

Lab no: 1 – SIMPLE C PROGRAMS

Q1. Write a C program to add two integers a and b read through the keyboard. Display the result using third variable sum.

Program:

```
/* Computing the sum of two numbers */  
  
#include <stdio.h>  
  
#include <stdlib.h>  
  
int main()  
{  
    printf("Name : MANOJ M MALLYA\n\n");  
    int a,b,sum;  
    printf("Enter two integers : ");  
    scanf("%d %d",&a,&b);  
    sum = (a+b); // sum  
    printf("\nThe sum of %d and %d is %d\n",a,b,sum);  
    return 0;  
}
```

Output:



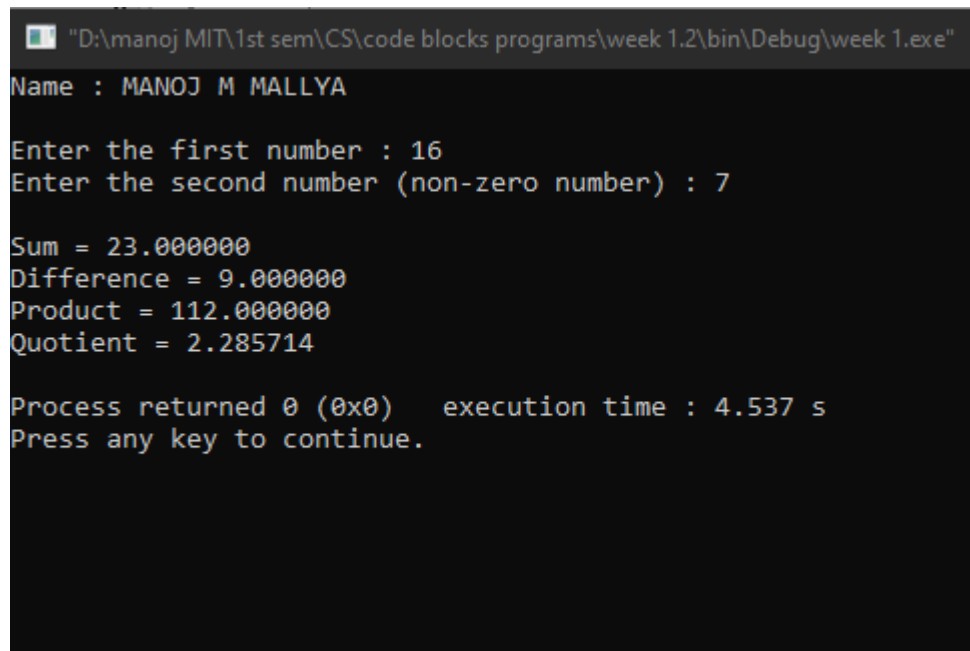
```
"D:\manoj MIT\1st sem\CS\code blocks programs\week 1.1\bin\Debug\week 1.exe"  
Name : MANOJ M MALLYA  
  
Enter two integers : 27 34  
  
The sum of 27 and 34 is 61  
  
Process returned 0 (0x0)   execution time : 12.872 s  
Press any key to continue.
```

Q2. Write a C program to find the sum, difference, product and quotient of 2 numbers.

Program:

```
/* Finding the sum, difference, product and quotient of 2 numbers */  
  
#include <stdio.h>  
  
#include <stdlib.h>  
  
int main()  
{  
    printf("Name : MANOJ M MALLYA\n\n");  
    double a,b;  
    double sum,difference,product,quotient;  
    printf("Enter the first number : ");  
    scanf("%lf",&a);  
    printf("Enter the second number (non-zero number) : ");  
    scanf("%lf",&b);  
    sum = a + b;  
    difference = a - b;  
    product = a * b;  
    quotient = a / b ;  
    printf("\nSum = %lf \nDifference = %lf \nProduct = %lf \nQuotient =  
%lf\n",sum,difference,product,quotient);  
    return 0;  
}
```

Output:

A screenshot of a terminal window showing the output of a C program. The window title is "D:\manoj MIT\1st sem\CS\code blocks programs\week 1.2\bin\Debug\week 1.exe". The output text is as follows:

```
Name : MANOJ M MALLYA

Enter the first number : 16
Enter the second number (non-zero number) : 7

Sum = 23.000000
Difference = 9.000000
Product = 112.000000
Quotient = 2.285714

Process returned 0 (0x0)   execution time : 4.537 s
Press any key to continue.
```

Q3. Write a C program to print the ASCII value of a character.

Program:

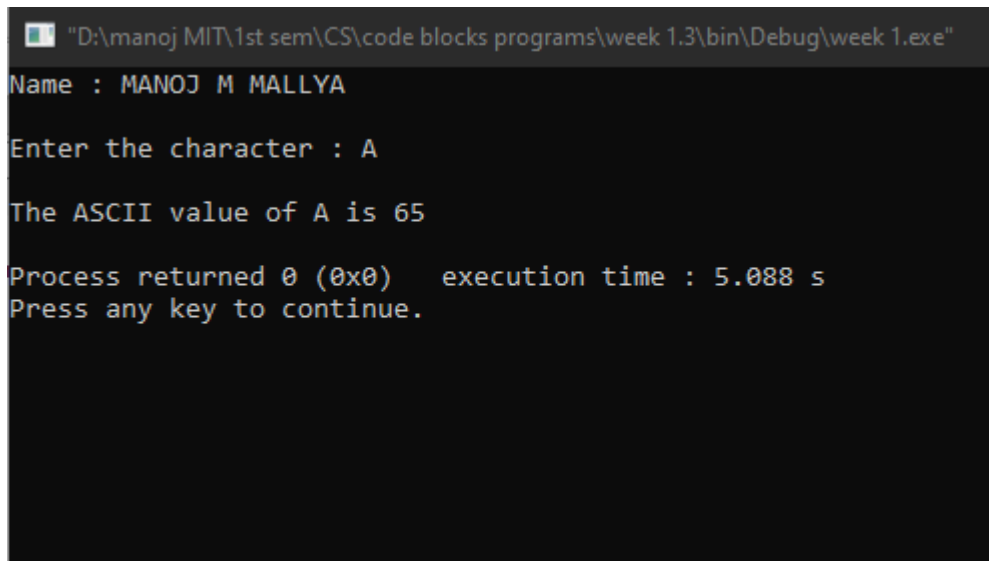
```
/* Printing the ASCII value of a character */

#include <stdio.h>

#include <stdlib.h>

int main()
{
    printf("Name : MANOJ M MALLYA\n\n");
    char letter;
    printf("Enter the character : ");
    scanf("%c",&letter);
    printf("\nThe ASCII value of %c is %d\n",letter,letter);
    return 0;
}
```

Output:



```
"D:\manoj MIT\1st sem\CS\code blocks programs\week 1.3\bin\Debug\week 1.exe"
Name : MANOJ M MALLYA
Enter the character : A
The ASCII value of A is 65
Process returned 0 (0x0) execution time : 5.088 s
Press any key to continue.
```

Q4. Write a C program to display the size of the data type int, char, float, double, long int and long double using size of () operator.

Program:

```
/* Getting the size of different data types */
```

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

```
#include <stdlib.h>
```

```
int main()
```

```
{
```

```
    printf("Name : MANOJ M MALLYA\n\n");
```

```
    printf("size of int = %d bytes\n",sizeof(int));
```

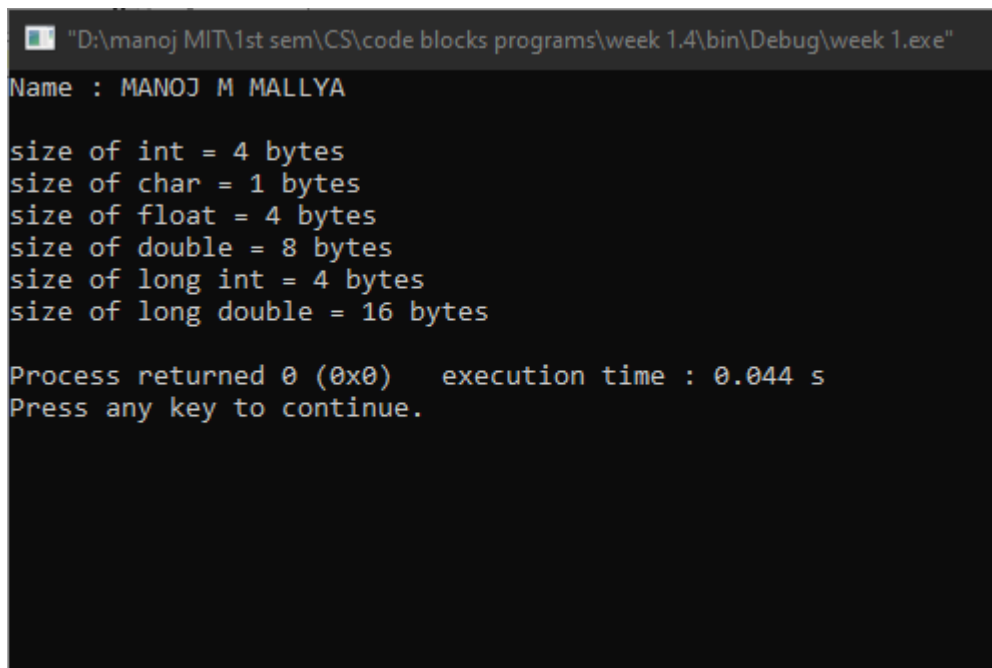
```
    printf("size of char = %d bytes\n",sizeof(char));
```

```
    printf("size of float = %d bytes\n",sizeof(float));
```

```
    printf("size of double = %d bytes\n",sizeof(double));
```

```
printf("size of long int = %d bytes\n",sizeof(long int));  
printf("size of long double = %d bytes\n",sizeof(long double));  
  
return 0;  
}
```

Output:



```
"D:\manoj MIT\1st sem\CS\code blocks programs\week 1.4\bin\Debug\week 1.exe"  
Name : MANOJ M MALLYA  
  
size of int = 4 bytes  
size of char = 1 bytes  
size of float = 4 bytes  
size of double = 8 bytes  
size of long int = 4 bytes  
size of long double = 16 bytes  
  
Process returned 0 (0x0)   execution time : 0.044 s  
Press any key to continue.
```

Q5. Input P, N and R to compute simple and compound interest.
[Hint: $SI = PNR/100$, $CI = P(1+R/100)^N - P$]

Program:

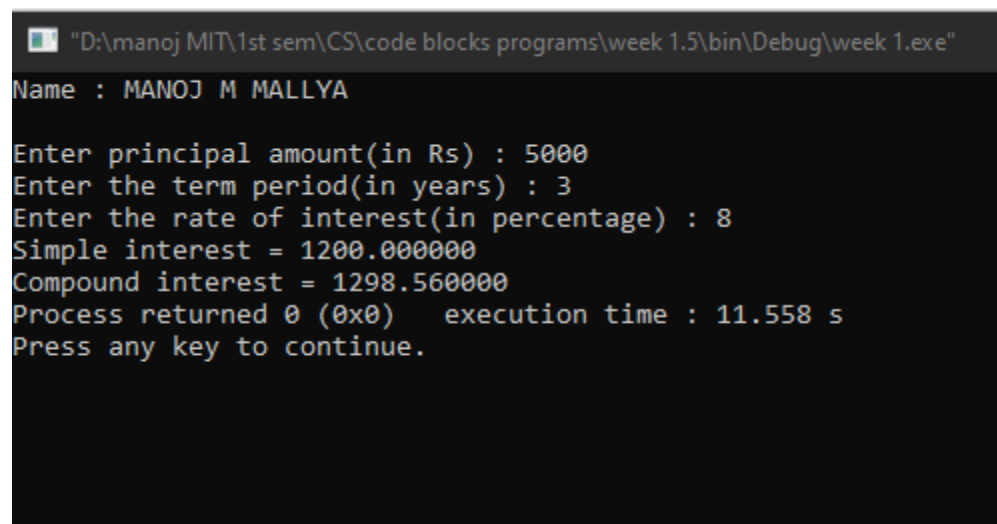
```
/* computing simple and compound interest */  
  
#include <stdio.h>  
  
#include <stdlib.h>  
  
#include <math.h>
```

```

int main()
{
    printf("Name : MANOJ M MALLYA\n\n");
    double principal,time,rate,simple_interest,compound_interest;
    printf("Enter principal amount(in Rs) : ");
    scanf("%lf",&principal);
    printf("Enter the term period(in years) : ");
    scanf("%lf",&time);
    printf("Enter the rate of interest(in percentage) : ");
    scanf("%lf",&rate);
    // computation
    simple_interest = (principal*time*rate)/100;
    compound_interest = principal*pow((1+rate/100),time) - principal;
    printf("Simple interest = %lf \nCompound interest = %lf\n",simple_interest,compound_interest);
    return 0;
}

```

Output:



```

"D:\manoj MIT\1st sem\CS\code blocks programs\week 1.5\bin\Debug\week 1.exe"
Name : MANOJ M MALLYA

Enter principal amount(in Rs) : 5000
Enter the term period(in years) : 3
Enter the rate of interest(in percentage) : 8
Simple interest = 1200.000000
Compound interest = 1298.560000
Process returned 0 (0x0)   execution time : 11.558 s
Press any key to continue.

```

Q6. Input radius to find the volume and surface area of a sphere.
[Hint: volume = $(4\pi r^3)/3$, Area = $4\pi r^2$]

Program:

```
/* Finding volume and surface area of a sphere */

#include <stdio.h>

#include <stdlib.h>

#define PI 3.14159265 //defining the value of irrational constant  $\pi$  (pi)

int main()
{
    printf("Name : MANOJ M MALLYA\n\n");

    double radius,volume,surface_area;

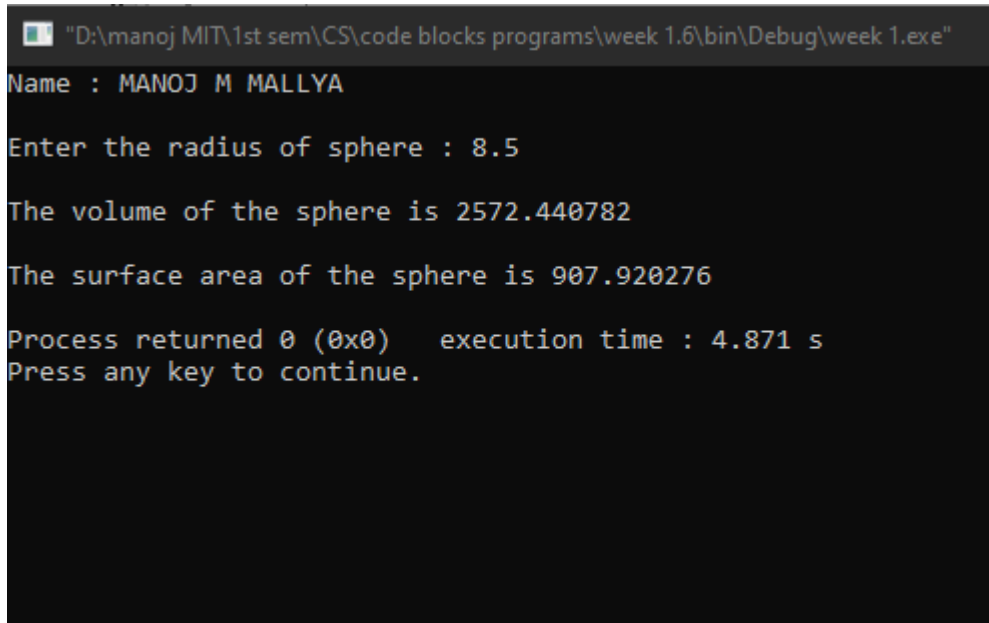
    printf("Enter the radius of sphere : ");
    scanf("%lf",&radius);

    //computation
    volume = (4*PI*radius*radius*radius)/3;
    surface_area = 4*PI*radius*radius;

    printf("\nThe volume of the sphere is %lf\n",volume);
    printf("\nThe surface area of the sphere is %lf\n",surface_area);

    return 0;
}
```

Output:



```
"D:\manoj MIT\1st sem\CS\code blocks programs\week 1.6\bin\Debug\week 1.exe"
Name : MANOJ M MALLYA

Enter the radius of sphere : 8.5

The volume of the sphere is 2572.440782

The surface area of the sphere is 907.920276

Process returned 0 (0x0)   execution time : 4.871 s
Press any key to continue.
```

Q7. Convert the given temperature in Fahrenheit to Centigrade. [Hint: $C = \frac{5}{9}(F - 32)$]

Program:

```
/* Conversion from Fahrenheit to Centigrade */

#include <stdio.h>
#include <stdlib.h>

int main()
{
    printf("Name : MANOJ M MALLYA\n\n");

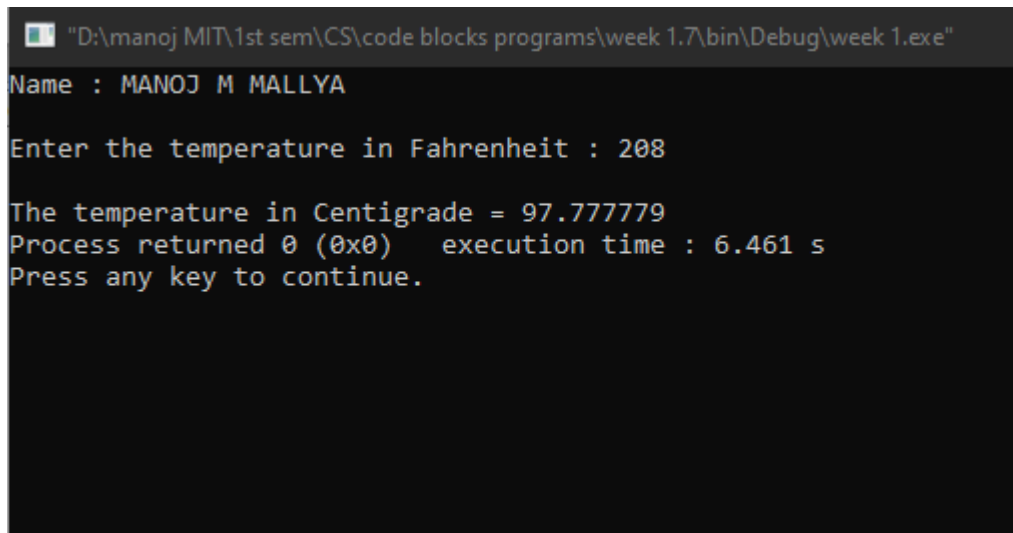
    float fahrenheit,centigrade;
    printf("Enter the temperature in Fahrenheit : ");
    scanf("%f",&fahrenheit);
```



```
//conversion
centigrade = 5*(fahrenheit-32)/9;

printf("\nThe temperature in Centigrade = %f ",centigrade);
return 0;
}
```

Output:



```
"D:\manoj MIT\1st sem\CS\code blocks programs\week 1.7\bin\Debug\week 1.exe"
Name : MANOJ M MALLYA
Enter the temperature in Fahrenheit : 208
The temperature in Centigrade = 97.777779
Process returned 0 (0x0)   execution time : 6.461 s
Press any key to continue.
```

Q8. Write a C program to evaluate the following expression for the values $a = 30$, $b = 10$, $c = 5$, $d = 15$. (i) $(a + b) * c / d$ (ii) $((a + b) * c) / d$ (iii) $a + (b * c) / d$ (iv) $(a + b) * (c / d)$

Program:

```
/* Evaluation */
#include <stdio.h>
#include <stdlib.h>
```

```

int main()
{
    printf("Name : MANOJ M MALLYA\n\n");

    int a=30,b=10,c=5,d=15;

    printf("(a + b) * c / d = %d \n((a + b) * c ) / d = %d \na + (b * c) / d
= %d \n(a + b) * (c / d) = %d\n",(a + b)*c/d, ((a + b)*c)/d, a+ (b*c)/d,
(a + b)*(c/d));

    return 0;
}

```

Output:

```

"D:\manoj MIT\1st sem\CS\code blocks programs\week 1.8\bin\Debug\week 1.exe"
Name : MANOJ M MALLYA

(a + b) * c / d = 13
((a + b) * c) / d = 13
a + (b * c) / d = 33
(a + b) * (c / d) = 0

Process returned 0 (0x0)   execution time : 0.043 s
Press any key to continue.

```

Lab no: 2 – BRANCHING CONTROLSTRUCTURES

Write C programs to do the following:

Q1. Check whether the given number is odd or even.

Program:

```
/* checking whether a number is odd or even */
```

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

```
#include <stdlib.h>
```

```
int main()
```

```
{
```

```
    printf("Name : MANOJ M MALLYA\n\n");
```

```
    int n;
```

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

```
    scanf("%d",&n);
```

```
    //checking remainder when divided by 2
```

```
    if (n%2==1)
```

```
    {
```

```
        printf("\n%d is an odd number.\n",n);
```

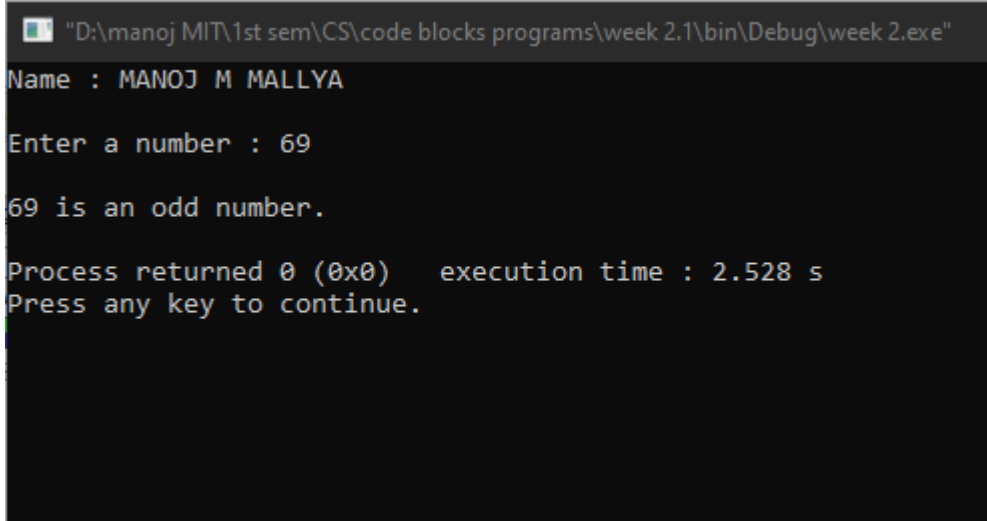
```
    }
```

```
    else
```

```
    {
```

```
        printf("\n%d is an even number.\n",n);  
    }  
    return 0;  
}
```

Output:



```
"D:\manoj MIT\1st sem\CS\code blocks programs\week 2.1\bin\Debug\week 2.exe"  
Name : MANOJ M MALLYA  
Enter a number : 69  
69 is an odd number.  
Process returned 0 (0x0)   execution time : 2.528 s  
Press any key to continue.
```

Q2. Find the largest among given 3 numbers.

Program:


```
/* finding the largest number */  
  
#include <stdio.h>  
  
#include <stdlib.h>  
  
int main()  
{  
    printf("Name : MANOJ M MALLYA\n\n");  
    int a,b,c;
```

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

if (a>b)
{
    if (a>c)
    {
        printf("\n%d is the largest number.\n",a);
    }
    else
    {
        printf("\n%d is the largest number.\n",c);
    }
}
else
{
    if (b>c)
    {
        printf("\n%d is the largest number.\n",b);
    }
    else
    {
        printf("\n%d is the largest number.\n",c);
    }
}
```

```
    return 0;
}
```

Output:



```
"D:\manoj MIT\1st sem\CS\code blocks programs\week 2.2\bin\Debug\week 2.exe"
Name : MANOJ M MALLYA
Enter 3 numbers : 369 123 447
447 is the largest number.
Process returned 0 (0x0)   execution time : 6.794 s
Press any key to continue.
```

Q3. Swap two numbers without using third variable.

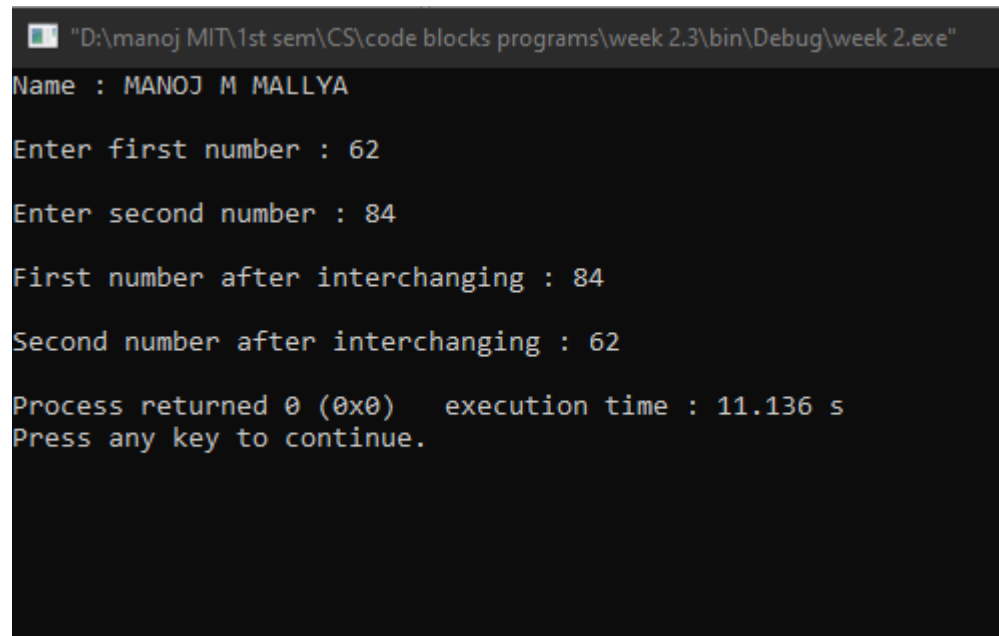
Program:

```
/* swapping two numbers without using 3rd variable */
#include <stdio.h>
#include <stdlib.h>

int main()
{
    printf("Name : MANOJ M MALLYA\n\n");
    int a,b;
    printf("Enter first number : ");
    scanf("%d",&a);
```

```
printf("\nEnter second number : ");  
scanf("%d",&b);  
  
a=a+b;// a becomes (a+b)  
b=a-b;//b becomes a  
a=a-b;//a becomes b  
  
printf("\nFirst number after interchanging : %d\n",a);  
printf("\nSecond number after interchanging : %d\n",b);  
return 0;  
}
```

Output:



```
"D:\manoj MIT\1st sem\CS\code blocks programs\week 2.3\bin\Debug\week 2.exe"  
Name : MANOJ M MALLYA  
Enter first number : 62  
Enter second number : 84  
First number after interchanging : 84  
Second number after interchanging : 62  
Process returned 0 (0x0)   execution time : 11.136 s  
Press any key to continue.
```

Q4. Compute all the roots of a quadratic equation using switch case statement. [Hint: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$]

Program:

```
/* getting the roots of a quadratic equation */
#include <stdio.h>
#include <stdlib.h>
#include <math.h>

int main()
{
    printf("Name : MANOJ M MALLYA\n\n");
    double a,b,c,x,y,real,imaginary;

    printf("The quadratic equation is of the form ax^2+bx+c=0\n\n");// standard
    form of a quadratic equation

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

    printf("Enter b : ");
    scanf("%lf",&b);

    printf("Enter c : ");
    scanf("%lf",&c);

    double disc = (b*b)-(4*a*c);//disc - discriminant
    int k;

    if(a!=0)
```



```

{
    if (disc > 0)
    {
        k=1;
    }
    if (disc == 0)
    {
        k=2;
    }
    if (disc < 0)
    {
        k=3;
    }

    switch (k)
    {
    case 1:
        printf("\nRoots are real and distinct.\n");
        x = ((-b) + sqrt((b*b) - (4*a*c)))/(2*a);//1st root
        y = ((-b) - sqrt((b*b) - (4*a*c)))/(2*a);//2nd root
        printf("\nThe two roots of the quadratic equation are x = %lf and y =
%lf\n",x,y);
        break;

    case 2:
        printf("\nRoots are real & equal.\n");
        x = -b / (2*a);

```

```

        printf("\nThe two roots of the quadratic equation are %lf and
%lf\n",x,x);

        break;

case 3:

    printf("\nRoots are imaginary.\n");

    real = -b / (2*a) ;

    imaginary = (sqrt (-1*disc)) / (2*a);

    printf("\nThe two roots of the quadratic equation are x = %f + i(%f)
and y = %f - i(%f)\n",real,imaginary,real,imaginary);

    }

}

else

{

    printf("\nIts a linear equation.\n");// as the co-efficient of 'a' is zero.

}

return 0;

}

```

Output:

```

D:\manoj MIT\1st sem\CS\code blocks programs\week 2.4\bin\Debug\week 2.exe
Name : MANOJ M MALLYA

The quadratic equation is of the form ax^2+bx+c=0
Enter a : 6
Enter b : 7
Enter c : 8

Roots are imaginary.

The two roots of the quadratic equation are x = -0.583333 + i(0.996522) and y = -0.583333 - i(0.996522)
Process returned 0 (0x0) execution time : 12.348 s
Press any key to continue.

```

Q5. Write a program that will read the value of x and evaluate the following function

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

Use else if statements & Print the result ('Y' value).

Program:

```
/* signum function */
```

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

```
#include <stdlib.h>
```

```
int main()
```

```
{
```

```
    printf("Name : MANOJ M MALLYA\n\n");
```

```
    int n,result;
```

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

```
    scanf("%d",&n);
```

```
    if (n>0)
```

```
    {
```

```
        result = 1;//when the number is greater than zero
```

```
    }
```

```
    else if (n<0)
```

```
    {
```

```
        result = -1;//when the number is less than zero
```

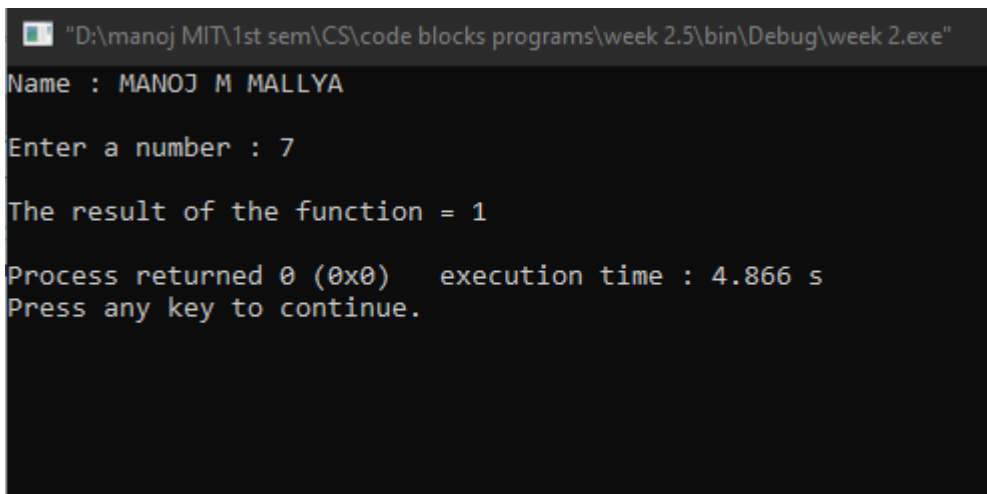
```

    }
else
{
    result = 0;//when the number is equal to zero
}

printf("\nThe result of the function = %d\n",result);
    return 0;
}

```

Output:



```

"D:\manoj MIT\1st sem\CS\code blocks programs\week 2.5\bin\Debug\week 2.exe"
Name : MANOJ M MALLYA
Enter a number : 7
The result of the function = 1
Process returned 0 (0x0)   execution time : 4.866 s
Press any key to continue.

```

Q6. Find the smallest among three numbers using conditional operator.

Program:

```

/* finding the smallest of 3 numbers using conditional operator */
#include <stdio.h>
#include <stdlib.h>

```

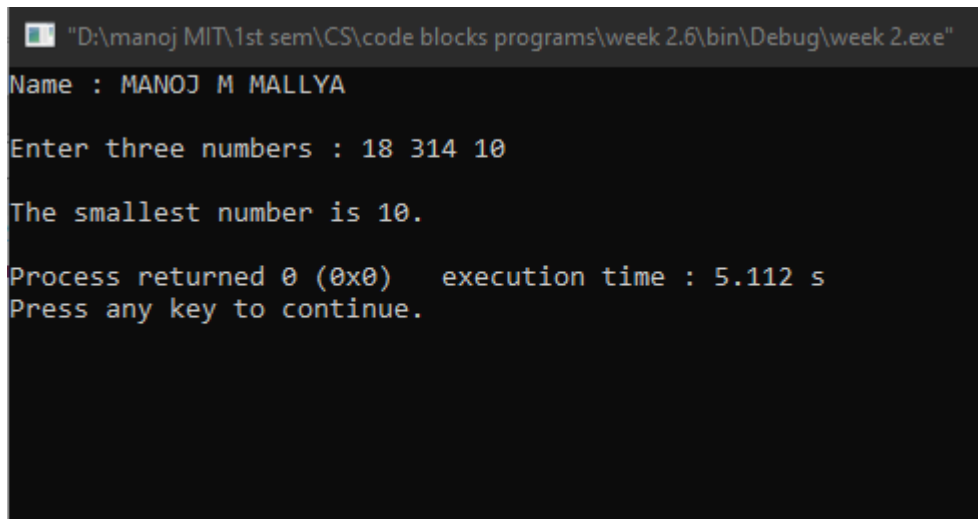
```
int main()
{
    printf("Name : MANOJ M MALLYA\n\n");
    int a,b,c,small;
    printf("Enter three numbers : ");//getting the 3 numbers
    scanf("%d %d %d",&a,&b,&c);

    small = (a < b)? ((a < c)? a : c ) : ((b < c)? b : c);//getting the
smallest number

    printf("\nThe smallest number is %d\n",small);//printing the
smallest number

    return 0;
}
```

Output:



```
"D:\manoj MIT\1st sem\CS\code blocks programs\week 2.6\bin\Debug\week 2.exe"
Name : MANOJ M MALLYA

Enter three numbers : 18 314 10

The smallest number is 10.

Process returned 0 (0x0)   execution time : 5.112 s
Press any key to continue.
```
