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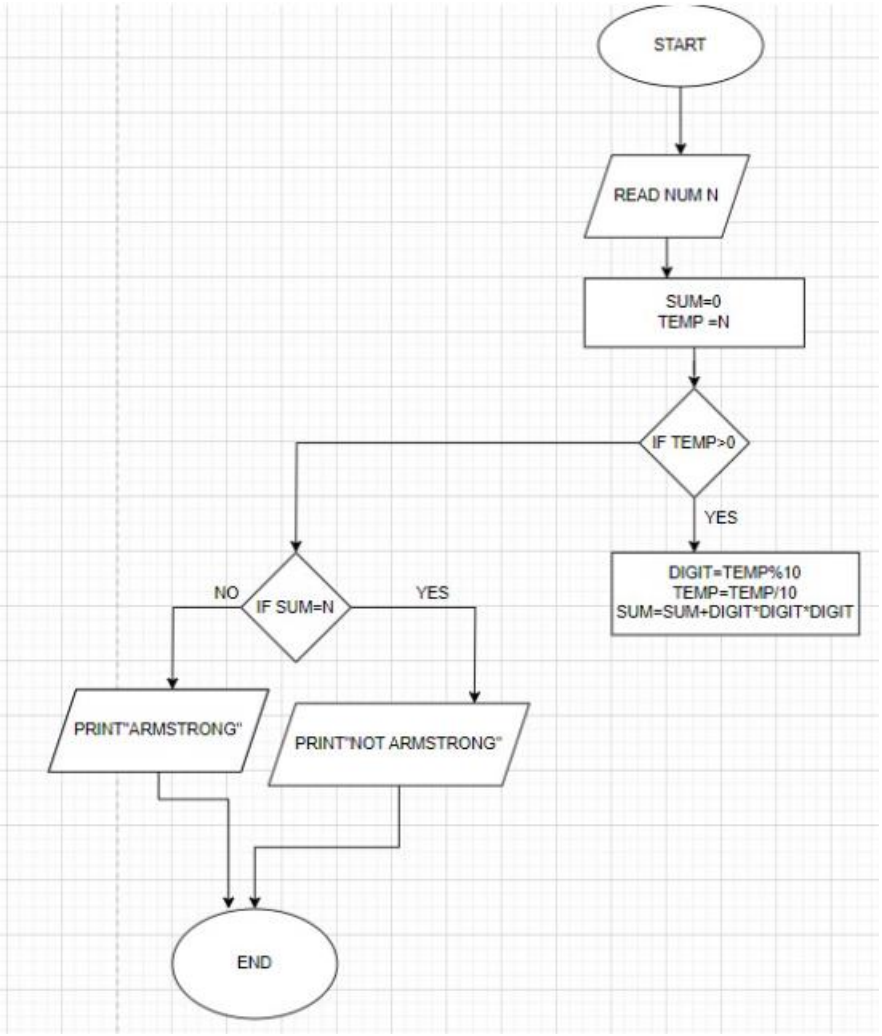
Experiment No.	2

AIM:	Apply various control structures to solve given problems
Program 1	
PROBLEM STATEMENT :	Write a program to print all armstrong numbers in the range entered by the user
ALGORITHM:	Step 1: Start Step 2: Print armstrong numbers between start and end Step 3: let c=start Step 4: let num=c Step 5: If num>0 execute the code Step 6: num=num/10, ctr++ Step 7: let num=c Step 8: If num>0 execute code Step 9: rem=num%10, sum1=sum1+pow((double)rem*1.0,(double)ctr*1), num/=10 Step 10: If sum=c execute the code Step 11: Print c Step 12: increase c by 1 Step 13: If c<=end Step 14:Stop

FLOWCHART:



PROGRAM:

```
#include <stdio.h>
#include<math.h>
int main()
{
  int num,sum=0,rem,num1,cnt=0,start,end;
  printf("Enter the range end points:");
  scanf("%d %d",&start,&end);
  printf("The armstrong numbers are:\n");
  for(int c=start;c<=end;c++)
    {
        num=c;
        cnt=0;
     while(num>0)
      {
```

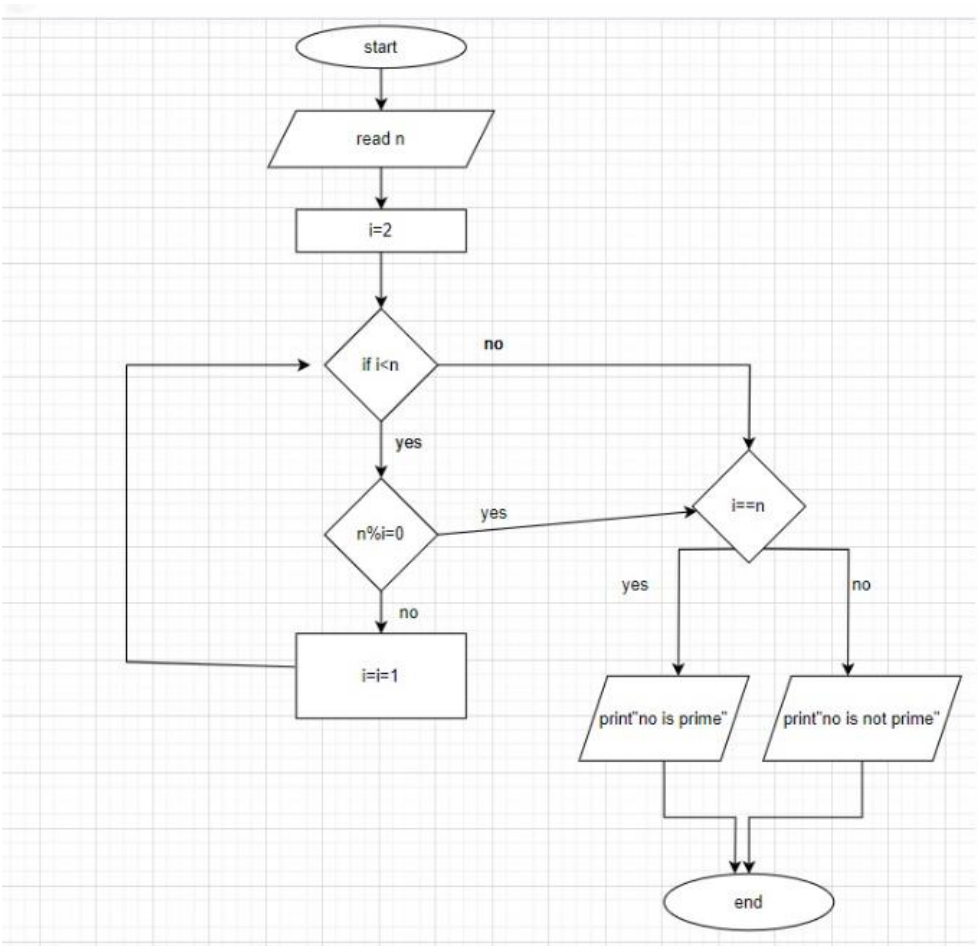
```
        num/=10;
       cnt++;
    }
    num=c;
    double sum1=0;
     while(num!=0)
      {
        rem=num%10;
        sum1+=pow((double)rem*1.0,(double)cnt*1.0);
        num/=10;
       }
        sum=sum1;
       if(sum==c)
      printf("%d ",sum);
  }
   return 0;
}
```

RESULT:

```
Enter the range end points:100 1000
The armstrong numbers are:
153 370 371 407
```

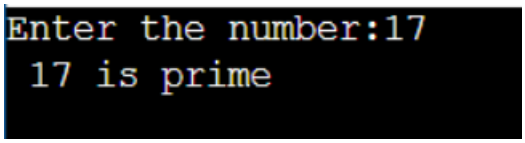
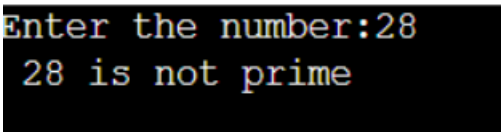
Program 2	
PROBLEM STATEMENT :	Write a program to identify whether a number is prime or not.
ALGORITHM:	Step1:Start Step2:read num Step3: Declare the number Step4: Using for loop when j<=sqrt(num) and num %i=0 Step5:print that %d is not prime Step6:using break Step7:read j>sqrt(num) and print %d is prime Step8:Stop

FLOWCHART:



PROGRAM:

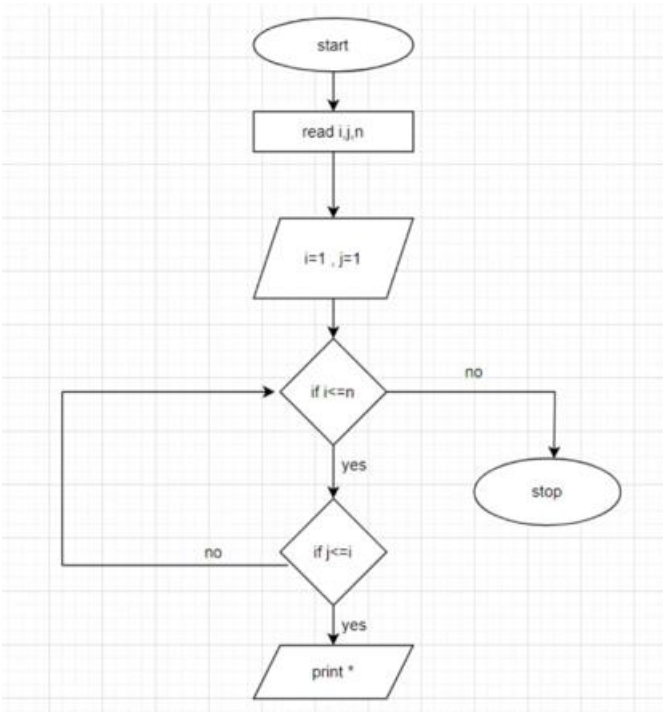
```
#include <stdio.h>
#include<math.h>
int main()
{
  int num;
  printf("Enter the number:");
  scanf("%d",&num);
  int j;
    for (j=2;j<=sqrt(num);j++)
     if(num%j==0)
     {
       printf(" %d is not prime",num);
       break;
     }
        if(j>sqrt(num)&&num!=1)
           printf(" %d is prime",num);
```

	return 0; }
RESULT:	 
Program 3	

PROBLEM STATEMENT:	Write a program to print the following patterns:
	*
	**
	***
	****
	
	  *
	  **
	  ***
	****

ALGORITHM:	Step1: Start Step2:take input as r Step3:read the value when j<=r and then when s<=j using for loop Step4:draw the pattern Step5:Stop

FLOWCHART:



PROGRAM:

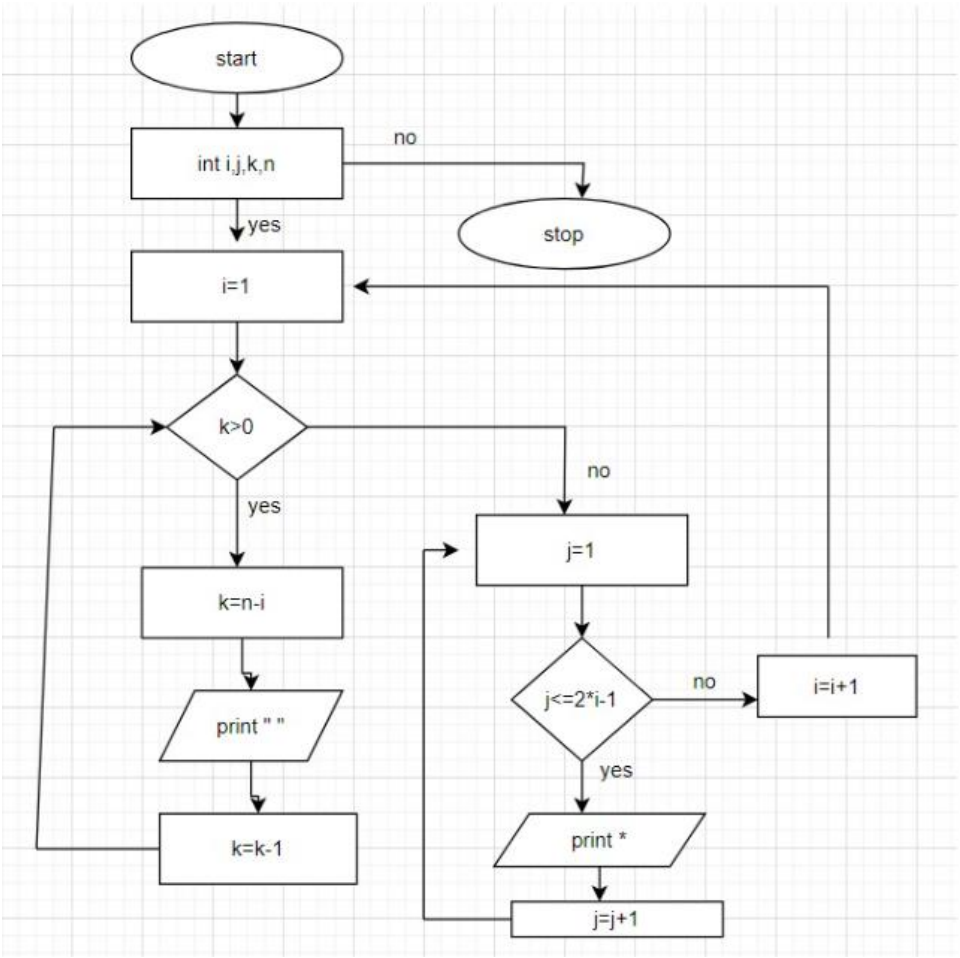
```
#include<stdio.h>
int main()
{
   int r;
   printf("Enter the number of rows:");
   scanf("%d",&r);
     for(int j=1;j<=r;j++)
      {
        for(int s=1;s<=j;s++)
        printf("*");
        printf("\n");
      }
 return 0;
}
```

RESULT:

```
Enter the number of rows:4
*
**
***
****
```

Program 4	
PROBLEM STATEMENT:	Write a program to print the following patterns: * * * * * * * * * * * * * * * *
ALGORITHM:	Step1: Start Step2:take input as i,j,k,n Step3:read the value when i<=n,k=n-I for k>0 Step4:then print space Step5read values when j<=2*i-1 Step6:print the pattern Step7:Stop

FLOWCHART:

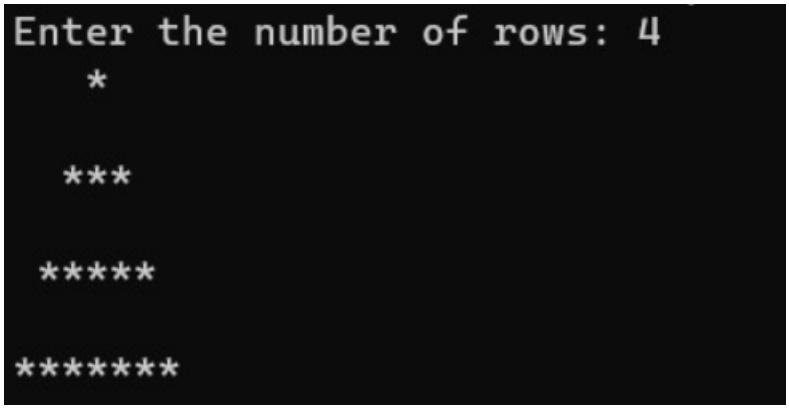


PROGRAM:

```
#include<stdio.h>
int main()
{
   int i,j,k,n;
   printf("Enter the number of rows:");
   scanf("%d",&n);
      for(i=1;i<=n;i++)
       {
         for(k=n-i;k>0;k--)
         {
               printf(" ");
         }
               for(j=1;j<=2*i-1;j++)
               {
                  printf("*");
```

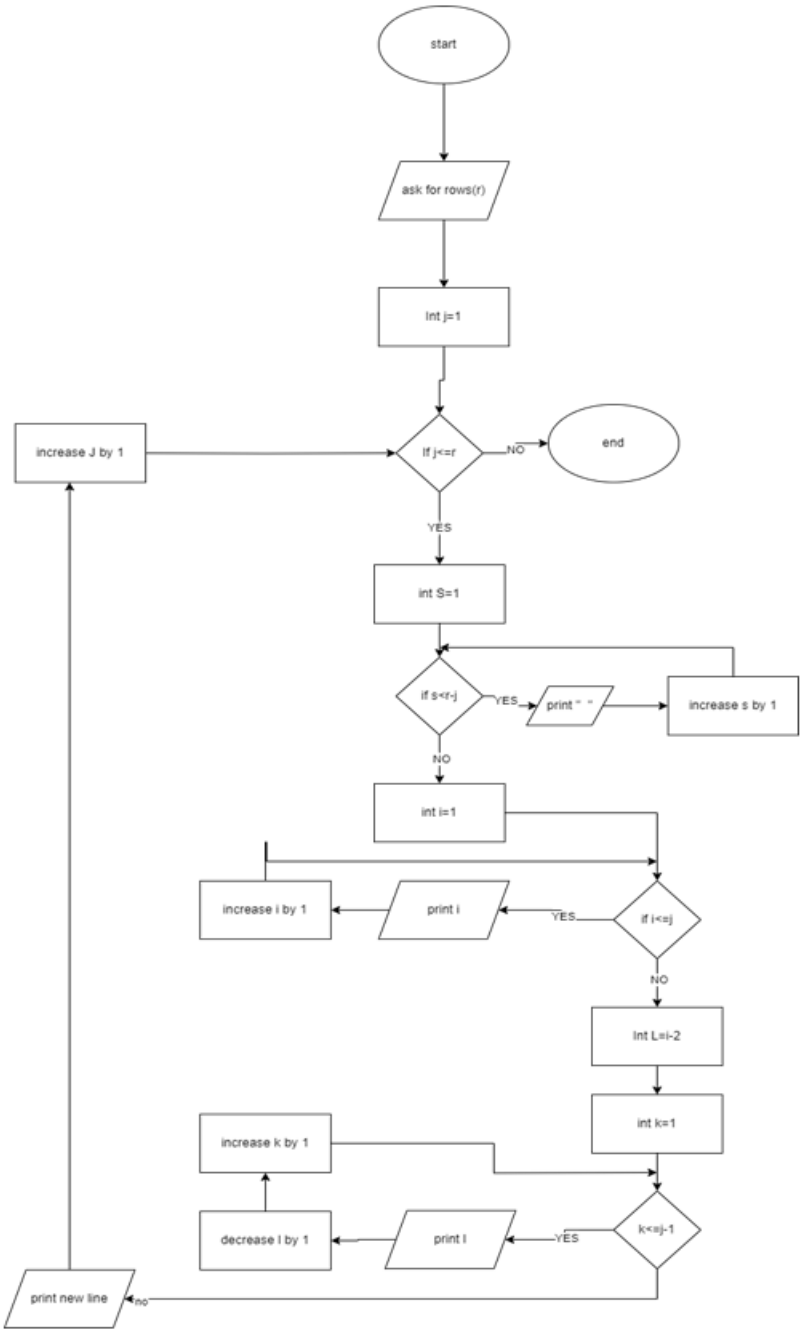
```
                }
            printf("\n");
        }
    return 0;
}
```

RESULT:



Program 5	
PROBLEM STATEMENT:	Write a program to print the following patterns: 1 1 2 1 1 2 3 2 1 1 2 3 4 3 2 1
ALGORITHM:	Step1:Start Step2:read the value of r Step3:perform using for loop when j<=r and s<=r-i Step4:print space Step5:read values when i<=j and k<=j-1 Step6:print the numbers in a triangle shape Step7:Stop

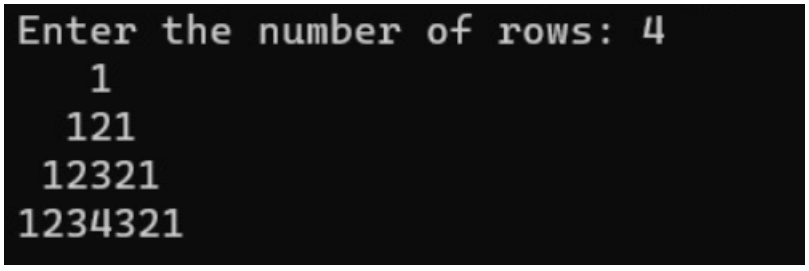
FLOWCHART:


start
ask for rows(r)
Int j=1
If j<=r
NO
end
YES
increase J by 1
int S=1
if s<r-j
YES
print " "
increase s by 1
NO
int i=1
if i<=j
YES
print i
increase i by 1
NO
Int L=i-2
int k=1
k<=j-1
YES
print l
decrease l by 1
increase k by 1
print new line
no

PROGRAM:

```
#include <stdio.h>
int main()
{
  int r;
  printf("Enter the number of rows: ");
  scanf("%d",&r);
   for (int j=1;j<=r;j++)
   {
    for(int s=1;s<=r-j;s++)
      printf(" ");
      int i;
        for ( i=1;i<=j;i++)
         printf("%d",i);
         int l=i-2
          for(int k=1;k<=j-1;k++)
          {
            printf("%d",l);
            l—
           }
     printf("\n");
   }
 return 0;
}
```

RESULT:



CONCLUSION:

By this experiment I have learnt the various control structures we can achieve using c language programming and the fundamental operations like the for loop.