Assignment 3

Deadline: ***Poush 29, 2075***

1. Draw flowchart for simulating a simple calculator that is performing addition, subtraction, multiplication and division.
2. Write down the *flowchart of nested* if in C and explain how it works?
3. Explain **break** and **goto** statement with examples.
4. Write a program that will read the value of x and evaluate the following function:

$$y = \begin{cases} 1 \; for \; x > 0 \\ 0 \; for \; x = 0 \\ 1 \; for \; x < 0 \end{cases}$$

   Using
   - *nested if* statement,
   - *else if* statement,
   - Conditional operator.
5. What is the purpose of **break** statement in switch? Explain with examples.
6. Why the use of **goto** statement is generally discouraged in C programming?
7. Compare conditional operator and if-else statement with examples.
8. In a control structure switch-case, explain the purpose of using default.
9. WAP in C to accept three digits (0-9) and print all possible combinations from these digits. (For example, if three digits are 2, 3 and 5 then all possible combinations are 235, 253, 325, 352, 523, and 532).
10. WAP in C to find the area of a circle, rectangle or triangle depending upon the user's choice:
    a. Using if-else-if ladder
    b. Using switch
11. In any program, using switch statement, *if all break statements are removed from all cases* of switch statement, how does it affect the functionality of switch statement? Give example
12. According to the Gregorian calendar, it was Monday on the date 01/01/01. If any year is input through the keyboard write a program to *find out what is the day on 1st January* of this year.
13. Compare **for loop**, **while loop** and **do…while loop** with flowchart and example.
14. Write an algorithm and draw flowchart for generating first n (n>2) Fibonacci terms. (Fibonacci terms are 0, 1, 1, 2, 3, 5, 8, 13, 21 ……).
15. Write an algorithm and draw flowchart for checking whether a given integer number by user is prime number or not.
16. Write an algorithm and draw flowchart for generating all prime numbers between MIN and MAX. Where (MIN<MAX)
17. Draw flowchart for printing multiplication table for all numbers from 1 to 10.
18. Draw flowchart and write the algorithm for finding the smallest of three numbers.
19. Draw a flowchart for checking whether a given number is palindrome or not.
20. What are the advantages and limitations of flowcharting?
21. Draw flowchart for solving quadratic equation for finding all roots (real and equal, real and distinct and complex).
22. Draw flowchart for finding biggest and smallest numbers form set of three numbers.

23. WAP in C to generate and display a table of **n** and $\mathbf{n^2}$, for integer value of n ranging from ***10*** *through* ***20*** along with appropriate column headings.
24. WAP to read the number until -1 is encountered. Also count the number of even number and odd number entered by user.
25. What is the importance of control structure in programming? Compare if-else-if ladder and switch construct. Which is better?
26. What is user-defined function? Why is it necessary in programming? How function is categorized in C?
27. WAP to find whether a number is prime or not using function. The function should take the number as argument and return true or false to the main program.
28. Draw a flowchart and then write a program to read three sides of a triangle and print area for valid data and to print "Invalid data" if the given data doesn't form valid triangle. (Area = $\sqrt{(s-a)(s-b)(s-c)}$, where a, b, c are three sides and $s=(a+b+c)/2$.
29. State with example, how **switch**() differs from **user-defined function** in computer programming language C.
30. What do you understand by **return** statement? Explain along with example about its advantages and disadvantages.
31. How does a *function optimize resources at the programmer and the machine side*? How does a function return value? Illustrate with example.
32. Write an interactive program that reads positive numbers until user enters "no" and then sum the numbers divisible by 4 that lie between the range of 10 and 50 and finally display the count and average value.
33. WAP in C that calculates the sum of digits entered by user successively until the sum reduces to a single digit number. For example, 12345 =>1+2+3+4+5 = 15 =>1+5 = 6. Your program should print sum at each step.
34. WAP to generate all combinations of 1, 2 and 3 using for loop.
35. Write a C program to generate following Patterns: