Datatypes and operators in C

```
/****************************************
WAP to find the size of all the datatypes.
****************************************/

#include <stdio.h>
void main()
{
    int i=10;
    char ch='n';
    float f=15.8;
    double d=18.8;
    short int s=260;
    long int l=125;
    long long int p=300;
    printf("%ld\n",sizeof(i));
    printf("%ld\n",sizeof(ch));
    printf("%ld\n",sizeof(f));
    printf("%ld\n",sizeof(d));
    printf("%ld\n",sizeof(s));
    printf("%ld\n",sizeof(l));
    printf("%ld\n",sizeof(p));
    //printf("N=%d\n",ch);
}

O/P:
        4
        1
        4
        8
        2
        8
        8


/************************************************
WAP to calculate the total distance between A and B.
************************************************/

#include<stdio.h>
void main()
{
    //int x,y,z;
    /*
    x=160;
    printf("Distance between A and C is:%d\n",x);
    y=50;
    printf("Distance between C and B is:%d\n",y);
```

```
    z=x+y;
    printf("Total distance between A and B is:%d\n",z);
        */

    /*
    printf("Distance between A and C is:%d\n",x=160);
    printf("Distance between C and B is:%d\n",y=50);
    printf("Total distance between A and B is:%d\n",z=x+y);
    */

    /*
    printf("Enter the distance between A and C:\n");
    scanf("%d",&x);
    printf("Enter the distance between C and B:\n");
    scanf("%d",&y);
    //z=x+y;
    //printf("Total distance between A and B is:%d\n",z);
    printf("Total distance between A and B is:%d\n",z=x+y);
    */

    unsigned char x=160;
        unsigned char y=50;
        unsigned char z=x+y;
        printf("Address of x=%p Address of y=%p Address of z=%p\n",&x,&y,&z);
        printf("Total distance between A and B is:%d\n",z);
}

O/P:
        Address of x=0x7ffcfc082e65 Address of y=0x7ffcfc082e66 Address of
z=0x7ffcfc082e67
    Total distance between A and B is:210


/*********************************************************************
WAP to showcase the usage of all the arithmetic operators on two defined operands.
*********************************************************************/

#include<stdio.h>
void main()
{
    unsigned char i=20,j=10,k;
    printf("k=%d\n",k=i+j);
    printf("k=%d\n",k=i-j);
    printf("k=%d\n",k=i*j);
    printf("k=%d\n",k=i/j);
    printf("k=%d\n",k=i%j);
    printf("k=%d\n",++k);
    printf("k=%d\n",--k);
    printf("k=%d\n",k++);
    printf("k=%d\n",k--);
```

```
}

O/P:
        k=30
        k=10
        k=200
        k=2
        k=0
        k=1
        k=0
        k=0
        k=1


/*****************************************************************************
WAP to showcase the usage of all the relational operators on two defined operands.
*****************************************************************************/

#include<stdio.h>
void main()
{
  int a = 50, b = 60;
  printf("a < b: %d \n", a<b);
  printf("a > b: %d \n", a>b);
  printf("a <= b: %d \n", a<=b);
  printf("a >= b: %d \n", a>=b);
  printf("a != b: %d \n", a!=b);
  printf("a == b: %d \n", a==b);
}

O/P:
        a < b: 1
        a > b: 0
        a <= b: 1
        a >= b: 0
        a != b: 1
        a == b: 0

/*****************************************
WAP to check whether the number is even or odd.
*****************************************/

#include<stdio.h>
void main()
{
    int num;
    printf("Enter the num:\n");
    scanf("%d",&num);
    if(num&1)
        printf("odd\n");
```

```
    else
        printf("even\n");
}

O/P:
        Enter the num:
        99
        odd

        Enter the num:
        54
        even


/*************************************************************************
***
WAP to perform addition, subtraction, multiplication, division, and modulus
operations
on two user-provided integers.
*************************************************************************
***/

#include<stdio.h>
void main()
{
    int i,j,k;
    printf("Enter the two numbers:\n");
    scanf("%d %d",&i,&j);
    k=i+j;
    printf("Addition of two numbers is %d",k);
    k=i-j;
    printf("\nSubtraction of two numbers is %d",k);
    k=i*j;
    printf("\nMultiplication of two numbers is %d",k);
    k=i/j;
    printf("\nDivision of two numbers is %d",k);
    k=i%j;
    printf("\nModulus of two numbers is %d",k);
}

O/P:

        Enter the two numbers:
        4 2
        Addition of two numbers is 6
        Subtraction of two numbers is 2
        Multiplication of two numbers is 8
        Division of two numbers is 2
        Modulus of two numbers is 0
```

```
/*****************************************************************
WAP to calculate the average of five integers provided by the user.
*****************************************************************/

#include<stdio.h>
void main()
{
    int i,j,k,l,m,avg;
    printf("Enter the 5 integers:\n");
    scanf("%d %d %d %d %d",&i,&j,&k,&l,&m);
    avg=(i+j+k+l+m)/5;
    printf("Average of 5 integers is %d",avg);

}
```

O/P:

```
        Enter the 5 numbers:
        5 4 8 6 2
        Average of 5 integers is 5
```

```
/*****************************************************************************
*********
WAP to compute and display the area and perimeter of a rectangle given its length
and width.
*****************************************************************************
********/

#include<stdio.h>
void main()
{
    int l,w,a,p;
    printf("Enter the length and width:\n");
    scanf("%d %d",&l,&w);
    a=l*w;
    printf("Area=%d",a);
    p=2*(l+w);
    printf("\nPerimeter=%d",p);
}
```

O/P:

```
        Enter the length and width:
        5 3
        Area=15
        Perimeter=16
```

```
/*****************************************************************************
********
```

```
WAP to calculate the compound interest using the formula: A=P×(1+(r/100))^n, where
P is the
principal, r is the rate of interest, and n is the time period.
*************************************************************************
********/

#include<stdio.h>
#include<math.h>
void main()
{
    double P,r,A,C;
    int n;
    printf("Enter the principal amount:\n");
    scanf("%lf",&P);
    printf("Enter the rate of interest:\n");
    scanf("%lf",&r);
    printf("Enter the time period:\n");
    scanf("%d",&n);
    A=P*pow(1+(r/100),n);
    printf("The amount is %lf",A);
    C=A-P;
    printf("\nThe compound interest is %lf",C);
}

O/P:
        Enter the principal amount:
        5000
        Enter the rate of interest:
        50
        Enter the time period:
        5
        The amount is 37968.750000
        The compound interest is 32968.750000


/*************************************************************************
****
WAP to convert a temperature from Celsius to Fahrenheit using the
formula:F=(9/5)*C+32.
*************************************************************************
***/

#include<stdio.h>
void main()
{
        float c,f;
    printf("Enter temperature in Celsius:\n");
    scanf("%f",&c);
    f=(9.0/5.0)*c+32;
    printf("%f Celsius is equal to %f Fahrenheit\n",c,f);
```

```
}

O/P:
        Enter temperature in Celsius:
        25
        25.000000 Celsius is equal to 77.000000 Fahrenheit


/*************************************************************************
****
WAP to swap the values of two variables without using a third variable, relying
only on
arithmetic operations.
*************************************************************************
***/

#include<stdio.h>
void main()
{
    int n1,n2;
    printf("Enter the n1 and n2:\n");
    scanf("%d %d",&n1,&n2);
    printf("Before swap n1=%d n2=%d\n",n1,n2);
    n1=n1+n2;
    n2=n1-n2;
    n1=n1-n2;
    printf("After swap n1=%d n2=%d\n",n1,n2);
}

O/P:
        Enter the n1 and n2:
        5 4
        Before swap n1=5 n2=4
        After swap n1=4 n2=5


/*************************************************************
WAP to find the sum of the digits of a given three-digit number.
*************************************************************/

#include<stdio.h>
void main()
{
    int n,m,sum=0,a,b,c;
    printf("Enter the 3 digit number:\n");
    scanf("%d",&n);
    if(n>100 && n<999)
    {
        a=n/100;
        b=((n%100)/10);
```

```
        c=n%10;
        sum=a+b+c;
        printf("Sum:%d",sum);
    }
    else
        printf("Invalid number");
}

O/P:
        Enter the 3 digit number:
        454
        Sum:13

        Enter the 3 digit number:
        4547
        Invalid number


/*************************************************************************
***
WAP to calculate the hypotenuse of a right triangle given the lengths of the other
two
sides using the formula:C = root over of (a^2 + b^2).
*************************************************************************
**/

#include<stdio.h>
#include<math.h>
void main()
{
    double a,b,c;
    printf("Enter the lengths of 2 sides:\n");
    scanf("%lf %lf",&a,&b);
    c=sqrt((a*a)+(b*b));
    printf("Hypotenuse=%lf",c);
}

O/P:
        Enter the lengths of 2 sides:
        3 4
        Hypotenuse=5.000000


/*************************************************************************
********
WAP to calculate the circumference and area of a circle given its radius. Use the
formulas:
Area: (pi)r^2 , Circumference: 2(pi)r.
*************************************************************************
*******/
```

```
#include <stdio.h>
#define PI 3.141
void main()
{
    float r,a,c;
    printf("Enter the radius of the circle:\n");
    scanf("%f",&r);
    a=PI*r*r;
    printf("Area of the circle:%f\n",a);
    c=2*PI*r;
    printf("Circumference of the circle:%f\n",c);
}

O/P:
        Enter the radius of the circle:
        4
        Area of the circle:50.256001
        Circumference of the circle:25.128000


/*************************************************************************
*******
WAP to calculate the profit or loss made on a transaction given the cost price and
selling
price of an item.
*************************************************************************
******/

#include<stdio.h>
#include<math.h>
void main()
{
    float cp,sp,r;
    printf("Enter the cost price:");
    scanf("%f",&cp);
    printf("Enter the selling price:");
    scanf("%f",&sp);
    if (sp>cp)
    {
        r=sp-cp;
        printf("Profit:%f\n",r);
    }
    else if(sp<cp)
    {
        r=cp-sp;
        printf("Loss:%f\n",r);
    }
    else
        printf("No profit,no loss\n");
```

```
}

O/P:
        Enter the cost price:500
        Enter the selling price:600
        Profit:100.000000

        Enter the cost price:700
        Enter the selling price:500
        Loss:200.000000

        Enter the cost price:400
        Enter the selling price:400
        No profit,no loss


/*************************************************************************
*****
WAP to check if two integers are equal, not equal, greater than, or less than each
other
using relational operators.
*************************************************************************
****/

#include<stdio.h>
void main()
{
    int n1,n2;
    printf("Enter the two integers:\n");
    scanf("%d %d",&n1,&n2);
    if(n1 == n2)
        printf("%d is equal to %d\n",n1,n2);
    else if(n1 != n2)
        printf("%d is not equal to %d\n",n1,n2);
    if(n1 > n2)
        printf("%d is greater than %d\n",n1,n2);
    else if(n1 < n2)
        printf("%d is less than %d\n",n1,n2);
}

O/P:
        Enter the two integers:
        5 4
        5 is not equal to 4
        5 is greater than 4


/*************************************************************************
**
WAP to determine whether a person is eligible to vote based on their age (age must
```

```
be
greater than or equal to 18).
*******************************************************************************
*/

#include<stdio.h>
void main()
{
    int age;
    printf("Enter the age:\n");
    scanf("%d",&age);
    if(age>=18)
        printf("Eligible to vote\n");
    else
        printf("Not eligible to vote\n");
}

O/P:
        Enter the age:
        15
        Not eligible to vote

        Enter the age:
        21
        Eligible to vote


/*******************************************************************************
******
WAP to given three sides of a triangle, use relational operators to check if the
triangle
is valid (the sum of any two sides must be greater than the third side).
*******************************************************************************
*****/

#include <stdio.h>
void main()
{
    float a,b,c;
    printf("Enter the three sides of the triangle:");
    scanf("%f %f %f",&a,&b,&c);
    if ((a+b>c) && (a+c>b) && (b+c>a))
        printf("Triangle is valid\n");
    else
        printf("Triangle is not valid\n");
}

O/P:
        Enter the three sides of the triangle:
        2 5 8
```

```
        Triangle is not valid

        Enter the three sides of the triangle:
        3 4 5
        Triangle is valid


/**************************************************************************
*****
WAP to compare the marks of two students to determine who scored higher, or if they
have
the same marks.
**************************************************************************
****/

#include<stdio.h>
void main()
{
    int m1,m2;
    printf("Enter the marks of two students:\n");
    scanf("%d %d",&m1,&m2);
    if (m1>m2)
        printf("First student scored higher\n");
    else if (m2>m1)
        printf("Second student scored higher\n");
    else
        printf("Both students scored the same marks\n");
}

O/P:
        Enter the marks of two students:
        50 60
        Second student scored higher

        Enter the marks of two students:
        70 40
        First student scored higher

        Enter the marks of two students:
        30 30
        Both students scored the same marks


/**************************************************************************
******
WAP to compare three numbers and determine the largest number using relational
operators.
**************************************************************************
*****/
```

```
#include<stdio.h>
void main()
{
    int n1,n2,n3;
    printf("Enter the 3 numbers:\n");
    scanf("%d %d %d",&n1,&n2,&n3);
    if (n1>=n2 && n1>=n3)
        printf("The largest number is:%d\n",n1);
    else if (n2>=n1 && n2>=n3)
        printf("The largest number is:%d\n",n2);
    else
        printf("The largest number is:%d\n",n3);
}
```

O/P:

```
        Enter the 3 numbers:
        4 8 6
        The largest number is:8
```

```
/*************************************************************************
******
WAP use relational operators to determine if a given year is a leap year (divisible
by 4
but not by 100 unless divisible by 400).
*************************************************************************
*****/

#include<stdio.h>
void main()
{
    int year;
    printf("Enter a year:\n");
    scanf("%d", &year);
    if ((year%4 == 0 && year%100 != 0) || (year%400 == 0))
        printf("%d is a leap year\n", year);
    else
        printf("%d is not a leap year\n", year);
}
```

O/P:

```
        Enter a year:
        2024
        2024 is a leap year

        Enter a year:
        2022
        2022 is a leap year
```

```
/*********************************************************************************
*****
WAP to check if the temperature exceeds a threshold value (e.g., greater than 40
degrees
Celsius) and display an alert message.
*********************************************************************************
****/

#include<stdio.h>
void main()
{
    float temp,t=40.0;
    printf("Enter the temperature in Celsius:\n");
    scanf("%f",&temp);
    if(temp>t)
        printf("Alert:Temperature is exceeded\n");
    else
        printf("Temperature is within the range\n");
}

O/P:
        Enter the temperature in Celsius:
        45
        Alert:Temperature is exceeded

        Enter the temperature in Celsius:
        39
        Temperature is within the range


/*********************************************************************************
WAP given the length of a password, check if it meets the minimum requirement of 8
characters using relational operators.
*********************************************************************************/

#include<stdio.h>
void main()
{
    int len;
    printf("Enter the length of the password:\n");
    scanf("%d",&len);
    if(len>=8)
        printf("Password meets the minimum length requirement\n");
    else
        printf("Password does not meet the minimum length requirement\n");
}

O/P:
        Enter the length of the password:
```

```
        9
        Password meets the minimum length requirement

        Enter the length of the password:
        4
        Password does not meet the minimum length requirement


/*************************************************************************
WAP to determine if one number is divisible by another using relational operators.
*************************************************************************/

#include<stdio.h>
void main()
{
    int m,n;
    printf("Enter the two numbers:\n");
    scanf("%d %d",&m,&n);
    if(n==0)
        printf("Division by zero is not allowed\n");
    else if(m%n==0)
        printf("One number is divisible by another\n");
    else
        printf("One number is not divisible by another\n");
}

O/P:
        Enter the two numbers:
        4 2
        One number is divisible by another

        Enter the two numbers:
        5 3
        One number is not divisible by another

        Enter the two numbers:
        8 0
        Division by zero is not allowed


/*************************************************************************
WAP to check if a student meets the criteria for admission to a course based on
their age (greater than or equal to 18) and marks (greater than or equal to 50).
*************************************************************************/

#include<stdio.h>
void main()
{
    int age;
    float marks;
```

```
    printf("Enter the student's age:\n");
    scanf("%d",&age);
    printf("Enter the student's marks:\n");
    scanf("%f",&marks);
    if (age>=18 && marks>=50)
        printf("Student meets the criteria for admission\n");
    else
        printf("Student does not meet the criteria for admission\n");
}
```

O/P:

```
        Enter the student's age:
        21
        Enter the student's marks:
        60
        Student meets the criteria for admission

        Enter the student's age:
        18
        Enter the student's marks:
        49
        Student does not meet the criteria for admission
```