PRG 155 –Programming Fundamentals Using C

LAB #1

Marks: 16
Due: Tues, Oct 1

Part 1. Pseudocode

The objective of your pseudocode is to specify the steps of the algorithm using natural/human readable language, rather than C programming keywords.

Design and write an algorithm in pseudocode that calculates the employee's pay, based on the number of hours and hourly rate entered by the user (pay = hours x rate). The program then displays the result.

Begin by creating a word document that will contain your pseudocode. the Use the following examples to write your pseudocode:

Example 1:

Write an algorithm in pseudocode that calculates the sum of two input numbers and displays the result.

```
Start
   Input A
   Input B
   sum = A + B
   Print sum
End
```

In this example, the `Start` and `End` terminators are used to signify the beginning and end of your algorithm. Take note of the indentation, the steps inside your terminators are indented by one tab space in order to show that these steps are contained within the main function.

Example 2:

Design an algorithm that will read two numbers (A and B) and compare them. If A is greater than or equal to B, the program will display number A. If B is greater than A, the program will display number B.

```
Start
   Input A
   Input B
   If a >= B
         Print A
   Else
         Print B
End
```

In this example a similar concept to the body of the main function is used for the inside of the body of the `If-Else` statement, where we indent by one tab space.

Part 2. Flowchart

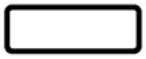
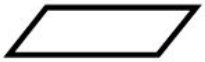
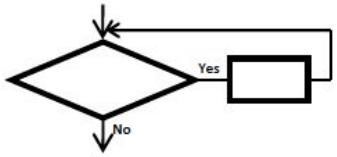
The objective of your flowchart is to specify the steps of the algorithm using a diagram (flowchart) that illustrates the flow of the program.

Design a flowchart that illustrates the algorithm you've developed above which calculates an employees salary.

Using the flowchart symbols on the following page, begin by creating a new file in one of the following applications to create your flowchart:

- **Microsoft Visio**: Seneca MyApps
- **Lucidchart**: Create a fee account at https://app.lucidchart.com/users/registerLevel#/createAcco

Flowchart Symbols

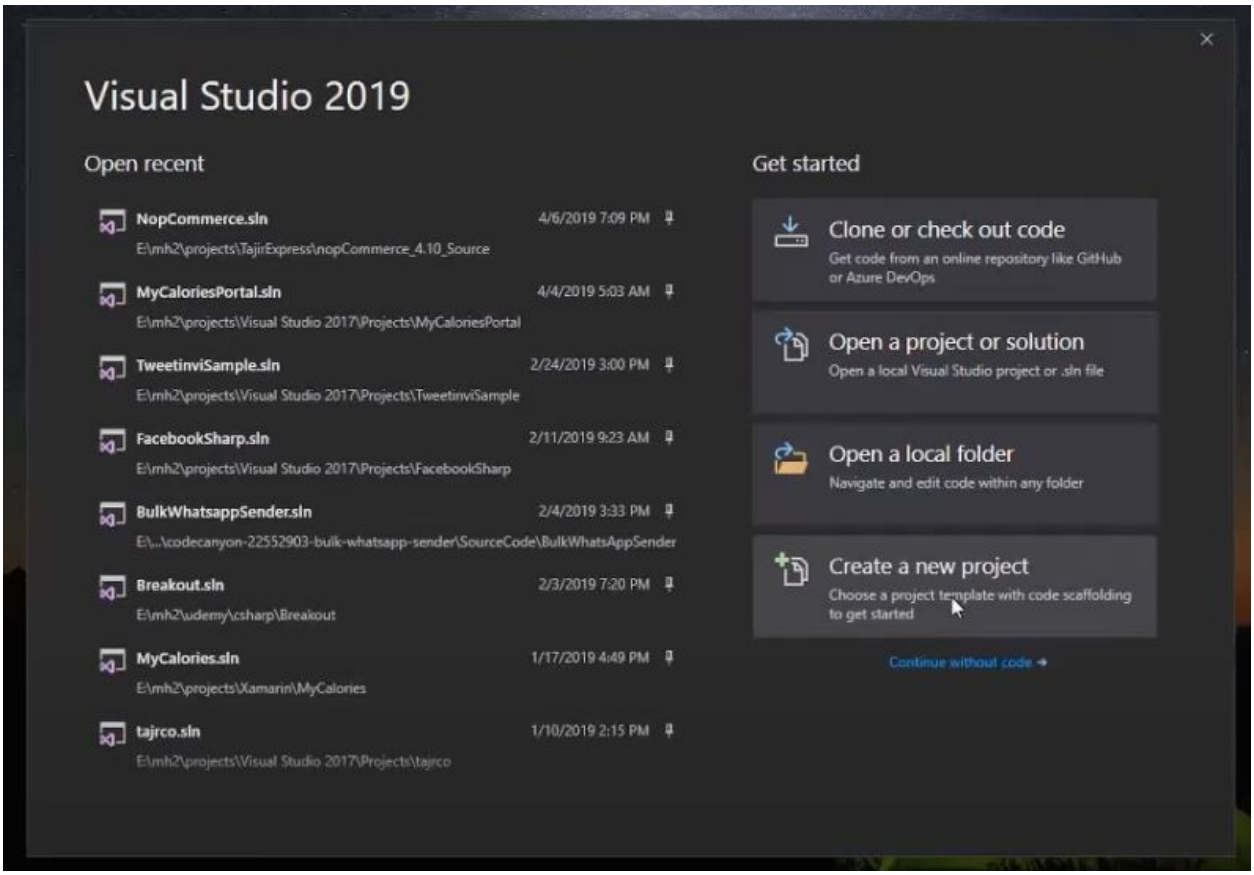
Symbol	Name	Description
	Terminal	Defines the start and end point of a flowchart
	Input/Output	Indicates an input or output operation
	Process	Data manipulation – assignments, mathematical and logical computations, etc.
	Flow lines	Defines the sequence of the algorithm/program. Arrow points to the next symbol to be performed.
	Decision	Process conditions using relational operators. It indicates a Yes/No questions. If the answer is Yes, the flow follows one path. If the answer is No, the flow follows another path.
	Repetition structure	Represents a part of the program that repeats ("loop"). A loop tests a condition. If the condition exists (it is "true"), it performs an action. The loop tests the condition again, and performs the action if the condition still exists (still "true"). This repeats until the condition no longer exists (it is "false").
	On-page connector	Used to avoid difficult to read and understand connections
	Off-page connector	Used to connect to the flowchart on a different page

Part 3. Create a C Project

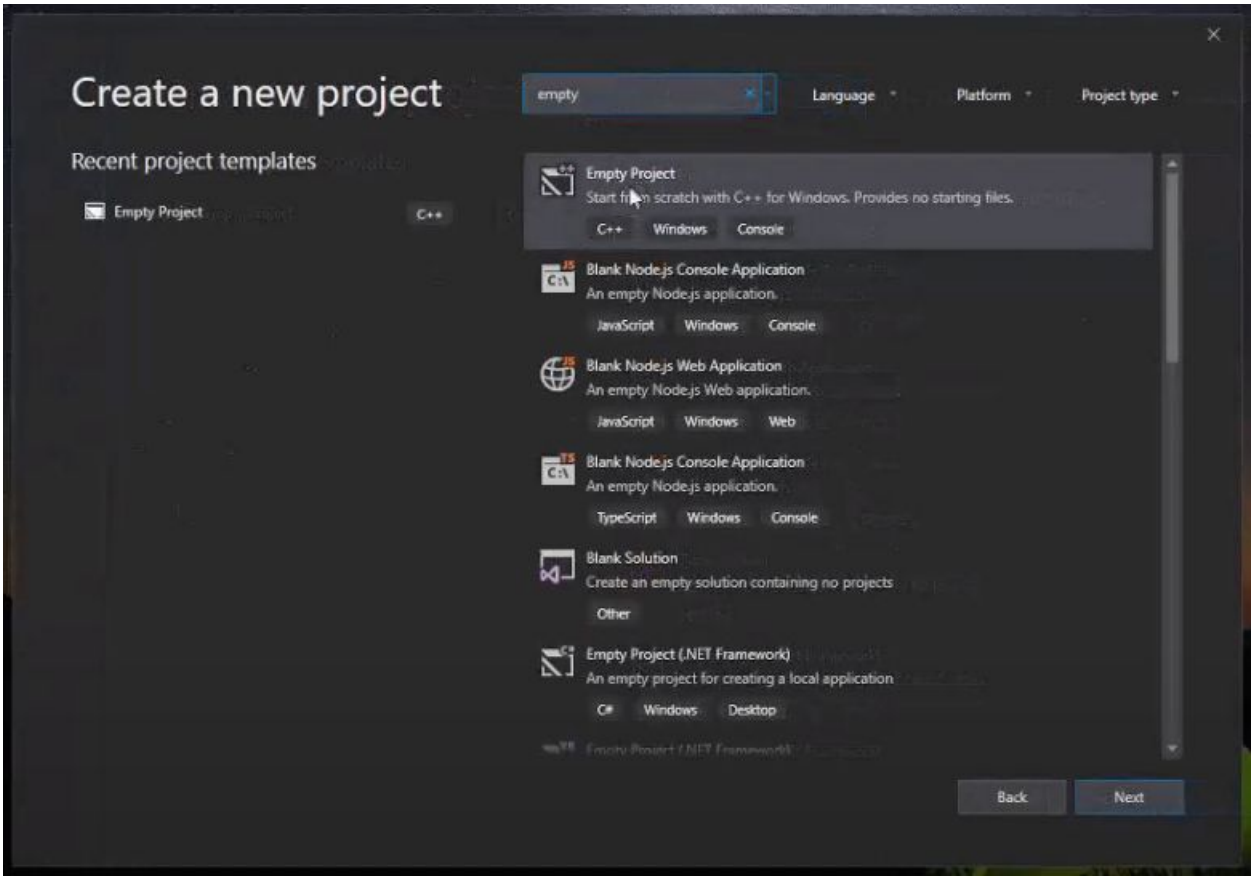
Begin by launching Visual Studio on your computer from Seneca MyApps by logging in to https://myapps.senecacollege.ca/

To download a copy of Visual Studio directly to your device you can find a download at the following link: https://visualstudio.microsoft.com/vs/features/cplusplus/

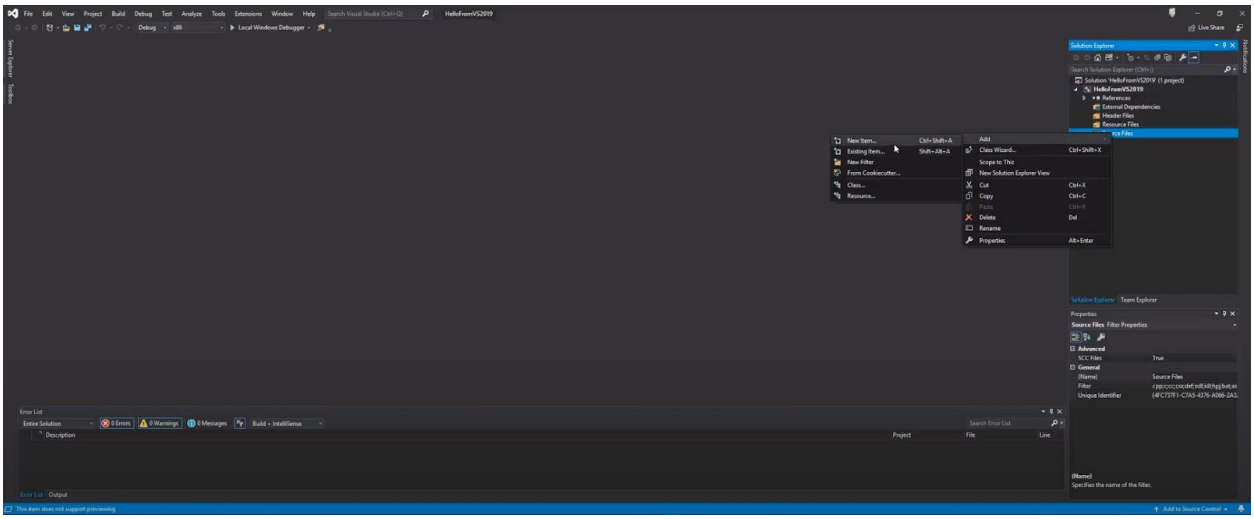
Once you have successfully launched the program, select *Create a new project* from the following menu:



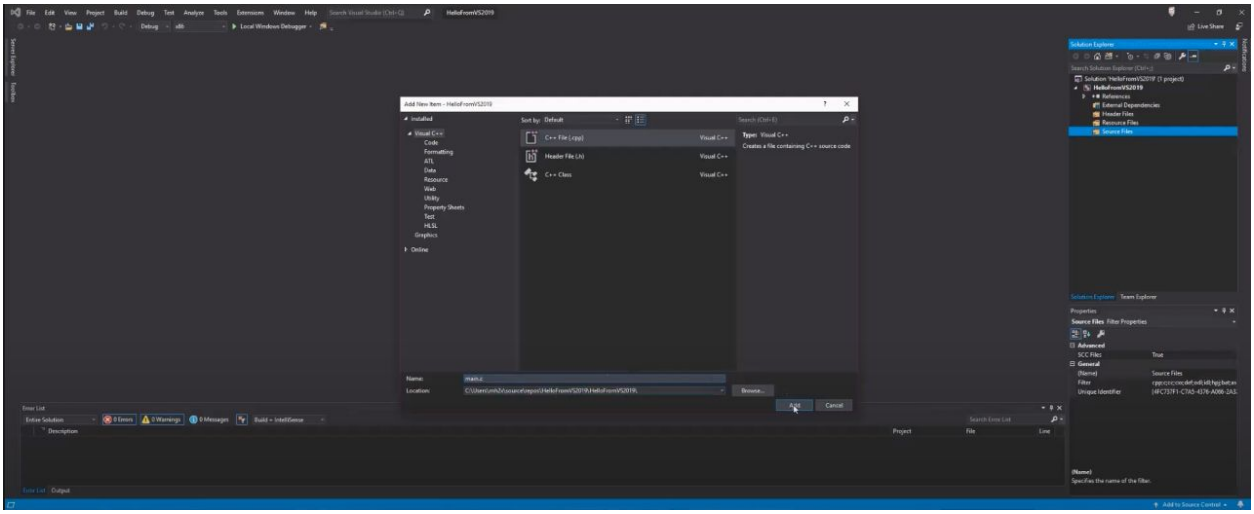
From the *Create a new project* window search for and select “Empty Project”, the description should look as follows:



You should now have a new project to begin with. From this screen, right-click on *Source Files*, then select *Add* then *New Item…*



In the *New Item* window be sure that you have Visual C++ selected, then click on C++ File(.cpp). **IMPORTANT:** Before selecting *Add*, be sure to change the extension in the name from .cpp. to .c, the .cpp extension is reserved for C++ language only.



Once you have created your **.c** file it is time to begin writing code!

Type the following code into your **.c** file to build the program that will represent your developed algorithm:

```
/*
  program: Lab 2
  author:  your_name
  date:    todays_date
*/

#include <stdio.h>

int main() {
  int hours, rate, pay;

  printf("Enter hours");
  scanf("%d", &hours);

  printf("Enter rate");
  scanf("%d", &rate);

  pay = hours * rate;

  printf("%d", pay);

  return 0;
}
```

Part 4. Submit your C project

Save your .c file by selecting File from the Visual Studio menu bar at the top, then select *Save as .c file…*

Login to Blackboard and submit all three files you've created (Pseudocode, Flowchart, .C file) to the submission dropbox.