

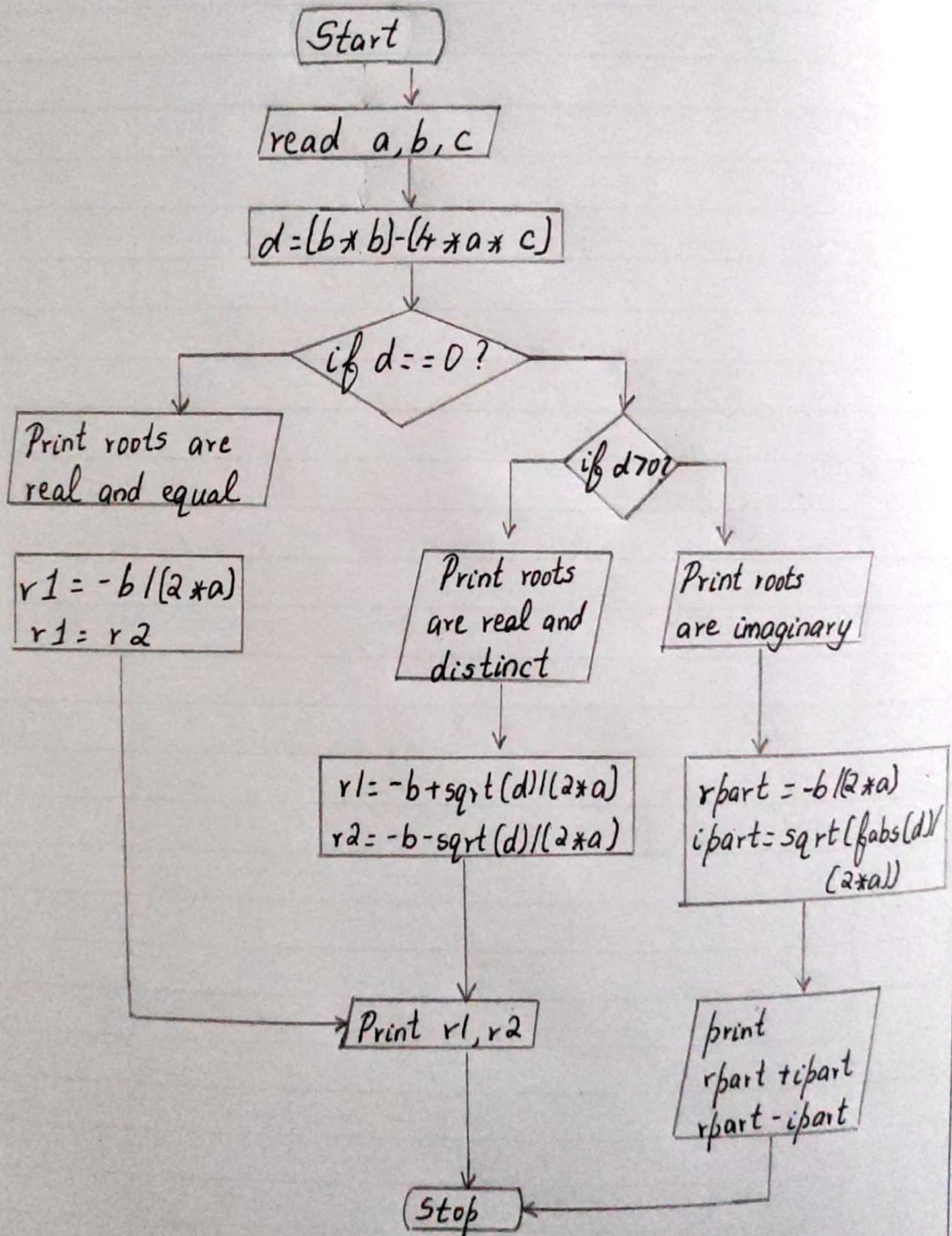
LIST OF EXPERIMENTS

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LIST OF EXPERIMENTS

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Flowchart :



D	D	M	M	Y	Y	Y	Y
1	2	0	2	2	0	1	9

Program - 1

Design and develop a C program that accepts three co-efficients (a, b and c) of a quadratic equation ($ax^2 + bx + c = 0$) as input and compute all the possible roots of the given set of co-efficients. Also print the message in case of zero-valued co-efficients.

```
#include <stdio.h>
#include <conio.h>
#include <math.h>
void main ()
{
    float a, b, c, r1, r2, d, rpart, ipart;
    clrscr ();
    printf ("Enter non-zero co-efficient values of a, b, c");
    scanf ("%f %f %f", &a, &b, &c);
    d = (b * b) - (4 * a * c);
    if (d == 0)
    {
        printf ("The roots are real and equal");
        r1 = -b / (2 * a);
        r2 = r1;
        printf ("\n Root 1 = %.f \n Root 2 = %.f", r1, r2);
    }
    else if (d > 0)
    {
        printf ("\n The roots are real and distinct");
    }
}
```

Output:

1. Enter non-zero co-efficient values of a,b,c
1 2 3

The roots are imaginary

$$\text{Root 1} = -1.000000 + i2.000000$$

$$\text{Root 2} = -1.000000 - i2.000000$$

2. Enter non-zero co-efficient values of a,b,c

1 2 3 4 0

The roots are real and distinct

$$\text{Root 1} = -117.000000$$

$$\text{Root 2} = -351.000000$$

3. Enter non-zero co-efficient values of a,b,c

1 0 0

The roots are real and equal

$$\text{Root 1} = 0.000000$$

$$\text{Root 2} = 0.000000$$

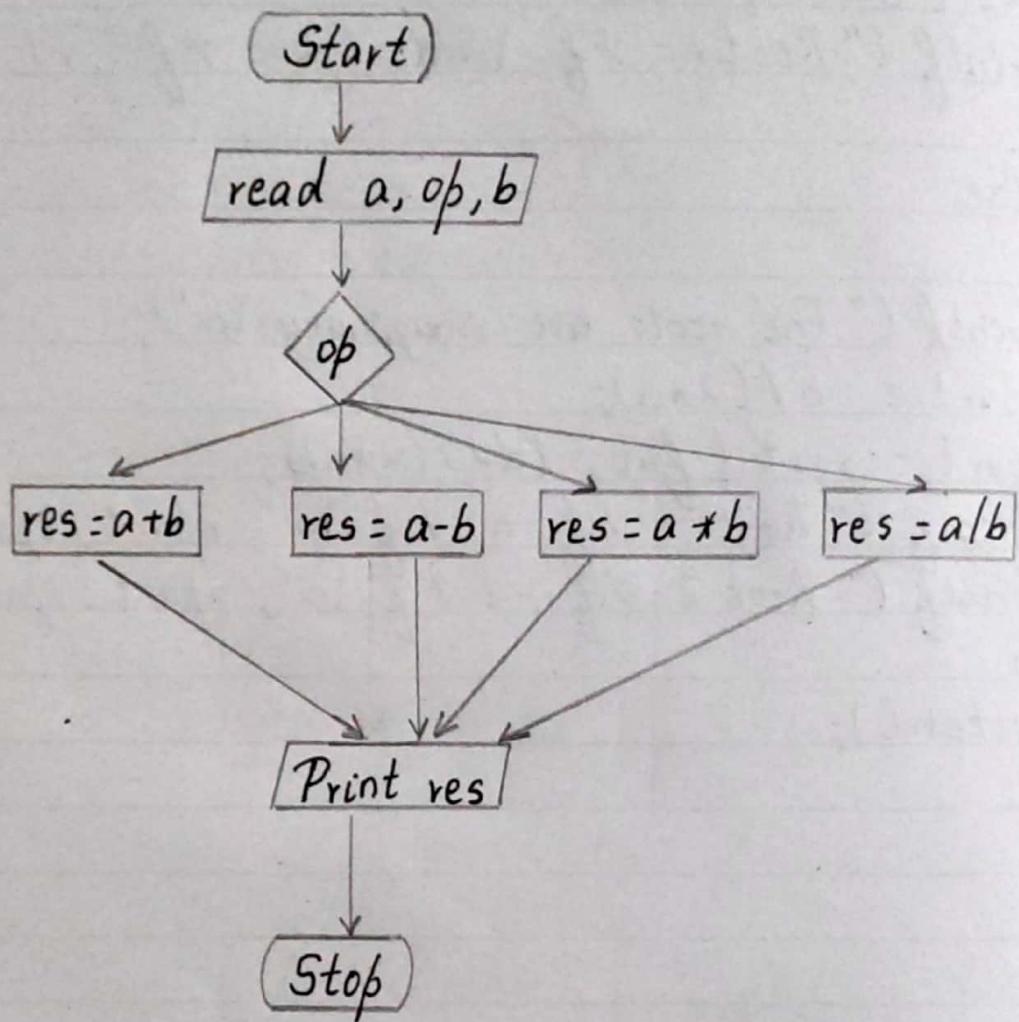
D	D	M	M	Y	Y	Y	Y

```

r1 = -b + sqrt(d)/(2*a);
r2 = -b - sqrt(d)/(2*a);
printf ("Root 1 = %f \n Root 2 = %f ", r1, r2 );
}
else
{
printf ("The roots are imaginary \n");
rpart = -b/(2*a);
ipart = sqrt(fabs(d)/(2*a));
printf ("Root1 = %f + i %f \n", rpart, ipart);
printf ("Root 2 = %f - i %f \n", rpart, ipart);
}
getch();
}

```

Flowchart:



D	D	M	M	Y	Y	Y	Y
1	9	0	2	2	0	1	9

Program - 2

Design and develop a program to solve simple computational problems using arithmetic expression and use each operator leading to simulation of a Commercial Calculator.

```
#include <stdio.h>
#include <conio.h>
void main()
{
    char op;
    float a, b, res;
    clrscr();
    printf ("Enter an Operator and two Operands");
    scanf ("%c %f %f", &op, &a, &b);
    switch (op)
    {
        case '+': res = a+b;
                     printf ("Result = %f", res);
                     break;
        case '-': res = a-b;
                     printf ("Result = %f", res);
                     break;
        case '*': res = a*b;
                     printf ("Result = %f", res);
                     break;
        case '/': if (b!=0)
                    {
                        res = a/b;
                    }
    }
}
```

Output:

1. Enter an Operator and two Operands + 3

2

Result = 5.000000

2. Enter an Operator and two Operands - 3

10

Result = -7.000000

3. Enter an Operator and two Operands * 2

3

Result = 6.000000

4. Enter an Operator and two Operands / 2

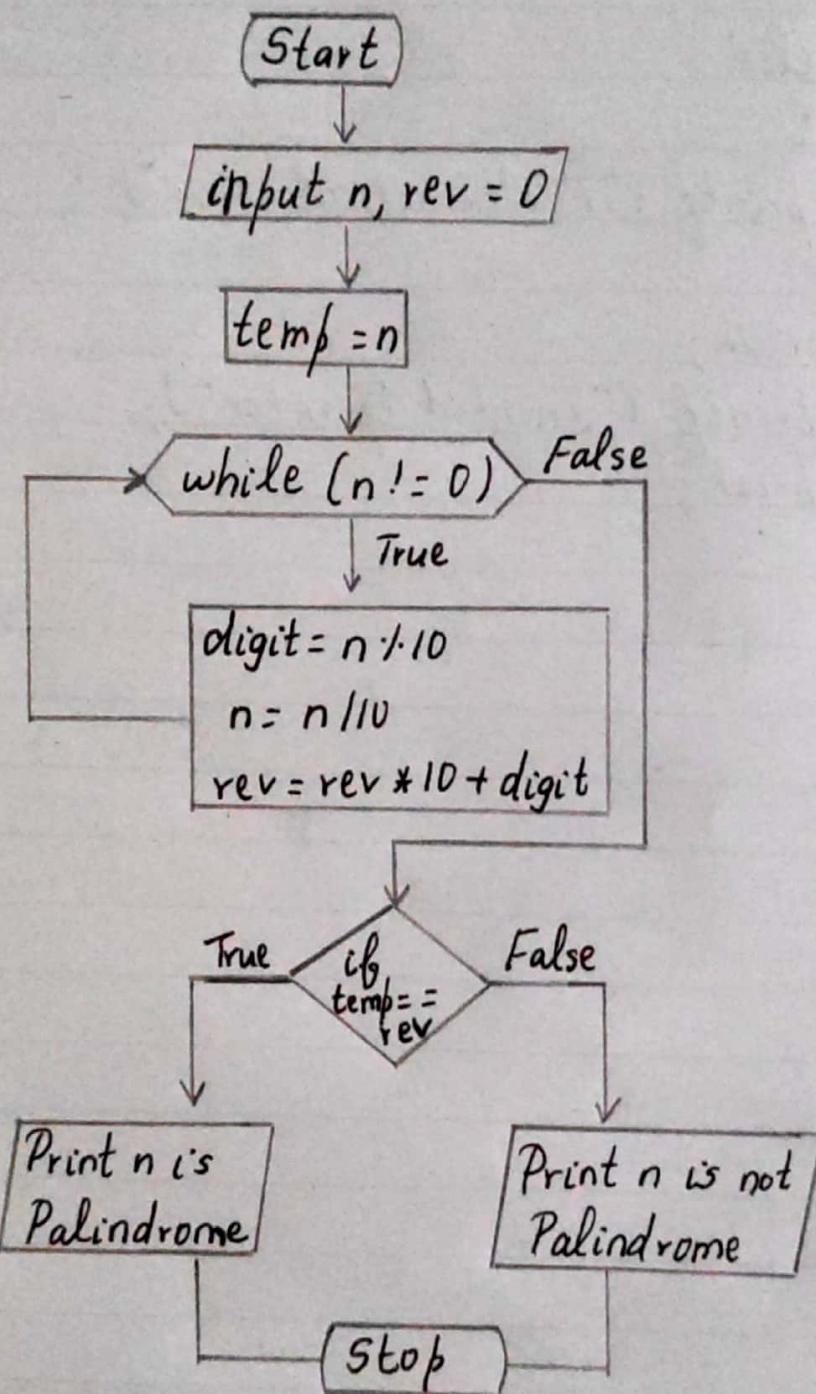
3

Result = 0.666667

D	D	M	M	Y	Y	Y	Y

```
    printf("Result = %f", res);
}
else
{
    printf("Mathematical error");
    break;
default: printf("Invalid Operator");
    break;
}
getch();
}
```

Flowchart:



D	D	M	M	Y	Y	Y
26	02	20	19			

Program - 3

Design and develop a program to find the reverse of an integer and check whether it is Palindrome or not.

```
#include <stdio.h>
#include <conio.h>
void main ()
{
    long int n, rev=0, digit, temp;
    clrscr();
    printf ("Enter the value of n:");
    scanf ("%ld", &n);
    temp = n;
    while (n!=0)
    {
        digit = n % 10;
        rev = rev * 10 + digit;
        n = n / 10;
    }
    printf ("\n The given no. is %ld", temp);
    printf ("\n The reverse of the number is %ld", rev);
    if (temp == rev)
    {
        printf ("\n %ld is a Palindrome no.", temp);
    }
    else
    {
        printf ("\n %ld is not a Palindrome no.", temp);
    }
}
```

Output:

1. Enter the value of n: 131

The given no. is 131

The reverse of the number is 131

131 is a Palindrome no.

2. Enter the value of n: 1321

The given no. is 1321

The reverse of the number is 1231

1321 is not a Palindrome no.

3. Enter the value of n: 12221

The given no. is 12221

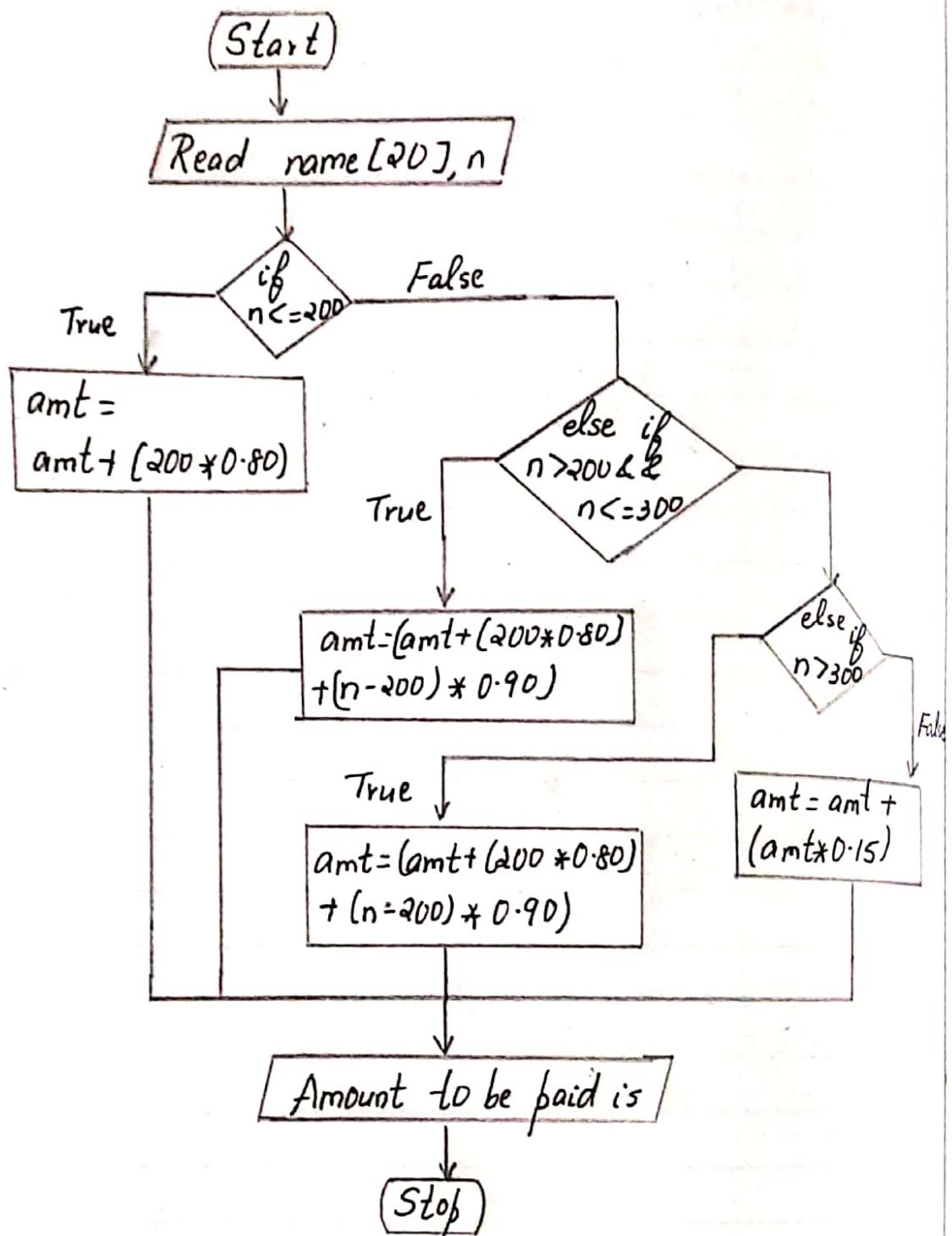
The reverse of the number is 12221

12221 is a Palindrome no.

D	D	M	M	Y	Y	Y	Y
<input type="checkbox"/>							

y
getch();
y

Flowchart :



Output :

Enter the Customer's Name Sandesh

Enter no of units consumed 10

Amount to be paid is 89.000000

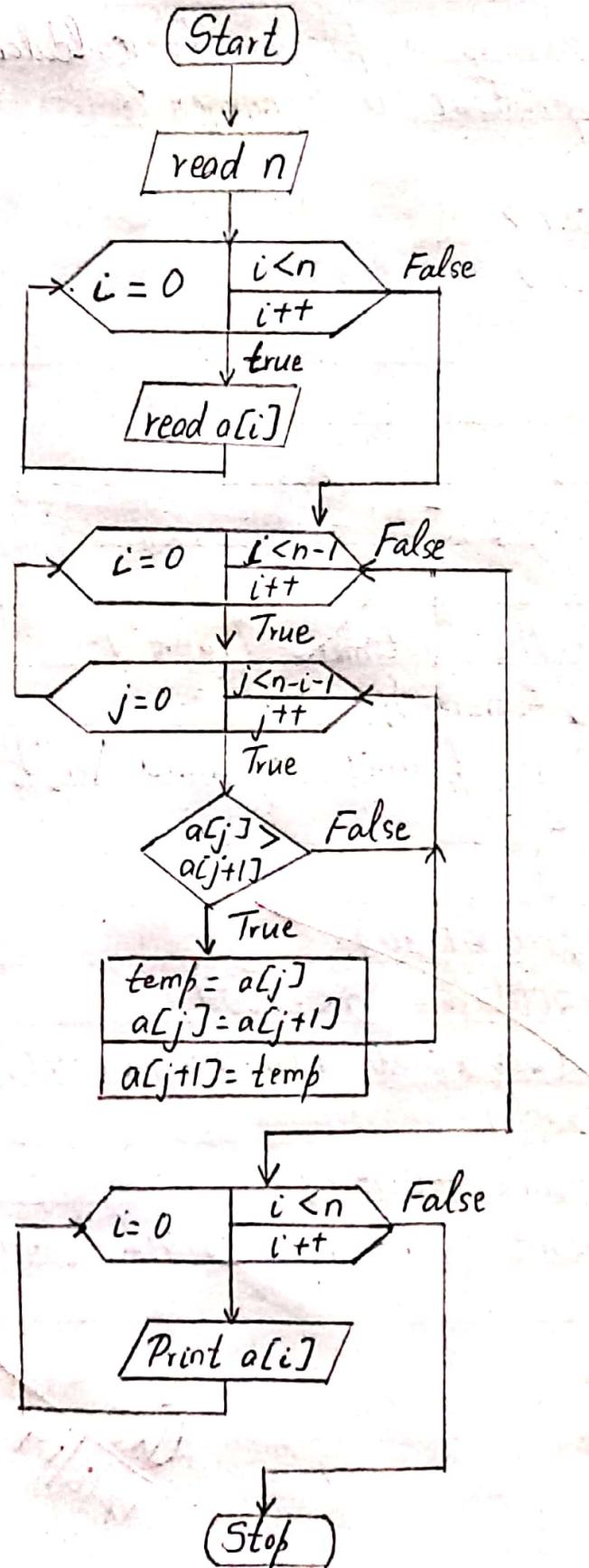
DD	MM	YY	YY
05	03	20	19

Program - 4

Design and develop a program to calculate the Electricity Bill and printout the charges

```
#include <stdio.h>
#include <conio.h>
void main()
{
    char name[20];
    float n, amt = 100;
    clrscr();
    printf("Enter the Customer's Name");
    scanf("%s", &name);
    printf("Enter no of units consumed \n");
    scanf("%f", &n);
    if (n <= 200)
        amt = amt + (200 * 0.80);
    else if (n > 200 && n <= 300)
        amt = (amt + (200 * 0.80)) + (n - 200) * 0.90;
    else if (n > 300)
        amt = amt + (amt * 0.15);
    printf("Amount to be paid is %f", amt);
    getch();
}
```

Flowchart



D	D	M	M	Y	Y	Y	Y
1	2	0	3	2	0	1	9

Program - 5

Design and develop a program that reads n integers and arrange them in ascending order using bubble sort

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int a[50], i, n, j, temp;
    clrscr();
    printf ("Enter the array size");
    scanf ("%d", &n);
    printf ("Enter the array elements");
    for (i=0; i<n; i++)
        scanf ("%d", &a[i]);
    for (i=0; i<n-1; i++)
        for (j=0; j<n-i-1; j++)
            if (a[j] > a[j+1])
            {
                temp = a[j];
                a[j] = a[j+1];
                a[j+1] = temp;
            }
    printf ("The sorted array elements are");
    for (i=0; i<n; i++)
        printf ("%d", a[i]);
}
```

Output

1. Enter the array size 4

Enter the array elements

1 12 3 46

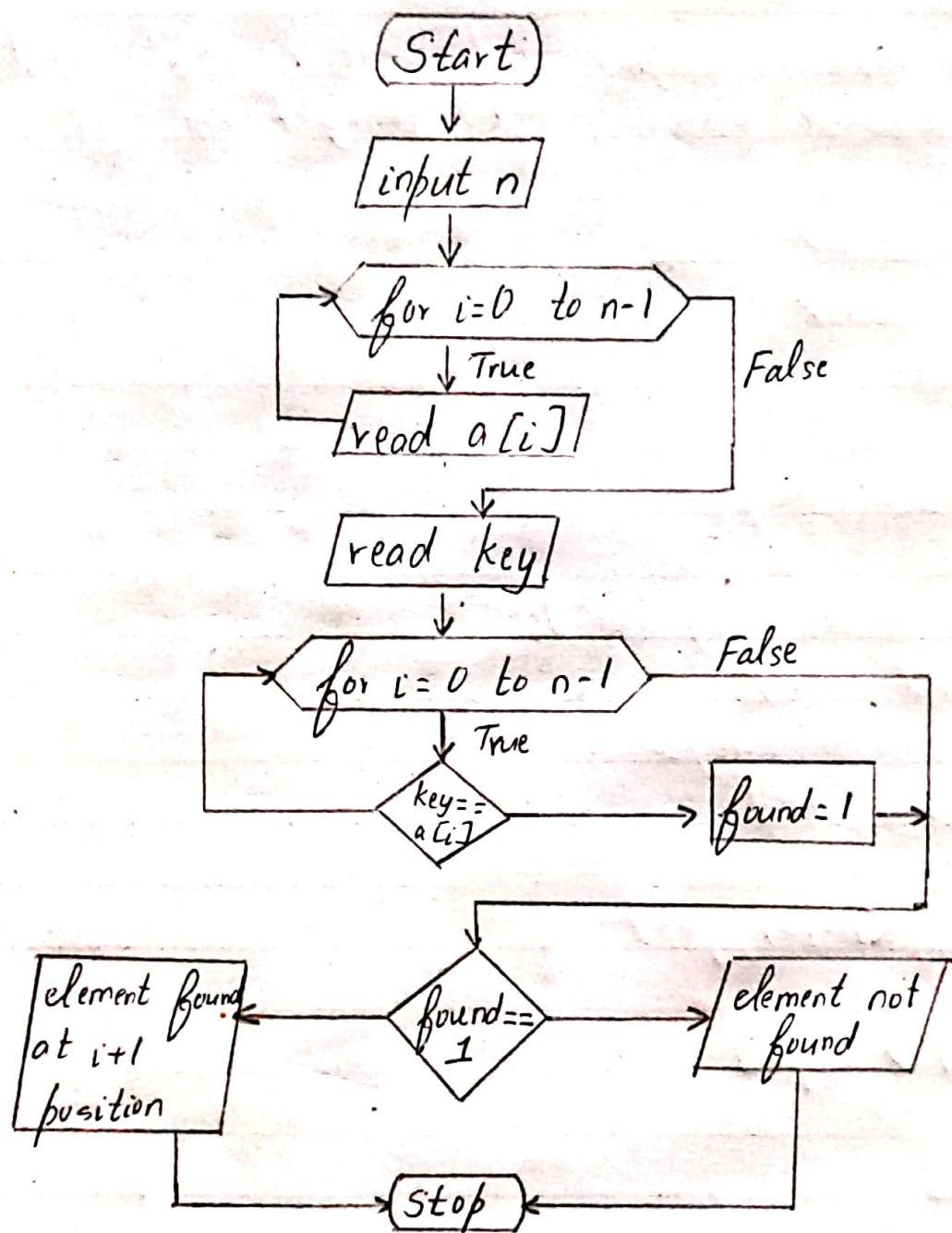
The sorted array elements are

1 3 12 46

D	D	M	M	Y	Y	Y	Y

```
printf ("It %d", a[i]);  
getch();  
y
```

Flowchart



D	D	M	M	Y	Y	Y	Y
1	2	0	3	2	0	1	9

Program - 6

Design and develop a program to input 'n' numbers and store them in an array and perform a linear search for a given key

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int a[100], i, n, found = 0, key;
    clrscr();
    printf ("Enter the array size");
    scanf ("%d", &n);
    printf ("Enter the array elements");
    for (i=0; i<n; i++)
    {
        scanf ("%d", &a[i]);
    }
    printf ("Enter the search element");
    scanf ("%d", &key);
    for (i=0; i<n; i++)
    {
        if (a[i] == key)
        {
            found = 1;
            break;
        }
    }
}
```

Output

1. Enter the array size 3

Enter the array elements

1 6 98

Enter the search element 2

Search element is not found

2. Enter the array size 4

Enter the array elements

1 3 7 9

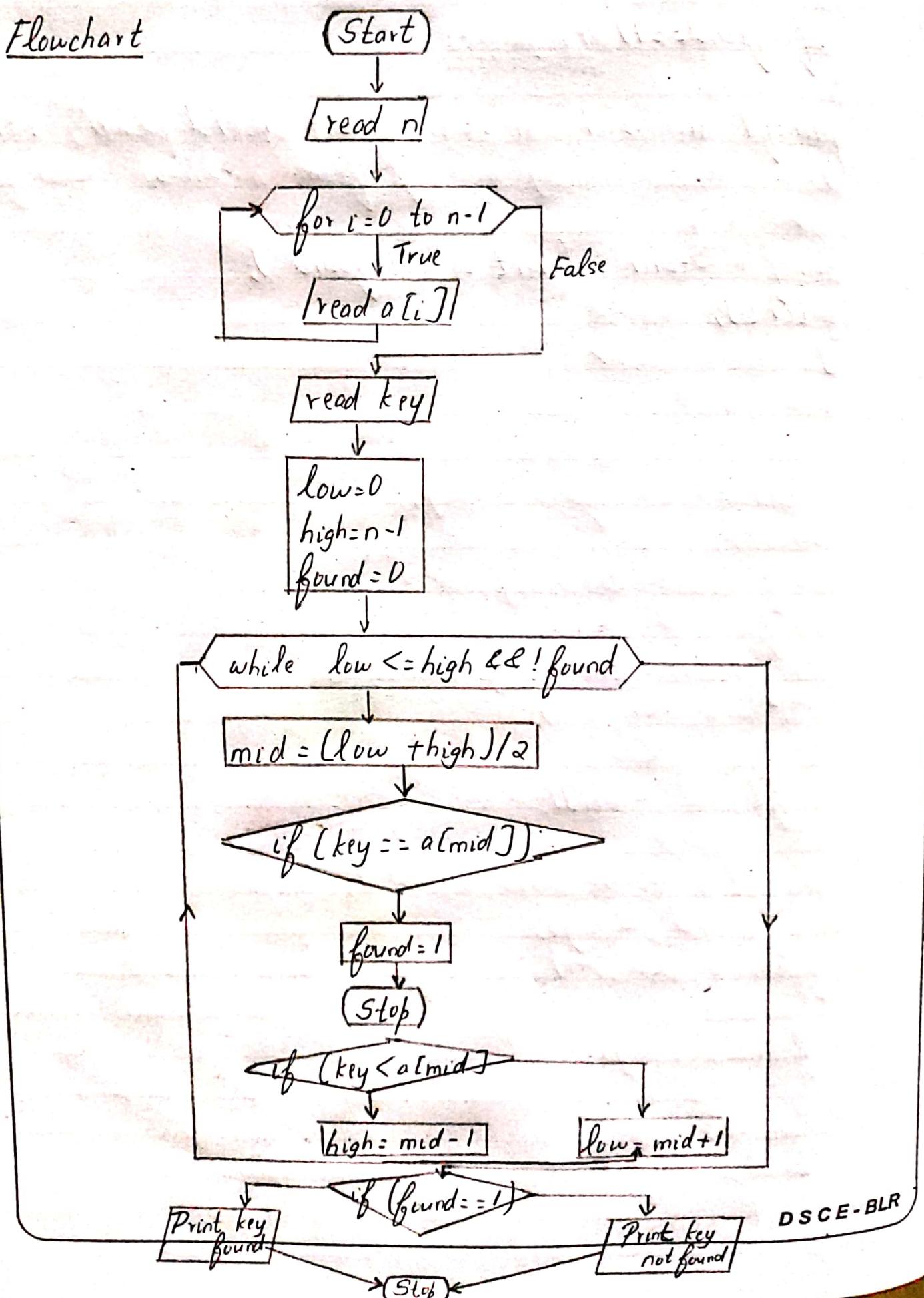
Enter the search element 3

Search element is present in 2 place

D	D	M	M	Y	Y	Y	Y

```
if (found == 1)
{
    printf("The search element is present in %d place", i+1);
}
else
{
    printf("Search element is not found");
}
getch();
y
```

Flowchart



DSCE-BLR

DD MM YY
12 03 2019

Program - 7

Design and develop a program that reads n numbers and search a key using binary search technique

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int a[100], i, n, found = 0, low, high, mid, key;
    clrscr();
    printf("Enter the array size");
    scanf("%d", &n);
    printf("Enter the array elements");
    for (i = 0; i < n; i++)
        scanf("%d", &a[i]);
    printf("Enter the key element");
    scanf("%d", &key);
    low = 0; high = n - 1;
    while (low <= high && !found)
    {
        mid = (low + high) / 2;
        if (key == a[mid])
            found = 1;
        else if (key < a[mid])
            high = mid - 1;
        else
            low = mid + 1;
    }
}
```

Output

1. Enter the array size 3

Enter the array elements

1 6 98

Enter the key element 1

The key element is found in 1 place

2. Enter the array size 2

Enter the array elements

2 6

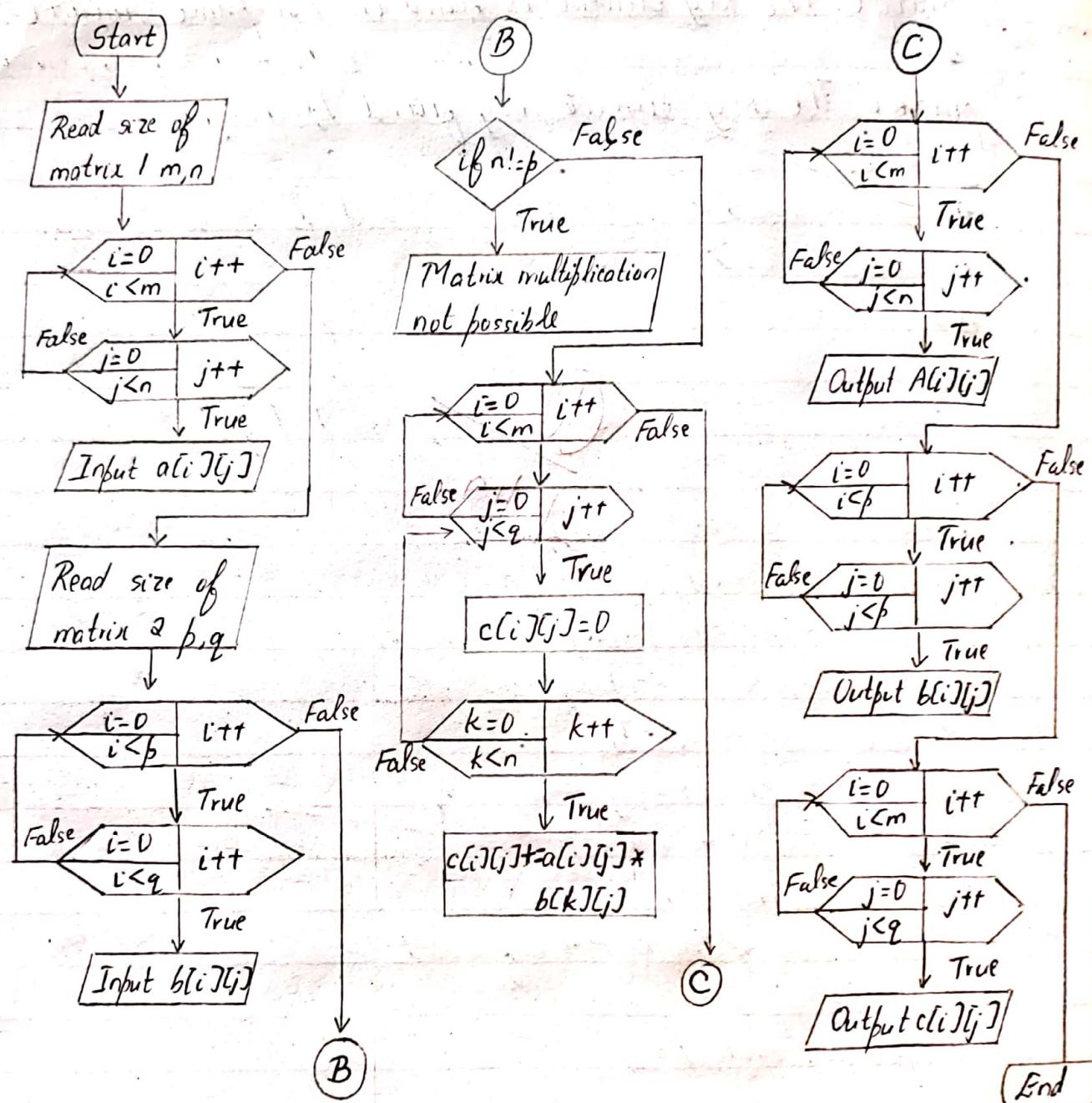
Enter the key element 1

The key element not found

D	D	M	M	Y	Y	Y	Y

```
if (found == 1)
    printf ("The key element is found in %d place ", mid+1);
else
    printf ("The key element not found ");
getch();
```

Flowchart :



D	D	M	M	Y	Y	Y	Y
02	09	2	019				

Program - 8

Design and develop a C program that reads two matrices A($m \times n$) and B($p \times q$) and compute product of matrices A and B.

Read matrix A and B in row major order. Print both the input matrices and resultant matrix appropriately

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int a[10][10], b[10][10], c[10][10], i, j, k, m, n, p, q;
    clrscr();
    printf("Enter the size of matrix a");
    scanf("%d %d", &m, &n);
    printf("Enter the size of matrix b");
    scanf("%d %d", &p, &q);
    if (n != p)
        printf("matrix multiplication is not possible");
    else
    {
        printf("Enter elements of matrix a\n");
        for (i = 0; i < m; i++)
            for (j = 0; j < n; j++)
                scanf("%d", &a[i][j]);
        printf("Enter elements of matrix b\n");
        for (i = 0; i < p; i++)
            for (j = 0; j < q; j++)
                scanf("%d", &b[i][j]);
    }
}
```

Output

1. Enter the size of matrix a

2 2

Enter the size of matrix b

2 3

Enter the elements of matrix a

2 4

1 3

Enter the elements of matrix b

4 1

2 3

The resultant matrix c

16 14

10 10

2. Enter the size of matrix a

3 2

Enter the size of matrix b

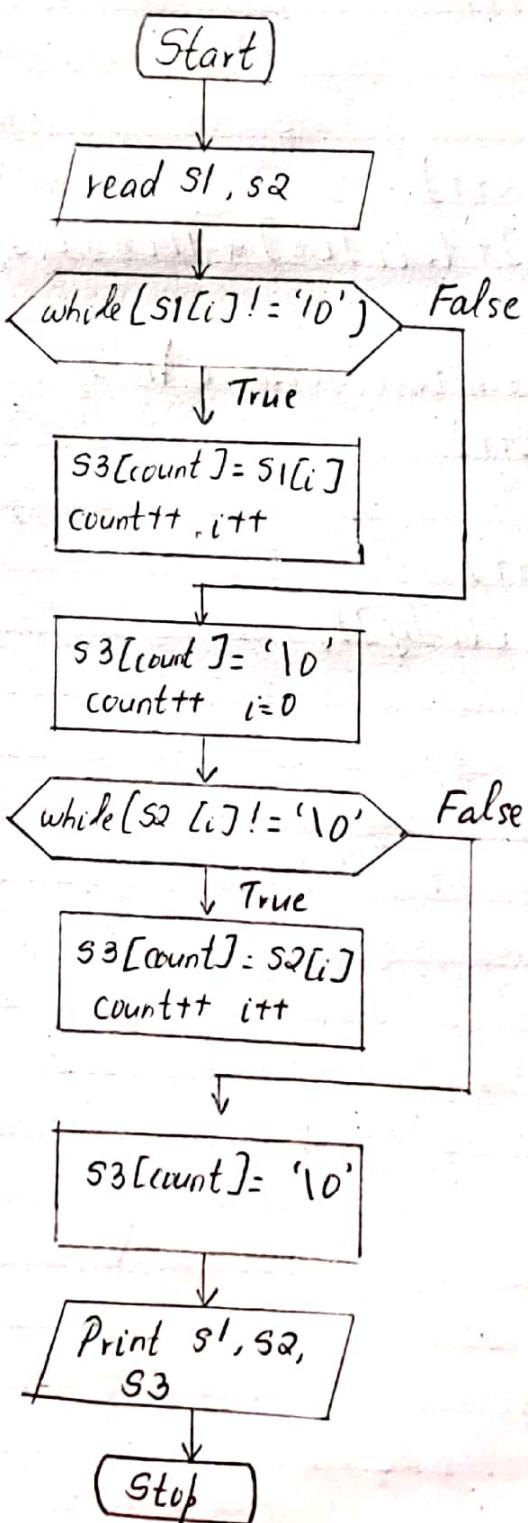
4 3

matrix multiplication is not possible

D	D	M	M	Y	Y	Y	Y

```
for (i=0; i<m; i++)  
{  
    for (j=0; j<q; j++)  
    {  
        c[i][j]=0;  
        for (k=0; k<n; k++)  
        {  
            c[i][j] = c[i][j] + a[i][k] * b[k][j];  
        }  
        printf ("In The resultant matrix c\n");  
        for (i=0; i<m; i++)  
        {  
            for (j=0; j<q; j++)  
            {  
                printf ("%5d", c[i][j]);  
                printf ("\n");  
            }  
        }  
        getch();  
    }  
}
```

Flowchart:



D	D	M	M	Y	Y	Y	Y
02	04	20	19				

Program - 9

Design and develop a C program to implement operations without using library functions.

```
#include <stdio.h>
#include <conio.h>
void main()
{
    char s1[100], s2[100], s3[100];
    int i=0, j=0, count=0;
    clrscr();
    printf("Enter the String1 \n");
    gets(s1);
    printf("Enter the String2 \n");
    gets(s2);
    while (s1[i]!='\0')
    {
        s3[count]=s1[i];
        count++;
        i++;
    }
    s3[count++]=' ';
    while (s2[j]!='\0')
    {
        s3[count]=s2[j];
        count++;
        j++;
    }
}
```

Output

1. S1 = Dayananda

S2 = Sagar

S3 = Dayananda Sagar

2. S1 = Engineering

S2 = Department

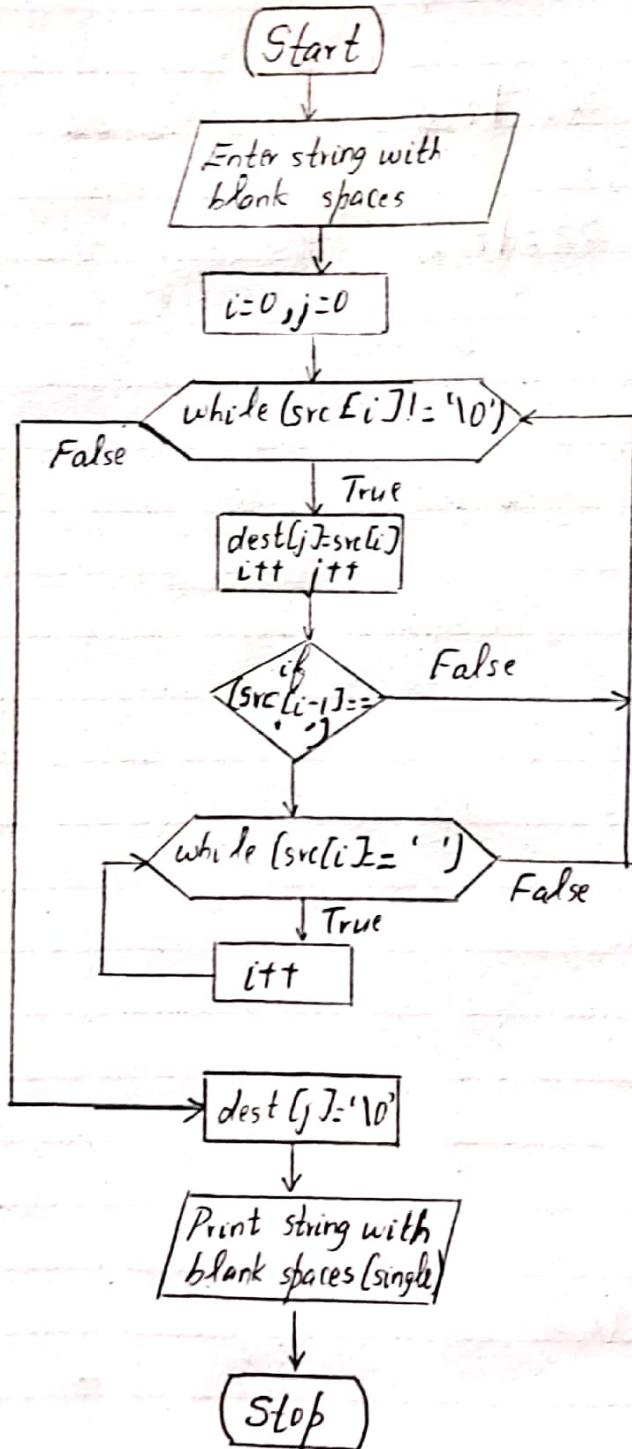
S3 = Engineering Department

D	D	M	M	Y	Y	Y	Y

```
s3 [count] = '\0';
printf ("In String s1= %t");
puts (s1);
printf ("In String s2= %t");
puts (s2);
printf ("In String s3= %t");
puts (s3);
getch();
```

3

Flowchart:



D	D	M	M	Y	Y	Y	Y
02	04	20	19				

Program - 10

Design and develop a program in C to copy its input to its output, replacing each string of one or more blanks by a single blank.

```
#include <stdio.h>
#include <conio.h>
void main ()
{
    char src[100], dest[100];
    int i, j;
    clrscr();
    printf ("Enter the string with blanks\n");
    gets (src);
    i = 0;
    j = 0;
    while (src[i] != '\0')
    {
        dest[j] = src[i];
        j++;
        i++;
        if (src[i-1] == ' ')
        {
            while (src[i] == ' ')
                i++;
        }
    }
}
```

Output

Enter the string with blanks

welcome ___ to ___ DSCE_DSI

The string with single blank space

welcome_to_DSCE_DSI

D	D	M	M	Y	Y	Y	Y
<input type="checkbox"/>							

```
dest[j] = '\0';
printf("The string with single blank space \n");
puts(dest);
getch();
^
```

Output

Enter number of employee 2
Enter details of employee Enter name Enter id
Enter age Enter salary Myna 155 22 200000
Enter details of employee Enter name Enter id
Enter age Enter salary Rani 166 25 200000
emphname empid empage empsal
Myna 155 22 200000
Rani 166 25 200000

DD	MM	YY	YY
09	04	20	19

1

Program-11

Design and develop a C program to create a structure called Employee to maintain a record of details using an array of structures.

```
#include<stdio.h>
#include <conio.h>
struct employee
{
    char name[20];
    int id, age;
    float sal;
} e[50];
void main()
{
    int n,i;
    float salary;
    clrscr();
    printf ("Enter number of employees \n");
    scanf ("%d", &n);
    for (i=0; i < n; i++)
    {
        printf ("Enter details of employee ");
        printf ("Enter name ");
        gets(e[i].name);
        printf ("Enter id ");
        scanf ("%d", &e[i].id);
    }
}
```

D	D	M	M	Y	Y	Y	Y

```
printf ("Enter age ");
scanf ("%d", &e[i].age);
printf ("Enter salary");
scanf ("%d", &e[i].sal);
e[i].sal = salary;
}
printf ("\n      \n");
printf ("Empname |t Empid |t Empage |t Empsal\n");
for (i=0; i<n; i++)
{
printf ("\n %s |t %d |t %d |t %f\n", e[i].name,
       e[i].id, e[i].age, e[i].sal);
}
getch();
```

Output

Enter the value x in degree: 45

The sine value is 0.706825

The sine value using built-in function is 0.706825

D	D	M	M	Y	Y	Y	Y
09	09	20	19				

Program - 12

Design and develop a C program to compute $\sin(x)$ using Taylor series approximation and compare with built-in library function and display

```
#include <stdio.h>
#include <conio.h>
#include <math.h>
#define pi 3.142
void main()
{
    int i, degree;
    float x, sum = 0, term, nume, deno;
    printf ("Enter the value of x in degree : ");
    scanf ("%f", &degree);
    x = degree * (pi / 180);
    nume = x; deno = 1; i = 2;
    do
    {
        term = nume / deno;
        nume = -nume * x * x;
        deno = deno * i * (i + 1);
        sum = sum + term;
        i = i + 2;
    } while (fabs(term) >= 0.000001);
    printf ("The sine value = %f", sum);
    printf ("The sine value using inbuilt function = %f",
    getch();
}
```

Output

Enter the range n_1 and n_2 to find prime numbers

10 20

The prime numbers between 10 and 20 are

11 13 17 19

Enter the range n_1 and n_2 to find prime numbers

1 10

The prime numbers between 1 and 10 are

2 3 5 7

DD	MM	YY	YY
09	04	20	19

Program - 13

Develop a C function `isprime(num)` that accepts an integer argument and returns 1 if argument is prime, 0 otherwise.

```
#include<stdio.h>
#include<conio.h>
int isprime(int);
void main()
{
    int n1,n2,r,i;
    clrscr();
    printf("Enter the range n1 and n2 to find prime numbers\n");
    scanf("%d %d", &n1, &n2);
    printf("The prime numbers between %d and %d are\n", n1, n2);
    for (i=n1; i<=n2; i++)
    {
        r = isprime(i);
        if (r == 1)
            printf("%d \t", i);
    }
    getch();
}
int isprime(int z)
{
    int i,c=0;
    for (i=1; i<=z; i++)
    {
        if (z % i == 0)
            c++;
    }
    if (c == 2)
        return 1;
    else
        return 0;
}
```

```
if (x < 0) {
    c++;
}
if (c == 2)
    return 1;
else
    return 0;
}
```

Output

1. Enter the number of elements

5

Enter array elements

1

2

3

4

5

Sum = 15.000000

Mean = 3.000000

Standard deviation = 1.414

2. Enter the number of elements

4

Enter array elements

10.5

25.25

30.56

9.5

Sum = 75.810

Mean = 18.952

Standard deviation = 9.154

D	D	M	M	Y	Y	Y	Y
16	04	2019					

Program - 14

Write a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of n real numbers

```
#include <stdio.h>
#include <conio.h>
#include <math.h>
void main()
{
    float a[10], *ptr, mean = 0, sum = 0, sd = 0, sumsd = 0;
    int i, n;
    printf ("\nEnter the number of elements:");
    scanf ("%d", &n);
    printf ("\nEnter the elements :");
    for (i=0; i<n; i++)
        scanf ("%f", &a[i]);
    ptr = a;
    for (i=0; i<n; i++)
    {
        sum = sum + *ptr;
        ptr++;
    }
    mean = sum/n;
    ptr = a;
    for (i=0; i<n; i++)
    {
        sumsd = sumsd + pow((*ptr - mean), 2);
        ptr++;
    }
}
```

D	D	M	M	Y	Y	Y	Y

ptr++;
y

sd = sqrt (sumsd / n);

printf (" \n Sum = %.f ", sum);

printf (" \n Mean = %.f ", mean);

printf (" \n Standard deviation = %.f ", sd);

getch();
y

Output

Enter a binary number

10101001

Decimal number is

169

D	D	M	M	Y	Y	Y	Y
16	04	2019					

Program - 15

Implement recursive program to convert binary to decimal

```
#include <stdio.h>
#include <conio.h>
int Bin2Dec (long long int);
int pos = 0;
void main()
{
    long long int num;
    int deci;
    printf ("Enter binary number \n");
    scanf ("%lld", &num);
    deci = Bin2Dec (num);
    printf ("Decimal number is %d \n", deci);
}
int Bin2Dec (long long int n)
{
    if (n == 0)
        return 0;
    else
        return n % 10 * pow (2, pos++) + Bin2Dec (n / 10);
}
```