

EXERCISE 1

Write a C Program to find area of a triangle.

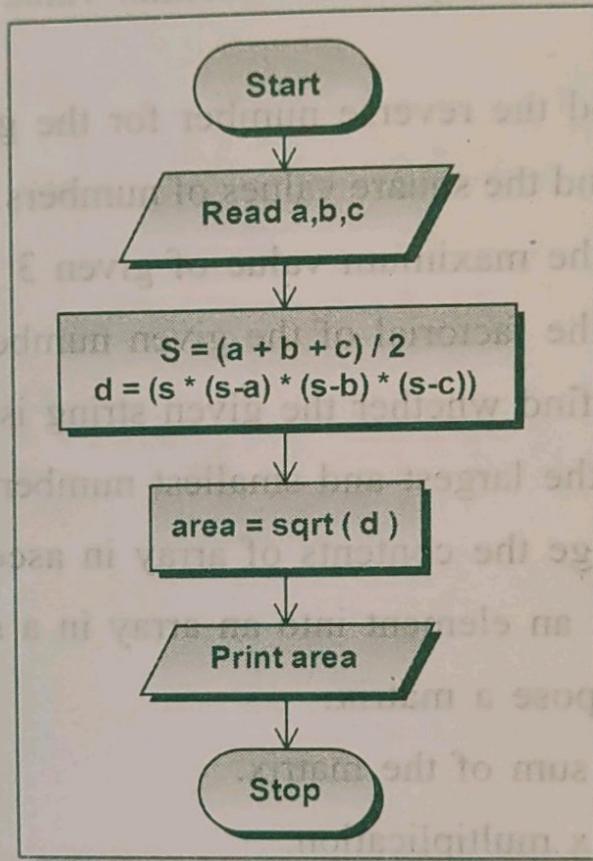
Aim

To write a program in C to find the area of a given triangle of sides a,b,c.

Algorithm

- Step-1** Start
- Step-2** Read the input values for sides of a triangle a,b,c
- Step-3** Compute $s = (a + b + c) / 2$
- Step-4** Compute $d = (s * (s-a) * (s-b) * (s-c))$
- Step-5** Compute the area of triangle area = \sqrt{d}
- Step-6** Print area
- Step-7** Stop

Flowchart



Program

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
void main()
{
    int a,b,c;
    float s,d,area;
    clrscr();
    printf("Enter three sides :");
```

```

scanf("%d%d%d",&a,&b,&c);
s=(a+b+c)/2;
d =(s*(s-a)*(s-b)*(s-c));
area=sqrt(d);
printf("Area of triangle = %f sq units \n",area);
getch();
}

```

Output

Enter three sides : 5 6 7
 Area of triangle = 14.696939 sq units

EXERCISE-2

Write a C program to find the square root for the given value.

Aim To write a program in C to find the square root value.

Algorithm

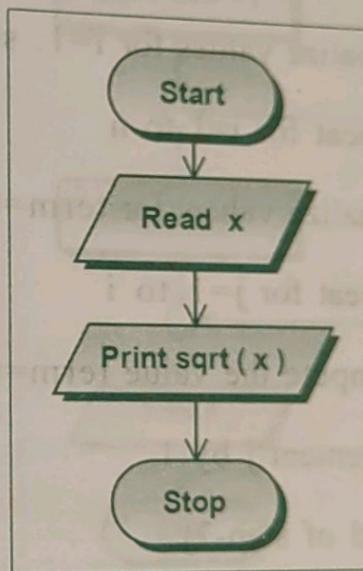
- Step-1 Start
- Step-2 Input the value of x
- Step-3 Compute and print the value of \sqrt{x}
- Step-4 Stop

Program

```

#include<stdio.h>
#include<conio.h>
#include<math.h>
void main()
{
    float x;
    clrscr();
    printf("Enter the value of x : ");
    scanf("%f",&x);
    printf("Square root of %.2f is %.2f",x,sqrt(x));
    getch();
}

```

Flowchart

Output

Enter the value of x : 81
 Square root of 81.00 is 9.00

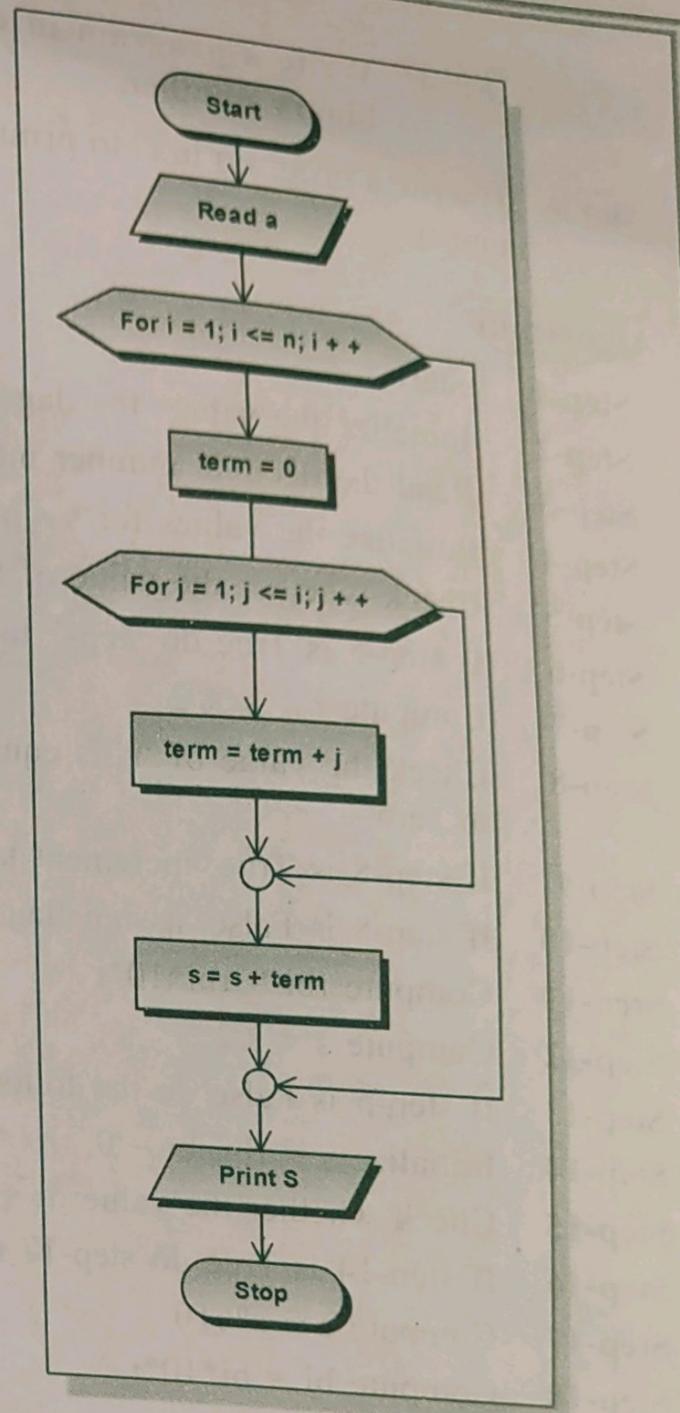
EXERCISE-3 Write a C program to find sum of the series
 $0+1+(1+2)+(1+2+3)+\dots+n$.

Aim To write a program in C to find sum of the series $0+(1+2)+(1+2+3)+\dots+n$

Algorithm

- Step-1** Start
- Step-2** Read the value of n
- Step-3** Initialize values for $i=1$, $s=0$
- Step-4** Repeat for $i=1$ to n
- Step-5** Initialize values for term=0, $j=1$
- Step-6** Repeat for $j=1$ to i
- Step-7** Compute the value term=term+j
- Step-8** Increment j by 1
- Step-9** [End of step-7]
- Step-10** Compute $s = s + \text{term}$
- Step-11** Increment i by 1
- Step-12** Print the value of s
- Step-13** Stop

Flowchart



Program

```

#include<stdio.h>
#include<conio.h>
void main()
{
    int i,j,n,s,term;
    //clrscr();
    printf("Enter the value n :");
    scanf("%d",&n);
    s=0;
    for(i=1;i<=n;i++)
    {
        term=0;
        for(j=1;j<=i;j++)
        {
            term=term+j;
        }
        s=s+term;
    }
    printf("Sum of the series S=%d.",s);
    getch();
}
  
```

Output

Enter the value n : 4
Sum of the series S = 20



EXERCISE-4

Write a program in C to convert the decimal number into binary number.

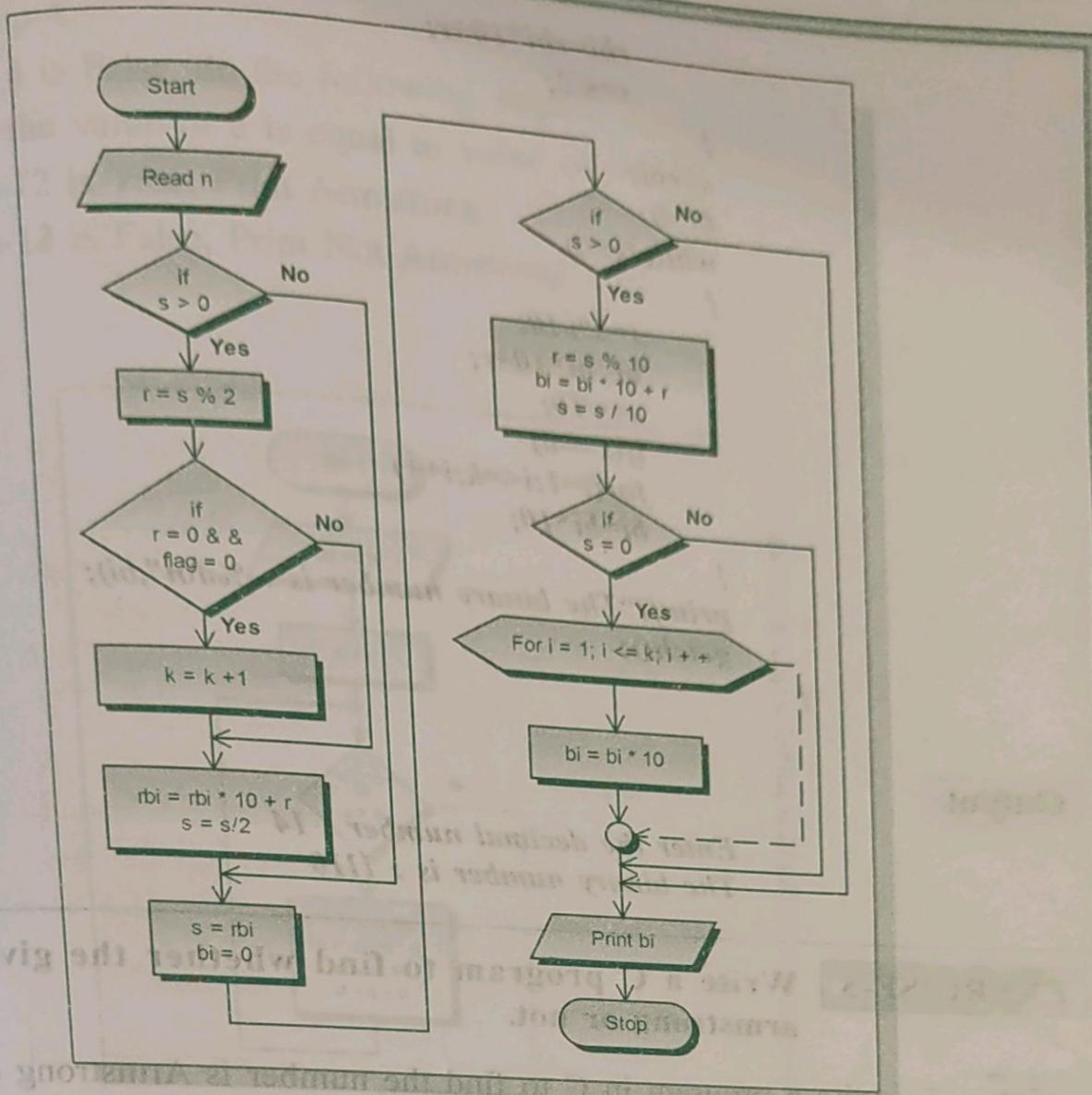
Aim

To write a program in C to print equivalent binary number for the decimal number.

Algorithm

- Step-1** Start
- Step-2** Initialize the values for flag = 0, k = 0
- Step-3** Read the decimal number into n.
- Step-4** Initialize the values for s = n, rbi = 0
- Step-5** Check whether the value of S is greater than zero.
- Step-6** If step-5 is True do step-7 to step-12
- Step-7** Compute $r = s \% 2$
- Step-8** Check the value of 'r' is equal to zero and the value of flag is equal to zero.
- Step-9** If step-8 is True, increment k by 1
- Step-10** If step-8 is False, assign flag = 1
- Step-11** Compute $rbi = rbi * 10^*r$
- Step-12** Compute $s = s/2$
- Step-13** If step-5 is False do the following steps
- Step-14** Initialize s = rbi, bi = 0
- Step-15** Check whether the value of s is greater than zero or not.
- Step-16** If step-14 is True do step-17 to step-25
- Step-17** Compute $r = s \% 10$
- Step-18** Compute $bi = bi * 10^*r$
- Step-19** Compute $s = s/10$
- Step-20** Check s is equal to zero
- Step-21** If step-20 is True do the following steps
- Step-22** Repeat for i = 1 to k
- Step-23** Compute $bi = bi * 10$
- Step-24** Increment i by 1
- Step-25** [End of step-22]
- Step-26** Print the value of bi
- Step-27** Stop

chart



program

```

#include<stdio.h>
#include<conio.h>
#include<math.h>
void main()
{
    int n,s,r,i,bi,rbi,flag=0,k=0;
    clrscr();
    printf("Enter the decimal number :");
    scanf("%d",&n);
    s=n;rbi=0;
    while(s>0)
    {
        r=s % 2;
        if (r==0 && flag == 0)
            k++;
        else
            flag=1;
    }
}
  
```

```

rbi=rbi*10+r;
s=s/2;
}
s=rbi;
bi=0;
while(s>0)
{
    r=s%10;
    bi=bi*10+r;
    s=s/10;
    if(s==0)
        for(i=1;i<=k;i++)
            bi=bi*10;
    }
printf("The binary number is : %d\n",bi);
getch();
}

```

Output

*Enter the decimal number : 14
The binary number is : 1110*

EXERCISE-5 Write a C program to find whether the given number is armstrong or not.

Aim To write a program in C to find the number is Armstrong or not.



The sum of the each digit cubic value of a number is equal to its original number is called Armstrong.

$$\text{eg. } 153 = 1^3 + 5^3 + 3^3 = 153$$

Algorithm

- Step-1** Start
- Step-2** Read the value to the a
- Step-3** Assign value a to the variable e
- Step-4** Check whether the value of a is greater than zero or not
- Step-5** If step-4 is True, do step-6 to step-10
- Step-6** Compute b = a%10
- Step-7** Compute c = b*b*b
- Step-8** Compute a = a/10
- Step-9** Compute d = c + d

Step-10 goto step-4

If step-4 is False, do the following steps.

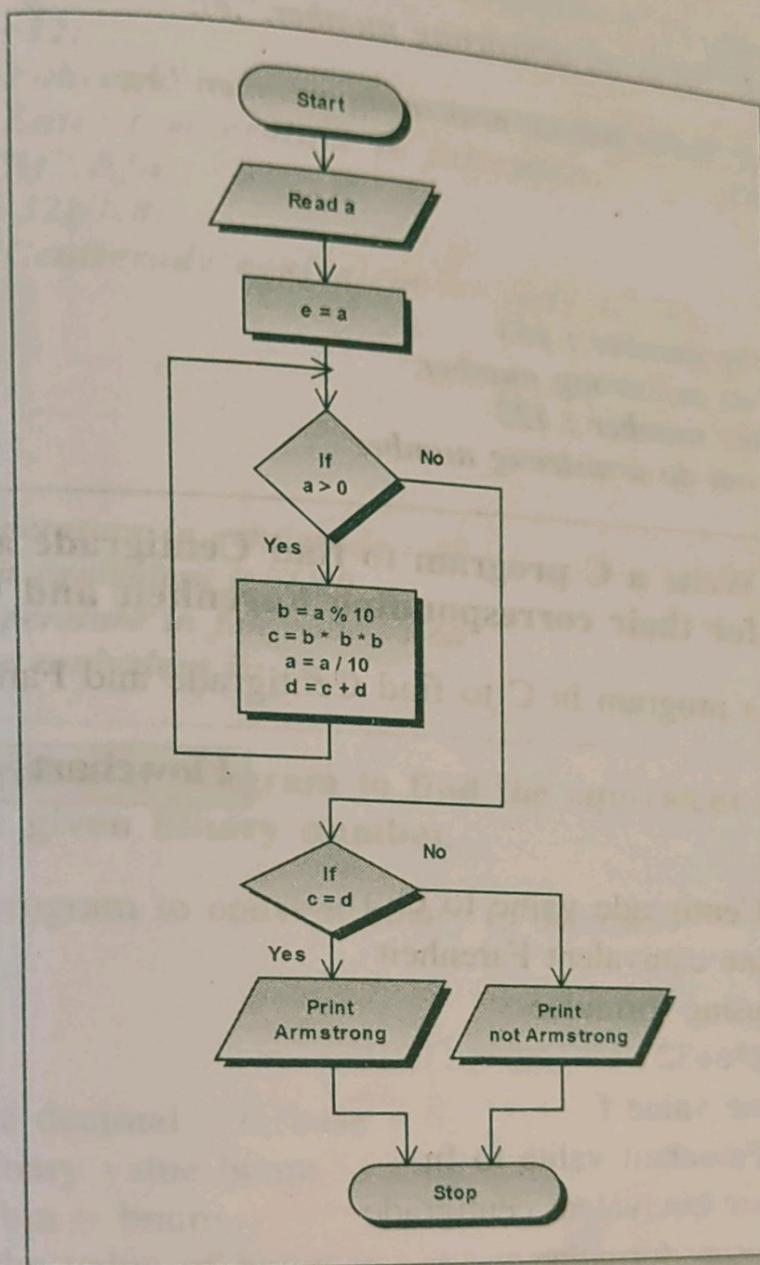
Check the value of e is equal to value of d

If step-12 is True, Print Armstrong

If step-12 is False, Print Not Armstrong

Stop

Flowchart



Program

```

#include<stdio.h>
#include<conio.h>
void main()
{
    int a,b,c,d,e;
    clrscr();
    printf("Enter the number :");
  
```

```

scanf("%d",&a);
e=a;
while(a>0)
{
    b=a%10;
    c=b*b*b;
    a=a/10;
    d=c+d;
}
if(e==d)
printf("%d is an armstrong number.",e);
else
printf("%d is not an armstrong number.",e);
getch();
}

```

Output

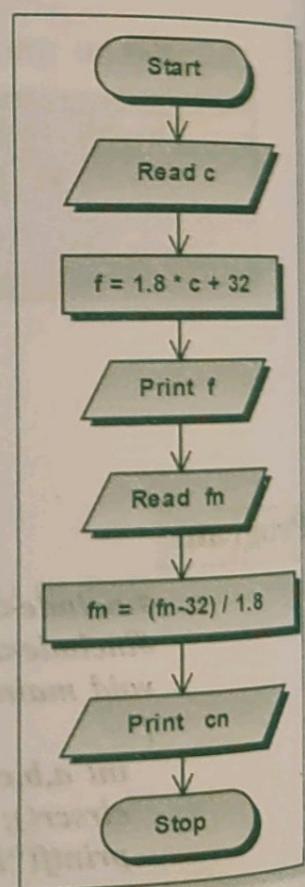
Enter the number : 153
153 is an armstrong number.
Enter the number : 123
123 is not an armstrong number

EXERCISE-6 Write a C program to find Centigrade and Farenheit values for their corresponding Farenheit and Centigrade values.

Aim To write a program in C to find Centigrade and Farenheit values.

Algorithm

- Step-1** Start
- Step-2** Read Centigrade value to C
- Step-3** Compute equivalent Farenheit value using formulae
 $f = 1.8 * c + 32$
- Step-4** Print the value f
- Step-5** Read Farenheit value to fn
- Step-6** Compute equivalent centigrade value using formulae
 $cn = (fn - 32) / 1.8$
- Step-7** Print the value of cn
- Step-8** Stop

Flowchart

Program

```
#include<stdio.h>
#include<conio.h>
void main()
{
    float c,f,cn,fn;
    clrscr();
    printf("Enter temperature in centigrade :");
    scanf("%f",&c);
    f=1.8*c+32;
    printf("Fahrenheit equivalent is :%.1f\n",f);
    printf("Enter temperature in fahrenheit :");
    scanf("%f",&fn);
    cn=(fn-32)/1.8;
    printf("Centigrade equivalent is: %.1f\n",cn);
    getch();
}
```

Output

```
Enter temperature in centigrade : 20
Fahrenheit equivalent is :68.0
Enter temperature in fahrenheit : 68
Centigrade equivalent is: 20.0
```

EXERCISE-7

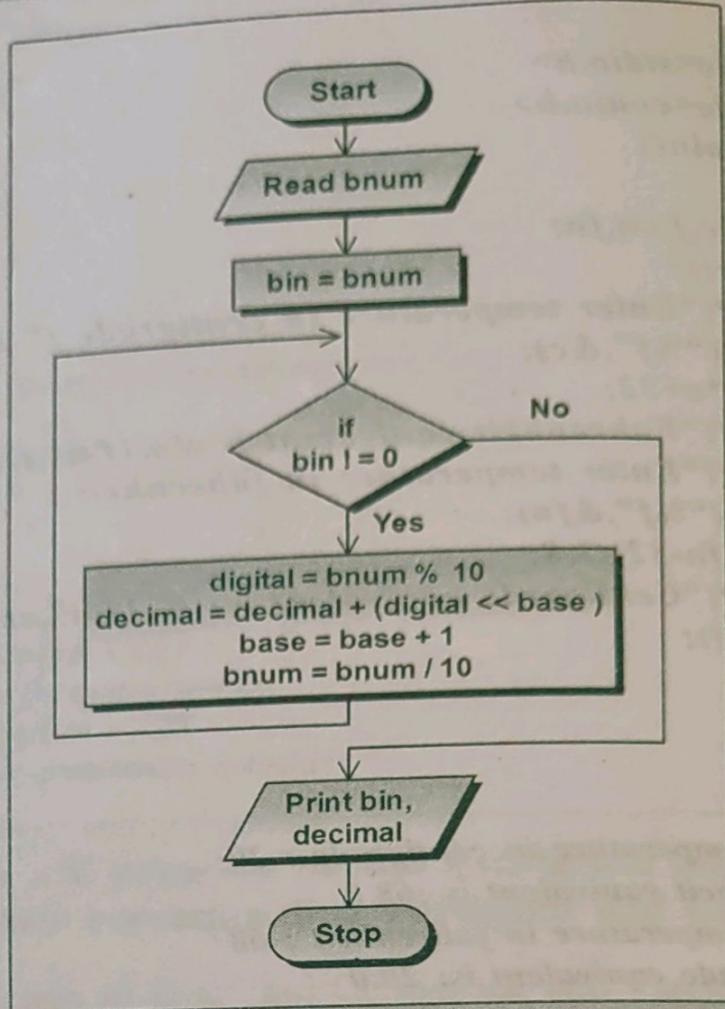
Write a C program to find the equivalent decimal value for the given binary number.

Aim

To write a program to convert binary to decimal.

Algorithm

- Step-1** Start
- Step-2** Initialize decimal = 0, base = 0
- Step-3** Read binary value bnum
- Step-4** Assign bin = bnum
- Step-5** Check the value of bnum is not equal to zero or not
- Step-6** If step-5 is True, do step-7 to step-10
- Step-7** Compute digit = bnum%10
- Step-8** Compute decimal = decimal + (digit << base)
- Step-9** Increment base by 1
- Step-10** Compute bnum = bnum/10
- Step-11** If step-5 is False, print decimal.
- Step-12** Stop

Flowchart**Program**

```

#include<stdio.h>
#include<conio.h>
void main()
{
    int bnum,digit,decimal =0,bin,base=0;
    clrscr();
    printf("Enter the binary number: ");
    scanf("%d",&bnum);
    bin=bnum;
    while(bnum!=0)
    {
        digit=bnum%10;
        decimal=decimal+(digit<<base);
        base=base+1;
        bnum=bnum/10;
    }
    printf("The binary equivalent of %d in decimal = %d", bin, decimal);
    getch();
}
  
```

Output

Enter the binary number: 1111
 The binary equivalent of 1111 in decimal = 15

EXERCISE-8

Write a C program to find the reverse number for the given number.

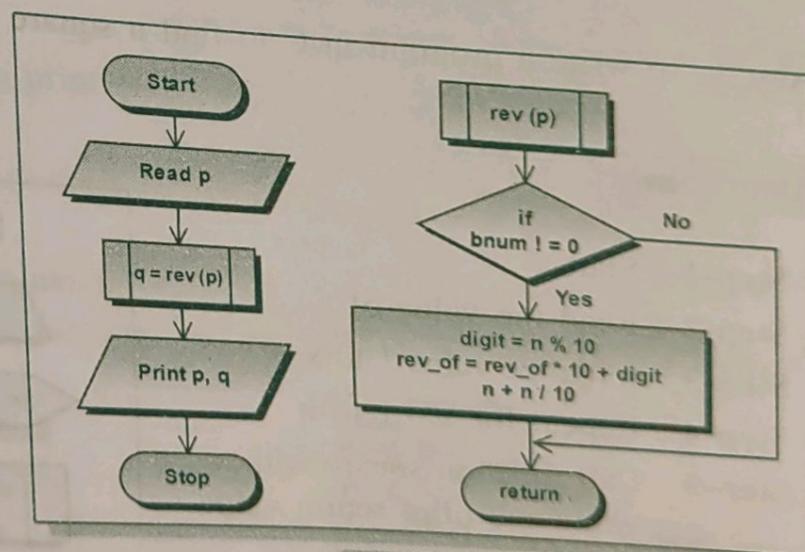
Aim

To write a program in C to find reverse number.

Algorithm

- Step-1** Start
- Step-2** Read the value for p
- Step-3** Call the function rev and assign the return value to q
- Step-4** Print the values of p and q
- Rev(n)** Function

- Step-1** Check whether the value of n is not equal to zero or not
- Step-2** If step-1 is True do step-3 to step-5
- Step-3** Compute digit=n%10
- Step-4** Compute rev_of = rev_of*10 + digit
- Step-5** Compute n = n/10
- Step-6** Return value of rev_of
- Step-7** End of Rev(n)

Flowchart**Program**

```

#include<stdio.h>
#include<conio.h>
int rev(int number);
void main()
{
    int p,q;
    clrscr();
  
```

```

printf("Enter the number : ");
scanf("%d",&p);
q=rev(p);
printf("Reverse of %d is %d \n",p,q);
getch();
}

int rev(int n)
{
    int digit, rev_of=0;
    while(n!=0)
    {
        digit = n% 10;
        rev_of = rev_of*10+digit;
        n=n/10;
    }
    return(rev_of);
}

```

Output

Enter the number : 1234
 Reverse of 1234 is 4321

EXERCISE 9 Write a program in C to find the square values of numbers upto given n numbers.

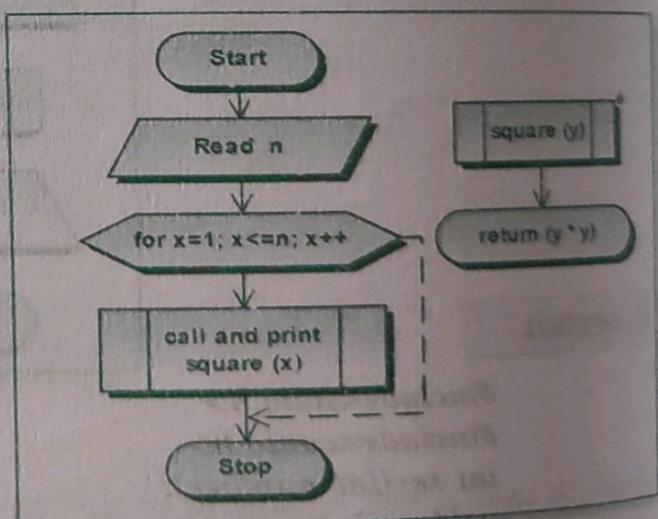
Aim To write a program in C to find n square values.

Algorithm

- Step-1** Start
- Step-2** Read the value of n
- Step-3** Initialize value 1 to x
- Step-4** Repeat for $x = 1$ to n
- Step-5** Call function square with x value and print return value
- Step-6** Increment x by 1
- Step-7** Stop

Square(y) – Function

- Step-1** Compute and return the value of $y*y$
- End of square(y)

Flowchart

Program

```
#include<stdio.h>
#include<conio.h>
int square(int);
void main()
{
    int x,n;
    clrscr();
    printf("Enter the nth element :");
    scanf("%d",&n);
    for(x=1;x<=n;x++)
        printf("%d ",square(x));
    printf("\n");
    getch();
}
int square(int y)
{
    return y*y;
}
```

Output

Enter the nth element :8
 1 4 9 16 25 36 49 64

EXERCISE-10 Write a program to find the maximum value of given 3 numbers.

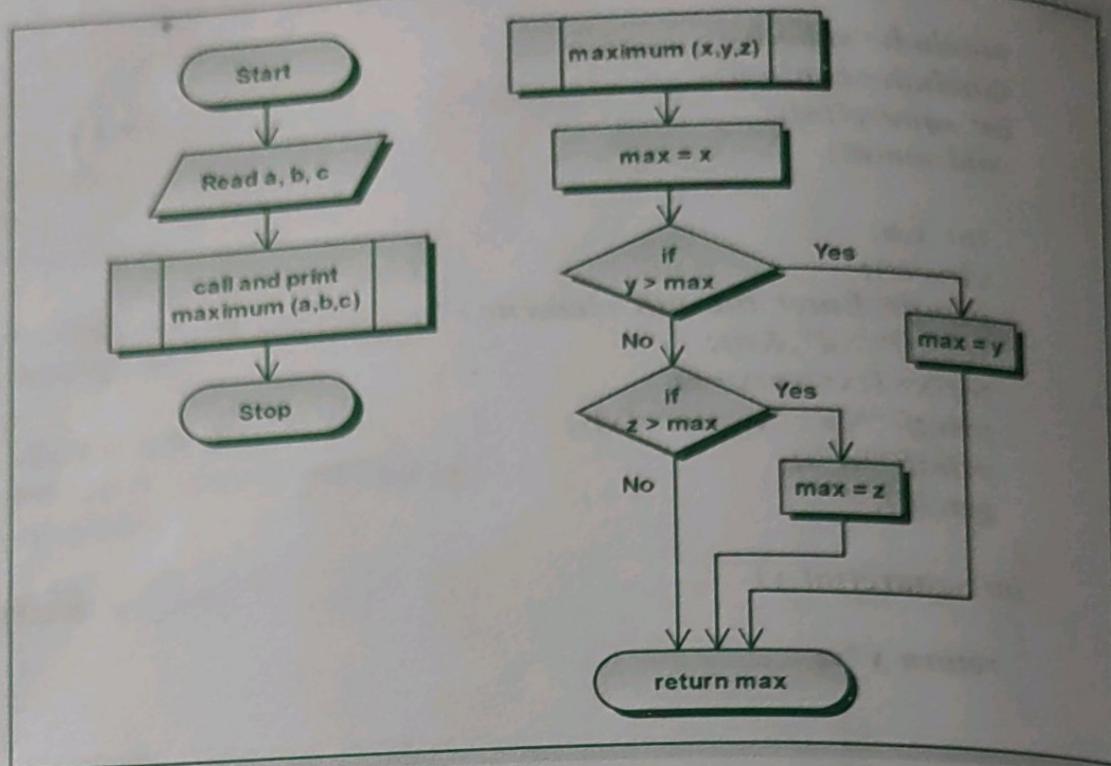
Aim To write a program to print maximum value of given 3 numbers.

Algorithm

- Step-1 Start
- Step-2 Read the input values a,b,c
- Step-3 Call and print the function maximum() with parameters a,b,c
- Step-4 Stop

maximum (x,y,z) – Function

- Step-1 Initialize max = x
- Step-2 Check whether the value of y is greater than the value of max
- Step-3 If step-2 is True, assign max = y
- Step-4 Check whether the value of z is greater than the value of max
- Step-5 If step-4 is True, assign max = z
- Step-6 Return the value of max to main program

Flowchart**Program**

```

#include<stdio.h>
#include<conio.h>
int maximum(int,int,int);
void main()
{
    int a,b,c;
    clrscr();
    printf("Enter three integers : ");
    scanf("%d%d%d",&a,&b,&c);
    printf("Maximum is: %d\n",maximum(a,b,c));
    getch();
}
int maximum(int x,int y,int z)
{
    int max=x;
    if(y>max)
        max=y;
    if(z>max)
        max=z;
    return max;
}
  
```

Output

Enter three integers : 2 6 9
Maximum is: 9

EXERCISE-11 Write a program to find the factorial of the given number using recursion.

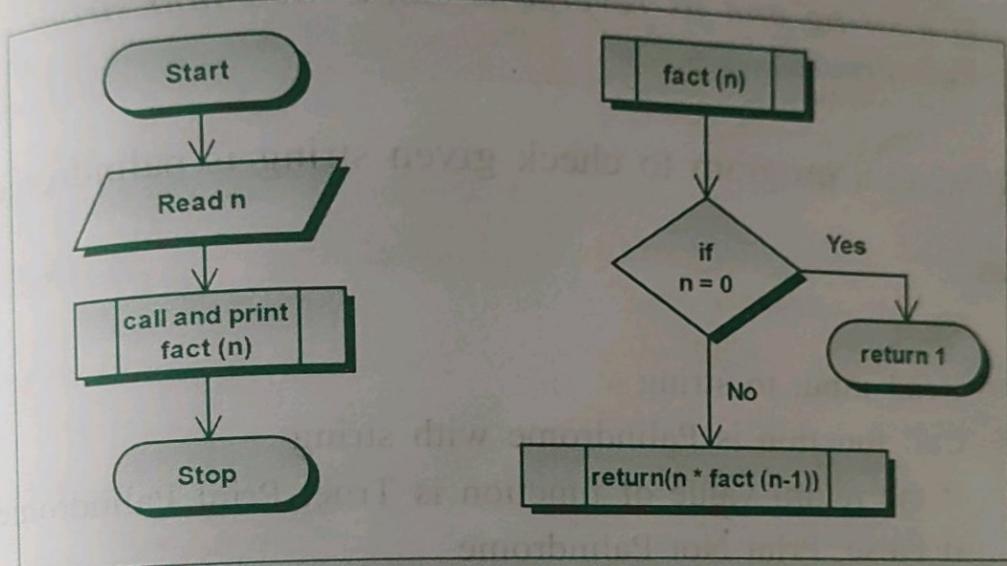
To write a program in C to find the factorial of the given number

Algorithm

Step-1
Step-2
Step-3
Step-4

Start
Read input value n
call and print function fact(n)
Stop

Step-1 Function fact start
Step-2 Is $n = 0$ return 1 else
 goto step-3
Step-3 return $(n * \text{fact}(n-1))$



Program

```

#include<stdio.h>
#include<conio.h>
void main()
{
    int n;
    long int fact();
    clrscr();
    printf("Enter the number whose factorial is to be found:");
    scanf("%d",&n);
    printf("The factorial of %d is : %d \n",n,fact(n));
    getch();
}
long int fact(n)
int n;

```

EXERCISE-11

Write a program to find the factorial of the given number using recursion.

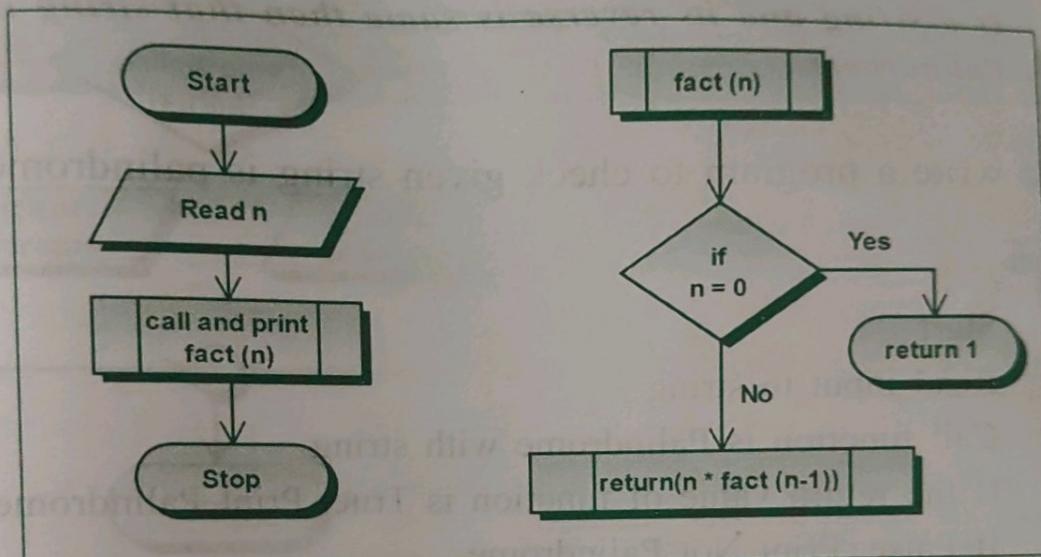
Aim

To write a program in C to find the factorial of the given number

Algorithm

- Step-1 Start
- Step-2 Read input value n
- Step-3 call and print function fact(n)
- Step-4 Stop

- Step-1** Function fact start
- Step-2** Is n = 0 return 1 else goto step-3
- Step-3** return (n*fact (n-1))

Flowchart**Program**

```

#include<stdio.h>
#include<conio.h>
void main()
{
    int n;
    long int fact();
    clrscr();
    printf("Enter the number whose factorial is to be found:");
    scanf("%d",&n);
    printf("The factorial of %d is : %d \n",n,fact(n));
    getch();
}
long int fact(n)
int n;

```

```

    {
        if(n==0)
            return(1);
        else
            return(n*fact(n-1));
    }

```

Output

Enter the number whose factorial is to be found:6
The factorial of 6 is : 720

EXERCISE-12 Write a program in C to find whether the given string is palindrome or not.



If a string and its reverse is same then that string is called Palindrome.

Aim To write a program to check given string is palindrome or not.

Algorithm

- Step-1** Start
- Step-2** Read input to string
- Step-3** Call function is Palindrome with string
- Step-4** If the return value of function is True, Print Palindrome
- Step-5** If False, Print Not Palindrome
- Step-6** Stop

ispalindrome(string)

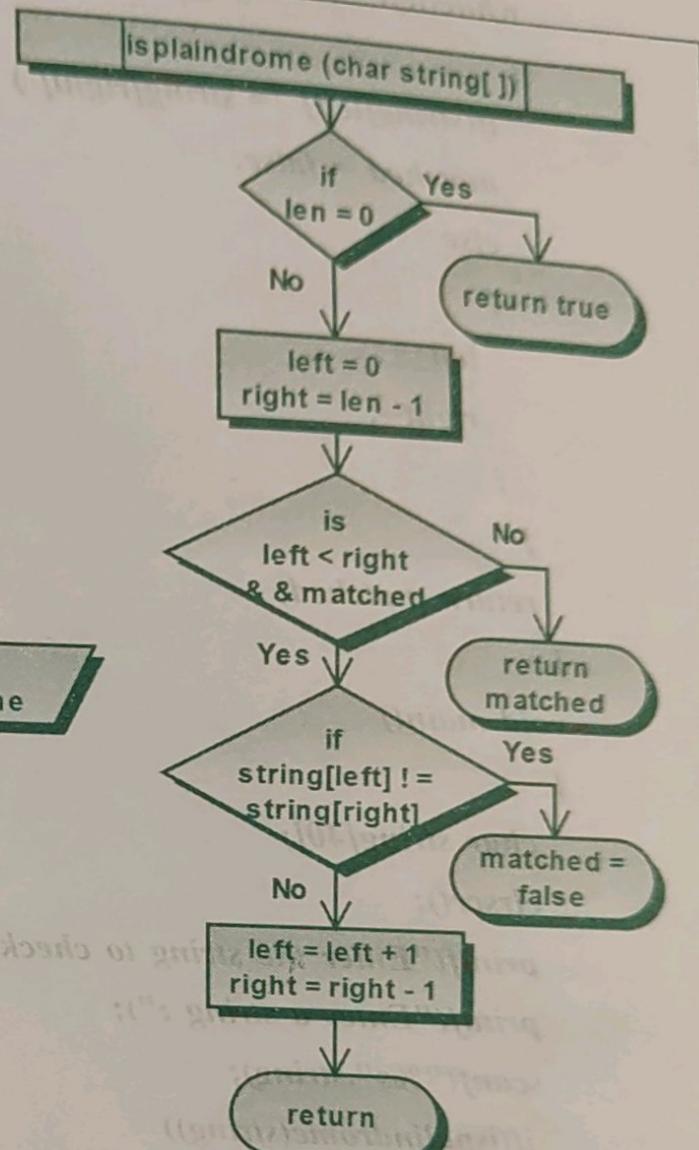
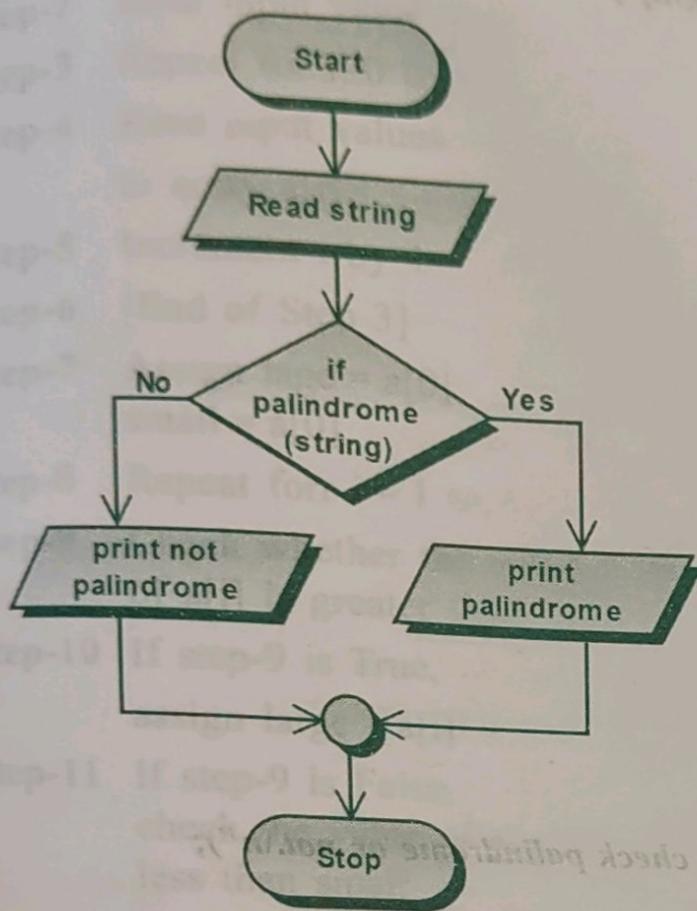
string char[]

- Step-1** Find length of the string into len
- Step-2** Initialize matched = True
- Step-3** Check whether the len is equal to zero
- Step-4** If step-3 is True, return True
- Step-5** Assign left = 0
- Step-6** Compute right = len-1
- Step-7** Check the value of left is less than right and the variable matched is True
- Step-8** If step-7 is True do step-9 to step-11
- Step-9** Check string[left] is not equal to string[right]
- Step-10** If step-9 is True, assign matched = false

Step-11
Step-12

If step-9 is False, increment left by 1, decrement right by 1
Return matched

Flowchart



Program

```

#include<stdio.h>
#include<conio.h>
#include<string.h>
enum boolean {false,true};
enum Boolean ispalindrome(char string[])
{
    int left,right,len=strlen(string);
    enum Boolean matched = true;
    if(len==0)
  
```

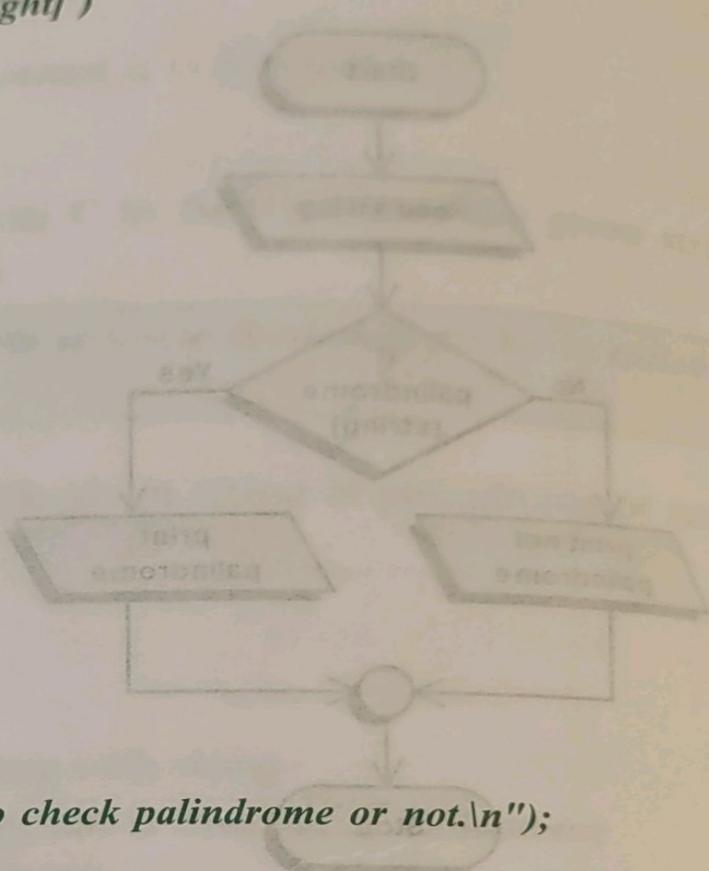
```

        return true;
    left = 0;
    right = len - 1;
    while(left < right && matched)
    {
        if(string[left] != string[right])
            matched = false;
        else
        {
            left++;
            right--;
        }
    }
    return matched;
}
void main()
{
    char string[40];
    clrscr();
    printf("Enter the string to check palindrome or not.\n");
    printf("Enter a string :");
    scanf("%s",string);
    if(ispalindrome(string))
        printf("The given string %s is a palindrome. \n",string);
    else
        printf("The given string %s is not a palindrome. \n",string);
    getch();
}

```

Output

Enter the string to check palindrome or not.
 Enter a string :madam
 The given string madam is a palindrome.



EXERCISE-13

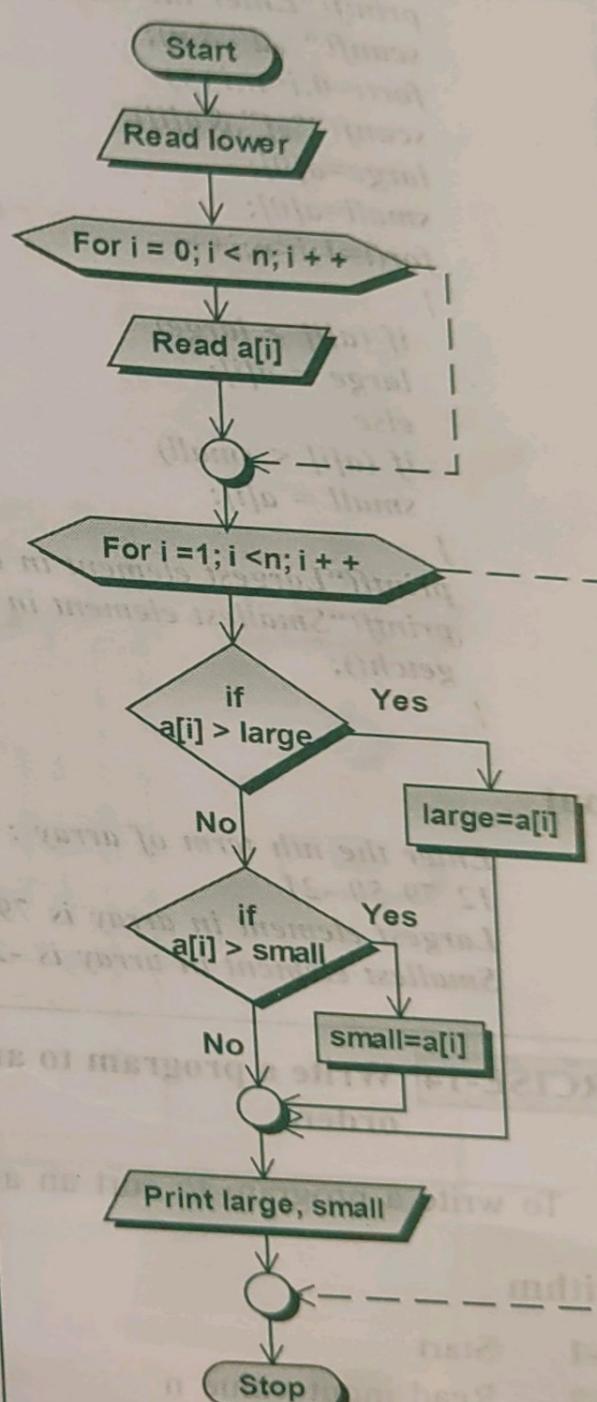
Write a program to find the largest and smallest number in the given Array.

Aim

To write a program to print largest and smallest number in the given array.

Algorithm

- Step-1** Start
- Step-2** Read input value to n
- Step-3** Repeat for i=0 to n
- Step-4** Read input values to array a[i]
- Step-5** Increment i by 1
- Step-6** [End of Step-3]
- Step-7** Assign large = a[0], small = a[0]
- Step-8** Repeat forr i = 1 to n
- Step-9** Check whether the value of a[i] is greater than large
- Step-10** If step-9 is True, assign large = a[i]
- Step-11** If step-9 is False, check the value of a[i] is less than small
- Step-12** If step-11 is true, assign small = a[i]
- Step-13** Increment i by 1
- Step-14** End of step-8
- Step-15** Print the values of large, small
- Step-16** Stop

Flowchart

Program

```

#include<stdio.h>
#include<conio.h>
void main()
{
    int i,n;
    float a[50],large,small;
    clrscr();
    printf("Enter the nth term of array :");
    scanf("%d",&n);
    for(i=0;i<n;i++)
        scanf("%f",&a[i]);
    large=a[0];
    small=a[0];
    for(i=1;i<n;i++)
    {
        if (a[i] > large)
            large = a[i];
        else
            if (a[i] < small)
                small = a[i];
    }
    printf("Largest element in array is %.2f\n",large);
    printf("Smallest element in array is %.2f\n",small);
    getch();
}

```

Output

Enter the nth term of array : 4
12 79 50 -21
Largest element in array is 79.00
Smallest element in array is -21.00

EXERCISE-14 Write a program to arrange the contents of array in ascending order.

Aim To write a program to sort an array.

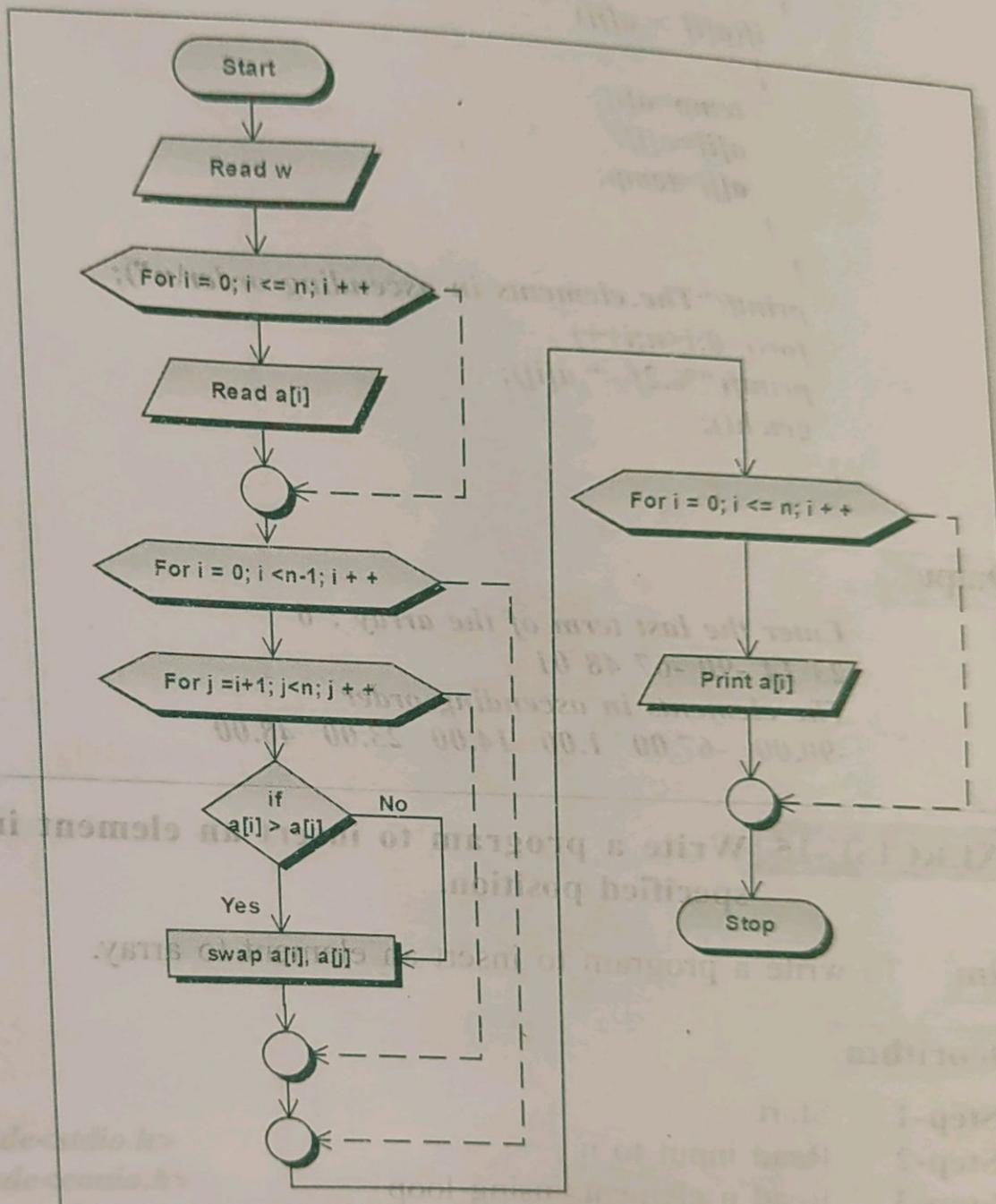
Algorithm

- Step-1** Start
- Step-2** Read input value n
- Step-3** Setup loop i from 0 to n
- Step-4** Read a[i]

- Step-5
Step-6
Step-7
Step-8
Step-9
Step-10
Step-11

Setup loop i from 0 to n-1
Setup loop i from i + 1 to n
Check the value of a[i] is greater than a[j]
If step-7 is True, swap a[i], a[j]
Setup loop i from 0 to n
Print a[i]
Stop

Flowchart



Program

```

#include<stdio.h>
#include<conio.h>
void main()
{
    int i,j,k,n;
    float a[50],temp;
    clrscr();
    
```

```

printf("Enter the last term of the array :");
scanf("%d",&n);
for(i=0;i<n;i++)
scanf("%f",&a[i]);
for(i=0;i<n-1;i++)
for(j=i+1;j<n;j++)
{
    if(a[i] > a[j])
    {
        temp=a[i];
        a[i]=a[j];
        a[j]=temp;
    }
}
printf("The elements in ascending order\n");
for(i=0;i<n;i++)
printf("%.2f ",a[i]);
getch();
}

```

Output

Enter the last term of the array : 6

23 14 -90 -67 48 01

The elements in ascending order

-90.00 -67.00 1.00 14.00 23.00 48.00

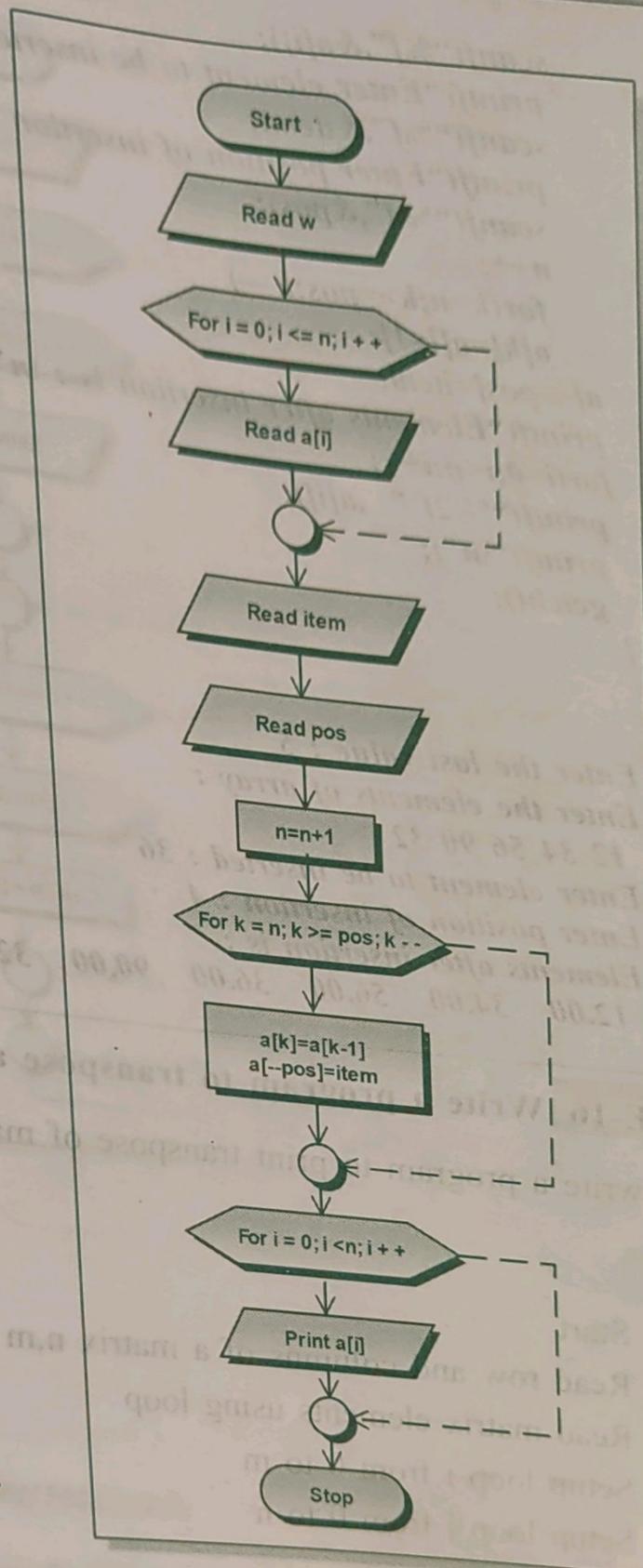
EXERCISE-15 Write a program to insert an element into an array in a specified position.

Aim To write a program to insert an element to array.

Algorithm

- Step-1** Start
- Step-2** Read input to n
- Step-3** Read n elements using loop
- Step-4** Read item to be insert
- Step-5** Read position there to insert
- Step-6** Increment n by 1
- Step-7** Setup loop k from n to k >= pos
- Step-8** Assign a[k-1] to a[k]
- Step-9** Assign item to a[--pos]
- Step-10** Print array elements using loop
- Step-11** Stop

Flowchart



Program

```

#include<stdio.h>
#include<conio.h>
void main()
{
    int i,j,k,n,pos;
    float a[50],item;
    clrscr();
    printf("Enter the last value : ");
    scanf("%d",&n);
    printf("Enter the elements of array : \n ");
    for(i=0;i<n;i++)
  
```

```

scanf("%f",&a[i]);
printf("Enter element to be inserted :");
scanf("%f",&item);
printf("Enter position of insertion :");
scanf("%d",&pos);
n++;
for(k=n;k>=pos;k--)
    a[k]=a[k-1];
a[pos]=item;
printf("Elements after insertion is : \n");
for(i=0;i<n;i++)
    printf("%.2f ",a[i]);
printf("\n");
getch();
}

```

Output

Enter the last value : 5
 Enter the elements of array :
 12 34 56 90 32
 Enter element to be inserted : 36
 Enter position of insertion : 4
 Elements after insertion is :
 12.00 34.00 56.00 36.00 90.00 32.00

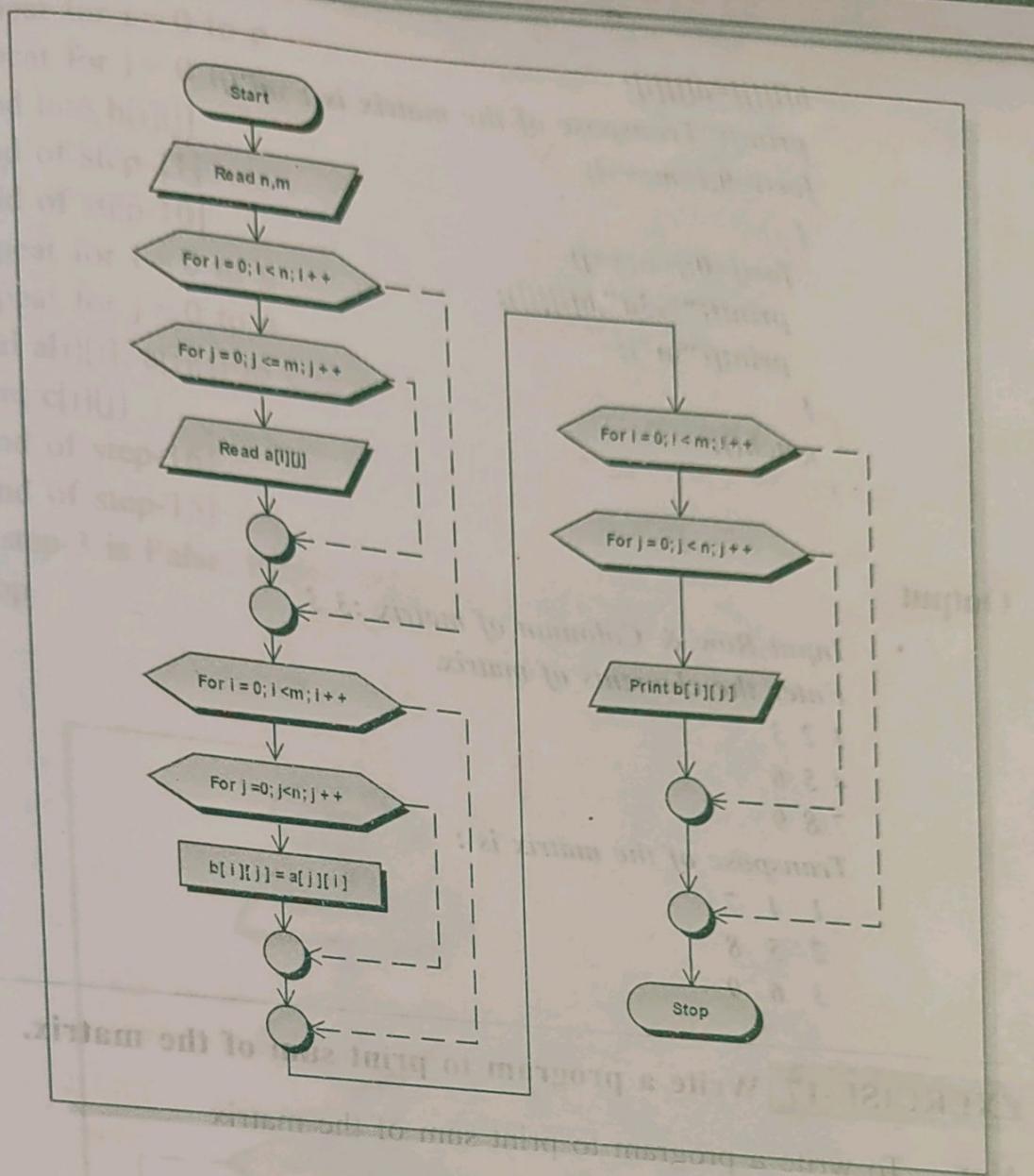
EXERCISE-16 Write a program to transpose a matrix

Aim To write a program to print transpose of matrix elements.

Algorithm

- Step-1** Start
- Step-2** Read row and columns of a matrix n,m
- Step-3** Read matrix elements using loop
- Step-4** Setup loop i from 0 to m
- Step-5** Setup loop j from 0 to n
- Step-6** Read a[i][j]
- Step-7** Assign a[j][i] to b[i][j]
- Step-8** [End of step-5]
- Step-9** [End of step-4]
- Step-10** print matrix B values using loops
- Step-11** Stop

Flowchart



Program

```

#include<stdio.h>
#include<conio.h>
void main()
{
    int a[10][10],b[10][10],i,j,m,n;
    clrscr();
    printf("Input Row & Coloumn of matrix :");
    scanf("%d%d",&n,&m);
    printf("Enter the elements of matrix.\n");
    for(i=0;i<n;++i)
        for(j=0;j<m;++j)
            scanf("%d",&a[i][j]);
    for(i=0;i<m;++i)
        for(j=0;j<n;++j)

```

```

b[i][j]=a[j][i];
printf("Transpose of the matrix is : \n");
for(i=0;i<m;++)
{
    for(j=0;j<n;j++)
        printf("%3d",b[i][j]);
    printf("\n");
}
getch();
}

```

Output

Input Row & Coloumn of matrix :3 3

Enter the elements of matrix.

1 2 3
4 5 6
7 8 9

Transpose of the matrix is :

1 4 7
2 5 8
3 6 9

EXERCISE-17 | Write a program to print sum of the matrix.

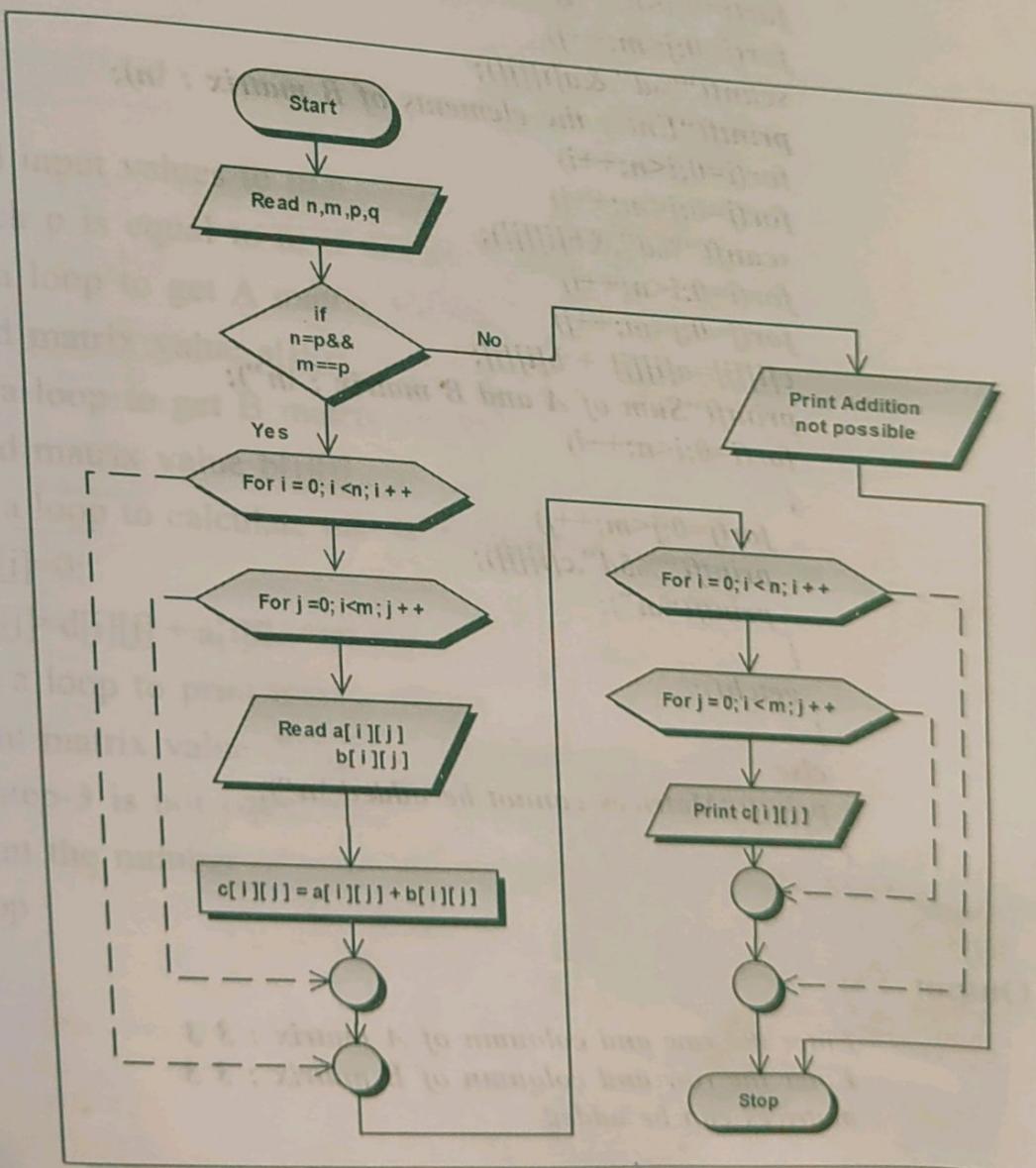
Aim To write a program to print sum of the matrix

Algorithm

- Step-1** Start
- Step-2** Read rows and columns of matrix A and B into n,m,p,q
- Step-3** Check the values of n is equal to p and m is equal to q
- Step-4** If step-3 is True, do step-5 to step-20
- Step-5** Repeat for i = 0 to n
- Step-6** Repeat for j = 0 to m
- Step-7** Read into a[i][j]
- Step-8** [End of step-6]
- Step-9** [End of step-5]

- Step-10 Repeat for $i = 0$ to p
 Step-11 Repeat for $j = 0$ to q
 Step-12 Read into $b[i][j]$
 Step-13 [End of step-11]
 Step-14 [End of step-10]
 Step-15 Repeat for $i = 0$ to n
 Step-16 Repeat for $j = 0$ to n
 Step-17 Add $a[i][j]$, $a[i][j]$ to $c[i][j]$
 Step-18 Print $c[i][j]$
 Step-19 [End of step-16]
 Step-20 [End of step-15]
 Step-21 If step-3 is False, Print "Addition is not possible"
 Step-22 Stop

Flowchart



Program

```

#include<stdio.h>
#include<conio.h>
void main()
{
    int a[10][10],b[10][10],c[10][10];
    int i,j,m,n,p,q;
    clrscr();
    printf("Enter the row and column of A matrix : ");
    scanf("%d%d",&n,&m);
    printf("Enter the row and column of B matrix : ");
    scanf("%d%d",&p,&q);
    if((n==p)&&(m==q))
    {
        printf("matrices can be added\n");
        printf("Enter the element of A matrix : \n");
        for(i=0;i<n;++i)
            for(j=0;j<m;++j)
                scanf("%d",&a[i][j]);
        printf("Enter the elements of B matrix : \n");
        for(i=0;i<n;++i)
            for(j=0;j<m;++j)
                scanf("%d",&b[i][j]);
        for(i=0;i<n;++i)
            for(j=0;j<m;++j)
                c[i][j]=a[i][j] + b[i][j];
        printf("Sum of A and B matrix : \n");
        for(i=0;i<n;++i)
        {
            for(j=0;j<m;++j)
                printf("%5d",c[i][j]);
            printf("\n");
        }
        getch();
    }
    else
        printf("Matrices cannot be added \n");
}

```

Output

Enter the row and column of A matrix : 3 3
 Enter the row and column of B matrix : 3 3
 matrices can be added

Enter the element of A matrix :

1 2 3
4 5 6
7 8 9

Enter the elements of B matrix :

1 2 3
4 5 6
6 7 4

Sum of A and B matrix :

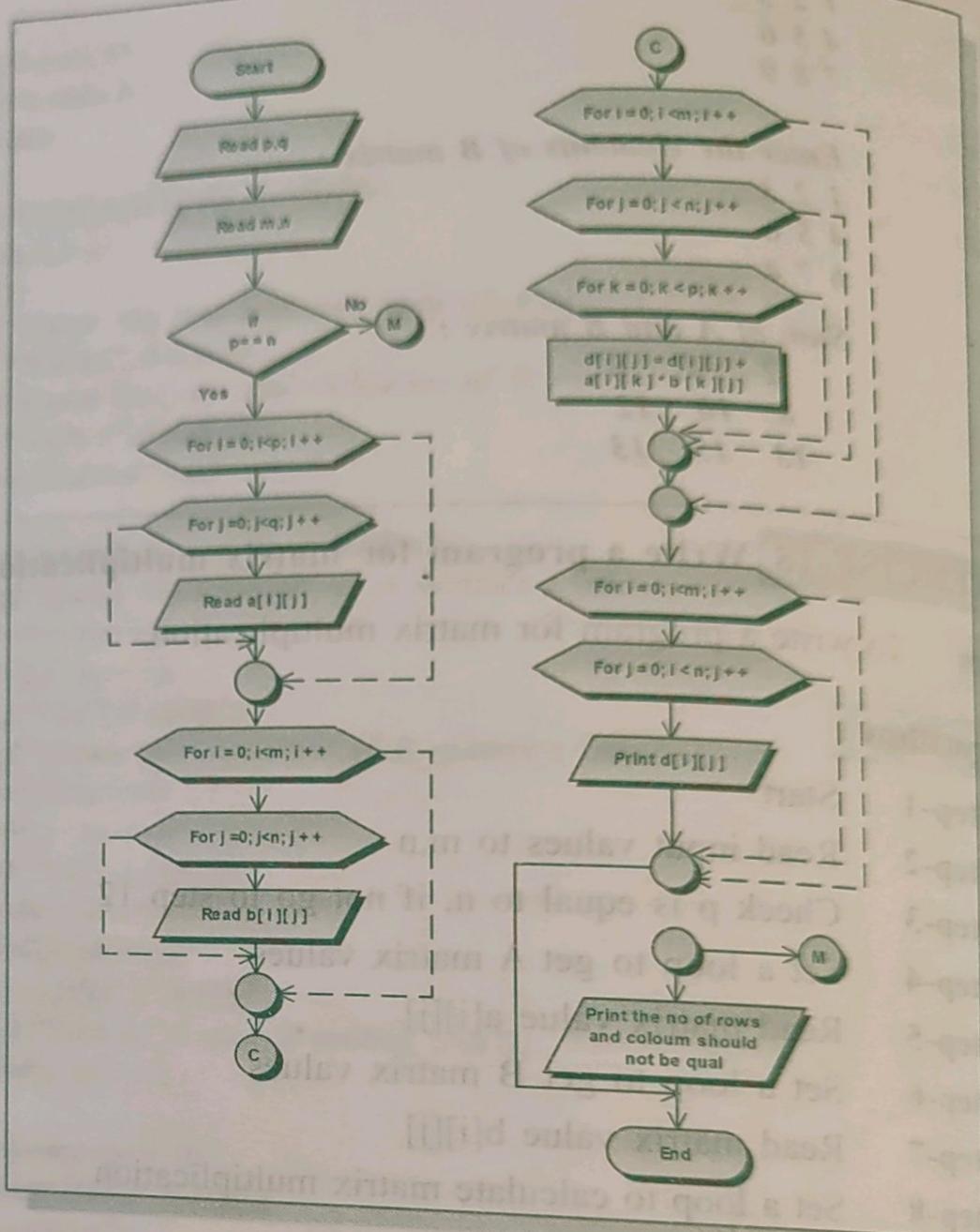
2 4 6
8 10 12
13 15 13

EXERCISE-18 | Write a program for matrix multiplication.

Aim To write a program for matrix multiplication.

Algorithm

- Step-1** Start
- Step-2** Read input values to m,n
- Step-3** Check p is equal to n, if not go to step 12
- Step-4** Set a loop to get A matrix values
- Step-5** Read matrix value $a[i][j]$
- Step-6** Set a loop to get B matrix values
- Step-7** Read matrix value $b[i][j]$
- Step-8** Set a loop to calculate matrix multiplication
- Step-9** $d[i][j]=0;$
- $d[i][j]=d[i][j] + a[i][k]*b[k][j]$
- Step-10** Set a loop to print matrix values
- Step-11** Print matrix value $d[i][j]$, after completing goto step 14
- Step-12** If step-3 is not equal then
- Step-13** Print the number of rows and columns should not be equal.
- Step-14** Stop

Flowchart**Program**

```

#include<stdio.h>
#include<conio.h>
void main()
{
    int a[10][10],b[10][10],d[10][10];
    int i,j,p,q,m,n,k;
    clrscr();
    printf("Enter size of the A matrix :");
    scanf("%d%d",&p,&q);
    printf("Enter size of the B matrix");
    scanf("%d%d",&m,&n);
    if(p==n)
    {
        printf("Enter the elements of A matrix.\n ");
    }
  
```

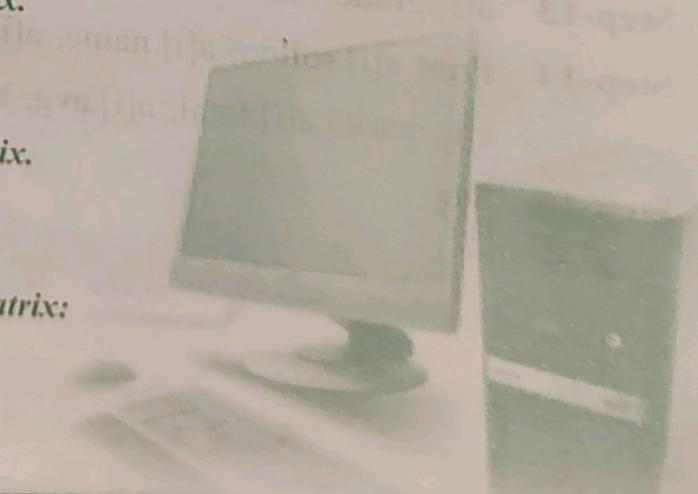
```

for(i=0;i<p;i++)
{
    for(j=0;j<q;j++)
        scanf("%d",&a[i][j]);
}
printf("Enter the elements of B matrix. \n ");
for(i=0;i<m;i++)
{
    for(j=0;j<n;j++)
        scanf("%d",&b[i][j]);
}
for(i=0;i<m;i++)
{
    for(j=0;j<n;j++)
    {
        d[i][j]=0;
        for(k=0;k<p;k++)
            d[i][j]=d[i][j]+a[i][k]*b[k][j];
    }
}
printf("Multiplication of A and B matrix:\n");
for(i=0;i<m;i++)
{
    for(j=0;j<n;j++)
        printf("%5d ",d[i][j]);
    printf("\n");
}
getch();
}
else
printf("The no.of rows and coloums should bot be equal.");
}

```

Output

Enter size of the A matrix : 3 3
 Enter size of the B matrix : 3 3
 Enter the elements of A matrix.
 1 2 3
 4 5 6
 7 8 9
 Enter the elements of B matrix.
 2 4 1
 6 7 4
 3 5 7
 Multiplication of A and B matrix:
 23 33 30
 56 81 66
 89 129 102



EXERCISE-19 Write a program to print student grade using structure

Aim To write a program to print student grade using structure.

Algorithm

Step-1 Start

Step-2 Define structure stud with the following members

rollno : integer

name[30] : character

mark1,mark2, mark3, total : integer

avg : float

grade : character

End stud

Step-3 Read input n

Step-4 Set a loop to get record details

Step-5 Read a[i].rollno, a[i].name

Step-6 a[i].mark1, a[i].mark2, a[i].mark3

Step-7 a[i].total=a[i] + mark1 + a[i].mark2 + a[i].mark3

Step-8 a[i].avg=a[i].total/3

Step-9 [End of step-4]

Step-10 Check if a[i].avg < 40 then assign a[i].grade = D

Step-11 Check if a[i].avg < 60 then assign a[i].grade = C

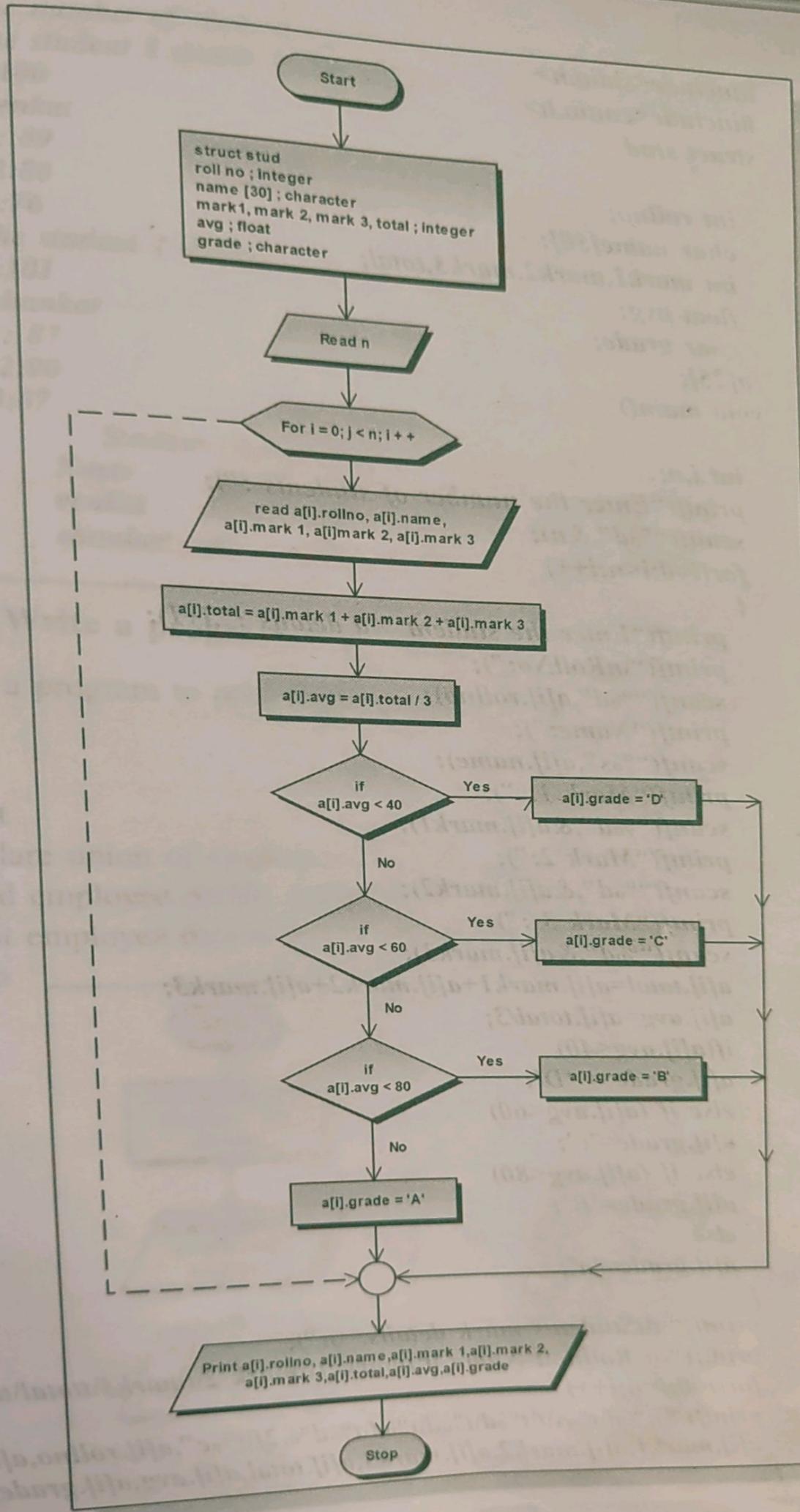
Step-12 Check if a[i].avg < 80 then assign a[i].grade = B else

Step-13 a[i].grade='A'

Step-14 Print a[i].rollno, a[i].name, a[i].mark1, a[i].mark2,
a[i].mark3,a[i].total, a[i].avg, a[i].grade

Step-15 Stop

Flowchart



Program

```

#include<stdio.h>
#include<conio.h>
struct stud
{
    int rollno;
    char name[30];
    int mark1,mark2,mark3,total;
    float avg;
    char grade;
}a[25];
void main()
{
    int i,n;
    printf("Enter the number of students :");
    scanf("%d",&n);
    for(i=0;i<n;i++)
    {
        printf("Enter the student %d details :",i+1);
        printf("\nRollNo:");
        scanf("%d",&a[i].rollno);
        printf("Name:");
        scanf("%s",&a[i].name);
        printf("Mark 1: ");
        scanf("%d",&a[i].mark1);
        printf("Mark 2: ");
        scanf("%d",&a[i].mark2);
        printf("Mark 3 :");
        scanf("%d",&a[i].mark3);
        a[i].total=a[i].mark1+a[i].mark2+a[i].mark3;
        a[i].avg=a[i].total/3;
        if(a[i].avg<40)
            a[i].grade = 'D';
        else if (a[i].avg<60)
            a[i].grade='c';
        else if (a[i].avg<80)
            a[i].grade='B';
        else
            a[i].grade='A';
    }
    printf("\t\tStudents mark details: \n");
    printf("\n Rollno\t Name \tmark 1\tmark 2\tmark3\ttotal\taverage");
    for(i=0;i<n;i++)
        printf("\n%d\t%s\t%d\t%d\t%d\t%.2f\t%c",a[i].rollno,a[i].name,
            a[i].mark1,a[i].mark2,a[i].mark3,a[i].total,a[i].avg,a[i].grade);
}

```

Output

Enter the number of students :2

Enter the student 1 details :

RollNo:100

Name:venkat

Mark 1: 89

Mark: 2:80

Mark 3:76

Enter the student 2 details :

RollNo:101

Name:shankar

Mark 1: 87

Mark: 2:90

Mark 3:67

Students mark details:						
Rollno	Name	mark1	mark2	mark3	total	average Grade
100	venkat	89	80	76	245	81.00 A
101	shankar	87	90	67	244	81.00 A

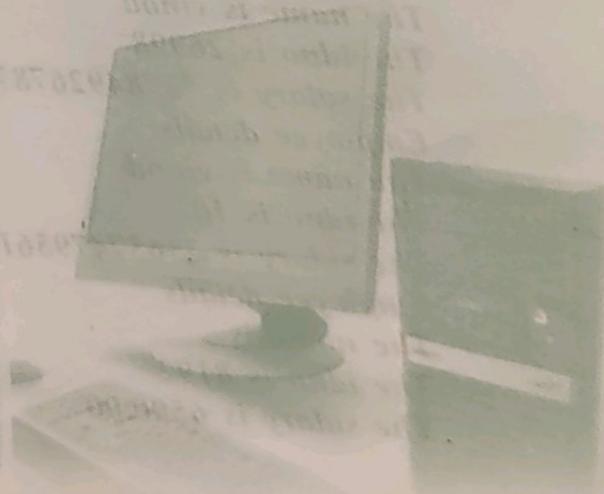
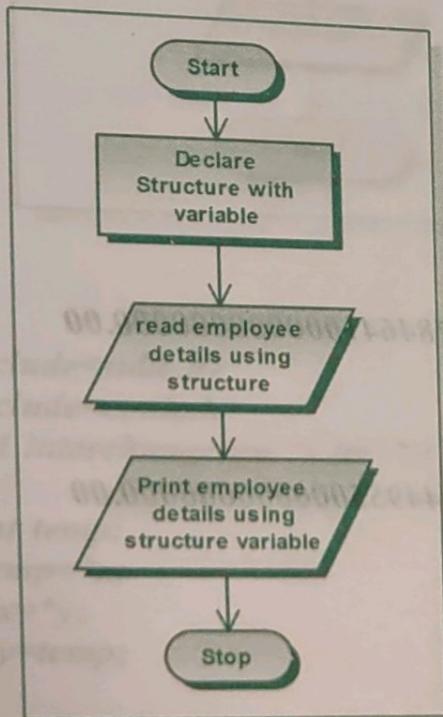
EXERCISE-20 | Write a program to print employee details using Union

Aim To write a program to print employee details using unions.

Algorithm

- Step-1 Start
- Step-2 Declare union of employee
- Step-3 Read employee details using union variable
- Step-4 Print employee details using union variable
- Step-5 Stop

Flowchart



Program

```
#include<stdio.h>
#include<conio.h>
union
{
    char name[25];
    int idno;
    float salary;
}desc;
void main()
{
    strcpy(desc.name,"vinod");
    clrscr();
    printf("Employee details\n");
    printf("The name is %s\n",desc.name);
    printf("The idno is %d\n",desc.idno);
    printf("The salary is %6.2f \n",desc.salary);
    desc.idno=10;
    printf("Employee details\n");
    printf("The name is %s",desc.name);
    printf("The idno is %d \n",desc.idno);
    printf("The salary is %6.2f\n",desc.salary);
    desc.salary=6500.00;
    printf("Employee details\n");
    printf("The name is %s \n",desc.name);
    printf("The idno is %d\n",desc.idno);
    printf("The salary is %6.2f\n",desc.salary);
    getch();
}
```

Output

Employee details
The name is vinod
The idno is 26998
The salary is 73784926787784641000000000000000.00
Employee details
The name is vinod
The idno is 10
The salary is 736574795611449550000000000000.00
Employee details
The name is
The idno is 8192
The salary is 6500.00

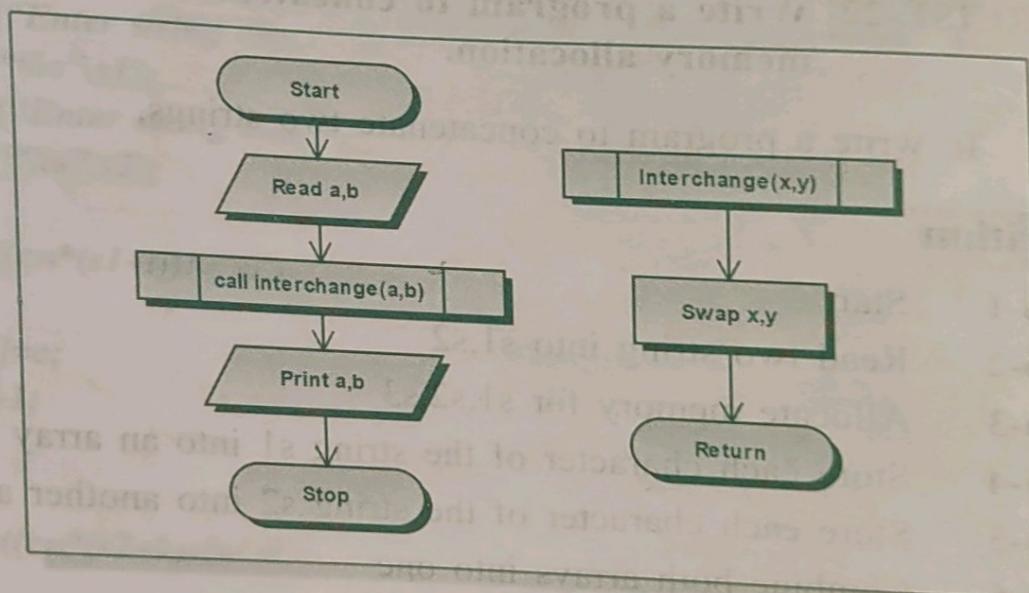
EXERCISE-21

Write a program to swap the contents of two variables using pointers.

Aim To write a program to swap the contents of pointer variable

Algorithm

- Step-1 Start
 - Step-2 Read input values a,b
 - Step-3 Call function interchange ()
 - Step-4 Print values of a,b
 - Step-5 Stop
-
- Step-1 Function Interchange start
 - Step-2 swap (x,y)
 - Step-3 return

Flowchart**Program**

```

#include<stdio.h>
#include<conio.h>
void interchange(int *x,int *y)
{
    int temp;
    temp=*x;
    *x=*y;
    *y=temp;
}

```

```

void main()
{
    int a,b;
    clrscr();
    printf("Enter the values A and B :");
    scanf("%d%d",&a,&b);
    printf("a=%d    b=%d\n",a,b);
    interchange(&a,&b);
    printf("After interchanging : \n");
    printf("a=%d    b=%d\n",a,b);
    getch();
}

```

Output

Enter the values A and B : 23 56

a=23 b=56

After interchanging :

a=56 b=23

EXERCISE-22 Write a program to concatenate two string using dynamic memory allocation.

Aim To write a program to concatenate two strings.

Algorithm

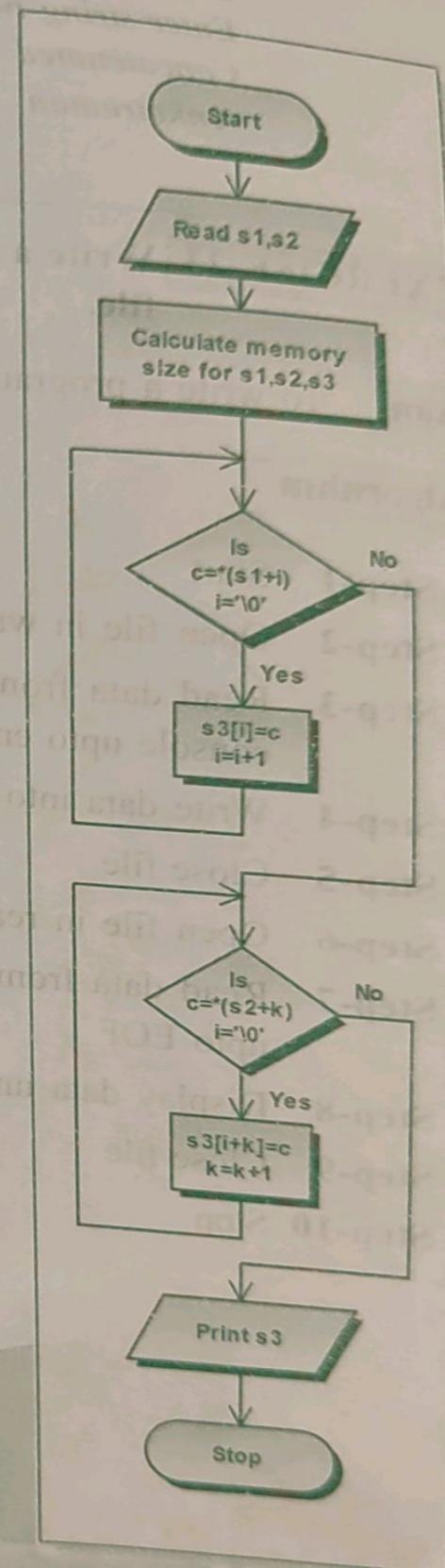
- Step-1** Start
- Step-2** Read two string into s1,s2
- Step-3** Allocate memory for s1,s2,s3
- Step-4** Store each character of the string s1 into an array
- Step-5** Store each character of the string s2 into another array
- Step-6** Combine both arrays into one
- Step-7** Print Concatenated string
- Step-8** Stop

Flowchart

```

program
#include<stdio.h>
#include<conio.h>
#include<malloc.h>
#define lenght 40
void main()
{
    char *s1,*s2,*s3,c;
    int i,j,k;
    clrscr();
    s1=(char*)malloc(lenght * sizeof(char));
    s2=(char*)malloc(lenght * sizeof(char));
    s3=(char*)malloc(2 * lenght * sizeof(char));
    printf("Enter string one :");
    scanf("%os",s1);
    printf("Enter string two :");
    scanf("%os",s2);
    i=0;
    while((c=*(s1+i))!='\0')
    {
        s3[i]=c;
        i=i+1;
    }
    k=0;
    while((c=*(s2+k))!='\0')
    {
        s3[i+k]=c;
        k=k+1;
    }
    printf("Concatenated string is : \n");
    printf("%os\n",s3);
    getch();
}

```



Output

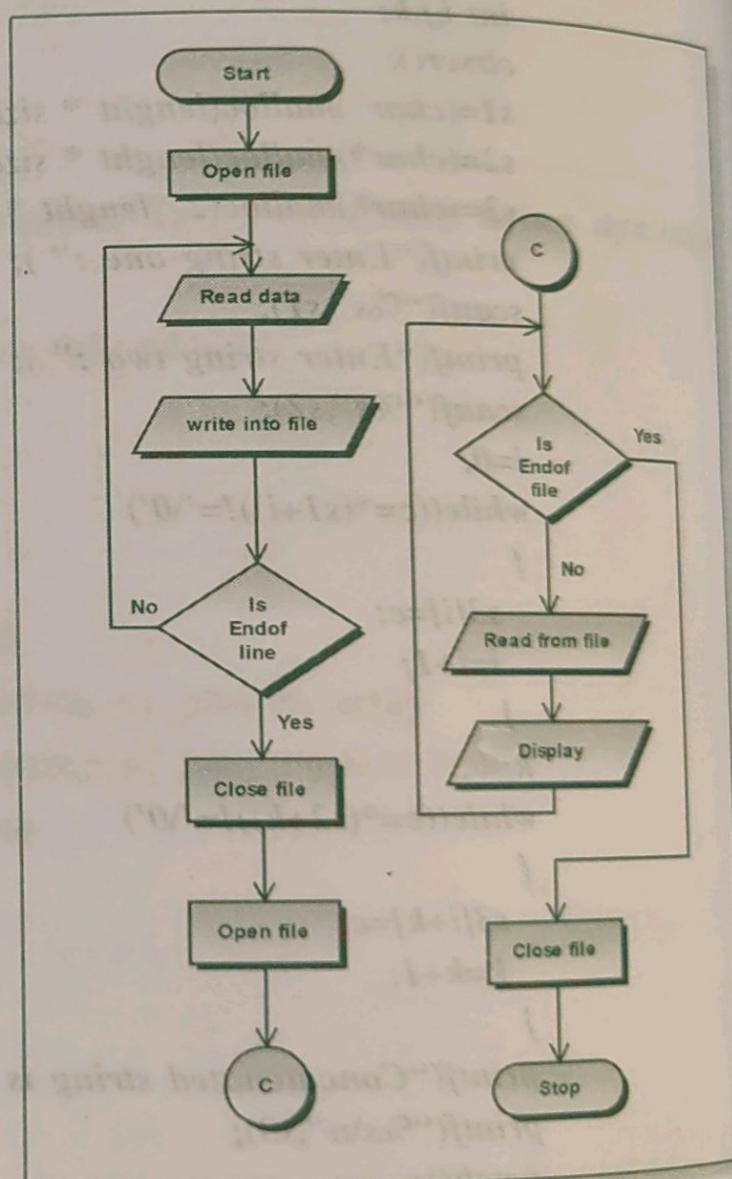
Enter string one : venkat
 Enter string two : raman
 Concatenated string is :
 venkatraman

EXERCISE-23 Write a program to store and print same data to and from the file.

Aim To write a program for file manipulation.

Algorithm

- Step-1** Start
- Step-2** Open file in write mode
- Step-3** Read data from the console upto end of line
- Step-4** Write data into the file
- Step-5** Close file
- Step-6** Open file in read mode
- Step-7** Read data from the file upto EOF
- Step-8** Display data into screen
- Step-9** Close file
- Step-10** Stop

Flowchart

```

Program
#include<stdio.h>
#include<conio.h>
void main()
{
    FILE *fp;
    char c;
    fp=fopen("TEXT","w");
    printf("Enter text - \n");
    while((c=getchar())!='\0')
        putc(c,fp);
    fclose(fp);
    printf("Displaying text from file :\n");
    fp=fopen("TEXT","r");
    while((c=getchar())!=EOF)
        printf("%c",c);
    fclose(fp);
}

```

Output

Enter text
VRB PUBLISHERS
 Displaying text from file:
 vrb publishers.

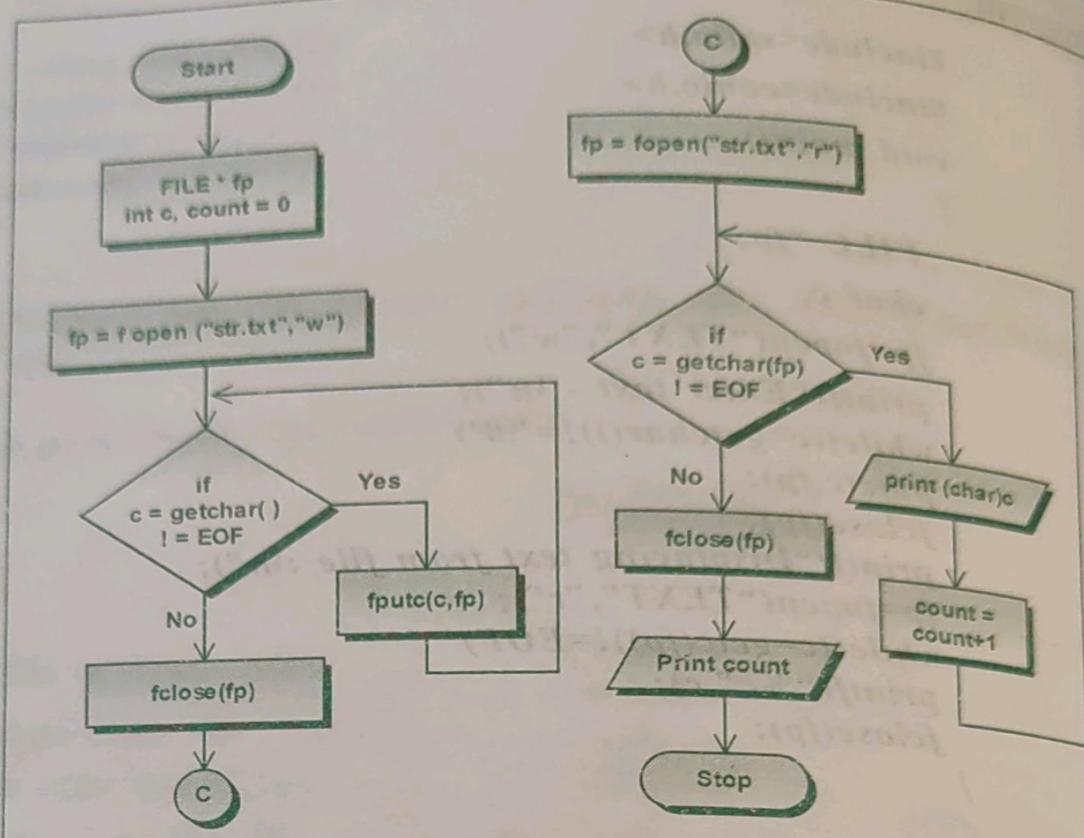
EXERCISE-24 | Write a program to count number of characters in a file.

Aim To write a program to count number of characters in a file.

Algorithm

- Step-1 Start
- Step-2 Open file in write mode
- Step-3 Read data upto end of line
- Step-4 Write into file
- Step-5 Close file
- Step-6 Open file in read mode
- Step-7 Read data from file upto EOF
- Step-8 Count character in C
- Step-9 Print count
- Step-10 Stop

Flowchart



Program

```

#include<stdio.h>
#include<conio.h>
void main()
{
    FILE *fp;
    int c, count=0;
    printf("Enter characters\n");
    printf("Press ctrl+z to stop entry. \n");
    fp = fopen("str.txt", "w");
    while((c=getchar())!=EOF)
        fputc(c,fp);
    fclose(fp);
    printf("\n");
    fp=fopen("str.txt", "r");
    while((c=fgetc(fp))!=EOF)
    {
        printf("%c", (char)c);
        ++count;
    }
    fclose(fp);
    printf("Number of characters in the file : %d.\n", count);
}

```

*Enter characters
Press ctrl+z to stop entry.
vrb publishers private limited*

*vrb publishers private limited
Number of characters in the file : 30.*

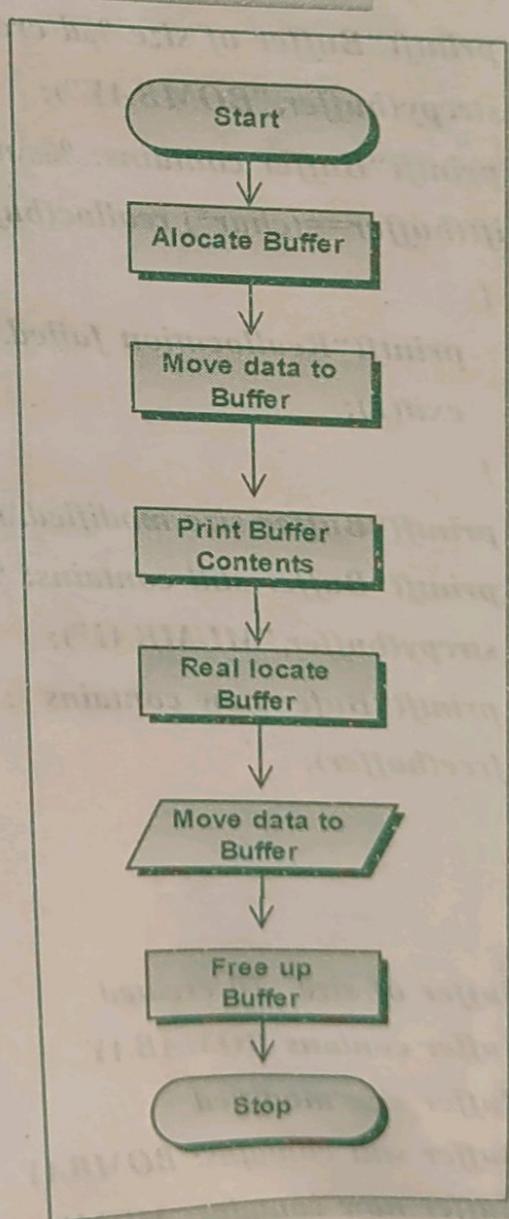
EXERCISE-25 Write a program using Memory allocation function.

Aim To write a program to memory allocation function.

Algorithm

- Step-1** Start
- Step-2** Allocate 10 Bytes to buffer using malloc()
- Step-3** Check it is NULL
- Step-4** Copy data to allocated buffer
- Step-5** Print buffer contents
- Step-6** Reallocate buffer with 15 Bytes
- Step-7** Check it is NULL
- Step-8** Move data to reallocated buffer
- Step-9** Print buffer contents
- Step-10** free up buffer
- Step-11** Stop

Flowchart



Program

```

#include<stdio.h>
#include<conio.h>
#define NULL 0
void main()
{
    char *buffer;
    if((buffer=(char*)malloc(10))==NULL)
    {
        printf("malloc failed.\n");
        exit(1);
    }
    printf("Buffer of size %d created \n",msize(buffer));
    strcpy(buffer,"BOMBAY");
    printf("Buffer contains: %s\n",buffer);
    if((buffer==(char*) realloc(buffer,15))==NULL)
    {
        printf("Reallocation failed.\n");
        exit(1);
    }
    printf("Buffer size modified.\n");
    printf("Buffer still contains: %s \n",buffer);
    strcpy(buffer,"MUMBAI");
    printf("Bufer now contains : %s\n",buffer);
    free(buffer);
}

```

Output

Buffer of size 10 created
 Buffer contains BOMBAY
 Buffer size modified
 Buffer still contains: BOMBAY
 Buffer now contains: MUMBAI