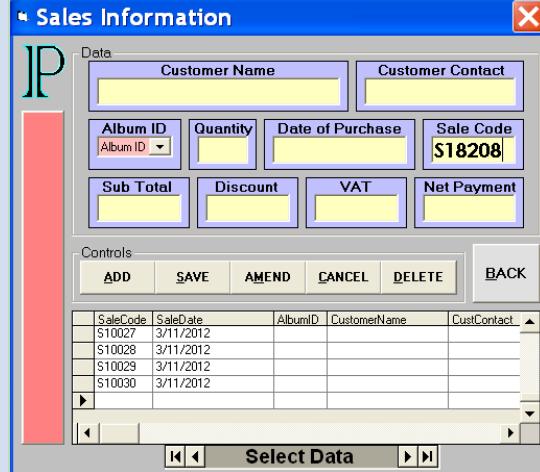
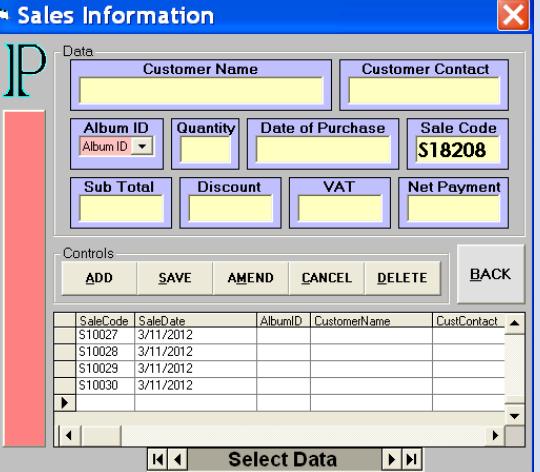
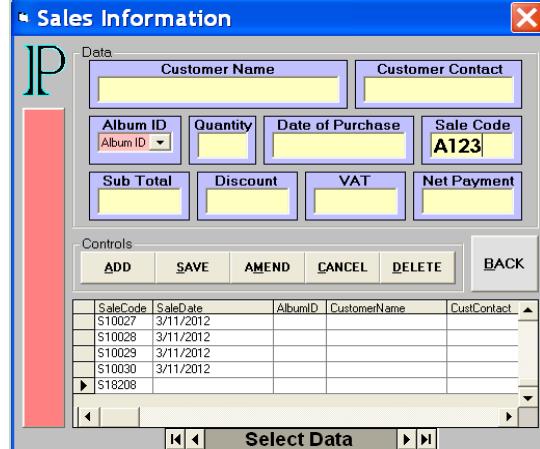
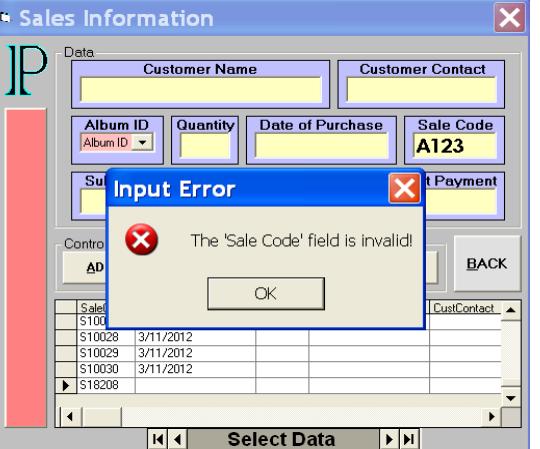
  

AlbumID	AlbumName	AlbumArtist	AlbumReleased	AlbumSong	AlbumTime	AlbumLabel
A1018	Colde	Skillet	11/18/2003	11	48:38	Lava Records
A1019	Invincible	Skillet	2/1/2000	12	52:38	Ardent Records
A1020	Ardent Worship	Skillet	9/29/2000	10	51:33	Ardent Records
A1021	Finger Eleven	Finger Eleven	6/17/2003	12	46:25	WindUp
A1022	Alien Youth	Skillet	8/28/2001	12	53:14	Ardent Worship
A1023	Time of My Life	3 Doors Down	7/19/2011	12	41:30	Universal Republic

The code used in the "Stock" box is:

```
Private Sub txtSTOCK_KeyPress(KeyAscii As Integer)
If KeyAscii = 13 Then
    If (txtSTOCK.Text = "") Or (IsNumeric(txtSTOCK.Text) = False)
    Or (Len(txtSTOCK.Text) > 4) Or (Val(txtSTOCK.Text) < 0) Then
        MsgBox "The 'Stock' field is invalid!", vbCritical, "Input
Error"
        txtSTOCK.Text = ""
        Else
        txtRELEASED.SetFocus
        End If
    End If
End Sub
```

<b>6</b>	SaleCode	S18208	Normal	To accept normal values	Accepted	Accepted
		A123	Abnormal	To reject abnormal values	Rejected	Rejected

	<i>Before Validation</i>	<i>After Validation</i>																				
	 <p>Sales Information</p> <p>Data</p> <table border="1"> <tr><td>Customer Name</td><td>Customer Contact</td></tr> <tr><td>Album ID</td><td>Quantity</td><td>Date of Purchase</td><td>Sale Code</td></tr> <tr><td>Sub Total</td><td>Discount</td><td>VAT</td><td>Net Payment</td></tr> </table> <p>Controls</p> <p>ADD SAVE AMEND CANCEL DELETE BACK</p> <p>Select Data</p> <p>SaleCode SaleDate AlbumID CustomerName CustContact</p> <ul style="list-style-type: none"> <li>S10027 3/11/2012</li> <li>S10028 3/11/2012</li> <li>S10029 3/11/2012</li> <li>S10030 3/11/2012</li> </ul>	Customer Name	Customer Contact	Album ID	Quantity	Date of Purchase	Sale Code	Sub Total	Discount	VAT	Net Payment	 <p>Sales Information</p> <p>Data</p> <table border="1"> <tr><td>Customer Name</td><td>Customer Contact</td></tr> <tr><td>Album ID</td><td>Quantity</td><td>Date of Purchase</td><td>Sale Code</td></tr> <tr><td>Sub Total</td><td>Discount</td><td>VAT</td><td>Net Payment</td></tr> </table> <p>Controls</p> <p>ADD SAVE AMEND CANCEL DELETE BACK</p> <p>Select Data</p> <p>SaleCode SaleDate AlbumID CustomerName CustContact</p> <ul style="list-style-type: none"> <li>S10027 3/11/2012</li> <li>S10028 3/11/2012</li> <li>S10029 3/11/2012</li> <li>S10030 3/11/2012</li> </ul>	Customer Name	Customer Contact	Album ID	Quantity	Date of Purchase	Sale Code	Sub Total	Discount	VAT	Net Payment
Customer Name	Customer Contact																					
Album ID	Quantity	Date of Purchase	Sale Code																			
Sub Total	Discount	VAT	Net Payment																			
Customer Name	Customer Contact																					
Album ID	Quantity	Date of Purchase	Sale Code																			
Sub Total	Discount	VAT	Net Payment																			
	 <p>Sales Information</p> <p>Data</p> <table border="1"> <tr><td>Customer Name</td><td>Customer Contact</td></tr> <tr><td>Album ID</td><td>Quantity</td><td>Date of Purchase</td><td>Sale Code</td></tr> <tr><td>Sub Total</td><td>Discount</td><td>VAT</td><td>Net Payment</td></tr> </table> <p>Controls</p> <p>ADD SAVE AMEND CANCEL DELETE BACK</p> <p>Select Data</p> <p>SaleCode SaleDate AlbumID CustomerName CustContact</p> <ul style="list-style-type: none"> <li>S10027 3/11/2012</li> <li>S10028 3/11/2012</li> <li>S10029 3/11/2012</li> <li>S10030 3/11/2012</li> <li>S18208</li> </ul>	Customer Name	Customer Contact	Album ID	Quantity	Date of Purchase	Sale Code	Sub Total	Discount	VAT	Net Payment	 <p>Sales Information</p> <p>Data</p> <table border="1"> <tr><td>Customer Name</td><td>Customer Contact</td></tr> <tr><td>Album ID</td><td>Quantity</td><td>Date of Purchase</td><td>Sale Code</td></tr> <tr><td>Sub Total</td><td>Discount</td><td>VAT</td><td>Net Payment</td></tr> </table> <p>Controls</p> <p>ADD SAVE AMEND CANCEL DELETE BACK</p> <p>Select Data</p> <p>SaleCode SaleDate AlbumID CustomerName CustContact</p> <ul style="list-style-type: none"> <li>S10027 3/11/2012</li> <li>S10028 3/11/2012</li> <li>S10029 3/11/2012</li> <li>S10030 3/11/2012</li> <li>S18208</li> </ul> <p><b>Input Error</b></p> <p>The 'Sale Code' field is invalid!</p> <p>OK</p>	Customer Name	Customer Contact	Album ID	Quantity	Date of Purchase	Sale Code	Sub Total	Discount	VAT	Net Payment
Customer Name	Customer Contact																					
Album ID	Quantity	Date of Purchase	Sale Code																			
Sub Total	Discount	VAT	Net Payment																			
Customer Name	Customer Contact																					
Album ID	Quantity	Date of Purchase	Sale Code																			
Sub Total	Discount	VAT	Net Payment																			

The code used in the "Sale Code" box is:

```
Private Sub txtSID_KeyPress(KeyAscii As Integer)
If KeyAscii = 13 Then
    If txtSID Like "S#####" Then
        txtCNAME.SetFocus
    Else
        MsgBox "The 'Sale Code' field is invalid!", vbCritical,
        "Input Error"
        txtSID.Text = ""
    End If
End If
End Sub
```

7	AlbumLabel	Hollywood	Normal	To accept normal values	Accepted	Accepted
			Abnormal	To reject abnormal values	Rejected	Rejected
		<i>Before Validation</i>		<i>After Validation</i>		

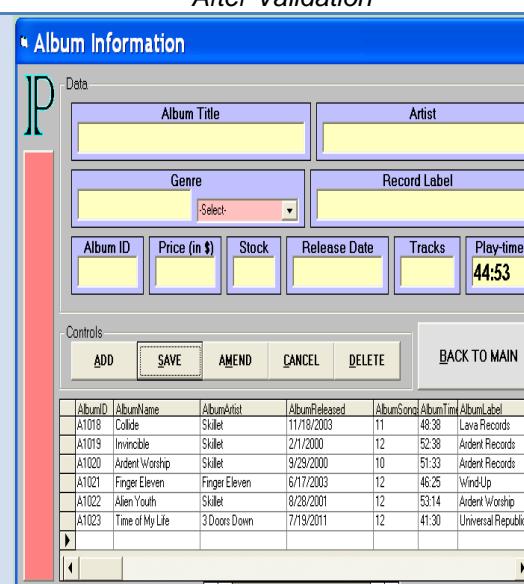
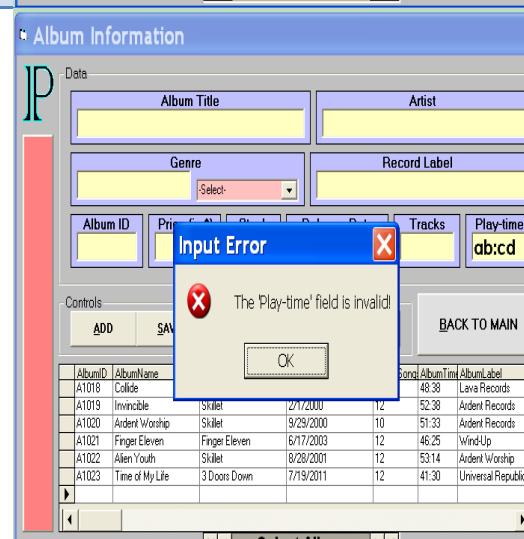
<p>The screenshot shows a Windows application window titled "Album Information". The interface includes fields for "Album Title", "Artist", "Genre" (with a dropdown menu), "Record Label" (set to "Hollywood"), and buttons for "Album ID", "Price (in \$)", "Stock", "Release Date", "Tracks", and "Play-time". Below these are "Controls" buttons: ADD, SAVE, AMEND, CANCEL, DELETE, and BACK TO MAIN. A data grid displays album records:</p> <pre>     +-----+-----+-----+-----+-----+-----+       AlbumID   AlbumName   AlbumArtist   AlbumReleased   AlbumSong   AlbumTime   AlbumLabel       +-----+-----+-----+-----+-----+-----+       A1018   Colde   Skillet   11/18/2003   11   48:38   Lava Records         A1019   Invincible   Skillet   2/1/2000   12   52:38   Ardent Records         A1020   Ardent Worship   Skillet   9/29/2000   10   51:33   Ardent Records         A1021   Finger Eleven   Finger Eleven   6/17/2003   12   46:25   WindUp         A1022   Alien Youth   Skillet   8/28/2001   12   53:14   Ardent Worship         A1023   Time of My Life   3 Doors Down   7/19/2011   12   41:30   Universal Republic       +-----+-----+-----+-----+-----+-----+   </pre> <p>At the bottom is a "Select Album" button.</p>	<p>The screenshot shows the same application window. The "Record Label" field is now empty. A modal dialog box titled "Input Error" appears with the message "The 'Record Label' field is invalid!" and an "OK" button. The data grid shows the same records as the first screenshot.</p>
---	---

The code used in the "Record Label" box is:

```

Private Sub txtLABEL_KeyPress(KeyAscii As Integer)
If KeyAscii = 13 Then
  If (txtLABEL.Text = "") Or (Len(txtLABEL.Text) > 30) Then
    MsgBox "The 'Record Label' field is invalid!", vbCritical,
    "Input Error"
    txtLABEL.Text = ""
  Else
    txtPRICE.SetFocus
  End If
End If
End Sub
  
```

<b>8</b>	AlbumTime	44:53	Normal	To accept normal values	Accepted	Accepted
----------	-----------	-------	--------	-------------------------	----------	----------

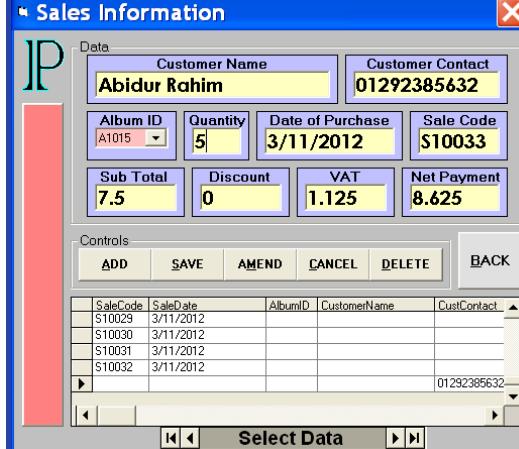
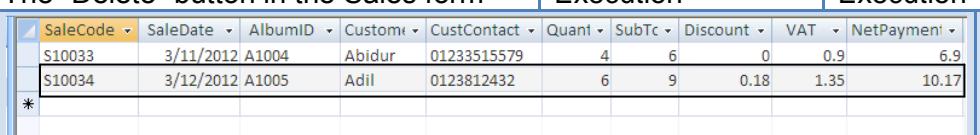
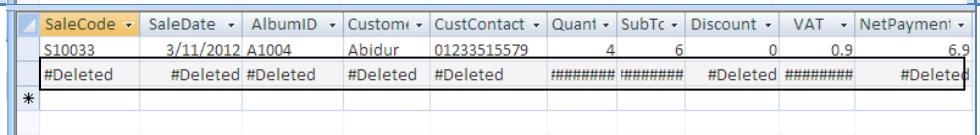
	ab:cd	Abnormal	To reject abnormal values	Rejected	Rejected
<b>Before Validation</b>					
					
<b>After Validation</b>					
					
					
					
<p>The code used in the "Play-time" box is:</p> <pre>Private Sub txtTIME_KeyPress(KeyAscii As Integer) If KeyAscii = 13 Then     If Left(txtTIME.Text, 2) &gt; 99 Then         MsgBox "The 'Play-time' field is invalid!", vbCritical,         "Input Error"         txtTIME.Text = ""     Else         cmdSAVE.SetFocus     End If End If End Sub</pre>					

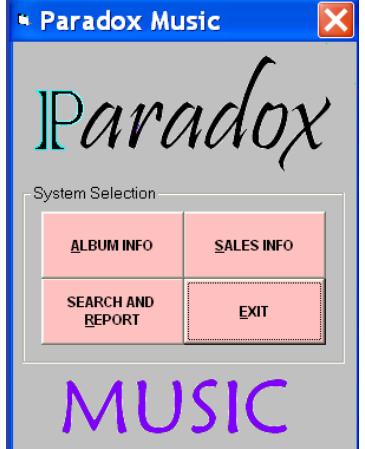
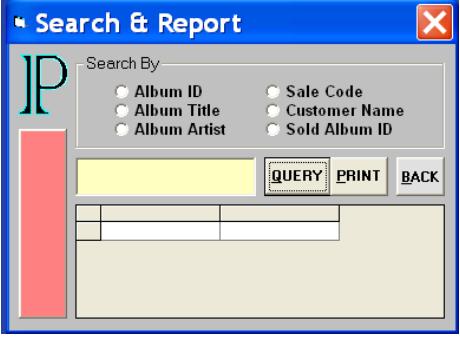
### The functional test for processes

| Candidate Name: Abidur Rahim | Centre Number: BDO09 | Candidate Number: 3293 |

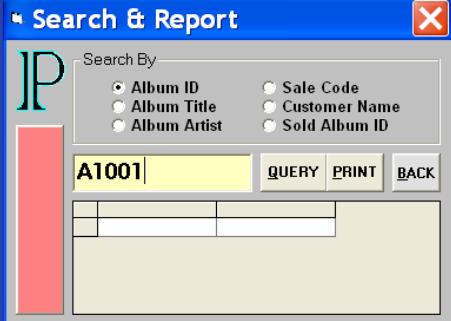
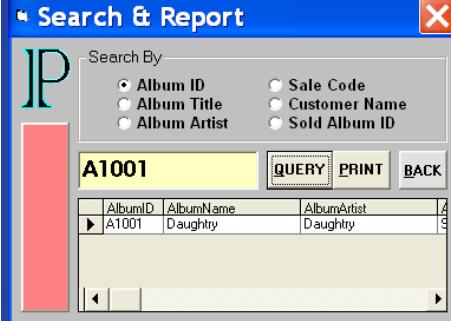
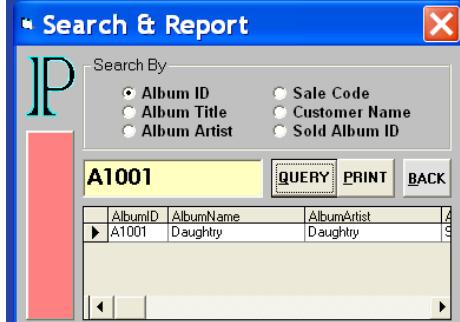
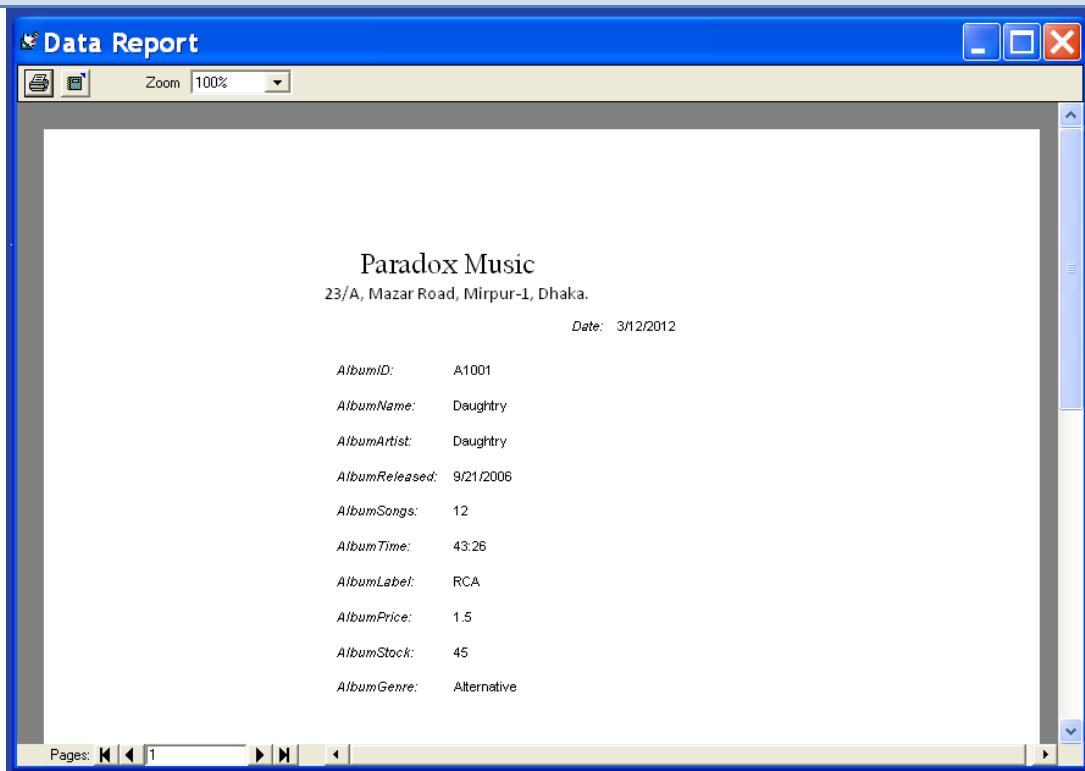
Test No.	Test	Expected Result	Actual Result
<b>Tests 9 to 19 can be linked to objectives 9, 13 and 19</b>			
<b>9</b>	The “Add” button in the Sales form.	Execution	Execution
Before			After
<p>A unique sale code has been generated and the date has also been automatically produced. Other textboxes have become blank to allow data input. This shows that the add button works. Its code is as follows:</p> <pre>Private Sub cmdNew_Click() txtSID.Locked = False txtCNAME.Locked = False txtAID.Locked = False txtDATE.Locked = False txtNUMBER.Locked = False txtCONTACT.Locked = False txtSUBTOTAL.Locked = False txtDISCOUNT.Locked = False txtVAT.Locked = False txtTOTAL.Locked = False txtAID.Visible = False adcSale.Recordset.MoveLast SID = Right(txtSID, 5) adcSale.Recordset.AddNew txtSID.Text = "S" + CStr(SID + 1) txtDATE.Text = Date txtCNAME.SetFocus End Sub</pre>			
<b>10</b>	The “Save” button is the Album form.	Execution	Execution
			<i>Before the save button was clicked</i>



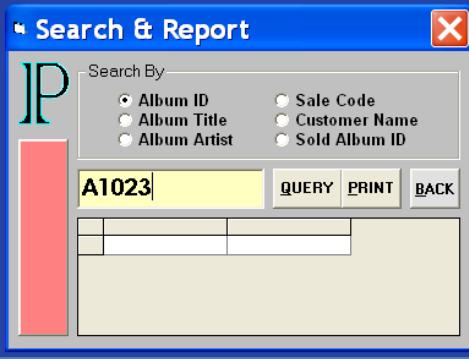
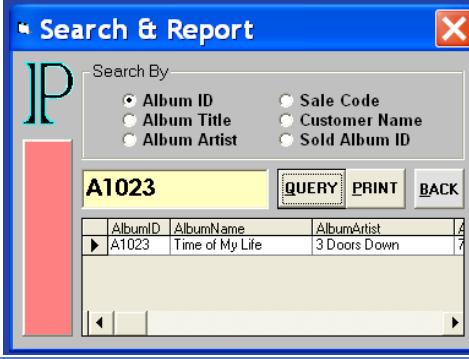
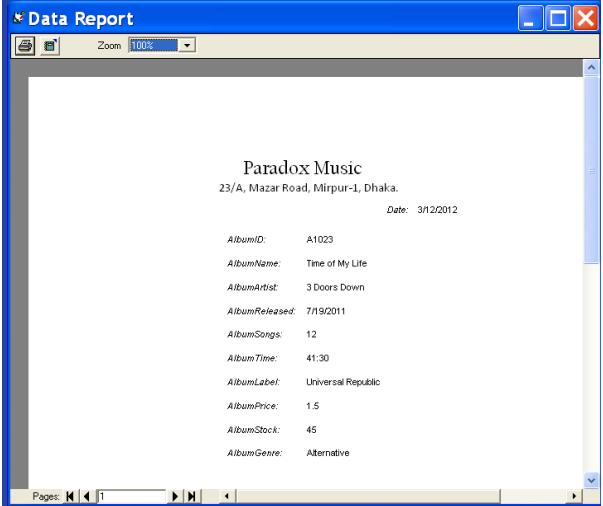
<b>12</b>	The “Cancel” button in the Sales form.	Execution	Execution
	<i>Before the click</i>	<i>After the click</i>	
			
<p>The record is not saved until the Save button is clicked. Clicking the Cancel button erased the data that was inputted after the Add button was clicked. It can be seen that the first record has been reselected. The code is:</p> <pre>Private Sub cmdDone_Click() adcSale.Refresh txtSID.Locked = True txtCNAME.Locked = True txtAID.Locked = True txtDATE.Locked = True txtNUMBER.Locked = True txtCONTACT.Locked = True txtSUBTOTAL.Locked = True txtDISCOUNT.Locked = True txtVAT.Locked = True txtTOTAL.Locked = True txtAID.Visible = True End Sub</pre>			
<b>13</b>	The “Delete” button in the Sales form	Execution	Execution
		<i>Before</i>	
			<i>After</i>
<p>Before the record is deleted, a message box appears asking whether the user is sure that the record should be deleted. The code is:</p> <pre>Private Sub cmdErase_Click() varL = MsgBox("Are you sure you want to delete this record?", vbYesNo, "Update") If varL = vbYes Then     adcSale.Recordset.Delete     MsgBox "Record deleted successfully.", vbInformation, "Update" End If End Sub</pre>			

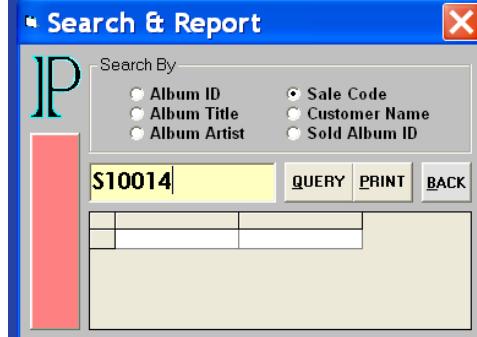
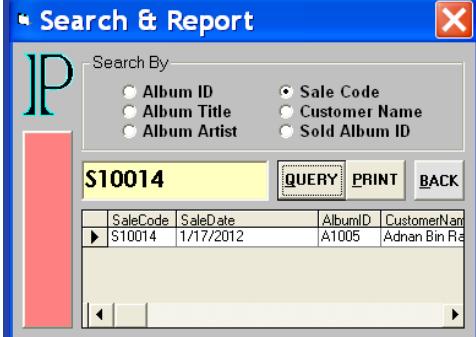
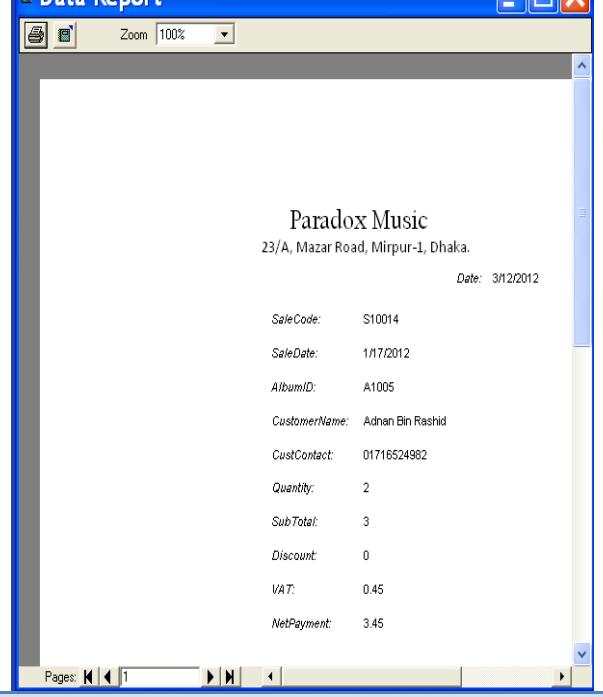
<b>14</b>	The “Back to Main” button in the Album form.	Execution	Execution
	<p><i>Before the click</i></p>  <p><i>After the click</i></p> 	<i>After the click</i>	
	<p>The code for the “Back to Main” button is:</p> <pre>Private Sub cmdBACK_Click() Unload Me frmLogin.Show End Sub</pre>		
<b>15</b>	The “Search and Report” button in the main screen.	Execution	Execution
	<p><i>Before the click</i></p>  <p><i>After the click</i></p> 	<i>After the click</i>	
	<p>The code for the “Search and Report” button is:</p> <pre>Private Sub cmdSearch_Click() Unload Me frmSearch.Show End Sub</pre>		

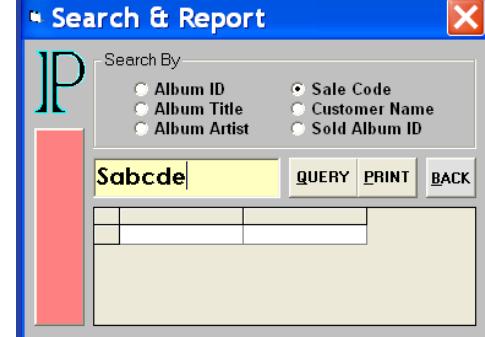
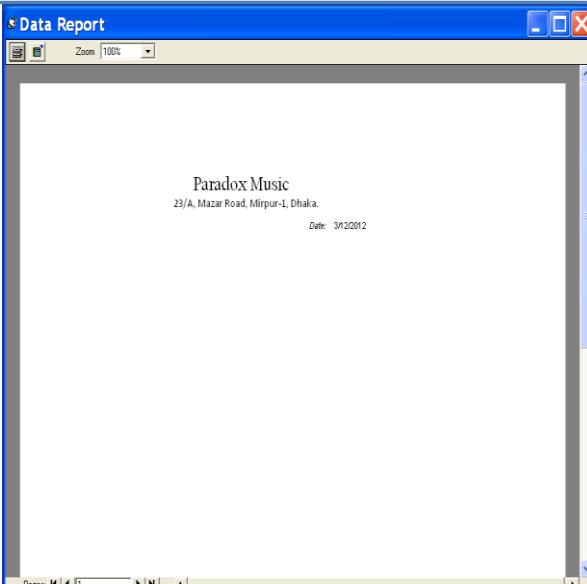
<b>16</b>	The “OK” button in the Login form.	Execution	Execution		
	<i>Before the click</i>	<i>After the click</i>			
A welcome message is displayed right before the Main form shows. The code in the OK button is:					
<pre>Private Sub cmdOK_Click()     'check for correct password     If txtUserName =         adcLogin.Recordset.Fields("UserID").Value And txtPassword =         adcLogin.Recordset.Fields("Password").Value Then             MsgBox "Login Successful!", vbInformation, "Welcome"             Unload Me             frmMain.Show         Else             MsgBox "Invalid Password, try again!", , "Login"             txtPassword.SetFocus         End If End Sub</pre>					
<b>17</b>	The “Exit” button in the Main form.	Execution	Execution		
	<i>Before the click</i>	<i>After the click</i>			
		The program ends			
The code that ends the program, and which was entered in the Exit button is:					
<pre>Private Sub cmdExit_Click() End End Sub</pre>					

<b>18</b>	The “Query” button in the Search form.	Execution	Execution
	<i>Before the click</i>		<i>After the click</i>
			
	At first a search parameter of chosen. Then the data which needs to be searched for is entered and the “Query” button is clicked.		
<b>19</b>	The “Print” button in the Search form.	Execution	Execution
	<i>Before the click</i>		
			
	<i>After the click</i>		
	The print option displays a data report for all the records found in the search and which were displayed in the grid. The print command is at the upper left of the report. The records in the report can be printed out.		

## The functional test for processes

Test No.	Test	Test Data	Test Data Type	Expected Result	Actual Result
<b>Tests 20 to 25 can be linked to objectives 7, 15 and 16</b>					
<b>20</b>	The query option in the Search form with Album ID as the search parameter.	A1023	Normal	The record gets displayed.	The record gets displayed.
<i>Before the click</i>					<i>After the click</i>
					
<p>This shows that normal data is accepted.</p>					
<b>21</b>	The print option in the Search form with Album ID as the search parameter.	A1023	Normal	The data report gets displayed.	The data report gets displayed.
<i>Before the click</i>					<i>After the click</i>
					
<p>The print option for normal data also works.</p>					

22	The query option in the Search form with Sale Code as the search parameter.	S10014	Normal	The record gets displayed.	The record gets displayed.
<p style="text-align: center;"><i>Before the click</i></p>  <p style="text-align: center;"><i>After the click</i></p> 					
<p>The search works with all provided parameters.</p>					
23	The print option in the Search form with Sale Code as the search parameter.	S10014	Normal	The data report gets displayed.	The data report gets displayed.
<p style="text-align: center;"><i>Before the click</i></p>  <p style="text-align: center;"><i>After the click</i></p> 					
<p>The report option also works.</p>					

24	The query option in the Search form with Sale Code as the search parameter.	Sabcde	Abnormal	Nothing gets displayed.	Nothing gets displayed.
<i>Before the click</i>			<i>After the click</i>		
					
	Abnormal values reveal no output. There are no search results for this.				
25	The print option in the Search form with Sale Code as the search parameter.	Sabcde	Abnormal	The data report is empty.	The data report is empty.
<i>Before the click</i>			<i>After the click</i>		
					
	The report is blank as there is nothing to be displayed.				

## Error log

During the coding process some errors had been come across. They were recorded in the error log, a section of which is shown below.

no.	problem faced	solution	solved?
1.	Error connecting Access database with software.	Change database format from 2007 to 2002-03	yes
2.	Incorrect field SubTotal being calculated. Unit price is not being multiplied by Quantity.	Revise and correct code.	yes
3.	Drop down of the field "Sold Album ID" not disappearing to show a text box.	Edit the properties of txtAID and also cboAID.	yes
4.	The field "Album Time" accepts characters that are alphabets.	Revise and correct code.	yes
5.	Printer not printing.	Reinstall printer driver.	yes

The **second problem** was fixed by changing the code to:

```
txtSUBTOTAL.Text =  
adcAlbum.Recordset.Fields("AlbumPrice").Value * txtNUMBER
```

The original code was missing the “\* txtNUMBER”.

The **forth problem** was solved by using the code:

```
If KeyAscii = 13 Then  
    If Left(txtTIME.Text, 2) > 99 Then  
        MsgBox "The 'Play-time' field is invalid!", vbCritical,  
        "Input Error"  
        txtTIME.Text = ""  
    Else  
        cmdSAVE.SetFocus  
    End If  
End If
```

## (IV) INSTALLATION

### *Changeover plans*

Method	Description	Advantages and Disadvantages
Direct	The old system is stopped overnight and the new system is introduced immediately.	<ul style="list-style-type: none"> <li>The benefits are immediate.</li> <li>Costs are reduced – since only one system is used, there is no need to pay for two sets of staff.</li> <li>There is a likelihood of a malfunction since the new system will have been fully tested.</li> <li>This system can be disastrous if the new system fails.</li> </ul>
Parallel running	The old and new systems are run side by side for a time before the new system takes over altogether.	<ul style="list-style-type: none"> <li>If the new system fails, the old system is still available as a backup.</li> <li>It is possible to train staff gradually.</li> <li>Staffs have time to get used to the new system.</li> <li>It is more expensive than direct changeover, since extra staff is needed to run both systems together.</li> </ul>
Pilot implementation	The new system is introduced into one part of the company (like into a warehouse of a supermarket) and its performance assessed.	<ul style="list-style-type: none"> <li>If the new system fails, only one part of the company is affected.</li> <li>It is possible to train staff in one area only, which is much faster and less costly than parallel running.</li> <li>The costs are also less than parallel running, since only one part of the system is being used in the pilot.</li> <li>It is more expensive than direct changeover, since each pilot scheme needs to be evaluated before the next stage is introduced.</li> </ul>
Phased implementation	Initially, only part of the new system is introduced. Only when it proves to work satisfactorily is the next part introduced, and so on, until the old system is fully replaced.	<ul style="list-style-type: none"> <li>If the latest part fails, it is only necessary to go back in the system to the point of failure, hence failure is not disastrous.</li> <li>It is possible to insure the system works properly before expanding.</li> <li>This is more expensive than direct changeover, since it is necessary to evaluate each phase before moving to the next stage.</li> </ul>

Considering the above points, I have decided to introduce the new system using the direct changeover method. This will be the most suited for our purpose.

I had sent the manager a statement of agreement for this:

## Changeover Agreement

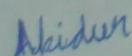
Mr. Husain Ali,  
Manager,  
Paradox Music

For the installation of the software, a certain implementation procedure has to be followed. As it seems the performance of the software is satisfactory, this needs to be done. The options available for changeover are described below:

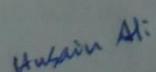
- **Direct:** The old system is stopped overnight and the new system is introduced immediately.
- **Parallel running:** The old and new systems are run side by side for a time before the new system takes over altogether.
- **Pilot:** The new system is introduced into one part of the company and its performance assessed.
- **Phased:** Initially, only part of the new system is introduced. Only when it proves to work satisfactorily is the next part introduced, and so on, until the old system is fully replaced.

By signing this document, Mr. Husain Ali, you agree that you are completely satisfied with the testing of the system, fully understand the different methods available as well as its advantages and disadvantages, and agree to implement the new system using the **direct changeover** method.

To sign



Abidur Rahim (Mr.)



Mr. Husain Ali  
Manager

All the data in the registers have to be input into the computer. The **key-to-disk** method can be used here. The records will be written into spreadsheet software (MS Excel) and then imported to MS Access.

The input in the spreadsheet software (MS Excel) will look something like this.

	A	B	C	D	E	F	G	H	I	J	K
1	AlbumID	AlbumName	AlbumArtist	AlbumReleased	AlbumSongs	AlbumTime	AlbumLabel	AlbumPrice	AlbumStock	AlbumGenre	
2	A1001	Daughtry	Daughtry	21-Sep-06	12	43:26	RCA	1.5	45	Alternative	
3	A1002	Leave This Town	Daughtry	14-Jul-09	14	45:26	RCA	1000	45	Rock	
		Leave This Town: The B-Sides - EP	Daughtry	06-Jul-10	6	25:39	RCA	1	45	Rock	
4	A1003	Life Turns Electric	Finger Eleven	21-Sep-10	10	32:12	Wind-Up	1.5	45	Alternative	
5	A1004	Them vs. You vs. Me	Finger Eleven	06-Mar-07	11	40:23	Wind-Up	1.5	45	Rock	
6	A1005										

It is then copied and pasted into the database software (MS Access).

AlbumID	AlbumName	AlbumArtist	AlbumRele	Albu	Albu	AlbumLabel	Album	Albu	AlbumGenre	Add N
A1001	Daughtry	Daughtry	9/21/2006	12	43:26	RCA		1.5	45	Alternative
A1002	Leave This Town	Daughtry	7/14/2009	14	45:26	RCA		1000	45	Rock
A1003	Leave This Town: The B-Si	Daughtry	7/6/2010	6	25:39	RCA		1	45	Rock
A1004	Life Turns Electric	Finger Eleven	9/21/2010	10	32:12	Wind-Up		1.5	45	Alternative
A1005	Them vs. You vs. Me	Finger Eleven	3/6/2007	11	40:23	Wind-Up		1.5	45	Rock

The following steps need to be followed in order to install the software:

1. Turn on the computer and start windows.
2. Go to the folder named “Tracedge 1.0 Installer” and open the setup application in it.
3. Follow the instructions in the installer.
4. After the installation has finished, put the Paradox Music database into the folder that the software was installed into.

After installation, the software can be accessed through “All Programs” from “Start”. The program can be uninstalled by going to the “Add/Remove Programs” option from the operating system’s control panel. After successful installation, place the MS Access database in the same directory where the software was installed.

Since the number of employees is limited, I thought it best to conduct sessions on how to use the software. A projector was used for the best experience. Everyone, including, the manager was requested and attended. In addition, user manuals were distributed to the employees. A copy of this document is also present in the CD used to install the software. So, if any new employees join, they will be able to learn to use the system without much hassle. A description of the layout of the classes is given below

<b>Day</b>	<b>Hour</b>	<b>Training Provided</b>
1	1	1. Purpose of the Training 2. Explanation of the schedule of the training 3. Purpose of the new system 4. Overview and features of the new system
	2	1. System requirements for installation 2. Installation of the system 3. How to start and access the program 4. Logging into the system 5. How to add new user by Administrators
	3	1. Learning outcomes 2. Question and Answer session 3. Live participation 4. Employee feedback
2	1	1. Review of the previous day's learning outcomes 2. How to open and close each form 3. Introduction to text box, Combo box, option button and Data Grid and ADODC button 4. Introduction to abbreviations and identifiers used
	2	1. How to add, edit, save, delete, cancel and refresh forms
	3	1. Learning outcomes 2. Question and Answer session 3. Live participation 4. Employee feedback
3	1	1. Review of the previous day's learning outcomes 2. Introduction of concept of link between forms and database in MS Access 3. How each tables are linked to each other 4. Concept of automatic update
	2	1. Billing Process and concept of Automatic calculations 2. Invoice production
	3	1. Learning outcomes 2. Question and Answer session 3. Live participation 4. Employee feedback
4	1	1. Review of the previous day's learning outcomes 2. Conducting searching 3. Generating and printing reports
	2	1. How to deal with common error messages, FAQ 2. Validation checks 3. Backup policy 4. Troubleshooting tips
	3	1. Overview of entire system 2. Question and Answer session 3. My contact details

## User testing

After everyone became fully acquainted with the system, they were asked to have a trial run of using the system and to fill up a testing form. A sample is given below.

No	Test Description	Test On	Y	N	Remark
1	Allows access only with correct username and password	Login form	✓		
2	Navigation from main form to all other forms	Login form	✓		
3	Automatic generation of IDs	Album form Sale form	✓ ✓		The IDs cannot be edited
4	Adding a new record	Album form Sale form	✓ ✓		
5	Amending (editing and saving) an existing record	Album form Sale form	✓ ✓		
6	Deleting an existing record	Album form Sale form	✓ ✓		
7	Canceling the addition of a record	Album form Sale form	✓ ✓		
8	Automatic calculation of bill	Sale form	✓		
9	Searching for a record with parameter	Album ID Album Name Album Artist Sale Code Customer Name Sold AlbumID	✓ ✓ ✓ ✓ ✓ ✓		not case sensitive
10	Generation of report and printing it out	Album ID Album Name Album Artist Sale Code Customer Name Sold AlbumID	✓ ✓ ✓ ✓ ✓ ✓		

Additional comments... More accounts may be added....  
...with limited accessibility... System works great!

Once the users had tested the system, further testing was carried out by me and some volunteers, which included some of my friends. A sample feedback form is given below.

No.	Test	Yes	No
1	Can you log in using the user name "user1" and password "pass123"?	✓	
2	Can you access the main form?	✓	
3	Can you navigate between the forms?	✓	
4	Can you add a new record?	✓	
5	Can you amend an existing record?	✓	
6	Can you delete a record?	✓	
7	Can you cancel the addition of a record?	✓	
8	Can you perform a search?	✓	
9	Can you generate and print a report of the search results?	✓	

Are you satisfied with the system?..... Yes,.. completely .. satisfied

Please mention any mistakes you may have come across .....

..... No .. mistakes .....

Please write down any additional comments you may have ... System ...  
.. is .. very .. stable .. and .. fast ..

## (e) Documentation

### (I) SYSTEM MAINTENANCE DOCUMENTATION

#### *System maintenance documentation*

##### Purpose of the system

The software was made so that the data stored in an Access database file can be edited easily. The software does not hold the data within itself, it manipulates it from afar. The main reason in doing this was to achieve a user-friendly interface. It also makes searches and reports easier. It keeps the two tables in the database organized and easy to access. It allows the user to add, amend, and delete records all with the surety that data will not get deleted accidentally. It also enhances security and provides basic validation checks.

##### The tables

There are three tables in the database. They are the Album (stock) table, the Sale table, and the User table. The Album table stores all the information about the albums in the shop, including their stock number. Each album has its own unique Album ID that is also used in the Sale table to show which album has been bought. The sale table also contains information on how many of the albums were bought, the customer's information, and the prices. The User table stores the User Names and Passwords. Further details can be found in the "Database design" section.

The structure of the Album, Sale, and User tables, respectively, are given below. The Album table stores information about the stock, the Sale table stores information of each sale, like which album was bought, the name of the customer, etc. The User table is used for security purposes and stores the username and password which must be used to sign into the software and access to the database. A data dictionary follows.

Field Name	Data Type	Size	Description	Example
AlbumID ( <i>primary key</i> )	Text	5	The unique ID given to each album. It is the primary key. This has the format A####.	A1023
AlbumName	Text	35	The title or name of the album.	A Thousand Suns
AlbumArtist	Text	25	The artist (singer/creator) of the music album.	Linkin Park
AlbumGenre	Lookup Wizard	15	The type of music. There are only a limited number of possibilities and thus a drop-down can be used.	Rock
AlbumSongs	Number	2	The number of songs in the album.	12
AlbumTime	Time	5	The total play time of the album.	49:26
AlbumReleased	Date	10	The date the album was released.	09/26/2009
AlbumLabel	Text	30	The record company of the album.	Universal Records
AlbumPrice	Currency	6	The unit price of the album in BDT.	950
AlbumStock	Number	4	The number of CDs of the album still present in the shop.	29

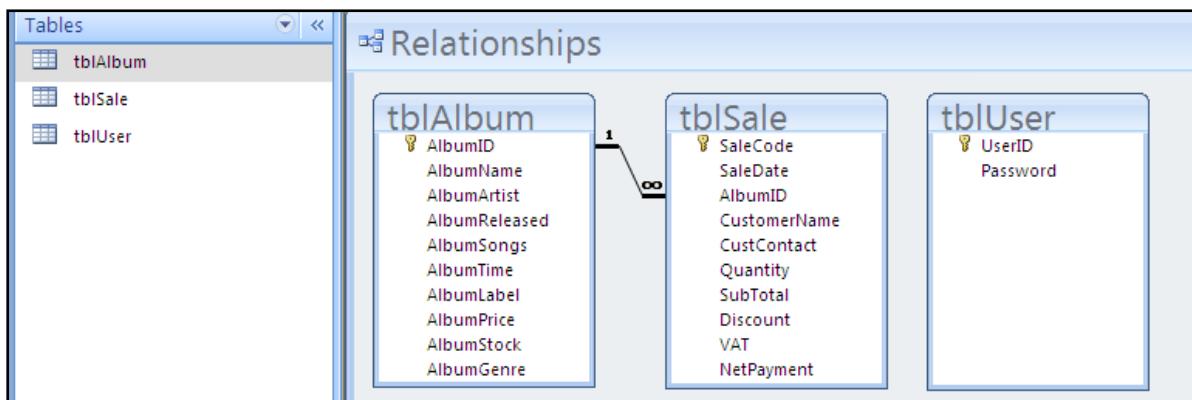
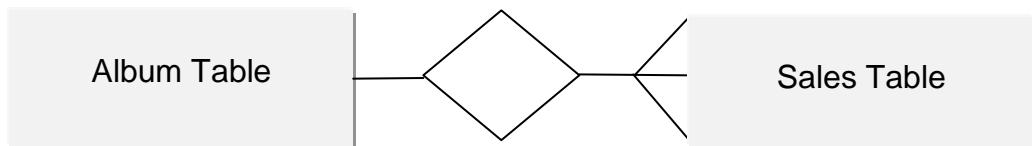
Field Name	Data Type	Size	Description	Example
SaleCode ( <i>primary key</i> )	Text	6	The unique ID given to each sale. It is the primary key. This has the format S#####.	S14532
CustomerName	Text	30	The name of the customer who bought the album. No numbers are allowed in this field.	Richard Parker
CustContact	Text	11	The customer's phone number. Cannot contain any alphabets.	01718272391
SaleDate	Date	10	The date of the sale.	02/30/2014
AlbumID ( <i>foreign key</i> )	Text	5	The Album ID of the album being sold. This is a foreign key.	A1264
Quantity	Number	3	The number of that album being sold. Has to be a positive integer.	2
SubTotal	Currency	6	The AlbumPrice multiplied by the Quantity.	1900
Discount	Currency	6	The discount on the album. This is input in percentage out of 100. Depends on the customer and also the Quantity.	25.5 (giving 485 as the discount)
VAT	Currency	6	The VAT of the album. This is 1.5% of the SubTotal.	285
NetPayment	Currency	6	The SubTotal plus VAT minus Discount.	1700

Field Name	Data Type	Size	Description	Example
UserID	Text	10	The user name that is required to sign in and consequently access the program.	Manager
Password	Text	15	The password corresponding to the UserID. Note that this field is case sensitive.	Note123

DATA DICTIONARY	
Field	Description
AlbumID (P.K.)	The unique ID given to each album. It is the primary key. This has the format A#####.
AlbumName	The title or name of the album.
AlbumArtist	The artist (singer/creator) of the music album.
AlbumGenre	The type of music. There are only a limited number of possibilities and thus a drop-down can be used.
AlbumSongs	The number of songs in the album.
AlbumTime	The total play time of the album.
AlbumReleased	The date the album was released.
AlbumLabel	The record company of the album.
AlbumPrice	The unit price of the album in BDT.
AlbumStock	The number of CDs of the album still present in the shop.
SaleCode (P.K.)	The unique ID given to each sale. It is the primary key. This has the format S#####.
CustomerName	The name of the customer who bought the album. No numbers are allowed in this field.
CustContact	The customer's phone number. Cannot contain any alphabets.
SaleData	The date of the sale.
AlbumID (F.K.)	The Album ID of the album being sold. This is a foreign key.
Quantity	The number of that album being sold. Has to be a positive integer.
SubTotal	The AlbumPrice multiplied by the Quantity.
Discount	The discount on the album. This is input in percentage out of 100. Depends on the customer and also the Quantity.
VAT	The VAT of the album. This is 1.5% of the SubTotal.
NetPayment	The SubTotal plus VAT minus Discount.
UserID	The user name that is required to sign in and consequently access the program.
Password	The password corresponding to the UserID. Note that this field is case sensitive.

### **The database design**

The relationship between the Album and Sale tables is given below.

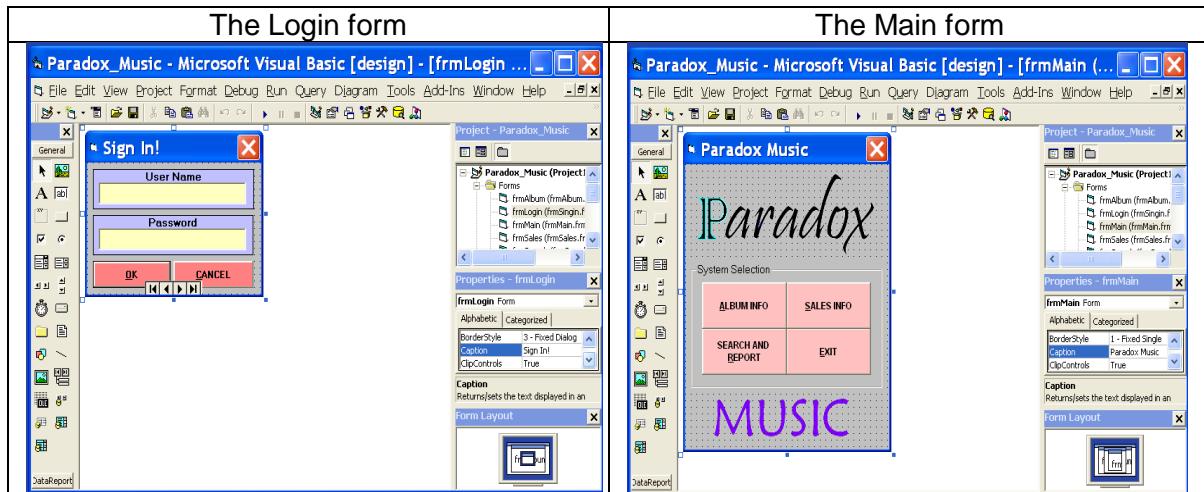
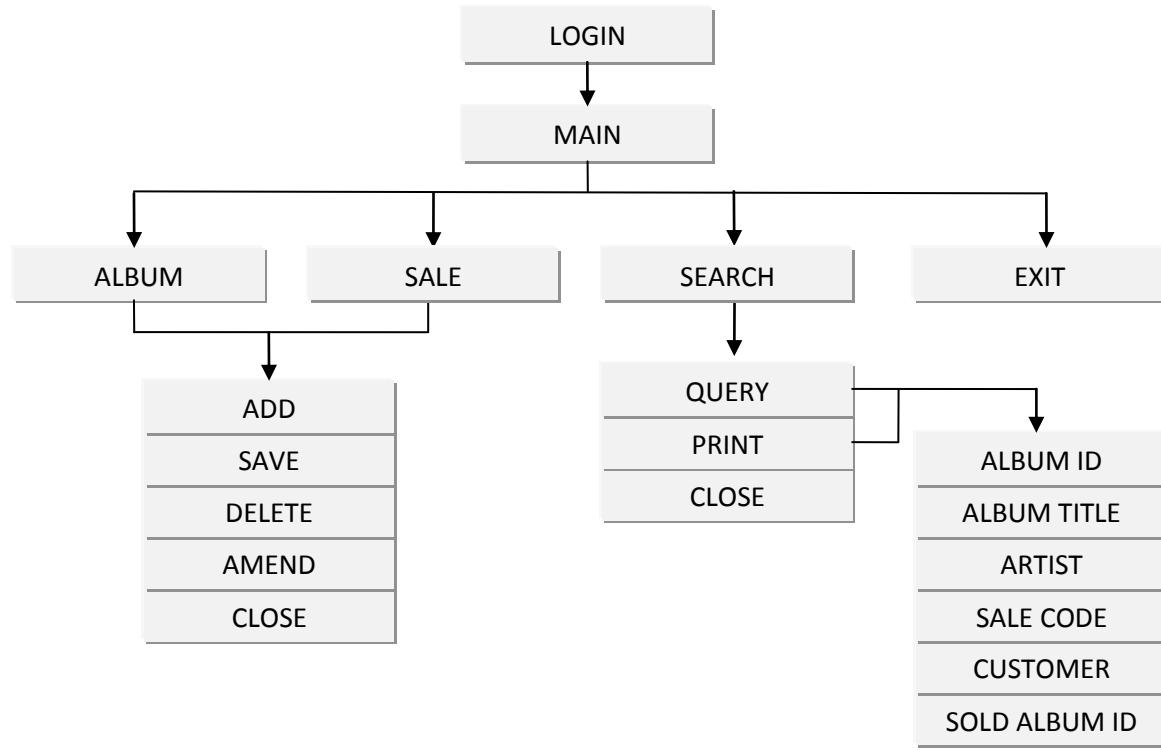


### **Validation**

The fields in the software are only validated once the Enter key is pressed. If the field is invalid, an error message is displayed and everything in the invalid field is erased. If it does not contain any mistakes, the next field is automatically selected so that data can be entered into it. Though these validation checks are not perfect, they provide a basic validation and prevent outrageous mistakes only.

### The program design

The basic structure of the software looks something like this:



**The Album form**

**The Sale form**

**The Search and Report form**

**The Data Report**

### The test plan

The following table can be used to see if the input validations work.

Test No.	Field	Test Data	Test Data Type	Reason	Expected Result
1	CustomerName	Abidur Rahim	Normal	To accept normal values	Accepted
		123	Abnormal	To reject abnormal values	Rejected
2	CustContact	8392134	Normal	To accept normal values	Accepted
		999999999999	Extreme	To accept extreme values	Accepted
		1111111111 1111111111	Abnormal	To reject abnormal values	Rejected
3	AlbumGenre	Metal	Normal	To accept normal values	Accepted
		123	Abnormal	To reject abnormal values	Rejected
4	AlbumReleased	09/09/2010	Normal	To accept normal values	Accepted
		09/2010/09	Abnormal	To reject abnormal values	Rejected
5	AlbumStock	17	Normal	To accept normal values	Accepted
		0	Extreme	To accept extreme values	Accepted
		-4	Abnormal	To reject abnormal values	Rejected
6	SaleCode	S18208	Normal	To accept normal values	Accepted
		A123	Abnormal	To reject abnormal values	Rejected
7	AlbumLabel	Hollywood	Normal	To accept normal values	Accepted
			Abnormal	To reject abnormal values	Rejected
8	AlbumTime	44:53	Normal	To accept normal values	Accepted
		ab:cd	Abnormal	To reject abnormal values	Rejected

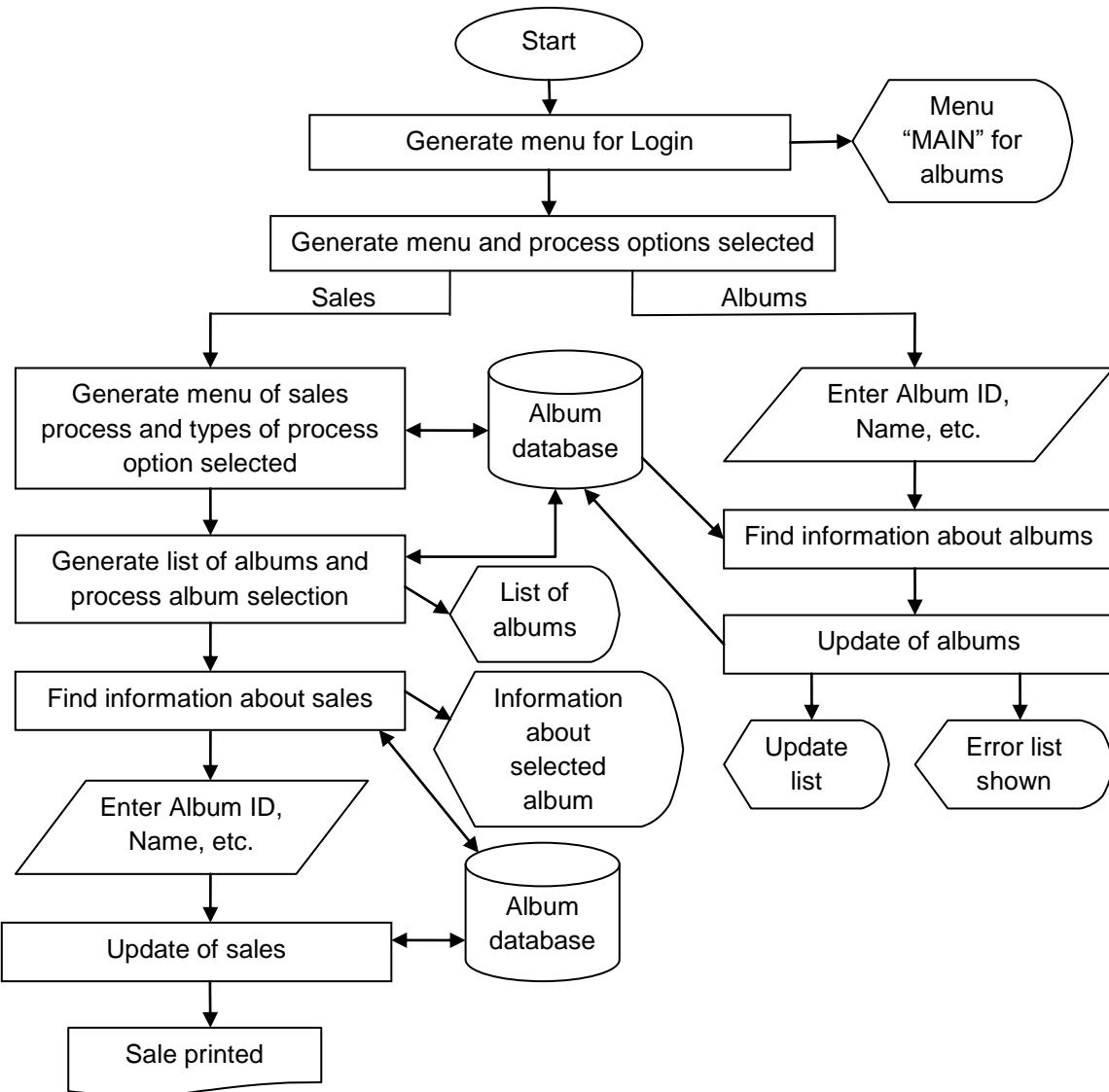
This table can be used to check the normal execution of tasks and forms in the software:

<b>Test No.</b>	<b>Test</b>	<b>Expected Result</b>
9	The “Add” button in the Sales form.	Execution
10	The “Save” button is the Album form.	Execution
11	The “Amend” button in the Album form.	Execution
12	The “Cancel” button in the Sales form.	Execution
13	The “Delete” button in the Sales form	Execution
14	The “Back to Main” button in the Album form.	Execution
15	The “Search and Report” button in the main screen.	Execution
16	The “OK” button in the Login form.	Execution
17	The “Exit” button in the Main form.	Execution
18	The “Query” button in the Search form.	Execution
19	The “Print” button in the Search form.	Execution

The following table can be used to check the software’s outputs.

<b>Test No.</b>	<b>Test</b>	<b>Test Data</b>	<b>Test Data Type</b>	<b>Expected Result</b>
20	The query option in Search form with Album ID as the search parameter.	A1023	Normal	The record gets displayed.
21	The print option in Search form with Album ID as the search parameter.	A1023	Normal	The data report gets displayed.
22	The query option in Search form with Sale Code as the search parameter.	S10014	Normal	The record gets displayed.
23	The print option in Search form with Sale Code as the search parameter.	S10014	Normal	The data report gets displayed.
24	The query option in Search form with Sale Code as the search parameter.	Sabcde	Abnormal	Nothing gets displayed.
25	The print option in Search form with Sale Code as the search parameter.	Sabcde	Abnormal	The data report is empty.

### System flowchart



[ FOR THE REST OF THE ALGORITHMS (ADD, SEARCH, EDIT, DELETE) AND SQL CODE AND FORMULAS PLEASE LOOK BACK TO PAGES 33 TO 35 OF THIS COURSEWORK ]

### The codes

[ FOR THE CODES PLEASE LOOK BACK TO PAGES 57 THROUGH 66 OF THIS COURSEWORK ]

### **Hardware requirements**

The minimum hardware requirements for the computerized system are:

<b>Hardware</b>	<b>Purpose</b>
Pentium 4 processor and CPU	Running the software
192 MB of RAM	Running the software
A display card	Visual display
15" average resolution VDU	Visual display
A 500 MB hard disk drive	Storage
A mouse and a keyboard	Input
A pen drive	Backup
An average resolution printer	Report printouts

However, this will not provide optimum performance. For the best output, the following configuration will be used:

<b>Hardware</b>	<b>Reason</b>
A Dual Core processor, CPU 2.26 GHz	<ul style="list-style-type: none"> <li>• It has a faster performance.</li> <li>• It can better cope up better with the software.</li> </ul>
2 GB of RAM	<ul style="list-style-type: none"> <li>• So that a lot of data can be handled at once.</li> <li>• To make system processes faster.</li> </ul>
A display card	<ul style="list-style-type: none"> <li>• For visual display.</li> <li>• So that the VDU can be connected.</li> </ul>
Sound card and speakers	<ul style="list-style-type: none"> <li>• To get sound outputs from the software.</li> <li>• So that albums can be tested.</li> </ul>
15" medium resolution monitor	<ul style="list-style-type: none"> <li>• To get proper display of the software.</li> <li>• So that color can be seen clearly.</li> </ul>
40 GB hard disk drive	<ul style="list-style-type: none"> <li>• To store huge amounts of data.</li> <li>• It can even carry a backup.</li> </ul>
A mouse and a keyboard	<ul style="list-style-type: none"> <li>• To input data.</li> <li>• To select data options.</li> </ul>
A laser printer	<ul style="list-style-type: none"> <li>• To achieve good quality report printouts.</li> <li>• To enable color prints with decorations.</li> </ul>
A CD-ROM and writer	<ul style="list-style-type: none"> <li>• To get permanent backups that will run easy.</li> <li>• To test albums.</li> <li>• To install necessary software.</li> </ul>
A pen drive	<ul style="list-style-type: none"> <li>• To keep temporary backups.</li> <li>• So that data can be transported if necessary.</li> </ul>

### **Software requirements**

<b>Software</b>	<b>Advantage</b>	<b>Disadvantage</b>	<b>Cost</b>
Spreadsheet	Large amounts of data can be viewed at once. Simulations, like the impact on the store's profit if a new policy is adopted, can be made easily.	Many of the big calculations have to be done by entering long, complex formulas.	Low
Database Management System	Huge amounts of data can be kept in an organized manner.	It will not perform specific tasks until programmed to do so.	Low
Customized software	The program will only perform tasks the store requires, thus increasing efficiency.	Many of the new and unfamiliar features in the program will have to be taught to the users.	High

It would be wise to use a database package to store data and a programming language to create interfaces at the front-end rather than using either only the database software or only the programming language, since neither of them can alone completely fulfill the needs of Paradox Music. Database software like FoxPro, Oracle, and Microsoft Access are available for use. But the best choice would be Microsoft Access since it comes with the MS Office suite and the store will find it handy to purchase MS Office for other purposes as well. Since the number of customers, the number of albums, and the number of transactions per day are, relatively, small, Microsoft Access will be the appropriate database choice. Microsoft Visual Basic can be used as the front-end program, since it requires a minimum amount of programming and is GUI based. Using the little coding in VB, many of the programming for the data handling part can be done easily compared to high-level languages like C, C++, and Java.

So, Microsoft Visual Basic and Microsoft Access will be used together. MS Access will be the data holder and Visual Basic will be the manipulator of the data. Microsoft Windows XP will be used as the operating system, because both Microsoft Access and Microsoft Visual Basic run well Windows XP. It is one of the most user-friendly operating systems. Anti-virus software will also be installed to protect the data from viruses, etc.

Therefore, a program will be written in Microsoft Visual Basic since many of the tasks that need to be done are not well or properly facilitated by the commercial software packages. Some sorts of tasks can be done a little more easily if a program is written rather than bought. Visual Basic is an easy language with short, uncomplicated codes. ADODC, Data Environments, Login Dialogs, etc. make the programming task a lot easier as these functions are built-in.

### **Adaptive maintenance:**

This software can be improved. Possible improvements may include:

- The ability to add new users and also delete users
- The ability to carry out multiple searches simultaneously
- The ability to select which fields appear in the report
- Automatically update the stock based on sales and warn when stock goes too low

### **Backup procedures**

It is recommended that a backup is made every day in a pendrive at the end of the working hour. This is kept in case something goes wrong with the original database. Another copy should be made at the every week and stored at a different location. Monthly backups can be saved as well. This may be stored in a cloud. Backups can also be kept on the computer itself.

### **How to use the system**

Before working with the database, the correct username and password has to be entered in the Login form and the “OK” button has to be clicked. After the correct username and password is entered, a form will be displayed where you can go to other forms.

Creating a new record:

1. Go to the required table from the Main form.
2. Click the “Add” button in the controls.
3. Fill in all the required information, remembering to click the Enter key each time a field is entered.
4. Click the “Save” button to save the record or click the “Cancel” button to not save the record.

Deleting an existing record:

1. Go to the required table from the Main form.
2. Go through the list of records in the data grid and select the record you want to delete.
3. Click the “Delete” button and confirm that you want to delete the record.

Amend an existing record:

1. Go to the required table from the Main form.
2. Go through the list of records in the data grid and select the record you want to amend.
3. Click the “Amend” button to unlock the text boxes.
4. Amend the data remembering to click the Enter key to validate the record.
5. Click the “Save” button to save the record or click the “Cancel” button to cancel saving the record.

Searching and record printing:

1. Go to the “Search and Report” form from the Main form.
2. Select the search parameter by clicking on the labeled option buttons.
3. Type in the data for which you want to perform the search and click the “Query” button. The result will immediately be displayed in the data grid.
4. To get a report of the results, click the “Print” button. A Data Report will be displayed. To print the report, click the “Print” button in the upper-left corner of the report.

### **The expectation**

The software was made so that the data stored in an Access database file can be edited easily. The software does not hold the data within itself, it manipulates it from afar. The main reason in doing this was to achieve a user-friendly interface. It also makes searches and reports easier. It keeps the two tables in the database organized and easy to access. It allows the user to add, amend, and delete records all with the surety that data will not get deleted accidentally. It also enhances security. The system provides basic validation so that outrageous errors are not made when inputting data. However, the checks only work when the “Enter” key is pressed after data is entered into a field.

## **(II)USER GUIDE**

### ***The user documentation***

<b>Contents</b>	<b>Page</b>	<b>Contents</b>	<b>Page</b>
Introduction	109	Searching	116
What it does	109	Printing a report	117
System requirements	109	Backing up	118
Installing the system	110	Common error guide	118
Form design	111	F.A.Q.	122
Description of the forms	113	Glossary	123
Data manipulation	115	Index	123

### **Introduction**

This is the user guide of the Paradox Music Database Management System (nicknamed Tracedge 1.0). It provides a basic outline of how the system should be handled to achieve the best results. If problems arise that cannot be solved even after going through this user guide, it is recommended that a programmer or analyst is contacted.

### **What it does**

The software was made so that the data stored in an Access database file can be edited easily. The software does not hold the data within itself, it manipulates it from afar. The main reason in doing this was to achieve a user-friendly interface. It also makes searches and reports easier. It keeps the two tables in the database organized and easy to access. It allows the user to add, amend, and delete records all with the surety that data will not get deleted accidentally. Note that the database can only be accessed when the correct username and password are entered into the login form that appears at the start, whenever the software is run.

### **System Requirements**

The optimum hardware requirements for the system are:

<b>Hardware</b>	<b>Reason</b>
A Dual Core processor, CPU 2.26 GHz	<ul style="list-style-type: none"><li>• It has a faster performance.</li><li>• It can better cope up better with the software.</li></ul>
2 GB of RAM	<ul style="list-style-type: none"><li>• So that a lot of data can be handled at once.</li><li>• To make system processes faster.</li></ul>
A display card	<ul style="list-style-type: none"><li>• For visual display.</li><li>• So that the VDU can be connected.</li></ul>
Sound card and speakers	<ul style="list-style-type: none"><li>• To get sound outputs from the software.</li><li>• So that albums can be tested.</li></ul>
15" color monitor	<ul style="list-style-type: none"><li>• To get proper display of the software.</li><li>• So that color can be seen clearly.</li></ul>
40 GB hard disk drive	<ul style="list-style-type: none"><li>• To store huge amounts of data.</li><li>• It can even carry a backup.</li></ul>
A mouse and a keyboard	<ul style="list-style-type: none"><li>• To input data.</li><li>• To select data options.</li></ul>
A laser printer	<ul style="list-style-type: none"><li>• To achieve good quality report printouts.</li><li>• To enable color prints with decorations.</li></ul>
A CD-ROM and writer	<ul style="list-style-type: none"><li>• To get permanent backups that will run easy.</li><li>• To test albums.</li><li>• To install necessary software.</li></ul>
A pen drive	<ul style="list-style-type: none"><li>• To keep temporary backups.</li><li>• So that data can be transported if necessary.</li></ul>

The software required to run the software include a Windows XP operating system (or higher), Microsoft Office 2007 (or higher), and any good anti-virus software to protect against malware. Since the DBMS (database management software) was made using Visual Basic 6.0, it might be a good idea to purchase Visual Studio 6 as well, although its installation is not required unless you want to edit the software.

### The system

The following steps need to be followed in order to install the software:

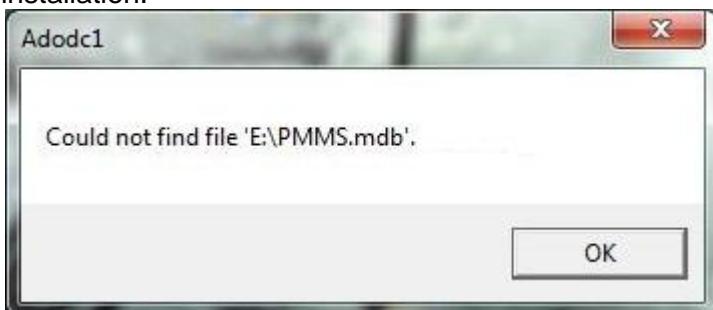
1. Turn on the computer and start windows.
2. Insert the CD that contains the Paradox Music DBMS into the disk drive and access its contents. They should look like this.



3. Open the setup application.



4. Follow the instructions in the installer, choosing a suitable directory for installation.
5. After the installation completes successfully, and the software is run, an error message is displayed saying that the "PMMS.mdb" file is missing in the directory of installation.

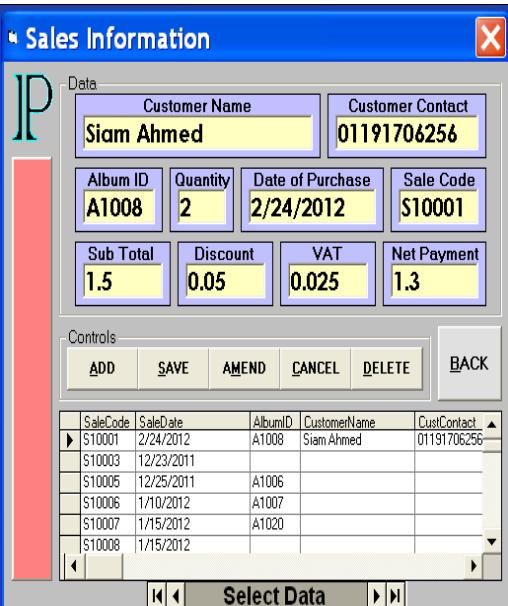


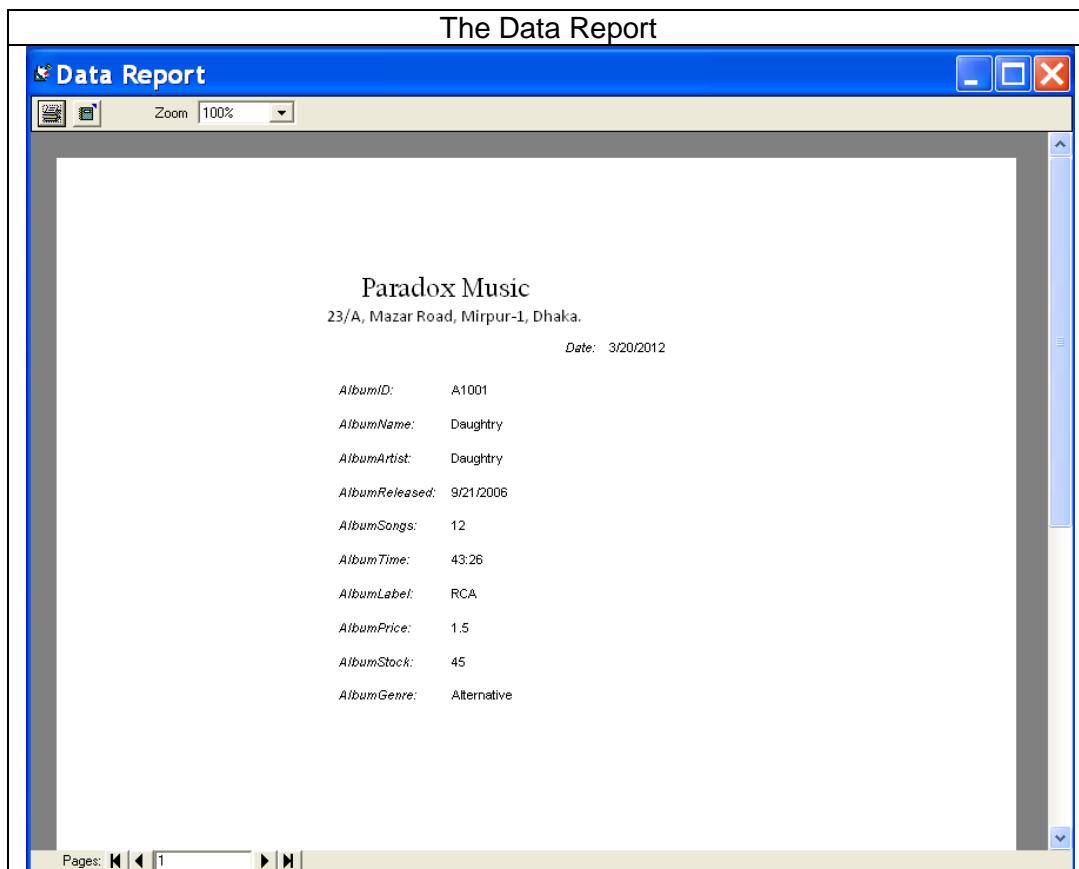
6. Place the database in the directory where the software is installed.
7. The software should now be ready for use.

After installation, the software can be accessed through "All Programs" from "Start". A shortcut of the program "Paradox Music DBMS 1.0" can be created by right-clicking on it, and this can be placed on the desktop for easy access. The program can be uninstalled by going to the "Add/Remove Programs" option from the operating system's control panel.

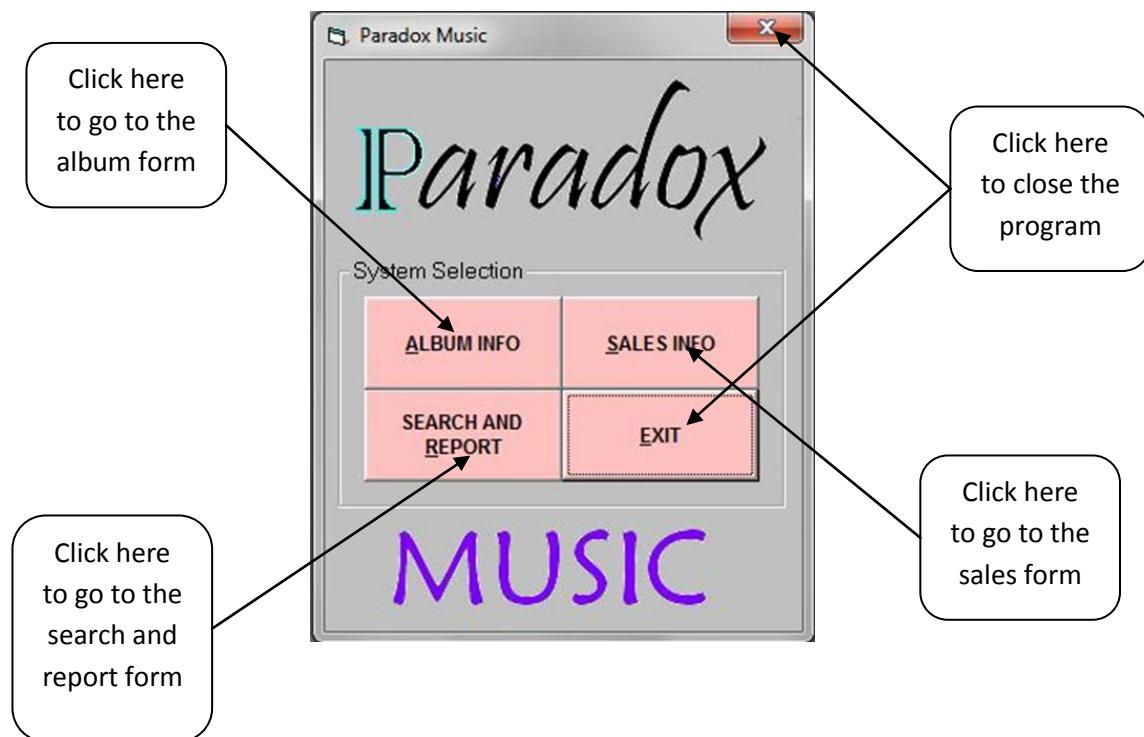
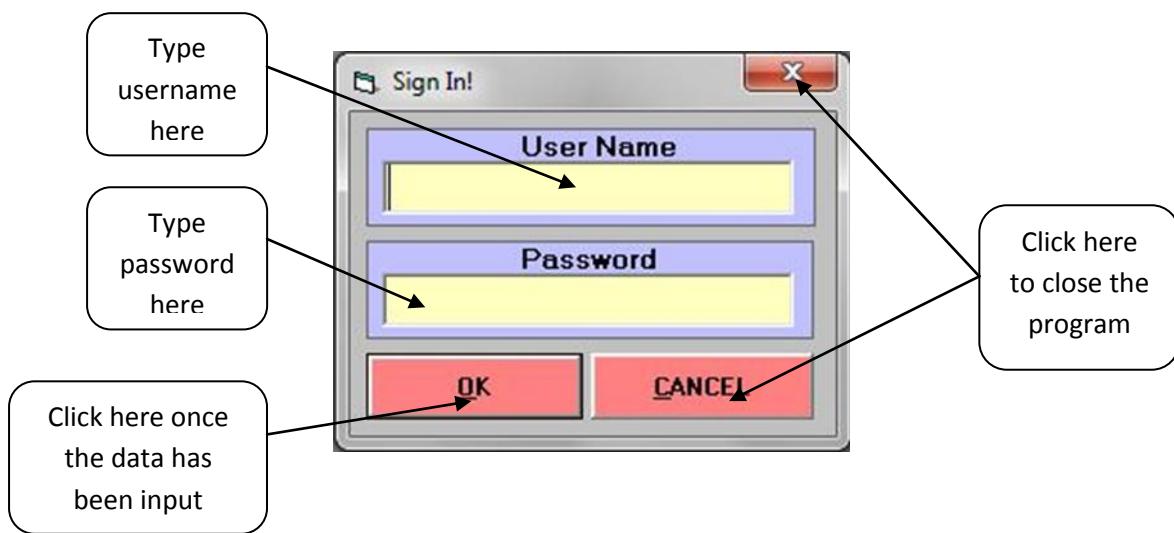
The forms and report of the software should look like the following.

<b>The Login form</b>	<b>The Main form</b>	<b>The Search form</b>
		

<b>The Album form</b>	<b>The Sale form</b>
	



Before working with the database, the correct username and password has to be entered in the Login form and the “OK” button has to be clicked. After the correct username and password is entered, the main form will appear from where you can navigate to the other forms and also close the program. Note that the large pink button below the logo on the left of the Album, Sales, and Search forms can be clicked to go back to the login form.



The required information are input and also displayed in the textboxes.

This is a label. It tells what piece of information should go in the correspond textbox.

**1** This is a label. It tells what piece of information should go in the correspond textbox.

**2** The required information are input and also displayed in the textboxes.

**3** Specific records can be selected by clicking on the list. It can also be selected by using the navigation buttons. The rightmost button selects the last record and the leftmost selects the first. Clicking the other two selects the next or previous records.

**4** This is a label. It tells what piece of information should go in the correspond textbox.

**5** The required information are input and also displayed in the textboxes.

Click here to go back to the main navigation form.

A description of some of the components are given as follows:

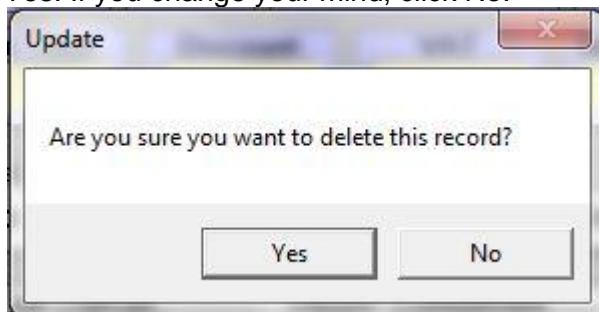
<b>Button</b>	<b>Description</b>
1 (Add)	Used to add another new record into that table. This also clears and unlocks the textboxes so that data can be entered there.
2 (Save)	Once the data for the new record has been entered, this button needs to be pressed to confirm that all the data entered is correct and that you want it to be saved into the database. The database is updated only if and when this button is pressed. The textboxes are then locked again.
3 (Amend)	Records can be edited. To edit, i.e. amend, a record, first select the record you want to edit. The textboxes are initially locked. Clicking the Amend button unlocks them and allows you to edit them. Once the edit has been done, remember to click Save.
4 (Cancel)	If you decide that you do not want to add the new record or edit a certain record, you can click the Cancel button to discard the changes.
5 (Delete)	This button deletes the selected record. You will be asked to confirm that you want to delete that record. Remember that once a record has been deleted, it is erased forever from the database and cannot be brought back.

#### Creating a new record:

1. Go to the required table from the Main form.
2. Click the “Add” button in the controls.
3. Fill in all the required information, remembering to click the Enter key each time a field is entered.
4. Click the “Save” button to save the record or click the “Cancel” button to not save the record.
5. A message will be displayed if there is an error in any of the fields and if the data has been saved successfully.
6. Note that the IDs are generated automatically and cannot be edited.

#### Deleting an existing record:

1. Go to the required table from the Main form.
2. Go through the list of records in the data grid and select the record you want to delete.
3. Click the “Delete” button and confirm that you want to delete the record by clicking Yes. If you change your mind, click No.



Amend an existing record:

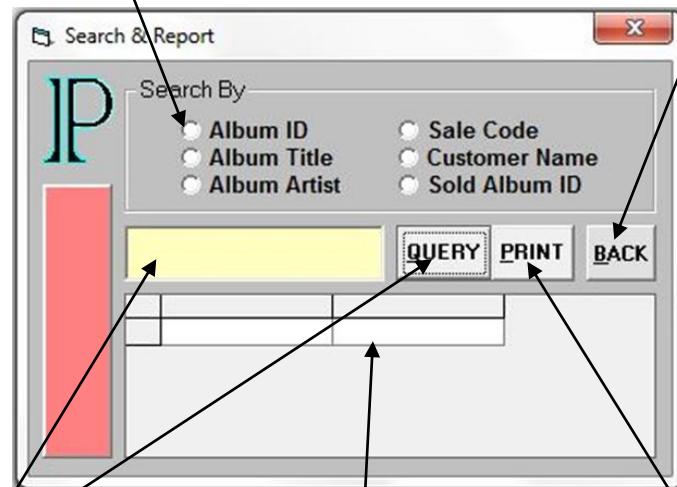
1. Go to the required table from the Main form.
2. Go through the list of records in the data grid and select the record you want to amend.
3. Click the "Amend" button to unlock the text boxes.
4. Amend the data remembering to click the Enter key to validate the record.
5. Click the "Save" button to save the record or click the "Cancel" button to cancel saving the record.

Searching and record printing:

1. Go to the "Search and Report" form from the Main form.
2. Select the search parameter by clicking on the labeled option buttons.
3. Type in the data for which you want to perform the search and click the "Query" button. The result will immediately be displayed in the data grid.
4. To get a report of the results, click the "Print" button. A Data Report will be displayed. To print the report, click the "Print" button in the upper-left corner of the report.

Choose the parameter of search by selecting the option button next to the option you want. There are 6 possible options.

Click here to go back to the main navigation form.

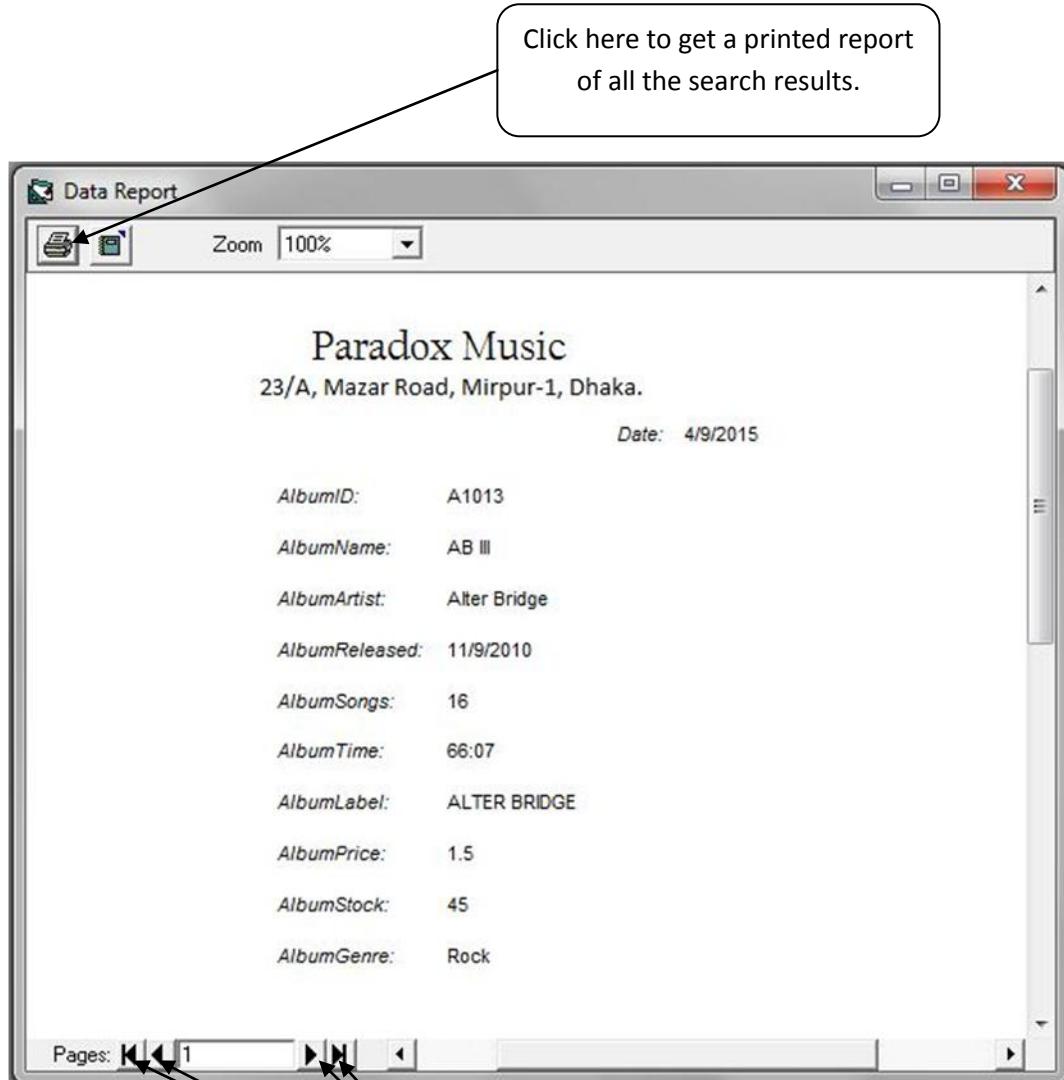


Type the search query keywords here and click Query.

The results of the search are displayed here.

Click here to see a data report and get a printed report of all the search results.

This is the report produced after the “Print” button is pressed.



Click here to get a printed report  
of all the search results.

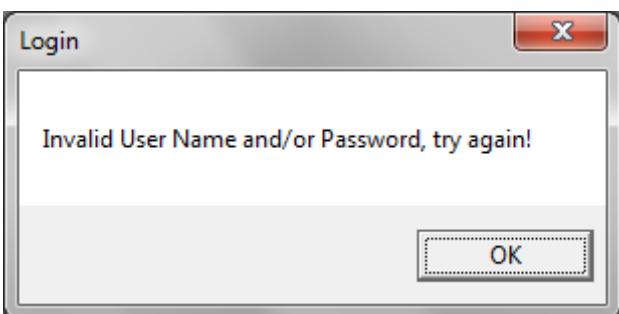
Use these buttons to  
navigate between the  
pages of the report.

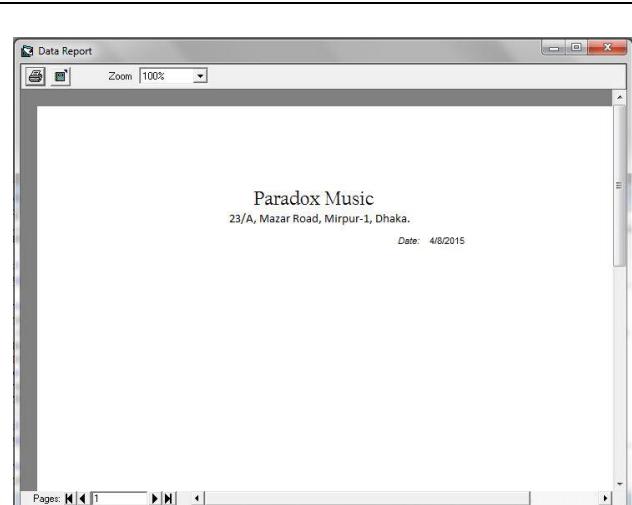
## **Backups**

To make a backup of the information, just copy the folder which has the software and database into the backup drive. The important thing is to copy the database (PMMS.mdb), which stores all the information. A backup of the software (Tracedge 1.0) installer should also be kept, but unlike the database that has to be backed up frequently, you do not need to make copies of it frequently. It is recommended that a backup is made every day in a pendrive at the end of the working hour. This is kept in case something goes wrong with the original database. Another copy should be made at the every week and stored at a different location. Monthly backups can be saved as well. This may be stored in a cloud. Backups can also be kept on the computer itself.

## **Common Error Guide (Troubleshooting)**

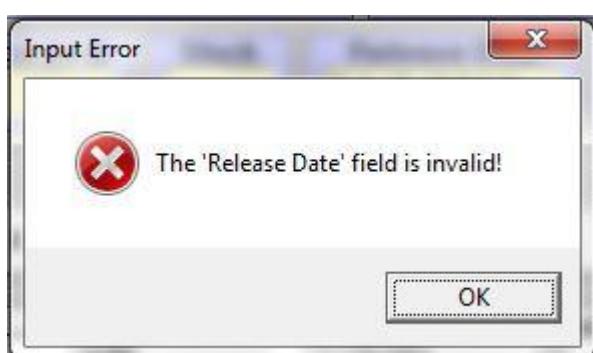
A list of common problems is given below.

Error	Solution
 <p>During login, the following error message may be displayed.</p>	<p>This error occurs when the login details are incorrect. In other words, the User Name (User ID) could be incorrect, the Password could be incorrect, or both could be incorrect. If this occurs, click the "OK" button on the message. You will be brought back to the Login form. Enter both details again, correctly this time. Remember that the Password field is case-sensitive. Check if the Caps Lock is on or not and manage accordingly.</p>



Blank report is produced.

This is likely to have occurred because there were no search results for the query you have made. Check if the search keywords were correct. Also check if the correct search parameter was selected. The search will have no results for the report to have no results.



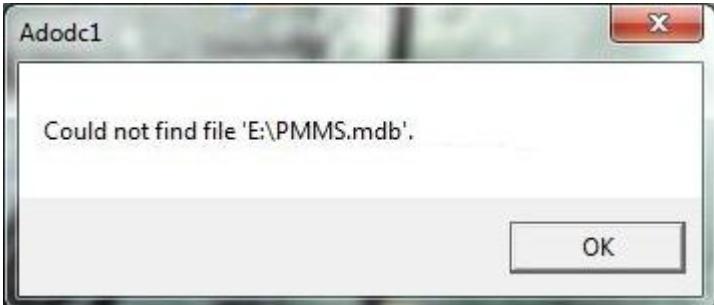
The date was entered correctly but an error message is still shown.

The “Release Date” of the Album table and the “Sale Date” of the Sale table are automatically set to the current date by default. If it requires to be edited, the format must be “MM/DD/YYYY”, not “DD/MM/YYYY”.



Discount field is invalid.

Remember that the discount field is entered in **percentage**, out off 100. It must be numeric too.

Validation checks are not being carried out.	The validation checks are carried out <b>only when the "Enter" key is pressed</b> . If, instead, the cursor is used to navigate across all the fields, the data will <b>not</b> be validated.
 Database not found.	The database has not been placed in the correct directory. Place it in the same folder as the software. To know more look at the installation section of this user guide.
When being launched from the desktop shortcut, software not executing past the login screen / not being found.	Make sure the directory of the software has not been changed. If it has, create a new shortcut and replace the old one.
Field is invalid.	Please read the description of the fields. It is given in this user guide, directly below.

Field Name	Data Type	Size	Description	Example
AlbumID <i>(primary key)</i>	Text	5	The unique ID given to each album. It is the primary key. This has the format A####.	A1023
AlbumName	Text	35	The title or name of the album.	A Thousand Suns
AlbumArtist	Text	25	The artist (singer/creator) of the music album.	Linkin Park
AlbumGenre	Lookup Wizard	15	The type of music. There are only a limited number of possibilities and thus a drop-down can be used.	Rock
AlbumSongs	Number	2	The number of songs in the album.	12
AlbumTime	Time	5	The total play time of the album.	49:26
AlbumReleased	Date	10	The date the album was released.	09/26/2009

AlbumLabel	Text	30	The record company of the album.	Universal Records
AlbumPrice	Currency	6	The unit price of the album in BDT.	950
AlbumStock	Number	4	The number of CDs of the album still present in the shop.	29

Field Name	Data Type	Size	Description	Example
SaleCode <i>(primary key)</i>	Text	6	The unique ID given to each sale. It is the primary key. This has the format S#####.	S14532
CustomerName	Text	30	The name of the customer who bought the album. No numbers are allowed in this field.	Richard Parker
CustContact	Text	11	The customer's phone number. Cannot contain any alphabets.	01718272391
SaleDate	Date	10	The date of the sale.	02/30/2014
AlbumID <i>(foreign key)</i>	Text	5	The Album ID of the album being sold. This is a foreign key.	A1264
Quantity	Number	3	The number of that album being sold. Has to be a positive integer.	2
SubTotal	Currency	6	The AlbumPrice multiplied by the Quantity.	1900
Discount	Currency	6	The discount on the album. This is input in percentage out of 100. Depends on the customer and also the Quantity.	25.5 (giving 485 as the discount)
VAT	Currency	6	The VAT of the album. This is 1.5% of the SubTotal.	285
NetPayment	Currency	6	The SubTotal plus VAT minus Discount.	1700

Field Name	Data Type	Size	Description	Example
UserID	Text	10	The user name that is required to sign in and consequently access the program.	Manager
Password	Text	15	The password corresponding to the User ID. Note that this field is case sensitive.	Note123

## F.A.Q.

*Q1. Is the software copyright protected?*

This software does not have any Legal Agreement and is not, technically, protected by copyright. It was, however, made so that it can only be used by Paradox Music. So, you should not sell or distribute this program.

*Q2. Do I have to install Visual Basic?*

No, it is not necessary that you do. Although it can be used to edit the software.

*Q3. Do I have to install the database?*

No. But you do have to install Microsoft Office.

*Q4. If I accidentally input wrong information, can I edit it later on?*

Yes, you can, by using the amend option.

*Q5. Do I have to make backups?*

It is necessary that you make frequent backups of the database. You should also have at least one backup of the DBMS installer. Read more in the backup section.

*Q6. Is the software password-protected?*

Yes, it is. You must enter the correct username and password in order to get access to the system.

*Q7. Does the software have a Technical Documentation?*

It has a User Guide as well as a Technical Documentation.

*Q8. What version is the software?*

This version is the very first ever. It is version 1.0.

*Q9. Can the software handle errors?*

The software displays “Input Error” messages when absurd information is entered into the fields. But when the software experiences a problem within itself, it displays an error message telling the user what is wrong. The program might also crash if the problem is serious. If such an error occurs, please refer to the User Guide and, if necessary, the Technical Documentation. If the problem cannot be solved by the user, please contact the author of the software or a system analyst.

*Q10. Can deleted records be recovered?*

No, it cannot. The database does not allow older deleted records to be recovered. However, the data should be present in the in the database backups. If the deleted data needs to be recovered urgently, the older database can be used to do so.

## Glossary

- Amend:** To change the information already present on an object.
- Backup:** An extra copy of the database kept in case the original gets corrupted or deleted.
- Case sensitive:** When the capitalization of the alphabets matters.
- Data grid:** The place where all the records are displayed in the software.
- Field:** A particular characteristic of an object in the database.
- Form:** The platform where the buttons, boxes, etc. reside.
- Record:** All the necessary information of a particular object in the database collectively.
- Report:** A document containing relevant information about an object(s).
- Validation:** Checking the correctness and accuracy of the data.

## Index

<b>A</b>		<b>M</b>	
Adding a record	115	Main form	113
Amending a record	116		
Album (stock) form	111, 120	<b>P</b>	
		Printing records	112, 116, 117
<b>B</b>		Purpose of the system	109
Backing up data	118		
<b>D</b>		<b>Q</b>	
Data reports	112, 117	Querying	116
Data structures	120		
Deleting a record	115	<b>S</b>	
		Sales form	111, 121
<b>E</b>		Saving a record	115
Editing a record	116	Software requirements	110
		Search results	116
<b>F</b>		<b>T</b>	
F.A.Q.	122	Tables	120
Form design	111	Troubleshooting	118
Format of input	120		
Foreign key	121	<b>U</b>	
		Uninstalling the software	110
<b>H</b>			
Hardware requirements	109	<b>V</b>	
		Validation rules	120
<b>I</b>			
Installing the software	110	<b>W</b>	
		What the system does	109
<b>L</b>			
Logging in (sign in)	111, 113		



## (f) Evaluation

### (I) DISCUSSION OF THE DEGREE OF SUCCESS IN MEETING THE ORIGINAL OBJECTIVES

#### **How it went**

Altogether, I am pretty satisfied with the system. The number of fields was kept as low as possible to avoid data redundancy. The information contained in the tables are very much everything that is needed to run the business well. The database itself is in the form of an Access database. The software I made just manipulates the data in the database. The Technical Documentation and User Guide both have information that will help the employees use and carry out maintenance checks on the system. It will be easy to change the software if and when needed.

#### **The cashier's (software user's) opinion**

I had a chat with the system user to know what he thought.

#### **The Cashier's Interview**

**What do you think the new system?**

I think the system is very easy to work with. It's very user-friendly and allows all the work to be done quickly.

**Is it easier to carry out the tasks now?**

The simple design of the whole system makes it a lot easier for me to carry out all the different tasks.

**Did you come across any problems while using the software?**

I had some trouble installing the software, but it turned out okay after I read the User Guide.

**How do you think the new system can be improved?**

For now, I don't think there are many ways left to improve this system... But you could introduce barcode recognition, if I'm not asking too much.

## ***Evaluation forms***

All the staffs were given a form to fill up for feedback. This is the manager's:

<b>Question</b>	<b>Reference</b>	<b>Answer</b>	
		<b>Yes</b>	<b>No</b>
Did you find the test results to your pleasing? Has it been tested as rigorously as possible?	All the tests	✓	
Is the new system user-friendly?	Objective 13	✓	
Is the security good and backing up data easy?	Objective 18	✓	
Does the system take up a lot of space?	Objective 6		✓
Is money being saved?	Objectives 3 and 8	✓	
Is the new system faster and more efficient?	Objectives 7 and 11	✓	
Are records easier to search and print now?	Objectives 15 and 16	✓	
Are large amounts of paper and stationeries still used?	Objective 1		✓
Did data manipulation become easier?	Objective 2	✓	
Did the customers appreciate the new system?	Objective 13	✓	
Do you think all the objectives have been satisfied?	All the objectives	✓	
Do you know of any issues in the system that have not been attended to and solved?	All the objectives		✓

Please leave a comment about the software . . . I am very pleased . . .  
 . . . with the product . . . It satisfies all the . . .  
 . . . objectives completely . . . I am very happy with it . . .

## The solution of the problem

Problem	Objective	Description	Solution	Proof
Backups	5, 6, 18	Since the data in the registers are so large, it was hard to keep backups.	The data is backed up digitally, so minimum space is required. Because of this, system and database recovery is also easier.	In page 118.
Searches and reports	7, 15, 16	Searching registers was painstaking work. Reports were also hard to produce and usually had to be written by hand.	The search option of the new system is many times faster than the older. Reports can also be produced at the press of a button.	In pages 52 to 56.
Input errors and bad handwriting	1, 2, 14	In rush hours, it was possible for the employees to mistake the input, especially in calculations. When the number of customers increases, the information is inputted in a hurry. This usually causes the writing to become unclear.	The validation rules are always active and working. The input is made into the computer so handwriting does not play any role. The use of receipts has also been eliminated, as was requested by the manager.	In pages 70 to 78.
Security	18	It was possible for anyone to view the content of the registers and potentially edit them.	Passwords have been kept in the new system. The input boxes are also locked by default to avoid accidental deletion.	In pages 45, 46, 57, 58, 83.
User friendliness and efficiency	4, 6, 8, 11, 13, 17, 19	The registers were not easy to work with. More workers were required.	Even the large quantity of data can be kept organized in the data grid. So, it is possible for only one person to manage it. Records are organized and IDs are produced automatically. The commands are simple, easy to find and execute, and are very fast in execution.	In pages 94, 95, 125.

## Description of improvements

The benefits of the new system are great. The main changes include these:

- **Time:** Time is not spent on doing calculations. The cashier does not have to worry about handwriting, the clarity of which required time. Human interaction is not required during processing, such as saving, and this makes the processes faster.
- **Cost:** The cost of setting up the system is great. But virtually no money is required (excluding the electricity bill) to process and store the data. Registers and other stationery do not have to be bought. The only paper needed is during the production of reports.
- **Space:** The only space required is the space occupied by the hardware. Large numbers of bulky registers are not needed to be stored. So, on the long run, space is actually saved. Backups in flash drives and CDs also occupy minimum space.

## Advantages of the new system

Some of the advantages of using this system are:

1. It is very user-friendly.
2. It can be backed up more easily.
3. Information here has a higher chance of being correct.
4. Searching is many times faster.
5. Reports are neater, simpler, and easy to achieve.
6. It takes up less space.
7. It can process huge amounts of data all at once.
8. Its running cost is lower.
9. Paper and other stationeries are saved.
10. Very few people are needed to run the system.
11. It has a tighter security.
12. Data manipulation is faster and easier.
13. Customers have to wait less long.
14. Data input and output are both faster.
15. It is easy to understand the writing in the system.

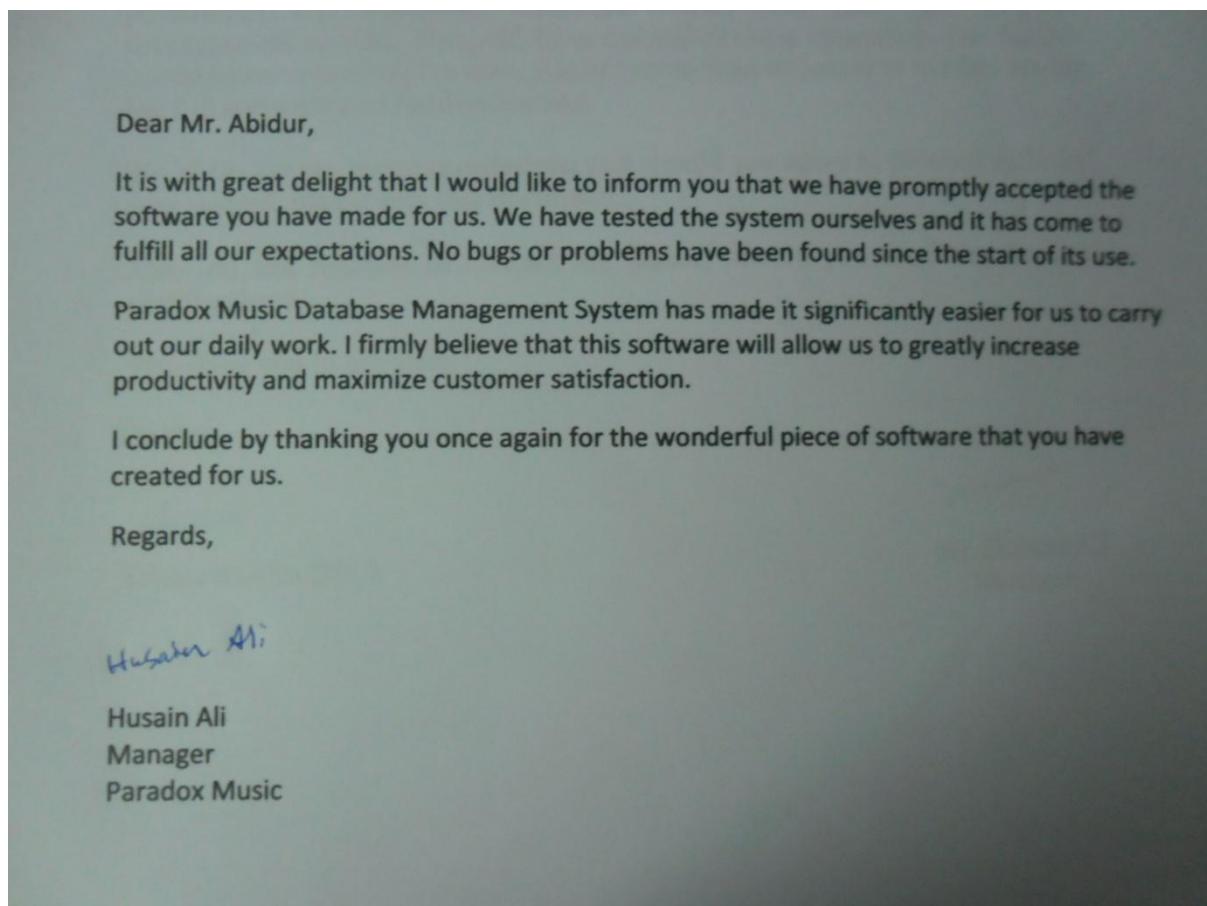
## Disadvantages of the new system

Some of the disadvantages of using this system are:

1. It needs to be backed up frequently.
2. The database is completely and only stored on the computer. Therefore, a system crash would cause major, though temporary, problems.
3. This system only supports that a person buys only one type of album at a time.
4. It may take some time to get used to.

## (II) EVALUATION OF THE CLIENT'S AND USER'S RESPONSE TO THE SYSTEM

### ***Acceptance letter***



### ***Evaluating the cashier's interview***

I had a chat with the system user to know what he thought. The discussion is in page-124. The point to be noted here are:

- A user-friendly interface has been achieved
- The system is effective in what it is designed to do
- The User Guide is comprehensive and helpful
- There is some scope of improvement

## **Evaluation of the feedback forms**

All the staffs were given a form to fill up for feedback. The manager's one is given in page-125. There are eight people at work in the shop and they were all given the evaluation form to fill up. The result in the form of votes is given below.

Result of Evaluation Form		
Question	Option	Votes
Did you find the test results to your pleasing? Has it been tested as rigorously as possible?	Yes	7
	No	1
Is the new system user-friendly?	Yes	8
	No	0
Is the security good and backing up data easy?	Yes	7
	No	1
Does the system take up a lot of space?	Yes	3
	No	5
Is money being saved?	Yes	6
	No	2
Is the new system faster and more efficient?	Yes	7
	No	1
Are records easier to search and print now?	Yes	8
	No	0
Are large amounts of paper and stationeries still used?	Yes	0
	No	8
Did data manipulation become easier?	Yes	8
	No	0
Did the customers appreciate the new system?	Yes	6
	No	2
Do you think all the objectives have been satisfied?	Yes	8
	No	0
Do you know of any issues in the system that have not been attended to any solved?	Yes	0
	No	8

The main points to be noted are:

- Most think the software has been tested rigorously. But it is for sure that it has not shown any problems since being implemented.
- Everyone thinks that all the objectives have been satisfied.

## **Customer feedback**

When the customers bought albums, they were asked if they were happy with the new system, and their response was recorded by hand on paper by the cashier. This was done for 100 customers. The result is shown.



It is pretty conclusive that the majority are happy with the new system.

## SYSTEM DEVELOPMENT

### *Possible improvements*

Though this system is pretty good and has completely satisfied current needs, there are a few ways through which it can be made even better. Some of these can be:

1. Adding better and stricter validation and verification rules.
2. Enabling the recognition of barcodes in the system.
3. Adding multiple user accounts with unique interfaces for everyone.
4. Making fancier reports.
5. Making the validation message boxes more user-friendly by letting them tell the user exactly what is wrong with the entered data.
6. Using voice recognition and biometrics for further security.
7. Making a customer database.
8. It is possible for a customer to purchase two or more different albums together, so a feature that can enable two or more sale information to be stored in the same record can be introduced.
9. Automatic profit or loss calculations of the shop could be done by the system itself.
10. Recording the exact time of sale.
11. Setting up access rights.
12. Making transaction files that can later update a master file.

The following things are attached in the next few pages:

- An answer of the questionnaire handed out to customer during the analysis stage
- The evaluation form returned by the manager
- Printed reports of
  - The query “Siam Ahmed” using Customer Name as the search parameter
  - The query “A1014” using Album ID as the search parameter
  - The query “Three Days Grace” using Album Artist as the search parameter