

Lab 4 Flow control (I) – Conditional statements

Please test the correctness of your program in **Q1**, **Q2**, **Q3** and **Q4** on **PASS**.

Q1.

Write a program that reads 3 integer values (> 0) from the user. The 3 values are interpreted as representing the lengths of the three sides of a triangle. The program prints a message saying whether the triangle is **Equilateral** (all sides equal), **Isosceles** (only 2 sides equal), **Scalene** (all sides unequal), or **Impossible** (can't form a triangle). A triangle can be formed only if the sum of the length of *any* 2 sides is greater than the length of the 3rd side and the length of all the sides of the triangle are *positive*.

Expected Output:

Example 1	Example 2
Enter the value of A, B and C: <u>3</u> <u>4</u> <u>5</u> Scalene	Enter the value of A, B and C: <u>3</u> <u>3</u> <u>3</u> Equilateral
Example 3	Example 4
Enter the value of A, B and C: <u>5</u> <u>5</u> <u>2</u> Isosceles	Enter the value of A, B and C: <u>1</u> <u>2</u> <u>10</u> Impossible
Example 5	Example 6
Enter the value of A, B and C: <u>0</u> <u>2</u> <u>10</u> Impossible	Enter the value of A, B and C: <u>1</u> <u>-2</u> <u>10</u> Impossible

Hint-1: If you'd like to check for equality, you should NOT write something like: `if (A==B==C)`, but instead, you should use the `&&` operator: `if (A == B && B == C)`

Hint-2: The order of checking may affect the complexity of your code (although it still works). You may wish to check for impossible cases first, and identify the scalene case last.

NOTE: Your program MUST follow the EXACT input/output format! Otherwise, you may not pass the test cases even though your calculation is correct.

Q2.

Write a program that prompts the user to enter an integer and determines whether it is

- divisible by 3 and 5
- divisible by 3 only
- divisible by 5 only
- not divisible by 3 or 5

Expected Output:

Example 1	Example 2
Enter an Integer Number: <u>15</u> 15 is divisible by 3 and 5.	Enter an Integer Number: <u>21</u> 21 is divisible by 3 only.
Example 3	Example 4
Enter an Integer Number: <u>40</u> 40 is divisible by 5 only.	Enter an Integer Number: <u>23</u> 23 is not divisible by 3 or 5.

Q-3. [Will be marked]

Write a program that calculates the result of 'a', 'operator', 'b' which are entered by users, like '1+4 = 5'.

- Verify whether the input 'a' and 'b' are digits.
- The operators include +, -, *, /, <, >, =.
- 'True' is simplified as 'T' while 'False' is simplified as 'F'.
- When the operator is '=', output '==' instead of '=' and add brackets to the equation, e.g., (1==2)=F.

Expected Output:

Example 1	Example 2
Enter the expression: <u>1</u> <u>+</u> <u>4</u> 1+4=5	Enter the expression: <u>10</u> <u>/</u> <u>6</u> 10/6=1.66667
Example 3	Example 4
Enter the expression: <u>a</u> <u>+</u> <u>1</u> Invalid input.	Enter the expression: <u>1</u> <u><</u> <u>4</u> 1<4=T
Example 5	Example 6
Enter the expression: <u>1</u> <u>\$</u> <u>4</u> Invalid operation.	Enter the expression: <u>5</u> <u>=</u> <u>5</u> (5==5)=T

Hint: Try to use `switch .. case`.

Q-4. [Optional]

Write a program that calculates your age in future.

The console's prompts for data entry and the output displayed should strictly follow the format of the expected output shown below.

- a) The program should cope with singulars and plurals properly in the output, e.g. "1 month" but "2 months", and "0 month" or "0 year" can be in the output.
- b) The program should check for invalid month input. If an input number for month is not in the range from 1 to 12, the program should print the message below and end.

Invalid Month Input!

- c) The program should check for invalid age input.
 1. If an input number for age is a negative integer, the program should print the message below and end.
The value for age cannot be a negative integer!
 2. If an input number for present age is larger than 200, the program should print the message below and end.
Sorry, people may be dead by this age!
- d) The program should check that you were not born yet in the year and month for which you wish to know your age. The program should print the message below and end.
You were not born!

- e) Given the calculated age X year(s) and Y month(s), the program should check the followings:
 1. If both X and Y are odd, print the following message.
Both of X and Y are odd!
 2. If either X or Y is odd, print the number that is odd. For example, if X is odd, print the following message.
X is odd!
 3. If neither X nor Y is odd, print the following message.
Both of X and Y are not odd!

Hints: Verify the inputs before calculating the outputs.

Expected Output:

Example
Enter the current year: <u>2019</u> Enter the current month: <u>10</u> Enter your current age in years: <u>20</u> Enter the month in which you were born: <u>6</u> Enter the year for which you wish to know your age: <u>2030</u> Enter the month in the year for which you wish to know your age: <u>8</u> Your age in 2030/8: 31 years and 2 months 31 is odd!