4. Control structures for decision making and branching statements

(Algorithm, Pseudocode, Flow chart, C code)

If statement:

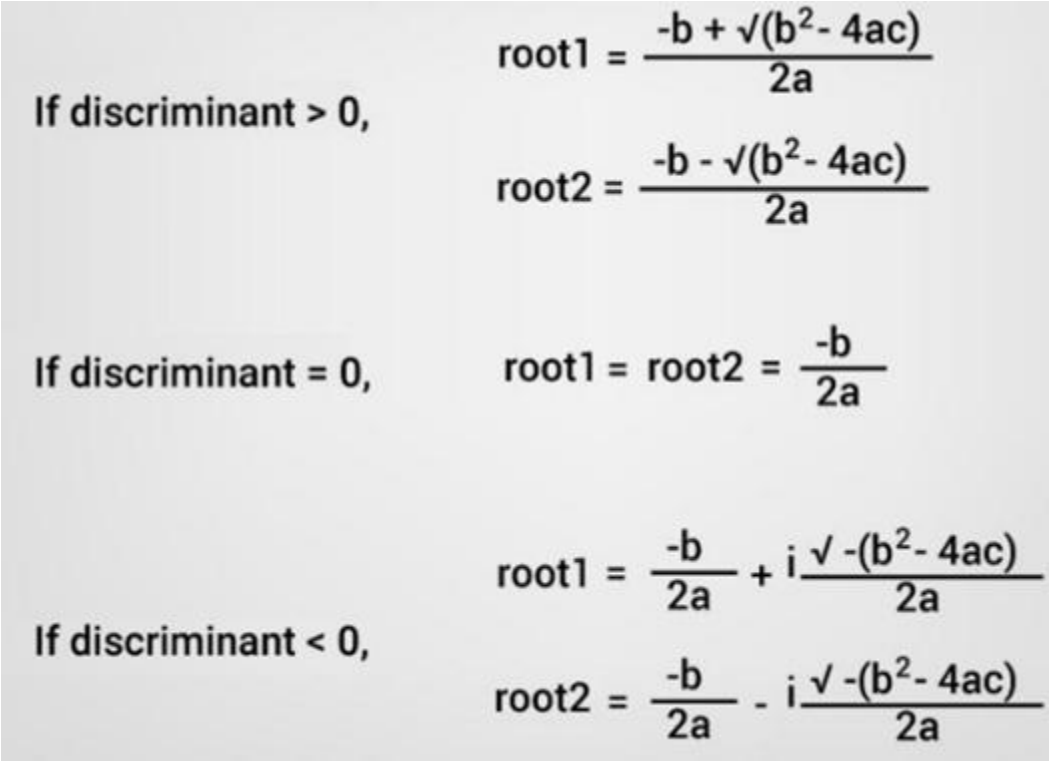
1. Get a number from user. If the number is less than or equal to 10. Print the message "good".
2. Find the Absolute value of a given number.
3. Read three numbers from the user and find the biggest of three using simple (multiple) if statements.

If else statement:

4. Find whether the given number is even or odd
5. The result of a student is calculated as the average of five marks. Student is pass if the average is greater than or equal to 50 if not fail.
6. Check whether the given year is leap year or not.

If else if ladder statement:

7. Check whether given number is +ve, -ve or zero
8. Find the biggest among 3 numbers
9. Find all the roots of a quadratic equation $ax^2 + bx + c = 0$ where the expression $b^2 - 4ac$ is called the discriminant.



Nested if:

10. Read three numbers from the user and find the biggest of three using nested if statements.
11. Write a C program that will read the value of x and evaluate the following function

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

Using nested if statements.

12. Write a C program for the following scenario, If Gender of the employee is Male the following conditions apply for Tax Payable calculation:
Up to Rs 1 Lakh of Net Salary – No Tax
Net salary > 1 Lakh – 10%
If Gender of the employee is Female the following conditions apply for Tax Payable calculation: Up to Rs 1.35 Lakh of Net Salary – No Tax
Net salary > 1.35 Lakh – 10% Tax using nested if.
Accept gender as character (m or f)

Switch case statement:

13. Design a simple calculator using switch.
14. Given a character representing one of the colors in a rainbow (VIBGYOR), print the subsequent colors in the rainbow starting from the given color.
15. Given a month number, print the name of that month.

Extra Questions:

1. Write a C program which takes three sides a, b and c of a triangle as input and calculates its area if all these conditions are satisfied a+b>c, b+c>a, a+c>b

$$A_{\triangle} = \sqrt{s(s-a)(s-b)(s-c)}$$

where

$$s = \frac{1}{2}(a+b+c)$$

2. Write a c program to check a character data an ALPHABET or DIGIT
3. Write a program which takes a character input and checks whether it is vowel or consonant
4. An electric power distribution company charges its domestic customers as follows

Consumption unit	Rate of charge
0 -200	Rs.0.50 per unit
201 – 400	Rs.100plus Rs0.65 per unit excess of 200 units
401 – 600	Rs.230plus Rs0.80 per unit excess of 400 units
601 and above	Rs.320plus Rs1.00 per unit excess of 600 units

Write a C program to calculate the monthly bill of consumers, where the consumer number (integer) and the number of units consumed are given as input.

5. The National Earthquake Information Center has the following criteria to determine the earthquake damages. Here is the given Richter scale serve as an input data and the characterization as output information.

RICHTER NUMBER (N).....CHARACTERIZATION
N<5.0----------little or no damage
5.0<=N<5.5----------some damage
5.5<=N<6.5. ----------serious damage
6.5<=N<7.5----------Disaster
Higher ----------Catastrophe

6. Write a C program to find the value of y using $y(x,n)=\begin{cases} 1+x \text{ when } n=1 \\ 1+(x/n) \text{ when } n=2 \\ 1+x^n \text{ when } n=3 \\ 1+nx \text{ when } n>3 \text{ or } n<1 \end{cases}$

7. Write a program to find the grade of a student using else..if ladder and switch case statement. Given

Marks	Grade
91 to 100	S
81 to 90	A
71 to 80	B
61 to 70	C
55 to 60	D
50 to 54	E
Less than 50	U

8. A certain grade of steel is graded according to the following conditions:
   (i) Hardness must be greater than 50
   (ii) Carbon content must be less than 0.7
   (iii) Tensile strength must be greater than 5600
   The grades are as follows: Grade is 10 if all three conditions are met
   Grade is 9 if conditions (i) and (ii) are met
   Grade is 8 if conditions (ii) and (iii) are met
   Grade is 7 if conditions (i) and (iii) are met
   Grade is 6 if only one condition is met
   Grade is 5 if none of the conditions are met

Write a program, which will require the user to give values of hardness, carbon content and tensile strength of the steel under consideration and output the grade of the steel.

9. Consider the pairs of characters used in C programs: ( ), { }, [ ], and < >. Accept one of these characters and print the name of the corresponding pair of characters a s parenthesis, curly braces, square brackets, and angle brackets.

10. Write a C program to read a double-type value x, that represents angle in degrees and a character type variable T that represents the type of trigonometric function and display the value of,
    a. sin(x), if s (or)S is assigned to T
    b. cos(x), if c (or)C is assigned to T
    c. tan(x), if t (or)T is assigned to T using switch statement.

    Note: All trigonometric functions accept input as radians ($2\pi=360^{o}$)