Concordia University
COMP 248 – Summer 2021
Assignment 3

Due Date:	By 11:59pm Wednesday June 23, 2021
Evaluation:	7% of final mark (see marking rubric at the end of handout)
Late Submission:	none accepted
Purpose:	The purpose of this assignment is to have you work with arrays, nested loops, classes and arrays of objects.
CEAB/CIPS Attributes:	Design/Problem analysis/Communication Skills

General Guidelines When Writing Programs:
Refer to handout of assignment 1 for details.

Question 1 – 2D-array (7.5 pts)

In this question, we will continue work on the question2 in your assignment2. Now, we will save all the items' info in the arrays and display the results.

1. Ask the user to prompt the type number of the items and the name (String), number (int), price(int) of each item. Please note your program should work for any number (greater or equal to 0) that the user entered.
2. Save the number and price in a 2D-array (int) and the name in a String array. The first line of 2D array should save the number and second line save the price of each item.
3. Your program should display the complete shopping list info and total price using the arrays.

For example,

If the user prompt 3 types of items with the info below,

Banana 2 10
Apple 3 5
Orange 2 9

Then the 2D-array (int) should save the relevant info

2	3	2
10	5	9

and the info saved in the String array is

Banana	Apple	Orange

The sample outputs below is to help illustrate the expected behaviour of your program. You can assume a perfect user will give the correct input format. Please make sure the same format is displayed in your program. Text in green is user input.

```
-------****-------****-------****-------****-----
      Welcome to Item Shopping Program!
-------****-------****-------****-------****-----

Please enter the type number of the items:
0

You have 0 items now!

Thank you for using this program!!
```

Figure 1 A sample output of question1

```
-------****-------****-------****-------****-----
      Welcome to Item Shopping Program!
-------****-------****-------****-------****-----

Please enter the type number of the items:
3
Please enter Item0 name number price:
banana 2 10
Please enter Item1 name number price:
apple 3 5
Please enter Item2 name number price:
orange 2 9
Here is your complete shopping list:


 Item0: 2 banana, price$ 20

 Item1: 3 apple, price$ 15

 Item2: 2 orange, price$ 18

You have 7 items in total. The total price is: $53.


Thank you for using this program!!
```

Figure 2 A sample output of question1

<u>Question 2</u> –Implementing & using Classes (9.5 pts)

a) (4 pts) Write the implementation of the class ***Vaccine*** as per the specifications that follow.
An object of type ***Vaccine*** stores information about the name, type, dose, and company.
The class ***Vaccine*** contains:

- Private instance variables of type *string* to store the name, type, and company of the vaccine, type *int* to store the dose.
- Three constructors:

    - One that takes 4 arguments and sets all of the corresponding instance variables.
    - A default constructor, which will set three attributes name, type, dose, and company to “Pfizer”, “mRNA”, 2, and “BioNTech”.
    - A copy constructor which sets the instance variables to be the same as the passed ***Vaccine*** object.
- Public methods to get (accessor) and set (mutator) each instance variable individually.
- A ***toString()*** method which displays on the console the vaccine name, dose, type and schedule. (see the example below)
- An ***equals(Vaccine v)*** method which tests for the equality of two ***Vaccine*** objects.

b) (5.5 pts) Write a driver which

- Create an object vaccine1 using the default constructor.
- Create an object vaccine2 using the constructor with 4 arguments. Prompt the user for the name, type, dose, and company. Assume the user enters valid input.
- Create an object vaccine3 using vaccine2 as the parameters for copy constructor.
- Display the vaccine of three objects following the format shown in the example at the end of this question.
- Compare the 2 objects (vaccine2 & vaccine3) and indicate whether they are equal. See format of message in the sample output at the end of this question.
- Prompt the user for the name, type, dose, and company. Assume the user enters valid inputs. Set the name, type, dose, and company of the vaccine1 to be the user’s input values. Display the info of vaccine1 object following the same format.
- End with a closing message.

Figure 2 is a sample output to help illustrate the expected behaviour of your program. You can modify the messages in your output but make sure the same information is displayed. Text in green is user input.

```
----------------------------------------
    Vaccine Class Driver Program
----------------------------------------

Enter the name, type, dose and company of vaccine2 please:
Moderna mRNA 2 biotechnology

vaccine 1 is The vaccine info
 Name: Pfizer, Type: mRNA, Dose: 2, Company:BioNTech

vaccine 2 is The vaccine info
 Name: Moderna, Type: mRNA, Dose: 2, Company:biotechnology

vaccine 3 is The vaccine info
 Name: Moderna, Type: mRNA, Dose: 2, Company:biotechnology

Compare the two vaccine objects (vaccine2&3):
The vaccine info
 Name: Moderna, Type: mRNA, Dose: 2, Company:biotechnology
 is equal to The vaccine info
 Name: Moderna, Type: mRNA, Dose: 2, Company:biotechnology

Enter the name, type, dose and company of vaccine1 please:
Astra ViraVector 2 AstraZeneca

Vaccine 1 is now: The vaccine info
 Name: Astra, Type: ViraVector, Dose: 2, Company:AstraZeneca


Thank you for using this program!
```

Figure3 A sample output of question2

Submitting Assignment 3

1. Please refer to instructions in Assignment 1 and Assignment 2 handouts.

Evaluation Criteria for Assignment 3 (20 points)

Source Code	
Comments for all 3 questions (1.5 pts.)	
Description of the program (authors, date, purpose)	0.5 pts.
Description of variables and constants	0.5 pts.
Description of the algorithm	0.5 pts.
Programming Style for all 3 questions (1.5 pts.)	
Use of significant names for identifiers	0.5 pt.
Indentation and readability	0.5 pt.
Welcome Banner or message/Closing message	0.5 pts.
Question 1 (7.5 pts.)	
Prompt for the items' info	1.5 pts.
Create and fill the 2D-array	1.5 pts.
Create and fill the String-array	1.5 pts.
Display content of the shopping list	1.5 pt.
Display the result of total price	1.5 pt.
Question 2 (9.5 pts.)	
a) Declare instance variables	0.5 pts.
Constructors	2 pts.
Accessor/mutator methods	1.5 pt.
toString()	1 pt.
equals()	1 pt.
b) Create 3 vaccine objects	0.5 pt.
Display the vaccine objects	1 pt.
Comparing vaccine objects	1 pt.
Prompt the user to change vaccine's values	1 pt.
TOTAL	**20 pts.**