**** Demonstration of Datatypes ****

Name of the student

Sakshi

Address of the student

Mumbai

Roll no. of the student

1770

Percentage of the student

69 %.

Grade of Student

A

mobile no.

8921567908.

Student name: Sakshi

Student address: Mumbai

Student roll no: 1770

Student Percent: 69 %

Student grade: A

Student mobile no: 8921567908.

Practical No. 1

Aim: - Programs to understand the Basic Data type & I/O

Program 1:

Source code:

```
#include <stdio.h>
# include <conio.h>
 void main ()
{
   char name [50];
   char add [50];
   int roll no;
    float Percent;
     char grade;
     char mob[10];
     clrscr ();
     Print ("***** Demonstration of Datatypes *****");
   Print ("Name of the student \n");
    gets (name);
    Printf ("Address of the student \n");
    Scanf ("%s", &add);
     Print f ("Roll no. of the student \n");
     Scan f ("%d", &roll no);
     Printf ("Percentage of student \n");
     Scanf ("%f", &Percent);
     Printf ("grade at student \n");
     Scanf ("%s", &grade);
```

```
Printf(" mobile No :\n");
Scanf("%10s", &mob);
Printf("\n Student Name : %s", name);
Printf("\n student Address : %s", add);
Printf("\n student rollno : %d", rollno);
Printf("\n student Percent : %f", Percent);
Printf("\n student Grade : %c", Grade);
Printf("\n student mobile no: %10s", mob);
getch();
}
```

Program 2:

Source code:

```
#include <stdio.h>
#include <conio.h>
void main()
{
  int side, area;
  clrscr();
  Printf("Enter the side: \n");
  Scanf("%d", &side);
  area = side * side;
  Printf("Area of a square is %d \n", area);
  getch();
}
```

15/01/2020

Enter side:
12
Area of a square is 144.

Output

Enter 1st number : 10
Enter 2nd number : 2
Addition of 2 numbers : 12
subtraction of 2 numbers 8
multiplication of 2 numbers : 20
Division of 2 numbers : 5.

Practical-2

Aim:- Write a C Program which will show the use of various different types of operators

#Arithmatic operators

Source code

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int num1, num2, add, sub, mul, div;
    clrscr();
    Printf("Enter 1st number:");
    scanf("%d", &num1);
    Printf("Enter 2nd number:");
    scanf("%d", &num2);
    add = num1 + num2;
    Printf("Addition of 2 numbers: %d \n", add);
    sub = num1 - num2;
    Printf("Subtraction of 2 numbers: %d \n", sub);
    mul = num1 * num2;
    Printf("multiplication of 2 numbers: %d \n", mul);
    div = num1 / num2;
    Printf("Division of 2 numbers: %d \n", div);
    getch();
}
```

logical operator

Source code.

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int x, y, z, value 1, value 2, value 3, value 4, Value 5;
    clrscr();
    Printf ("Enter 1st value :")
    scanf ("%d", &x);
    Printf ("Enter 2nd value :");
    scanf ("%d", &y);
    Printf ("Enter 3rd value :");
    scanf ("%d", &z);
    value 1 = (x<y) && (z>y);
    Printf ("value 1 is = %d \n", value 1);
    value 2 = (x=y) && (z<y);
    Printf ("value 2 is = %d \n", value 2);
    value 3 = (x<y) || (z=y);
    Printf ("value 3 is = %d \n", value 3);
    value 4 = ! (x==y);
    Printf ("value 4 is: %d \n", value 4);
    value 5 = (x==y);
    Printf ("value 5 is = %d \n", value 5);
    getch();
}
```

Output

Enter 1st value: 9
Enter 2nd value: 8
Enter 3rd value: 2

value1 is = 0
value 2 is = 1
value 3 is = 1
value 4 is = 0
value 5 is = 1

output,

value of a is: 9

Value of b is: 1

greater number is: 9.

b) Aim :- Write C Program that will demonstrate the use of ternary operator.

Source code:-

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int a, b, x;
    clrscr();
    printf("value of a is:");
    scanf("%d", &a);
    printf("value of b is:");
    scanf("%d", &a);
    x = (a>b) ? a : b;
    printf("Greater number is: %d \n", x);
    getch();
}
```

Practical - 3

a) Aim: Write a C Program to find whether the entered year is leapyear or not

Source code:

```
# include <stdio.h>
# include <conio.h>
  void main()
 {
        int n;
        clrscr();
        printf("Enter a year:");
        scanf("%d", &n);
        if (n%4==0)
        {
           printf("Entered year is a leapyear",n);
        }
        else
        {
           printf("Not a leap year");
        }
        getch();
 }
```

output

Enter a year = 2012
Entered year is a leap year.

Enter a year : 2013
not a leap year

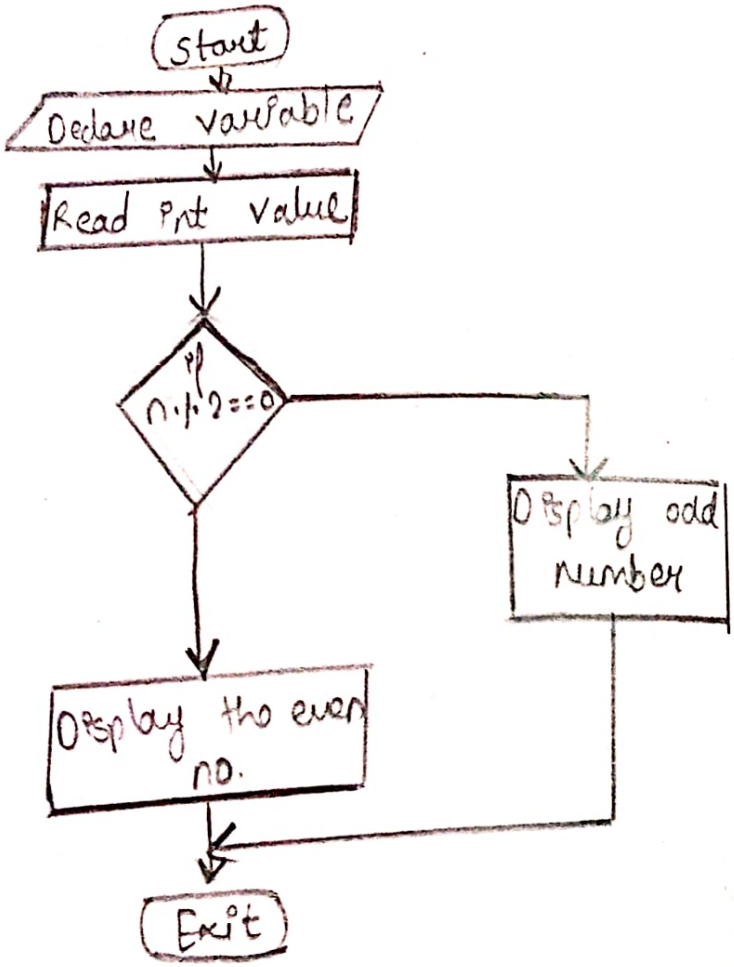
Output:

Enter a number: 20

Even number

Enter a number: 57

odd number.



b) Aim: Write a C Program to find odd & even numbers.

ALGORITHM

1. Start
2. [Take input] Read a number from the user
3. check if number % 2 = 0 then Print even number
4. Exit

Code:

```
#include <stdio.h>
#include <conio.h>
 void main()
{
 int n;
 clrscr();
 Printf("Enter a number:");
 scanf("%d", &n);
 if (n % 2 == 0)
 {
    Printf("Even method:");
 }
  else
 {
  Printf("odd number:");
 }
  getch();
}
```

4. Write a Program to find whether the character is vowel or constant.

ALGORITHM:

1. Start
2. (Take input) Read character value from user.
3. [check] if value == 'a' || value == "2" || value = "i" || value = "o" || value "u" || value = "A" || value = "E" || value = "I" || value = "O" || value = "U"
4. Exit

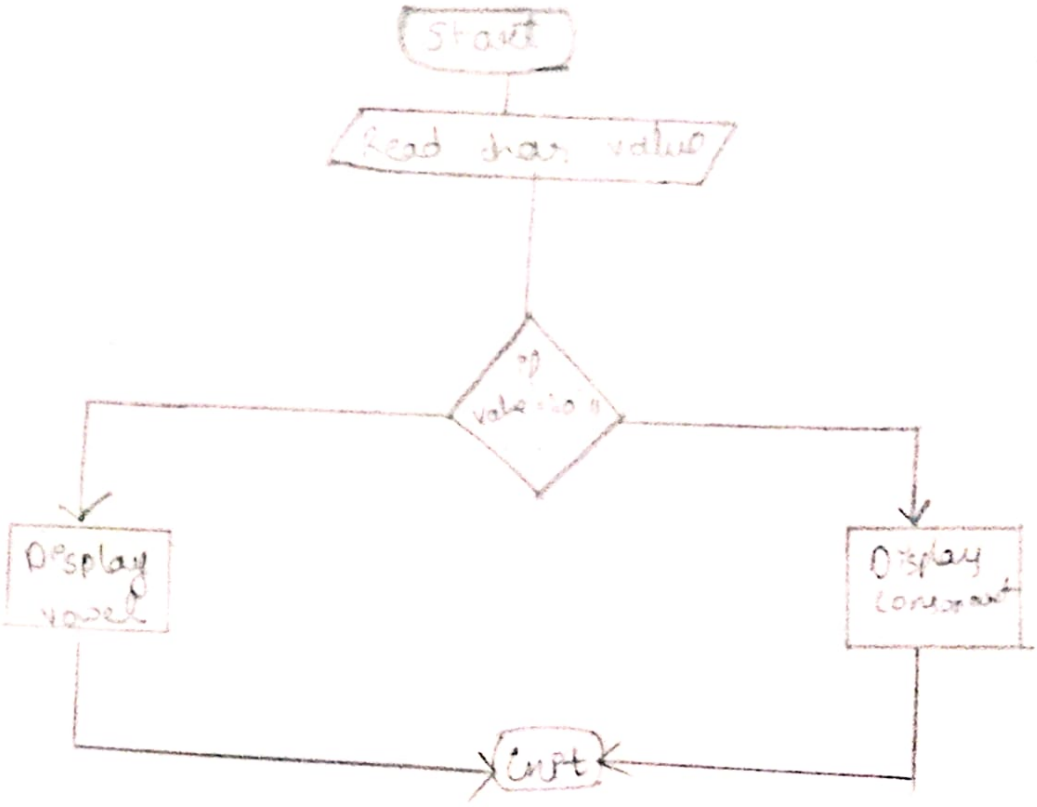
Program:

```
#include <stdio.h>
#include <conio.h>
void main()
{
 char a;
 clrscr();
 printf("Enter the alphabet:");
 scanf("%c", &a);
 if (a=='a' || a=='e' || a=='i' || a=='o' ||
     a=='u' || a=='A' || a=='E' || a=='I' ||
      a=='U')
 {
  printf("vowel");
 }
 else
 {
  printf("consonant");
```

Output :

Enter the alphabet : o
vowel

Enter the alphabet :
Consonant



```
}
getch();
}
```

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Practical - 4

Aim: Programs on looping.

1) Write a Program to Print even numbers between 1-50 using while loop.

Source code:

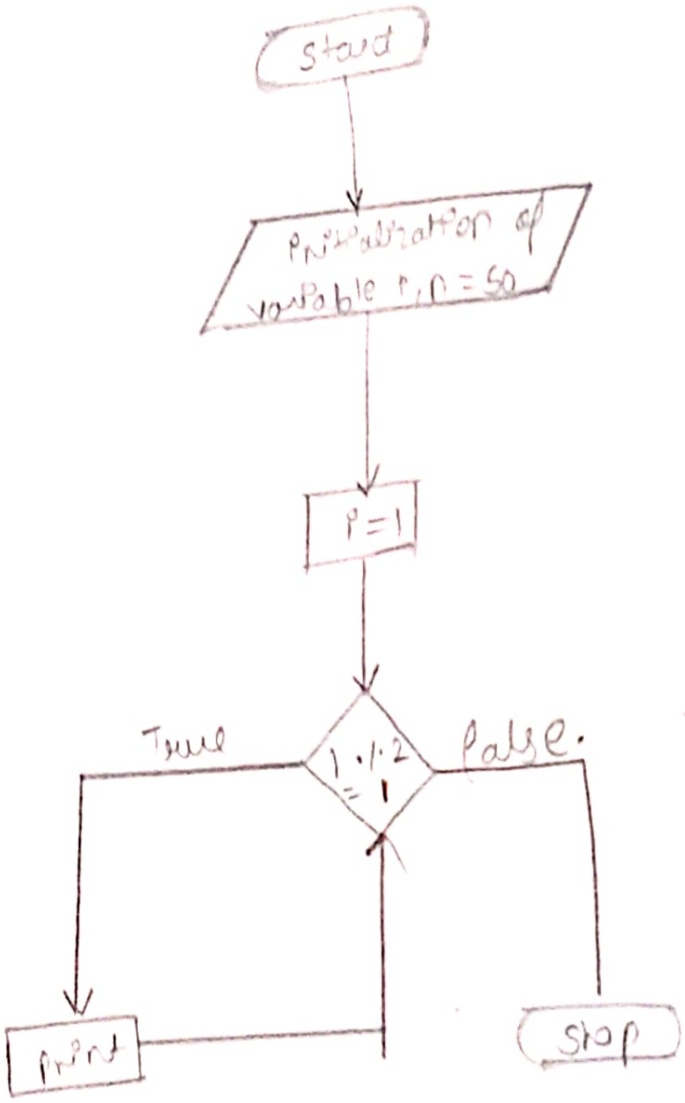
```
#include <stdio.h>
#include <conio.h>
void main()
{
  int i, n=50;
  clrscr();
  printf("\n All even numbers from 1 to 50 are:");
  i=2;
  while (i<=n)
  {
    printf("%d\n", i);
    i=i+2;
  }
  getch();
}
```

output

pe even numbers from 1 to 50 are.

2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
34
36
38
40
42
44
46
48
50.

92
Flowchart



Algorithm:

step 1: Start.

step 2: Initialize two variable with static variable where n=50 & i=2

step 3: Use while loop for Printing the even no. upto the range 50.

step 4: Adding 2 to current even number will give next even number.

step 5: Display the appropriate output

step 6: stop.

2) Write a C Program to print odd numbers between 1-50 using do-while loop.

Source code:

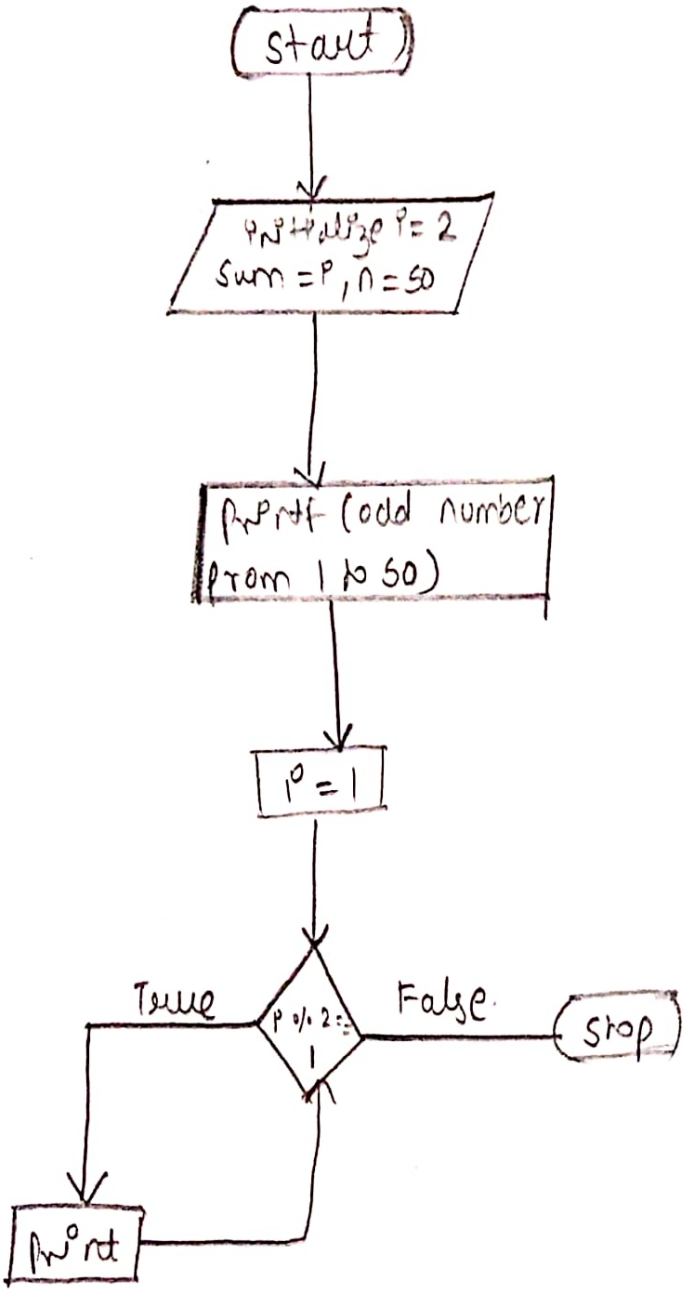
```
#include <stdio.h>
#include <conio.h>
void main()
{
  int i, n=50;
  clrscr();
  printf("\n odd numbers from 1 to 50 are\n", n);
  i=1;
  do
  {
    if (i%2==1)
    {
      printf("%d\n", i);
    }
    i++;
  }
  while (i<=n);
  getch();
}
```

output

odd numbers from 1 to 50 are.

1
3
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39
41
43
45
47
49.

Flowchart:



Algorithm:

step 1 : start

Step 2. Initialize two static variable n=5, i=1.

step 3: Use do while loop for printing odd number from 1 to 50

step 4: Use if conditional statement to check whether given number is odd or even.

step 5: Increment the value of i

Step 6: Display the appropriate output

step 7 : Stop.

c) Aim: Write a C Program to Print sum of all even number between 1 to n using for loop.

Source code:

```
# include <stdio.h>
# include <conio.h>
void main()
{
  int i, n, sum=0;
  clrscr();
  Printf("\n Enter the range =");
  scanf("\n %d", &n);
  for (i= 2; i<=n; i= i+2)
  {
   sum = sum +i;
  }
  Printf("\nSum of all even number upto the
          range are =", sum);
  getch();
}
```

Algorithm:

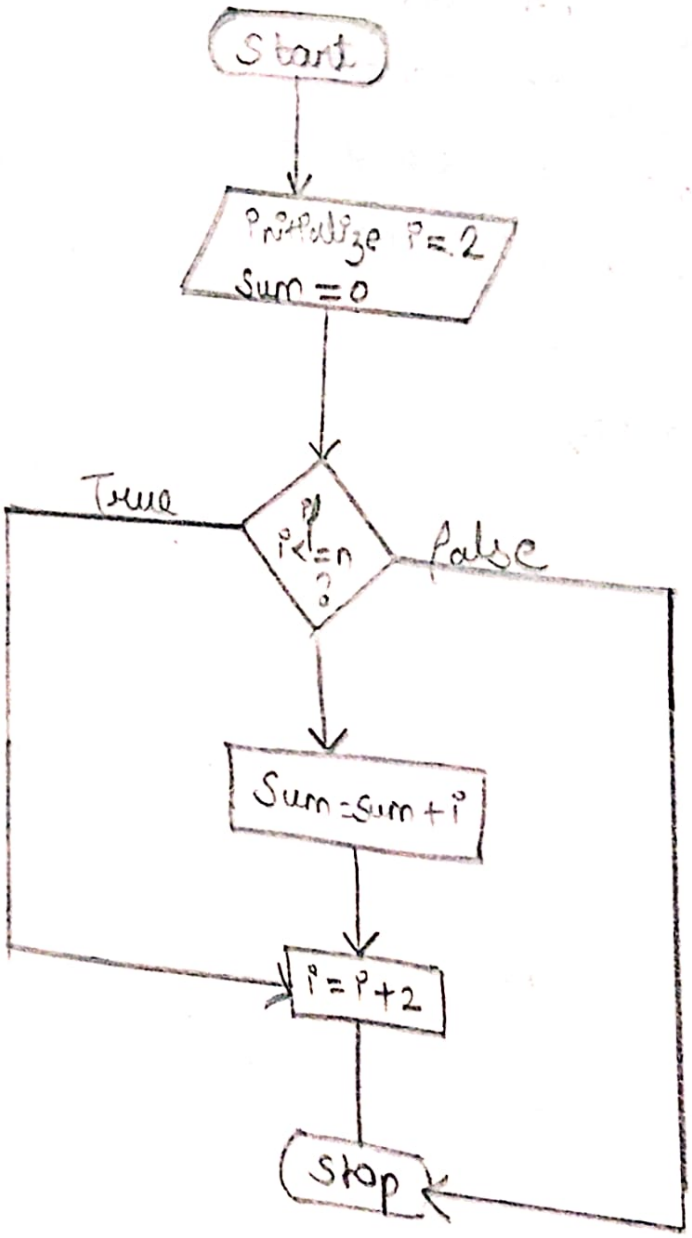
1) Start
2) Initialize three variable one is static & two are dy
3) Use for loop for check the given range.
4) Add current even number.
5) Display the appropriate
6) Stop.

output

Enter the range = 10

Sum of all even numbers upto the range are 30

Flowchart:



Output:

```
Enter the numbers less than 20:5
Enter the a[0] no. element 2
Enter the a[1] no. element 3
Enter the a[2] no. element 1
Enter the a[3] no element 2
Enter the a[4] no. element 3

The displayed array:
sum of the array[11]
```

Practical - 05

Aim Use of array.

1) Write a C Program to Print the input array elements.

Source code:

```
#include <stdio.h>
#include <conio.h>
void main()
 {
   int a [20];
   int size, i;
   clrscr();
   printf("\n Enter numbers less than 20:");
   scanf("%d", &size);
   for (i=0; i<size; i++)
   {
     printf("\n Enter the a[%d] no element", i);
     scanf("%d", &size);
     for (i=0; i<size; i++)
     {
       Print("\n Enter the a[%d] no ele
       Scanf("%d", a[i]);
     }
     printf("\n the displayed array \n:");
     for (i=0; i<size; i++)
     {
```

```
        printf ("\n Enter a [%d] %d", i);
    }
    getch ();
}
```

Algorithm:

step 1: start

step 2: Declare an array of user specified size.

step 3: Initialize two variables of integer type i.e size & i,

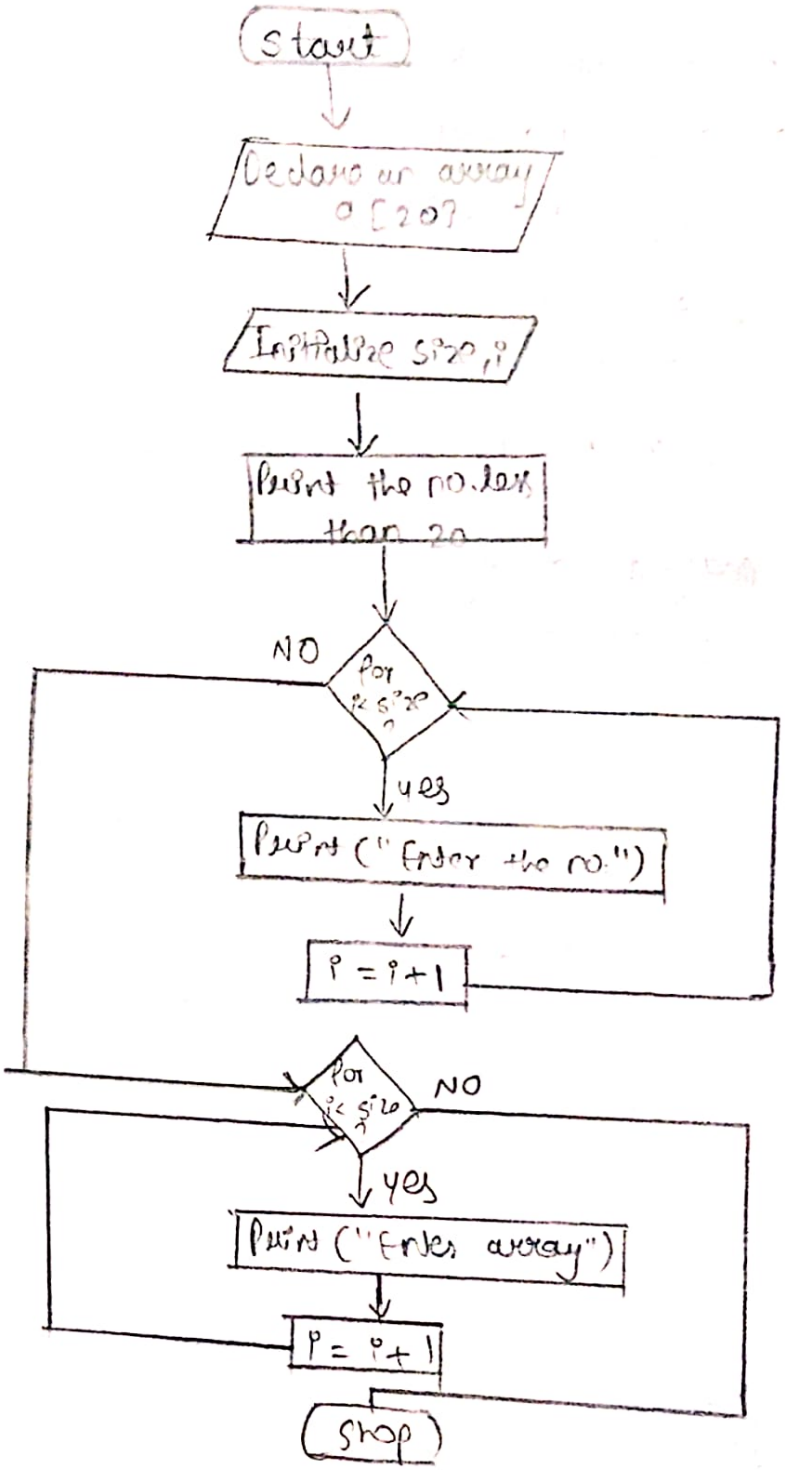
step 4: Take range from the user that to be printed which should be less than the specified size of an array.

step 5: Use nested for conditional loop for printing the elements in arrays according to its indexing.

step 6: Print the appropriate output.

step 7: Exit.

Flow chart.



Output:

```
Enter the numbers less than 20:5
Enter the a[0] no. element 2
Enter the a[1] no. element 3
Enter the a[2] no. element 1
Enter the a[3] no. element 2
Enter the a[4] no. element 3

The displayed array:
sum of the array[11]
```

2) To find the sum of elements of the array.

Source code:

```
#include <stdio.h>
# Include <conio.h>
void main()
{
  int a [20];
   int sum = 0, size, i;
    clrscr();
    Printf ("\n Enter number less than 20:");
     scanf ("%d", & size);
     for (i=0; i<size; i++)
     {
     Printf ("\n Enter the a[%d] no. element", i),
      scanf ("%d", &a [i]);
     }
      Printf ("\n the displayed array:");
      for (i=0; i< size; i++)
      {
       sum = sum + a [i];
      }
      Printf ("\n Sum of the arrays: [%d]", sum);
       getch();
      }
```

Algorithm:

Step 1 : Start.

Step 2 : Declare an array of integer type of user specified size.

Step 3 : Initialize the variable one of static type & two of dynamic type.
i.e sum = 0, i, size.

Step 4 : Take range from the user that to be printed & add, which should be less than the specified size of an array.

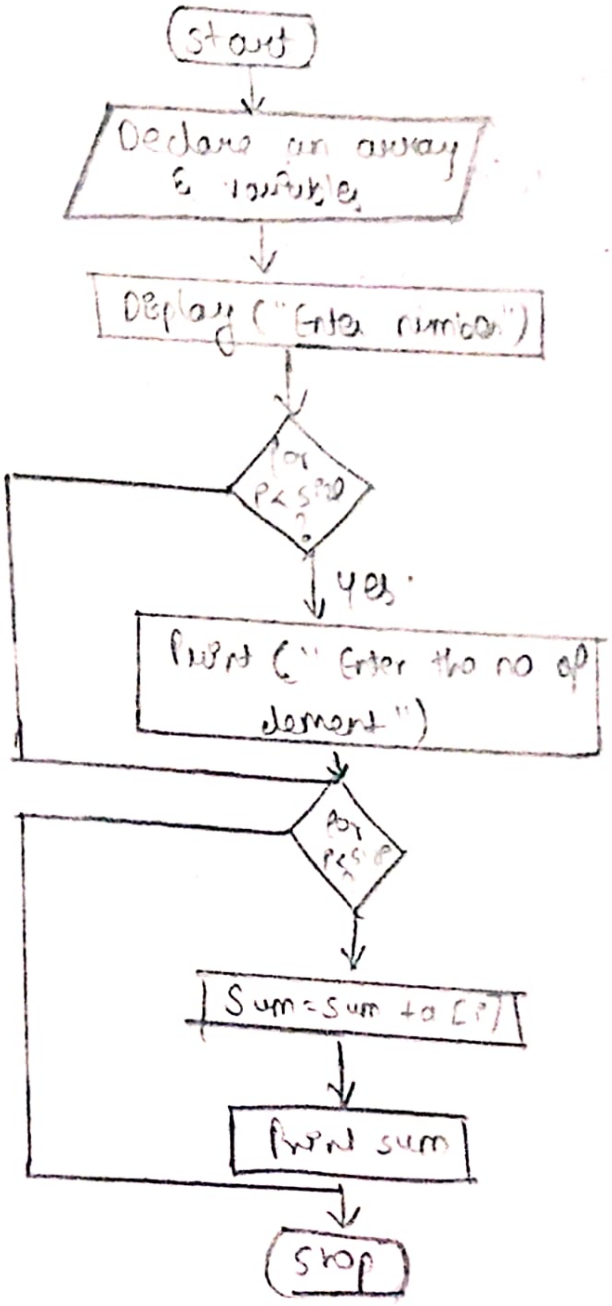
Step 5 : Use nested for conditional loop for printing the element in array according to its indexing.

Step 6 : Adding the element of the array.

Step 7 : Print the appropriate output.

Step 8 : Exit.

Flowchart:-



output:

Enter the no. of terms 7

The Fibonacci series upto 7 terms is:

0 1 1 2 3 5 8

Write a C Program to find out fibonacci series using array.

Source code:

```
#include <stdio.h>
#include <conio.h>
void main()
{
 int a[20], n, i;
 clrscr();
 printf("\n Enter the no. of terms");
 scanf("%d", &n);
  a[0] = 0;
  a[1] = 1;
  for (i = 2; i<n; i++)
  {
    a[i] = a[i-2] + a[i-1];
  }
  printf("\n The fibonacci series upto %d term
                              ps", n);
  for (i=0; i<n; i++)
  {
    printf("%d \t", a[i]);
  }
   getch();
}
```

Algorithm:

Step 1: Start

Step 2: Declare an array of integer type of specified size by the user.

Step 3: Initialize two variables of dynamic variable i.e i, n.

Step 4: Take the no. of terms from the user up till what the no. should be printed.

Step 5: Initialize indexing value of a[0]=0 & a[1]=1, for printing the fibonacci series.

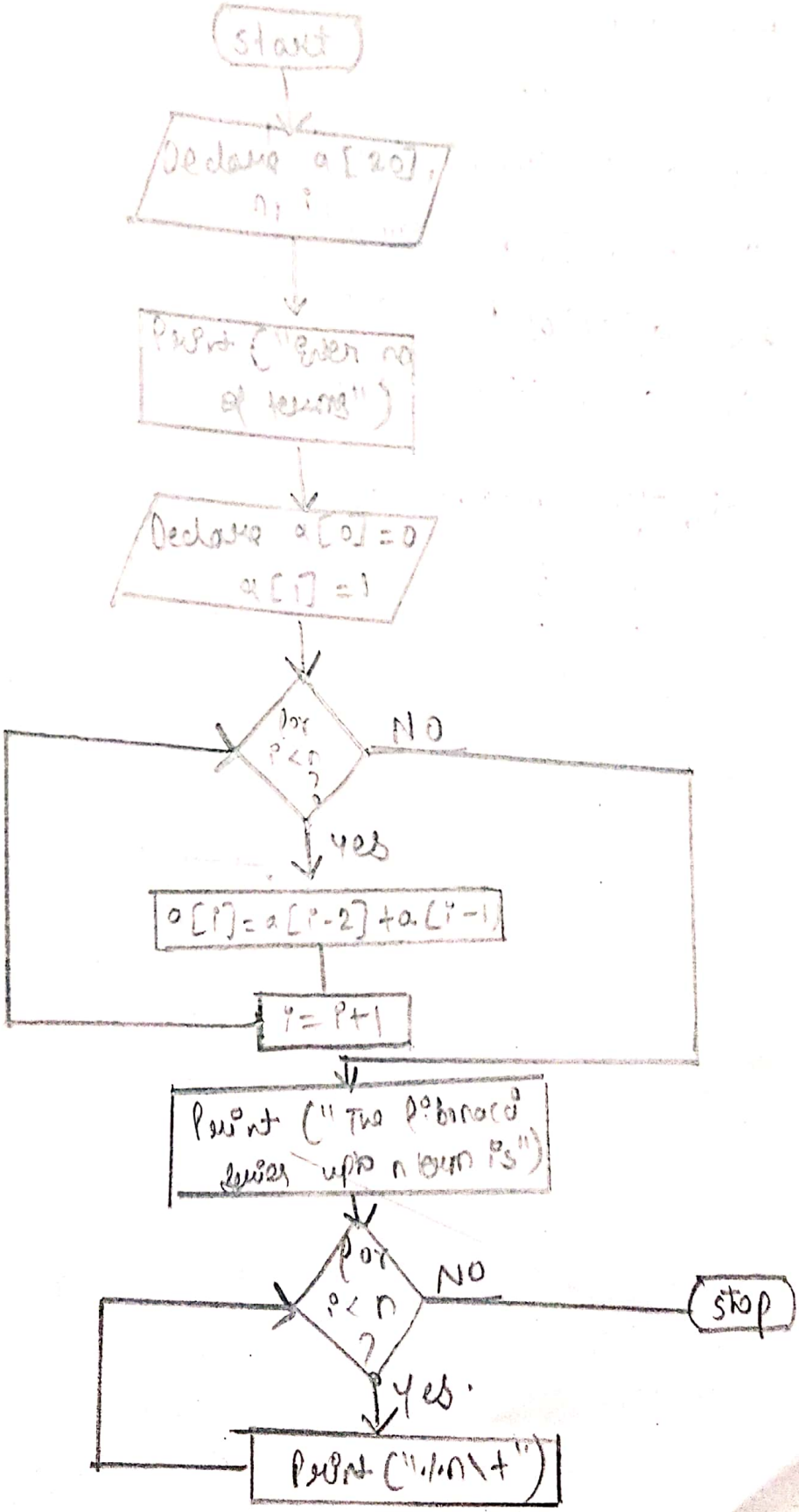
Step 6: using for condition loop for looping of numbers

Step 7: Indexing value of present array is equal to previous to previous indexing value + previous indexing value.

Step 8: Print the fibonacci series upto the term given by the user.

Step 9: use for loop for printing the output in tabular form
Step 10: Print the appropriate output
Step 11: Exit.

flow chart



output:

Enter no. of row : 2

Enter no. of column : 2

Enter the a[0][0] no. element : 1

Enter the a[0][1] no. element : 5

Enter the a[1][0] no. element : 4

Enter the a[1][1] no. element : 2

The displayed matrix is :

1 5

4 2.

4) Write a C Program to represent a multidemensional array in matrix input.

Source code:

```
#include <stdio.h>
#include <conio.h>
void main()
{
 int a[20][20];
 int row, col, i, j;
 clrscr();
 printf("\n Enter no. of rows:");
 scanf("%d", &row);
 printf("\n Enter no. of columns:");
 scanf("%d", &col);
 for(i=0; i<row; i++)
 {
  for(j=0; j<col; j++)
   {
  printf("\n Enter the a[%d][%d] no. element :")
   scanf("%d", &a[i][j]);
   }
 }
 printf("\n The displayed matrix is \n");
  for(i=0; i<row; i++)
  {
   for(j=0; j<col; j++)
   {
    printf("\t%d", a[i][j]);
```

```
    }
    printf("\n");
    }
    getch();
}
```

Algorithm:

Step 1: Start

Step 2: Declare multi-dimensional array & row, column, i & j

Step 3: Display to enter no. of rows.

Step 4: Scan the same.

Step 5: Similarly for columns.

Step 6: Use the for conditional for accessing the array element.

Step 7: use another for loop for displaying the array value.

Step 8: Stop.

output.

The book id is : 2250.

The book price is : 150.

The author is : Liam

Practical - 7

Program on structure & union

Program to read the book details such as book id, price, author etc & display the same using structure.

Code

```
#include <stdio.h>
#include <conio.h>
struct book
{
    int book_id;
    int Price;
    char ; author;
};
Void main()
{
  Struct book book_details;
   book_details.book_id = 2205
    book_details.Price =150
    book.details.author = "Liam"

Printf("The book id is: %d", book-details.book_id);
Printf("The book Price is: %d", book_details.Price);
 Printf("The Authors name is: %s", book-details.author);
   getch();
}.
```

→ Program to use structure with Pointers.

```
#include <stdio.h>
#include <conio.h>
struct Person
{
  int age;
  float weight;
};
void main()
{
 struct Person *personptr, person1;
  personptr = &person1;

printf("Enter age:\n");
scanf("%d", &personPtr -> age);
printf("Enter weight :\n");
scanf("%f", &personptr -> weight);

printf("Age : %d\n", personptr -> age);
 printf("weight : %f\n", personptr -> weight);

  getch();
}.
```

Output.

Enter age : 19

Enter weight : 75

Age : 19

weight : 75.

output

```
Id is : 1
Name is : chinmay
Percetage is : 90.5

Id is : 2
Name is : Sakshi
Percentage is : 89.3.
```

Program to demonstrate structure array.

Code:

```
#include <stdio.h>
#include <conio.h>
struct student
  {
    int id;
    char name [20];
    float percent;
  };
  void main()
  {
    int i;
    struct student a = { 1, "chinmay", 90.5};
    struct student b = { 2, "Saksh", 89.3};
```

Practical-8

Programs on Pointers

Swap two numbers using pointers.

code:

```
#include <stdio.h>
#include <conio.h>
void swap (int *, int *)
void main()
{
  int a, b;
  clrscr();
  printf("Enter two numbers");
  scanf("%d %d", &a, &b);

  printf("Numbers before swap a=%d, b=%d\n",a,b);
  swap (&a, &b);

  printf("Numbers after swap a=%d, b=%d\n",a,b);

  getch();
}
void swap (int *x, int *y);
{
  int t;
```

Output

Enter two numbers

2

4

Numbers before swap a = 2

b = 4

Numbers after swap a = 4

b = 2.

12

Output

Enter a string : Book

The Length of a string is 4

```
    t = *x;
    *x = *y;
    *y = t;
}
```

→ Program to find length of string using pointer.

```
#include <stdio.h>
#include <conio.h>
void main()
{
  char a[20], *length
  clrscr();
  Printf("Enter a string ");
  scanf("%s", a);

  while (a != '\0')
  {
    length++;
    a++;
  }
  Printf("The length of string is %d", length);

  getch();
}
```

→ Program for Demonstration of Pointer.

```
#include <stdio.h>
#include <conio.h>
void main()
{
  int y=10;
  int *ptr, **ptr2;
  ptr = &y
  ptr2 = &ptr
printf("The value of y = %d", y);
printf("The address of y = %u", &y);
printf("The value of y = %d", *ptr);
printf("The address of y = %u", ptr);
printf("The value of y = %d", **ptr);
getch();
}
```

output

The value of j = 10

The address of j = 2205

The value of j = 2205

The address of j = 10

The value of j = 10.

Output:

Enter a string:
chinmay Bandekar.

Enter string is:
chinmay Bandekar

→ Program to print character array using pointer.

Code

```
#include <stdio.h>
#include <conio.h>
void main()
{
  char a[50];
  char *ptr;

  printf("Enter a string");
  gets(a);

  ptr=0

  printf("Enter string is:");
```

Practical - 6

Aim :- Programs on functions.

1) Write a program in C which will demonstrate the use of getch(), getche() and getchar().

Source code:

```
# include <stdio.h>
# include <conio.h>
void main()
{
 char ch = 'a';
 Printf("\n Press any key to continue");
 getch();
 Printf("\n Enter an alphabet");
 ch = getche();
 Printf("\n Continue Y/N");
 getchar();
 }
```

2) Write a program in C which will demonstrate use of Putch & Putchar.

```
# include <stdio.h>
# include <conio.h>
 void main()
{
  char ch = "a";
  Putch(ch);
  Putchar(ch);
  Getch();
```

Output :

Press any key to continue (a to z)

Enter an alphabet a

Continue Y/N Y (enter)

output :

a

Output:

Enter the value of x: 4

factorial of 4 = 24.

2> WAP to find factorial of a number using recursion function

```
#include <stdio.h>
#include <conio.h>
int factorial (int n);
void main()
{
 clrscr();
  int x, fact;
  Printf("\n Enter value of x:");
  Scanf("%d", &x);
  fact = factorial (x);
  Printf("\n factorial of %d = %d", x, fact);
  getch();
}
  int factorial (int n)
  {
    int f;
    if (n==1)
    return (1)
    else
      f = n * factorial (n-1);
    return (f)
  }
```

4) Sum of digits of entered numbers.

```
#include <stdio.h>
#include <conio.h>
void abc (int n);
void main()
{
 clrscr();
 int n;
 Printf ("\n Enter Number :");
 Scanf ("%d", &n);
  abc (n);
  getch ();
}
 void abc(int n)
 {
   int r, s = 0;
   while (n != 0)
 {
    r = n % 10;
    S = S + r;
     n = n / 10;
   }
 Printf ("\n Sum of digits = %d", s);
}.
```

Output:

Enter number : 31

Sum of digit : 4

78

output:

Enter value of x,y,z: 4 6 9

Average = 6.333333

5) Average of 3 (entered numbers)

```
#include <stdio.h>
#include <conio.h>
void average (int sum);
void sum (int a, int b, int c);
void main()
{
  clrscr();
  int x, y, z;
  Printf ("\n Enter value of x, y, z);
  Scanf ("%d %d %d", &x, &y, &z);
  sum (x, y, z);
  getch();
}
void sum (int a, int b, int c)
{
 int s;
 s = a + b + c;
 average (s);
}
Void average (int sum)
{
  float average;
  average = sum / 3.0;
  Printf ("\n Average : %f", avg);
}
```