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CERTIFICATE

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Teacher In-Charge

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Date : _____

Examiner

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Practical No: 01

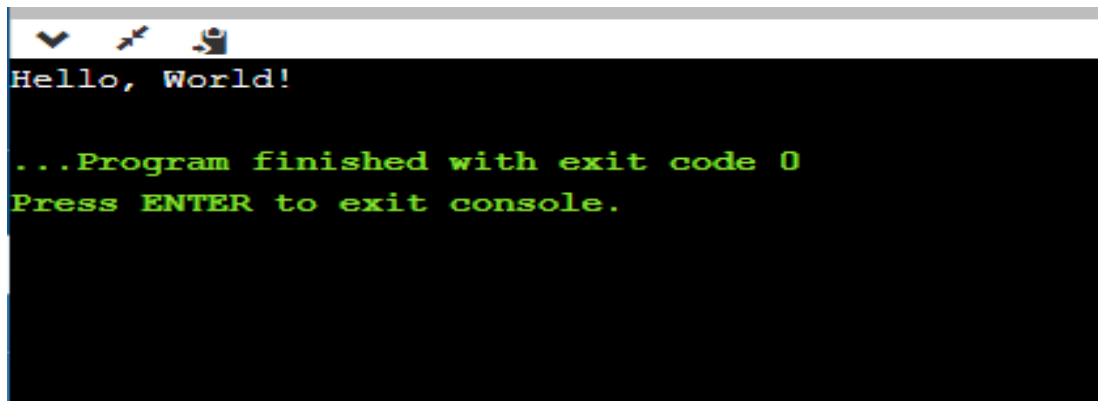
Aim: Programs to understand the basic data type and Input/Output.

Program1: To print hello world.

Source code:

```
#include <stdio.h>
int main() {
printf("Hello, World!");
return 0;
}
```

Output:



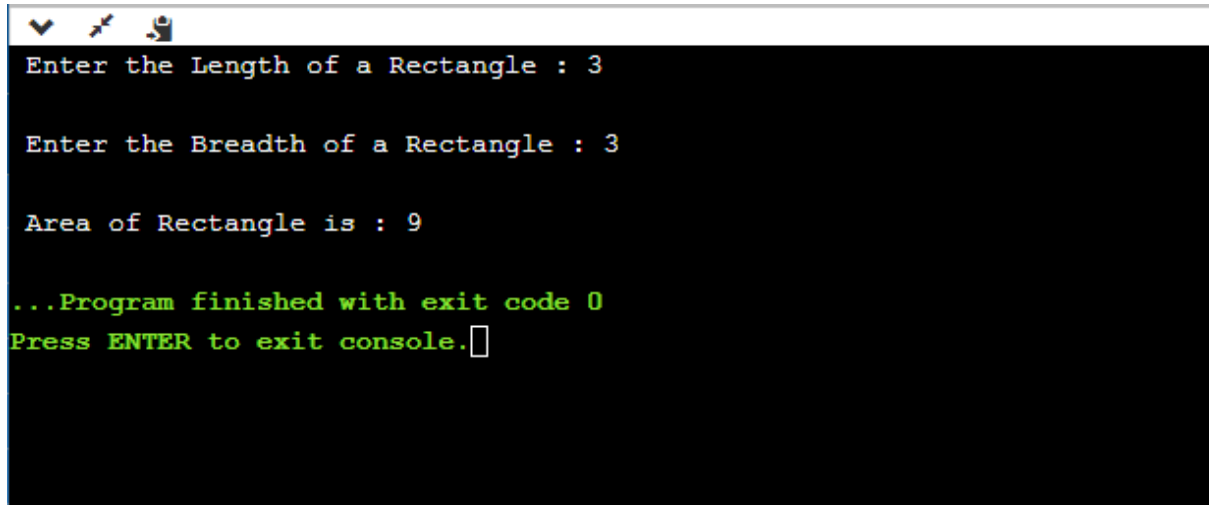
Program2: Area of rectangle.

Source code:

```
#include<stdio.h>
int main()
{
int length, breadth, area;
clrscr();
printf(" Enter the Length of a Rectangle : ");
scanf("%d",&length);
printf("\n Enter the Breadth of a Rectangle : ");
scanf("%d",&breadth);
area = length * breadth;
printf("\n Area of Rectangle is : %d",area);
}
```

```
return 0;  
}
```

Output:



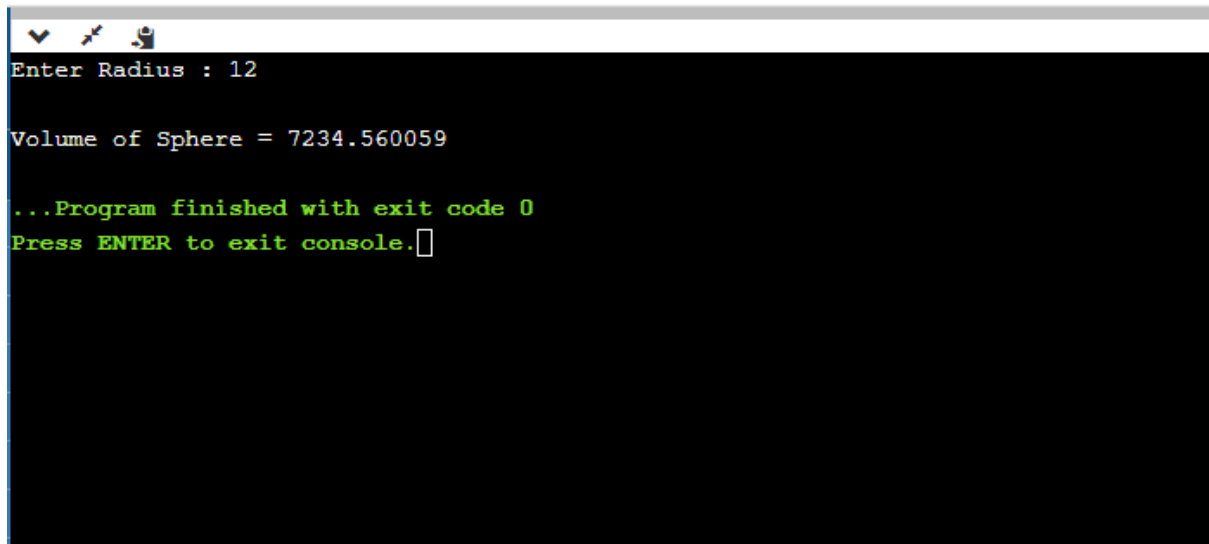
```
Enter the Length of a Rectangle : 3  
  
Enter the Breadth of a Rectangle : 3  
  
Area of Rectangle is : 9  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```

Program3: Volume of sphere.

Source Code:

```
#include<stdio.h>  
int main()  
{  
int r;  
float volume_sphere;  
printf("Enter Radius : ");  
scanf("%d",&r);  
volume_sphere = (4/3.0)*3.14*r*r*r;  
printf("\nVolume of Sphere = %f",volume_sphere);  
return 0;  
}
```

Output:



```
Enter Radius : 12

Volume of Sphere = 7234.560059

...Program finished with exit code 0
Press ENTER to exit console.
```

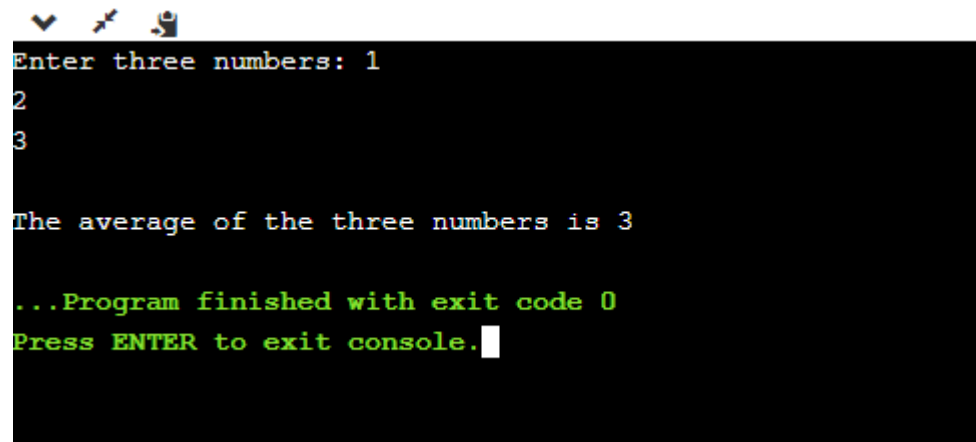
Assignment Question: Write a program to find average of three numbers.

Source Code:

```
#include<stdio.h>

int main()
{
    int a,b,c,sum,avg;
    printf("Enter three numbers: ");
    scanf("%d%d%d",&a,&b,&c);
    sum=a+b+c;
    avg=sum/2;
    printf("\nThe average of the three numbers is %d",avg);
    return 0;}
```

Output:



A screenshot of a terminal window with a black background and white and green text. At the top left, there are three small icons: a checkmark, a cursor, and a document. The text in the terminal reads: "Enter three numbers: 1", "2", "3", "The average of the three numbers is 3", "...Program finished with exit code 0", and "Press ENTER to exit console." followed by a white cursor block.

```
Enter three numbers: 1
2
3
The average of the three numbers is 3
...Program finished with exit code 0
Press ENTER to exit console.
```

Practical No: 02

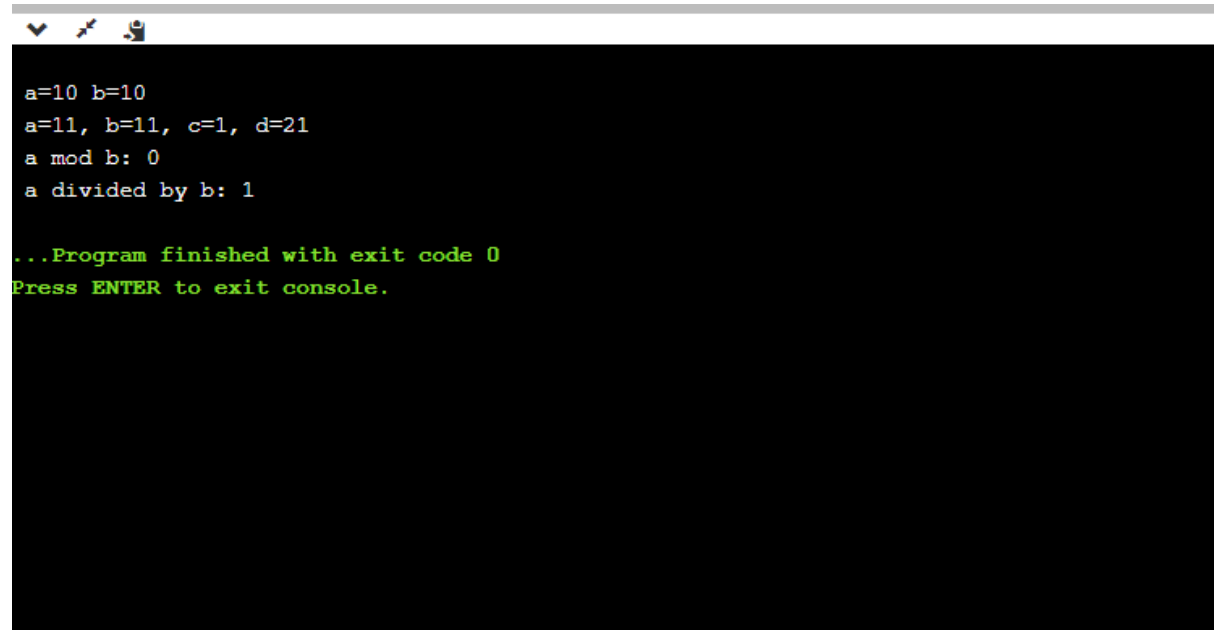
Aim: Programs on Operation and Expressions.

Program 1:

Source Code:

```
#include <stdio.h>
//#include <conio.h>
int main()
{
    int a,b,c,d;
    a=10, b=10;
    printf("\n a=%d b=%d", a,b);
    c=++a-b;
    d=b+++a;
    printf("\n a=%d, b=%d, c=%d, d=%d",a,b,c,d);
    c=a%b;
    d=a/b;
    printf("\n a mod b: %d",c);
    printf("\n a divided by b: %d",d);
    return 0;
    //getch();
}
```

Output:



```
a=10 b=10
a=11, b=11, c=1, d=21
a mod b: 0
a divided by b: 1

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 2:

Source Code:

```
#include <stdio.h>
//#include <conio.h>
int main()
{
// your code goes here
float a,b,c,x,y,z;
a=12, b=9, c=3;
printf("a=%f, b=%f, c=%f", a,b,c);
x=a-b;
y=a-b*2;
z=a+b+c;
printf("\n x=%f, y=%f, z=%f", x,y,z);
return 0;
//getch();
}
```

Output:



```
a=12.000000, b=9.000000, c=3.000000
x=3.000000, y=-6.000000, z=24.000000

...Program finished with exit code 0
Press ENTER to exit console.
```

Assignment Question: Write a program to demonstrate relational operator using float data type.

Source Code:

// C program to demonstrate working of relational operators

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

```
int main()
```

```
{
```

```
    int a = 24, b = 26;
```

```
    // greater than example
```

```
    if (a > b)
```

```
        printf("a is greater than b\n");
```

```
    else
```

```
        printf("a is less than or equal to b\n");
```

```
// greater than equal to
if (a >= b)
    printf("a is greater than or equal to b\n");
else
    printf("a is lesser than b\n");

// less than example
if (a < b)
    printf("a is less than b\n");
else
    printf("a is greater than or equal to b\n");

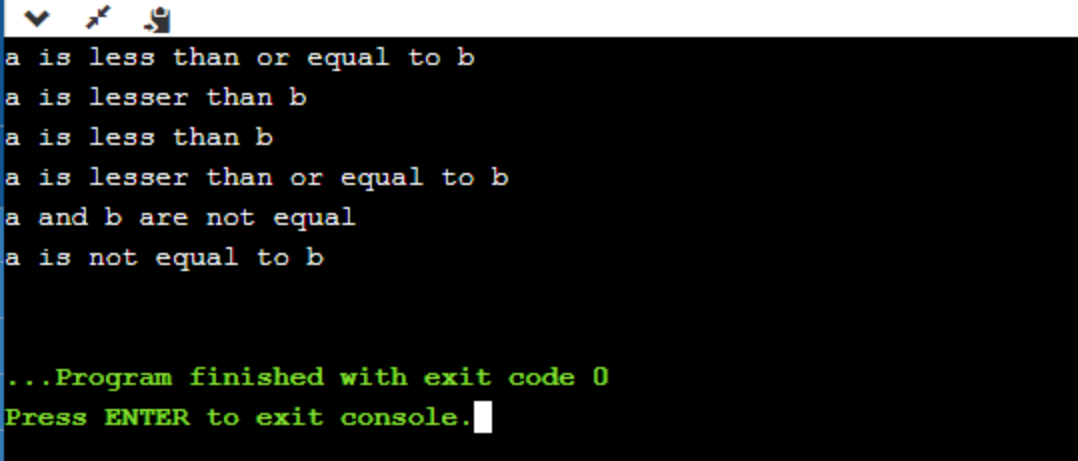
// lesser than equal to
if (a <= b)
    printf("a is lesser than or equal to b\n");
else
    printf("a is greater than b\n");

// equal to
if (a == b)
    printf("a is equal to b\n");
else
    printf("a and b are not equal\n");

// not equal to
if (a != b)
    printf("a is not equal to b\n");
```

```
    else  
        printf("a is equal b\n");  
  
    return 0;  
}
```

Output:

A screenshot of a terminal window with a black background and green text. The output of the program is displayed line by line. At the top, there are three small icons: a checkmark, a cursor, and a person. The output lines are: "a is less than or equal to b", "a is lesser than b", "a is less than b", "a is lesser than or equal to b", "a and b are not equal", and "a is not equal to b". Below these, it says "...Program finished with exit code 0" and "Press ENTER to exit console." followed by a white cursor block.

```
✓ ✎ 👤  
a is less than or equal to b  
a is lesser than b  
a is less than b  
a is lesser than or equal to b  
a and b are not equal  
a is not equal to b  
  
...Program finished with exit code 0  
Press ENTER to exit console.█
```

Practical No: 03

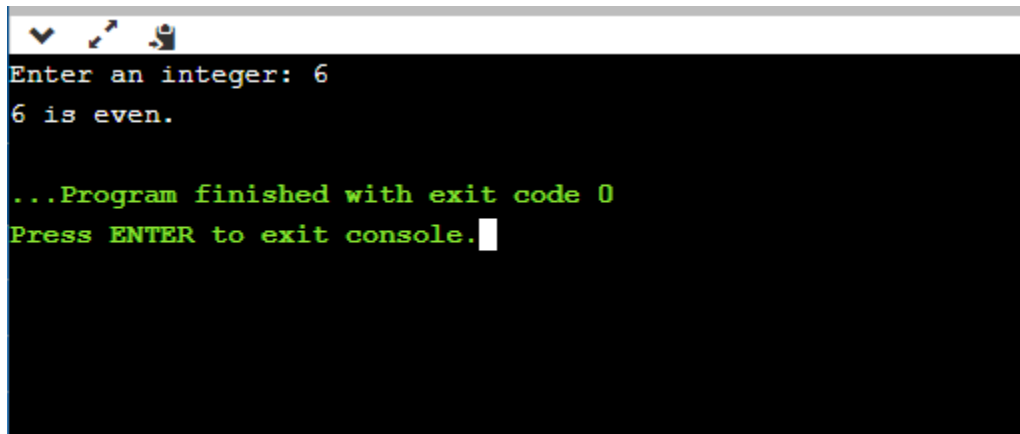
Aim: Programs on decision making and Branching.

Program1: To check whether a number is even or odd.

Source Code:

```
#include <stdio.h>
int main() {
    int num;
    printf("Enter an integer: ");
    scanf("%d", &num);
    if(num % 2 == 0)
        printf("%d is even.", num);
    else
        printf("%d is odd.", num);
    return 0;
}
```

Output:



```
Enter an integer: 6
6 is even.

...Program finished with exit code 0
Press ENTER to exit console.
```

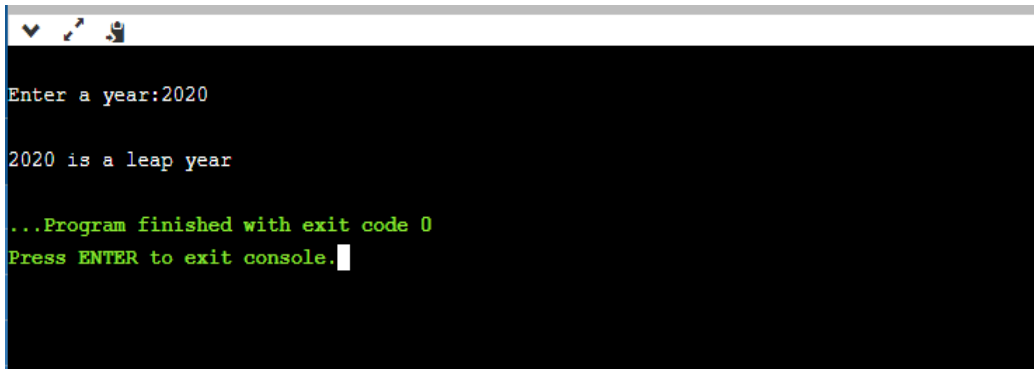
Program2: To check whether a year is leap year or not.

Source Code:

```
#include <stdio.h>
int main() {
    int year;
    //year = 2016;
```

```
printf("\nEnter a year:");  
scanf("\n%d",&year);  
if (year % 4 == 0)  
printf("\n%d is a leap year", year);  
else  
printf("\n%d is not a leap year", year);  
return 0;  
}
```

Output:



```
Enter a year:2020  
  
2020 is a leap year  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```

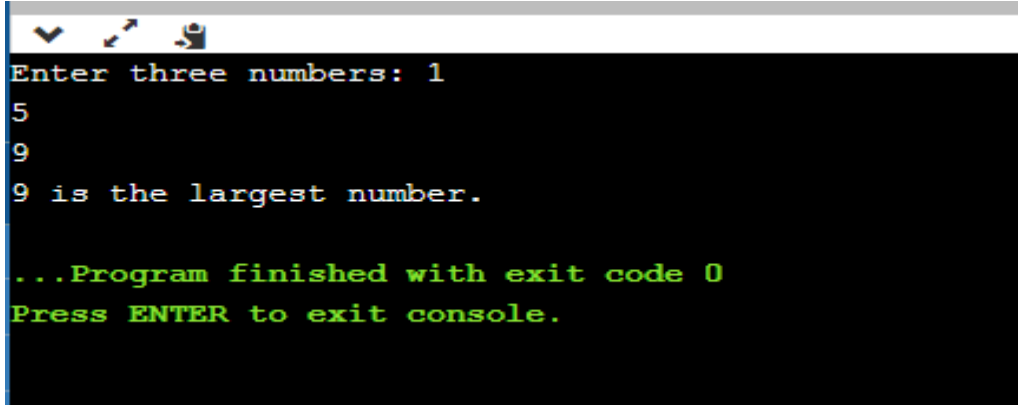
Program3: To check largest of three numbers using nested if.

Source Code:

```
#include <stdio.h>  
int main() {  
    // Write C code here  
    int a, b, c;  
    printf("Enter three numbers: ");  
    scanf("%d %d %d", &a, &b, &c);  
    if (a >= b) {  
        if (a >= c)  
            printf("%d is the largest number.", a);  
        else  
            printf("%d is the largest number.", c);  
    }  
    else {  
        if (b >= c)  
            printf("%d is the largest number.", b);  
        else  
            printf("%d is the largest number.", c);  
    }  
}
```

```
return 0;  
}
```

Output:



```
Enter three numbers: 1  
5  
9  
9 is the largest number.  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```

Program 4: To add, sub, mul, div using switch case.

Source Code:

```
#include <stdio.h>  
  
int main() {  
    // Write C code here  
  
    int a,b,op;  
  
    printf(" 1.Addition\n 2.Subtraction\n 3.Multiplication\n 4.Division\n");  
    printf("Enter the values of a & b: ");  
    scanf("%d %d",&a,&b);  
    printf("Enter your Choice : ");  
    scanf("%d",&op);  
    switch(op)  
    {  
        case 1 :  
            printf("Sum is : %d",a+b);  
            break;
```

case 2 :

```
printf("Difference of %d and %d is : %d",a,b,a-b);
```

```
break;
```

case 3 :

```
printf("Multiplication of %d and %d is : %d",a,b,a*b);
```

```
break;
```

case 4 :

```
printf("Division of Two Numbers is :%d ",a/b);
```

```
break;
```

default :

```
printf(" Enter Your Correct Choice.");
```

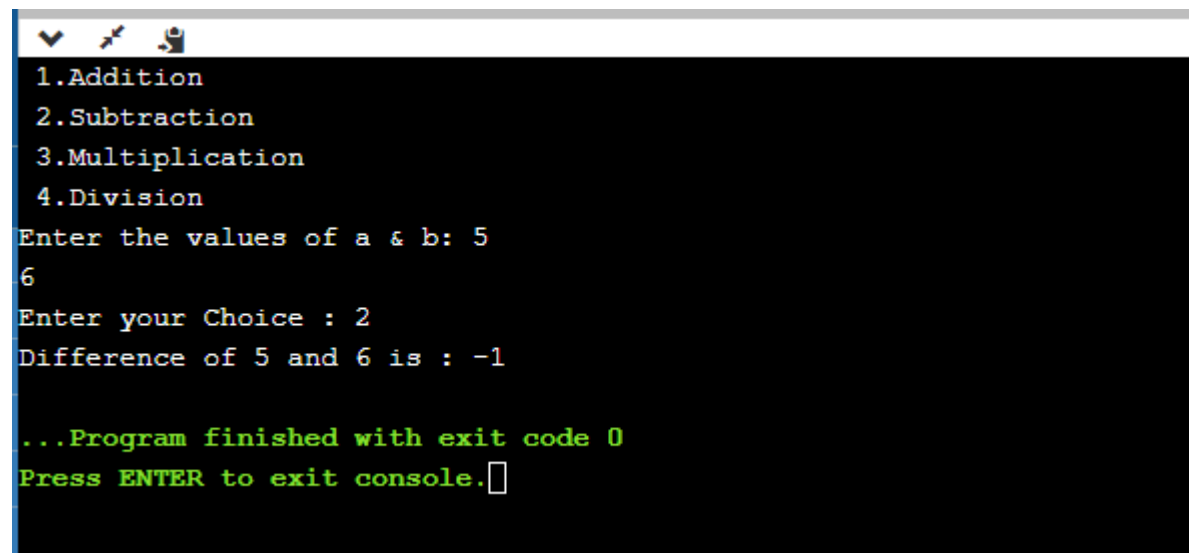
```
break;
```

```
}
```

```
return 0;
```

```
}
```

Output:



```
1.Addition
2.Subtraction
3.Multiplication
4.Division
Enter the values of a & b: 5
6
Enter your Choice : 2
Difference of 5 and 6 is : -1

...Program finished with exit code 0
Press ENTER to exit console.
```

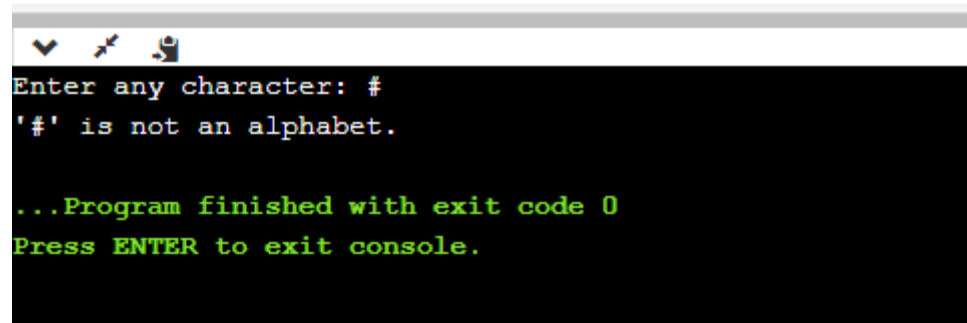
Assignment Question: To Check whether alphabets is a vowel or not.

Source Code:

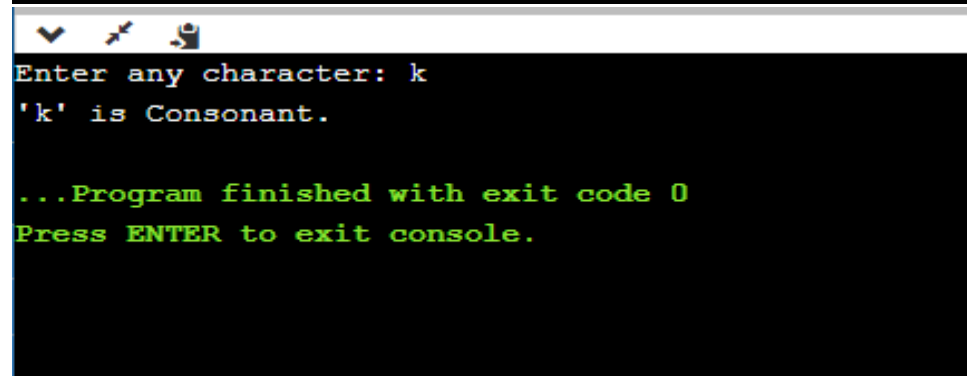
```
#include <stdio.h>

int main()
{
    char ch;
    printf("Enter any 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("'%c' is Vowel.", ch);
    }
    else if((ch >= 'a' && ch <= 'z') || (ch >= 'A' && ch <= 'Z'))
    {
        printf("'%c' is Consonant.", ch);
    }
    else
    {
        printf("'%c' is not an alphabet.", ch);
    }
    return 0;
}
```

Output:



```
Enter any character: #  
'#' is not an alphabet.  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```



```
Enter any character: k  
'k' is Consonant.  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```

Practical No: 04

Aim: Programs to demonstrate Loops.

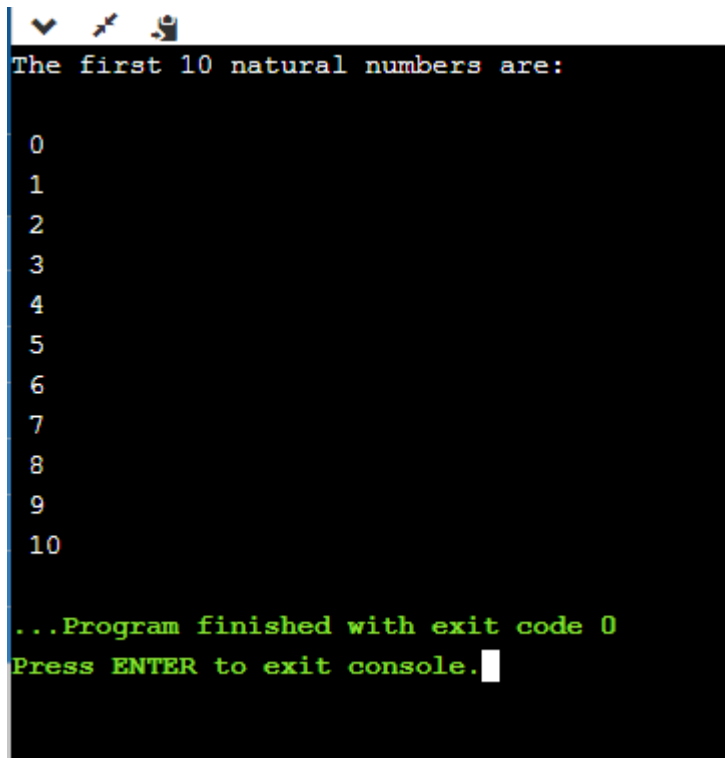
Program1: To display the first 10 natural numbers using for loop.

Source Code:

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

int main()
{
    int i;
    printf("The first 10 natural numbers are:\n");
    for(i=0;i<=10;i++)
    {
        printf("\n %d ",i);
    }
    //getch();
    return 0;
}
```

Output:

A screenshot of a console window with a black background and white text. At the top, there are three small icons: a checkmark, a pencil, and a person. Below the icons, the text "The first 10 natural numbers are:" is displayed. This is followed by a list of numbers from 0 to 10, each on a new line. At the bottom of the console, the text "...Program finished with exit code 0" and "Press ENTER to exit console." is shown, with a white cursor character at the end of the second line.

```
The first 10 natural numbers are:
0
1
2
3
4
5
6
7
8
9
10

...Program finished with exit code 0
Press ENTER to exit console.
```

Program2: To print all even numbers from 1 to 100 using while loop.

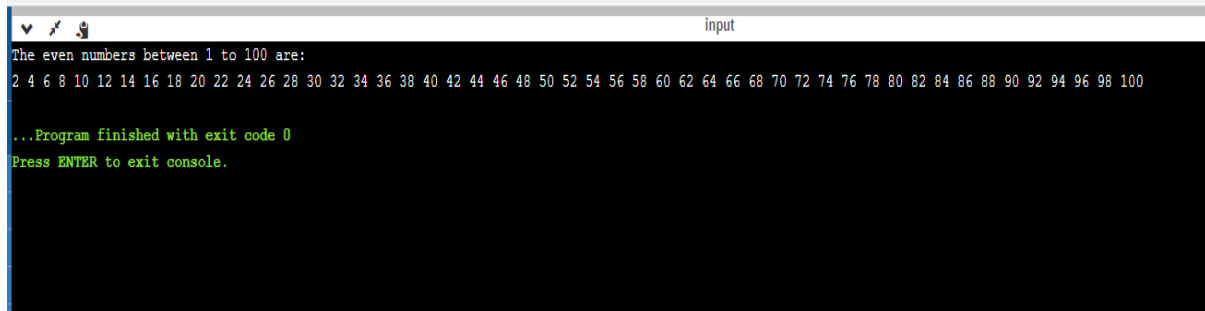
Source Code:

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

int main()
{
    int i=1,r;
    printf("The even numbers between 1 to 100 are: \n");
    while(i<=100)
    {
        r=i%2;
        if(r==0)
        {
            printf("%d ",i);
        }
    }
}
```

```
        i++;  
    }  
    return 0;  
}
```

Output:



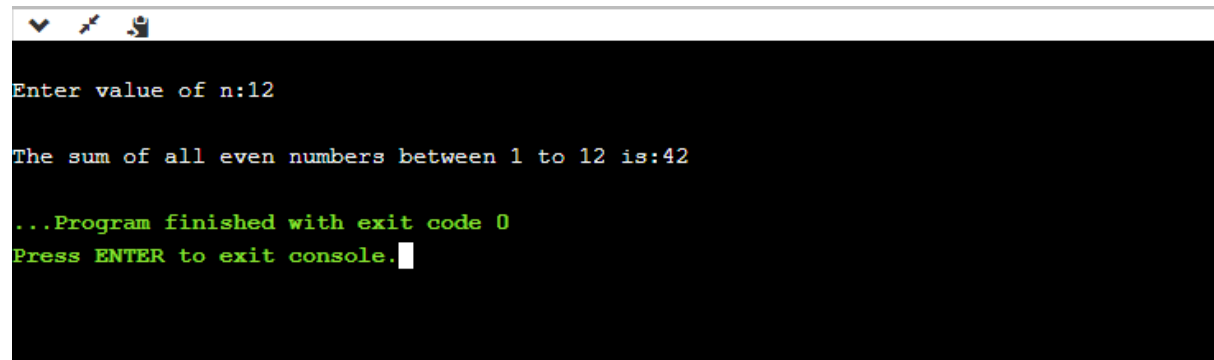
```
input  
The even numbers between 1 to 100 are:  
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100  
...Program finished with exit code 0  
Press ENTER to exit console.
```

Program3: To print the sum of all even numbers from 1 to n using Do while loop.

Source Code:

```
#include <stdio.h>  
int main() {  
    // Write C code here  
    int i,n,r,s;  
    printf("\nEnter value of n:");  
    scanf("%d",&n);  
    i=1,s=0;  
    do  
    {  
        r=i%2;  
        if(r==0)  
        {  
            s=s+i;  
        }  
        ++i;  
    }  
    while(i<=n);  
    printf("\nThe sum of all even numbers between 1 to %d is:%d",n,s);  
    return 0;  
}
```

Output:

A screenshot of a console window with a black background and white text. The text shows the program's execution: it prompts for a value of n (12), calculates the sum of even numbers from 1 to 12 (42), and displays the exit code (0).

```
Enter value of n:12

The sum of all even numbers between 1 to 12 is:42

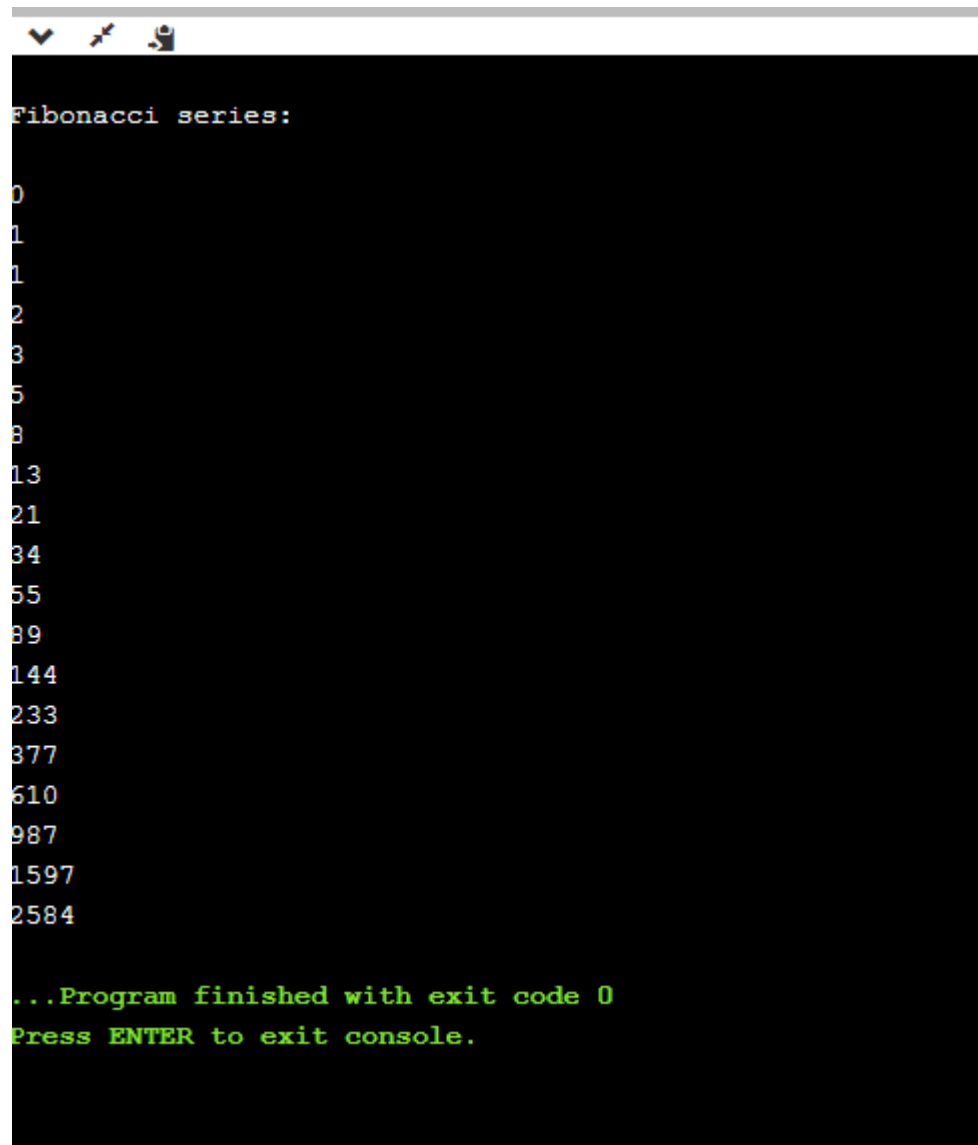
...Program finished with exit code 0
Press ENTER to exit console.
```

Program4: Fibonacci series of first 20 terms.

Source Code:

```
#include <stdio.h>
int main() {
int a,b,i,f;
printf("\nFibonacci series:\n");
a=1;
b=0;
printf("\n%d",b);
for(i=3;i<=20;i++)
{
f=a+b;
a=b;
b=f;
printf("\n%d",f);
}
return 0;
}
```

Output:



```
Fibonacci series:
0
1
1
2
3
5
8
13
21
34
55
89
144
233
377
610
987
1597
2584

...Program finished with exit code 0
Press ENTER to exit console.
```

Program5: To obtain the following output.

```
*
**
***
****
```

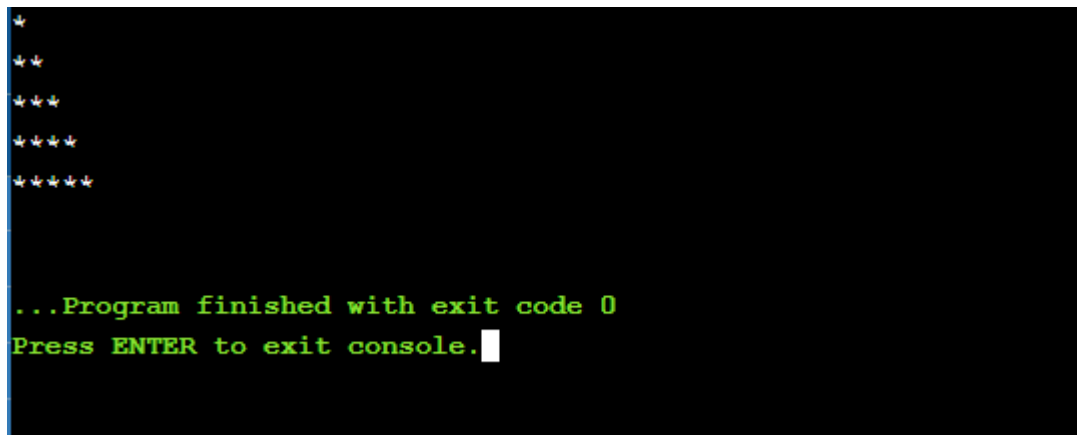
Source Code:

```
#include <stdio.h>

int main()
{
    int i,j;
```

```
for(i=1;i<=5;i++)  
{  
    for(j=1;j<=i;j++)  
        printf("*");  
    printf("\n");  
}  
return 0;  
}
```

Output:



```
...Program finished with exit code 0  
Press ENTER to exit console.
```

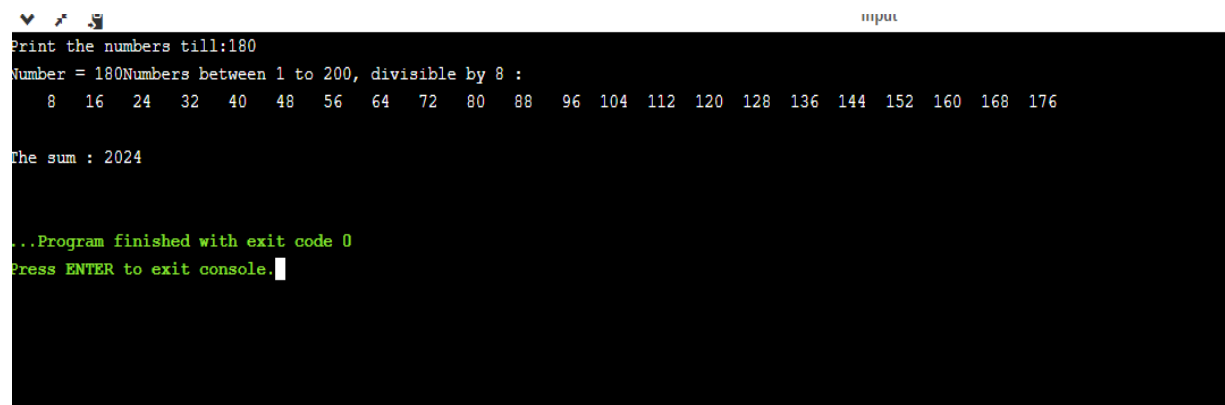
Assignment Question: To Print numbers between 1 to n (from user) which is divisible by 8.

Source Code:

```
#include <stdio.h>  
  
int main()  
{  
    int i,a, sum=0;  
    printf("Print the numbers till:");  
    scanf("%d", &a);  
    printf("Number = %d",a);  
    printf("Numbers between 1 to 200, divisible by 8 : \n");  
}
```

```
for(i=1;i<a;i++)  
{  
    if(i%8==0)  
    {  
        printf("% 5d",i);  
        sum+=i;  
    }  
}  
  
printf("\n\nThe sum : %d \n",sum);  
}
```

Output:



```
Print the numbers till:180  
Number = 180Numbers between 1 to 200, divisible by 8 :  
    8   16   24   32   40   48   56   64   72   80   88   96  104  112  120  128  136  144  152  160  168  176  
  
The sum : 2024  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```


Practical No: 05

Aim: Programs on Arrays.

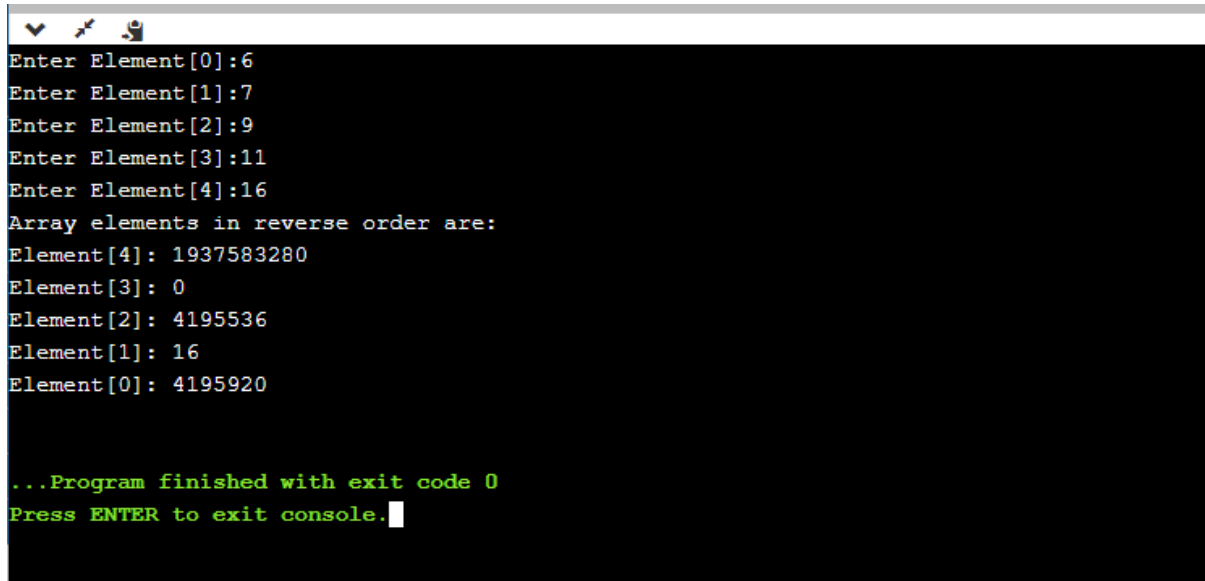
Program 1: Program to print elements of array in reverse order.

Source Code:

```
#include<stdio.h>

int main()
{
    int i, arr1[5];
    for(i=0;i<5;i++)
    {
        printf("Enter Element[%d]:",i);
        scanf("%d",&arr1[i]);
    }
    printf("Array elements in reverse order are:\n");
    for(i=4;i>=0;i--)
    {
        printf("Element[%d]: %d\n",i,arr1[i]);
    }
}
```

Output:



```
Enter Element[0]:6
Enter Element[1]:7
Enter Element[2]:9
Enter Element[3]:11
Enter Element[4]:16
Array elements in reverse order are:
Element[4]: 1937583280
Element[3]: 0
Element[2]: 4195536
Element[1]: 16
Element[0]: 4195920

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 2: To find largest element in an array.

Source Code:

```
#include<stdio.h>

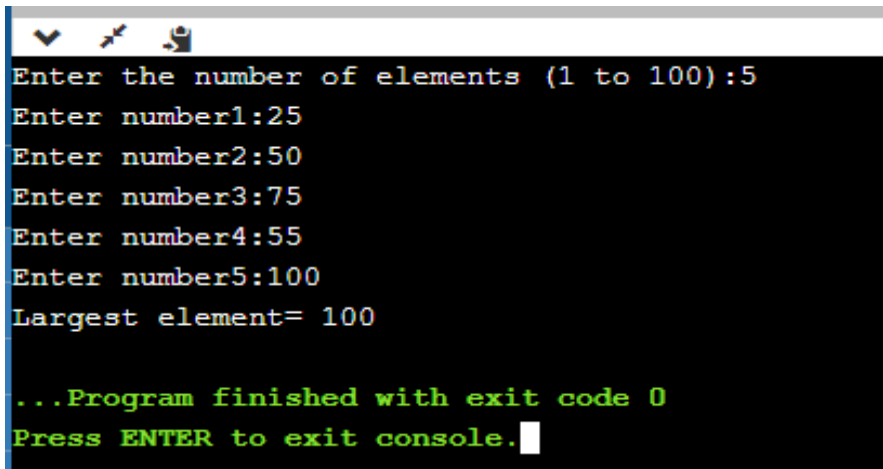
int main()
{
    int n;
    int arr[100];
    printf("Enter the number of elements (1 to 100):");
    scanf("%d",&n);

    for(int i = 0; i<n;++i)
    {
        printf("Enter number%d:",i+1);
        scanf("%d", &arr[i]);
    }

    // storing the largest number to arr[0]
    for(int i=1; i<n;++i){
        if(arr[0]<arr[i]){
```

```
    arr[0]=arr[i];  
    }  
}  
printf("Largest element= %d",arr[0]);  
return 0;  
}
```

Output:



```
Enter the number of elements (1 to 100):5  
Enter number1:25  
Enter number2:50  
Enter number3:75  
Enter number4:55  
Enter number5:100  
Largest element= 100  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```

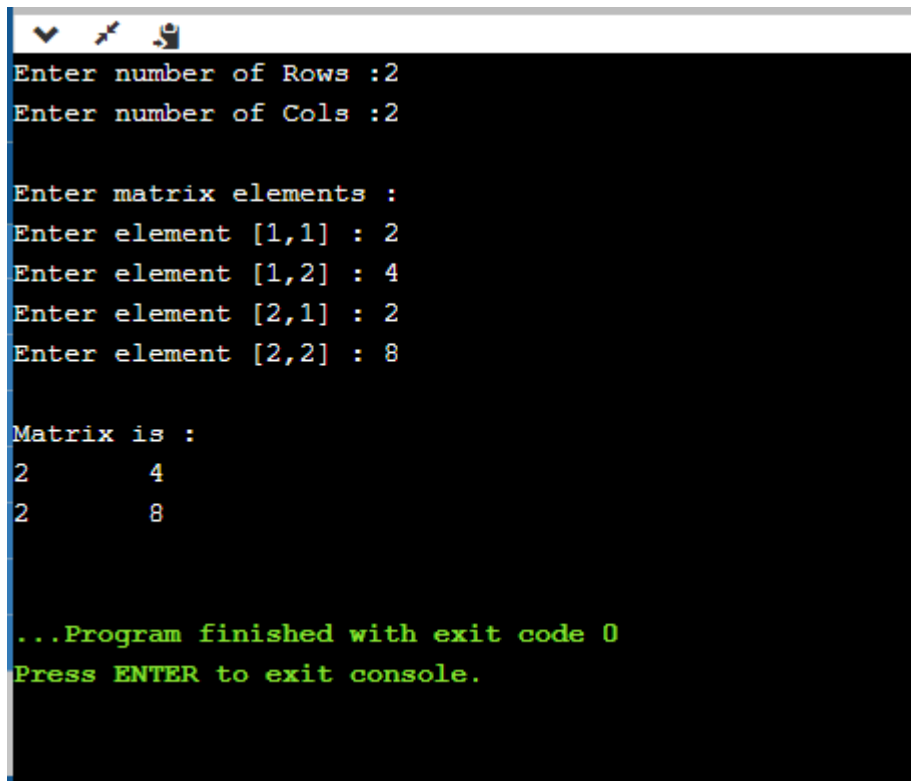
Program 3: To read and print a RxC Matrix.

Source Code:

```
#include <stdio.h>  
  
int main()  
{  
    int matrix[10][10];  
    int i,j,r,c;  
  
    printf("Enter number of Rows :");  
    scanf("%d",&r);  
    printf("Enter number of Cols :");  
    scanf("%d",&c);  
    printf("\nEnter matrix elements :\n");
```

```
for(i=0;i< r;i++)
{
for(j=0;j< c;j++)
{
printf("Enter element [%d,%d] : ",i+1,j+1);
scanf("%d",&matrix[i][j]);
}
}
printf("\nMatrix is :\n");
for(i=0;i< r;i++)
{
for(j=0;j< c;j++)
{
printf("%d\t",matrix[i][j]);
}
printf("\n"); /*new line after row elements*/
}
return 0;
}
```

Output:



```
Enter number of Rows :2
Enter number of Cols :2

Enter matrix elements :
Enter element [1,1] : 2
Enter element [1,2] : 4
Enter element [2,1] : 2
Enter element [2,2] : 8

Matrix is :
2      4
2      8

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 4: Matrix Multiplication.

Source Code:

```
#include<stdio.h>

int main(){
int a[10][10],b[10][10],mul[10][10],r,c,i,j,k;

printf("enter the number of row=");
scanf("%d",&r);
printf("enter the number of column=");
scanf("%d",&c);
printf("enter the first matrix element=\n");
for(i=0;i<r;i++)
{
for(j=0;j<c;j++)
```

```
{
scanf("%d",&a[i][j]);
}
}

printf("enter the second matrix element=\n");
for(i=0;i<r;i++)
{
for(j=0;j<c;j++)
{
scanf("%d",&b[i][j]);
}
}

printf("multiply of the matrix=\n");
for(i=0;i<r;i++)
{
for(j=0;j<c;j++)
{
mul[i][j]=0;
for(k=0;k<c;k++)
{
mul[i][j]+=a[i][k]*b[k][j]; //a=a+b is also written as a+=b
}
}
}

//for printing result
for(i=0;i<r;i++)
```

```
{  
for(j=0;j<c;j++)  
{  
printf("%d\t",mul[i][j]);  
}  
printf("\n");  
}  
return 0;  
}
```

Output:

```
enter the number of row=3
enter the number of column=3
enter the first matrix element=
2
4
6
8
9
7
6
5
4
enter the second matrix element=
1
7
8
9
6
5
4
1
2
multiply of the matrix=
62      44      48
117      117     123
67       76      81

...Program finished with exit code 0
Press ENTER to exit console.
```

Assignment Question: To print the sum of all elements in One dimensional array.

Source code:

```
#include <stdio.h>

int main()
{
    int a[100];
    int i, n, sum=0;
```



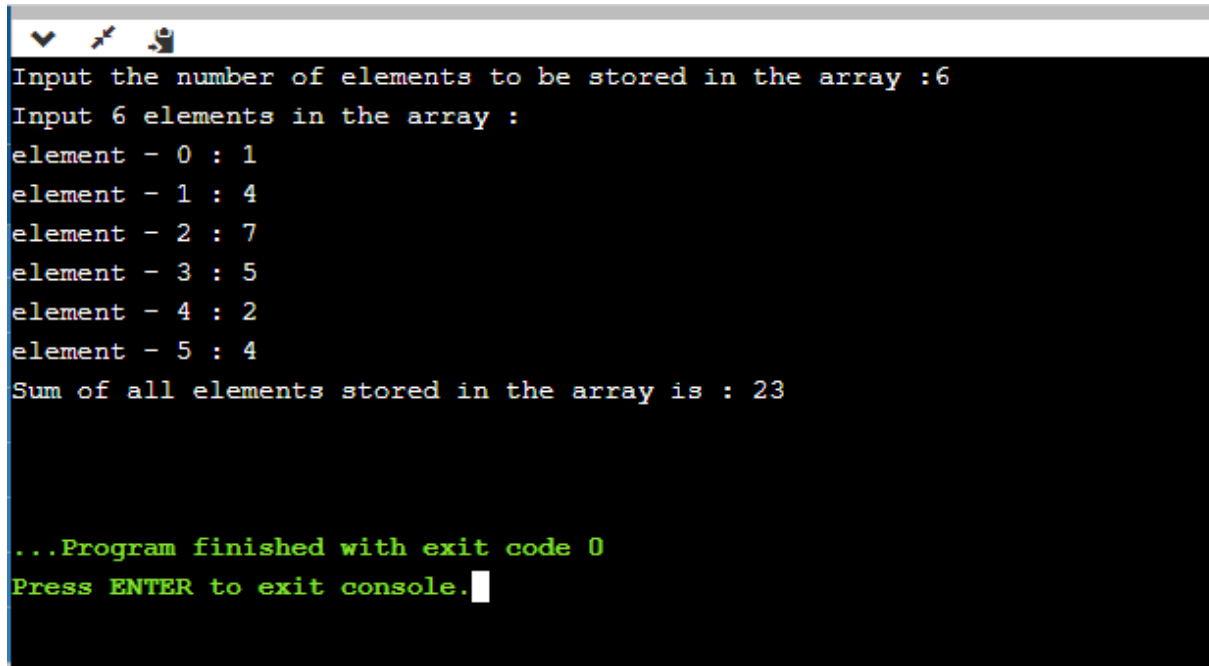
```
printf("Input the number of elements to be stored in the array :");
scanf("%d",&n);

printf("Input %d elements in the array :\n",n);
for(i=0;i<n;i++)
{
    printf("element - %d : ",i);
    scanf("%d",&a[i]);
}

for(i=0; i<n; i++)
{
    sum += a[i];
}

printf("Sum of all elements stored in the array is : %d\n\n", sum);
}
```

Output:



```
Input the number of elements to be stored in the array :6
Input 6 elements in the array :
element - 0 : 1
element - 1 : 4
element - 2 : 7
element - 3 : 5
element - 4 : 2
element - 5 : 4
Sum of all elements stored in the array is : 23

...Program finished with exit code 0
Press ENTER to exit console.
```

Practical No: 06

Aim: Programs on Strings.

Program1: To read string of words using scanf().

Source Code:

```
#include <stdio.h>

#include<string.h>

int main() {

    // Write C code here

    char w1[20],w2[20],w3[20],w4[20];

    printf("Enter text of words:");

    scanf("\n%s %s %s %s",&w1,&w2,&w3,&w4);

    printf("\nWord 1:%s",w1);

    printf("\nWord 2:%s",w2);

    printf("\nWord 3:%s",w3);

    printf("\nWord 4:%s",w4);


    return 0;

}
```

Output:

```
Enter text of words:My
Name
is
Kaysan

Word 1:My
Word 2:Name
Word 3:is
Word 4:Kaysan

...Program finished with exit code 0
Press ENTER to exit console.□
```

Program 2: Matrix Multiplication.

Source Code:

```
#include <stdio.h>

int main()
{
    char ch[30];
    printf("Enter the string: ");
    gets(ch);
    printf("you entered string here\n");
    puts(ch);
    return 0;
}
```

Output:

```
Enter the string: hello there its kaysan
you entered string here
hello there its kaysan

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 3: Program to copy one string into another.

Source Code:

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

int main()
{
    char text1[100], text2[100];

    /* Input original string from user */
    printf("Enter any string: ");
    gets(text1);

    /* Copy text1 to text2 using strcpy() */
    strcpy(text2, text1);

    printf("First string = %s\n", text1);
    printf("Second string = %s\n", text2);

    return 0;
}
```

Output:

```
Enter any string: I am doing my Practical
First string = I am doing my Practical
Second string = I am doing my Practical

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 4: To usestrupr() andstrlwr() function.

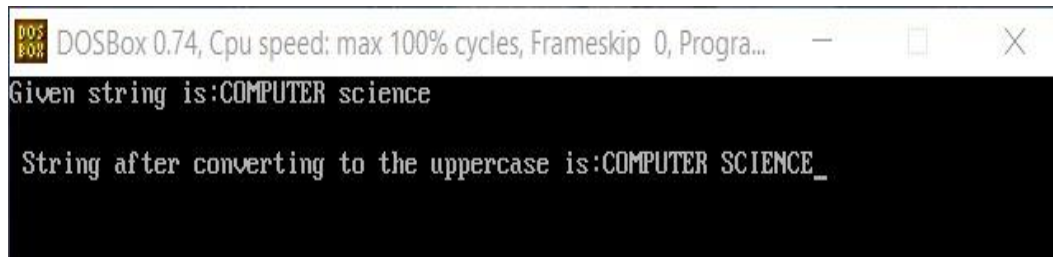
Source Code:

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

clrscr();

int main()
{
    char str[] = "COMPUTER science"
    printf("Given string is: %s\n", str);
    printf("\nstring after converting to the uppercase is: %s",strupr(str));
    getch();
}
```

Output:



```
DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Progra...
Given string is:COMPUTER science

String after converting to the uppercase is:COMPUTER SCIENCE_
```

Program 5: To use strlen() function.

Source Code:

```
#include <stdio.h>

#include <string.h>

int main()
{
    char text[100];
    int length;

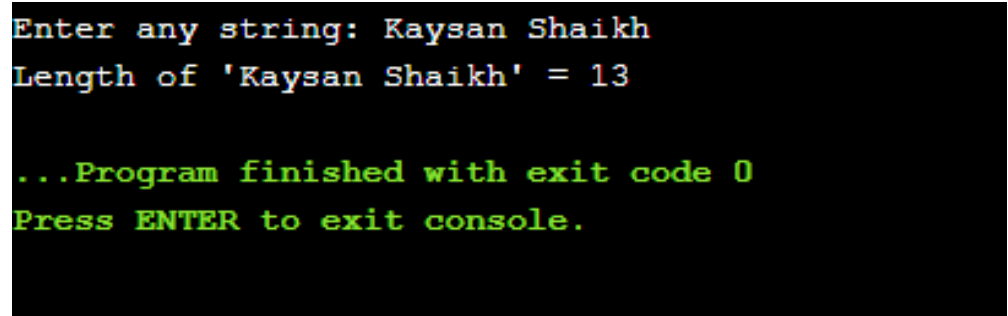
    printf("Enter any string: ");
    gets(text);

    length = strlen(text);

    printf("Length of '%s' = %d", text, length);

    return 0;
}
```

Output:

A screenshot of a terminal window with a black background and green text. The output shows the program's execution: it prompts for a string, receives 'Kaysan Shaikh', calculates its length as 13, and then displays the result. The program ends with an exit code of 0 and a prompt to press ENTER to exit the console.

```
Enter any string: Kaysan Shaikh
Length of 'Kaysan Shaikh' = 13

...Program finished with exit code 0
Press ENTER to exit console.
```

Assignment Question: Program to use strcat() function.

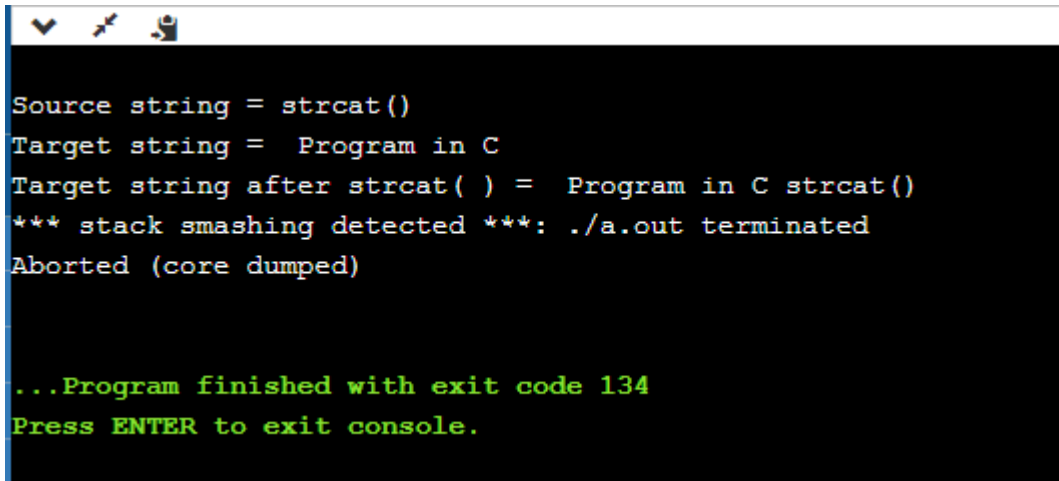
Source code:

```
#include <stdio.h>

#include <string.h>

int main( )
{
    char source[ ] = "strcat()" ;
    char target[ ]= " Program in C " ;
    printf ( "\nSource string = %s", source ) ;
    printf ( "\nTarget string = %s", target ) ;
    strcat ( target, source ) ;
    printf ( "\nTarget string after strcat( ) = %s \n", target ) ;
}
```

Output:



```
Source string = strcat()
Target string =  Program in C
Target string after strcat( ) =  Program in C strcat()
*** stack smashing detected ***: ./a.out terminated
Aborted (core dumped)

...Program finished with exit code 134
Press ENTER to exit console.
```


Practical No: 07

Aim: Programs on User-defined Functions.

Program 1: To print square of a number.

Source code:

```
#include <stdio.h>

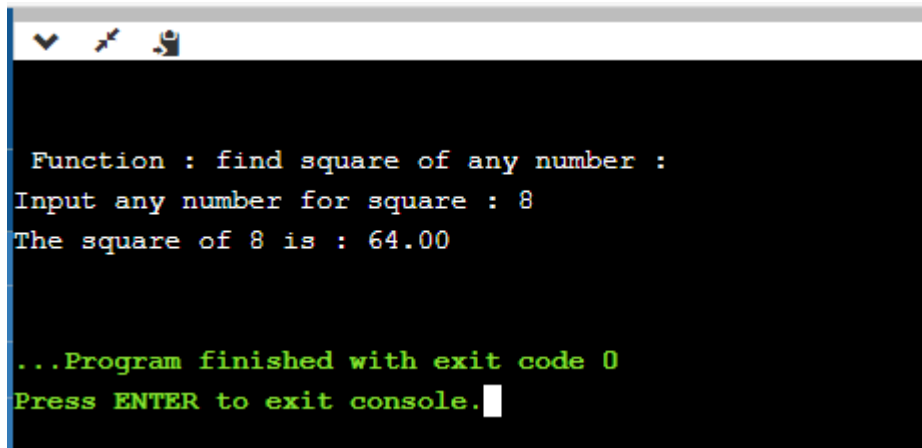
float square(float num)
{
    return (num * num);
}

int main()
{
    int num;
    float n;

    printf("\n\n Function : find square of any number :\n");

    printf("Input any number for square : ");
    scanf("%d", &num);
    n = square(num);
    printf("The square of %d is : %.2f\n", num, n);
    return 0;
}
```

Output:



```
Function : find square of any number :  
Input any number for square : 8  
The square of 8 is : 64.00  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```

Program 2: To print digit of entered number.

Source code:

```
#include<stdio.h>  
#include<conio.h>  
int get_no(void);  
void main() {  
    int m;  
    m=get_no();  
    printf("\nEntered num is=%d ",m);  
    getch();  
}  
int get_no(void)  
{  
    int num;  
    printf("Enter num:");  
    scanf("%d",&num);  
    return(num);  
}
```

Output:



Program 3: To find average of three numbers.

Source code:

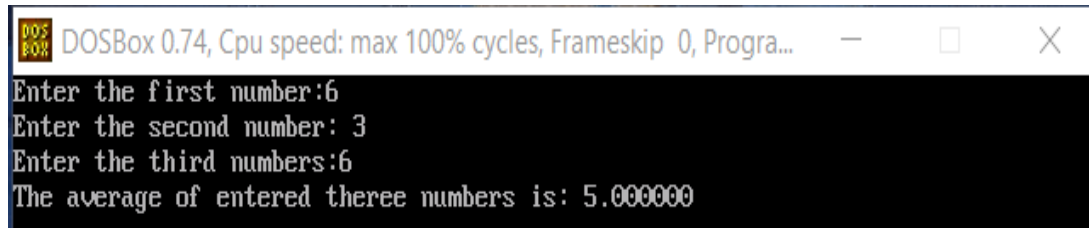
```
#include<stdio.h>
#include<conio.h>
float avg(int a,int b,int c);

void main()
{
    int a,b,c;
    float average;
    printf("Enter the first integer number: ");
    scanf("%d",&a);

    printf("Enter the second integer number: ");
    scanf("%d",&b);
    printf("Enter the third number: ");
    scanf("%d",&c);
    average=avg(a,b,c);
    printf("the average of entered three numbers is:%f",average);
    getch();
    float avg(int a,int b,int c)
```

```
{  
    int sum=a+b+c;  
    return (float)sum/3;  
}
```

Output:

A screenshot of a DOSBox 0.74 window. The title bar reads "DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Progra...". The window contains a black terminal area with white text. The text shows the program's execution: "Enter the first number:6", "Enter the second number: 3", "Enter the third numbers:6", and "The average of entered theree numbers is: 5.000000".

```
DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Progra...  
Enter the first number:6  
Enter the second number: 3  
Enter the third numbers:6  
The average of entered theree numbers is: 5.000000
```

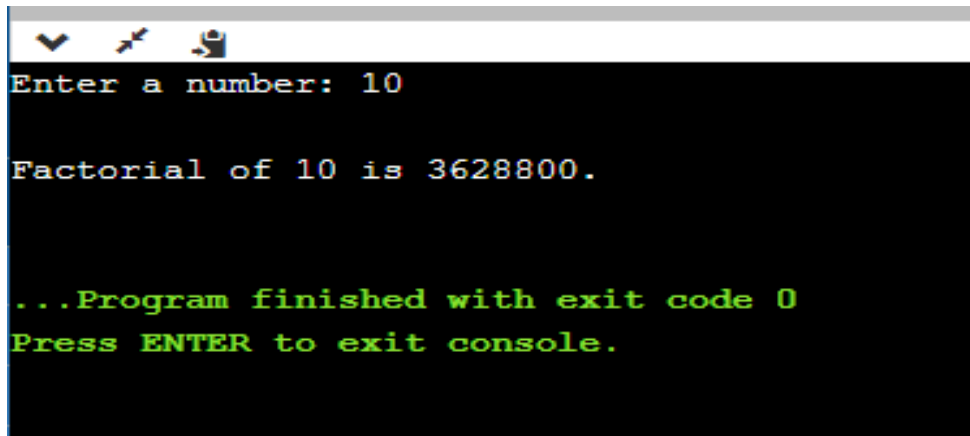
Program 4: Factorial of a number using recursion.

Source code:

```
#include <stdio.h>  
  
int fact(int);  
  
int main()  
{  
    int num;  
  
    printf("Enter a number: ");  
    scanf("%d", &num);  
  
    printf("\nFactorial of %d is %d.\n", num, fact(num));  
  
    return 0;  
}
```

```
int fact(int num)
{
    if(num)
        return(num * fact(num - 1));
    else
        return 1;
}
```

Output:



```
Enter a number: 10

Factorial of 10 is 3628800.

...Program finished with exit code 0
Press ENTER to exit console.
```

Assignment Question: To find the cube root of a number using function.

Source code:

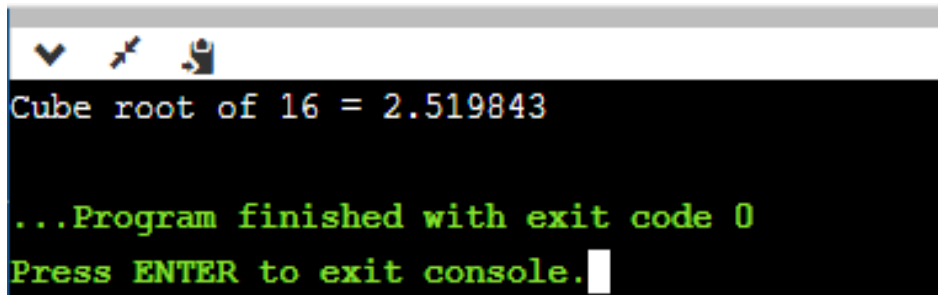
```
#include <stdio.h>

double cubeRoot(double n) {
    double i, precision = 0.000001;
    for(i = 1; (i*i*i) <= n; ++i);
    for(--i; (i*i*i) < n; i += precision);
    return i;
}

int main() {
```

```
int n = 16;  
printf("Cube root of %d = %lf", n, cubeRoot(n));  
return 0;  
}
```

Output:



```
Cube root of 16 = 2.519843  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```

Practical No: 08

Aim: Programs on Pointers.

Program1: To show the basic declaration of pointer.

Source Code:

```
#include <stdio.h>

int main()
{
    int m=10, n, o;
    int *z=&m;

    printf("\n\n z stores the address of m = %p\n", z); //& //*
    printf("\n *z stores the value of m= %i\n", *z);
    printf("\n &m is the address of m= %p\n", &m);
    printf("\n &n stores the address of n= %p\n", &n);
    printf("\n &o stores the address of o= %p\n", &o);
    printf("\n &z stores the address of z= %p\n\n", &z);
    return 0;
}
```

Output:

```
z stores the address of m = 0x7ffc294e470c
*z stores the value of m= 10
&m is the address of m= 0x7ffc294e470c
&n stores the address of n= 0x7ffc294e4710
&o stores the address of o= 0x7ffc294e4714
&z stores the address of z= 0x7ffc294e4718

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 2: To find difference of two numbers using pointers.

Source code:

```
#include <stdio.h>

int main()
{
    int fno, sno, *ptr, *qtr, sub;

    printf(" Input the first number : ");
    scanf("%d", &fno);
    printf(" Input the second number : ");
    scanf("%d", &sno);

    ptr = &fno;
    qtr = &sno;
```

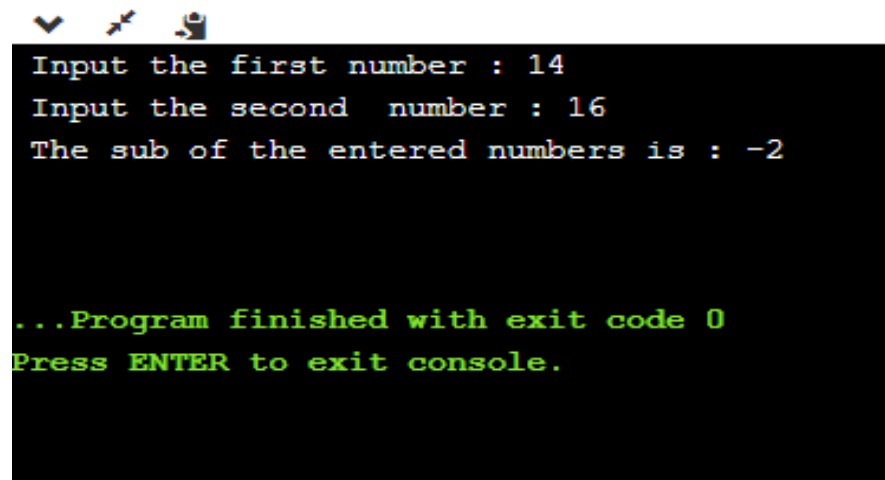


```
sub = *ptr - *qtr;

printf(" The sub of the entered numbers is : %d\n\n",sub);

return 0;
}
```

Output:

A screenshot of a terminal window with a black background and green text. It shows the execution of a C program. The first two lines are prompts for input: "Input the first number : 14" and "Input the second number : 16". The third line shows the result: "The sub of the entered numbers is : -2". Below this, it says "...Program finished with exit code 0" and "Press ENTER to exit console.".

```
Input the first number : 14
Input the second number : 16
The sub of the entered numbers is : -2

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 3: To swap elements using call by reference.

Source code:

```
#include <stdio.h>

void swapNumbers(int *x,int *y);

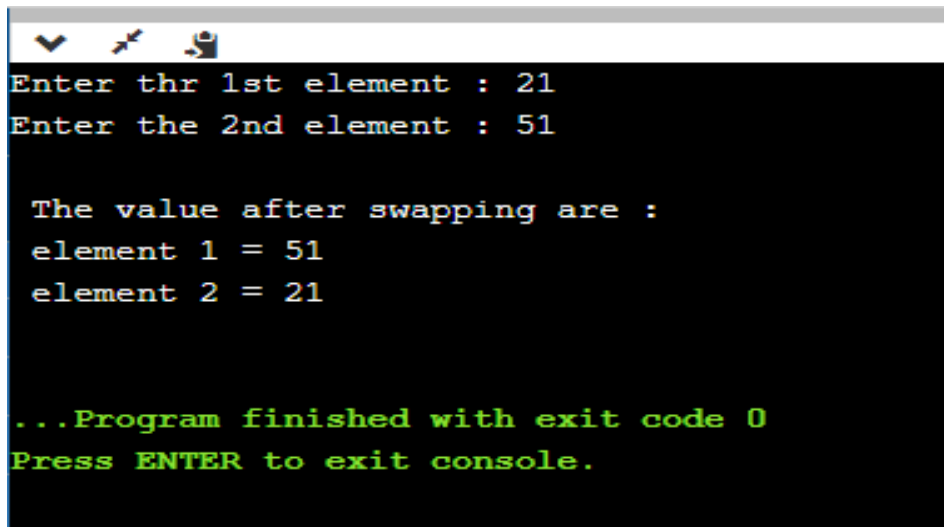
int main()
{
    int e1,e2;
    printf("Enter thr 1st element : ");
    scanf("%d",&e1);

    printf("Enter the 2nd element : ");
    scanf("%d",&e2);

    swapNumbers(&e1,&e2);
}
```

```
printf("\n The value after swapping are :\n");  
printf(" element 1 = %d\n element 2 = %d\n",e1,e2);  
return 0;  
}  
void swapNumbers(int *x,int *y)  
{  
    int tmp;  
    tmp=*y;  
    *y=*x;  
    *x=tmp;  
    return 0;  
}
```

Output:



```
Enter thr 1st element : 21  
Enter the 2nd element : 51  
  
The value after swapping are :  
element 1 = 51  
element 2 = 21  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```

Program 4: To print elements of arrays using pointers.

Source code:

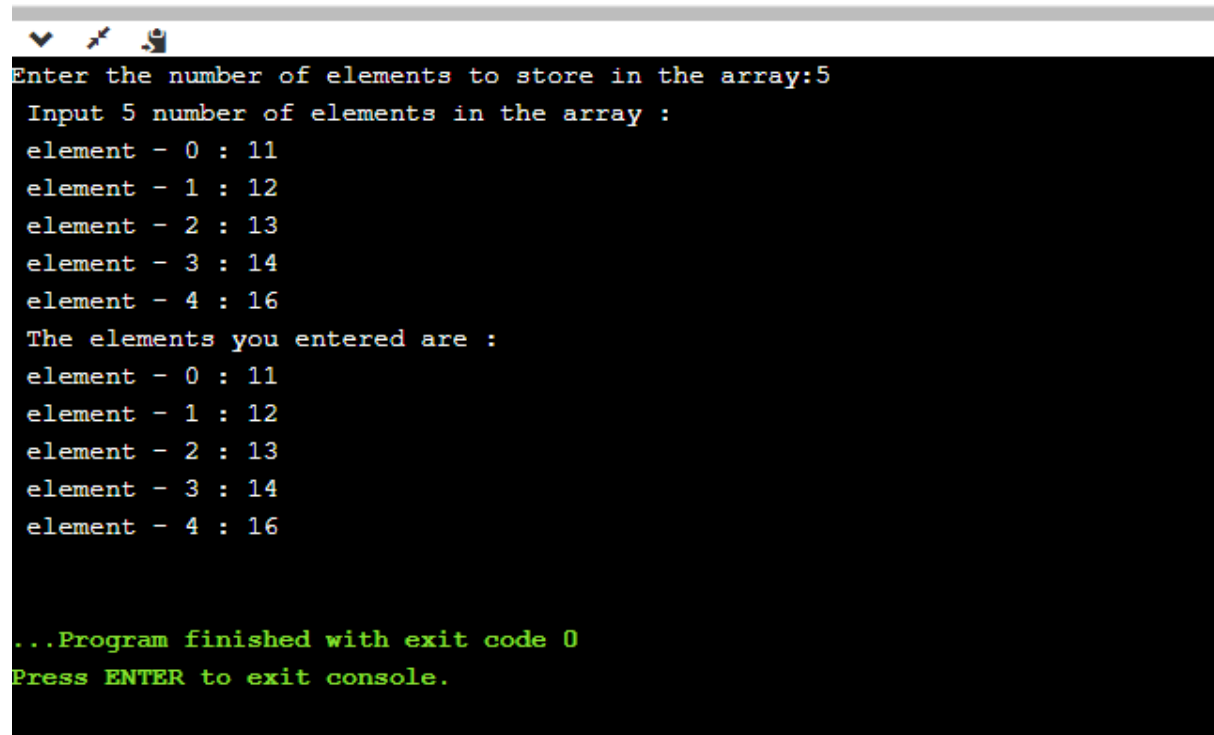
```
#include <stdio.h>  
  
int main()  
{
```

```
int arr1[25], i,n;

printf("Enter the number of elements to store in the array:");
scanf("%d",&n);

printf(" Input %d number of elements in the array :\n",n);
for(i=0;i<n;i++)//5
{
    printf(" element - %d : ",i);
    scanf("%d",arr1+i);
}
printf(" The elements you entered are : \n");
for(i=0;i<n;i++)
{
    printf(" element - %d : %d \n",i,*(arr1+i));
}
return 0;
}
```

Output:



```
Enter the number of elements to store in the array:5
Input 5 number of elements in the array :
element - 0 : 11
element - 1 : 12
element - 2 : 13
element - 3 : 14
element - 4 : 16
The elements you entered are :
element - 0 : 11
element - 1 : 12
element - 2 : 13
element - 3 : 14
element - 4 : 16

...Program finished with exit code 0
Press ENTER to exit console.
```

Practical No: 09

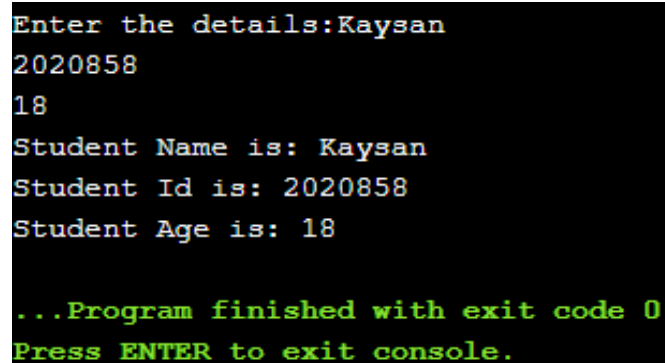
Aim: Program on Structures.

Program1: Student Structure.

Source Code:

```
#include <stdio.h>
struct StudentData{
char stu_name[50];
int stu_id;
int stu_age;
};
int main()
{
struct StudentData s; //s.sname,s.age,s.id
printf("Enter the details:");
scanf("%s %d %d",&s.stu_name,&s.stu_id,&s.stu_age);
/* Displaying the values of struct members */
printf("Student Name is: %s", s.stu_name);
printf("\nStudent Id is: %d", s.stu_id);
printf("\nStudent Age is: %d", s.stu_age);
return 0;
}
```

Output:



```
Enter the details:Kaysan
2020858
18
Student Name is: Kaysan
Student Id is: 2020858
Student Age is: 18

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 2: Employee comparison.

Source code:

```
#include <stdio.h>

struct emp{
    int eno,salary;
};

int main() {
    // Write C codehere

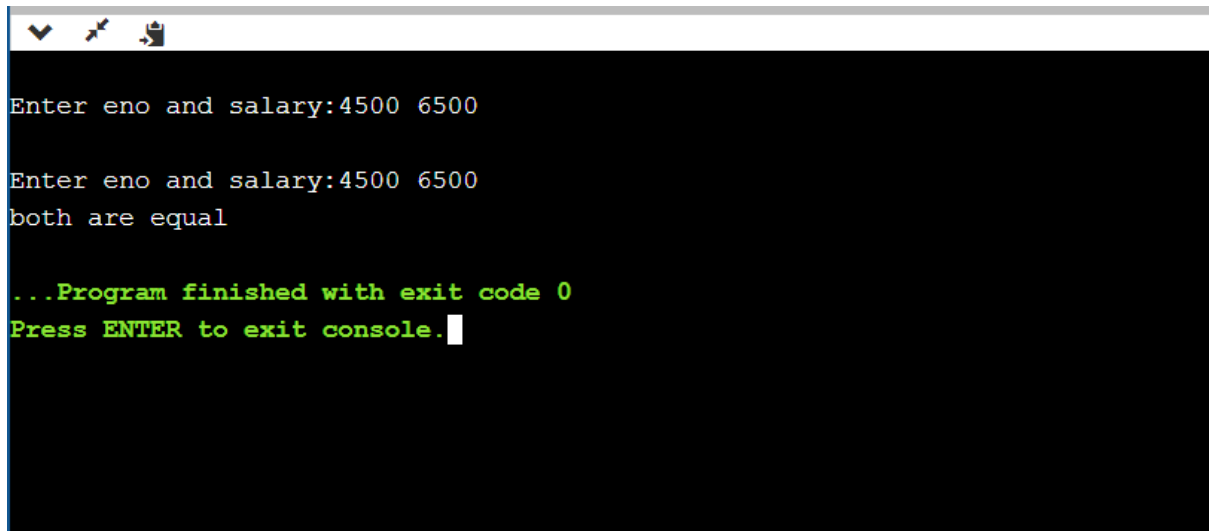
    struct emp n,y; //n is for 1st employee & y is for second employee
    printf("\nEnter eno and salary:");
    scanf("%d %d",&n.eno,&n.salary);//for 1st employee

    printf("\nEnter eno and salary:");
    scanf("%d %d",&y.eno,&y.salary);//for 2nd employee

    if(n.eno==y.eno & n.salary==y.salary)
    {
        printf("both are equal");
    }
    else
        printf("both are unequal");

    return 0;
}
```

Output:

A screenshot of a console window with a black background and white text. The text shows the program's execution: it prompts for 'eno' and 'salary', receives the input '4500 6500', and outputs 'both are equal'. It then shows the program finishing with exit code 0 and a prompt to press ENTER to exit the console.

```
Enter eno and salary:4500 6500
Enter eno and salary:4500 6500
both are equal

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 3: Fruit Structure.

Source code:

```
#include <stdio.h>

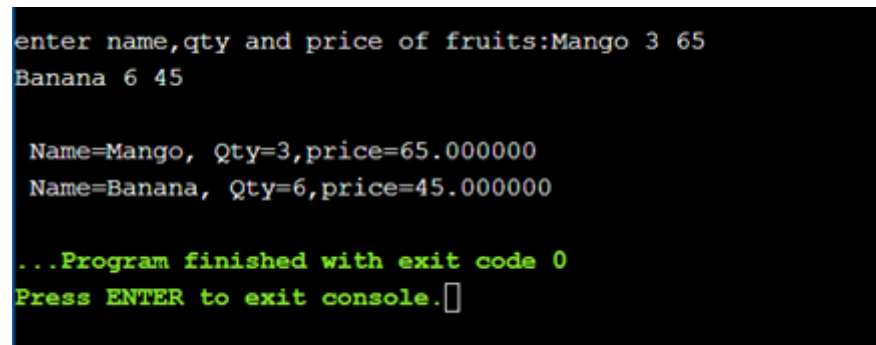
#include <string.h>

struct fruit
{
    char name[50];
    int qty;
    float price;
};

int main()
{
    int i;
    struct fruit f1[5]; //int arr[5]
    printf("enter name,qty and price of fruits:");
    for(i=0;i<2;i++)
```

```
{  
scanf("%s %d %f",f1[i].name,&f1[i].qty,&f1[i].price);  
}  
for(i=0;i<2;i++)  
{  
printf("\n Name=%s, Qty=%d,price=%f",f1[i].name,f1[i].qty,f1[i].price);  
}  
return 0;  
}
```

Output:



```
enter name,qty and price of fruits:Mango 3 65  
Banana 6 45  
  
Name=Mango, Qty=3,price=65.000000  
Name=Banana, Qty=6,price=45.000000  
  
...Program finished with exit code 0  
Press ENTER to exit console.█
```

Assignment Question: Create a structure for books.

Source Code:

```
#include<stdio.h>  
#include<string.h>  
#define SIZE 20  
  
struct bookdetail  
{  
    char name[20];  
    char author[20];
```



```
        int pages;

        float price;

};

void output(struct bookdetail v[],int n);

void main()
{
    struct bookdetail b[SIZE];

    int num,i;
    printf("Enter the Numbers of Books:");
    scanf("%d",&num);
    printf("\n");
    for(i=0;i<num;i++)

    {

        printf("\t=:Book %d Detail:=\n",i+1);

        printf("\nEnter the Book Name:\n");
        scanf("%s",b[i].name);

        printf("Enter the Author of Book:\n");
        scanf("%s",b[i].author);
```

```
        printf("Enter the Pages of Book:\n");
        scanf("%d",&b[i].pages);

        printf("Enter the Price of Book:\n");
        scanf("%f",&b[i].price);

    }

    output(b,num);

}

void output(struct bookdetail v[],int n)

{

    int i,t=1;

    for(i=0;i<n;i++,t++)

    {

        printf("\n");

        printf("Book No.%d\n",t);

        printf("\t\tBook %d Name is=%s \n",t,v[i].name);
```

```
printf("\t\tBook %d Author is=%s \n",t,v[i].author);
```

```
printf("\t\tBook %d Pages is=%d \n",t,v[i].pages);
```

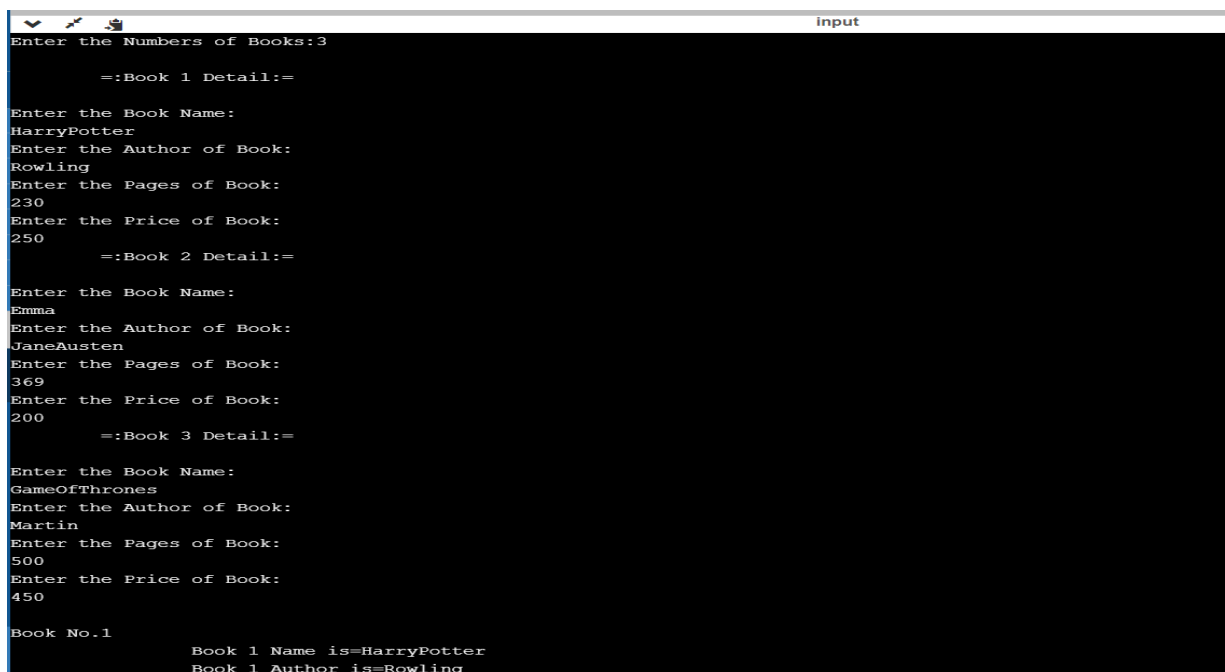
```
printf("\t\tBook %d Price is=%f \n",t,v[i].price);
```

```
printf("\n");
```

```
}
```

```
}
```

Output:



```
input
Enter the Numbers of Books:3

==Book 1 Detail:=
Enter the Book Name:
HarryPotter
Enter the Author of Book:
Rowling
Enter the Pages of Book:
230
Enter the Price of Book:
250

==Book 2 Detail:=
Enter the Book Name:
Emma
Enter the Author of Book:
JaneAustin
Enter the Pages of Book:
369
Enter the Price of Book:
200

==Book 3 Detail:=
Enter the Book Name:
GameOfThrones
Enter the Author of Book:
Martin
Enter the Pages of Book:
500
Enter the Price of Book:
450

Book No.1
Book 1 Name is=HarryPotter
Book 1 Author is=Rowling
```