

**1. [3 points]** Write a C program to check whether an character is vowel or lowercase consonant or uppercase consonant using `if else`. English alphabets `a, e, i, o` and `u` both lowercase and uppercase are known as vowels. Alphabets other than vowels are known as consonants.

- a) Declare a character variable and assign its value using the `scanf` function.
- b) Classify the character entered by the user using the `if-else-if` construct. Print the entered character and its classification on the screen.

The user can enter a vowel, a consonant or any character from the keyboard as input.

Test Data :

Enter any character: D  
'D' is uppercase consonant.

Enter any character: c  
'c' is lowercase consonant.

Enter any character: 1  
'1' is not an alphabet.

Enter any character: E  
'E' is Vowel.

Enter any character: o  
'o' is Vowel.

**2. [4 points]** Write a C program to create calculator that performs basic arithmetic operations (add, subtract, multiply and divide) using `switch case`. The calculator should input two numbers and an operator from user. It should perform operation according to the operator entered and must take input in given format.

- a) Declare three variables. Two to hold the values and the third to hold the operator. What types should be variables? Use `scanf` to give them values.
- b) The `switch` decides what operation to perform based on the value of the operator.
- c) Create 4 `case` labels for 4 arithmetic operations.
- d) Use `default` when the user-supplied symbol does not match any of the four arithmetic operations.
- e) Print the result on the screen.

Test Data :

Information for the user: Enter [number 1] [+ - \* /] [number 2]

Data entered by the user: 123 + 34

Result: 123.00 + 34.00 = 157.00

Information for the user: Enter [number 1] [+ - \* /] [number 2]  
Data entered by the user: 12 # 34  
Result: Invalid operator

3. **[3 points]** Write a C program to input two numbers from user and find maximum between two numbers using `switch case`, and check whether the maximum is even or odd using `switch case`.

- a) Declare three variables. Use `scanf` to initialize two of them.
- b) Use `switch` to find maximum. Create two labels, don't use `default`.
- c) Print the maximum to the screen.
- d) Use `switch` to check whether the maximum is even or odd. Create two labels, don't use `default`.
- e) Print info to the screen.

Test Data :  
Input: Enter two numbers: 12 13  
Result:  
13 is Maximum.  
Maximum is Odd.

Input: Enter two numbers: 16 13  
Result:  
16 is Maximum.  
Maximum is Even.

4. **[3 points]** Write a program that consists of two `while` loops. The first loop prints even numbers between 2 and 19 and uses the `if` statement. The second loop prints even numbers between 2 and 19 and does not use the `if` statement.

Test Data :  
while with if: 2 4 6 8 10 12 14 16 18  
while without if: 2 4 6 8 10 12 14 16 18

5. **[3 points]** Write a C program that consists of three `while` loops. The first loop prints alphabets from a to m, the second loop prints alphabets from z to n, and the third loop prints alphabets from a to m, but the loop condition uses ASCII codes. Only one character variable can be declared in a program. ASCII value of a=97

Test Data :  
Alphabets from a - m are:  
a b c d e f g h i j k l m  
Alphabets from z - n are:  
z y x w v u t s r q p o n  
Alphabets from (ASCII) a - m are:  
a b c d e f g h i j k l m

6. **[4 points]** Write a C program that prints **n** odd numbers not less than **a**. The program reads two numbers **a** and **n**. The value of **a** can be even or odd. Use `scanf`, `while`, `if` and `%`. Use no more than three variables.

Test Data :

Enter a n:

12 7

13 15 17 19 21 23 25

Enter a n:

13 7

13 15 17 19 21 23 25

Next time:

Laboratory 05 – Loops: `for`, `while`, `do-while`.