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DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

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EEI3372 – Programming in Python

Mini Project

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Contents

Introduction

In this report, the development of a Python-based program for managing a university library is the primary goal. Books, magazines, educational DVDs, and lecture CDs are the library's four different categories of resources. There are unique characteristics for each type of resource, including the ISBN number, magazine number, DVD number, CD number, format, feature, title, subject, rental per day, and the number of copies.

The program has been designed to provide many features, such as adding a new resource, removing a resource, lending a resource, viewing current available and unavailable resources, receiving a resource, and searching by the subject. A command-line interface is provided to operate the program.

The user may select the required feature by inputting a number between 0 and 8 after selecting a specific resource. After that, the program will run the relevant function to carry out the specific task.

Assumptions

- I had to make some assumptions in order to develop a successful library management system. So first of all, I take for granted that each resource in the library has a unique identifier that identifies it apart from all the others. This may, for example, be a Cd number for lecture materials or an ISBN number for books.

- I assume that the program doesn't keep any records of library users' histories. This indicates that it is unable to keep track of who accessed which resources and when.

- I assume that when a user borrows a resource, it is marked as unavailable until it is received in order to prevent many users from borrowing it at once.

- I assume the program only runs from the command line and does not have a graphical user interface (GUI). This means that in order to communicate with the program, the user must use the terminal. In addition, the program doesn't undertake much error checking because it believes the user enters valid input data. As a result, if the user provides invalid input, the application could behave unexpectedly.

Problems and Solutions

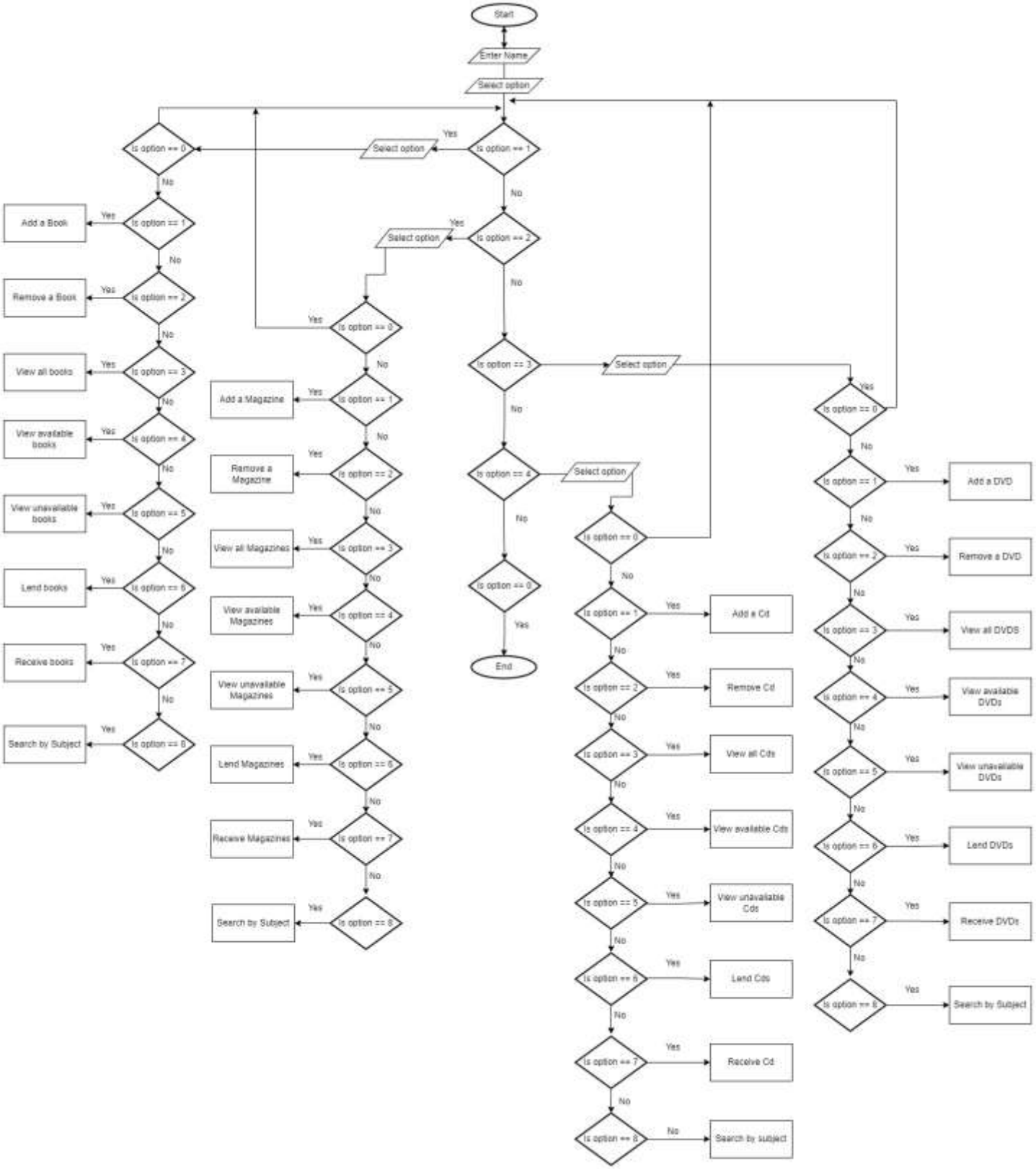
- The coding itself has given me trouble. Developing a project requires more than coding knowledge, even if I have a strong understanding of the Python language. I should be able to think logically and innovatively to develop a solution that satisfies the project's requirements. I occasionally get stuck on a particular issue or bug, and it can be frustrating to spend a lot of time searching for a solution.

- When I was designing the submenu the while loop which I used in the main menu repeatedly confused my codes then I used the (break) function to overcome this challenge.

- Time management was a major problem for me because I need to complete another 2 mini projects within the same time period.

- After designing classes and functions for the different types of resources, I fell into an issue while developing this library management system. At first, I made separate files for each kind of resource and the functions that went with them, but I encountered issues when I tried to import those files into the main program file. To fix that issue, I decided that I would place all resource functions in one file and the main program in another. I was able to correctly organize my code and fix the import error I was experiencing as a result.

Flowchart


Start
Enter Name
Select option
Is option == 0
Is option == 1
Select option
Yes
No
Add a Book
Is option == 1
Is option == 2
Select option
Remove a Book
Is option == 2
Is option == 0
Is option == 3
Select option
View all books
Is option == 3
Add a Magazine
Is option == 1
Is option == 4
Select option
View available books
Is option == 4
Remove a Magazine
Is option == 2
Is option == 0
View unavailable books
Is option == 5
View all Magazines
Is option == 3
Is option == 1
Add a Cd
Is option == 0
Add a DVD
Lend books
Is option == 6
View available Magazines
Is option == 4
Is option == 2
Remove Cd
Is option == 1
Remove a DVD
Receive books
Is option == 7
View unavailable Magazines
Is option == 5
Is option == 3
View all Cds
Is option == 2
View all DVDS
Search by Subject
Is option == 8
Lend Magazines
Is option == 6
Is option == 4
View available Cds
Is option == 3
View available DVDs
Receive Magazines
Is option == 7
Is option == 5
View unavailable Cds
Is option == 4
View unavailable DVDs
Search by Subject
Is option == 8
Is option == 6
Lend Cds
Is option == 5
Lend DVDs
Is option == 7
Receive Cd
Is option == 6
Receive DVDs
Is option == 8
Search by subject
Is option == 7
Search by Subject
Is option == 8
End

Source code and output

Main menu

Source code:

```
def mainmenu():
    print("\n\nWelcome", name,
      "to our university library, where a treasure trove of knowledge awaits!")
    print("_____")
    print("_____")
    print("\nEnter the number of the option you want to select")
    print("1 - Books")
    print("2 - Magazines")
    print("3 - Educational DVDs")
    print("4 - Lecture CDs")
    print("0 - Exit")
    select_main = 1
    while select_main > 0:
        select_main = int(input("\n\nEnter your selection : "))
        if select_main == 0:
            print(
                "\n\nThank You for using our system\nYou are now succesfully exit from our library system")
            print("_____")

        elif select_main == 1:
            bookmenu()
            break
        elif select_main == 2:
            magmenu()
            break
        elif select_main == 3:
            dvdmenu()
            break
        elif select_main == 4:
            cdmenu()
            break
        else:
            print("\nInvalid input")

```

Output:

```
Enter your name: Nihushagan


Welcome Nihushagan to our university library, where a treasure trove of knowledge awaits!
_____
_____

Enter the number of the option you want to select
1 - Books
2 - Magazines
3 - Educational DVDs
4 - Lecture CDs
0 - Exit


Enter your selection :
```

Book menu

Source code:

```
def bookmenu():
    select_book = 1
    while select_book > 0:
        print("\n\nYou have selected the book option\n")
        print("1 - Add Book(s)")
        print("2 - Remove Book(s)")
        print("3 - View all Books")
        print("4 - View available Books")
        print("5 - View unavailable Books")
        print("6 - Lend Book(s)")
        print("7 - Receive Book(s)")
        print("8 - Search by subject")
        print("0 - Back to Mainmenu")
        select_book = int(
            input("\nEnter the number of the option you want to select : "))
        if select_book == 1:
            bookfunc.add()
        elif select_book == 2:
            bookfunc.remove()
        elif select_book == 3:
            bookfunc.all()
        elif select_book == 4:
            bookfunc.available()
        elif select_book == 5:
            bookfunc.unavailable()
        elif select_book == 6:
            bookfunc.lend()
        elif select_book == 7:
            bookfunc.receive()
        elif select_book == 8:
            bookfunc.search()
        elif select_book == 0:
            mainmenu()
        else:
            print("Invalid input")
```

Output:

```
Enter your selection : 1


You have selected the book option

1 - Add Book(s)
2 - Remove Book(s)
3 - View all Books
4 - View available Books
5 - View unavailable Books
6 - Lend Book(s)
7 - Receive Book(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select :
```

Add a book

Source code:

```
def add(self):
    isbn=input("Enter ISBN Number : ").strip().upper()
    title1=input("Title of book : ")
    format1=input("Book Format (Harcover/Paperback) : ")
    subject1=input("Subject of the Book : ")
    rental1=float(input("Rental per day : "))
    copies1=int(input("How many copies available : "))
    book0= Book(isbn_No=isbn, title=title1, format=format1, subject=subject1,rental=rental1,copies=copies1)
    self.BookList.append(book0)
    print("Book added Succesfully")
```

Output:

```
You have selected the book option

1 - Add Book(s)
2 - Remove Book(s)
3 - View all Books
4 - View available Books
5 - View unavailable Books
6 - Lend Book(s)
7 - Receive Book(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select : 1
Enter ISBN Number : ISBN1506
Title of book : Programming in python
Book Format (Harcover/Paperback) : Hardcover
Subject of the Book : Information technology
Rental per day : 50.00
How many copies available : 15
Book added Succesfully
```

Remove a book

Source code:

```
def remove(self):
    isbn=input("Enter a valid ISBN Number : ").strip().upper()
    matching=list(x for x in self.BookList if x.isbn_No==isbn)
    for x in matching:
        self.BookList.remove(x)
        print("Book Removed Succesfully")
```

Output:

```
You have selected the book option

1 - Add Book(s)
2 - Remove Book(s)
3 - View all Books
4 - View available Books
5 - View unavailable Books
6 - Lend Book(s)
7 - Receive Book(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select : 2
Enter a valid ISBN Number : ISBN1234
Book Removed Succesfully
```

View all books

Source code:

```
def all(self):
    for x in self.BookList:
        printInfoB(book=x)
```

Output:

```
You have selected the book option

1 - Add Book(s)
2 - Remove Book(s)
3 - View all Books
4 - View available Books
5 - View unavailable Books
6 - Lend Book(s)
7 - Receive Book(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select : 3
ISBN NO: ISBN9876, Title: Type of Animal Species, Format: Paperback, Subject: Science, Rental Price: 10.0, Available Copies: 8
ISBN NO: ISBN1290, Title: Second World War, Format: Hardcover, Subject: History, Rental Price: 12.5, Available Copies: 1
```

View available books

Source code:

```
def available(self):
    matching=list(x for x in self.BookList if x.copies>0)
    for x in matching:
        printInfoB(book=x)
```

Output:

```
Enter the number of the option you want to select : 4
ISBN NO: ISBN9876, Title: Type of Animal Species, Format: Paperback, Subject: Science, Rental Price: 10.0, Available Copies: 8
ISBN NO: ISBN1290, Title: Second World War, Format: Hardcover, Subject: History, Rental Price: 12.5, Available Copies: 1
```

View unavailable books

Source code:

```
def unavailable(self):
    matching=list(x for x in self.BookList if x.copies==0)
    for x in matching:
        printInfoB(book=x)
```

Output:

```
Enter the number of the option you want to select : 5
```

Lend books

Source code:

```
def lend(self):
    isbn=input("Enter ISBN Number: ")
    copies1=int(input("How many copies yo want to lend: "))
    matching=list(x for x in self.BookList if x.isbn_No ==isbn)
    for x in matching:
        x.copies-=copies1
        print("You have lend book(s) succesfully")
```

Output:

```
You have selected the book option

1 - Add Book(s)
2 - Remove Book(s)
3 - View all Books
4 - View available Books
5 - View unavailable Books
6 - Lend Book(s)
7 - Receive Book(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select : 6
Enter ISBN Number: ISBN1234
How many copies yo want to lend: 1
You have lend book(s) succesfully
```

Receive books

Source code:

```
def receive(self):
    isbn=input("Enter ISBN Number: ")
    copies=int(input("How many copies you want to receive: "))
    matching=list(x for x in self.BookList if x.isbn_No == isbn)
    for x in matching:
        x.copies+=copies
        print("You have received book(s) succesfully")
```

Output:

```
You have selected the book option

1 - Add Book(s)
2 - Remove Book(s)
3 - View all Books
4 - View available Books
5 - View unavailable Books
6 - Lend Book(s)
7 - Receive Book(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select : 7
Enter ISBN Number: ISBN1234
How many copies you want to receive: 5
You have received book(s) succesfully
```

Search books by subject

Source code:

```
def search(self):
    subject1=input("Enter the subject (Science / History / Literature): ")
    matching=list(x for x in self.BookList if x.subject==subject1)
    for x in matching:
        printInfoB(book=x)
```

Output:

```
You have selected the book option

1 - Add Book(s)
2 - Remove Book(s)
3 - View all Books
4 - View available Books
5 - View unavailable Books
6 - Lend Book(s)
7 - Receive Book(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select : 8
Enter the subject (Science / History / Literature): Science
ISBN NO: ISBN1234, Title: The Solar System, Format: Harcover, Subject: Science, Rental Price: 15.0, Available Copies: 5
ISBN NO: ISBN9876, Title: Type of Animal Species, Format: Paperback, Subject: Science, Rental Price: 10.0, Available Copies: 8
```

Magazine menu

Source code:

```
def magmenu():
    select_mag = 2
    while select_mag > 0:
        print("\n\nYou have selected the magazine option\n")
        print("1 - Add Magazine(s)")
        print("2 - Remove Magazine(s)")
        print("3 - View all Magazines")
        print("4 - View available Magazines")
        print("5 - View unavailable Magazines")
        print("6 - Lend Magazine(s)")
        print("7 - Receive Magazine(s)")
        print("8 - Search by subject")
        print("0 - Back to Mainmenu")
        select_mag = int(
            input("\nEnter the number of the option you want to select : "))
        if select_mag == 1:
            magfunc.add()
        elif select_mag == 2:
            magfunc.remove()
        elif select_mag == 3:
            magfunc.all()
        elif select_mag == 4:
            magfunc.available()
        elif select_mag == 5:
            magfunc.unavailable()
        elif select_mag == 6:
            magfunc.lend()
        elif select_mag == 7:
            magfunc.receive()
        elif select_mag == 8:
            magfunc.search()
        elif select_mag == 0:
            mainmenu()
        else:
            print("Invalid input")

```

Output:

```
Enter your selection : 2


You have selected the magazine option

1 - Add Magazine(s)
2 - Remove Magazine(s)
3 - View all Magazines
4 - View available Magazines
5 - View unavailable Magazines
6 - Lend Magazine(s)
7 - Receive Magazine(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select :
```

Add a magazine

Source code:

```
def add(self):
    mag=input("Enter Magazine Number : ").strip().upper()
    title1=input("Title of Magazine : ")
    feature1=input("Magazine feature (color print/black&white print) : ")
    subject1=input("Subject of the Magazine : ")
    rental1=float(input("Rental per day : "))
    copies1=int(input("How many copies available : "))
    mag0= Magazine(magazine_No=mag, title=title1, feature=feature1, subject=subject1,rental=rental1,copies=copies1)
    self.MagazineList.append(mag0)
    print("Magazine added Succesfully")
```

Output:

```
You have selected the magazine option

1 - Add Magazine(s)
2 - Remove Magazine(s)
3 - View all Magazines
4 - View available Magazines
5 - View unavailable Magazines
6 - Lend Magazine(s)
7 - Receive Magazine(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select : 1
Enter Magazine Number : 03
Title of Magazine : Python
Magazine feature (color print/black&white print) : Color peint
Subject of the Magazine : ICT
Rental per day : 45.00
How many copies available : 41
Magazine added Succesfully
```

Remove a magazine

Source code:

```
def remove(self):
    mag=input("Enter a valid Magazine Number : ")
    matching=list(x for x in self.MagazineList if x.magazine_No==mag)
    for x in matching:
        self.MagazineList.remove(x)
        print("Magazine Removed Succesfully")
```

Output:

```
Enter the number of the option you want to select : 2
Enter a valid Magazine Number : 01
Magazine Removed Succesfully
```

View all magazines

Source code:

```
def all(self):
    for x in self.MagazineList:
        printInfoM(magazine=x)
```

Output:

```
1 - Add Magazine(s)
2 - Remove Magazine(s)
3 - View all Magazines
4 - View available Magazines
5 - View unavailable Magazines
6 - Lend Magazine(s)
7 - Receive Magazine(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select : 3
Magazine NO: 02, Title: Evolution of the Computer, Format: black&white print, Subject: Technology, Rental Price: 3.0, Available Copies: 21
Magazine NO: 03, Title: Python, Format: Color peint, Subject: ICT, Rental Price: 45.0, Available Copies: 41
```

View available magazines

Source code:

```
def available(self):
    matching=list(x for x in self.MagazineList if x.copies>0)
    for x in matching:
        printInfoM(magazine=x)
```

Output:

```
You have selected the magazine option

1 - Add Magazine(s)
2 - Remove Magazine(s)
3 - View all Magazines
4 - View available Magazines
5 - View unavailable Magazines
6 - Lend Magazine(s)
7 - Receive Magazine(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select : 4
Magazine NO: 01, Title: History of Cricket, Format: color print, Subject: Sports, Rental Price: 5.0, Available Copies: 7
Magazine NO: 02, Title: Evolution of the Computer, Format: black&white print, Subject: Technology, Rental Price: 3.0, Available Copies: 21
```

View unavailable magazines

Source code:

```
def unavailable(self):
    matching=list(x for x in self.MagazineList if x.copies==0)
    for x in matching:
        printInfoM(magazine=x)
```

Output:

```
You have selected the magazine option

1 - Add Magazine(s)
2 - Remove Magazine(s)
3 - View all Magazines
4 - View available Magazines
5 - View unavailable Magazines
6 - Lend Magazine(s)
7 - Receive Magazine(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select : 5
```

Lend magazines

Source code:

```
def lend(self):
    mag=input("Enter Magazine Number: ")
    copies1=int(input("How many copies yo want to lend: "))
    matching=list(x for x in self.MagazineList if x.magazine_No ==mag)
    for x in matching:
        x.copies-=copies1
        print("You have lent magazine(s) succesfully")
```

Output:

```
You have selected the magazine option

1 - Add Magazine(s)
2 - Remove Magazine(s)
3 - View all Magazines
4 - View available Magazines
5 - View unavailable Magazines
6 - Lend Magazine(s)
7 - Receive Magazine(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select : 6
Enter Magazine Number: 01
How many copies yo want to lend: 1
You have lent magazine(s) succesfully
```

Receive magazines

Source code:

```
def receive(self):
    mag=input("Enter Magazine Number: ")
    copies=int(input("How many copies you want to receive: "))
    matching=list(x for x in self.MagazineList if x.magazine_No == mag)
    for x in matching:
        x.copies+=copies
        print("You have received magazine(s) succesfully")
```

Output:

```
You have selected the magazine option

1 - Add Magazine(s)
2 - Remove Magazine(s)
3 - View all Magazines
4 - View available Magazines
5 - View unavailable Magazines
6 - Lend Magazine(s)
7 - Receive Magazine(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select : 7
Enter Magazine Number: 01
How many copies you want to receive: 2
You have received magazine(s) succesfully
```

Search magazines by subject

Source code:

```
def search(self):
    subject1=input("Enter the subject )(Science / Technology / Sports): ")
    matching=list(x for x in self.MagazineList if x.subject==subject1)
    for x in matching:
        printInfoM(magazine=x)
```

Output:

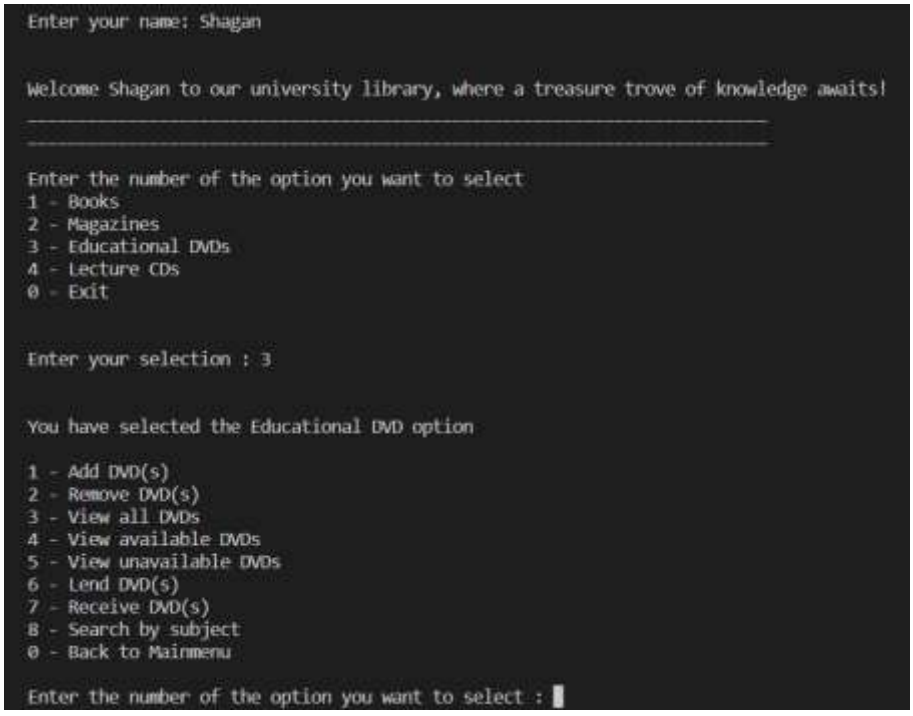
```
You have selected the magazine option

1 - Add Magazine(s)
2 - Remove Magazine(s)
3 - View all Magazines
4 - View available Magazines
5 - View unavailable Magazines
6 - Lend Magazine(s)
7 - Receive Magazine(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select : 8
Enter the subject )(Science / Technology / Sports): Sports
Magazine NO: 01, Title: History of Cricket, Format: color print, Subject: Sports, Rental Price: 5.0, Available Copies: 7
```

Dvd menu

Source code:

```
def dvdmenu():
    select_dvd = 1
    while select_dvd > 0:
        print("\n\nYou have selected the Educational DVD option\n")
        print("1 - Add DVD(s)")
        print("2 - Remove DVD(s)")
        print("3 - View all DVDs")
        print("4 - View available DVDs")
        print("5 - View unavailable DVDs")
        print("6 - Lend DVD(s)")
        print("7 - Receive DVD(s)")
        print("8 - Search by subject")
        print("0 - Back to Mainmenu")
        select_dvd = int(
            input("\nEnter the number of the option you want to select : "))
        if select_dvd == 1:
            dvdfunc.add()
        elif select_dvd == 2:
            dvdfunc.remove()
        elif select_dvd == 3:
            dvdfunc.all()
        elif select_dvd == 4:
            dvdfunc.available()
        elif select_dvd == 5:
            dvdfunc.unavailable()
        elif select_dvd == 6:
            dvdfunc.lend()
        elif select_dvd == 7:
            dvdfunc.receive()
        elif select_dvd == 8:
            dvdfunc.search()
        elif select_dvd == 0:
            mainmenu()
        else:
            print("Invalid input")
```

Output:



```
Enter your name: Shagan

Welcome Shagan to our university library, where a treasure trove of knowledge awaits!
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------

Enter the number of the option you want to select
1 - Books
2 - Magazines
3 - Educational DVDs
4 - Lecture CDs
0 - Exit

Enter your selection : 3


You have selected the Educational DVD option

1 - Add DVD(s)
2 - Remove DVD(s)
3 - View all DVDs
4 - View available DVDs
5 - View unavailable DVDs
6 - Lend DVD(s)
7 - Receive DVD(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select :
```

Cd menu

Source code:

```
158  def cdmenu():
159      select_cd = 4
160      while select_cd > 0:
161          print("\n\nYou have selected the Lecture CD option\n")
162          print("1 - Add CD(s)")
163          print("2 - Remove CD(s)")
164          print("3 - View all CD")
165          print("4 - View available CD")
166          print("5 - View unavailable CD")
167          print("6 - Lend CD(s)")
168          print("7 - Receive CD(s)")
169          print("8 - Search by subject")
170          print("0 - Back to Mainmenu")
171          select_cd = int(
172              input("\nEnter the number of the option you want to select : "))
173          if select_cd == 1:
174              cdfunc.add()
175          elif select_cd == 2:
176              cdfunc.remove()
177          elif select_cd == 3:
178              cdfunc.all()
179          elif select_cd == 4:
180              cdfunc.available()
181          elif select_cd == 5:
182              cdfunc.unavailable()
183          elif select_cd == 6:
184              cdfunc.lend()
185          elif select_cd == 7:
186              cdfunc.receive()
187          elif select_cd == 8:
188              cdfunc.search()
189          elif select_cd == 0:
190              mainmenu()
191          else:
192              print("Invalid input")
193
```

Output:

```
Enter your name: Shagan

Welcome Shagan to our university library, where a treasure trove of knowledge awaits!
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------

Enter the number of the option you want to select
1 - Books
2 - Magazines
3 - Educational DVDs
4 - Lecture CDs
0 - Exit

Enter your selection : 4


You have selected the Lecture CD option

1 - Add CD(s)
2 - Remove CD(s)
3 - View all CD
4 - View available CD
5 - View unavailable CD
6 - Lend CD(s)
7 - Receive CD(s)
8 - Search by subject
0 - Back to Mainmenu

Enter the number of the option you want to select :
```

Benefits of this system

- By using this system user can easily identify if a book is available or unavailable.

- Users can easily check the rental of the books.

- It may prevent the issue of multiple users borrowing the same resource at the same time.