Vanier College
Faculty of Continuing Education

Programming Concepts I

Assignment 1

Due Date: By 11:59pm Thursday July 1, 2021
Evaluation: 15% of final mark (see marking rubric at the end of handout)
Purpose: The purpose of this assignment is to help you learn Java identifiers, assignments, input/output, selection and flow of control statements: if, if/else, switch, while, do while.
Teams: The assignment is to be done individually.
Late Submission: Late assignments will be discounted by 25%. Late assignments are accepted up to three days late (grace period) and weekends count.

General Guidelines When Writing Programs:

Include the following comments at the top of your source codes:

```
// -----------------------------------------------------
// Assignment (include number)
// Written by: (include your name and student id)
// For "Programming Concepts I" Section (your section) – Summer 2021
// -----------------------------------------------------
```

- In a comment, give a general explanation of what your program does. As the programming questions get more complex, the explanations will get lengthier.
- Include comments in your program describing the main steps in your program.
- Display a welcome message.
- Display clear prompts for users when you are expecting the user to enter data from the keyboard.
- All output should be displayed with clear messages and in an easy to read format.
- End your program with a closing message so that the user knows that the program has terminated.

What to Submit:

- Make **one ZIP** file that includes all of the **.java files.** (Implement each question in a separate java file).
- Submit the ZIP file via Omnivox.
  - Do not use the RAR (or some other) format!

Assignments not submitted to the correct location or not in the requested format will not be graded.

Question 1 – Nested selection statements

The Quebec government is trying to crack down on texting and driving. "The law is very clear: you must not hold a cell phone in your hand while driving. Failure to abide by this rule is an offence subject to a fine and demerit points." (https://saaq.gouv.qc.ca/en/road safety/behaviours/distractions/cell-phones-texting/what-the-law-says/). Write a program that determines the penalty for a driver holding a cell phone while driving based on the following criteria.

If the driver is driving and holding a cell phone

- On the highway the fine is $80. If it is the drivers 1st offence, s/he gets 1 demerit point otherwise 2 demerit points.
- In a school zone the fine is $100 (the maximum). If the driver has been driving for less than 24 months s/he loose his/her license on the spot otherwise s/he get 4 demerit points (the maximum).
- If the car is stopped, for example at a stop sign or a traffic light, and the cellphone is an iPhone, the fine is $100 and s/he gets 2 demerit point otherwise the fine is $80 and s/he gets 1 demerit points.
- All other cases the fine is $90 and the driver gets 3 demerit points.

After determining where the driver was stopped and what their fine if they have not yet lost their license, ask the user how many demerit points the driver originally had. When a driver has 12 demerit points they lose their license. Determine if the driver should lose their license given where they were when they were holding their cell phone. Output how many demerit points the driver now has.

-Assume you have a perfect user who enters valid input.

-The following are recommended statements for solving this problems: switch, if/else and nested if/else.

-Here are a few sample outputs to illustrate the expected behavior of your program.

Note: user input is highlighted in green.

```
-------****-------****-------****-------****-----****-----
       Welcome to the Fine and Demerit Point Evaluator!

-------****-------****-------****-------****-----****-----

Welcome Officer - I need some information before I tell you what the fine and demerit points are.
Here are the possible locations
       1 - Driver was stopped on the highway
       2 - In a school zone
       3 - Car is stopped at a Stop sign or traffic light
       4 - None of the above

Please enter the digit corresponding to your case: 1

Officer, is this the driver's 1st offence (answer with y for yes and anything else for no)? y
Last question officer! How many demerit points did the driver have prior to being stopped? 5

--> Write a ticket for $80 and inform the driver that they now have 6 demerit points.

Good job officer! keep up the good work!!!!
```

```
-------****-------****-------****-------****-----****-----
       Welcome to the Fine and Demerit Point Evaluator!

-------****-------****-------****-------****-----****-----

Welcome Officer - I need some information before I tell you what the fine and demerit points are.
Here are the possible locations
       1 - Driver was stopped on the highway
       2 - In a school zone
       3 - Car is stopped at a Stop sign or traffic light
       4 - None of the above

Please enter the digit corresponding to your case: 2

Officer, how many months has the driver been driving? 20

--> Officer, write a ticket for $100, take away their driver's license and make arrangements to
have the car towed right away.

Good job officer! keep up the good work!!!!
```

```
-------****-------****-------****-------****-----****-----
       Welcome to the Fine and Demerit Point Evaluator!

-------****-------****-------****-------****-----****-----

Welcome Officer - I need some information before I tell you what the fine and demerit points are.
Here are the possible locations
       1 - Driver was stopped on the highway
       2 - In a school zone
       3 - Car is stopped at a Stop sign or traffic light
       4 - None of the above

Please enter the digit corresponding to your case: 3

Officer, is the cellphone in question an iPhone (answer with y for yes and anything else for no)? n
Last question officer! How many demerit points did the driver have prior to being stopped? 9

-->Write a ticket for $80 and inform the driver that they now have 10 demerit points.

Good job officer! keep up the good work!!!!
```

```
-------****-------****-------****-------****-----****-----
       Welcome to the Fine and Demerit Point Evaluator!

-------****-------****-------****-------****-----****-----

Welcome Officer - I need some information before I tell you what the fine and demerit points are.
Here are the possible locations
       1 - Driver was stopped on the highway
       2 - In a school zone
       3 - Car is stopped at a Stop sign or traffic light
       4 - None of the above

Please enter the digit corresponding to your case: 4
Last question officer! How many demerit points did the driver have prior to being stopped? 10

-->Write a ticket for $90. Also the driver has 13 demerit points.
Please take away their driver's license and make arrangements to have the car towed right away.

Good job officer! keep up the good work!!!!
```

Question 2*: Integer Divisions & While loop*

You are asked to write a Java program which will serve as a tutorial for the addition of two whole numbers with at most 3-digits for primary school children. Your program is to read in two integers and show how the addition is done along with the carry. Assume that the numbers being added have at most 3 digits and are positive (so no validation of user input is required). This program is to repeat until the user says otherwise.

Hint: You will need to use integer division and modulo to solve this problem (% and /).

Below is a sample output screen to illustrate the expected behavior of your program. Your output does not need to be formatted in exactly the same way. Just make sure the required information appears.

Note: user input is highlighted in green.

```
Welcome to Addition Tutorial Program!
--------------------------------------

Enter two numbers with at most 3-digits each, separated by a space and press enter: 123 456

You requested the following operation:

 num1:    123
 num2:  + 456
       ------

1st addition:
  last digit of each number
  3 + 6 = 9 so answer is 9 with a carry of 0

2st addition:
  the carry from previous addition plus the middle digit of each number
  0 + 2 + 5 = 7 so answer is 7 with a carry of 0

3rd addition:
  the carry from previous addition plus the first digit of each number
  0 + 1 + 4 = 5 so answer is 5

Final answer:
 num1:    123
 num2:  + 456
       ------
 Answer:  579

Do you want to try another one? (y or Y to repeat) y

Enter two numbers with at most 3-digits each, separated by a space and press enter: 888 201

You requested the following operation:

 num1:    888
 num2:  + 201
       ------

1st addition:
  last digit of each number
  8 + 1 = 9 so answer is 9 with a carry of 0

2st addition:
  the carry from previous addition plus the middle digit of each number
  0 + 8 + 0 = 8 so answer is 8 with a carry of 0

3rd addition:
  the carry from previous addition plus the first digit of each number
  0 + 8 + 2 = 10 so answer is 10
```

```
Final answer:
 num1:    888
 num2:  + 201
       ------
 Answer: 1089

Do you want to try another one? (y or Y to repeat) y

Enter two numbers with at most 3-digits each, separated by a space and press enter: 12 999

You requested the following operation:

 num1:     12
 num2:  + 999
       ------

1st addition:
  last digit of each number
  2 + 9 = 11 so answer is 1 with a carry of 1

2st addition:
  the carry from previous addition plus the middle digit of each number
  1 + 1 + 9 = 11 so answer is 1 with a carry of 1

3rd addition:
  the carry from previous addition plus the first digit of each number
  1 + 0 + 9 = 10 so answer is 10

Final answer:
 num1:     12
 num2:  + 999
       ------
 Answer: 1011

Do you want to try another one? (y or Y to repeat) n

Hope you are more comfortable with additions now! If not, don't hesitate to come back :-)
```

Here is a recommended skeleton of the algorithm to solve this problem
1. Display welcome message/welcome banner
2. Prompt user for 2 numbers to add
3. 1st addition: Add the last digit of each number, extract the result of the 2-digit addition and the carry and show this information to the user in a clear message.
4. 2nd addition: Add the carry from the 1st addition to the middle digit of each number, extract the result of the addition of the 2 digits and the carry and show this information to the user in a clear message.
5. Add the carry from the 2nd addition to the 1st digit of each number and display the result in a clear message.
6. Finish off by showing the result of the addition
7. Ask the user if they want to try another addition.
- If yes repeat from step 2
- If no display a closing message

Make sure that in your output, the numbers in the addition are right justified. The use of printf will help you do this.

Question 3 – String variables/Selection & loops.

Write a complete Java program which prompts the user for a sentence on one line where each word is separated by one space, reads the line into one String variable using *nextline()*, converts the string into ubbi dubbi and displays the translated sentence.
Ubbi dubbi works by adding *ub* before each vowel sound in a syllable. For example, *hello* becomes *h**ub**ell**ub**o*. The word *speak* has the vowel sound ea, so in ubbi dubbi it becomes *sp**ub**eak*.

ubbi dubbi rules for this assignment :

1. The vowels are a, e, i, o and u.
2. In the case that a word has 2 vowels following one another we only place *ub* in front of the 1st vowel. So zoom would be *z**ub**oom* and not *z**ub**o**ub**om*. Similarly, *steak* would be *st**ub**eak* and not *st**ub**e**ub**ak*.
3. For words that are 1 character or 2 character long we add ub in front of each character whether they are vowels or consonants.
4. If *e* is the last character of the word, we don't add *ub* in front of it. For example, the word *one* is translated as ***ub**one* and not ***ub**on**ub**e*.
5. Any other characters (punctuations, digits) are treated as non-vowels

Assumptions.
For this assignment you can assume that
1. There is exactly 1 space between words.
2. The entered string does not start or end with a space.
3. All words are in lower case letters.
4. The sentence has at least one non-blank character

Following is sample output to illustrate the expected behaviour of your program. Your program should work for any input, not just the one in the sample below.

Note: user input is highlighted in green.

```
-----------------------------------------------------
      English to Ubbi Dubbi Translator Program
-----------------------------------------------------

Please enter the English sentence you want translated into Ubbi Dubbi
(Be sure to have 1 space bwtween words and to not have any spaces at the front and
end of the sentence):
i am having fun with ubbi dubbi!
Translated sentence:
ubi ubaubm hubavubing fubun wubith ububbubi dububbubi!
Have fun speaking it!!!
```

Evaluation Criteria for Assignment 1 (30 points)

Source Code	
Comments for all 3 questions (3 pts.)	
Description of the program (authors, date, purpose)	1 pt.
Description of variables and constants	1 pt.
Description of the algorithm	1 pt.
Programming Style for all 3 questions (3 pts.)	
Use of significant names for identifiers	1 pt.
Indentation and readability	1 pt.
Welcome Banner/Closing message	1 pt.
Question 1 (8 pts.)	
Prompting user/reading data	2 pts.
Determine fine	2 pts.
Determine demerit points / lost license	2 pts.
Display correct results	2 pts.
Question 2 (8 pts.)	
Read in numbers	1 pt.
1st addition	1.5 pts.
2nd addition	1.5 pts.
3rd addition	1.5 pts.
Format of output	1 pt.
Repetition	1.5 pts.
Question 3 (8 pts.)	
ub in front of a single	1 pt.
Only one ub when more than 1 vowel	2 pts.
Single character and 2- character words	2 pts.
e last letter of a word	2 pts.
Non-vowel characters	1 pt.
TOTAL	**30 pts.**