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AIM:	Apply various control structures to solve given problems.
Program 1	
PROBLEM STATEMENT :	Take two numbers as input and calculate their LCM and GCD

ALGORITHM:

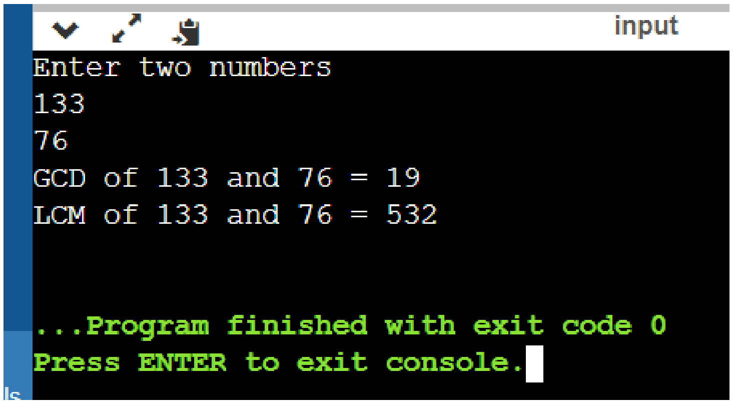
```
1. START
2. Input 2 Numbers
3. if (n1 > n2)
   {
      num = n1
      den = n2
   }
   else
   {
      num = n2
      den = n1
   }
4. while (rem != 0)
   {
      num   = den
      den = rem
      rem   = num % den
   }
5. gcd = den
   lcm = n1 * n2 / gcd
6.Print LCM and GCD
7.STOP
```

FLOWCHART:

PROGRAM:

```
#include <stdio.h>

int main()
{
    int n1, n2, gcd, lcm, rem, num, den;

    printf("Enter two numbers\n");
    scanf("%d %d", &n1, &n2);
    if (n1 > n2)
    {
        num = n1;
        den = n2;
    }
    else
    {
        num = n2;
        den = n1;
    }
    rem = num % den;
    while (rem != 0)
    {
        num   = den;
        den = rem;
        rem   = num % den;
    }
    gcd = den;
    lcm = n1 * n2 / gcd;
    printf("GCD of %d and %d = %d\n", n1, n2, gcd);
    printf("LCM of %d and %d = %d\n", n1, n2, lcm);

return 0;
}
```

RESULT:



```
Enter two numbers
133
76
GCD of 133 and 76 = 19
LCM of 133 and 76 = 532


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

Program 2

PROBLEM STATEMENT : Write a program to convert a decimal number to binary or convert a binary number to decimal

ALGORITHM:

```
1. START
2.Input 1 for decimal and two for binary to decimal
3. If Inp =1
Input Decimal Number
   while(n!=0)
   {
      bi = bi + ((n % 2)* i);
      n = n / 2;
      i = i * 10;
   }
4.print bi
5. Else If Input = 2
```

```
Input Binary Number
Sum = 0
For(I=0;Number>0;I++)
{
Temp = (Number-((Number/10)*10))*(2^I)
Sum = Sum + Temp
}
Print Sum
6. STOP
```

FLOWCHART:

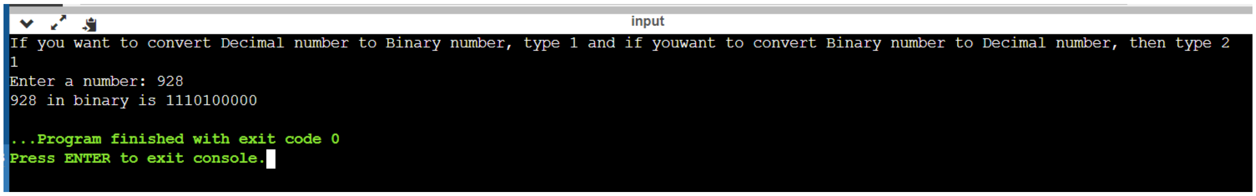
PROGRAM:

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

{
int flag=0;
int inp;
do
{
printf("If you want to convert Decimal number to Binary number, type 1
and if you want to convert Binary number to Decimal number, then
```

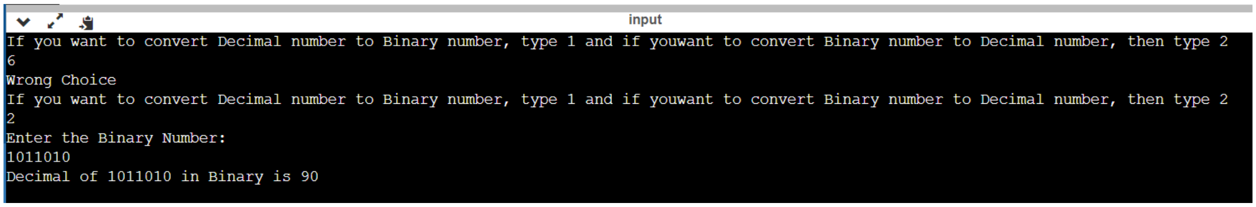
```
type 2\n");
scanf("%d",&inp);
if(inp==1)
{
flag=1;
    int n, bi=0, i=1;
    printf("Enter a number: ");
    scanf("%d", &n);
    printf ("%d in binary is ", n);
    while(n!=0)
    {
        bi = bi + ((n % 2)* i);
        n = n / 2;
        i = i * 10;
    }
    printf("%d", bi);

}
    else if(inp==2)
{
flag=1;
int bi,n,temp,sum=0;
printf("Enter the Binary Number: \n");
scanf("%d",&bi);
n=bi;
for(int i=0;n>0;i++)
{
temp=(n-((n/10)*10))*pow(2,i);
n=n/10;
sum = sum + temp;
}
printf("Decimal of %d in Binary is %d\n",bi,sum);
```

```
}
else
{
flag=0;
printf("Wrong Choice\n");
}
}while(flag==0);
return 0;
}
```

RESULT:



```
If you want to convert Decimal number to Binary number, type 1 and if youwant to convert Binary number to Decimal number, then type 2
1
Enter a number: 928
928 in binary is 1110100000

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



```
If you want to convert Decimal number to Binary number, type 1 and if youwant to convert Binary number to Decimal number, then type 2
6
Wrong Choice
If you want to convert Decimal number to Binary number, type 1 and if youwant to convert Binary number to Decimal number, then type 2
2
Enter the Binary Number:
1011010
Decimal of 1011010 in Binary is 90
```

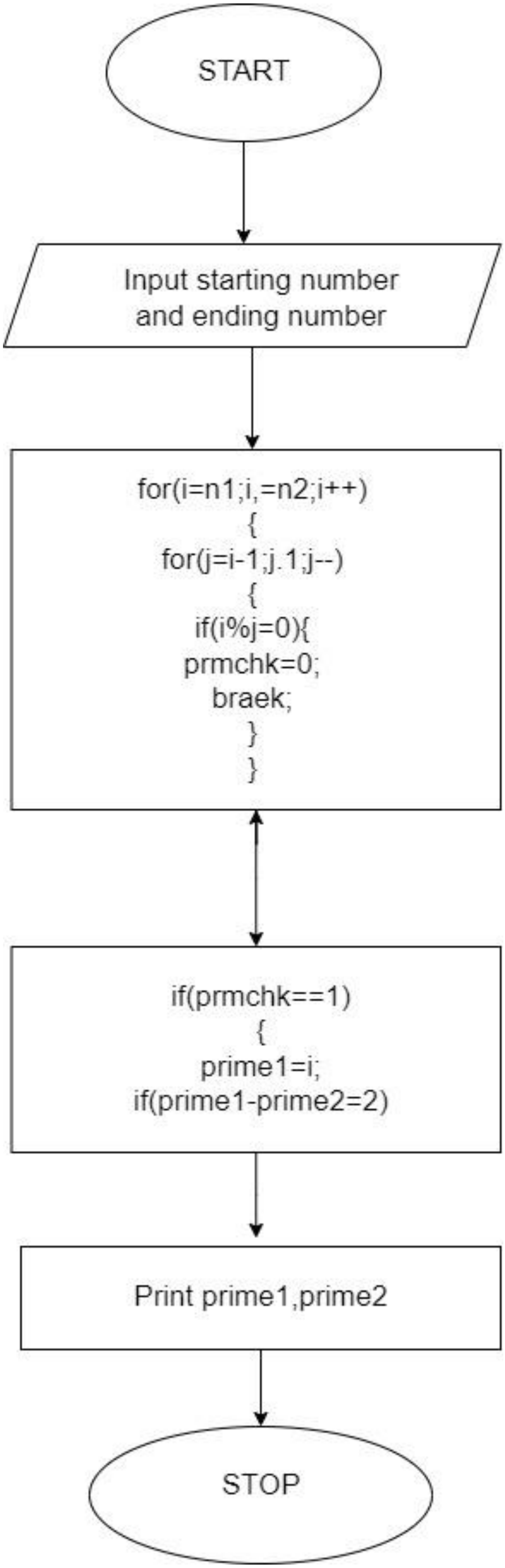
Program 3

PROBLEM	Twin primes are consecutive odd numbers, both of which are prime

STATEMENT:	numbers. Write a program which inputs two positive integers A and B and outputs all twin primes in range A to B.

ALGORITHM:	1. START
	2.Enter starting number and ending number
	3. for(i=n1; i<=n2; i++)
	{
	for(j=i-1; j>1; j--)
	{
	if(i%j == 0)
	{
	prmchk = 0;
	break;
	}
	}
	if(prmchk == 1)
	{
	prime1 = i;
	if(prime1 - prime2 == 2)
	4.print prime1 and prime2
	5.STOP

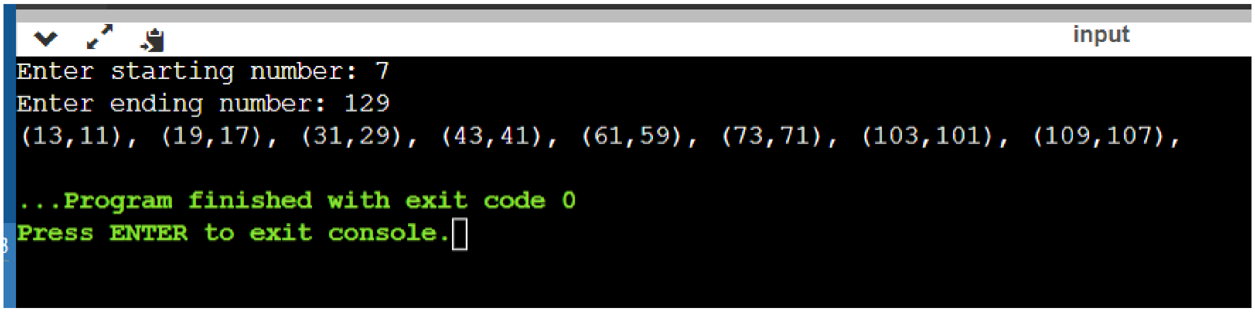
FLOWCHART:


START
Input starting number
and ending number
for(i=n1;i,=n2;i++)
{
for(j=i-1;j.1;j--)
{
if(i%j=0){
prmchk=0;
braek;
}
}
if(prmchk==1)
{
prime1=i;
if(prime1-prime2=2)
Print prime1,prime2
STOP

PROGRAM:

```
#include <stdio.h>
int main()
{
    int n1, n2, i, j;
    int prime1, prime2, prmchk=1;
    printf("Enter starting number: ");
    scanf("%d", &n1);
    printf("Enter ending number: ");
    scanf("%d", &n2);
    for(i=n1; i<=n2; i++)
    {
        for(j=i-1; j>1; j--)
        {
            if(i%j == 0)
            {
                prmchk = 0;
                break;
            }
        }
        if(prmchk == 1)
 {
            prime1 = i;
            if(prime1 - prime2 == 2)
            {
                printf("(%d,%d), ", prime1, prime2);
            }
        }
        prime2 = prime1;
        prmchk = 1;
    }
    return 0;
}
```

RESULT:



```
Enter starting number: 7
Enter ending number: 129
(13,11), (19,17), (31,29), (43,41), (61,59), (73,71), (103,101), (109,107),

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

Program 4

PROBLEM STATEMENT:

Write a program to find out whether a number is kaprekar or not. Consider an n-digit number k. Square it and add the right n digits to the left n or n-1 digits. If the resultant sum is k, then k is called a Kaprekar number. For example, 9 is a Kaprekar number.4

ALGORITHM:

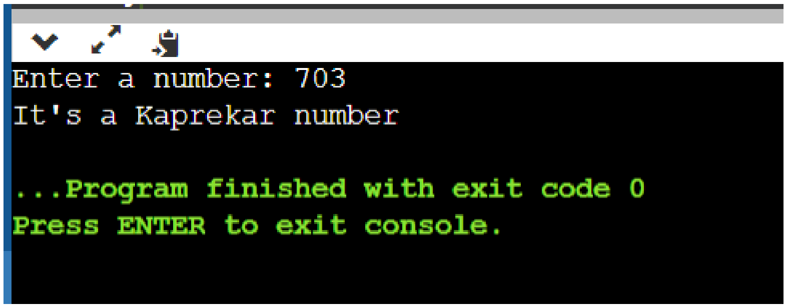
```
1.START
2.input a number n
3.square=n*n
4. while(sq != 0)
   {
      digits++;
      sq = sq/10;
   }
   if(digits%2 == 0){}
   else {
      digits = digits + 1;
   }
5. num = digits/2;
   power = pow(10, num);
   k1 = sq % power;
   k2 = (sq - k1) / power;
   if(k1+k2 == n)
Print it’s a Kaprekar number
Else
Print it’s not a kaprekar number
6.STOP
```

FLOWCHART:

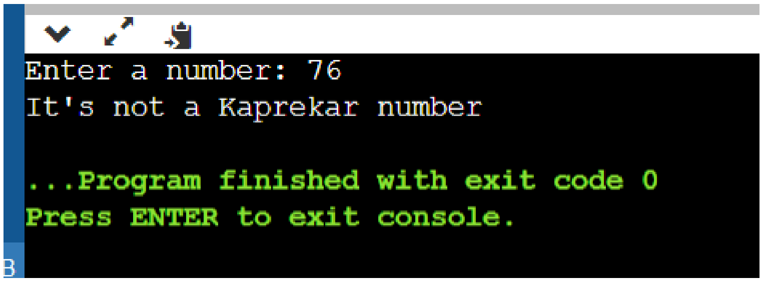
PROGRAM:

```
 #include <stdio.h>
#include <math.h>
int main()
{
    int n, k1, k2, sq, digits, num, power;
    printf("Enter a number: ");
    scanf("%d", &n);
    sq = n*n;
    while(sq != 0)
    {
        digits++;
        sq = sq/10;
    }
    if(digits%2 == 0){}
    else {
        digits = digits + 1;
    }
    sq = n*n;
    num = digits/2;
    power = pow(10, num);
    k1 = sq % power;
    k2 = (sq - k1) / power;
    if(k1+k2 == n)
    {
        printf("It's a Kaprekar number");
    }else {printf("It's not a Kaprekar number");}
    return 0;
}
```

RESULT:



```
Enter a number: 703
It's a Kaprekar number

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



```
Enter a number: 76
It's not a Kaprekar number

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

Program 5

PROBLEM STATEMENT:

Write a program to check whether a given number is Armstrong number or not. For Example 371 is 3^3+7^3+1^3=371.

ALGORITHM:

```
1.START
2.Take input number from user
store number in num and temp variable n
3. while(n!=0)
    {
        n = n/10;
        digCount++;
    }
    n = num;
    while(n!=0)
    {
        dig = n%10;
        power = pow(dig, digCount);
        sum = sum + power;
        n = n/10;
    }
    if (sum == num)
4.Print num is an armstrong number
```

```
5.else
Print it’s not aan armstrong number
6.STOP
```

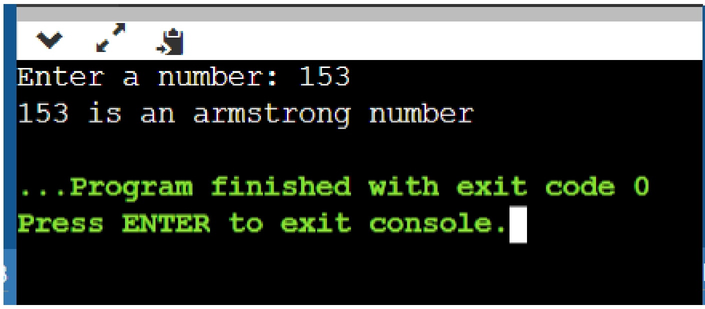
FLOWCHART:

PROGRAM:

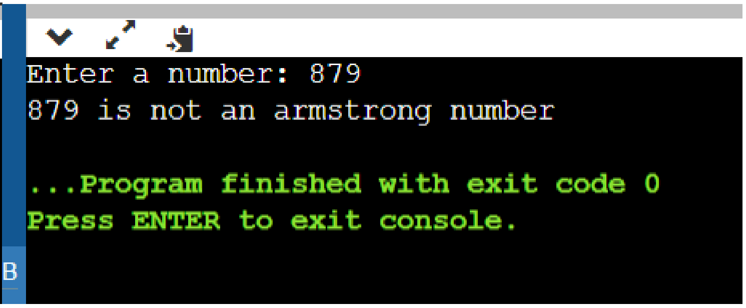
```c
#include <stdio.h>
#include <math.h>
int main()
{
    int num, dig, power, sum=0, digCount=0, n;
    printf("Enter a number: ");
    scanf("%d", &num);
    n = num;
    while(n!=0)
    {
        n = n/10;
        digCount++;
    }
    n = num;
    while(n!=0)
    {
        dig = n%10;
        power = pow(dig, digCount);
        sum = sum + power;
        n = n/10;
    }
    if (sum == num)
    {
        printf("%d is an armstrong number", num);
    }else { printf("%d is not an armstrong number", num); }
    return 0;
```

	}

RESULT:



```
Enter a number: 153
153 is an armstrong number

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



```
Enter a number: 879
879 is not an armstrong number

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

CONCLUSION:	In this experiment we learnt about various types of control structures like for,while, do while we also learnt about the if-elsse statement and the various types of compund assignment operators like !=(not equals),==(equals to) and arithmetic operators like /,+,- etc.