Logic   
  
**Temperature Analyzer**

Workshop 3 (worth 3% of your final grade)  
URL: https://…….

In this workshop, you will code a C-language program that analyzes data logically.

**LEARNING OUTCOMES**

Upon successful completion of this workshop, you will have demonstrated the abilities:

* to create a simple interactive program
* to use a selection construct to code a decision
* to use an iteration construct to code repetitive logic
* to nest a logical block within another logical block
* to describe to your instructor what you have learned in completing this workshop

**SUBMISSION POLICY**

Your workshops are divided into two sections; in\_lab and at\_home.

The "in-lab" section is to be completed during your assigned lab section.  It is to be completed and submitted by the end of the workshop period.  If you attend the lab period and cannot complete the in-lab portion of the workshop during that period, ask your instructor for permission to complete the in-lab portion after the period.  If you do not attend the workshop, you can submit the “in\_lab” section along with your “at\_home” section, but there will be a reduction from 40% to 10% for the “in\_lab” portion. The “at\_home” portion of the lab is **due the day before your next scheduled workshop.**

All your work (all the files you create or modify) must contain your name, Seneca email and student number.

You are responsible for regularly backing up your work.

**IN-LAB: ITEM Class (50%)**

Download or clone workshop 3 from https://….

Code a program that does the following:

1. Before the declaration of main define NUMS as 3: > #define NUMS 3 <
2. Print the title of the application.  
     
   > ---=== IPC Temperature Analyzer ===--- <  
     
   \* the first character of the title must be on column 8
3. Using a for loop, prompt the user to enter the high and low values for each of NUMS days. The values entered must be between -40 and 40, and high must be greater than low.  
     
   Print the following messages: **> Enter the high value for day 1: < (or day 2, or day 3)**\* Read the high value.  
     
    **> Enter the low value for day 1: < (or day 2, or day 3)**\* Read the low value.
4. Within the body of the for loop, use a while loop around the input statements to validate the input: high must be greater than low, high must be less than 41, and low must be greater than -41  
     
   \*If any entry is incorrect, prompt the user to enter again until the entries pass the tests:  
     
   > Incorrect values, temperatures must be in the range -40 to 40, high must be greater than low. <  
     
   Then prompt again for the high and low temperatures for the day.
5. When the user has correctly entered the high and low temperatures, add them to variables that will store the total high and low temperatures for NUMS days.
6. When the for loop finishes calculate the average (mean) temperature for NUMS (the total of the temperatures entered divided by the number of temperature readings entered) days and display:  
     
   > The Average (mean) temperature was: -- <

## Output Example

**---=== IPC Temperature Analyzer ===---**

**Enter the high value for day 1: 8**

**Enter the low value for day 1: -2**

**Enter the high value for day 2: 9**

**Enter the low value for day 2: -4**

**Enter the high value for day 3: 11**

**Enter the low value for day 3: 5**

**The average (mean) temperature was: 4.50**

## Output Example with Errors Handled

---=== IPC Temperature Analyzer ===---

Enter the high value for day 1: 8

Enter the low value for day 1: -2

Enter the high value for day 2: 41

Enter the low value for day 2: -4

Incorrect values, temperatures must be in the range -40 to 40, high must be greater than low.

Enter the high value for day 2: 9

Enter the low value for day 2: -4

Enter the high value for day 3: 5

Enter the low value for day 3: 11

Incorrect values, temperatures must be in the range -40 to 40, high must be greater than low.

Enter the high value for day 3: 11

Enter the low value for day 3: 5

The average (mean) temperature was: 9.67

For submission instructions, see the [SUBMISSION](https://scs.senecac.on.ca/~oop244/pages/workshops/w2.html#sub) section below.

**In\_Lab SUBMISSION:**

To test and demonstrate execution of your program use the same data as the output example above or any information needed…. (8, -2, 9, -4, 11, 5)

If not on matrix already, upload your **temps.c** to your matrix account. Compile and run your code and make sure everything works properly.

Then run the following script from your account: (replace profname.proflastname with your professors Seneca userid)

**~profname.proflastname/submit ipc\_w3\_lab <ENTER>**

and follow the instructions.

**AT\_HOME: (40%)**

After completing the in\_lab section, upgrade temps.c to

* process a 4-day period using a single change to your in\_lab code
* display the highest temperature, and on which day it occurred
* display the lowest temperature, and on which day it occurred
* calculate and display the mean temperature for the 4-day period.

## Output Example

**---=== IPC Temperature Analyzer ===---**

**Enter the high value for day 1: 8**

**Enter the low value for day 1: -2**

**Enter the high value for day 2: 9**

**Enter the low value for day 2: -4**

**Enter the high value for day 3: 11**

**Enter the low value for day 3: 5**

**Enter the high value for day 4: 10**

**Enter the low value for day 4: 3**

**The average (mean) temperature was: 5.00**

**The highest temperature was 11, on day 3**

**The lowest temperature was -4, on day 2**

**AT-HOME REFLECTION (10%)**

Please provide brief answers to the following questions in a text file named **reflect.txt.**

1. Name all the iteration constructs?
2. Explain the difference between a “do while” and a “while” loop?
3. What is a conditional expression?

**At\_Home SUBMISSION:**

To test and demonstrate execution of your program use the same data as the output example above… (8, -2, 9, -4, 11, 5, 10, 3)

If not on matrix already, upload your **temps.c and reflect.txt** to your matrix account. Compile and run your code and make sure everything works properly.

Then run the following script from your account: (replace profname.proflastname with your professors Seneca userid)

**~profname.proflastname/submit ipc\_w3\_at\_home <ENTER>**

and follow the instructions.