CIS 41A - Lab 5

This assignment is loosely based on Textbook P6.27. Since this assignment is before the midterm, it covers previous chapters for review purpose, therefore it's highly recommended that you allot enough time for it, and you can work with one other person in class if you like. If you work with another person, make sure both people turn in a copy of the lab with both names at the top of the lab.

Write a program that manages a theater seating chart and lets the user buys tickets for seats of their choice.

The theater seating chart is read from a file. The sample input file lab5input1.txt is:

30 40 50 50 50 50 50 50 40 30

20 30 40 50 50 50 50 40 30 20

20 30 40 50 50 50 50 40 30 20

20 20 30 40 40 40 40 30 20 20

20 20 30 40 40 40 40 30 20 20

10 20 20 30 30 30 30 20 20 10

10 10 20 30 30 30 30 20 10 10

10 10 10 20 20 20 20 10 10 10

10 10 10 10 10 10 10 10 10 10

where each value is the price of one seat.

There is also a lab5input2.txt with a smaller seating chart in the same lab5input.zip file. Your program should be able to work with both input files.

The program has a main function that calls 3 other functions (there are 5 functions total):

1. Call readChart() to:

* Prompt the user for a filename or hit enter to use the default lab5input2.txt.
* Read in the data from the input file and stores it in a seating chart, which is a list of lists, where each inner list is a row of data of the input file.
* call printChart() to print the seating chart. See the sample output for printing format. Make sure there are column headers and row headers as shown, and the data columns line up.

1. Call buySeat() to:

* Loop to ask the user buy seats by prompting for the row and column numbers, until the user enters 0.
* If the seat is available:
  + add up the price of the seat
  + mark the seat with an 'X' to show that it's taken
  + save the seat (row, col) location as a tuple in a list of tuples

If it's not available, print an error message and re-prompt

* When all seats are chosen, print out the total price for all the seats, all the seat locations as (row,col) tuples, and call printChart() to print the updated seating chart. See sample output.

1. Call saveChart() to:

* Save the seating chart by prompting the user for an output file or hit Enter to save back to the default lab5input2.txt file.
* When saving the seating chart, the 'X' is saved as '--' (2 dashes).

Exception and error handling

Here are the exceptions and errors that the program needs to handle:

1. Input file doesn't exist: print "file not found" message and re-prompt
2. User enters non-integers for row number or column number: print "must be integer" message and re-prompt
3. User enters out-of-range row number or column number: print "invalid row / col" message and re-prompt
4. User chooses a seat that's already taken: print "seat taken" and re-prompt

- Some of the above are exceptions that require try except, and some are errors that can be used with if else statements.

- Make sure you check for exception right at the block of code that can produce the error. Writing a try except in the main function is not the right way.

Sample program output:

First run:

Enter file name or hit Enter for default lab5input2.txt: lab5.txt # invalid file

Can't open lab5.txt

Enter file name or hit Enter for default lab5input2.txt: # enter key

Price chart

Column

1 2 3 4 5 6 7 8 # note column and row headers

Row ======================================== # columns are right justified

1 | $10 $10 $20 $30 $30 $20 $10 $10

2 | $5 $5 $10 $20 $20 $10 $5 $5

3 | $5 $5 $5 $10 $10 $5 $5 $5

4 | $3 $3 $5 $5 $5 $5 $3 $3

Available seats are shown with price

Enter row,col for seat 1 or enter 0 to end: ab,cd # non-numeric input

Row and column must be numbers

Enter row,col for seat 1 or enter 0 to end: two,three

Row and column must be numbers

Enter row,col for seat 1 or enter 0 to end: 2,30 # invalid column

Invalid row or column

Enter row,col for seat 1 or enter 0 to end: 2,3 # valid input

Enter row,col for seat 2 or enter 0 to end: 2,3 # seat already taken

Sorry, that seat is not available.

Enter row,col for seat 2 or enter 0 to end: 2,four # non-numeric input

Row and column must be numbers

Enter row,col for seat 2 or enter 0 to end: 2,4 # valid input

Enter row,col for seat 3 or enter 0 to end: 0 # end of input

Your total: $30 # show total cost

Your 2 seat(s) at (2, 3) (2, 4) are marked with 'X' # show number of seats and location

Price chart

Column

1 2 3 4 5 6 7 8

Row ========================================

1 | $10 $10 $20 $30 $30 $20 $10 $10

2 | $5 $5 X X $20 $10 $5 $5 # X for seat being bought

3 | $5 $5 $5 $10 $10 $5 $5 $5

4 | $3 $3 $5 $5 $5 $5 $3 $3

Enter file name or hit Enter for default lab5input2.txt: # enter key

lab5input2.txt updated # confirmation

Second run:

Enter file name or hit Enter for default lab5input2.txt: # enter key

Price chart

Column

1 2 3 4 5 6 7 8

Row ========================================

1 | $10 $10 $20 $30 $30 $20 $10 $10

2 | $5 $5 -- -- $20 $10 $5 $5 # -- for unavailable seat

3 | $5 $5 $5 $10 $10 $5 $5 $5

4 | $3 $3 $5 $5 $5 $5 $3 $3

Available seats are shown with price

Enter row,col for seat 1 or enter 0 to end: 2,4 # seat already taken

Sorry, that seat is not available.

Enter row,col for seat 1 or enter 0 to end: 3,4 # buy only one seat

Enter row,col for seat 2 or enter 0 to end: 0

Your total: $10

Your 1 seat(s) at (3, 4) are marked with 'X'

Price chart

Column

1 2 3 4 5 6 7 8

Row ========================================

1 | $10 $10 $20 $30 $30 $20 $10 $10

2 | $5 $5 -- -- $20 $10 $5 $5 # -- for unavailable seat

3 | $5 $5 $5 X $10 $5 $5 $5 # X for seat being bought

4 | $3 $3 $5 $5 $5 $5 $3 $3

Enter file name or hit Enter for default lab5input2.txt: # enter key

lab5input2.txt updated # confirmation

Third run:

Enter file name or hit Enter for default lab5input2.txt: # enter key

Price chart

Column

1 2 3 4 5 6 7 8

Row ========================================

1 | $10 $10 $20 $30 $30 $20 $10 $10

2 | $5 $5 -- -- $20 $10 $5 $5 # note unavailable seats from both

3 | $5 $5 $5 -- $10 $5 $5 $5 # of the previous runs

4 | $3 $3 $5 $5 $5 $5 $3 $3

Available seats are shown with price

Enter row,col for seat 1 or enter 0 to end: 8,9 # invalid column

Invalid row or column

Enter row,col for seat 1 or enter 0 to end: 4,1 # valid seats

Enter row,col for seat 2 or enter 0 to end: 4,8

Enter row,col for seat 3 or enter 0 to end: 0

Your total: $6

Your 2 seat(s) at (4, 1) (4, 8) are marked with 'X'

Price chart

Column

1 2 3 4 5 6 7 8

Row ========================================

1 | $10 $10 $20 $30 $30 $20 $10 $10

2 | $5 $5 -- -- $20 $10 $5 $5

3 | $5 $5 $5 -- $10 $5 $5 $5

4 | X $3 $5 $5 $5 $5 $3 X

Enter file name or hit Enter for default lab5input2.txt:

lab5input2.txt updated # confirmation

Fourth run:

Enter file name or hit Enter for default lab5input2.txt: lab5input1.txt

# give filename

Price chart

Column

1 2 3 4 5 6 7 8 9 10

Row ==================================================

1 | $30 $40 $50 $50 $50 $50 $50 $50 $40 $30

2 | $20 $30 $40 $50 $50 $50 $50 $40 $30 $20

3 | $20 $30 $40 $50 $50 $50 $50 $40 $30 $20

4 | $20 $20 $30 $40 $40 $40 $40 $30 $20 $20

5 | $20 $20 $30 $40 $40 $40 $40 $30 $20 $20

6 | $10 $20 $20 $30 $30 $30 $30 $20 $20 $10

7 | $10 $10 $20 $30 $30 $30 $30 $20 $10 $10

8 | $10 $10 $10 $20 $20 $20 $20 $10 $10 $10

9 | $10 $10 $10 $10 $10 $10 $10 $10 $10 $10

Available seats are shown with price

Enter row,col for seat 1 or enter 0 to end: 0 # buy 0 ticket

Your total: $0

Your 0 seat(s) at are marked with 'X'

Price chart

Column

1 2 3 4 5 6 7 8 9 10

Row ==================================================

1 | $30 $40 $50 $50 $50 $50 $50 $50 $40 $30

2 | $20 $30 $40 $50 $50 $50 $50 $40 $30 $20

3 | $20 $30 $40 $50 $50 $50 $50 $40 $30 $20

4 | $20 $20 $30 $40 $40 $40 $40 $30 $20 $20

5 | $20 $20 $30 $40 $40 $40 $40 $30 $20 $20

6 | $10 $20 $20 $30 $30 $30 $30 $20 $20 $10

7 | $10 $10 $20 $30 $30 $30 $30 $20 $10 $10

8 | $10 $10 $10 $20 $20 $20 $20 $10 $10 $10

9 | $10 $10 $10 $10 $10 $10 $10 $10 $10 $10

Enter file name or hit Enter for default lab5input2.txt: lab5input1.txt

lab5input1.txt updated