Overview

- Welcome to CSC-284-H1 Advanced C++
- Meetings: Webex
- Tools: Visual Studio
- Assignments: Every Week

- Evaluation Dates:

    - March 11th 2021, Midterm date

    - May 6th 2021, Final Project Presentation

    - May 13th 2021, Final Exam

Course Outcome

- - Design and develop algorithms
- - Decompose and refactor code into concise functions
- - Create object-oriented programs utilizing Abstract Data types such as classes and structures to solve complex problems
- - Utilize memory allocation and deallocation appropriately
- - Choose and utilize features of the Standard Template Library appropriately
- - Research and incorporate a third party graphics library (e.g.: Qt, MFC, OpenGL, Metal, Dear ImGui) into programs
- - Create standard documentation using a tool such as DOXYGEN
- - Design and document classes and structures using UMLs
- - Create programs that utilize command line arguments as well as programs that have a graphic user interface (GUI)
- - Create templates
- - Implement and test exception classes
- - Create unit tests for all parts of the code.
- - Utilize file streams to create, read from, and write to text and binary files

Evaluation

- Attendance and Participation: 5%
- Labs & Homework: 20%
- Group Programming Projects: 25%
- Team Evaluation of Group Work: 10%
- Quizzes: 0
- Midterm Examination: 15%
- Final Examination: 25%
- Total 100%

Exercise 1

Restaurant Selector

You have a group of friends coming to visit for your high school reunion, and you want to take them out to eat at a local restaurant. You aren't sure if any of them have dietary restrictions, but your restaurant choices are as follows:

Joe's Gourmet Burgers—Vegetarian: *No*, Vegan: *No*, Gluten-Free: *No*
Main Street Pizza Company—Vegetarian: *Yes*, Vegan: *No*, Gluten-Free: *Yes*
Corner Café—Vegetarian: *Yes*, Vegan: *Yes*, Gluten-Free: *Yes*
Mama's Fine Italian—Vegetarian: *Yes*, Vegan: *No*, Gluten-Free: *No*
The Chef's Kitchen—Vegetarian: *Yes*, Vegan: *Yes*, Gluten-Free: *Yes*

Write a program that asks whether any members of your party are vegetarian, vegan, or gluten-free, then displays only the restaurants that you may take the group to. Here is an example of the program's output:

```
Is anyone in your party a vegetarian? yes Enter
Is anyone in your party a vegan? no Enter
Is anyone in your party gluten-free? yes Enter
Here are your restaurant choices:
    Main Street Pizza Company
    Corner Cafe
    The Chef's Kitchen
```

Here is another example of the program's output:

```
Is anyone in your party a vegetarian? yes Enter
Is anyone in your party a vegan? yes Enter
Is anyone in your party gluten-free? yes Enter
Here are your restaurant choices:
    Corner Cafe
    The Chef's Kitchen
```

Exercise 2

Stock Profit

The profit from the sale of a stock can be calculated as follows:

$$\text{Profit} = ((NS \times SP) - SC) - ((NS \times PP) + PC)$$

where NS is the number of shares, SP is the sale price per share, SC is the sale commission paid, PP is the purchase price per share, and PC is the purchase commission paid. If the calculation yields a positive value, then the sale of the stock resulted in a profit. If the calculation yields a negative number, then the sale resulted in a loss.

Write a function that accepts as arguments the number of shares, the purchase price per share, the purchase commission paid, the sale price per share, and the sale commission paid. The function should return the profit (or loss) from the sale of stock.

Exercise 3

2D Array Operations

Write a program that creates a two-dimensional array initialized with test data. Use any data type you wish. The program should have the following functions:

- **getTotal**—This function should accept a two-dimensional array as its argument and return the total of all the values in the array.
- **getAverage**—This function should accept a two-dimensional array as its argument and return the average of all the values in the array.
- **getRowTotal**—This function should accept a two-dimensional array as its first argument and an integer as its second argument. The second argument should be the subscript of a row in the array. The function should return the total of the values in the specified row.
- **getColumnTotal**—This function should accept a two-dimensional array as its first argument and an integer as its second argument. The second argument should be the subscript of a column in the array. The function should return the total of the values in the specified column.
- **getHighestInRow**—This function should accept a two-dimensional array as its first argument and an integer as its second argument. The second argument should be the subscript of a row in the array. The function should return the highest value in the specified row of the array.
- **getLowestInRow**—This function should accept a two-dimensional array as its first argument and an integer as its second argument. The second argument should be the subscript of a row in the array. The function should return the lowest value in the specified row of the array.

Demonstrate each of the functions in this program.