**CIS121 Computer Science I**

**Assignment Five**

**Due: May 17, 2021**

There are two options for Assignment Five. You only need to do one question.

**Option 1: Theater Seating**

Write a program that can be used by a small theater to sell tickets for performances. The theater’s auditorium has 8 rows of seats, with 6 seats in each row. The program should display a screen that shows which seats are available and which are taken. For example, the following screen shows a chart depicting each seat in the theater. Seats that are taken are represented by an \*symbol, and seats that are available are represented by a # symbol:

Seats 1 2 3 4 5 6 7 8

Row 1 \* \* \* # # # \* \*

Row 2 # # # # \* \* \* \*

Row 3 \* \* # # # \* \* \*

Row 4 \* \* # # # # # #

Row 5 \* \* \* \* \* \* \* \*

Row 6 # # # # # # # #

Here is a list of tasks this program must perform:

• When the program begins, it should ask the user to enter the seat prices for each row. The prices can be stored in a separate array. (Alternatively, the prices may be read from a file.)

• Once the prices are entered, the program should display a seating chart similar to the one shown above. The user may enter the row and seat numbers for tickets being sold. Every time a ticket or group of tickets is purchased, the program should display the total ticket prices and update the seating chart.

• The program should keep a total of all ticket sales. The user should be given an option of viewing this amount.

• The program should also give the user an option to see a list of how many seats have been sold, how many seats are available in each row, and how many seats are available in the entire auditorium.

***Validation****: When tickets are being sold, do not accept row or seat numbers that do not exist. When someone requests a particular seat, the program should make sure that seat is available before it is sold.*

**Sample Output:**

Please enter ticket price for Row 1: 10

Please enter ticket price for Row 2: 10

Please enter ticket price for Row 3: 10

Please enter ticket price for Row 4: 8

Please enter ticket price for Row 5: 8

Please enter ticket price for Row 6: 8

C++ Theatre

1. View Available Seats

2. View Seating Prices

3. View Ticket Sales

4. Purchase a Ticket

5. Exit the Program

Enter your choice(1-5): 4

C++ Theatre

Ticket Purchase Opportunity

Do you wish to view the chart of available seats before making your selections (y/n)? y

Seats

12345678

Row 1 ########

Row 2 ########

Row 3 ########

Row 4 ########

Row 5 ########

Row 6 ########

Legend: \* = Sold

# = Available

Please enter desired row number (1-6): 2

Please enter desired seat number (1-8): 4

Purchase confirmed

Would you like to purchase another seat (y/n)? y

Please enter desired row number (1-6): 2

Please enter desired seat number (1-8): 5

Purchase confirmed

Would you like to purchase another seat (y/n)? n

You have purchased a total of 2 tickets for a total price of $20.00

C++ Theatre

1. View Available Seats

2. View Seating Prices

3. View Ticket Sales

4. Purchase a Ticket

5. Exit the Program

Enter your choice(1-5): 2

Ticket Prices By Row

Row Price

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1 10.00

2 10.00

3 10.00

4 8.00

5 8.00

6 8.00

C++ Theatre

1. View Available Seats

2. View Seating Prices

3. View Ticket Sales

4. Purchase a Ticket

5. Exit the Program

Enter your choice(1-5): 4

C++ Theatre

Ticket Purchase Opportunity

Do you wish to view the chart of available seats before making your selections (y/n)? y

Seats

12345678

Row 1 ########

Row 2 ###\*\*###

Row 3 ########

Row 4 ########

Row 5 ########

Row 6 ########

Legend: \* = Sold

# = Available

Please enter desired row number (1-6): 3

Please enter desired seat number (1-8): 3

Purchase confirmed

Would you like to purchase another seat (y/n)? n

You have purchased a total of 1 tickets for a total price of $10.00

C++ Theatre

1. View Available Seats

2. View Seating Prices

3. View Ticket Sales

4. Purchase a Ticket

5. Exit the Program

Enter your choice(1-5): 3

Total Sales to Date: $30.00

C++ Theatre

1. View Available Seats

2. View Seating Prices

3. View Ticket Sales

4. Purchase a Ticket

5. Exit the Program

Enter your choice(1-5): 5

Press any key to continue……

**Option 2: Home Mortgage**

A specific loan can be viewed as an object of a Loan class. Interest rate, loan amount, loan period and monthly payment are its data properties. Computing monthly payment and total payment are its functions. You can then use the functions to find the monthly payment and total payment of your loan.

**Design a class** that will determine the monthly payment on a home mortgage. The monthly payment with interest compounded monthly can be calculated as follows:

Where

* Payment = the monthly payment
* Loan = the dollar amount of the loan
* Rate = the annual interest rate
* Years= the number of years of the loan

The class should have member functions for setting the loan amount, interest rate, and number of years of the loan.

It should also have member functions for returning the monthly payment amount and the total paid to the bank at the end of the loan period.

**Input Validation**: do not accept negative numbers for any of the loan values.

**Implement the class in a complete program.**

**Sample Output:**

Enter the amount of the loan: 300000

Enter the annual interest rate in decimal form (example .075): 0.0425

Enter the length of the loan in years: 30

Monthly Payment: $1475.82

Total Pay Back: $531295.08

Press any key to continue . . .

**Requirements:**

* Use the “Steps for creating a program” template to develop your solution. When complete, save as a .txt, .doc or .rtf file and upload this with the other two required files.
* Use meaningful variable names and reasonable data types.
* Use the header format template. Include a comment section at the top of you file, with your name, the assignment number and a brief summary (in your own words) of what the program does.
* Include comments to describe the major sections of the program
* Prompt for each input value you need and annotate the output to describe what it represents.

**Submit:**

* You should submit the three files: the source code file, the output screen shot and written report (filled “Steps for creating a program”)
* Submit the source codes to the Asn Five DropBox on D2L before the deadline.