C-Programming / C Programs / **README.md**

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Basic Simple C Programs

1. WAP(Write a program) to print "Hello World".

Expected Output

```
Hello World
```

Source Code

```c
#include <stdio.h>

int main(){
    printf("Hello World");
    return 0;
}
```

2. WAP. to input a number and print them.

Test Data

```
Enter a number: 5
```

Expected Output

```
Number is 5
```

Source Code

```c
#include <stdio.h>
```

```c
int main(){
    int num;

    printf("Enter a number");
    scanf("%d", &num);

    printf("Number is %d", num);

    return 0;
}
```

3. WAP. to accept two numbers and print their addition, subtraction, multiplication, division.

Test Data

```
Enter 2 number: 5 10
```

Expected Output

```
Addition = 15
Subtraction = -5
Multiplication = 50
Division = 0
```

Source Code

```c
#include <stdio.h>

int main(){

    int add, mul, sub, div, num1, num2;

    printf("\nEnter 2 number:");
    scanf("%d %d", &num1, &num2);

    add = num1 + num2;
    sub = num1 - num2;
    mul = num1 * num2;
    div = num1 / num2;

    printf("Addition = %d \nSubtraction = %d \nMultiplication = %d \nDivision = %d"
    , add, sub, mul, div);

    return 0;
}
```

4. WAP. to input a number and change the sign.

Test Data

```
Enter a number: 5
Enter a number: -5
```

Expected Output

```
Changed number = -5
Changed number = 5
```

Source Code

```c
#include <stdio.h>

int main(){
    int num;

    printf("Enter a number: ");
    scanf("%d", &num);

    num = num * -1;

    printf("Changed number = %d", num);
    return 0;
}
```

5. WAP. to input two number and display quotient and remainder.

Test Data

```
input number : 98 4
```

Expected Output

```
quotient = 24
remainder = 2
```

Source Code

```c
#include <stdio.h>

int main(){
    int dividend, divisor, quotient, remainder;

    printf("Enter Dividend and Division: ");
    scanf("%d %d", &dividend, &divisor);

    quotient = dividend / divisor;
    remainder = dividend % divisor;

    printf("Quotient = %d Remainder = %d", quotient, remainder);
```

```c
        return 0;
}
```

6. WAP. to display last digit of a number.

Test Data

```
Enter a number: 153
```

Expected Output

```
Last digit = 3
```

Source Code

```c
#include <stdio.h>

int main(){
    int num;

    printf("Enter a number: ");
    scanf("%d", &num);

    num = num % 10;

    printf("Last digit = %d", num);

    return 0;
}
```

7. WAP. to accept a number from user and print it's square & cube in C language.

Test Data

```
Enter a number = 5
```

Expected Output

```
Square = 25 Cube = 125
```

Source Code

```c
#include <stdio.h>

int main(){
```

```
    int num, cube, square;

    printf("Enter a number: ");
    scanf("%d", &num);

    cube = num * num * num;
    square = num * num;

    printf("Square: %d Cube: %d \n", square, cube);

    return 0;
}
```

8. WAP. to calculate Area and Circumference of a Circle.

| Formula

Area of a Circle = πr^2

Circumference of a circle = $2\pi r$

| Test Data

```
Enter Radius: 15
```

| Expected Output

```
Area of a circle = 78.525002
Circumference of a circle = 31.410000
```

| Source Code

```c
#include <stdio.h>

int main(){

    float area, circum, radius, pi = 3.14153;

    printf("\nEnter Radius: ");
    scanf("%f", &radius);

    area = radius * radius * pi;
    circum = 2 * pi * radius;

    printf("Area of the circle: %f \n", area);
    printf("Circumference of the circle: %f \n", circum);

    return 0;
}
```

9. WAP. to input a number to compute the perimeter and area of a rectangle.

| Formula

Perimeter of the rectangle $= 2(height + width)$

Area of Rectangle $= height * width$

| Test Data

```
Enter height and width of the rectangle respectively: 12 5
```

| Expected Output

```
Area of a rectangle = 60 square inches
Perimeter of a rectangle = 34 inches
```

| Source Code

```c
#include <stdio.h>

int main(){
    int height, width, area, perimeter;

    printf("Enter height and width of the rectangle respectively: ");
    scanf("%d %d", &height, &width);

    area = height * width;
    perimeter = 2 * (height + width);

    printf("Area of a rectangle = %d square inches
\nPerimeter of a rectangle = %d inches", area, perimeter);

    return 0;
}
```

10. WAP. to Calculate Percentage of 5 Subjects.

| Test Data

```
Enter marks of 5 subjects:72 93 56 80 57
```

| Expected Output

```
Your Overall Percentage: 71.599998
```

| Source Code

```c
#include <stdio.h>
```

```c
int main(){

    float sanskrit, math, eng, hin, accounts, percentage, total;

    printf("Enter marks of 5 subjects:");
    scanf("%f %f %f %f %f", &sanskrit, &hin, &eng, &math, &accounts);

    total = sanskrit + hin + eng + math + accounts;
    percentage = total / 500 * 100;

    printf("\nTotal Marks = %f \nYour Overall Percentage: %f", total,
    percentage);

    return 0;
}
```

11. WAP. to Calculate Simple Interest.

> Formula

Simple Interest = $(p * r * t)/100;$

p = *Principal*, **r** = *Rate of interest*, **t** = *Time period*

> Test Data

```
Enter Principal Amount: 4500
Enter Rate of Interest: 9.5
Enter Time: 6
```

> Expected Output

```
Simple interest: 2565.000000
```

> Source Code

```c
#include <stdio.h>

int main(){

    float si, amount, interest, time;

    printf("Enter Principal Amount: ");
    scanf("%f", &amount);

    printf("Enter Rate of Interest: ");
    scanf("%f", &interest);

    printf("Enter Time: ");
    scanf("%f", &time);

    si = (amount * interest * time) / 100;

    printf("Simple interest: %f", si);
```

```
        return 0;
    }
```

12. WAP. to print area of a triangle.

| Formula

Triangle = $0.5 * Base * Height$

| Test Data

```
Enter BASE and HEIGHT: 15 30
```

| Expected Output

```
Area of Triangle : 225.000000
```

| Source Code

```c
#include <stdio.h>

int main(){

    float area, base, height;

    printf("Enter BASE and HEIGHT: ");
    scanf("%f %f", &base, &height);

    area = 0.5 * base * height;

    printf("Area of Triangle : %f", area);

    return 0;
}
```

13. WAP. to accept marks of 3 subjects of a student, Calculate total of 3 subjects and average in c language

| Formula

Average = $Sanskrit + Hindi + Math/3$

| Test Data

```
Enter Marks of 3 subjects: 75 50 80
```

| Expected Output

```
Total marks: 205.000000
Average marks: 68.333336
```

Source Code

```c
#include <stdio.h>

int main(){

    float sub1, sub2, sub3, average, total;

    printf("Enter marks of 3 subjects: ");
    scanf("%f %f %f", &sub1, &sub2, &sub3);

    total = (sub1 + sub2 + sub3);
    average =  total / 3;

    printf("\nTotal marks: %f", total);
    printf("\nAverage marks: %f", average);

    return 0;
}
```

14. WAP. to input paisa and convert it into rs. and paisa

Test Data

```
Enter paisa:2150
```

Expected Output

```
Total 21 ₹ and 50 Paisa
```

Source Code

```c
#include <stdio.h>

int main(){
    int paisa, rs;

    printf("Enter paisa:");
    scanf("%d", &paisa);

    rs = paisa / 100;
    paisa = paisa % 100;

    printf("Total %d ₹ and %d Paisa", rs, paisa);

    return 0;
}
```

15. WAP. to print the following outputs: `https:\\www.google.com\` in C language

Expected Output

```
Google Link: https:\\www.google.com\
```

Source Code

```c
#include <stdio.h>

int main(){

    printf("Google Link: https:\\\\www.google.com\\ ");

    return 0;
}
```

16. WAP. For Converting Temperature Celsius Into Fahrenheit and Fahrenheit to Celsius

Formula

Fahrenheit = $((9/5) * c) + 32$ // or you can use `1.8` in place of `9/5`

celsius = $(f - 32) \times 5/9$

Test Data

```
Enter Celsius or Fahrenheit: 55
```

Expected Output

```
Celsius to Fahrenheit: 131.000000
Fahrenheit to Celsius: 12.777778
```

Source Code

```c
#include <stdio.h>

int main(){
    float celFah, fahrenheit, celsius;

    printf("\nEnter Celsius or Fahrenheit: ");
    scanf("%f", &celFah);

    fahrenheit = (9.0 / 5.0 * celFah) + 32.0;
    celsius = (celFah - 32.0) * (5.0 / 9.0);
```

```c
    printf("\nCelsius to Fahrenheit: %f", fahrenheit);
    printf("\nFahrenheit to Celsius: %f", celsius);

    return 0;
}
```

17. WAP. to Calculate Gross Salary of an Employee whose dearness allowance is 40% of basic salary and house rent allowance is 20% of basic salary.

Formula

Gross Salary $= b + da + o$

b = *Basic Salary,* **da** = *Dearness Allowance* **o** = *Other Allowance*

Test Data

```
Enter Basic Salary: 20000
```

Expected Output

```
Gross Salary = 32000
```

Source Code

```c
#include <stdio.h>

int main(){

    int gs, bs, da, hra;

    printf("Enter Basic salary: ");
    scanf("%d", &bs);

    da = bs *  40 / 100;
    hra = bs * 20 / 100;
    gs = bs + da + hra;

    printf("Gross Salary = %d \n", gs);

    return 0;
}
```

18. WAP. to print profit and profit percentage. Selling price and cost price is given by user.>

Formula

Profit $= selling - cost$

Profit Percentage $= \frac{profit}{cost} * 100$

```
Enter Selling price and Cost price respectively: 200 150
```

Expected Output

Total Profit = 50% and Profit percentage = 33%

Source Code

```c
int main(){
    int profit, profitPercentage, sellingPrice, costPrice;

    printf("Enter Selling price and Cost price respectively: ");
    scanf("%d %d", &sellingPrice, &costPrice);

    profit = sellingPrice - costPrice;
    profitPercentage = (profit * 100) / costPrice;

    printf("Total Profit = %d%% and Profit percentage = %d%%",
    profit, profitPercentage);

    return 0;
}
```

19. WAP. to calculate the remainder of 2 numbers without using % operator.

Test Data:

```
Enter 2 number: 10 5
```

Expected Output:

```
Remainder = 0
```

Source Code

```c
#include <stdio.h>

int main(){
    int divisor, dividend, remainder, quotient;

    printf("Enter 2 dividend and divisor: ");
    scanf("%d %d", &dividend, &divisor);

    remainder = dividend - divisor * (dividend / divisor);

    printf("\nRemainder = %d", remainder);
```

```
        return 0;
    }
```

20. WAP. that accepts two item's weight (floating points' values) and number of purchase (floating points' values) and calculate the average value of the items.

Test Data :

```
Weight - Item1: 15
No. of item1: 5
Weight - Item2: 25
No. of item2: 4
```

Expected Output:

```
Average Value = 19.444444
```

Source Code

```c
#include <stdio.h>

int main(){
    float weight1, weight2, itemNum1, itemNum2, average;

    printf("Weight - Item1: ");
    scanf("%f", &weight1);

    printf("No. of Item1: ");
    scanf("%f", &itemNum1);

    printf("Weight - Item2: ");
    scanf("%f", &weight2);

    printf("No. of Item1: ");
    scanf("%f", &itemNum2);

    average = (weight1 * itemNum1 + weight2 * itemNum2) / (itemNum1 + itemNum2);

    printf("Average value of the item = %f", average);

    return 0;
}
```

21. WAP. to show swap of two numbers.

```
i) using three variable

ii) without using third variable.
```

iii) swap within a single line.

Input two number a and b: 5 10

Expected Output:

a = 10 and b = 5

Source Code

```c
#include <stdio.h>

int main(){
    int a, b, temp;

    printf("Enter two number a and b:");
    scanf("%d %d", &a, &b);

    // swap two number using third variable.
    // temp = a;
    // a = b;
    // b = temp;

    // Swap two number without using third variable.
    // a = a + b;
    // b = a - b;
    // a = a - b;

    // Swap two number within single line.
    b = a + b - (a = b);

    printf("a = %d and b = %d", a, b);

    return 0;
}
```

22. WAP. to SWAP three numbers (any format).

i) using four variable

ii) without using four variable.

iii) swap within a single line.

Test Data:

Enter 3 number : 5 10 15

```
changed number = 15 5 10
```

Source Code

```c
#include <stdio.h>

int main(){
    int a, b, c, temp;

    printf("Enter 3 number a, b and c: ");
    scanf("%d %d %d", &a, &b, &c);

    // using four variable
    // temp = a;
    // a = b;
    // b = c;
    // c = temp;

    // Without using four variable.
    // a = a + b + c;
    // b = a - b - c;
    // c = a - b - c;
    // a = a - b - c;

    // Swap numbers within a single line.
    a = (temp = a + b + c) - (b = temp - b - c) -
    (c = temp - b - c);

    printf("Changed number = %d %d %d", a, b , c);

    return 0;
}
```

23. WAP. to merge three number. E.g. a= 1, b= 2, c = 8 is 128.

Test Data:

```
Enter 3 number: 1 2 3
```

Expected Output:

```
merge number = 123
```

Source Code

```c
#include <stdio.h>

int main(){
    int a, b, c, merge;
```

```c
    printf("Enter 3 number:\n");
    scanf("%d %d %d", &a, &b, &c);

    merge = a * 10;
    merge = merge + b;
    merge = merge * 10;
    merge = merge + c;

    printf("merge number = %d", merge);

    return 0;
}
```

24 .WAP. to Print the range of a number. E.g. number 78 is between 70 and 79, 102 is between 100 and 109.

Test Data:

```
Enter a number : 78

Enter a number : 102
```

Expected Output:

```
78 number is between 70 and 79

102 number is between 100 and 109
```

Source Code

```c
#include <stdio.h>

int main(){
    int num, x, y;

    printf("Enter a number:");
    scanf("%d", &num);

    x = num / 10 * 10;
    y = x + 9;

    printf("%d number is between %d and %d", num, x, y);

    return 0;
}
```

25. WAP. to input a 3 digit number and reverse it.

Test Data:

```
number = 123
```

```
reverse number = 321
```

Source Code

```c
#include <stdio.h>

int main(){
    int num, rev, rem;

    printf("Enter a 3 digit number: ");
    scanf("%d", &num);

    rem = num % 10;
    num = num / 10;
    rev = rev * 10 + rem;
    rem = num % 10;
    num = num / 10;
    rev = rev * 10 + rem;
    rem = num % 10;
    num = num / 10;
    rev = rev * 10 + rem;

    printf("Reverse number = %d\n", rev);

    return 0;
}
```

26. WAP. to calculate sum of the digits of three digit number.

Test Data

```
Enter a 3 digit number: 123
```

Expected Output

```
Sum = 6
```

Source Code

```c
#include <stdio.h>

int main(){
    int num, sum = 0;

    printf("Enter a number: ");
    scanf("%d", &num);
```

```c
        sum = sum + num % 10;
        num = num / 10;
        sum = sum + num % 10;
        sum = sum + num / 10;

        printf("Sum = %d", sum);

        return 0;
    }
```

27. WAP. to input a 5 digit number and calculate the sum of last and first digit number.

Test Data:

```
number : 12345
```

Expected Output:

```
sum = 6
```

Source Code

```c
#include <stdio.h>

int main(){
    int num, sum;

    printf("Enter a 5 digit number: ");
    scanf("%d", &num);

    sum = (num % 10) + (num / 10000);

    printf("Sum = %d", sum);

    return 0;
}
```

28. WAP. to convert specified days into years, weeks and days.

Note: Ignore leap year.

Test Data

```
Enter number of days: 415
```

Expected Output

```
Years = 1 Weeks = 7 Days = 1
```

```c
#include <stdio.h>

int main(){
    int days, years, weeks;

    printf("Enter number of days: ");
    scanf("%d", &days);

    years = days / 365;
    weeks = (days % 365) / 7;
    days = (days % 365) % 7;

    printf("Years = %d Weeks = %d Days = %d", years, weeks, days);

    return 0;
}
```

29. WAP. to convert a given integer (in seconds) to hours, minutes and seconds.

Test Data :

```
Input seconds: 25300
```

Expected Output:

```
There are:
H:M:S - 7:1:40
```

Source Code

```c
#include <stdio.h>

int main(){
    int seconds, minutes, hours;

    printf("Enter seconds: ");
    scanf("%d", &seconds);

    hours = seconds / 3600;
    seconds = seconds % 3600;
    minutes = seconds / 60;
    seconds = seconds % 60;

    printf("\nThere are:\nH:M:S - %d:%d:%d", hours, minutes, seconds);

    return 0;
}
```

30. WAP. to convert a given integer (in millimeters) to kilometers, meters and centimeters.

```
1 centimeter = 10 millimeters.
1 meter = 100 centimeters.
1 meter = 1,000 millimeters.
1 kilometer = 1,000 meters.
```

Test Data :

```
Input millimeters: 2535220
```

Expected Output:

```
2.53 kilometers
2535.22 Meters
253522.0 Centimeters
```

Source Code

```c
#include <stdio.h>

int main(){
    float millimeters, kilometers, meters, centimeters;

    printf("Enter millimeters:");
    scanf("%f", &millimeters);

    centimeters = millimeters / 10;
    meters = centimeters / 100;
    kilometers = meters / 1000;

    printf("Kilometers = %f Meters = %f Centimeters = %f",
     kilometers, meters, centimeters);

    return 0;
}
```

31. WAP. to read an amount (integer value) and break the amount into smallest possible number of bank notes.

Test Data :

```
Input the amount: 375
```

Expected Output:

```
There are:
3 Note(s) of 100.00
1 Note(s) of 50.00
1 Note(s) of 20.00
0 Note(s) of 10.00
1 Note(s) of 5.00
0 Note(s) of 2.00
0 Note(s) of 1.00
```

Source Code

```c
#include <stdio.h>

int main(){
    int amount, hundred, fifty, twenty, ten, five, two, one;

    printf("Enter amount: ");
    scanf("%d", &amount);

    hundred = amount / 100;
    fifty = (amount % 100) / 50;
    twenty = ((amount % 100) % 50) / 20;
    amount = ((amount % 100) % 50) % 20;
    ten = amount / 10;
    amount = amount % 10;
    five = amount / 5;
    amount = amount % 5;
    two = amount / 2;
    amount = amount % 2;
    one = amount;

    printf("\n%d Note(s) of 100.00", hundred);
    printf("\n%d Note(s) of 50.00", fifty);
    printf("\n%d Note(s) of 20.00", twenty);
    printf("\n%d Note(s) of 10.00", ten);
    printf("\n%d Note(s) of 5.00", five);
    printf("\n%d Note(s) of 2.00", two);
    printf("\n%d Note(s) of 1.00", one);

    return 0;
}
```

32. Write a C program to calculate the distance between the two points

Formula

$$\sqrt{(x_1 - x_2)^2 + (y_1 + y_2)^2}$$

Test Data :

```
Input x1: 25
Input y1: 15
```

```
Input x2: 35
Input y2: 10
```

Expected Output:

```
Distance between the said points: 11.1803
```

Source Code

```c
#include <stdio.h>
#include <math.h>

int main(){
    float x1, x2, y1, y2, distance;

    printf("Enter x1, y1, x2 and y2 respectively:");
    scanf("%f %f %f %f", &x1, &y1, &x2, &y2);

    distance = sqrt(pow((x1 - x2), 2) + pow((y1 - y2), 2));

    printf("The distance between the two points = Square root(%f)", distance);

    return 0;
}
```

33. WAP. to Print the Ascii Value of the Character.

Test Data

```
Enter The Character: c
```

Expected Output

```
Value = 99
```

Source Code

```c
#include <stdio.h>

int main(){
    char a;

    printf("Enter The Character: ");
    scanf("%c", &a);

    printf("Value = %d", a);

    return 0;
}
```

34. WAP. to accept 3 characters and print the sum of their ascii.

```
Enter 3 character: a b c
```

Expected Output

```
Sum of the 3 character = 294
```

Source Code

```c
#include <stdio.h>

int main(){
    char a, b, c;
    int sum;

    printf("Enter 3 character: ");
    scanf("%c %c %c", &a, &b, &c);

    sum = (int)a + (int)b + (int)c;

    printf("Sum of the 3 character = %d", sum);

    return 0;
}
```

35. WAP. to Display The Size of Different Data Types

Data Type	Size (bytes)	Range	Format Specifier
int	2	-2,147,483,648 to 2,147,483,647	%d
long int	4	-2,147,483,648 to 2,147,483,647	%ld
float	4	1.2E-38 to 3.4E+38	%f
double	8	1.7E-308 to 1.7E+308	%lf
long double	12	3.4E-4932 to 1.1E+4932	%Lf
char	1	-128 to 127	%c

Source Code

```c
#include <stdio.h>

int main() {
```

```c
    printf("Size of Int Data Types in C = %2d bytes \n", sizeof(short int));

    printf("Size of Long Int Data Types in C = %2d bytes \n", sizeof(long int));

    printf("Size of Float Data Types in C = %2d bytes \n", sizeof(float));

    printf("Size of Double Data Types in C = %2d bytes \n", sizeof(double));

    printf("Size of Long Double Data Types in C = %2d bytes \n", sizeof(long double));

    printf("Size of Char Data Types in C = %2d bytes \n", sizeof(char));

    return 0;
}
```

If/Else Statement

1. WAP. to print greatest among the two numbers.

Test Data

```
Enter 2 Numbers: 15 20
```

Expected Output

```
Greater number = 20
```

Source Code

```c
#include <stdio.h>

int main(){
    int num1, num2, great;

    printf("Enter 2 numbers: ");
    scanf("%d %d", &num1, &num2);

    if(num1 > num2)
        great = num1;
    else
        great = num2;

    printf("\nGreater number = %d", great);
    return 0;
}
```

2. WAP. to check the given number is positive or negative.

```
Enter a number: 15
```

Expected Output

```
Number is 'Positive'.
```

Source Code

```c
#include <stdio.h>

int main(){
    int num;

    printf("Enter a number:");
    scanf("%d", &num);

    if(num < 0)
        printf("number is 'Negative'.");
    else
        printf("number is 'Positive'.");
    return 0;
}
```

3. WAP. to check the given number is even or odd.

Test Data

```
Enter a number: 12
```

Expected Output

```
number is 'Even'.
```

Source Code

```c
#include <stdio.h>

int main(){
    int num;

    printf("\nEnter a number:");
    scanf("%d", &num);

    if(num % 2 == 0)
        printf("\nnumber is 'Even'.");
    else
```

```
        printf("\nnumber is 'Odd'.");
    return 0;
}
```

4. WAP. to check the person is eligible for vote or not.

Test Data

```
Enter your age: 17
```

Expected Output

```
Your are not eligible for vote.
```

Source Code

```
#include <stdio.h>

int main(){
    int age;

    printf("\nEnter your age:");
    scanf("%d", &age);

    if(age < 18)
        printf("\nYour are not eligible for vote.");
    else
        printf("\nYour are eligible for vote.");
    return 0;
}
```

5. WAP. to input a character and check whether it is vowel or consonant.

Test Data

```
Enter a character: a
```

Expected Output

```
Character is 'Vowel'.
```

Source Code

```
#include <stdio.h>

int main(){
    char ch;
```

```c
    printf("Enter a character:");
    scanf("%c", &ch);

    if(ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u'
    || ch == 'A' || ch == 'E' || ch == 'I' || ch == 'O' || ch == 'U')
        printf("Character is 'Vowel'.");
    else
        printf("Character is 'Consonant'.");

    return 0;
}
```

6. WAP. to check the given year is leap year or not.

Test Data

```
Enter a year: 2023
```

Expected Output

```
Not a leap year
```

Source Code

```c
#include <stdio.h>

int main(){
    int year;

    printf("Enter a year:");
    scanf("%d", &year);

    if(year % 4 == 0 && year % 100 != 0 || year % 400 == 0)
        printf("\nYear is Leap Year.");
    else
        printf("\nYear is Not a Leap Year.");

    return 0;
}
```

7. WAP. to check the given number is buzz number or not.

Buzz number

Buzz numbers are those numbers that are *divisible by 7* or *end with 7*.

Test Data

```
Enter a number: 47
```

```
47 is a Buzz Number.
```

Source Code

```c
#include <stdio.h>

int main(){
    int num;

    printf("\nEnter a number:");
    scanf("%d", &num);

    if(num % 7 == 0 || num % 10 == 7)
        printf("%d is a Buzz number.", num);
    else
        printf("%d is not a Buzz number.", num);

    return 0;
}
```

8. WAP. to input cost and sales price and calculate percentage of profit or loss.

Test Data

```
Enter Cost price and Sales price : 20 45
```

Expected Output

```
Total Profit = 25 and Percentage of Profit =
```

Source Code

```c
#include <stdio.h>

int main(){
    int costPrice, sellingPrice, profit, perProfit, loss, perLoss;

    printf("Enter Cost price and Sales price: ");
    scanf("%d %d", &costPrice, &sellingPrice);

    if(costPrice > sellingPrice){
        loss = costPrice - sellingPrice;
        perLoss = loss * 100 / costPrice;
        printf("\nTotal Loss = %d₹ and Percentage of Loss = %d%%",
        loss, perLoss);
    } else{
```

```
        profit = sellingPrice - costPrice;
        perProfit = profit * 100 / costPrice;
        printf("\nTotal Profit = %d₹ and Percentage of Profit = %d%%",
        profit, perProfit);
    }

    return 0;
}
```

9. WAP. to input two number and check they are proper division or not.

Test Data

```
Enter 2 numbers: 45 90
Enter 2 numbers: 45 5
```

Expected Output

```
They are not a proper division.
They are a proper division.
```

Source Code

```c
#include <stdio.h>

int main(){
    int num1, num2;

    printf("\nEnter 2 number:");
    scanf("%d %d", &num1, &num2);

    if(num1 % num2 == 0)
        printf("\nThey are a proper division.");
    else
        printf("\nThey are not a proper division.");
    return 0;
}
```

10. WAP. to input age and marks. If age >= 18 and marks >= 80 then the student is eligible for admission otherwise not.

Test Data

```
Enter age and marks: 18 85
```

Expected Output

Source Code

```c
#include <stdio.h>

int main(){
    int age, marks;

    printf("\nEnter your age and marks:");
    scanf("%d %d", &age, &marks);

    if(age >= 18 && marks >= 80)
        printf("\nYou are eligible for admission.");
    else
        printf("\nYou are not eligible for admission.");
    return 0;
}
```

11. WAP. to check the given number is perfect square or not.

Test Data

```
Enter a number: 25
```

Expected Output

```
25 is a Perfect Square.
```

Source Code

```c
#include <stdio.h>
#include <math.h>


int main(){
    int num, sqr;

    printf("\nEnter a number:");
    scanf("%d", &num);

    sqr = sqrt(num);

    if(sqr * sqr == num)
        printf("%d is a Perfect Square.", num);
    else
        printf("%d is not a Perfect Square.", num);

    return 0;
}
```

12. WAP. to check the given number is 3 digit number or not.

Test Data

```
Enter a number: 22
```

Expected Output

```
22 is not a 3 digit number
```

Source Code

```c
#include <stdio.h>

int main(){
    int num;

    printf("\nEnter a number:");
    scanf("%d", &num);

    if(num > 99 && num < 1000)
        printf("\n%d is a 3 digit number.", num);
    else
        printf("\n%d is not a 3 digit number.", num);

    return 0;
}
```

13. WAP. to calculate greatest among the 3 numbers.

Test Data

```
Enter 3 numbers: 15 20 25
```

Expected Output

```
Greater number is 25
```

Source Code

```c
#include <stdio.h>

int main(){
    int num1, num2, num3, great;

    printf("\nEnter 3 numbers:");
    scanf("%d %d %d", &num1, &num2, &num3);
```

```c
    if(num1 > num2 && num1 > num3)
        great = num1;
    else if(num1 < num2 && num2 > num3)
        great = num2;
    else
        great = num3;

    printf("Greater number = %d", great);
    return 0;
}
```

14. WAP. to calculate the grade of a student after the input of marks of that student.

> Grade

Percentage >= 90 grade is *'A'*

Percentage >= 70 grade is *'B'*

Percentage >= 50 grade is *'C'*

Percentage >= 35 grade is *'D'*

Percentage < 35 grade is *'F'*

> Test Data

```
Enter marks: 80
```

> Expected Output

```
Grade is 'B'.
```

> Source Code

```c
#include <stdio.h>

int main(){
    int marks;

    printf("\nEnter marks:");
    scanf("%d", &marks);

    if(marks >= 90)
        printf("\nGrade is 'A'.");
    else if(marks >= 70)
        printf("\nGread is 'B'.");
    else if(marks >= 50)
        printf("\nGread is 'C'.");
    else if(marks >= 35)
        printf("\nGread is 'D'.");
```

```
    else
        printf("\nGread is 'F'.");
    return 0;
}
```

15. WAP. to Calculate Telephone Bill:-

calls	Rate/call
First 50 calls	free
next 100 calls	₹3/call
next 200 calls	₹5/call
next 350 calls	₹7/call

Test Data

```
Enter numbers of call: 155
```

Expected Output

```
Total Telephone Bill = 325
```

Source Code

```c
#include <stdio.h>

int main(){
    int calls, totalBill;

    printf("\nEnter numbers of call:");
    scanf("%d", &calls);

    if(calls <= 50)
        totalBill = 0;
    else if(calls > 50 && calls < 150)
        totalBill = (calls - 50) * 3;
    else if(calls > 150 && calls < 350)
        totalBill = 300 + (calls - 150) * 5;
    else
        totalBill = 1300 + (calls - 350) * 7;

    printf("\nTotal Telephone Bill = %d", totalBill);

    return 0;
}
```

16. WAP. to input 3 sides of a triangle and check whether it is possible or not. It possible then check whether the triangle is an equilateral, isosceles or scalene triangle.

| Triangle

- *Equilateral Triangle:* A triangle is considered to be an equilateral triangle *when all three sides have the same length.*
- *Isosceles triangle: When two sides of a triangle are equal or congruent,* then it is called an isosceles triangle.
- *Scalene triangle: When none of the sides of a triangle are equal,* it is called a scalene triangle.

| Test Data

```
Enter 3 sides of a triangle: 2 2 1
```

| Expected Output

```
Isosceles Triangle.
```

| Source Code

```c
#include <stdio.h>

int main(){
    int s1, s2, s3;

    printf("Enter 3 sides of a triangle:");
    scanf("%d %d %d", &s1, &s2, &s3);

    if(s1 + s2 > s3 || s1 + s3 > s2 || s2 + s3 > s1){
        if(s1 == s2 && s2 == s3)
            printf("\nEquilateral Triangle.");
        else if(s1 != s2 && s2 != s3)
            printf("\nScalene Triangle.");
        else
            printf("\nIsosceles Triangle.");
    } else
        printf("\nNot a Valid Triangle.");
    return 0;
}
```

17. WAP. to compute income tax paid by an employee:

Annual Salary	Rate of Income Tax
up to ₹100000	NO TAX
₹100001 to 150000	10% of amount exceeding ₹100000
RS.150001 to ₹250000	₹5000 + 20% of the amount exceeding ₹150000

Annual Salary	Rate of Income Tax
Above ₹250000	₹25000 + 30% of the amount exceeding ₹250000

Test Data

```
Enter your salary: 275000
```

Expected Output

```
Total tax paid by him = 32500.000000
```

Source Code

```c
#include <stdio.h>

int main(){
    float salary, taxableAmount;

    printf("\nEnter your salary:");
    scanf("%f", &salary);

    if(salary < 100000)
        taxableAmount = 0;
    else if(salary > 100000 && salary <= 150000)
        taxableAmount = (salary - 100000) * 10 / 100;
    else if(salary > 150000 && salary <= 250000)
        taxableAmount = 5000 + (salary - 150000) * 20 / 100;
    else
        taxableAmount = 25000 + (salary - 250000) * 30 / 100;

    printf("\nTotal Tax paid by him = %f", taxableAmount);
    return 0;
}
```

18. WAP. to accept three numbers from user and print them in ascending and descending order in c.

Test Data

```
Enter 3 numbers: 3 4 1
```

Expected Output

```
Ascending order = 4 3 1
Descending order = 1 3 4
```

Source Code

```c
#include <stdio.h>

int main(){
    int num1, num2, num3;

    printf("\nEnter 3 numbers: ");
    scanf("%d %d %d", &num1, &num2, &num3);

    if(num1 > num2 && num1 > num3){
        if(num2 > num3){
            printf("\nAscending order: %d %d %d",
            num1, num2, num3);
            printf("\nDescending order: %d %d %d",
            num3, num2, num1);
        } else{
            printf("\nAscending order: %d %d %d",
            num1, num3, num2);
            printf("\nDescending order: %d %d %d",
            num2, num3, num1);
        }
    } else if(num2 > num1 && num2 > num3){
        if(num1 > num3){
            printf("\nAscending order = %d %d %d",
            num2, num1, num3);
            printf("\nDescending order = %d %d %d",
            num3, num1, num2);
        } else {
            printf("\nAscending order = %d %d %d",
            num2, num3, num1);
            printf("\nDescending order = %d %d %d",
            num1, num3, num2);
        }
    } else{
        if(num1 > num2){
            printf("\nAscending order = %d %d %d",
            num3, num1, num2);
            printf("\nDescending order = %d %d %d",
            num2, num1, num3);
        } else{
            printf("\nAscending order = %d %d %d",
            num3, num2, num1);
            printf("\nDescending order = %d %d %d",
            num1, num2, num3);
        }
    }

    return 0;
}
```

19. WAP. to check the given date is correct or not.

Test Data

```
Enter Date month and year e.g.(dd mm yyyy): 29 2 2023
```

29-2-2023 is not a valid date.

```c
#include <stdio.h>

int main(){
    int date, month, year, valid = 0;

    printf("\nEnter Date month and year (dd mm yyyy):");
    scanf("%d %d %d", &date, &month, &year);

    if(year % 4 == 0 && year % 100 != 0 || year % 400 == 0){
        if(month == 2 && (date <= 29 && date >= 1)){
            valid = 1;
        } else {
            valid = 0;
        }
    } else {
        if(month == 2 && (date <= 28 && date >= 1)){
            valid = 1;
        } else {
            valid = 0;
        }
    }

    if(valid == 1 ||
    (((month == 1 || month == 3 || month == 5 || month == 7 || month == 8 ||
     month == 10 || month == 12) && (date <= 31 && date >= 1)) ||
    ((month == 4 || month == 6 || month == 9 || month == 11) &&
     (date <= 30 && date >= 1))))
        printf("\n%d-%d-%d is a Valid Date.",
         date, month, year);
    else
        printf("\n%d-%d-%d is not a Valid Date.",
     date, month, year);

    return 0;
}
```

20. WAP. to input week number and print weekday.

Test Data

Enter Week number: 4

Thursday

```c
#include <stdio.h>

int main(){
    int weekNO;

    printf("\nEnter Week number:");
    scanf("%d", &weekNO);

    if(weekNO == 1)
        printf("\nMonday");
    else if(weekNO == 2)
        printf("\nTuesday");
    else if(weekNO == 3)
        printf("\nWednesday");
    else if(weekNO == 4)
        printf("\nThursday");
    else if(weekNO == 5)
        printf("\nFriday");
    else if(weekNO == 6)
        printf("\nSaturday");
    else if(weekNO == 7)
        printf("\nSunday");
    else
        printf("\nEnter a valid week number.");

    return 0;
}
```

21. WAP. to input month number and print number of days in that month.

Test Data

```
Enter month number: 4
```

Expected Output

```
30 Days
```

Source Code

```c
#include <stdio.h>

int main(){
    int monthNum, flag;

    printf("\nEnter month number:");
    scanf("%d", &monthNum);

    if(monthNum == 1 || monthNum == 3 || monthNum == 5 || monthNum == 7 ||
        monthNum == 8 || monthNum == 10 || monthNum == 12)
        flag = 1;
```

```c
        else if (monthNum == 2)
            flag = 3;
        else if(monthNum == 4 || monthNum == 6
                || monthNum == 9 || monthNum == 11)
            flag = 2;
        else
            flag = 0;


        if(flag == 1)
            printf("\n31 Days");
        else if(flag == 2)
            printf("\n30 Days");
        else if(flag == 3)
            printf("\n28 or 29 Days");
        else
            printf("\nNot a Valid month.");


        return 0;
}
```

22. WAP. to check whether a triangle is valid or not, when the three angles of the triangle are entered through the keyboard.

Condition

A triangle is valid if the sum of all the three angles is *equal to 180 degrees.*

Test Data

```
Enter 3 angles of a triangle: 90 45 45
```

Expected Output

```
Valid Triangle
```

Source Code

```c
#include <stdio.h>

int main(){
    int a1, a2, a3;

    printf("\nEnter 3 angles of a triangle:");
    scanf("%d %d %d", &a1, &a2, &a3);

    if(a1 + a2 + a3 == 180)
        printf("\nValid Triangle");
    else
        printf("\nnot a Valid Triangle");
```

```
        return 0;
}
```

23. WAP. to print the second largest out of three numbers.

```
Enter 3 numbers: 45 99 53
```

```
Second largest number = 53
```

```c
#include <stdio.h>

int main(){
    int num1, num2, num3, secLargest;

    printf("Enter 3 numbers:");
    scanf("%d %d %d", &num1, &num2, &num3);

    if((num1 < num3 || num1 < num2) &&
       (num1 > num2 || num1 > num3))
          secLargest = num1;
    else if((num2 < num3 || num2 < num1) &&
            (num2 > num1 || num2 > num3))
          secLargest = num2;
    else
          secLargest = num3;

    printf("\nSecond Largest number = %d", secLargest);

    return 0;
}
```

24. WAP. to compute the pension of an employee.

If the person is male.

Age	Pension
Age >= 90	pension is 4000
Age >= 60	pension is 6000
Age < 60	pension is 0

If the person is female.

Age	Pension
Age >= 90	pension is 3000
Age >= 60	pension is 5000
Age < 60	pension is 0

Test Data

```
Enter Your Age and Gender: 99 f
```

Expected Output

```
Pension = 3000
```

Source Code

```c
#include <stdio.h>

int main(){
    int age, pension;
    char gender;

    printf("\nEnter Your Age and Gender: ");
    scanf("%d %c", &age, &gender);

    if(age >= 90){
        if(gender == 'm')
            pension = 4000;
        else if(gender == 'f')
            pension = 3000;
        else
            printf("\nEnter a Valid Gender.");
    } else if(age >= 60){
        if(gender == 'm')
            pension = 6000;
        else if(gender == 'f')
            pension = 5000;
        else
            printf("\nEnter a Valid Gender.");
    } else {
        pension = 0;
    }

    printf("\nPension = %d", pension);
    return 0;
}
```

25. WAP. to check whether a 3 digit number is a magic number or not. (Palindrome) A number is a magic number if its reverse is same as the original number.

Enter number 121

Expected Output

121 is a magic number

Source Code

```c
#include <stdio.h>

int main(){
    int num, rev, temp;

    printf("\nEnter a number:");
    scanf("%d", &num);

    temp = num;

    rev = num % 10;
    temp = temp / 10;
    rev = (rev * 10) + temp % 10;
    rev = (rev * 10) + temp / 10;

    printf("%d %d", rev, num);
    if(rev == num)
        printf("\n%d is a magic number.", num);
    else
        printf("\n%d is not a magic number.", num);

    return 0;
}
```

26. WAP. to Find the absolute value of a number entered through the keyboard.

Test Data

Enter a number: 11
Enter a number: -23

Expected Output

Absolute number = 11
Absolute number = 23

Source Code

```c
#include <stdio.h>
```

```c
int main(){
    int num;

    printf("\nEnter a number:");
    scanf("%d", &num);

    if(num < 0)
        num = num * -1;

    printf("Absolute number = %d", num);
    return 0;
}
```

27. WAP. to to accept users marital status, gender and age to check if he/she is eligible for marriage or not.

Test Data

```
Enter MaritalStatus: m (married) / u (unmarried): u
Enter your gender: m (male) / f (female): m
Enter your age: 24
```

Expected Output

```
You can marry!
```

Source Code

```c
#include <stdio.h>

int main(){

    int age;
    char maritalStatus, gender;

    printf("\nEnter MaritalStatus: m (married) / u (unmarried): ");
    scanf(" %c", &maritalStatus);

    printf("\nEnter your gender: m (male) / f (female): ");
    scanf(" %c", &gender);

    printf("\nEnter your age: ");
    scanf(" %d", &age);

    if(maritalStatus == 'm')
        printf("\nYou can not marry!");
    else if(maritalStatus == 'u'){
        if(gender == 'm'){
            if(age >= 21)
                printf("\nYou can marry!");
            else
                printf("\nYou can not marry!");
        } else if(gender == 'f'){
```

```c
            if(age >= 18)
                printf("\nYou can marry!");
            else
                printf("\nYou can not marry!");
        } else
            printf("\nEnter valid gender: ");
    } else
        printf("\nEnter valid Marital Status: ");
    return 0;
}
```

28. WAP. to Count the total numbers of notes in given amount.

Test Data

```
Enter the amount: 375
```

Expected Output

```
2000 = 0
500 = 2
200 = 1
100 = 0
50 = 0
20 = 1
10 = 0
5 = 0
2 = 0
1 = 1
```

Source Code

```c
#include <stdio.h>

int main(){
    int amount, twoThousand = 0, fiveHundred = 0, twoHundred = 0,
    oneHundred = 0, fifty = 0, twenty = 0, ten = 0,
    five = 0, two = 0, one = 0;

    printf("\nEnter amount:");
    scanf("%d", &amount);

    if(amount > 2000){
        twoThousand = amount / 2000;
        amount = amount % 2000;
    }

    if(amount > 500){
        fiveHundred = amount / 500;
        amount = amount % 500;
    }

    if(amount > 200){
        twoHundred = amount / 200;
```

```c
            amount = amount % 200;
    }

    if(amount > 100){
        oneHundred = amount / 100;
        amount = amount % 100;
    }

    if(amount > 50){
        fifty = amount / 50;
        amount = amount % 50;
    }

    if(amount > 20){
        twenty = amount / 20;
        amount = amount % 20;
    }

    if(amount > 10){
        ten = amount / 10;
        amount = amount % 10;
    }

    if(amount > 5){
        five = amount / 5;
        amount = amount % 5;
    }

    if(amount > 2){
        two = amount / 2;
        amount = amount % 2;
    }

    if(amount >= 1){
        one = amount;
    }

    printf("\n2000 = %d", twoThousand);
    printf("\n500 = %d", fiveHundred);
    printf("\n200 = %d", twoHundred);
    printf("\n100 = %d", oneHundred);
    printf("\n50 = %d", fifty);
    printf("\n20 = %d", twenty);
    printf("\n10 = %d", ten);
    printf("\n5 = %d", five);
    printf("\n2 = %d", two);
    printf("\n1 = %d", one);
    return 0;
}
```

29. WAP. to determine whether the given character is a capital letter, a small case letter, a digit or a special symbol.

Hint

ASCII value of the **digit** is between **48 to 58** and **lowercase characters** in the range of **97 to 122**, and **uppercase** is between **65 and 90**, and **special symbol** is between **(32 to 47, 58 to 64, 91 to 96, 123 to 127)**.

Test Data

```
Enter Any Character: c
```

Expected Output

```
Character is 'Lowercase'.
```

Source Code

```c
#include <stdio.h>

int main(){

    char ch;

    printf("Enter Any Character: ");
    scanf("%c", &ch);

    if(ch >= 48 && ch < 58){
        printf("Character is 'Digit'.");
    } else if(ch >= 32 && ch <= 47 || ch >= 58 && ch <= 64
    ||ch >= 91 && ch <= 96 ||ch >= 123 && ch <= 127){
        printf("Character is 'Special Character'.");
    } else if(ch >= 65 && ch <= 90){
        printf("Character is 'UpperCase'.");
    } else if(ch >= 97 && ch <= 121){
        printf("Character is 'Lowercase'.");
    }

    return 0;
}
```

30. WAP. to input the length and breadth of a rectangle, find whether the area of the rectangle is greater than its perimeter.

Test Data

```
Enter the length and breadth of a rectangle: 5 4
```

Expected Output

```
Area of rectangle is greater than its perimeter.
```

Source Code

```c
#include <stdio.h>

int main(){
    int length, breadth, area, perimeter;

    printf("\nEnter the length and breadth of a rectangle:");
    scanf("%d %d", &length, &breadth);

    area = length * breadth;
    perimeter = 2 * (length + breadth);

    if(area > perimeter)
        printf("\nArea is greater than it's perimeter.");
    else
        printf("\nArea is not greater than it's perimeter.");

    return 0;
}
```

31. WAP. to input three points (x1, y1), (x2, y2) and (x3, y3), check if all the three points fall on one straight line.

Test Data

```
Enter points (x1, y1):1 2
Enter points (x2, y2):3 4
Enter points (x3, y3):5 6
```

Expected Output

```
All the three points fall on the straight line:
```

Source Code

```c
#include <stdio.h>

int main(){
    int x1, y1, x2, y2, x3, y3, m, n;

    printf("Enter points (x1, y1):");
    scanf("%d %d", &x1, &y1);

    printf("Enter points (x2, y2):");
    scanf("%d %d", &x2, &y2);

    printf("Enter points (x3, y3):");
    scanf("%d %d", &x3, &y3);

    m = (y2 - y1) / (x2 - x1);
    n = (y3 - y2) / (x3 - x2);

    if(m == n)
        printf("All the three points fall on the straight line:");
```

```
        else
            printf("All 3 points do not lie on the same line\n");

        return 0;
    }
```

32. WAP. to input a point (x, y), find out if it lies on the x-axis, y-axis or at the origin, viz. (0, 0).

| Condition

In point (x, y), if x = 0 and y = 0, then the point lies on the origin. If value of x is zero and y is greater than zero, then the point lies on y-axis. If y is zero and x is greater than zero, then the point lies on x-axis.

| Test Data

```
Enter point (x, y): 35 20
```

| Expected Output

```
Point (35, 20) neither lie on x-axis nor on y-axis
```

| Source Code

```
#include <stdio.h>

int main(){
    int x1, y1;

    printf("Enter (x, y): ");
    scanf("%d %d", &x1, &y1);

    if(x1 == 0 && y1 == 0)
        printf("\nThe point (%d, %d) lies on the origin.", x1, y1);
    else if(x1 == 0 && y1 > 0)
        printf("\nThe point (%d, %d) lies on the y-axis.", x1, y1);
    else if(x1 > 0 && y1 == 0)
        printf("\nThe point (%d, %d) lies on the x-axis.", x1, y1);
    else
        printf("Point (%d, %d) neither lie on x-axis nor on y-axis", x1, y1);
}
```

33. WAP. to check whether a given number is even or odd without using modulo (%) operator

| Test Data:

```
Enter a number: 12
```

```
Even number
```

Source Code

```c
#include <stdio.h>

int main(){
    int num, rem;

    printf("Enter a number: ");
    scanf("%d", &num);

    rem = num - num / 2 * 2;

    if(rem == 0)
        printf("\nEven number");
    else
        printf("\nOdd number");

    return 0;
}
```

34. WAP. An electricity board charges the following rates for the use of electricity:

Unit	Price
first 200 units	Rs. 0.80 per unit
next 100 units	Rs. 0.90 per unit
Beyond 300 units	Rs. 1 per unit

All users are charged a minimum of Rs. 100 as meter charge.

If the total amount is more than Rs. 400, then an additional surcharge of 15% of total amount is charged.

Test Data

```
Enter number of units: 417
```

Expected Output

```
Total Charges = 437.05
```

```c
#include <stdio.h>

int main(){
    float units, price;

    printf("\nEnter number of units: ");
    scanf("%f", &units);

    if(units <= 200 && units > 0)
        price = units * 0.80;
    else if(units <= 300 && units > 200)
        price = 160 + (units - 200) * 0.90;
    else if(units > 300)
        price = 250 + (units - 300) * 1;
    else
        price = 0;

    price = price + 100;

    if(price > 400)
        price = price + (price * 15 / 100);

    printf("\nTotal Charges = %.2f", price);

    return 0;
}
```

Conditional or Ternary Operator

1. WAP. to input a number and print even or odd.

Test Data

```
Enter a number: 5
```

Expected Output

```
5 is a Odd number.
```

Source Code

```c
#include <stdio.h>

int main(){
    int num;

    printf("Enter a number:");
```

```c
    scanf("%d", &num);

    num % 2 == 0 ? printf("Even Number.") : printf("Odd number");

    return 0;
}
```

2. WAP. to find the greatest of the two numbers.

Test Data

```
Enter two number: 5 10
```

Expected Output

```
Greater number = 10
```

Source Code

```c
#include <stdio.h>

int main(){
    int num1, num2, great;

    printf("Enter two number: ");
    scanf("%d %d", &num1, &num2);

    great = num1 > num2 ? num1 : num2;

    printf("Greater number = %d", great);

    return 0;
}
```

3. WAP. to find the greatest of the three numbers.

Test Data

```
Enter Three number: 22 43 10
```

Expected Output

```
Greater number = 43
```

Source Code

```c
#include <stdio.h>

int main(){
    int num1, num2, num3, great;

    printf("\nEnter three number: ");
    scanf("%d %d %d", &num1, &num2, &num3);

    great = num1 > num2 ? num1 > num3 ?
    num1 : num3 : num2 > num3 ? num2 : num3;

    printf("\nGreater number = %d", great);

    return 0;
}
```

4. WAP. using conditional operators to determine whether a year entered through the keyboard is a leap year or not

Test Data

```
Enter a year: 2021
```

Expected Output

```
Not a leap year.
```

Source Code

```c
#include <stdio.h>

int main(){
    int year;

    printf("\nEnter a year:");
    scanf("%d", &year);

    year % 4 == 0 ? printf("\nLeap year.") :
    year % 100 != 0 && year % 400 == 0 ?
    printf("\nLeap year.") : printf("\nNot a Leap year.");

    return 0;
}
```

5. WAP. The cost of one type of mobile service is Rs. 250 plus Rs. 1.25 for each call made over and above 100 calls. print the bill. (ternary operator)

Test Data

```
Enter number of Calls: 200
```

```
Total Bill = 251.25
```

Source Code

```c
#include <stdio.h>

int main(){
    float calls, bill;

    printf("Enter number of Calls: ");
    scanf("%f", &calls);

    bill = calls > 100 ?(250 + (calls - 100) * 1.25 ): 250;

    printf("Total Bill = %.2f", bill);

    return 0;
}
```

6. WAP. to find Whether the character entered through the keyboard is a lower case alphabet or uppercase.

Test Data

```
Enter a character: a
```

Expected Output

```
Character is Lowercase.
```

Source Code

```c
#include <stdio.h>

int main(){
    char ch;

    printf("Enter a character: ");
    scanf("%c", &ch);

    ch >= 65 && ch <= 90 ? printf("Character is Uppercase.") :
    ch >= 97 && ch <= 121 ? printf("Character is Lowercase.") :
    printf("Not a character.");
```

```
    return 0;
}
```

Loop Control Instruction

1. WAP. to print first 10 natural numbers.

| Natural numbers

First 10 Natural Numbers are: *1, 2, 3, 4, 5, 6, 7, 8, 9 and 10*.

| Expected Output

```
1 2 3 4 5 6 7 8 9 10
```

| Source Code

```c
#include <stdio.h>

int main(){

    for(int i = 1; i <= 10; i++){
        printf("%d ", i);
    }

    return 0;
}
```

2. WAP. to print first 10 natural numbers in reverse order.

| Natural numbers

First 10 Natural Numbers are: *1, 2, 3, 4, 5, 6, 7, 8, 9 and 10*.

| Expected Output

```
10 9 8 7 6 5 4 3 2 1
```

| Source Code

```c
#include <stdio.h>

int main(){

    for(int i = 1; i >= 1; i--){
        printf("%d ", i);
    }
```

```c
        return 0;
    }
```

3. WAP. to print first 10 odd natural numbers

Odd numbers

Odd numbers are *not multiples of 2*.

Expected Output

```
1 3 5 7 9 11 13 15 17 19
```

Source Code

```c
#include <stdio.h>

int main(){

    int count = 0;

    for(int i = 1; i <= 100; i++){
        if(i % 2 != 0){
            printf("%d ", i);
            count++;
        }
        if(count == 10)
            break;
    }

    return 0;
}
```

4. WAP. to print first 10 even natural numbers

Even numbers

Even numbers are *multiples of 2*.

Expected Output

```
2 4 6 8 10 12 14 16 18 20
```

Source Code

```c
#include <stdio.h>

int main(){

    int count = 0;
```

```c
    for(int i = 1; i<= 100; i++){
        if(i % 2 == 0){
            printf("%d ", i);
            count++;
        }
        if(count == 10)
            break;
    }

    return 0;
}
```

5. WAP. to print first N natural numbers. Value of N is given by user.

Test Data

```
Enter n number: 15
```

Expected Output

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
```

Source Code

```c
#include <stdio.h>

int main(){
    int n;

    printf("\nEnter n number: ");
    scanf("%d", &n);

    for(int i = 1; i <= n; i++){
        printf("%d ", i);
    }
    return 0;
}
```

6. WAP. to print first N odd natural numbers in reverse order. Value of N is given by user.

Test Data

```
Enter n number: 25
```

Expected Output

```
First 25 Odd numbers in reverse order = 25 23 21 19 17 15 13 11 9 7 5 3 1
```

```c
#include <stdio.h>

int main(){
    int n;

    printf("Enter n number: ");
    scanf("%d", &n);

    printf("\nFirst %d Odd numbers in reverse order = ", n);
    for(int i = n; i >= 1; i--){
        if(i % 2 != 0)
            printf("%d ", i);
    }

    return 0;
}
```

7. WAP. to calculate sum of first N natural numbers. Value of N is given by user.

Test Data

```
Enter n number: 5
```

Expected Output

```
Sum of 5 Natural number = 15
```

Source Code

```c
#include <stdio.h>

int main(){
    int n, sum = 0;

    printf("Enter n number: ");
    scanf("%d", &n);

    for(int i = 1; i <= n; i++){
        sum += i;
    }

    printf("\nSum of %d Natural number = %d", n, sum);
    return 0;
}
```

8. WAP. to calculate factorial of a numbers.

Factorial number

the factorial of 6 is $1*2*3*4*5*6 = 720$

Test Data

```
Enter n number: 6
```

Expected Output

```
Factorial of 6 = 720
```

Source Code

```c
#include <stdio.h>

int main(){
    int n, fact = 1;

    printf("\nEnter a number:");
    scanf("%d", &n);

    for(int i = n; i >= 1; i--){
        fact *= i;
    }

    printf("Factorial of %d = %d", n, fact);

    return 0;
}
```

9. WAP. to calculate x^y. Values of x and y are given by user.

Test Data

```
Enter x and y: 3 5
```

Expected Output

```
Value of x and y = 243
```

Source Code

```c
#include <stdio.h>

int main(){
    int x, y, value = 1;
```

```c
    printf("Enter x and y: ");
    scanf("%d %d", &x, &y);

    for(int i = 1; i <= y; i++){
        value *= x;
    }

    printf("Value of x and y = %d", value);
    return 0;
}
```

10. WAP. to count number of digits in a given number.

Test Data

Enter a number: 123

Expected Output

3 number of digits in a given number.

Source Code

```c
#include <stdio.h>

int main(){
    int count = 0, num;

    printf("Enter a number: ");
    scanf("%d", &num);

    while(num > 0){
        count++;
        num /= 10;
    }

    printf("%d number of digits in a given number.", count);

    return 0;
}
```

11. WAP. to calculate sum of the digits of a given number.

Test Data

Enter a number: 352

Expected Output

```
Sum = 10
```

```c
#include <stdio.h>

int main(){
    int num, sum = 0;

    printf("Enter a number: ");
    scanf("%d", &num);

    while(num > 0){
        sum += num % 10;
        num /= 10;
    }

    printf("Sum = %d", sum);
    return 0;
}
```

12. WAP. to reverse a number.

Test Data

```
Enter a number: 352
```

Expected Output

```
Reverse number = 253
```

Source Code

```c
#include <stdio.h>

int main(){
    int num, rev = 0, rem;

    printf("Enter a number: ");
    scanf("%d", &num);

    while(num > 0){
        rem = num % 10;
        rev = rev * 10 + rem;
        num /= 10;
    }

    printf("Reverse number = %d", rev);

    return 0;
}
```

13. WAP. to check whether the two given numbers are reverse of each other or not.

```
Enter two number: 123 321
```

Expected Output

```
YES
```

Source Code

```c
#include <stdio.h>

int main(){
    int num1, num2, rev = 0;

    printf("Enter a number: ");
    scanf("%d %d", &num1, &num2);

    while(num1 > 0){
        rev = rev * 10 + num1 % 10;
        num1 /= 10;
    }

    (rev == num2) ? printf("YES") : printf("NO");
    return 0;
}
```

14. WAP. to check whether a given number is Prime or not.

Test Data

```
Enter a number: 5
```

Expected Output

```
Prime number
```

Source Code

```c
#include <stdio.h>

int main(){
    int num, flag = 1;
```

```c
        printf("Enter a number: ");
        scanf("%d", &num);

        for(int i = 2; i <= num / 2; i++){
            if(num % i == 0){
                flag = 0;
                break;
            }
        }

        if(num == 1)
            flag = 0;

        if(flag == 1)
            printf("Prime number");
        else
            printf("Not a Prime number");
        return 0;
}
```

15. WAP. to print all prime numbers between two given numbers.

Test Data

```
Enter the range between two number: 25 50
```

Expected Output

```
29 31 37 41 43 47
```

Source Code

```c
#include <stdio.h>

int main(){
    int n1, n2, flag;

    printf("Enter the range between two numbers: ");
    scanf("%d %d", &n1, &n2);

    printf("\nPrime numbers in the given range are = ");
    for(int i = n1; i <= n2; i++){
        flag = 1;
        for(int j = 2; j <= i / 2; j++){
            if(i % j == 0){
                flag = 0;
                break;
            }
        }
        if(i == 1)
            flag = 0;
        if(flag == 1)
            printf("%d ", i);
    }
```

```c
    return 0;
}
```

16. WAP. to print all prime numbers in first 1000 natural numbers.

Source Code

```c
#include <stdio.h>

int main(){
    int flag;

    printf("\nPrime numbers = ");
    for(int i = 1; i <= 1000; i++){
        flag = 1;
        for(int j = 2; j <= i / 2; j++){
            if(i % j == 0){
                flag = 0;
                break;
            }
        }
        if(i == 1)
            flag = 0;
        if(flag == 1)
            printf("%d ", i);
    }

    return 0;
}
```

17. WAP. to find GCD of two numbers.

Greatest Common Divisor - GCD

Find the **GCD** of **15 and 20.**

```
Factor of 15 = 1, 3, 5, 15
Factor of 20 = 1, 2, 4, 5, 10, 20

GCD of 15 and 20 = 5
```

Test Data

```
Enter two numbers:  36 60
```

Expected Output

```
GCD = 12
```

```c
#include <stdio.h>

int main(){
    int num1, num2, smaller, gcd;

    printf("\nEnter two numbers: ");
    scanf("%d %d", &num1, &num2);

    smaller = num1;

    if(num1 > num2)
        smaller = num2;

    while(smaller != 0){
        if(num1 % smaller == 0 && num2 % smaller == 0){
            gcd = smaller;
            break;
        }
        smaller--;
    }

    printf("\nGCD = %d", gcd);

    return 0;
}
```

18. WAP. to find LCM of two numbers.

Test Data

```
Enter two number: 12 52
```

Expected Output

```
LCM = 156
```

Source Code

```c
#include <stdio.h>

int main(){
    int num1, num2, greater, lcm;

    printf("Enter two number: ");
    scanf("%d %d", &num1, &num2);

    greater = num1;

    if(num1 < num2)
        greater = num2;
```

```c
    while(1){
        if(greater % num1 == 0 && greater % num2 == 0){
            lcm = greater;
            break;
        }
        greater++;
    }

    printf("LCM = %d", lcm);

    return 0;
}
```

19. WAP. to print the following 1, 4, 7, 10 ..... 40.

Expected Output

```
1 4 7 10 13 16 19 22 25 28 31 34 37 40
```

Source Code

```c
#include <stdio.h>

int main(){
    int i = 1;

    while(i <= 40){
        printf("%d ", i);
        i += 3;
    }

    return 0;
}
```

20. WAP. to print the following 1, -4, 7, -10 ..... -40.

Expected Output

```
1 -4 7 -10 13 -16 19 -22 25 -28 31 -34 37 -40
```

Source Code

```c
#include <stdio.h>

int main(){
    int i = 1, s = 1;

    while(i <= 40){
        printf("%d ",i * s);
        i += 3;
```

```
        s *= -1;
    }

    return 0;
}
```

21. WAP. to print table of a given number.

```
Enter a number: 19
```

Expected Output

```
19 x 1 = 19
19 x 2 = 38
19 x 3 = 57
19 x 4 = 76
19 x 5 = 95
19 x 6 = 114
19 x 7 = 133
19 x 8 = 152
19 x 9 = 171
19 x 10 = 190
```

Source Code

```c
#include <stdio.h>

int main(){
    int n, i = 1;

    printf("Enter a number: ");
    scanf("%d", &n);

    while(i <= 10){
        printf("\n%d x %d = %d", n, i, n * i);
        i++;
    }

    return 0;
}
```

22. WAP. to find a 3 digit number is Armstrong or not. (without using pow function)

Armstrong number

0, 1, 153, 370, 371 and 407 are the Armstrong numbers.

$153 = 1*1*1 + 5*5*5 + 3*3*3$

$153 = 1 + 125 + 27$

$153 = 153$

Test Data

```
Enter a number: 153
```

Expected Output

```
153 is a Armstrong number
```

Source Code

```c
#include <stdio.h>

int main(){
    int num, rem, arm = 0, temp;

    printf("Enter a number: ");
    scanf("%d", &num);

    temp = num;

    while(temp != 0){
        rem = temp % 10;
        arm += rem * rem * rem;
        temp /= 10;
    }

    if(num == arm)
        printf("%d is a Armstrong number.", num);
    else
        printf("%d is not a Armstrong number.", num);


    return 0;
}
```

23. WAP. to Find Number Is Armstrong Or Not

Armstrong number

0, 1, 153, 370, 371 and 407 are the Armstrong numbers.

$153 = 1*1*1 + 5*5*5 + 3*3*3$

$153 = 1 + 125 + 27$

$153 = 153$

```
Enter a number: 9474
```

Expected Output

```
9474 is a Armstrong number
```

Source Code

```c
#include <stdio.h>
#include <math.h>

int main(){
    int n, count = 0, temp, arm = 0, rem;

    printf("Enter a number: ");
    scanf("%d", &n);

    temp = n;

    while(temp != 0){
        count++;
        temp /= 10;
    }

    temp = n;

    while(temp != 0){
        rem = temp % 10;
        arm += pow(rem, count);
        temp /= 10;
    }

    printf("Arm = %d n = %d", arm, n);

    if(arm == n)
        printf("%d is a Armstrong number.", n);
    else
        printf("%d is not an Armstrong number.", n);

    return 0;
}
```

24. WAP. to check whether it is a Palindrome number or not.

Palindrome number

that remains the *same when its digits are reversed.*

Test Data

```
Enter a number: 35153
```

Expected Output

```
35153 is a Palindrome number
```

Source Code

```c
#include <stdio.h>

int main(){
    int num, rev = 0, rem, temp;

    printf("Enter a number: ");
    scanf("%d", &num);

    temp = num;

    while(temp != 0){
        rem = temp % 10;
        rev = rev * 10 + rem;
        temp /= 10;
    }

    if(rev == num)
        printf("%d is a Palindrome number.", num);
    else
        printf("%d is not a Palindrome number.", num);

    return 0;
}
```

25. WAP. to print Armstrong number between 1 to 1000.

Test Data

```
Enter the value of n: 10000
```

Expected Output

```
1 2 3 4 5 6 7 8 9 153 370 371 407 1634 8208 9474
```

Source Code

```c
#include <stdio.h>
#include <math.h>

int main(){
    int n, count = 0, temp, rem, arm = 0;
```

```c
        printf("Enter the value of n: ");
        scanf("%d", &n);

        for(int i = 1; i <= n; i++){
            arm = 0;
            count = 0;
            temp = i;
            while(temp != 0){
                count++;
                temp /= 10;
            }
            temp = i;
            while(temp != 0){
                rem = temp % 10;
                arm += pow(rem, count);
                temp /= 10;
            }

            if(i == arm)
                printf("%d ", i);


        }
        return 0;
}
```

26. WAP. to print n fibonacci series.

Fibonacci numbers

The Fibonacci numbers are the numbers in the following integer sequence: *0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, ...*

Test Data

```
Enter the value of n: 5
```

Expected Output

```
0 1 1 2 3
```

Source Code

```c
#include <stdio.h>

int main(){
    int n, n1 = 0, n2 = 1, sum = 0;

    printf("Enter the value of n: ");
    scanf("%d", &n);

    for(int i = 0; i <= n; i++){
        if(i <= 1)
            printf("%d ", i);
```

```
        else{
            sum = n1 + n2;
            n1 = n2;
            n2 = sum;
            printf("%d ", sum);
        }
    }

    return 0;
}
```

27. WAP. to print n Square number series ex:- 1, 4, 9, 16, 25, 36, 48;

Test Data

```
Enter the value of n: 6
```

Expected Output

```
1, 4, 9, 16, 25, 36
```

Source Code

```
#include <stdio.h>

int main(){
    int n;

    printf("Enter the value of n: ");
    scanf("%d", &n);

    for(int i = 1; i <= n; i++){
        printf("%d ", i * i);
    }

    return 0;
}
```

28. WAP. to print the following series 1, 8, 27, 64, 125 , 216....

Test Data

```
Enter the value of n: 5
```

Expected Output

```
1 8 27 64 125
```

```c
#include <stdio.h>

int main(){
    int n;

    printf("Enter the value of n: ");
    scanf("%d", &n);

    for(int i = 1; i <= n; i++){
        printf("%d ", i * i * i);
    }

    return 0;
}
```

29. WAP. to print the following 1, -1, 1, -1, 1, ...

Test Data

```
Enter the value of n: 5
```

Expected Output

```
1 -1 1 -1 1
```

Source Code

```c
#include <stdio.h>

int main(){
    int n, num = 1;

    printf("Enter the value of n: ");
    scanf("%d", &n);

    for(int i = 1; i <= n; i++){
        printf("%d ", num);
        num *= -1;
    }

    return 0;
}
```

30. WAP. to print the following 1, 1, 2, 4, 7, 13, 24, ... (Lucas series)

Test Data

```
Enter the value of n: 5
```

Expected Output

```
1 1 2 4 7
```

Source Code

```c
#include <stdio.h>

int main(){
    int n, n1 = 1, n2 = 1, n3 = 0, temp;

    printf("Enter the value of n: ");
    scanf("%d", &n);

    for(int i = 1; i <= n; i++){
        if(i <= 2){
            printf("%d ", 1);
        } else {
            temp = n1 + n2 + n3;
            n3 = n2;
            n2 = n1;
            n1 = temp;

            printf("%d ", n1);
        }
    }
    return 0;
}
```

Hi 👋, I'm Rajiv Kumar

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