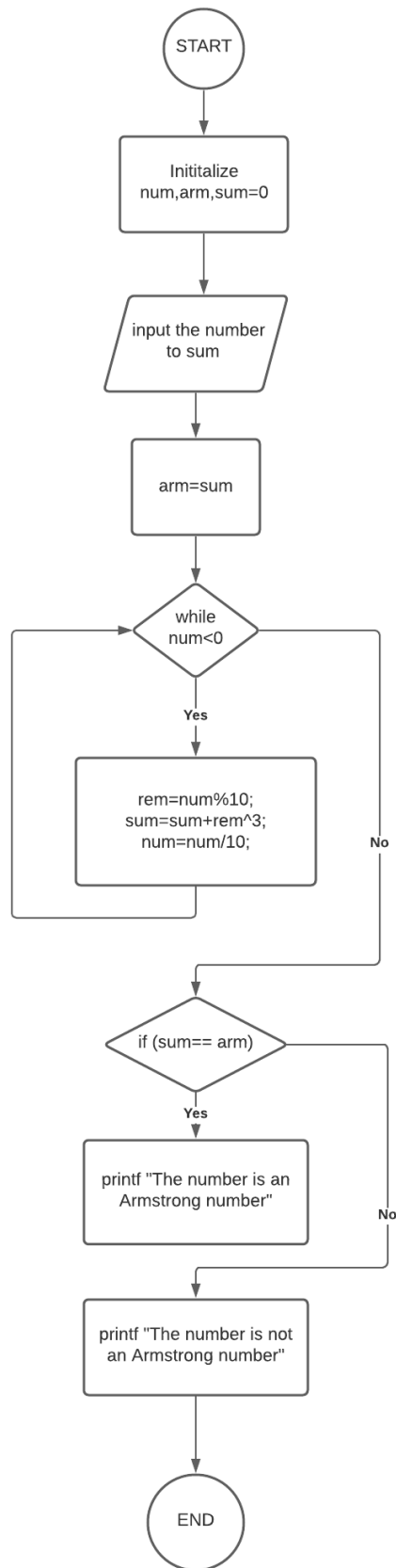


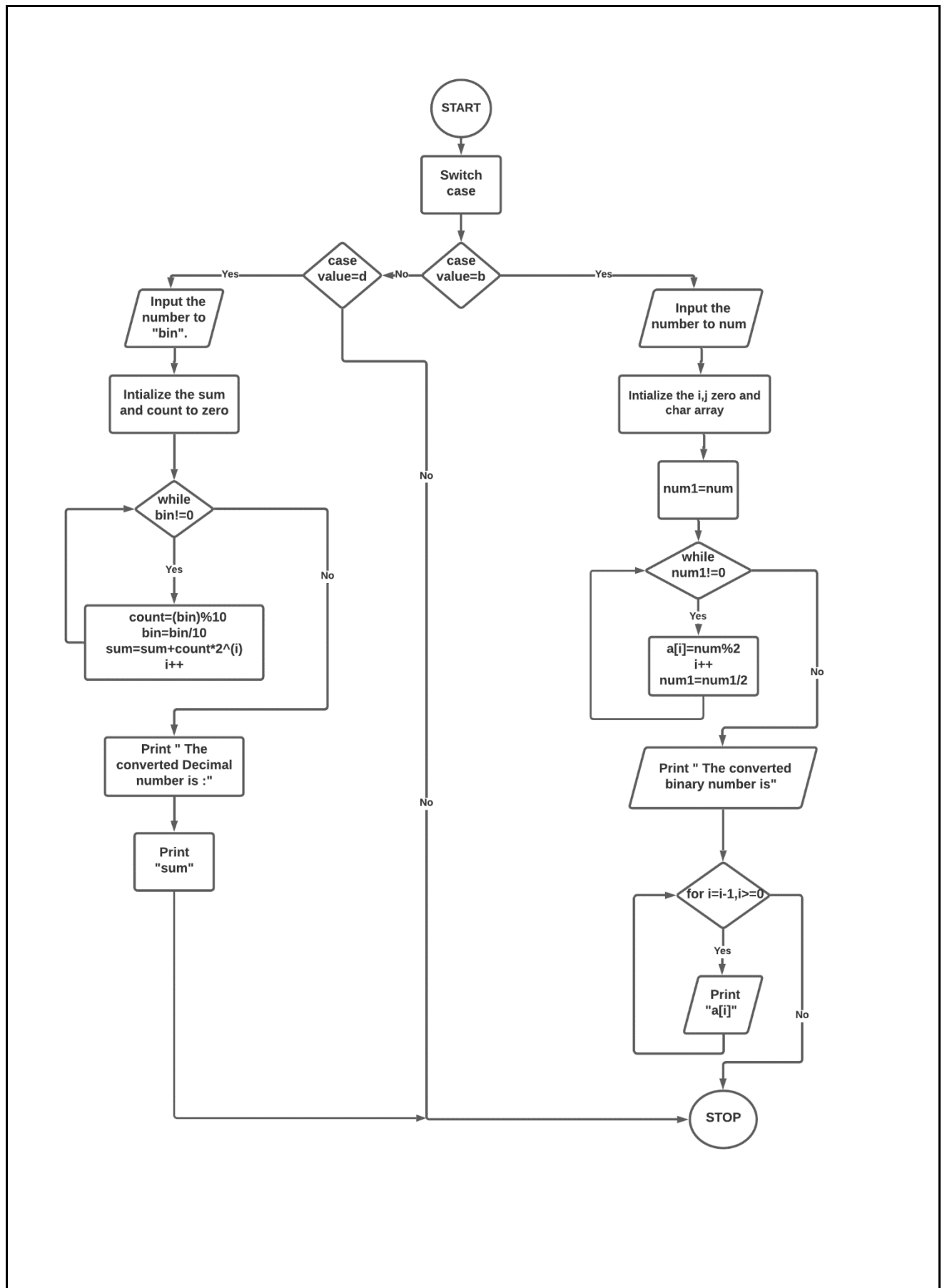
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Experiment No.	2

AIM:	To apply various control structures to solve given problem.
Program 1	
PROBLEM STATEMENT :	Write a program to check whether a given number is armstrong number or not. For Example. 371 is $3^3+7^3+1^3=371$.
PROGRAM:	<p>ALGORITHM:</p> <p>STEP 1: START.</p> <p>STEP 2: Take the number to be checked as input from the user and store it in variable name "num".</p> <p>STEP 3: Copy the original number into a new variable "arm".</p> <p>STEP 4: Initialize rem,arm and sum=0.</p> <p>STEP 5: While n is not equal to zero repeat steps 5.1 and 5.2 ,else if the condition is false the go to step 5.</p> <p>STEP 5.1: Do $n=n/10$.</p> <p>STEP 5.2: Increment the counter by 1.Counter contains the number of digits of number to be checked.</p> <p>STEP 6: Copy the original number into a new variable num.</p> <p>STEP 7: while num is not equal to zero repeat steps 7.1,7.2 and 7.3. If the condition is false then go to step 8.</p> <p>STEP 7.1: $rem=num\%10$. Rem stores the last digit of num.</p> <p>STEP 7.2: $sum=sum+rem^3$. Sum stores the sum of digits raised to cnt.</p> <p>STEP 7.3: Do $num=num/10$.</p> <p>STEP 8: If sum is equal to no then print "Number is a Armstrong." else go to step 8.1.</p> <p>STEP 8.1: print "Number is not a Armstrong."</p> <p>STEP 9: STOP.</p>



	<u>PROGRAM:</u> <pre> #include<stdio.h> void main () { int num,arm,sum=0; printf("Enter the number to be checked: \n"); scanf("%d",&num); arm=num; while(num>0) { int rem=num%10; num=num/10; sum =sum+(rem*rem*rem); } if(sum==arm) { printf("The number is an amstrong number"); } else { printf("The number is not an amstrong number "); } } </pre>
RESULT: The Number is checked whether the number is an Armstrong number.	
INPUT:	407
OUTPUT:	Number is a Armstrong.

Program 2	
PROBLEM STATEMENT :	Write a program to convert a decimal number to binary or convert a binary number to decimal
PROGRAM	<p><u>ALGORITHM:</u></p> <p>STEP 1: START</p> <p>STEP 2: Take the number to be converted from the user and store it in the variable under the name “num”.</p> <p>STEP 3: Initialize i,j(counter) to zero and char array</p> <p>STEP 4: Create a switch case for determine the binary to decimal or decimal conversion.</p> <p>STEP 5: Press “b” for decimal to binary conversion and “d ” for decimal to binary conversion.</p> <p>STEP 6:(For decimal to binary conversion).Copy the original number to a variable name “num1”.</p> <p>STEP 7: While num1 is not equal to zero repeat steps 7.1 and 7.2 ,else if the condition is false the go to step 7.</p> <p>STEP 7.1: Replace the ith place of the array with (num1%2)</p> <p>STEP 7.2: Increment the counter ‘i’ by one and replace the num1 by (num1/2).</p> <p>STEP 8: To print the binary number,For i=i-1 and “i” greater then zero , Repeat the step 8.1 else if the condition is false the go to step 8.</p> <p>STEP 8.1: Print the ith position of the char array.</p> <p>STEP 9: (For the binary to decimal conversion). Take the number to be converted from the user and store it in the variable under the name “bin”and copy the original number to “bin1”.</p> <p>STEP 10: Intialize counter,i,sum to zero</p> <p>STEP 11:While the bin1 not equal to zero, repeat the steps 11.1,11.2 else if the condition is false the go to step 11.</p> <p>STEP 11.1: Do count=(bin1)% 10 and replace bin1 with bin1/10.</p> <p>STEP 11.2: Do sum=sum+count*(2^i) and increment the counter by 1.</p> <p>STEP 12: Print the value of the “sum” as converted decimal number.</p> <p>STEP 13: STOP.</p>



PROGRAM:

```
#include<stdio.h>
#include<math.h>
void main()
{
    char s;
    printf("Enter 'd' for Binary to Decimal conversion OR Enter 'b' for b
Decimal to Binary conversion \n");
    scanf("%c",&s);
    if (s=='b')
    {
        int num,i=0;
        char a[100];
        printf("Enter the decimal number to be converted in binary :\n");
        scanf("%d",&num);
        int num1=num;
        while(num1!=0)
        {
            a[i]=num1%2;
            i++;
            num1=num1/2;
        }
        printf("Enter the binary conversion is:");
        for(i=i-1;i>=0;i--)
        {
            printf("%d",a[i]);
        }
    }
    else if(s=='d')
    {
        int i=0;
        long bin;
        long sum=0,count;
        printf("Enter the Binary number:");
        scanf("%ld",&bin);
        while (bin!=0)
        {
            count=(bin)%10;
            bin=bin/10;
            sum=sum+count*pow(2,i);
            i++;
        }
        printf("The Converted Decimal number is:");
        printf("%ld",sum);
    }
}
```

RESULT:	The Converted Binary and Decimal number were displayed
INPUT Case 1:	(For the Decimal to Binary) Decimal number :69
Case 2:	(For the Binary to Decimal) Binary number :100110
OUTPUT Case 1:	(For the Decimal to Binary) Enter 'd' for Binary to Decimal conversion OR Enter 'b' for Decimal to Binary conversion b Enter the decimal number to be converted in binary :69 Enter the binary conversion is:1000101
Case 2:	For the Binary to Decimal) Enter 'd' for Binary to Decimal conversion OR Enter 'b' for Decimal to Binary conversion d Enter the Binary number:100110 The Converted Decimal number is:38

Program 3

**PROBLEM
STATEMENT :**

Note that $12*42 = 21*24$ and $12*63 = 21*36$ and $12*84 = 21*48$ and so on. There is a property that $(10a+b)*(10c+d) = (10b+a)(10d+c)$ where a and b are unequal and c and d are also unequal. Write a program which outputs them all between 10 to 99.

PROGRAM:**ALGORITHM:**

STEP 1: START.

STEP 2: Take the range from the user as input and store it in the variable name "low" and "up".

STEP 3: Declare the variables U1,L1,U2,L2 for the digit storage

STEP 4: Initialize the loop counters i,j to "low" and "low+1" resp.

STEP 5: For i less than equal to value of "up", Repeat the steps 5.1 ,5.2and 5.3 else if the condition is false go to step 5.

STEP 5.1:Do $U1=i/10$ and $L1=i\%10$.

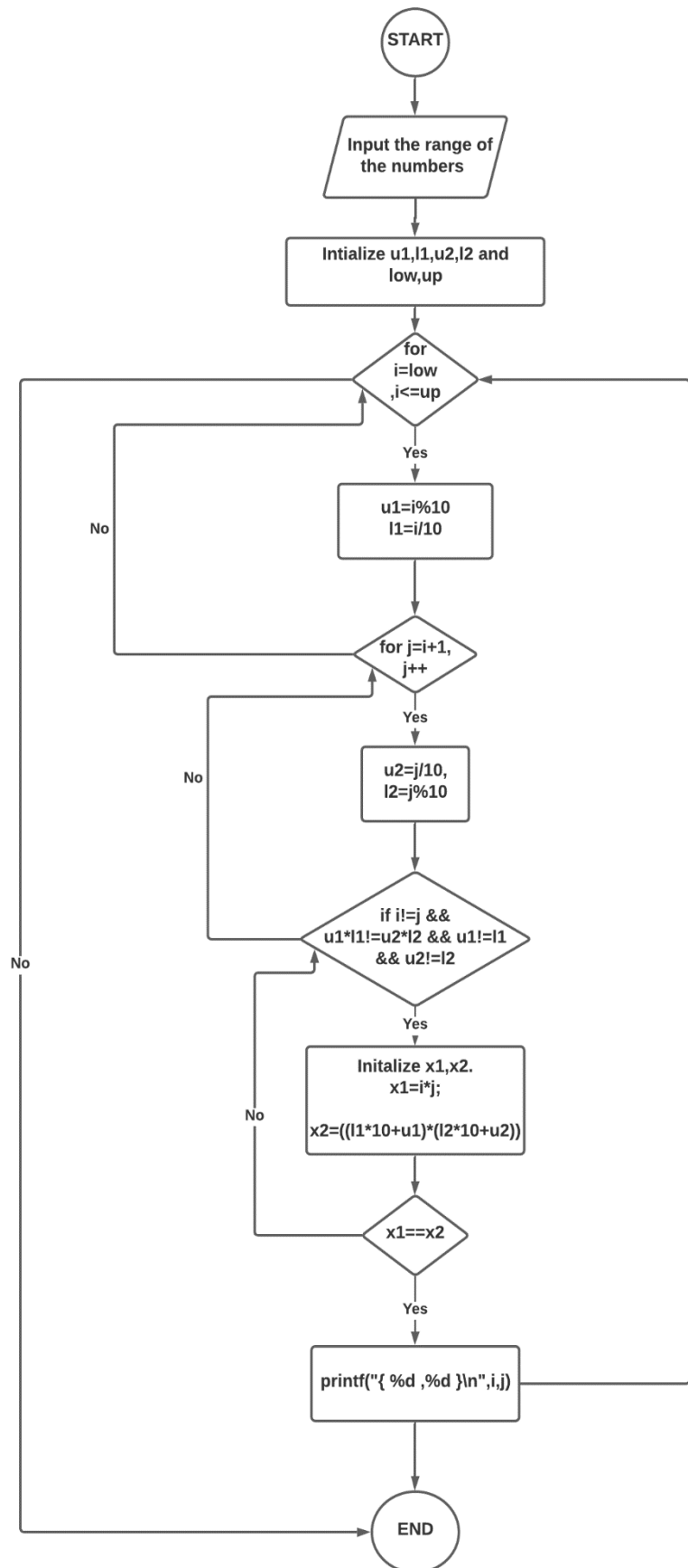
STEP 5.2: For j is less than or equal to "up", Repeat steps 5.2.1 ,5.2.2 and 5.2.3 else if the condition is false ,go to step 5.2.

STEP 5.2.1 : Do $U2=j/10$ and $L2=j\%10$.

STEP 5.2.2 : If i not equal to j and $U1*L1$ not equal to $U2*L2$ and U1 not equal to L1 and U2 not equal to L2, Execute Step 5.2.3 ,else go to step 5.1 and increment the loop counter i,j by one

STEP 5.2.3 If $(i*j)$ is equal to $(L1*10+U1)*(L2*10+U2)$, Print { i , j}or else go to step 5.1 and increment the loop counter i,j by one .

STEP 6: STOP.



	<p><u>PROGRAM:</u></p> <pre> #include<stdio.h> void main() { int up,low; int u1,u2,l1,l2; printf("Enter the range of the numbers seperated by a space :"); scanf("%d %d",&low,&up); for(int i=low;i<=up;i++) { u1=i/10; l1=i%10; for(int j=i+1;j<=up;j++) { u2=j/10; l2=j%10; if(i!=j && u1*l1!=u2*l2 && u1!=l1 && u2!=l2) { int x1=i*j; int x2=((l1*10+u1)*(l2*10+u2)); if(x1==x2) { printf("{ %d ,%d }\n",i,j); } } } } } </pre>
<p>RESULT: All the numbers following the property $(10a+b)*(10c+d) = (10b+a)(10d+c)$ is followed.</p>	
INPUT:	10 50
OUTPUT:	<p>Enter the range of the numbers separated by a space :10 50</p> <pre> { 12 ,42} { 21 ,24} { 21 ,36} { 21 ,48} { 26 ,31} { 28 ,41} { 31 ,39} { 32 ,46} { 36 ,42} { 42 ,48} </pre>

Program 4

**PROBLEM
STATEMENT :**

Twin primes are consecutive odd numbers both of which are prime numbers. Write a program which inputs two positive integers A and B and outputs all twin primes in range A to B

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ALGORITHM:

STEP 1: START.

STEP 2: Take the user input of the range and store it in under the variable name "low" and "upper".

STEP 3: Initialize the variable "temp", i, j and count equal to zero.

STEP 4: For i equal to value of "lower" and less than the value of "upper", Repeat the steps 4.1, 4.2 and 4.3 or else if the condition fails go to step 4.

STEP 4.1: For j equal to one and less the value of i, Repeat the steps 4.1.1 and 4.1.2 or else if the condition is false go to step 4.1

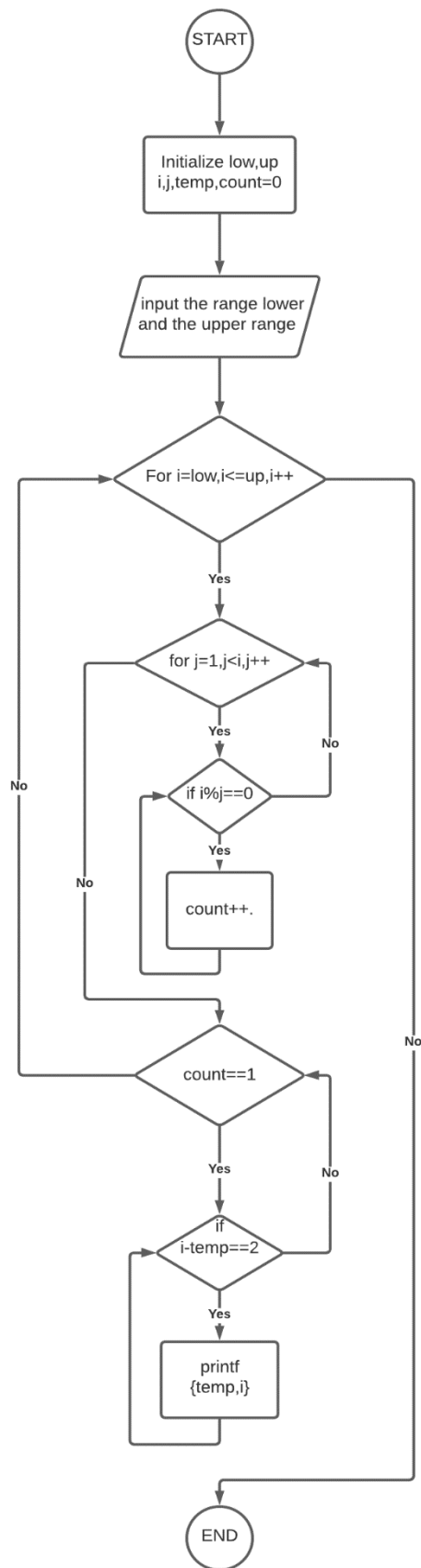
STEP 4.1.1: If i%j equal to zero do increment count by one or else if the go to step 4.1.2.

STEP 4.1.2: Increment the loop counter j by one.

STEP 4.2: If the value of count is equal to one then if the value of (i-temp) equal to two then print { temp, i } and set the value of temp to i, else go to step 4.3

STEP 4.3: Do temp=i and increment the loop counter i by one.

STEP 5: END



	PROGRAM: <pre> #include<stdio.h> void main() { int lower,upper,temp; printf("Enter the Range of the number :"); scanf("%d %d",&lower,&upper); for(int i=lower;i<=upper;i++) { int count = 0; for(int j=1;j<i;j++) { if(i%j==0) { count++; } } if(count==1) { if((i-temp)==2) { printf("{ %d %d}\n",temp,i); } temp = i; } } } </pre>
RESULT: The twin prime number belonging in the range were displayed	
INPUT:	1 and 50
OUTPUT:	Enter the Range of the number :1 50 {3 5} {5 7} {11 13} {17 19} {29 31} {41 43}