

# 1 Introduction

Each exercise should be its own separate project.

**Remember to follow the coding and documentation standards for the class listed on the MyClasses pages.**

When you are ready to submit your work create a folder called `Homework07` in that folder have separate folders for each project, one folder per project. Put all the code files needed for that project in its respective folder. Do not include the files that the IDE creates, I just want the code files. Zip the entire `Homework07` folder up into a single zip file and submit it.

# 2 Exercises

1. This exercise is to take numeric input from a file, load it into a vector and then do some calculations on that data. The `cabdata.txt` file contains over half a million decimal numbers each on their own line. These numbers are real data, they are the distances (in miles) for every cab fair of the famous Yellow Cab Company of New York city for the month of June 2022. You will write a program that will bring in this data and store it in a vector, then use the vector to gather some statistics on the data. You are going to write this in general so that you could load in any file with this type of data. Hence you need to make this work with different file sizes. Unlike with an array where you would need to read the file first to determine the number of elements in it, with a vector you can read the data just one time and load the vector on the file read. The statistics you will print out to the console screen are the average trip length, the smallest trip distance, the longest trip distance, the number of trips over 10 miles, and the number of trips under a quarter mile.
2. This program is to create a ticket purchasing system for a small theater. The theater's auditorium has 15 rows of seats, with 30 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. For example,

```

                                Seats
                                123456789012345678901234567890
Row 1      .....#####.....
Row 2      #####
Row 3      .....
Row 4      ....#.
Row 5      .....
Row 6      .....
Row 7      .....#####.
Row 8      .....#####.
Row 9      .....#####.
Row 10     .....#####.
```

```

Row 11  #.....
Row 12  .....
Row 13  .....
Row 14  .....
Row 15  .....#.....

```

1. Purchase Ticket
2. Purchase Block of Tickets
3. Total Sold
4. Total Available
8. Clear Theater
0. Quit

Selection:

There are two files included in this homework, `prices.txt` and `seats.txt`. The `prices.txt` file contains the ticket price for each row of the theater. This should be read into an array. Since you already know the number of data items in the array you do not need to pre-read the data. The `seats.txt` file is the seating layout of the theater with all seats empty. You will load this into a two-dimensional array of characters, again you already know the size. The program is to have the following menu for the user to make selections. Make sure that you error check this and all other user inputs.

1. Purchase Ticket
2. Purchase Block of Tickets
3. Total Sold
4. Total Available
8. Clear Theater
0. Quit

Selection:

If the user selects Purchase Ticket, the program will ask for the row and seat they would like. If it is available the program will mark that seat as taken with a # and it will display the cost of the ticket. If the user selects Purchase Block of Tickets The program will ask for the beginning and ending rows and seats. If all of the seats are available the program will block off those seats, and display the total ticket cost. The Total Sold option will display the number, percentage, and cost of the sold seats. The Total Available option will display the number, percentage, and cost of the remaining seats. The Clear Theater option will reset the seats to all empty, so sales for a new play or film can be done. Quit will of course quit the program. Anytime a transaction is made the seat file must be updated with the current theater seating so that if the program is quit and then restarted the last seating arrangement loads. A run is below.

```

                Seats
            123456789012345678901234567890
Row 1      .....
Row 2      .....
Row 3      .....
Row 4      .....
Row 5      .....
Row 6      .....

```

```
Row 7 .....
Row 8 .....
Row 9 .....
Row 10 .....
Row 11 .....
Row 12 .....
Row 13 .....
Row 14 .....
Row 15 .....
```

1. Purchase Ticket
2. Purchase Block of Tickets
3. Total Sold
4. Total Available
8. Clear Theater
0. Quit

```
Selection: 1
Select Row: 5
Select Column/Seat: 12
Ticket for row 5 seat 12
Cost = $35
```

```
                Seats
            123456789012345678901234567890
Row 1 .....
Row 2 .....
Row 3 .....
Row 4 .....
Row 5 .....#.....
Row 6 .....
Row 7 .....
Row 8 .....
Row 9 .....
Row 10 .....
Row 11 .....
Row 12 .....
Row 13 .....
Row 14 .....
Row 15 .....
```

1. Purchase Ticket
2. Purchase Block of Tickets
3. Total Sold
4. Total Available
8. Clear Theater
0. Quit

```
Selection: 1
Select Row: 15
Select Column/Seat: 30
Ticket for row 15 seat 30
Cost = $15
```

```
                Seats
            123456789012345678901234567890
Row 1 .....
Row 2 .....
Row 3 .....
Row 4 .....
Row 5 .....#.....
Row 6 .....
Row 7 .....
Row 8 .....
```

```

Row 9      .....
Row 10     .....
Row 11     .....
Row 12     .....
Row 13     .....
Row 14     .....
Row 15     .....#

```

1. Purchase Ticket
2. Purchase Block of Tickets
3. Total Sold
4. Total Available
8. Clear Theater
0. Quit

```

Selection: 2
Select Beginning Row: 5
Select Ending Row: 7
Select Beginning Column/Seat: 15
Select Ending Column/Seat: 22
Tickets for rows 5 to 7 and seats 15 to 22
Cost = $784

```

```

                Seats
            123456789012345678901234567890
Row 1      .....
Row 2      .....
Row 3      .....
Row 4      .....
Row 5      .....#.....
Row 6      .....#.....
Row 7      .....#.....
Row 8      .....
Row 9      .....
Row 10     .....
Row 11     .....
Row 12     .....
Row 13     .....
Row 14     .....
Row 15     .....#

```

1. Purchase Ticket
2. Purchase Block of Tickets
3. Total Sold
4. Total Available
8. Clear Theater
0. Quit

```

Selection: 1
Select Row: 5
Select Column/Seat: 20
I am sorry, that seat is taken.

```

```

                Seats
            123456789012345678901234567890
Row 1      .....
Row 2      .....
Row 3      .....
Row 4      .....
Row 5      .....#.....
Row 6      .....#.....
Row 7      .....#.....
Row 8      .....
Row 9      .....

```

```

Row 10 .....
Row 11 .....
Row 12 .....
Row 13 .....
Row 14 .....
Row 15 .....#

```

1. Purchase Ticket
2. Purchase Block of Tickets
3. Total Sold
4. Total Available
8. Clear Theater
0. Quit

```

Selection: 2
Select Beginning Row: 7
Select Ending Row: 7
Select Beginning Column/Seat: 12
Select Ending Column/Seat: 15
I am sorry, not all of those seats are available.

```

```

                Seats
            123456789012345678901234567890
Row 1 .....
Row 2 .....
Row 3 .....
Row 4 .....
Row 5 .....#.....
Row 6 .....#.....
Row 7 .....#.....
Row 8 .....
Row 9 .....
Row 10 .....
Row 11 .....
Row 12 .....
Row 13 .....
Row 14 .....
Row 15 .....#

```

1. Purchase Ticket
2. Purchase Block of Tickets
3. Total Sold
4. Total Available
8. Clear Theater
0. Quit

```

Selection: 2
Select Beginning Row: 10
Select Ending Row: 10
Select Beginning Column/Seat: 1
Select Ending Column/Seat: 30
Tickets for rows 10 to 10 and seats 1 to 30
Cost = $840

```

```

                Seats
            123456789012345678901234567890
Row 1 .....
Row 2 .....
Row 3 .....
Row 4 .....
Row 5 .....#.....
Row 6 .....#.....
Row 7 .....#.....
Row 8 .....

```

```

Row 9      .....
Row 10     #####
Row 11     .....
Row 12     .....
Row 13     .....
Row 14     .....
Row 15     .....#

```

1. Purchase Ticket
2. Purchase Block of Tickets
3. Total Sold
4. Total Available
8. Clear Theater
0. Quit

```

Selection: 2
Select Beginning Row: 1
Select Ending Row: 2
Select Beginning Column/Seat: 12
Select Ending Column/Seat: 17
Tickets for rows 1 to 2 and seats 12 to 17
Cost = $570

```

```

                Seats
            123456789012345678901234567890
Row 1      .....#####.....
Row 2      .....#####.....
Row 3      .....
Row 4      .....
Row 5      .....#.....#####.....
Row 6      .....#####.....
Row 7      .....#####.....
Row 8      .....
Row 9      .....
Row 10     #####
Row 11     .....
Row 12     .....
Row 13     .....
Row 14     .....
Row 15     .....#

```

1. Purchase Ticket
2. Purchase Block of Tickets
3. Total Sold
4. Total Available
8. Clear Theater
0. Quit

```

Selection: 3
Total Tickets: 68 Tickets, 15.1111%
Total Revenue: $2244

```

```

                Seats
            123456789012345678901234567890
Row 1      .....#####.....
Row 2      .....#####.....
Row 3      .....
Row 4      .....
Row 5      .....#.....#####.....
Row 6      .....#####.....
Row 7      .....#####.....
Row 8      .....
Row 9      .....
Row 10     #####

```

```

Row 11 .....
Row 12 .....
Row 13 .....
Row 14 .....
Row 15 .....#

```

1. Purchase Ticket
2. Purchase Block of Tickets
3. Total Sold
4. Total Available
8. Clear Theater
0. Quit

```

Selection: 4
Total Available Tickets: 382 Tickets, 84.8889%
Total Available Revenue: $11886

```

```

                Seats
            123456789012345678901234567890
Row 1      .....#####.....
Row 2      .....#####.....
Row 3      .....#####.....
Row 4      .....#####.....
Row 5      .....#..#####.....
Row 6      .....#####.....
Row 7      .....#####.....
Row 8      .....#####.....
Row 9      .....#####.....
Row 10     #####
Row 11     .....#####.....
Row 12     .....#####.....
Row 13     .....#####.....
Row 14     .....#####.....
Row 15     .....#####.....#

```

1. Purchase Ticket
2. Purchase Block of Tickets
3. Total Sold
4. Total Available
8. Clear Theater
0. Quit

```

Selection: 0

```

At this point I closed the program down and restarted it. Note it loaded the last seating arrangement.

```

                Seats
            123456789012345678901234567890
Row 1      .....#####.....
Row 2      .....#####.....
Row 3      .....#####.....
Row 4      .....#####.....
Row 5      .....#..#####.....
Row 6      .....#####.....
Row 7      .....#####.....
Row 8      .....#####.....
Row 9      .....#####.....
Row 10     #####
Row 11     .....#####.....
Row 12     .....#####.....
Row 13     .....#####.....

```

Row 14 .....  
Row 15 .....#

1. Purchase Ticket
2. Purchase Block of Tickets
3. Total Sold
4. Total Available
8. Clear Theater
0. Quit

Selection: