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|---|---|
| **Exp.No:1** | **Usage of Input/Output Functions** |
| **Date: 29-09-2020** | |

## 1)Aim:

To write a C program to calculate distance travelled by a vehicle.

## Algorithm:

**Step1**: Start.

**Step2**: Include required header files.

**Step3**: Declare the variable speed, time and distance.

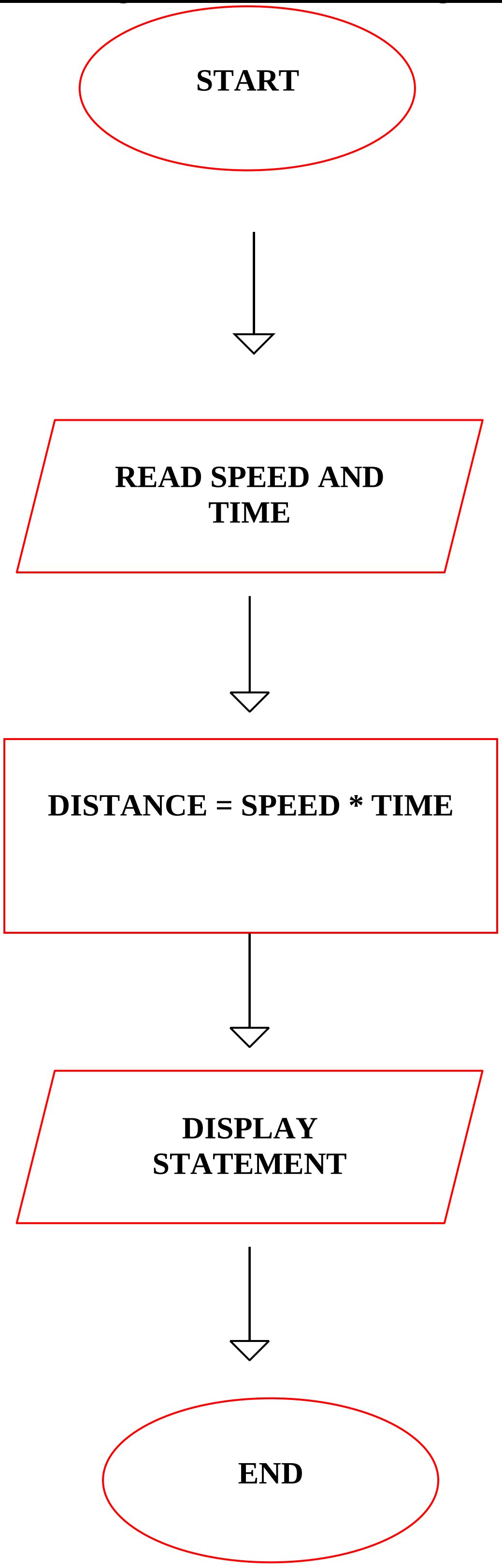
**Step4**: Get the values for speed and time from the user.

**Step5**: Calculate Distance = speed * time

**Step6**: print the result.

**Step7**:  End.

## Flowchart:



**Program:**

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

{ int speed, time, distance; printf("Enter the

Speed in Kms: \n"); scanf("%d",

&speed);

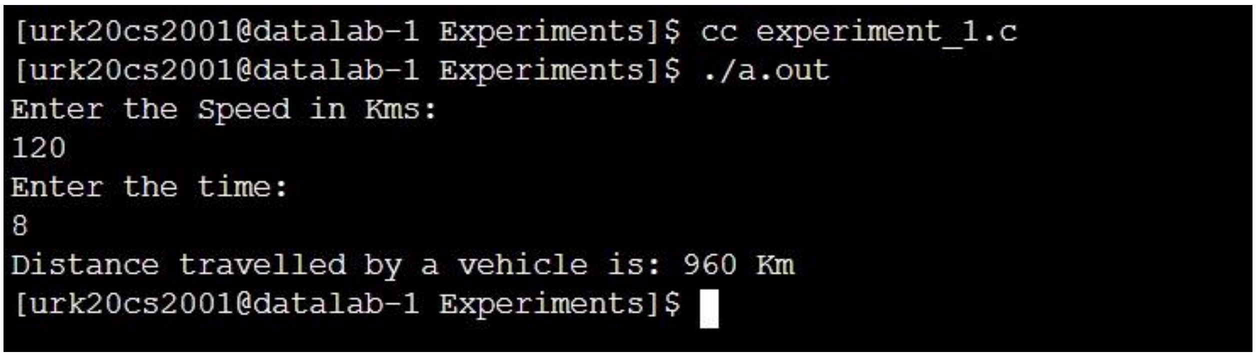
printf("Enter the time: \n ");

scanf("%d", &time);

distance = speed * time; printf("Distance travelled by a vehicle is:

%d Km  \n" , distance ); }

## Output:



```
[urk20cs2001@datalab-1 Experiments]$ cc experiment_1.c
[urk20cs2001@datalab-1 Experiments]$ ./a.out
Enter the Speed in Kms:
120
Enter the time:
8
Distance travelled by a vehicle is: 960 Km
[urk20cs2001@datalab-1 Experiments]$
```

## 2)Aim:

To write a C program to print the size of the built-in datatypes using the sizeof() operator.

## Algorithm:

**Step1**: Start.

**Step2**: Include the required header files.

**Step3**: Declare the required variables.

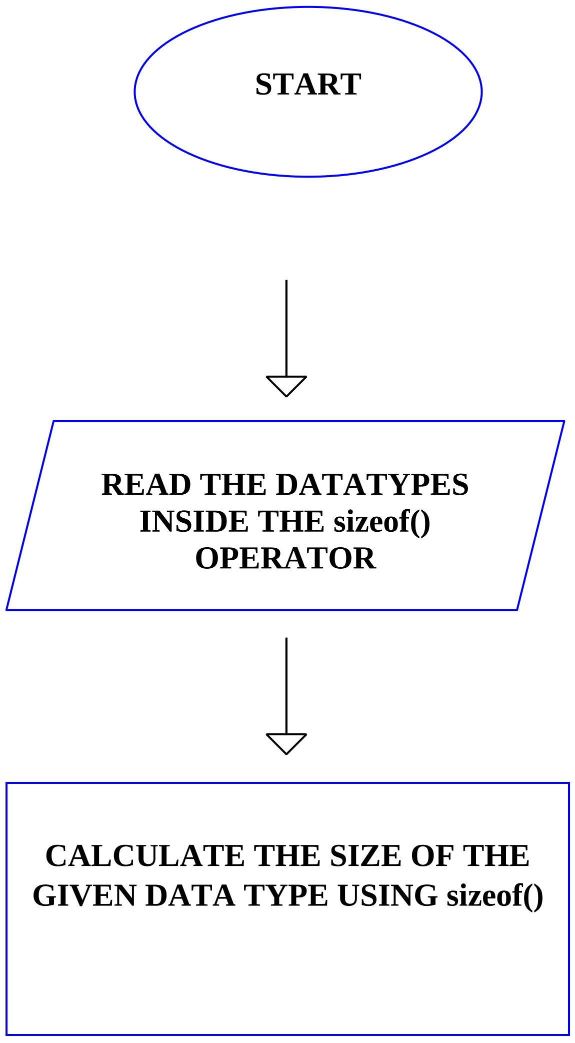
**Step4**: Read the datatypes of the sizeof() operators.

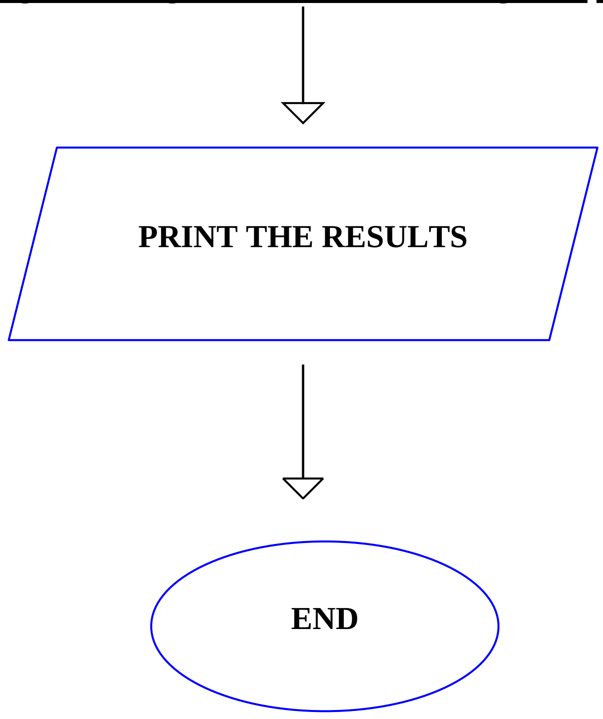
**Step5**: Calculate the size of the given data type using sizeof().

**Step6**: Print sizeof() all the required data types.

**Step7**: End.

## Flowchart:


START
READ THE DATATYPES INSIDE THE sizeof() OPERATOR
CALCULATE THE SIZE OF THE GIVEN DATA TYPE USING sizeof()



**Program:**

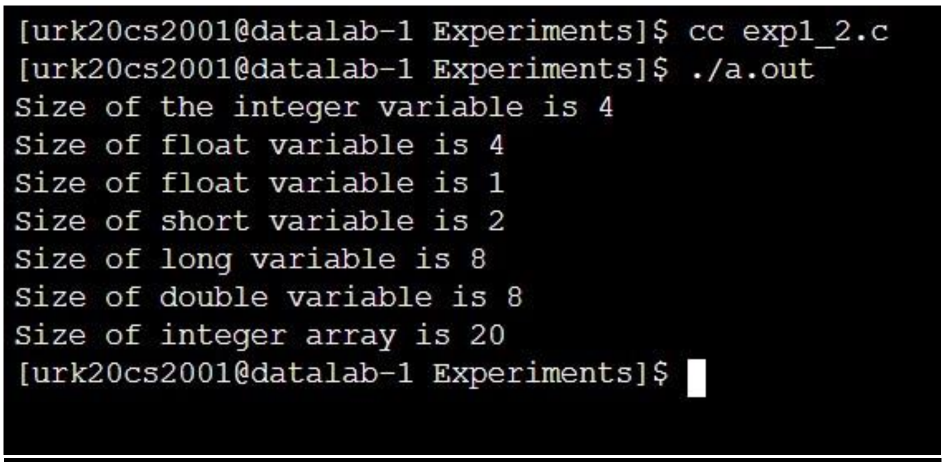
```
#include<stdio.h> int
main()
{
        int int_var;
float float_var;
char char_var;


        int int_array[5];


        int size;


        printf("Size of the integer variable is %d \n", sizeof(int_var));
printf("Size of float variable is %d \n", sizeof(float_var));


        size = sizeof(char_var);


        printf("Size of float variable is %d \n", sizeof(char_var));
printf("Size of short variable is %d \n", sizeof(short));        printf("Size
of long variable is %d \n", sizeof(long));       printf("Size of double
```

variable is %d \n”, sizeof(double)); printf(“Size of integer array is %d

\n”, sizeof(int_array));

}

**Output:**



```
[urk20cs2001@datalab-1 Experiments]$ cc exp1_2.c
[urk20cs2001@datalab-1 Experiments]$ ./a.out
Size of the integer variable is 4
Size of float variable is 4
Size of float variable is 1
Size of short variable is 2
Size of long variable is 8
Size of double variable is 8
Size of integer array is 20
[urk20cs2001@datalab-1 Experiments]$
```

## 3)Aim:

To write a C program to calculate the area of a triangle.

## Algorithm:

**Step1**: Start.

**Step2**: Include the required header files.

**Step3**: Declare the variables.

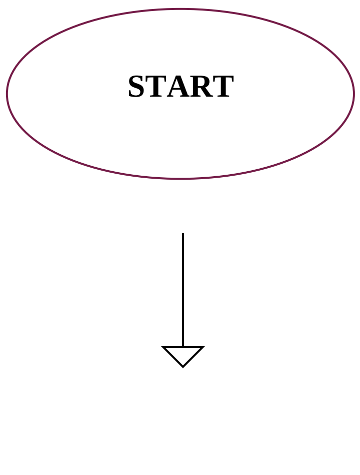
**Step4**: Get the values from the user.

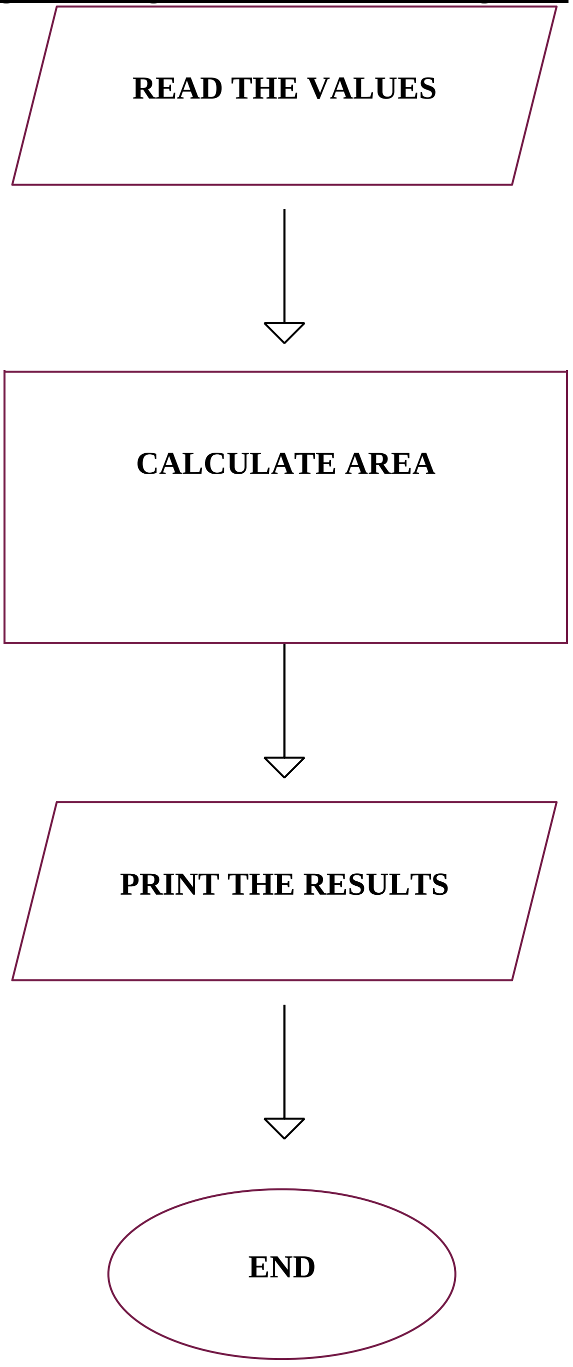
**Step5**: Calculate the area of the triangle.

**Step6**: Print the results.

**Step7**: End.

## Flowchart:

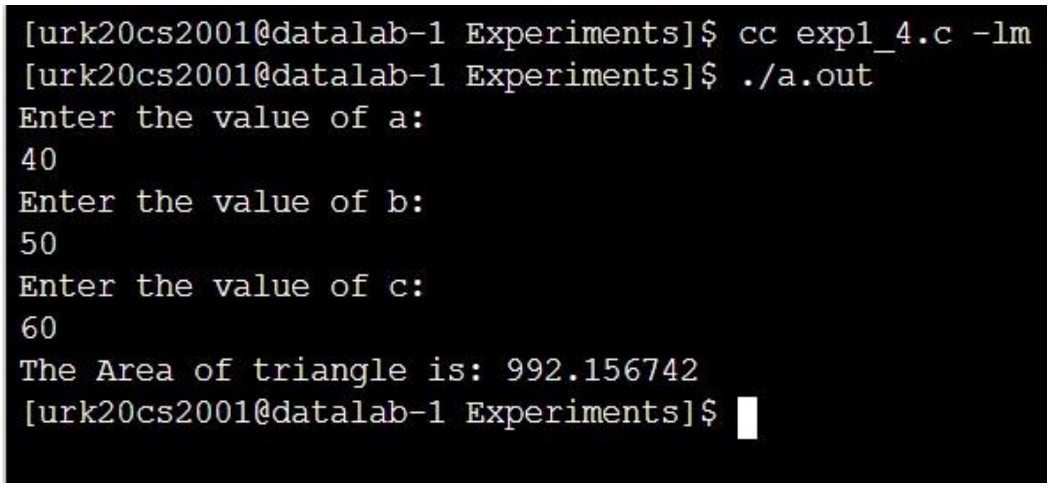




**Program:**

```
#include<stdio.h>

#include<math.h> int

main(void)

{

        double a,b,c,s,area;


 printf("Enter the value of a: \n");  scanf("%lf", &a);


 printf("Enter the value of b: \n");  scanf("%lf", &b);
 printf("Enter the value of c: \n");  scanf("%lf", &c);

        s = (a+b+c)/2;

        area = sqrt(s*(s-a)*(s-b)*(s-c));

        printf("The Area of triangle is: %lf \n", area);
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiments]$ cc exp1_4.c -lm
[urk20cs2001@datalab-1 Experiments]$ ./a.out
Enter the value of a:
40
Enter the value of b:
50
Enter the value of c:
60
The Area of triangle is: 992.156742
[urk20cs2001@datalab-1 Experiments]$
```

## 4)Aim:

To write a C program to print your student profile.

## Algorithm:

**Step1**: Start.

**Step2**: Include the required header files.

**Step3**: Declare the variable regno, name, age and Dob.

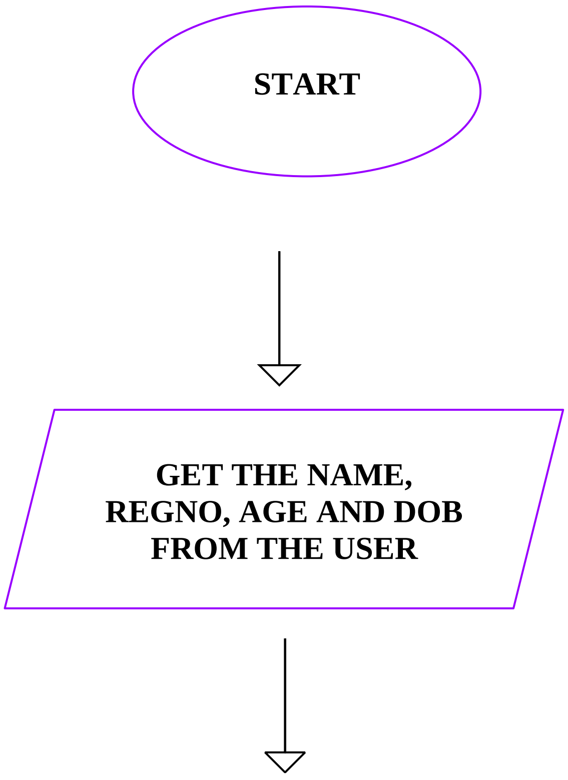
**Step4**: Get the Name, Reg No, age and Dob.

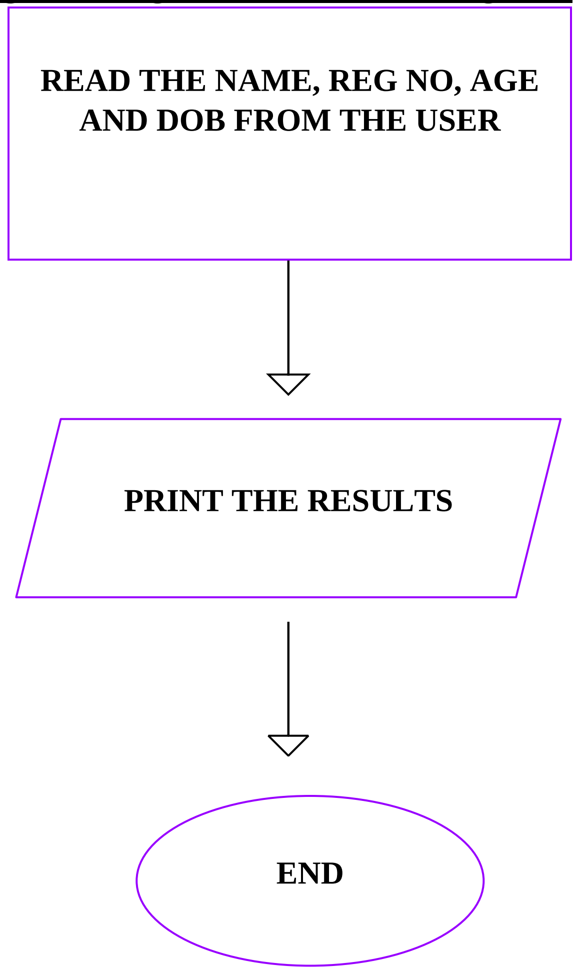
**Step5**: Read the Name, RegNO, age and Dob from the user.

**Step6**: Print the result.

**Step7**: End

## Flowchart:



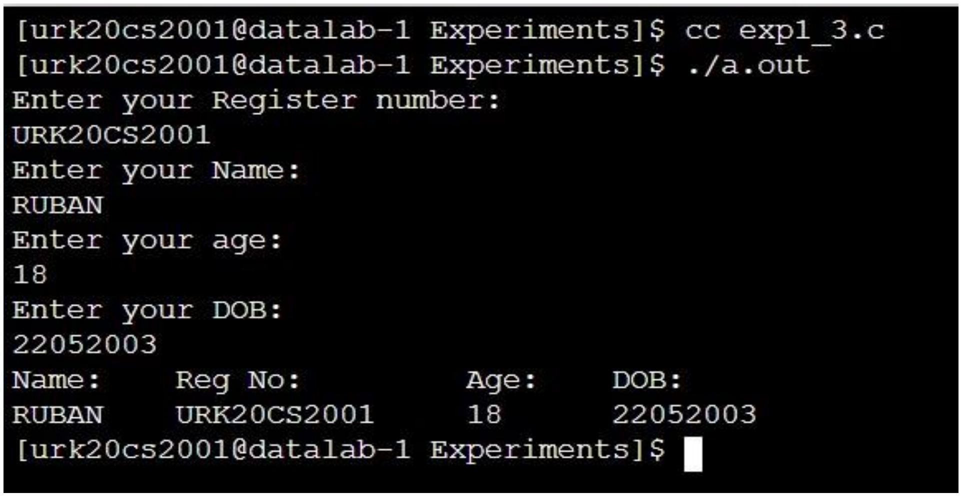


**Program:**

```
#include<stdio.h> int
main()
{
        char regno[10];
char name[10];
int age;        int dob;

        printf("Enter your Register Number: \n");
scanf("%s", &regno);

        printf("Enter your Name: \n");
scanf("%s", &name);

        printf("Enter your age: \n");
scanf("%d", &age);
```

```
        printf("Enter your DOB: \n");
scanf("%d", &dob);


        printf("Name:  \t Regno:  \t Age:  \t DOB: \n);
printf("%s \t %s \t %d \t %d \n", name, regno, age, dob);
}
```

## Output:



```
[urk20cs2001@datalab-1 Experiments]$ cc exp1_3.c
[urk20cs2001@datalab-1 Experiments]$ ./a.out
Enter your Register number:
URK20CS2001
Enter your Name:
RUBAN
Enter your age:
18
Enter your DOB:
22052003
Name:    Reg No:          Age:    DOB:
RUBAN    URK20CS2001      18      22052003
[urk20cs2001@datalab-1 Experiments]$ 
```

## Result:

Thus the program for experimenting input and output functions in C programming are coded, compiled and executed successfully.

| | |
|---|---|
| **Exp.No: 2** | **Usage of Operators** |
| **Date:6-10-2020** | |

## 1)Aim:

To write a c program to evaluate the expression (a+b) * c / d (e-f).

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables a,b,c,d,e and f.

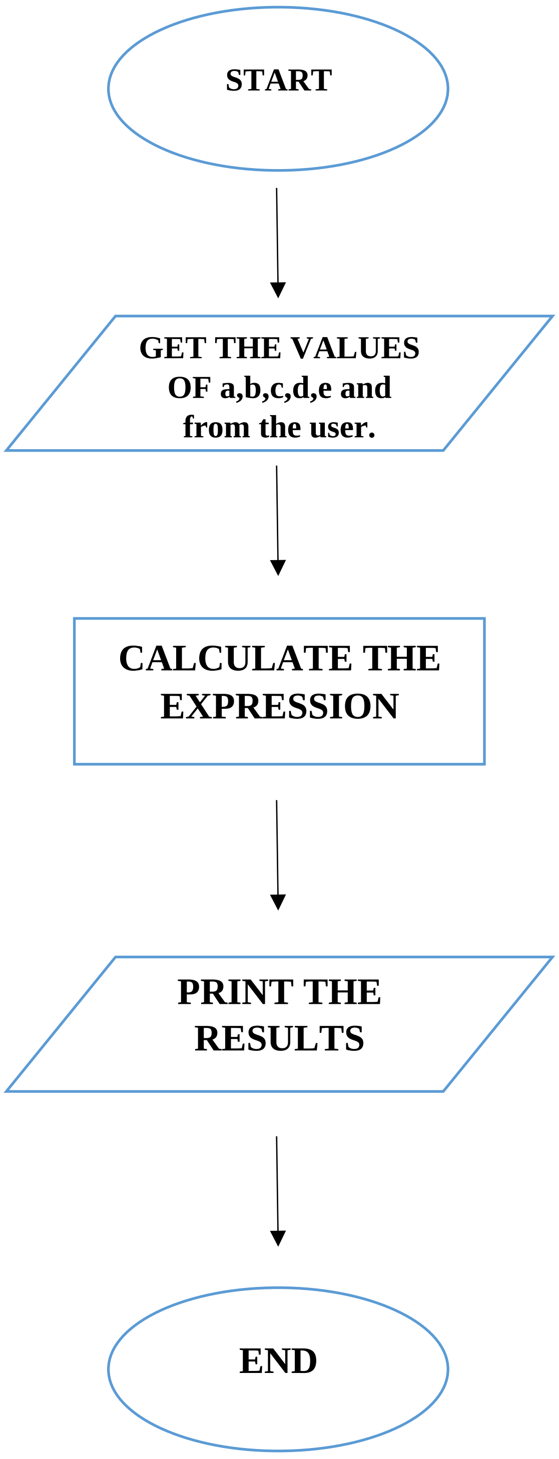
**Step4:** Get the input a,b,c,d,e and f from the user.

**Step5:** Calculate the expression.

**Step6:** Print the result.

**Step7:** End

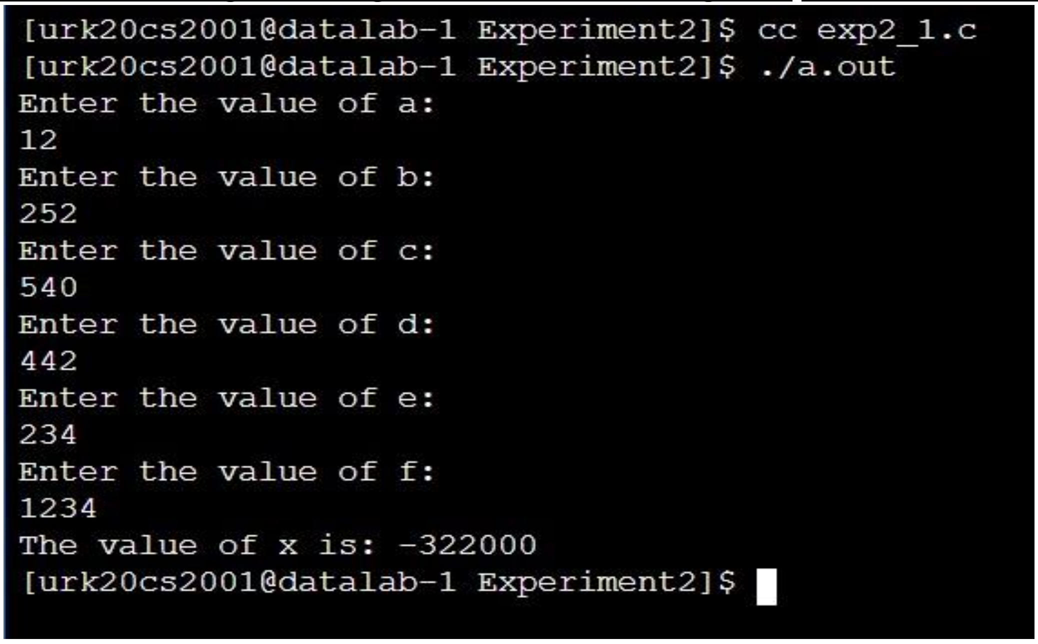
**Flowchart:**


START
GET THE VALUES OF a,b,c,d,e and from the user.
CALCULATE THE EXPRESSION
PRINT THE RESULTS
END

**Program:**

```
#include<stdio.h> int
main()
{
            int a,b,c,d,e,f,x;
printf("Enter the value of a: \n");
scanf("%d", &a);

 printf("Enter the value of b: \n");  scanf("%d", &b);

 printf("Enter the value of c: \n");  scanf("%d", &c);

 printf("Enter the value of d: \n");  scanf("%d", &d);

 printf("Enter the value of e: \n");  scanf("%d", &e);

 printf("Enter the value of f: \n");  scanf("%d", &f);

            x = ( a+b) * c / d * (e-f);

            printf("The value of x is: %d \n", x);
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment2]$ cc exp2_1.c
[urk20cs2001@datalab-1 Experiment2]$ ./a.out
Enter the value of a:
12
Enter the value of b:
252
Enter the value of c:
540
Enter the value of d:
442
Enter the value of e:
234
Enter the value of f:
1234
The value of x is: -322000
[urk20cs2001@datalab-1 Experiment2]$ 
```

## 2)Aim:

To write a C program to calculate the Body Mass Index.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the required variables.

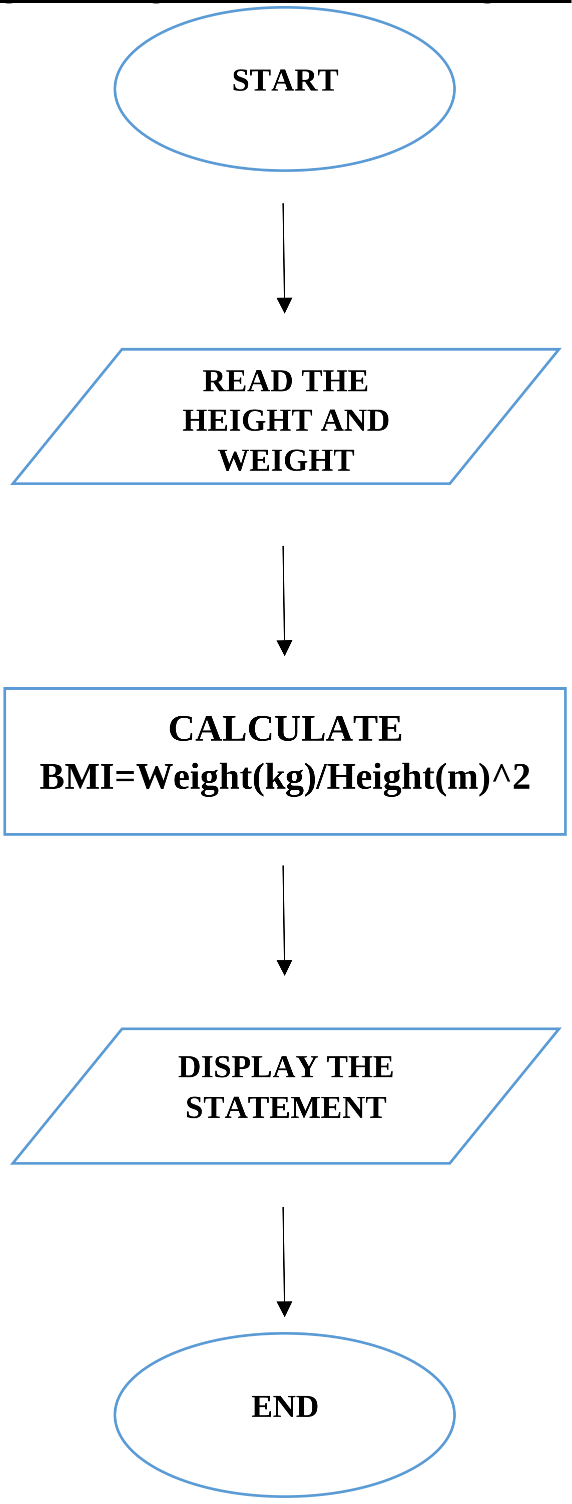
**Step4:** Get the input height and weight from the user.

**Step5:** Calculate the Body Mass Index using the formula

**Step6:** Print the results.

**Step7:** End.

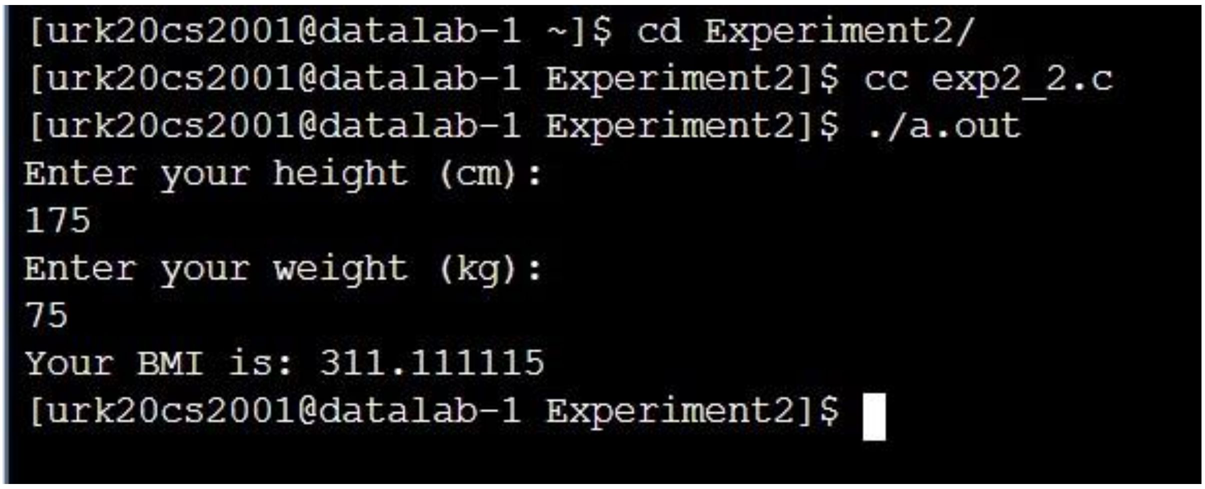
## Flowchart:


START
READ THE HEIGHT AND WEIGHT
CALCULATE BMI=Weight(kg)/Height(m)^2
DISPLAY THE STATEMENT
END

**Program:**

```
#include<stdio.h> int
main()
{
 float  height,  weight,
BMI, h;  printf("Enter
your height (cm): \n");
scanf("%f", &weight);

 printf("Enter your
weight (kg): \n");
scanf("%f", &height);

          h = height / 100 * height / 100;
BMI = weight / h;       printf("Your BMI is:
%f  \n", BMI);
}
```

**Output:**



```
[urk20cs2001@datalab-1 ~]$ cd Experiment2/
[urk20cs2001@datalab-1 Experiment2]$ cc exp2_2.c
[urk20cs2001@datalab-1 Experiment2]$ ./a.out
Enter your height (cm):
175
Enter your weight (kg):
75
Your BMI is: 311.111115
[urk20cs2001@datalab-1 Experiment2]$
```

## 3)Aim:

To write a C program to perform various arithmetic operations.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables

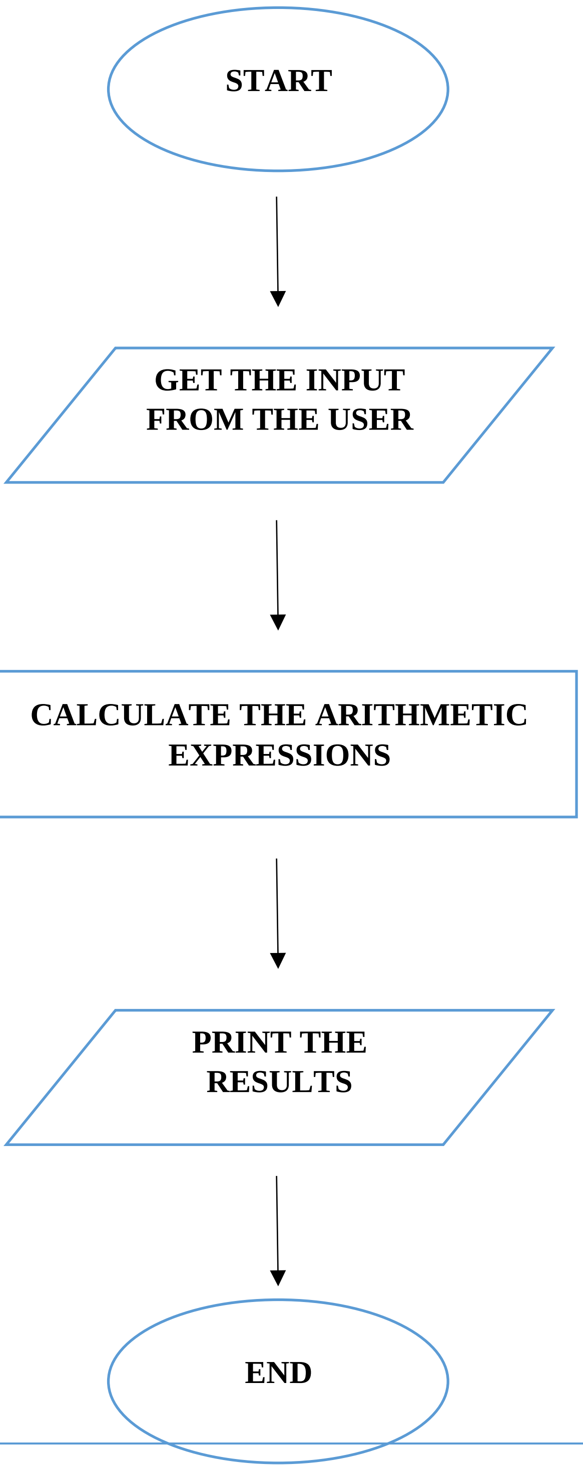
**Step4:** Read the Input from the user.

**Step5:** Calculate the arithmetic operations.

**Step6:** Print the steps.

**Step7:** End.

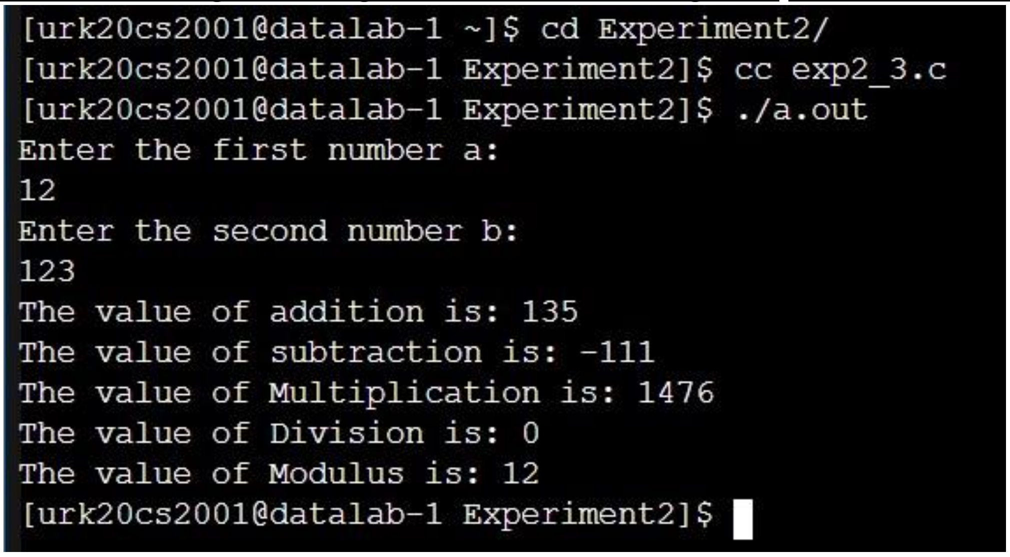
**Flowchart:**


START
GET THE INPUT FROM THE USER
CALCULATE THE ARITHMETIC EXPRESSIONS
PRINT THE RESULTS
END

## Program:

```
#include<stdio.h> int
main()
{
            int A,S,M,D,Mod,a,b;

 printf(“Enter the first number a: \n”);  scanf(“%d”, &a);

 printf(“Enter the second number b: \n”);  scanf(“%d”, &b);

            A = a + b;
            S = a – b;
            M = a * b;
            D = a / b;
            Mod = a % b;

            printf("The value of Addition is: %d \n", A);
printf("The value of Subtraction is: %d \n", S);
printf("The value of Multiplication is: %d \n", M);
printf("The value of Division is: %d \n", D);
printf("The value of Modulus is: %d \n", Mod);
}
```

## Output:



```
[urk20cs2001@datalab-1 ~]$ cd Experiment2/
[urk20cs2001@datalab-1 Experiment2]$ cc exp2_3.c
[urk20cs2001@datalab-1 Experiment2]$ ./a.out
Enter the first number a:
12
Enter the second number b:
123
The value of addition is: 135
The value of subtraction is: -111
The value of Multiplication is: 1476
The value of Division is: 0
The value of Modulus is: 12
[urk20cs2001@datalab-1 Experiment2]$ 
```

## 4)Aim:

To write a C program to find the roots of a quadratic equation.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

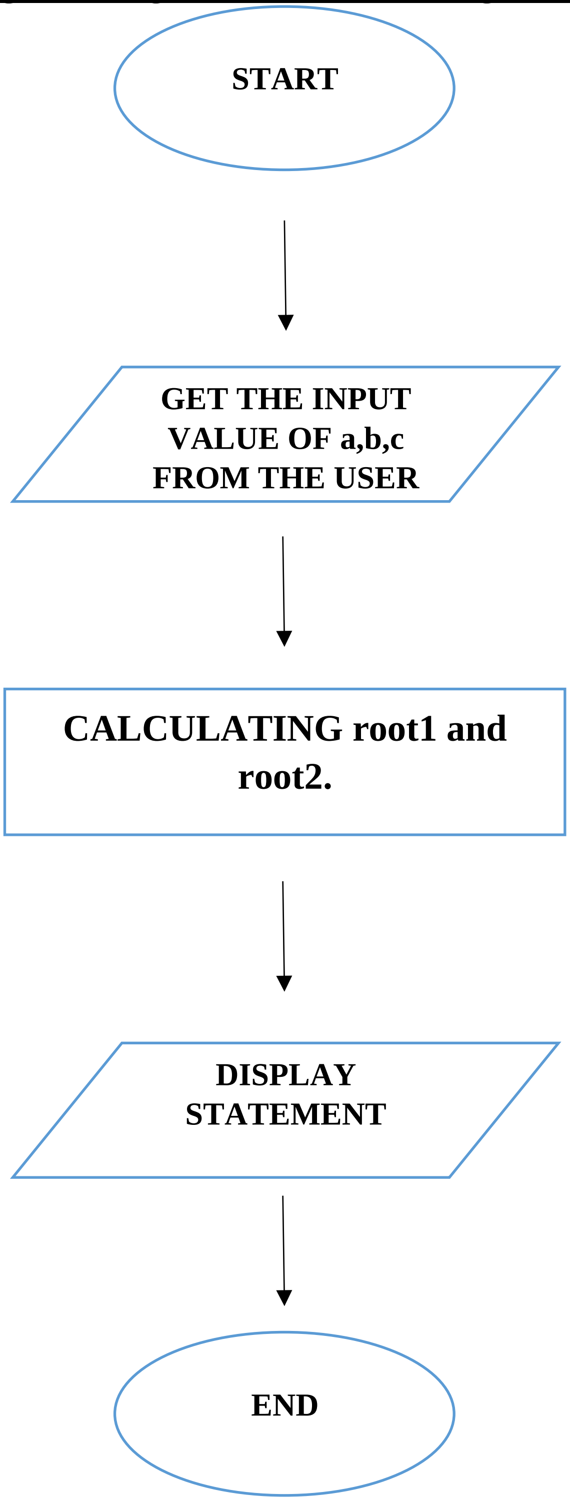
**Step3:** Declare the required variables.

**Step4:** Calculate the equation.

**Step4:** Print the results.

**Step5:** End.

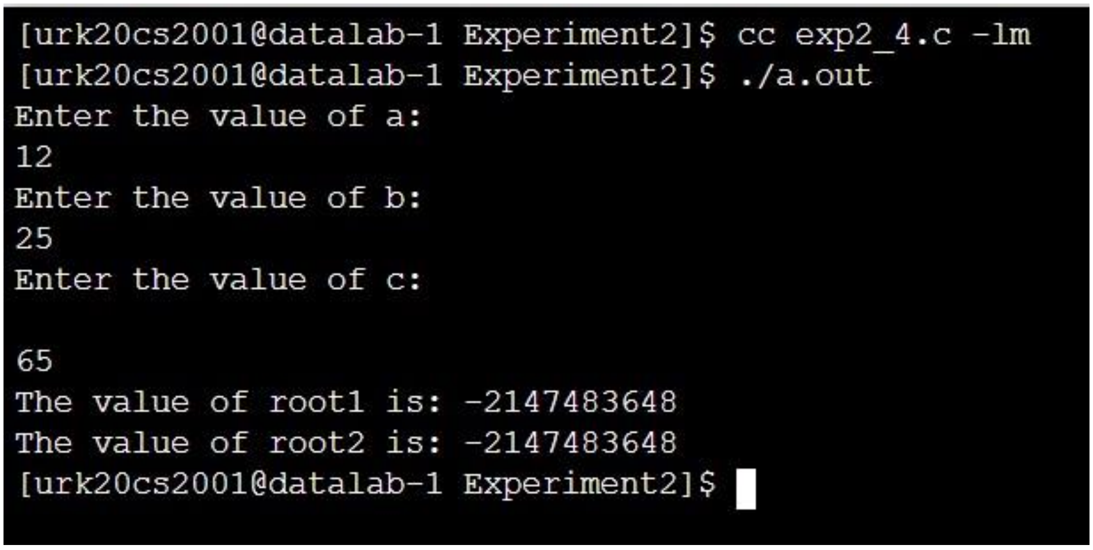
## Flowchart:


START
GET THE INPUT VALUE OF a,b,c FROM THE USER
CALCULATING root1 and root2.
DISPLAY STATEMENT
END

**Program:**

```
#include<stdio.h>
#include<math.h> int
main() {     int
a,b,c,root1,root2;

    printf("Enter the
value of a: \n");
scanf("%d", &a);

    printf("Enter the
value of b: \n");     scanf("%d", &b);

    printf("Enter the value of c: \n");
scanf("%d", &c);

    root1 = -b+(sqrt(b^2-4*a*c))/2*a;
    root2 = -b-(sqrt(b^2-4*a*c))/2*a;


    printf("The value of root1 is: %d \n", root1);
printf("The value of root2 is: %d \n", root2);
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment2]$ cc exp2_4.c -lm
[urk20cs2001@datalab-1 Experiment2]$ ./a.out
Enter the value of a:
12
Enter the value of b:
25
Enter the value of c:

65
The value of root1 is: -2147483648
The value of root2 is: -2147483648
[urk20cs2001@datalab-1 Experiment2]$
```

## 5)Aim:

To write a C program to check the number is positive or negative and even or odd

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variable number1 and number2.

**Step4:** Check the numbers

**Step5:** Print the result

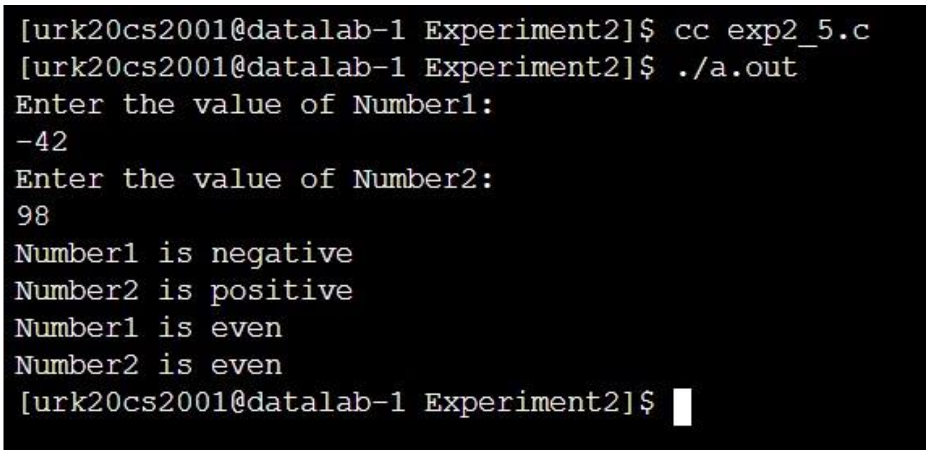
**Step6:** End.

**Flowchart:**

**Program:**

```
#include<stdio.h>
int main() {
   int number1, number2;


   printf("Enter the value of Number1: \n");
scanf("%d", &number1);


   printf("Enter the value of Number2: \n");
scanf("%d", &number2);


   (number1>0)?printf("Number1 is positive \n") : printf("Number1 is negative \n");
(number2>0)?printf("Number2 is positive \n") : printf("Number2 is negative \n");


   (number1%2==0)? printf("Number1 is even \n") : printf("Number1 is odd\n");
(number2%2==0)? printf("Number2 is even \n") : printf("Number2 is odd\n"); }
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment2]$ cc exp2_5.c
[urk20cs2001@datalab-1 Experiment2]$ ./a.out
Enter the value of Number1:
-42
Enter the value of Number2:
98
Number1 is negative
Number2 is positive
Number1 is even
Number2 is even
[urk20cs2001@datalab-1 Experiment2]$
```

| | |
|---|---|
| **Exp.No: 3** | **Usage of Conditional Statements** |
| **Date: 13-10-2020** | |

## 1) Aim:

To write a C program to implement a ticket booking application.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

`

**Step3:** Declare the variables age and price.

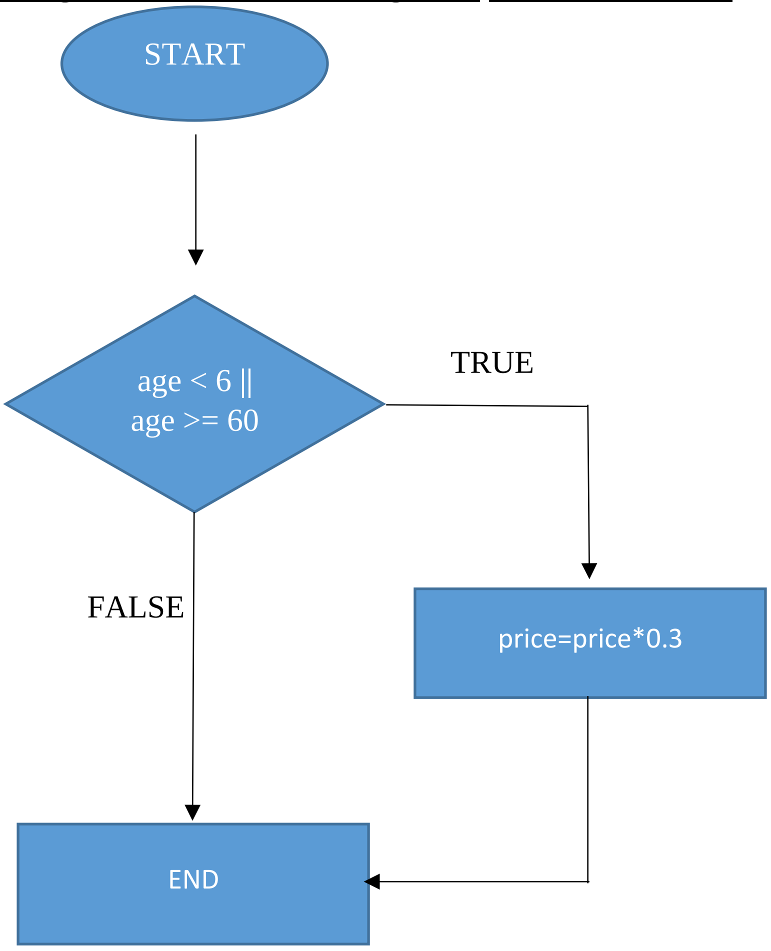
**Step4:** Get the input from the user.

**Step5:** Checking the condition.

**Step6:** Display the Statements.

**Step7:** End.

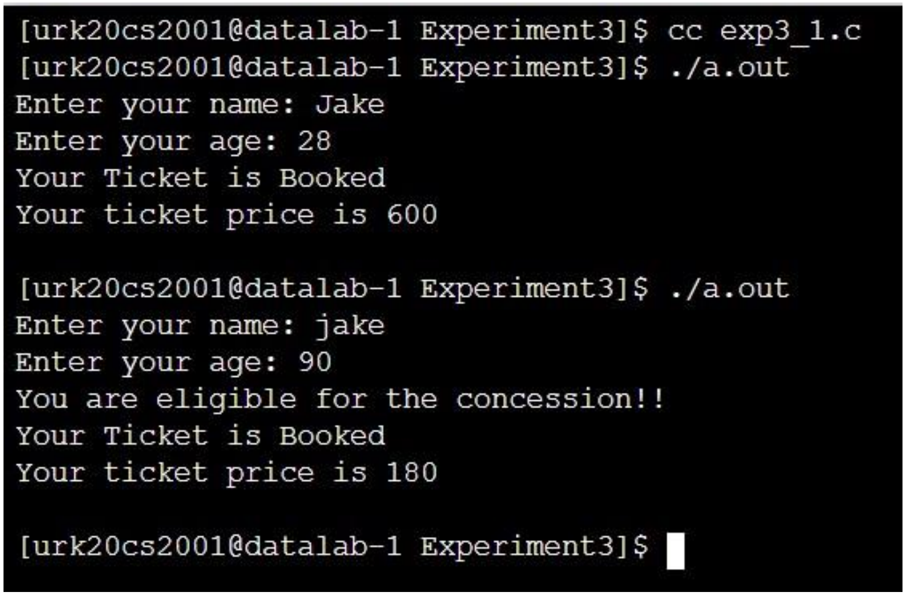
## Flowchart:



**Program:**

```
#include<stdio.h> int
main() {     char
name[20];     int age,
price = 600;

    printf("Enter your name: ");
scanf("%s",              &name);
printf("Enter   your   age:   ");
scanf("%d", &age);

    if( age < 6 || age >= 60 )
    {
        price = price * 0.3;
        printf("You are eligible for the concession!! \n");
    }
    printf("Your Ticket is Booked \n");
printf("Your ticket price is %d \n\n", price);
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment3]$ cc exp3_1.c
[urk20cs2001@datalab-1 Experiment3]$ ./a.out
Enter your name: Jake
Enter your age: 28
Your Ticket is Booked
Your ticket price is 600

[urk20cs2001@datalab-1 Experiment3]$ ./a.out
Enter your name: jake
Enter your age: 90
You are eligible for the concession!!
Your Ticket is Booked
Your ticket price is 180

[urk20cs2001@datalab-1 Experiment3]$ 
```

## 2) Aim:

To write a C program to check the eligibility of a candidate to poll his vote.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

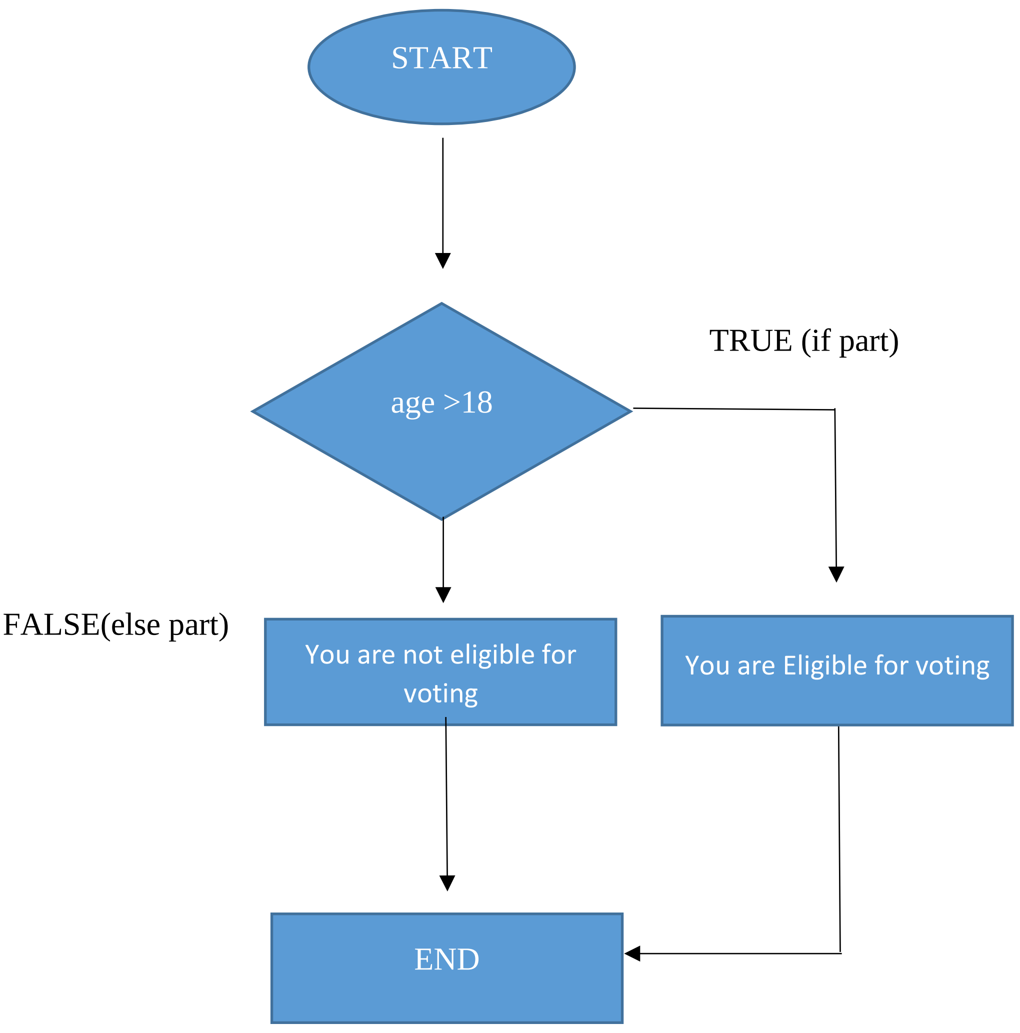
**Step3:** Declare the variable age.

**Step4:** check the condition.

**Step5:** Display the Statement.

**Step6:** End.

**Flowchart:**

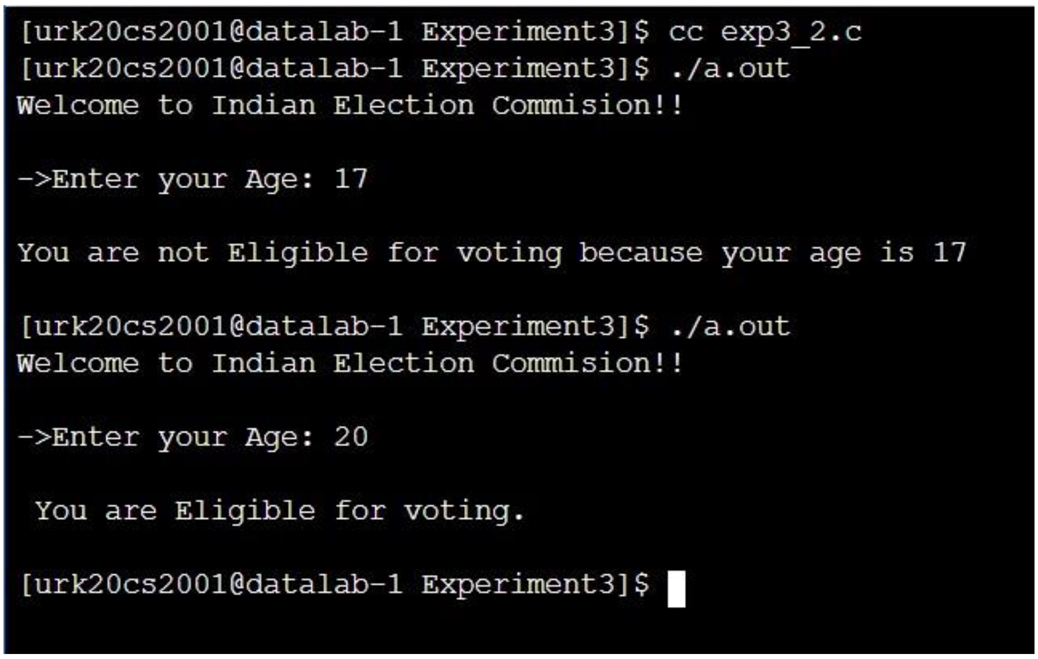


**Program:**

```
#include<stdio.h>

int main() {     int
age;
```

```
    printf("Welcome to Indian Election Commision!!\n");
printf("\n->Enter your Age: ");     scanf("%d", &age);


    if(age > 18){
        printf("\n You are Eligible for voting.\n\n");
    }
else
        printf("\nYou are not Eligible for voting because your age is %d\n\n", age); }
```

**OUTPUT:**



```
[urk20cs2001@datalab-1 Experiment3]$ cc exp3_2.c
[urk20cs2001@datalab-1 Experiment3]$ ./a.out
Welcome to Indian Election Commision!!

->Enter your Age: 17

You are not Eligible for voting because your age is 17

[urk20cs2001@datalab-1 Experiment3]$ ./a.out
Welcome to Indian Election Commision!!

->Enter your Age: 20

 You are Eligible for voting.

[urk20cs2001@datalab-1 Experiment3]$ 
```

**3) Aim:**

To write a C program to calculate the Body Mass Index.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables height, weight, BMI, h.

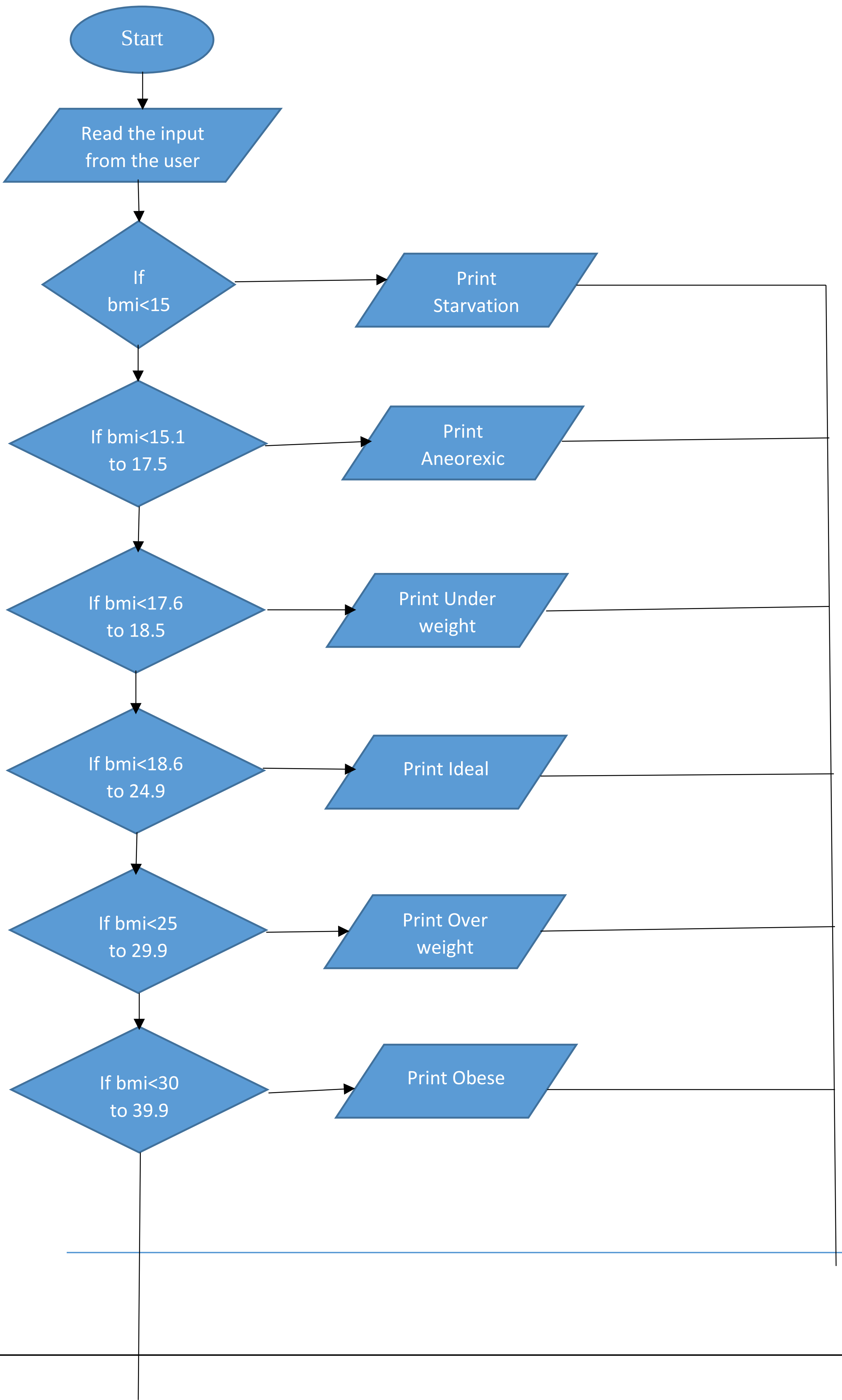
**Step4:** Get the input from the user.

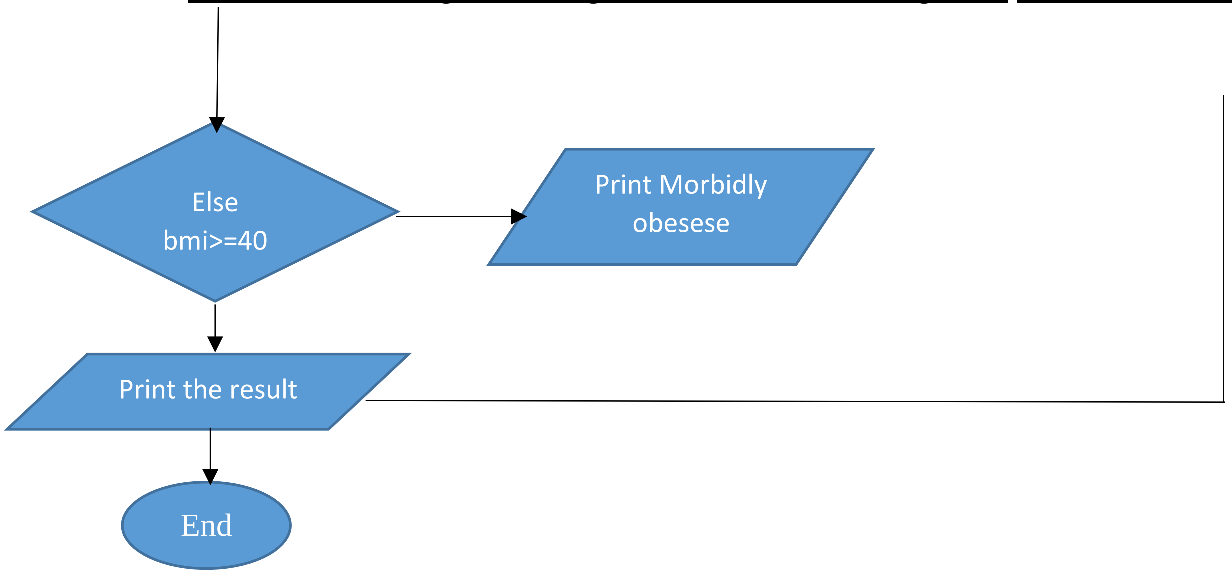
**Step5:** Calculate the BMI

**Step6:** Print the result.

**Step7:** End.

**Flowchart:**

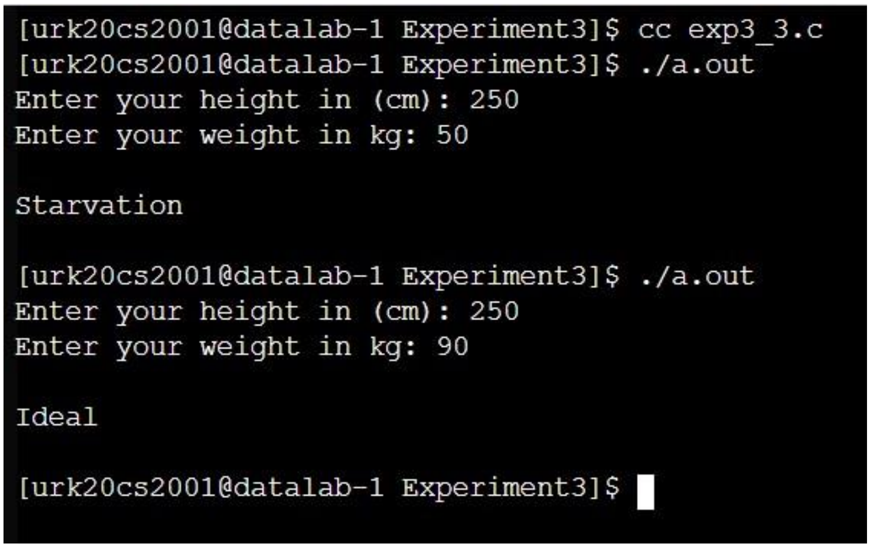

Start
Read the input from the user
If bmi<15
Print Starvation
If bmi<15.1 to 17.5
Print Aneorexic
If bmi<17.6 to 18.5
Print Under weight
If bmi<18.6 to 24.9
Print Ideal
If bmi<25 to 29.9
Print Over weight
If bmi<30 to 39.9
Print Obese



**Program:**

```
#include<stdio.h>
int main()
{
    int height, weight, BMI, h;

    printf("Enter your height in (m): ");
    scanf("%d", &height);
    printf("Enter your weight in kg: ");
    scanf("%d", &weight);

    h = height/100*height/100;

    BMI = weight/h;

    if(BMI < 15){
        printf("\nStarvation\n\n");
    }
    else if(BMI >= 15.1 && BMI <= 17.5){
        printf("\nAnorexic!!\n\n");
    }
    else if(BMI >= 17.6 && BMI <= 18.5){
printf("\nUnder Weight\n\n");
    }
    else if(BMI >= 18.6 && BMI <= 24.9){
printf("\nIdeal\n\n");
    }
    else if(BMI >= 25 && BMI <= 29.9){
printf("\nOver Weight\n\n");
    }
    else if(BMI >= 30 && BMI <= 39.9){
printf("\nObese\n\n");
    }
else
        printf("\nMorbidly obese\n\n");
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment3]$ cc exp3_3.c
[urk20cs2001@datalab-1 Experiment3]$ ./a.out
Enter your height in (cm): 250
Enter your weight in kg: 50

Starvation

[urk20cs2001@datalab-1 Experiment3]$ ./a.out
Enter your height in (cm): 250
Enter your weight in kg: 90

Ideal

[urk20cs2001@datalab-1 Experiment3]$ 
```

**4)Aim:**

To write a C program to calculate the gross salary.

**Algorithm:**

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variable bs, hra, da, cv, gs.

**Step4:** Get the input salary from the user.

**Step5:** Calculating the basic salary.

**Step6:** Print the results.

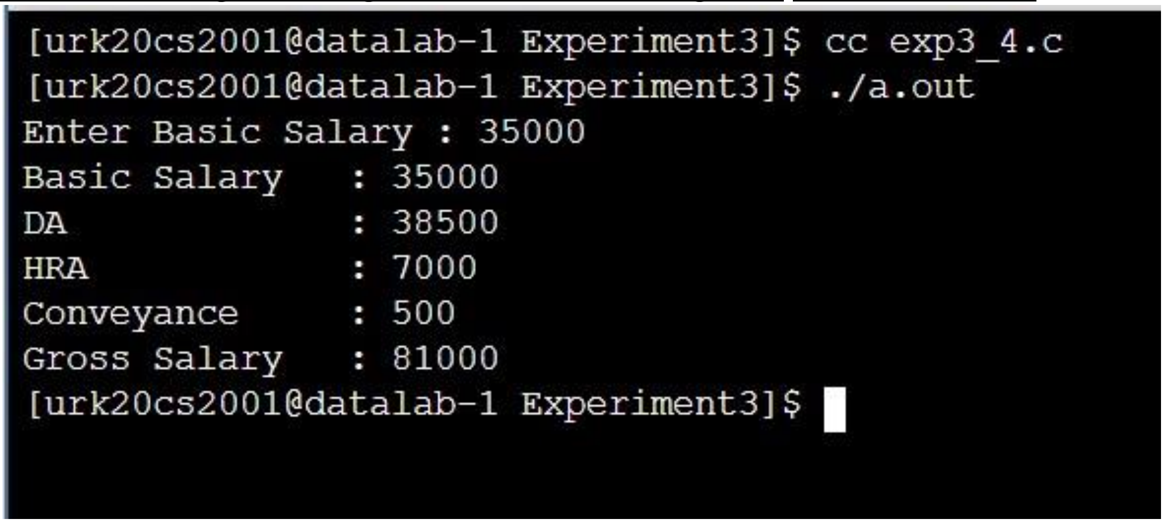
**Step7:** End.

**Flowchart:**

**Program:**

```
#include <stdio.h>
int main() {
    float bs, hra, da, cv, gs;
printf("Enter Basic Salary : ");
scanf("%f", &bs);

    if(bs >= 5000)
    {          da = 110 * bs /
100;          hra = 20 * bs /
100;          cv = 500;
    }
    else if(bs >= 3000 && bs < 5000)
    {          da = 100 * bs /
100;          hra = 15 * bs /
100;          cv = 400;
    }     else if( bs <
3000)
    {          da = 90 * bs /
100;          hra = 10 * bs
/ 100;          cv = 300;
    }
    gs = bs + da + hra + cv;
printf("Basic Salary   : %.f \n",bs);
printf("DA             : %.f \n",da);
printf("HRA            : %.f \n",hra);
printf("Conveyance     : %.f \n",cv);
printf("Gross Salary   : %.f \n",gs);
return 0;
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment3]$ cc exp3_4.c
[urk20cs2001@datalab-1 Experiment3]$ ./a.out
Enter Basic Salary : 35000
Basic Salary    : 35000
DA              : 38500
HRA             : 7000
Conveyance      : 500
Gross Salary    : 81000
[urk20cs2001@datalab-1 Experiment3]$
```

## 5)Aim:

To write a C program to print a person is Boy/Men/Girl by checking their age using nested if.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required headerfiles.

**Step3:** Declare the variables a and b.

**Step4:** Get the input from the user.

**Step5:** Checking the conditions using nested if.

**Step6:** Print the result.

**Step7:** End.

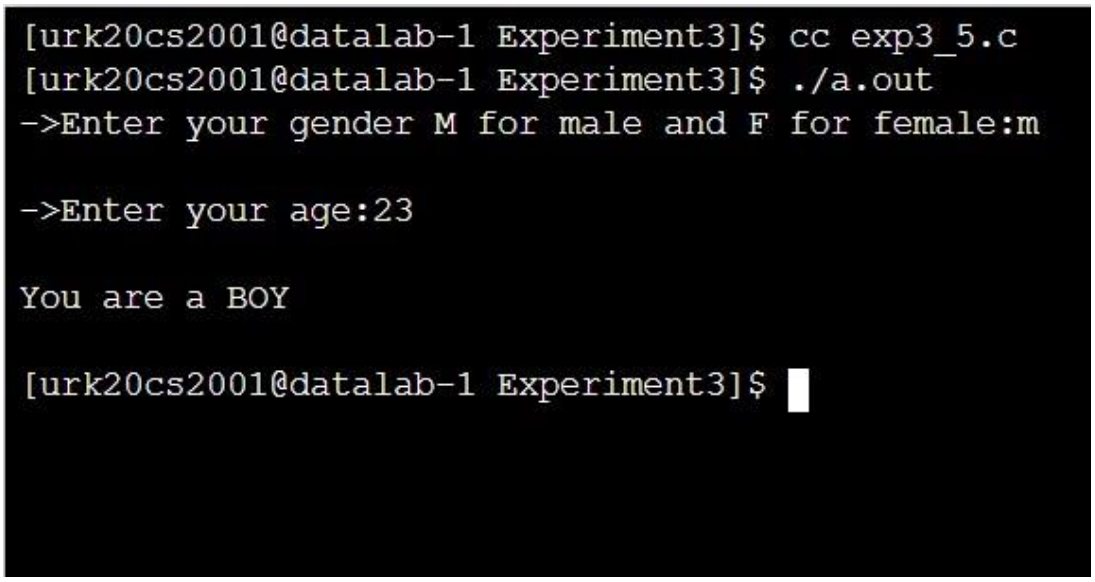
**Flowchart**

**Program:**

```
#include<stdio.h>
int main() {
   int a;
char b;

   printf("Enter your gender M for male and F for female: \t");
scanf("%c", &b);     printf("\nEnter your age: \t");
scanf("%d", &a);

   if (b=='M' || b=='m')
   {        if (a
<= 25)
      {
         printf("You are a BOY");
      }
else
      {
         printf("You are a MAN");
      }
}
   else if (b=='F' || b=='f')
   {        if
(a<=20)
      {
         printf("You are a GIRL");
      }
else
      {
         printf("You are a WOMAN");
```

```
        }
}
else
   {
        printf("OOPS YOUR INPUT IS WRONG!! TRY AGAIN WITH ANOTHER INPUT");
   }
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment3]$ cc exp3_5.c
[urk20cs2001@datalab-1 Experiment3]$ ./a.out
->Enter your gender M for male and F for female:m

->Enter your age:23

You are a BOY

[urk20cs2001@datalab-1 Experiment3]$
```

**6) Aim:**

To write a C program to create a basic arithmetic calculator using switch case statement.

**Algorithm:**

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variable a, b and c.

**Step4:** Get the input from the user.

**Step5:** Calculating the switch case statement.

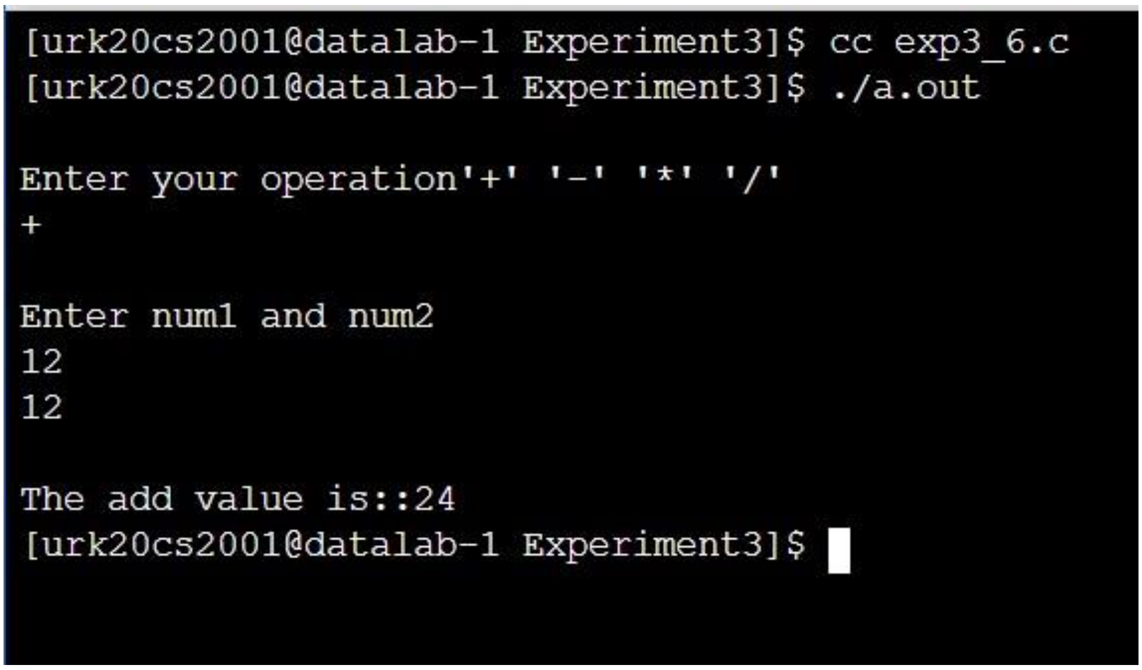
**Step6:** End.

**Program:**

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


   char a;     int
num1,num2,result=0;


   printf("\nEnter your operation'+' '-' '*' '/' \n");
scanf("%s",&a);     printf("\nEnter num1 and
num2\n");
scanf("%d""%d",&num1,&num2);


   switch (a)
   {
case '+':
         printf("\nThe add value is::%d\n",num1+num2);
         break;
       case '-
':
         printf("\nThe add value is::%d\n",num1-num2);
         break;
       case
'*':
```

```
printf("\nTh

e add value

is::%d\n",nu

m1*num2);


            break;

         case

'/':

            printf("\nThe add value is::%d\n",num1/num2);

            break;


default:

            printf("\nThe entered number is invalid\n");

    }

}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment3]$ cc exp3_6.c
[urk20cs2001@datalab-1 Experiment3]$ ./a.out

Enter your operation'+' '-' '*' '/'
+

Enter num1 and num2
12
12

The add value is::24
[urk20cs2001@datalab-1 Experiment3]$ █
```

**Result:**

Thus the program for experimenting Usage of Conditional Statement in C programming are coded, compiled and executed successfully.

| | |
|---|---|
| **Exp. No: 4** | **Usage of Control Statements** |
| **Date: 20-10-2020** | |

**1)Aim:**

To write a C program to print a pattern.

**Algorithm:**

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the required variables.

**Step4:** Use for loop and while loop to check for the special condition and execute accordingly

**Step5:** print the result.

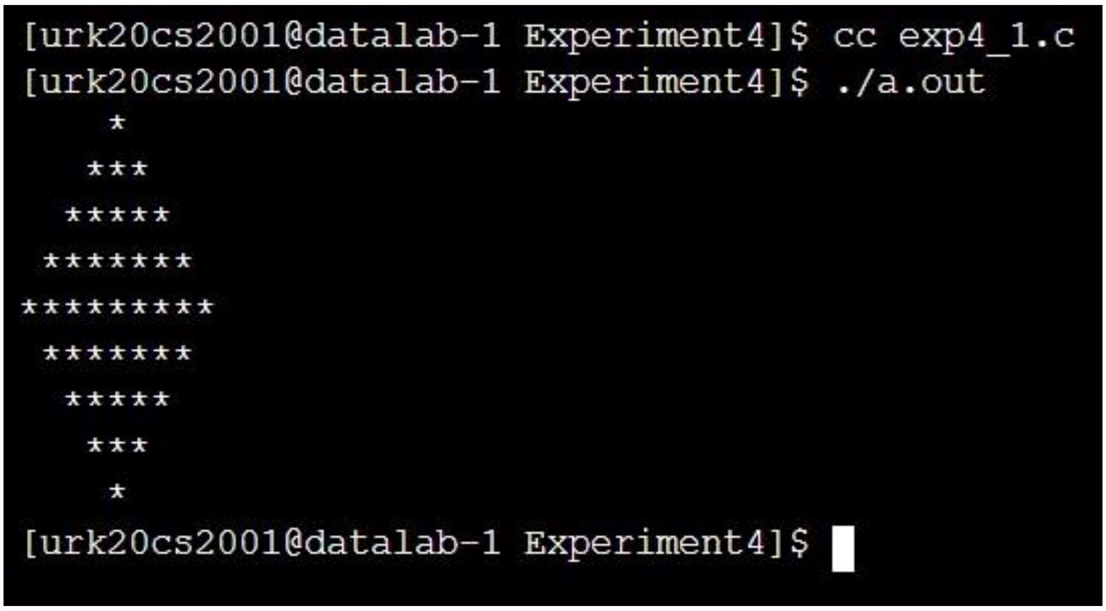
**Step6:** End.

**Flowchart:**

**Program:**

```
#include<stdio.h> int
main() {     int i, k, row=5,
count=1;     count = row -
1;

    for(k=1; k<=row; k++)
    {         for(i=1; i<=count;
i++)
        {
printf(" ");         }
count--;

        for(i=1; i<=2*k-1; i++)
        {
printf("*");         }
printf("\n");
    }
    count=1;

    for(k=1; k<=row-1; k++)
    {         for(i=1; i<=count;
i++)
        {
printf(" ");
        }
        count++;

        for(i=1; i<=2*(row-k)-1; i++)
        {
            printf("*");
        }
printf("\n");
    }
return 0;
}
```

**Out put:**



```
[urk20cs2001@datalab-1 Experiment4]$ cc exp4_1.c
[urk20cs2001@datalab-1 Experiment4]$ ./a.out
    *
   ***
  *****
 *******
*********
 *******
  *****
   ***
    *
[urk20cs2001@datalab-1 Experiment4]$
```

## 2)Aim:

To write a C program to print the multiplication table of a number and Get the number and range from the user.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables number, i, range.

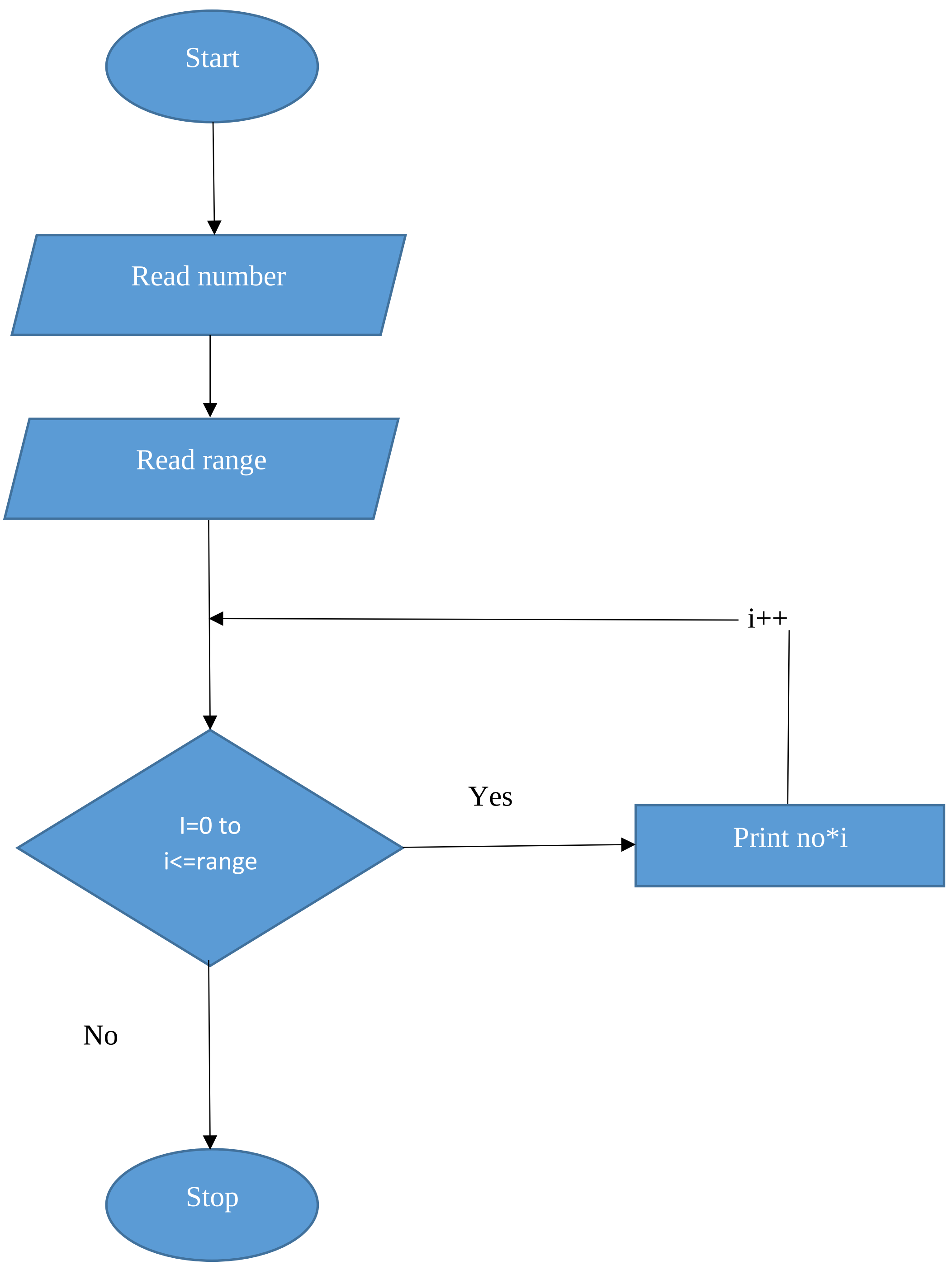
**Step4:** Get the number and range as an input from the user.

**Step5:** calculating and looping the statement.

**Step6:** Print the result.

**Step7:** End.

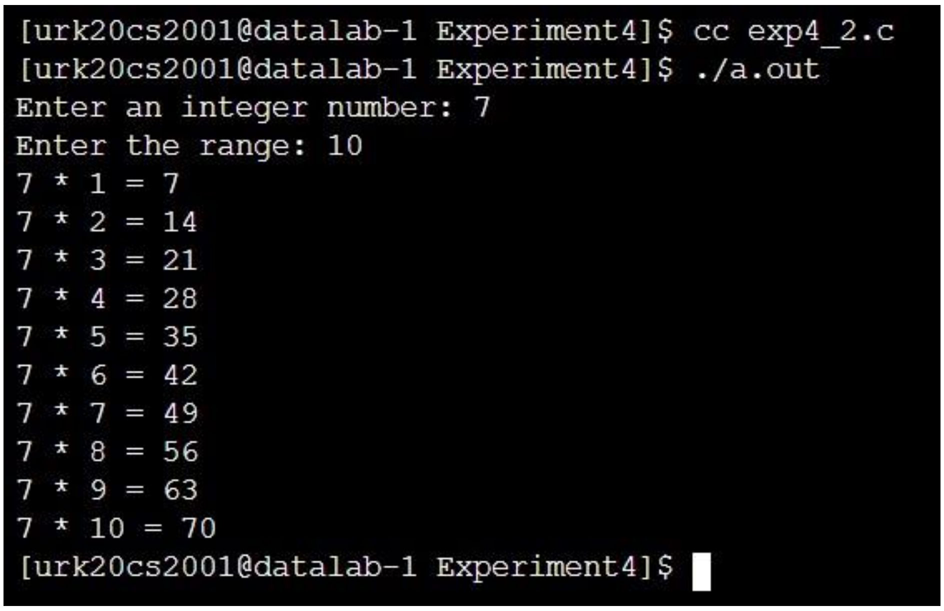
**Flowchart:**


Start
Read number
Read range
i++
I=0 to i<=range
Yes
Print no*i
No
Stop

**Program:**

```
#include<stdio.h>
int main() {
   int number, i, range;

   printf("Enter an integer number: ");
scanf("%d", &number);

   printf("Enter the range: ");
scanf("%d", &range);

   for(i=1; i<=range; ++i)
   {
      printf("%d * %d = %d \n", number, i, number * i);
   }
return 0;
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment4]$ cc exp4_2.c
[urk20cs2001@datalab-1 Experiment4]$ ./a.out
Enter an integer number: 7
Enter the range: 10
7 * 1 = 7
7 * 2 = 14
7 * 3 = 21
7 * 4 = 28
7 * 5 = 35
7 * 6 = 42
7 * 7 = 49
7 * 8 = 56
7 * 9 = 63
7 * 10 = 70
[urk20cs2001@datalab-1 Experiment4]$
```

**3)Aim:**

To write a C program to check the given number is Armstrong number or not.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables n, r, temp, sum=0;

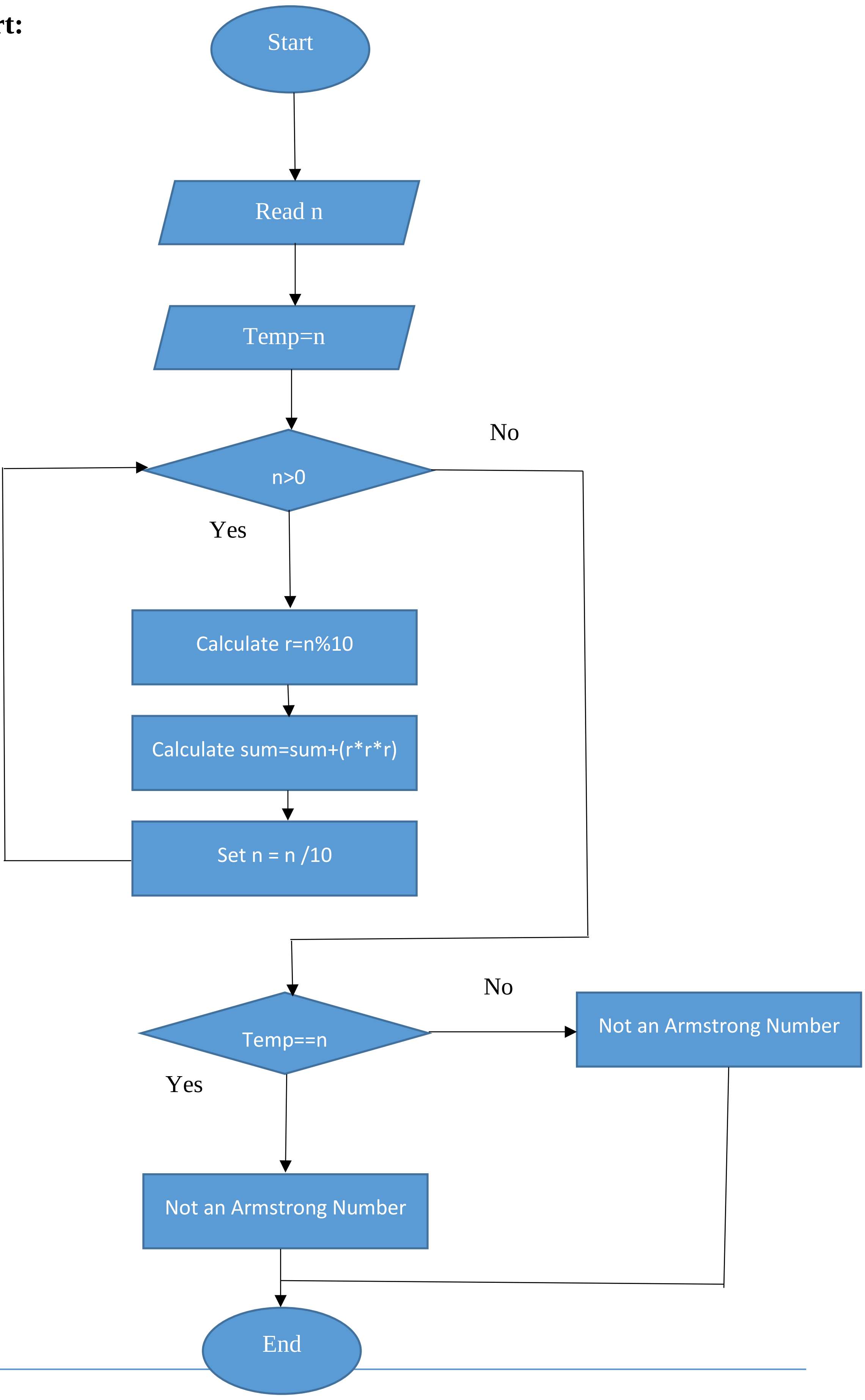
**Step4:** Get the number as an input from the user.

**Step5:** Calculating the number using while loop and if else statement.

**Step6:** Print the result.

**Step7:** End.

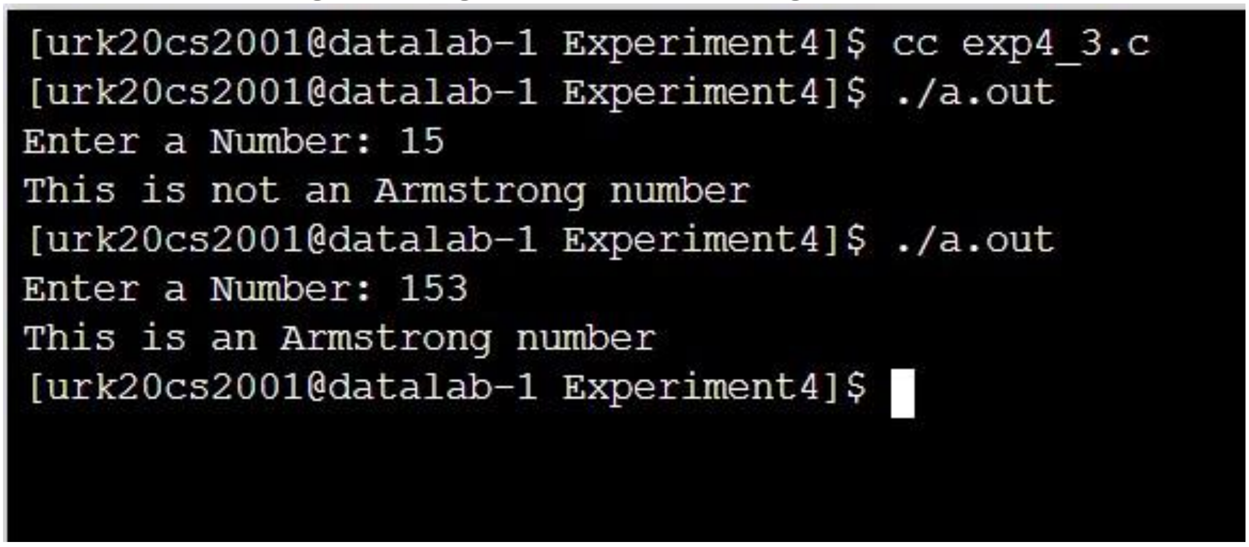
**Flowchart:**


Start
Read n
Temp=n
n>0
No
Yes
Calculate r=n%10
Calculate sum=sum+(r*r*r)
Set n = n /10
Temp==n
No
Yes
Not an Armstrong Number
Not an Armstrong Number
End

**Program:**

```
#include<stdio.h> int
main() {     int n, r,
temp, sum=0;

    printf("Enter a Number: ");
scanf("%d", &n);

    temp = n;

    while(n>0){         r = n %
10;         sum = sum + (r * r
* r);         n = n / 10;
    }

    if(temp == sum)
    {
        printf("This is an Armstrong number\n");
    }
else{
        printf("This is not an Armstrong number \n");
    }
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment4]$ cc exp4_3.c
[urk20cs2001@datalab-1 Experiment4]$ ./a.out
Enter a Number: 15
This is not an Armstrong number
[urk20cs2001@datalab-1 Experiment4]$ ./a.out
Enter a Number: 153
This is an Armstrong number
[urk20cs2001@datalab-1 Experiment4]$ 
```

**4)Aim:**

To write a C program to print the prime numbers between the given range.

**Algorithm:**

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables number1, number2, flag, temp, count=0, i, j;

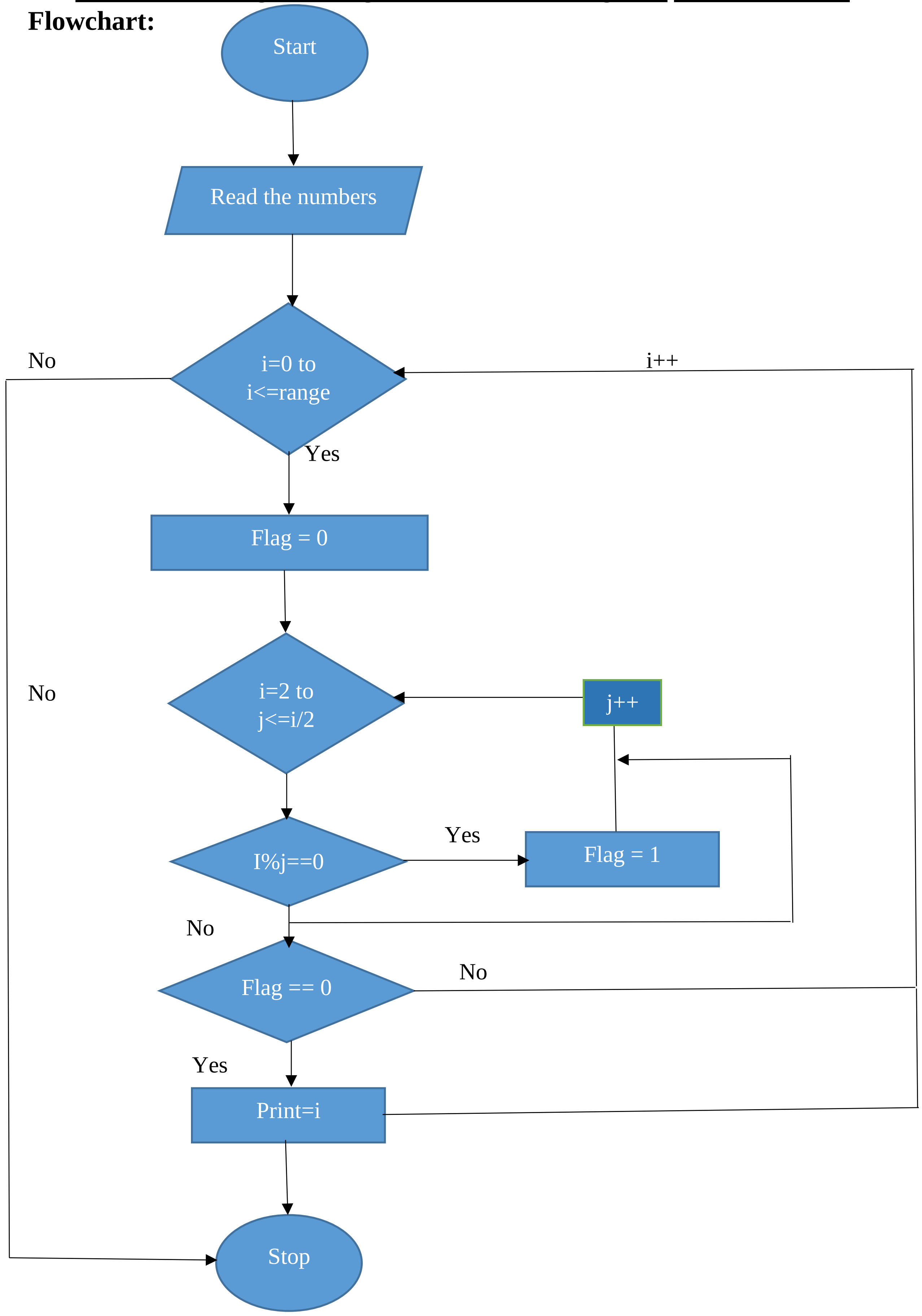
**Step4:** Get the Input number1 and number2 from the user.

**Step5:** Checking the condition if the number is prime or not.

**Step6:** Print the result.

**Step7:** End.

**Flowchart:**

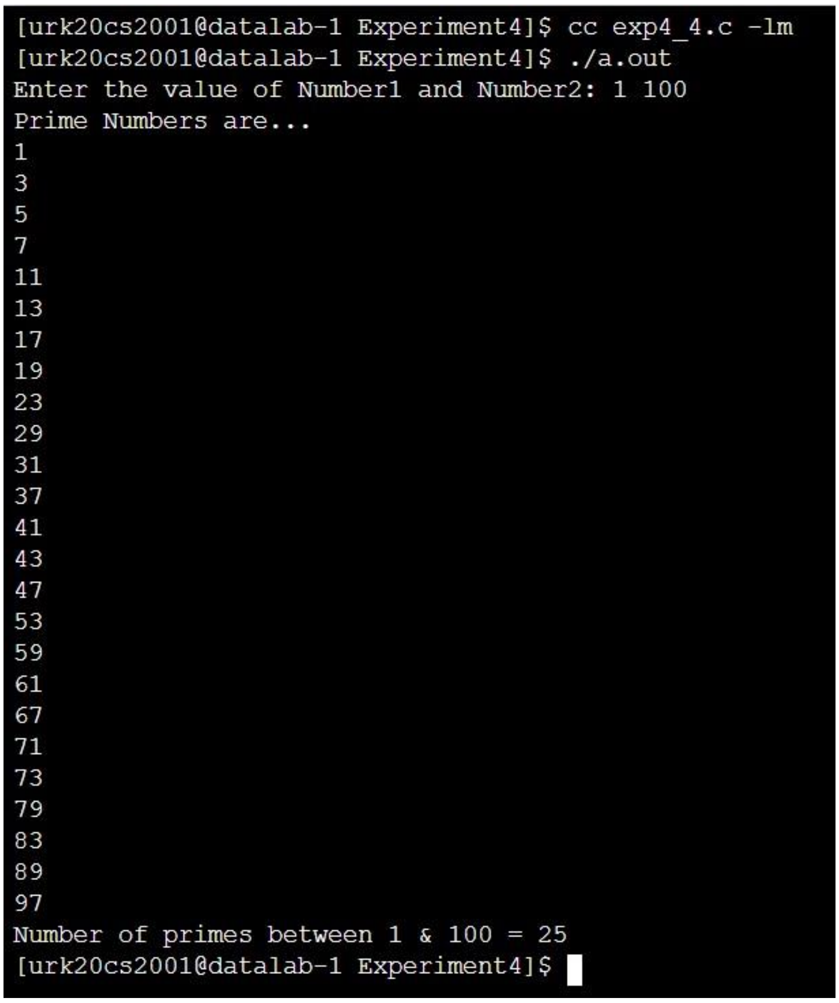


**Program:**

```
#include<stdio.h>

#include<stdlib.h>

void main() {

   int number1, number2, flag, temp, count=0, i, j;


   printf("Enter the value of Number1 and Number2: ");

scanf("%d %d", &number1, &number2);


   if(number2<2)

   {

      printf("There are no primes upto %d \n", number2);

   }

   printf("Prime Numbers are...\n");

temp = number1;


   if(number1 % 2 == 0)

   {

      number1++;

   }

   for(i=number1; i<=number2; i=i+2)

   {        flag = 0;

for(j=2; j<=i/2; j++)

      {

if((i%j)==0)

         {

flag = 1;

break;

         }        }

if(flag == 0)

      {

         printf("%d \n", i);

count++;
```

```
        }

    }

    printf("Number of primes between %d & %d = %d \n", temp, number2, count); }
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment4]$ cc exp4_4.c -lm
[urk20cs2001@datalab-1 Experiment4]$ ./a.out
Enter the value of Number1 and Number2: 1 100
Prime Numbers are...
1
3
5
7
11
13
17
19
23
29
31
37
41
43
47
53
59
61
67
71
73
79
83
89
97
Number of primes between 1 & 100 = 25
[urk20cs2001@datalab-1 Experiment4]$
```

**5)Aim:**

To write a C program to read a password until it is correct. For wrong password print Incorrect, Allow only 3 incorrect password attempts and if it exceeds quit the program.

**Algorithm:**

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables enteredPassword, password = 1234.

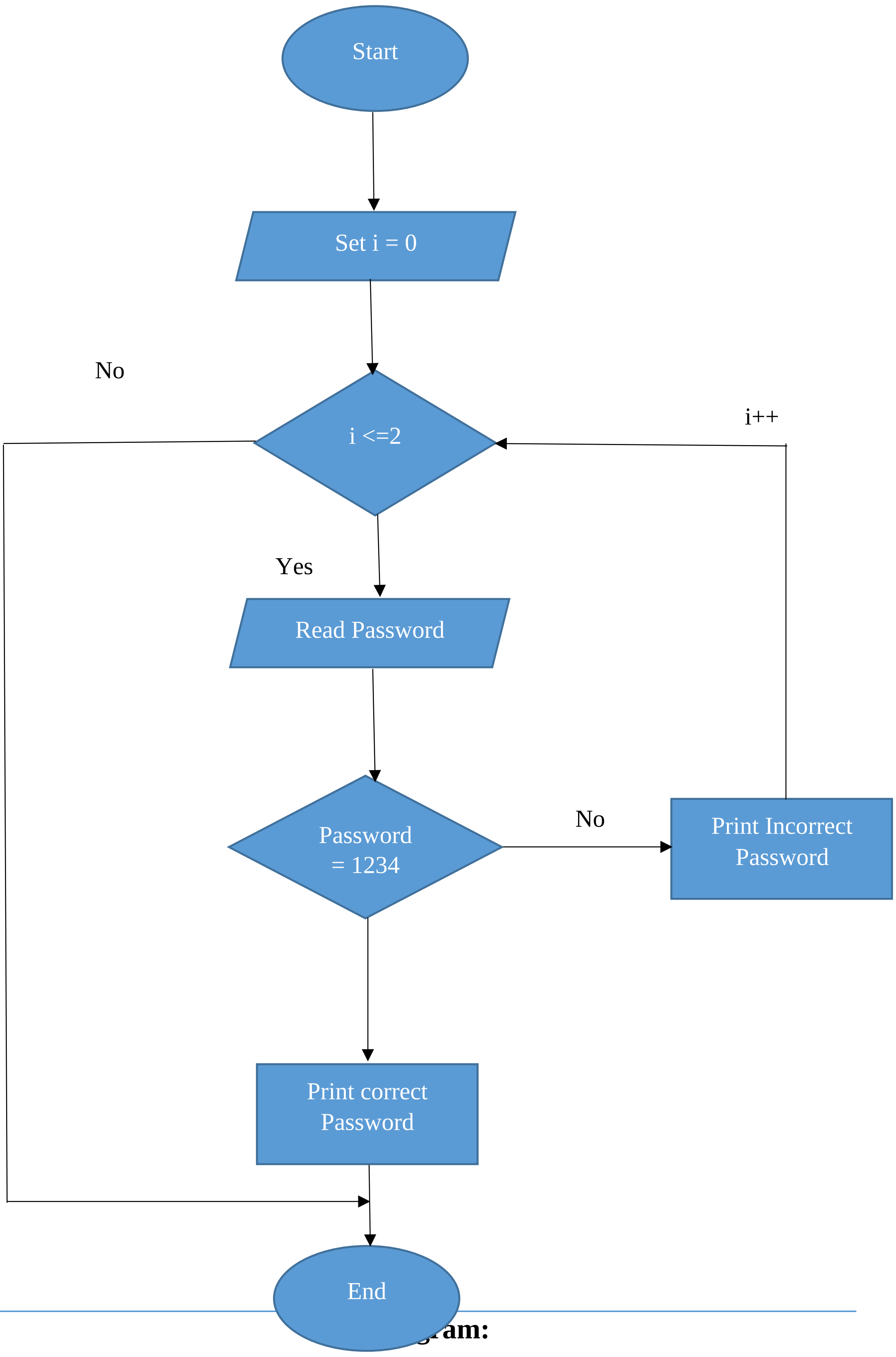
**Step4:** Get the input as a password from the user.

**Step5:** Checking the condition using if else and for loop.

**Step6:** Print the result as a Display statement.

**Step7:** End.

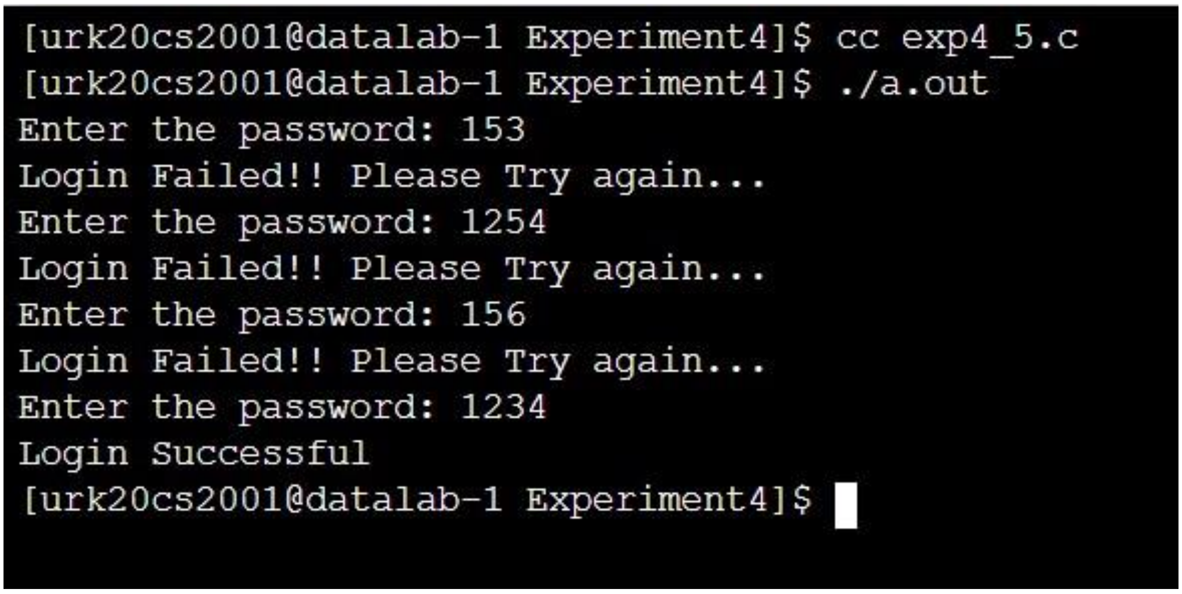
**Flowchart:**



**am:**

```
#include<stdio.h>
int main(void) {
   int enteredPassword, password=1234;
   int i = 0;

   printf("Enter the password: ");
scanf("%d", &enteredPassword);

   if(password == enteredPassword)
   {
      printf("Login Successful \n ");
   }
else
   {
      printf("Login Failed!! Please Try again...\n");
   }

   for(i = 0; i <= 2; i++)
   {
      printf("Enter the password: ");
scanf("%d", &enteredPassword);

      if(password == enteredPassword)
      {
         printf("Login Successful \n");
      }
      else
      {
         printf("Login Failed!! Please Try again...\n");
      }
   }

}
```

## Output:



```
[urk20cs2001@datalab-1 Experiment4]$ cc exp4_5.c
[urk20cs2001@datalab-1 Experiment4]$ ./a.out
Enter the password: 153
Login Failed!! Please Try again...
Enter the password: 1254
Login Failed!! Please Try again...
Enter the password: 156
Login Failed!! Please Try again...
Enter the password: 1234
Login Successful
[urk20cs2001@datalab-1 Experiment4]$
```

## 6)Aim:

To write a C Program to develop a basic arithmetic calculator with options.

## Algorithm:

**Step1:** Start

**Step2:** Include the required header files.

**Step3:** Declare the variables a, b, c, d, e, z=y.

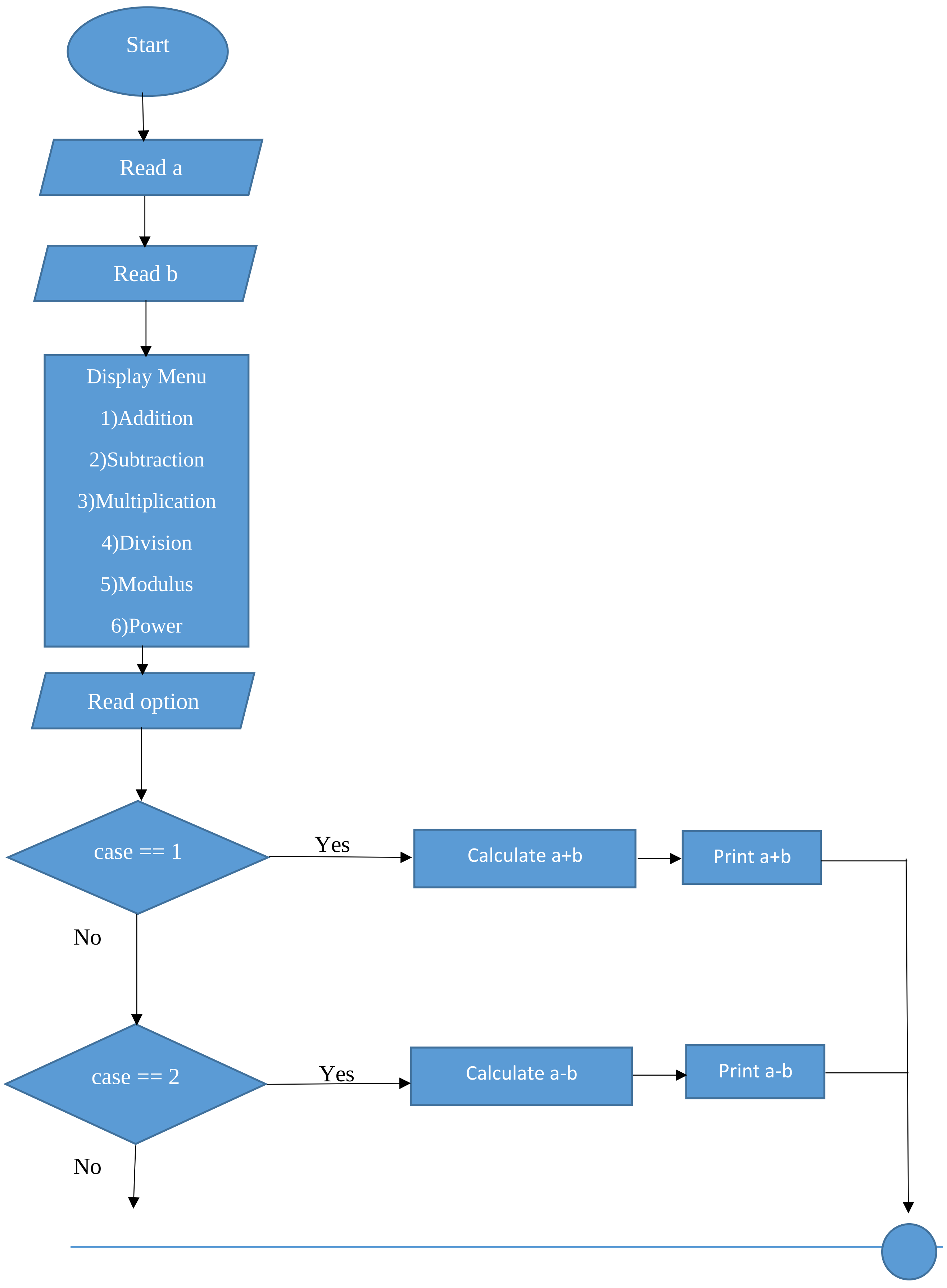
**Step4:** Get the values from the user.

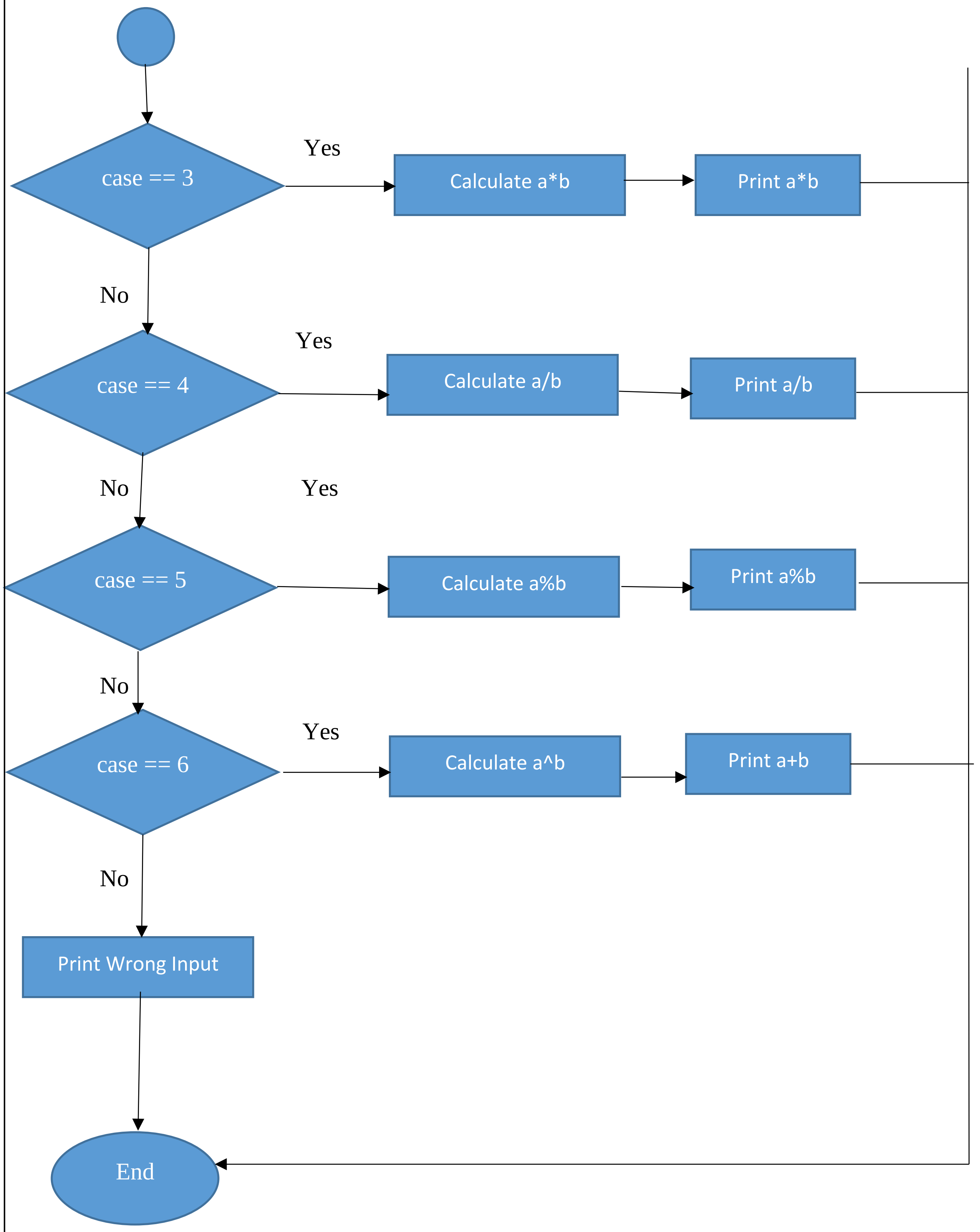
**Step5:** calculating using switch case statement and while loop.

**Step6:** Print the result.

**Step7:** End.

**Flowchart:**


Start
Read a
Read b
Display Menu
1)Addition
2)Subtraction
3)Multiplication
4)Division
5)Modulus
6)Power
Read option
case == 1
Yes
Calculate a+b
Print a+b
No
case == 2
Yes
Calculate a-b
Print a-b
No


case == 3
Yes
Calculate a*b
Print a*b
No
case == 4
Yes
Calculate a/b
Print a/b
No
case == 5
Yes
Calculate a%b
Print a%b
No
case == 6
Yes
Calculate a^b
Print a+b
No
Print Wrong Input
End

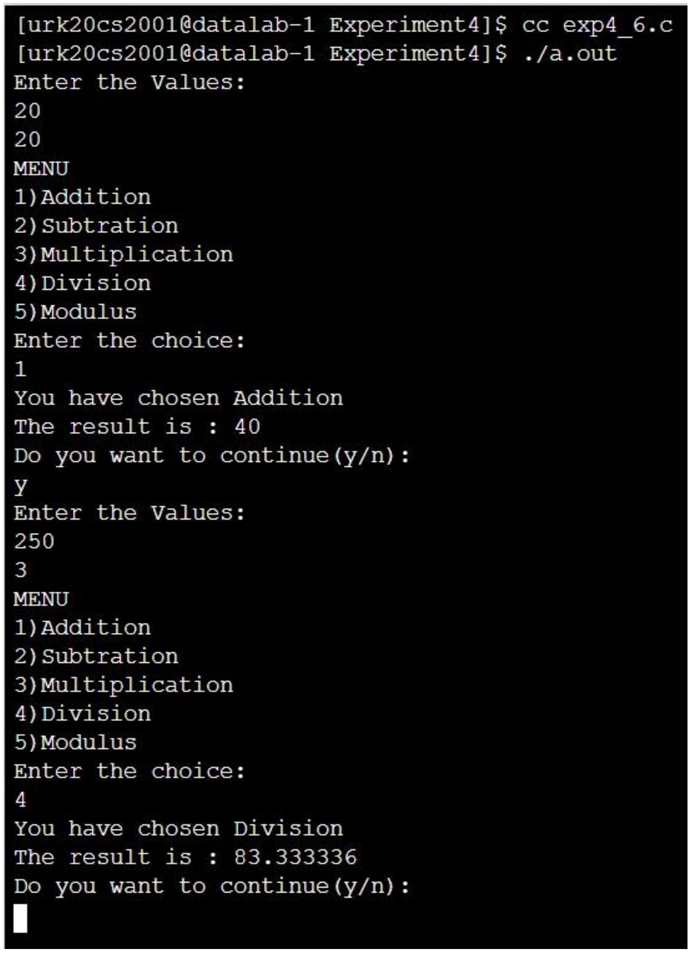
**Program:**

```
#include<stdio.h>
void main() {
int a,b,c,d;
float e;     char
z='y';     do
   {
       printf("Enter the Values:\n");
scanf(" %d%d",&a,&b);

       printf("MENU\n");
printf("1)Addition\n");
printf("2)Subtration\n");
printf("3)Multiplication\n");
printf("4)Division\n");
printf("5)Modulus\n");
printf("6)Power\n");

       printf("Enter the choice:\n");
scanf(" %d",&d);

       switch(d)
             {
case 1:
                  printf("You have chosen Addition\n");
c=a+b;
                  printf("The result is : %d \n",c);
                  break;

case 2:
                  printf("You have chosen Subtraction \n");

c=a-b;
```

```
                printf("The result is : %d \n",c);
break;

case 3:
                printf("You have chosen Multiplication\n");
c=a*b;
                printf("The result is : %d \n",c);
break;

case 4:
               printf("You have chosen Division\n");
e=(float) a/b;                  printf("The result is : %f
\n",e);                break;                         case
5:
              printf("You have chosen Modulus\n");
c=a%b;
              printf("The result is : %d \n",c);
break;

           case 6:
              printf("You have chosen Power\n");
c=a^b;

              printf("The result is : %d \n",c);
break;



default:
              printf("WRONG CHOICE....!! \n");

       }
       printf("Do you want to continue(y/n):\n");
scanf(" %c",&z);
```

```
    }while( z=='y' || z=='Y');
switch(d);
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment4]$ cc exp4_6.c
[urk20cs2001@datalab-1 Experiment4]$ ./a.out
Enter the Values:
20
20
MENU
1)Addition
2)Subtration
3)Multiplication
4)Division
5)Modulus
Enter the choice:
1
You have chosen Addition
The result is : 40
Do you want to continue(y/n):
y
Enter the Values:
250
3
MENU
1)Addition
2)Subtration
3)Multiplication
4)Division
5)Modulus
Enter the choice:
4
You have chosen Division
The result is : 83.333336
Do you want to continue(y/n):
█
```

**Result:**

Thus the program for experimenting Usage of conditional statement in C Programming are coded, compiled and executed successfully.

| | |
|---|---|
| **Exp no: 5** | **Usage of Arrays** |
| **Date: 10-11-2020** | |

**1)Aim:**

To write a C program to get 10 numbers from the user and find the largest and smallest number of the array and print it's index value.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables a[10], i, minimum, index1, maximum, index2.

**Step4:** Calculating the values of array.

**Step5:** Print the results.

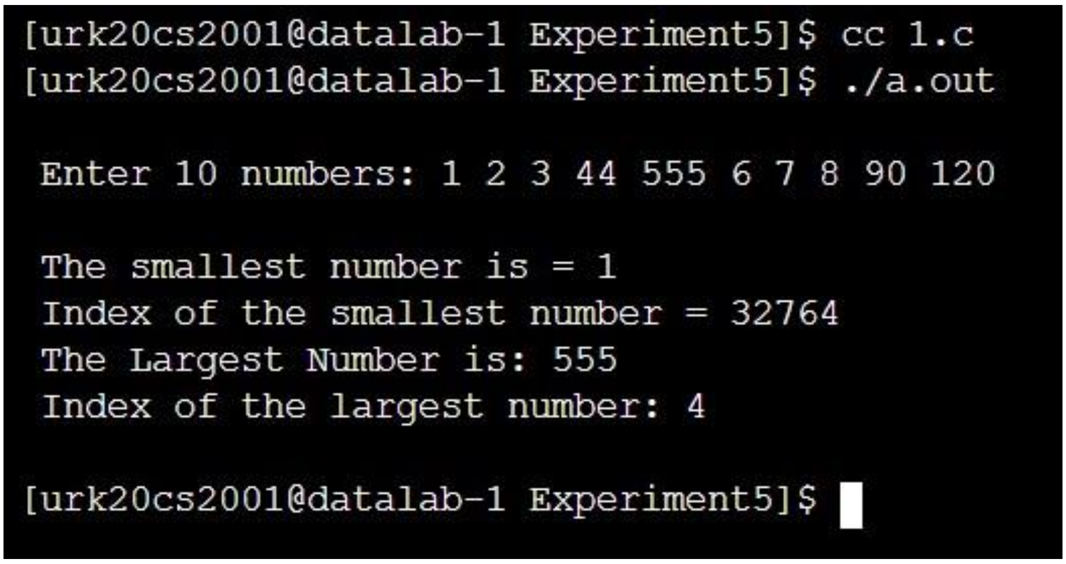
**Step6:** End.

## Program:

```
#include<stdio.h>  int main() {     int a[10], i,
minimum, index1, maximum, index2;     printf("\n
Enter 10 numbers: ");     for(i=0; i<10; i++)
   {        scanf("%d",
&a[i]);
   }

   minimum = a[0];
maximum = a[0];

   for(i=0; i<10; i++)
   {
       if(minimum > a[i])
```

```
        {
            minimum = a[i];
index1 = i;
        }
        if(maximum < a[i])
        {
            maximum = a[i];
index2 = i;
        }
    }

    printf("\n The smallest number is = %d", minimum);
printf("\n Index of the smallest number = %d", index1);
printf("\n The Largest Number is: %d", maximum);      printf("\n
Index of the largest number: %d\n\n", index2);     return 0;
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment5]$ cc 1.c
[urk20cs2001@datalab-1 Experiment5]$ ./a.out

 Enter 10 numbers: 1 2 3 44 555 6 7 8 90 120

 The smallest number is = 1
 Index of the smallest number = 32764
 The Largest Number is: 555
 Index of the largest number: 4

[urk20cs2001@datalab-1 Experiment5]$
```

## 2)Aim:

To write a C program to find their union and intersection for the given arrays.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables a[100], b[100], c[100], an, bn, s, i, j.

**Step4:** Calculating the Union and Intersection for the two given arrays.

**Step5:** Print the results.

**Step6:** End.

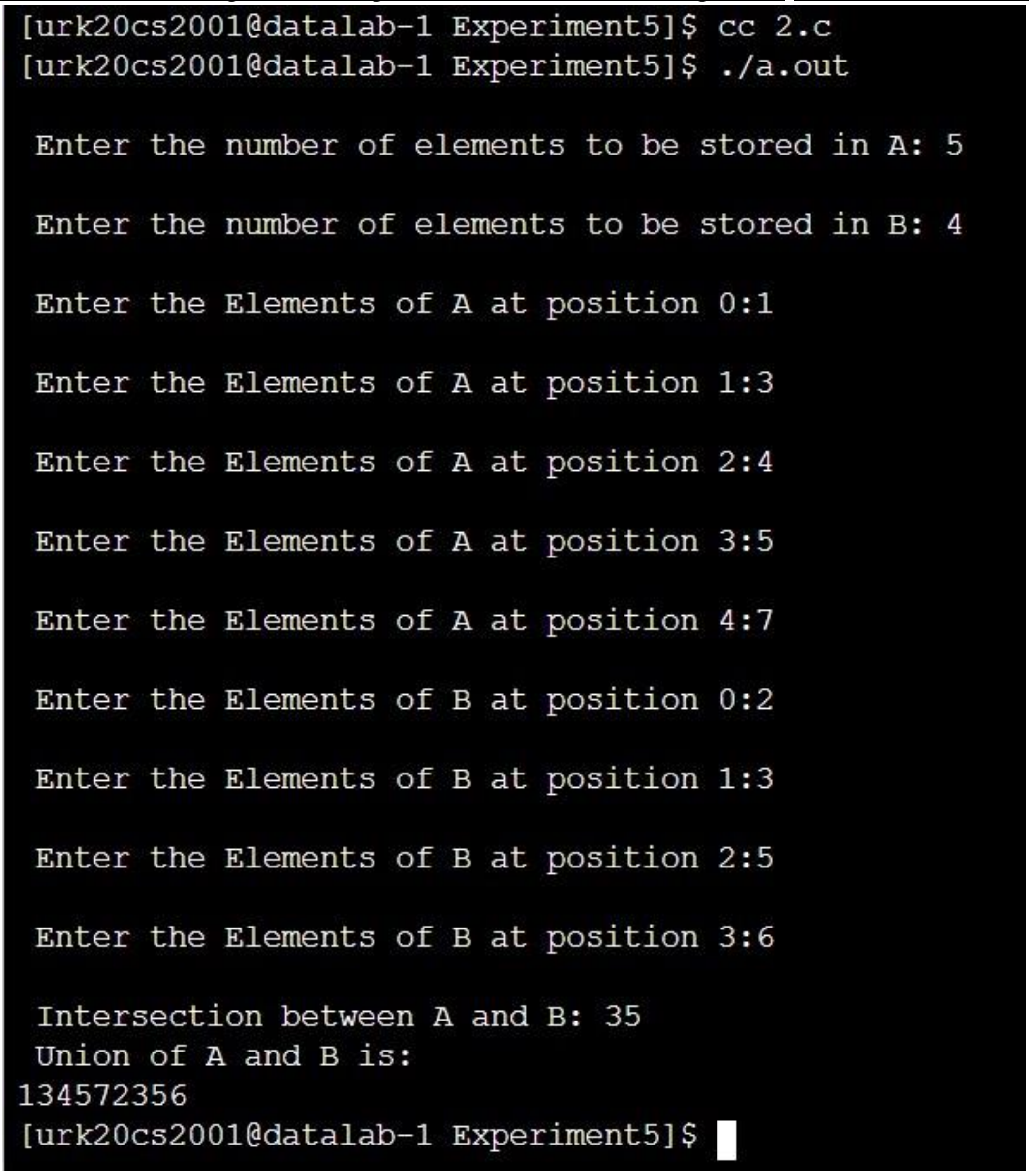
## Program:

```
#include<stdio.h> void

main()
```

```
{     int a[100], b[100], c[100], an, bn, s, i, j;     printf("\n Enter

the number of elements to be stored in A: ");     scanf("%d",

&an);     printf("\n Enter the number of elements to be stored

in B: ");     scanf("%d", &bn);



   for(i=0;i<an;i++)

   {

       printf("\n Enter the Elements of A at position %d:", i);

scanf("%d", &a[i]);

   }

   for(j=0;j<bn;j++)

   {

       printf("\n Enter the Elements of B at position %d:", j);

scanf("%d", &b[j]);

   }



   printf("\n Intersection between A and B: ");

for(i=0;i<an;i++)

   {

for(j=0;j<bn;j++)

       {            if(a[i]==b[j])

printf("%d", a[i]);

       }

   }



   printf("\n Union of A and B is: \n");

i=an;     s=an+bn;
```

```
   for(i=an,j=0;i<s;i++,j++)

   {

a[i]=b[j];     }


   for(i=0;i<s;i++)

   {         printf("%d",

a[i]);

   }


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

**Output:**



```
[urk20cs2001@datalab-1 Experiment5]$ cc 2.c
[urk20cs2001@datalab-1 Experiment5]$ ./a.out

 Enter the number of elements to be stored in A: 5

 Enter the number of elements to be stored in B: 4

 Enter the Elements of A at position 0:1

 Enter the Elements of A at position 1:3

 Enter the Elements of A at position 2:4

 Enter the Elements of A at position 3:5

 Enter the Elements of A at position 4:7

 Enter the Elements of B at position 0:2

 Enter the Elements of B at position 1:3

 Enter the Elements of B at position 2:5

 Enter the Elements of B at position 3:6

 Intersection between A and B: 35
 Union of A and B is:
134572356
[urk20cs2001@datalab-1 Experiment5]$
```

**3)Aim:**

To write a C program to perform two dimensional array operations and perform the matrices to be added, subtraction and multiplication and perform the operations for two matrices.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables a[10][10], b[10][10], i, j, m, n, p, q;

**Step4:** Calculating the arithmetic operations of addition, subtraction, multiplication with the two matrices.

**Step5:** End.

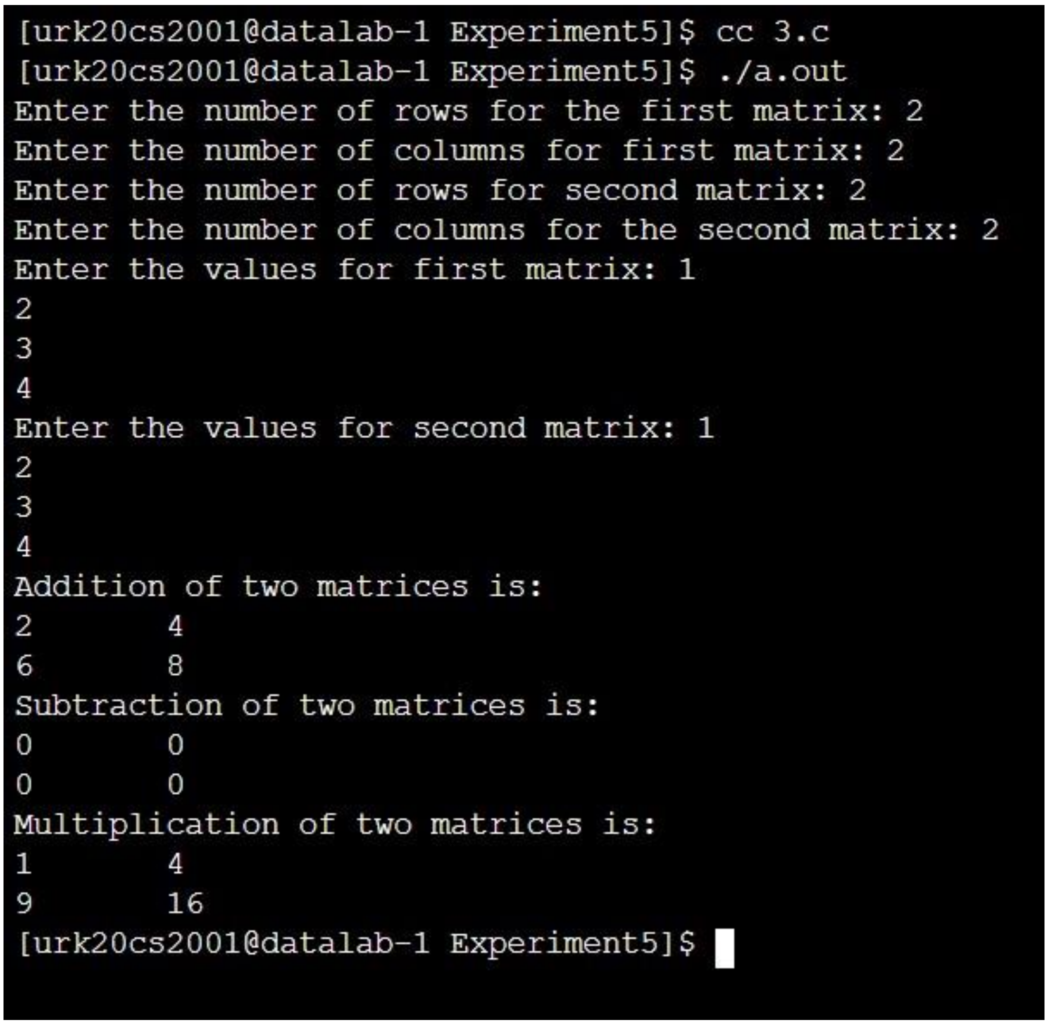
## Program:

```
#include<stdio.h>  int main() {     int a[10][10], b[10][10],

i, j, m, n, p, q;     printf("Enter the number of rows for the

first matrix: ");     scanf("%d", &m);     printf("Enter the

number of columns for first matrix: ");     scanf("%d",

&n);

    printf("Enter the number of rows for second matrix: ");

scanf("%d", &p);     printf("Enter the number of columns for the

second matrix: ");     scanf("%d", &q);


    if((m==p)&&(n==p))

    {        printf("Enter the values for first

matrix: ");        for(i=0;i<m;i++)

        {

for(j=0;j<n;j++)
```

```
           {               scanf("%d",
&a[i][j]);
           }
       }


       printf("Enter the values for second matrix: ");
for(i=0;i<p;i++)
       {
for(j=0;j<q;j++)
           {
              scanf("%d", &b[i][j]);
           }
       }

       printf("Addition of two matrices is: \n");
for(i=0;i<m;i++)
       {
for(j=0;j<n;j++)
           {               printf("%d\t",
a[i][j]+b[i][j]);
           }
printf("\n");
       }


       printf("Subtraction of two matrices is: \n");
for(i=0;i<m;i++)
       {

for(j=0;j<n;j++)
```

```
            {               printf("%d\t",
a[i][j]-b[i][j]);
            }
printf("\n");
        }
    }


else


    {
        printf("Matrix addition and subtraction are impossibe.\n");     }     if(n==p)
    {        printf("Multiplication of two matrices is:
\n");         for(i=0;i<m;i++)
        {
for(j=0;j<n;j++)
            {               printf("%d\t",
a[i][j]*b[i][j]);
            }
printf("\n");
        }
}
else
    {
        printf("Matrix multiplication is impossible!!\n");
    }
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment5]$ cc 3.c
[urk20cs2001@datalab-1 Experiment5]$ ./a.out
Enter the number of rows for the first matrix: 2
Enter the number of columns for first matrix: 2
Enter the number of rows for second matrix: 2
Enter the number of columns for the second matrix: 2
Enter the values for first matrix: 1
2
3
4
Enter the values for second matrix: 1
2
3
4
Addition of two matrices is:
2       4
6       8
Subtraction of two matrices is:
0       0
0       0
Multiplication of two matrices is:
1       4
9       16
[urk20cs2001@datalab-1 Experiment5]$
```

## 4)Aim:

To write a C program to implement a Bubble sort.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables array[100], swap, n, i, j.

**Step4:** Calculating the array using bubble sort.

**Step5:** Print the results.

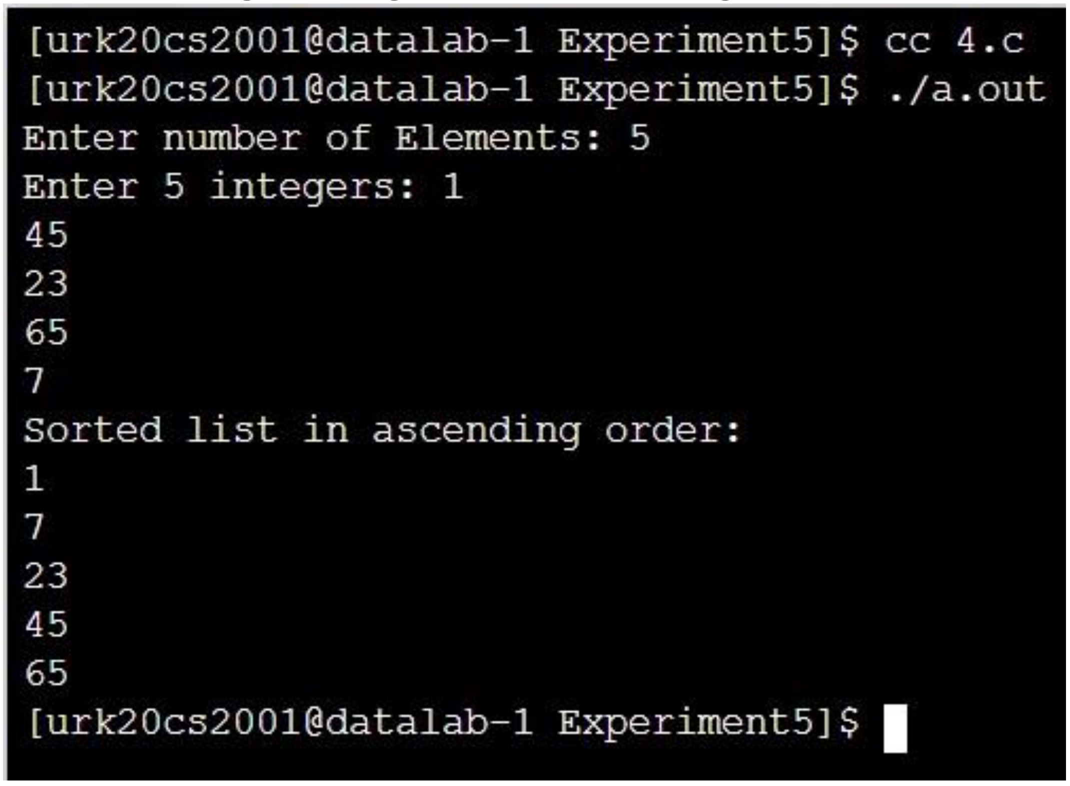
**Step6:** End.

## Program:

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

{    int array[100], swap, n, i,

j;


   printf("Enter number of Elements: ");

scanf("%d", &n);

   printf("Enter %d integers: ", n);


   for(i=0;i<n;i++)

scanf("%d", &array[i]);
```

```
   for(i=0;i<n-1;i++)
   {        for(j=0;j<n-i-
1;j++)
      {
if(array[j]>array[j+1])
         {              swap =
array[j];              array[j] =
array[j+1];
array[j+1] = swap;
         }
      }
   }

   printf("Sorted list in ascending order: \n");
for(i=0;i<n;i++)       printf("%d\n",
array[i]);     return 0;
}
```

## Output:



```
[urk20cs2001@datalab-1 Experiment5]$ cc 4.c
[urk20cs2001@datalab-1 Experiment5]$ ./a.out
Enter number of Elements: 5
Enter 5 integers: 1
45
23
65
7
Sorted list in ascending order:
1
7
23
45
65
[urk20cs2001@datalab-1 Experiment5]$
```

**Result:**

Thus the program for experimenting Usage of arrays in C programming are coded, compiled and executed successfully.

| | |
|---|---|
| **Exp no: 6** | **String Operations** |
| **Date: 17-11-2020** | |

**1)Aim:**

To write a C program to show the usage of string library functions.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables len, comp, char.

**Step4:** calculating the output by using the string functions.

**Step5:** Print the result.

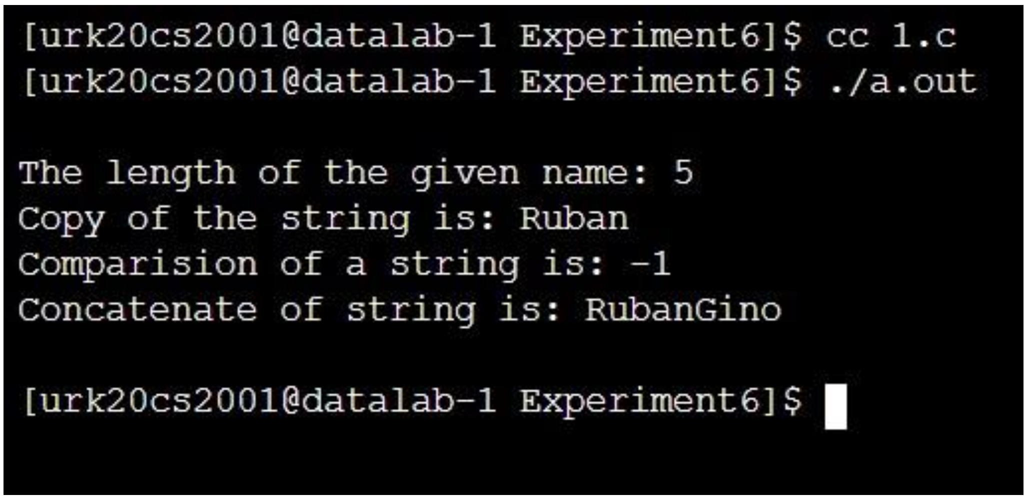
**Step6:** End.

## Program:

```
#include<stdio.h>
#include<string.h>
int main() {
   int len, comp;     char
name1[50] = "Ruban";     char
name2[50] = "Gino";     char
name3[50] = "Singh";     char
name4[50];


   len = strlen(name1);


   printf("\nThe length of the given name: %d \n", len);
printf("Copy of the string is: ");     strcpy(name4,
name1);     printf("%s\n", &name4);


   printf("Comparision of a string is: ");
comp = strcmp(name1, name3);
```

```
   printf("%d \n", comp);
printf("Concatenate of string is: ");
strcat(name1, name2);     printf("%s\n\n",
name1);
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment6]$ cc 1.c
[urk20cs2001@datalab-1 Experiment6]$ ./a.out

The length of the given name: 5
Copy of the string is: Ruban
Comparision of a string is: -1
Concatenate of string is: RubanGino

[urk20cs2001@datalab-1 Experiment6]$
```

**2)Aim:**

To write a C program to get a string input from the user and check if its palindrome.

**Algorithm:**

**Step1:** Start.

**Step2:** Include the required header files

**Step3:** Declare the variables char str1[20], int i, length, flag=0.

**Step4:** Get the string input from the user.

**Step5:** Calculating the result.

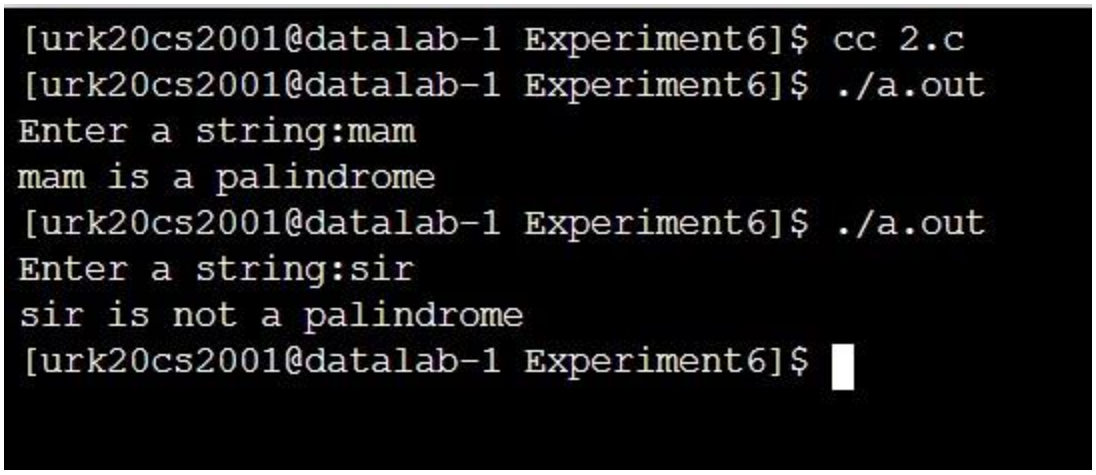
**Step6:** Print the output.

**Step7:** End.

## Program:

```
#include <stdio.h>
#include <string.h>

int main(){
char str1[20];
int i, length;
int flag = 0;

   printf("Enter a string:");
scanf("%s", str1);


   length = strlen(str1);

   for(i=0;i < length ;i++)
   {
      if(str1[i] != str1[length-i-1])
      {
flag = 1;
break;
      }
   }
    if
(flag)
   {
      printf("%s is not a palindrome\n", str1);
   }
else
   {
        printf("%s is a palindrome\n", str1);

    }

return 0;

}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment6]$ cc 2.c
[urk20cs2001@datalab-1 Experiment6]$ ./a.out
Enter a string:mam
mam is a palindrome
[urk20cs2001@datalab-1 Experiment6]$ ./a.out
Enter a string:sir
sir is not a palindrome
[urk20cs2001@datalab-1 Experiment6]$
```

## 3)Aim:

To write a C program to create a login application.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables char username[20], password[20].

**Step4:** Get the username and password from the user.

**Step5:** Calculating the program with If else condition.

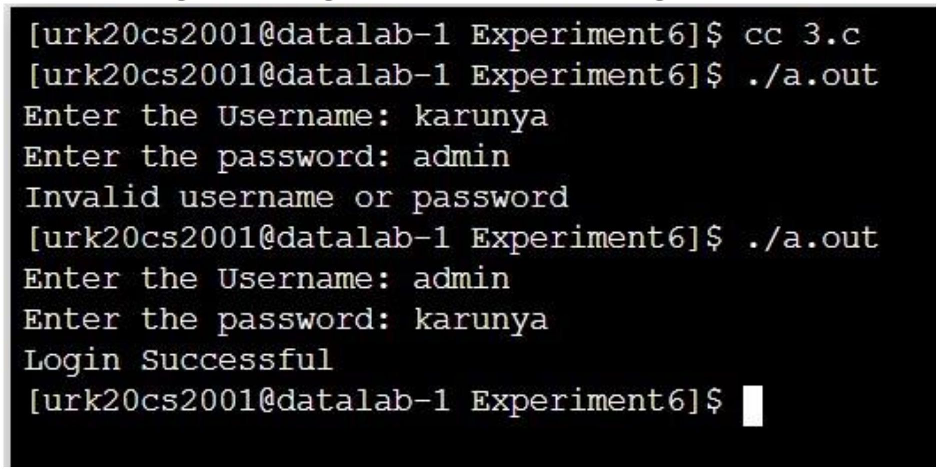
**Step6:** Print the result.

**Step7:** End.

## Program:

```
#include<stdio.h>
#include<string.h>
int main() {
   char username[20];
char password[20];

   printf("Enter      the      Username:      ");
scanf("%s", &username);      printf("Enter
the   password:   ");              scanf("%s",
&password);


   if(strcmp(username, "admin")==0)
   {
      if(strcmp(password, "karunya")==0)
      {
         printf("Login Successful \n");
      }
else
      {
         printf("Wrong password\n");
      }
}
else
   {
      printf("Invalid username or password\n");
   }
return 0;
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment6]$ cc 3.c
[urk20cs2001@datalab-1 Experiment6]$ ./a.out
Enter the Username: karunya
Enter the password: admin
Invalid username or password
[urk20cs2001@datalab-1 Experiment6]$ ./a.out
Enter the Username: admin
Enter the password: karunya
Login Successful
[urk20cs2001@datalab-1 Experiment6]$
```

## 4)Aim:

To write a C program to get full name as input from the user and Identify the vowels in the full name and change it to uppercase.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables char str1[100], int i.

**Step4:** Get the Name as an input.

**Step5:** Checking the while condition.

**Step6:** Print the result.

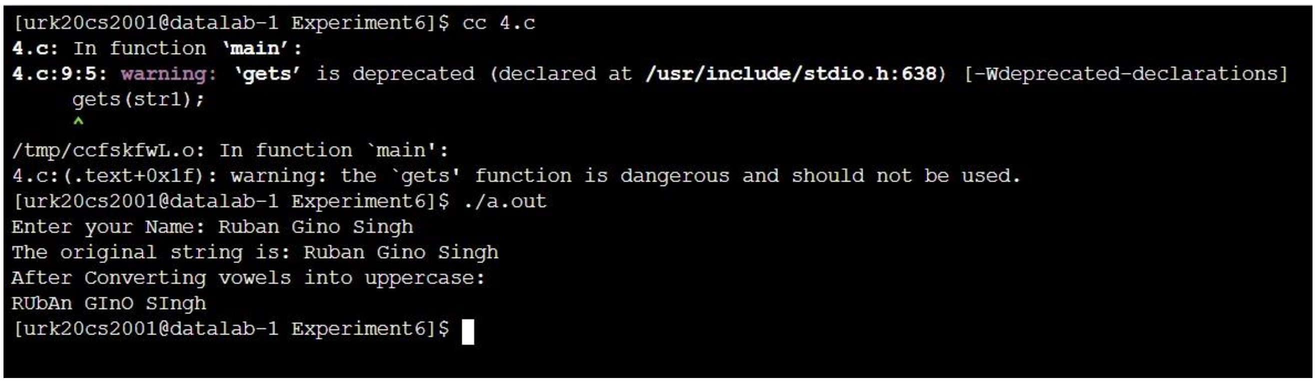
**Step7:** End.

## Program:

```
#include<stdio.h>
int main() {
    char str1[100];
int i;

    printf("Enter your Name: ");
gets(str1);
```

```
    printf("The original string is: ");
    puts(str1);

    i=0;

    while(str1[i]!='\0')
    {
        if(str1[i]=='a' || str1[i]=='e' || str1[i]=='i' || str1[i]=='o' || str1[i]=='u')
            str1[i]=str1[i]-32;
        i++;
    }

    printf("After Converting vowels into uppercase: \n");
    puts(str1);
}
```

## Output:



```
[urk20cs2001@datalab-1 Experiment6]$ cc 4.c
4.c: In function 'main':
4.c:9:5: warning: 'gets' is deprecated (declared at /usr/include/stdio.h:638) [-Wdeprecated-declarations]
     gets(str1);
     ^
/tmp/ccfskfwL.o: In function `main':
4.c:(.text+0x1f): warning: the `gets' function is dangerous and should not be used.
[urk20cs2001@datalab-1 Experiment6]$ ./a.out
Enter your Name: Ruban Gino Singh
The original string is: Ruban Gino Singh
After Converting vowels into uppercase:
RUbAn GInO SIngh
[urk20cs2001@datalab-1 Experiment6]$
```

## Result:

Thus the program for experimenting String operators in C programming are coded, compiled and executed successfully.

| Exp No: 7 | User Defined Functions |
|---|---|
| Date: 24-11-2020 | |

## Programs:

## 1)Aim:

To Write a C program to create a user defined function that accepts seconds as input. And display the time in hh:mm:ss format.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables sec.

**Step4:** Get the input from the user.

**Step5:** Convert the seconds to hh:mm:ss format.

**Step6:** Print the results.

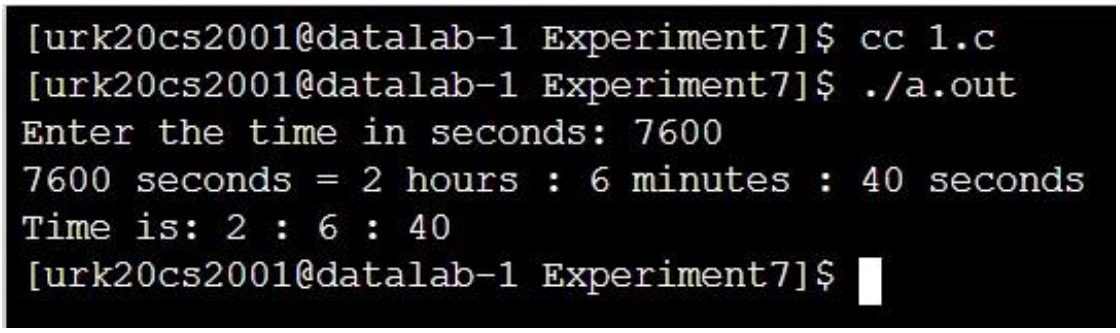
**Step7:** End.

## Programs:

```
 #include<stdio.h>
#include<math.h>
int time(int); int
main()
{     int
sec;
```

```
    printf("Enter the time in seconds: ");
scanf("%d", &sec);


    time(sec);
return(0);
}


int time(int sec)
{
    int hh, mm, ss;     hh = sec /
3600;     mm = (sec - hh * 3600) /
60;     ss = sec - hh * 3600 - mm *
60;


    printf("%d seconds = %d hours : %d minutes : %d seconds\n", sec, hh, mm, ss);
printf("Time is: %d : %d : %d\n", hh, mm, ss);
}
```

## Output:



```
[urk20cs2001@datalab-1 Experiment7]$ cc 1.c
[urk20cs2001@datalab-1 Experiment7]$ ./a.out
Enter the time in seconds: 7600
7600 seconds = 2 hours : 6 minutes : 40 seconds
Time is: 2 : 6 : 40
[urk20cs2001@datalab-1 Experiment7]$
```

## 2)Aim:

To write a C program to Create a user defined function that accepts a decimal number as an input and prints the binary equivalent of the number.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables n, i, a[10].

**Step4**: Get the integer input from the user.

**Step5:** Convert the decimal number to a Binary number.

**Step6:** Print the results.

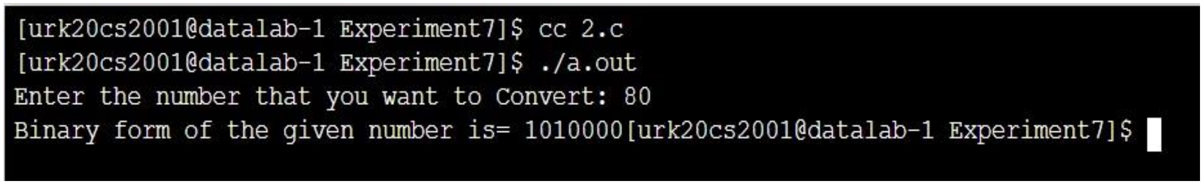
**Step7:** End.

## Program:

```
#include<stdio.h>
#include<stdlib.h>
int binary(int); int
main() {
   int n,i,a[10]; printf("Enter the number that you want
   to Convert: "); scanf("%d", &n);


   binary(n);
return(0);
}

int binary(int n)
{
   int a[10],i;
for(i=0;n>0;i++)
   {
a[i]=n%2;
n=n/2;
```

```
   }
   printf("Binary form of the given number is= ");     for(i=i-
1;i>=0;i--)
   {
       printf("%d", a[i]);
   }
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment7]$ cc 2.c
[urk20cs2001@datalab-1 Experiment7]$ ./a.out
Enter the number that you want to Convert: 80
Binary form of the given number is= 1010000[urk20cs2001@datalab-1 Experiment7]$
```

**3)Aim:**

To Write a C program to create a user defined function that accepts a string as input and returns the number of vowels and consonants in the string.

**Algorithm:**

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables vowels=0, consonants=0, i.

**Step4:** Get the string input from the user.

**Step5:** Returning the no of vowels and consonants in the giver string.

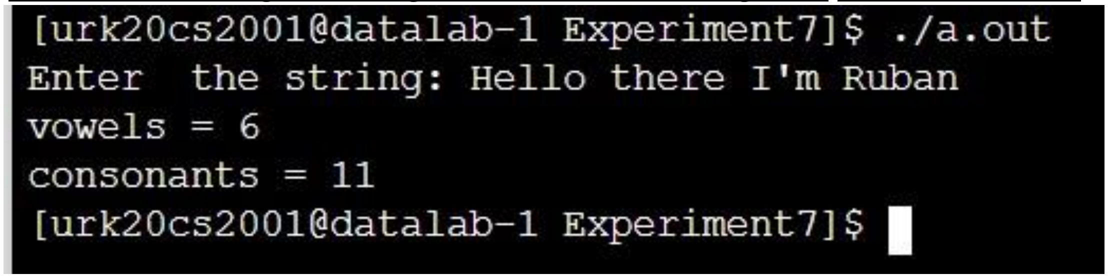
**Step6:** Print the Results.

**Step7:** End.

## Program:

```
#include<string.h> void
stringcount(char*s)
{
   int vowels=0, consonants=0, i;

   for(i=0;s[i];i++)
   {
   if((s[i]>=65 && s[i]<=90)|| (s[i]>=97 && s[i]<=122))
   {           if(s[i]=='a'||
s[i]=='e'||s[i]=='i'||s[i]=='o'||s[i]=='u')      vowels++;
         else
consonants++;
      }
 }
   printf("vowels = %d\n",vowels);
printf("consonants = %d\n",consonants);
} int
main() {
   char s[1000];
printf("Enter  the string: ");
gets(s);        stringcount(s);
 }
```

## Output:



```
[urk20cs2001@datalab-1 Experiment7]$ ./a.out
Enter  the string: Hello there I'm Ruban
vowels = 6
consonants = 11
[urk20cs2001@datalab-1 Experiment7]$
```

## 4)Aim:

To write a C program to create a functions that accepts a float array as input and returns the maximum value of the array.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables int i, n and float arr[100].

**Step4:** Get the number of elements from the user.

**Step5:** Return the maximum of the array.

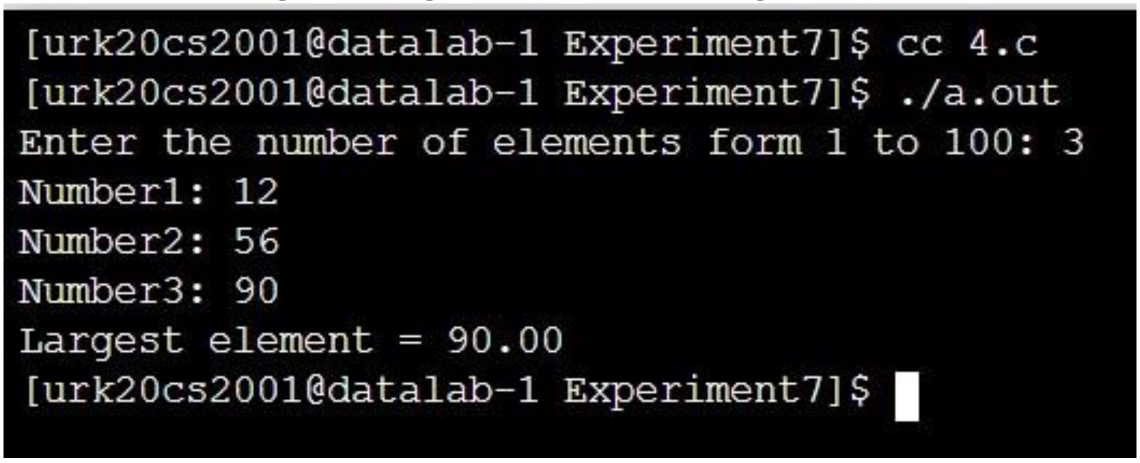
**Step6:** Print the results.

**Step7:** End.

## Program:

```
#include<stdio.h>
int maximum(int);
int main() {
   int n, i;
float arr[100];

    printf("Enter the number of elements form 1 to 100: ");
    scanf("%d", &n);
    maximum(n);
    return 0;
}
int maximum(int n)
{
   int i;    float
arr[100];
for(i=0;i<n;++i)
   {
       printf("Number%d: ", i+1);
scanf("%f", &arr[i]);
   }
   for(i=1;i<n;++i)
   {
       if(arr[0]<arr[i])
arr[0] = arr[i];
   }
   printf("Largest element = %.2f\n", arr[0]);
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment7]$ cc 4.c
[urk20cs2001@datalab-1 Experiment7]$ ./a.out
Enter the number of elements form 1 to 100: 3
Number1: 12
Number2: 56
Number3: 90
Largest element = 90.00
[urk20cs2001@datalab-1 Experiment7]$ 
```

## 5)Aim:

To write a C program to print the Fibonacci series up to a given range by using recursive functions.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables int n, m=0, i.

**Step4:** Get the total terms from the user.

**Step5:** Calculating the Fibonacci series.

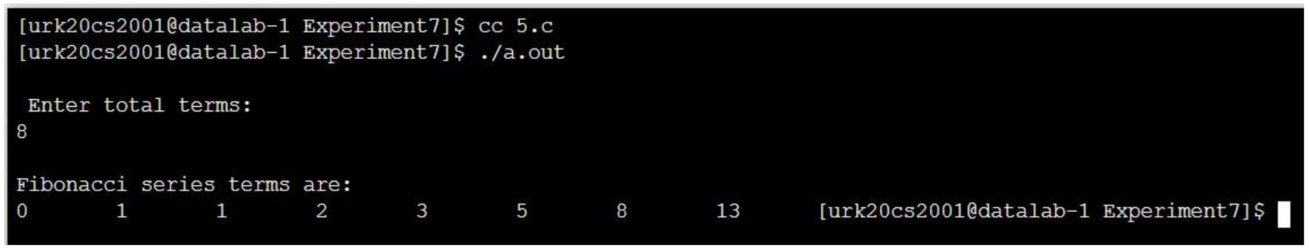
**Step6:** Print the results.

**Step7:** End.

## Program:

```
#include<stdio.h>
int fibonacci(int);
int main() {
   int n, m=0, i;
   printf("\n    Enter    total    terms:    \n");
   scanf("%d",   &n);   printf("\nFibonacci
   series terms are:\n"); for(i = 1; i <= n;
   i++)
   {        printf("%d\t",
fibonacci(m));        m++;
   }
return 0;
}
int fibonacci(int n)
{
   if(n==0 || n==1)
return n;    else
      return(fibonacci(n-1) + fibonacci(n-2));
}
```

## Output:



```
[urk20cs2001@datalab-1 Experiment7]$ cc 5.c
[urk20cs2001@datalab-1 Experiment7]$ ./a.out

 Enter total terms:
8

Fibonacci series terms are:
0       1       1       2       3       5       8       13      [urk20cs2001@datalab-1 Experiment7]$
```

## Result:

Thus the program for experimenting the user defined functions in C programming are coded, compiled and executed successfully.

| Exp no: 8 | |
|---|---|

| **Date: 1-12-2020** | **Usage of Pointers** |
|---|---|

## 1)Aim:

To write a C program to swap two numbers using pass by value and pass by reference method.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables int temp inside the function void swap.

**Step4:** Get the input as a numbers from the user.

**Step5:** Pass the value inside the functions void swap to calculate the program.

**Step6:** Print the results.

**Step7:** End.

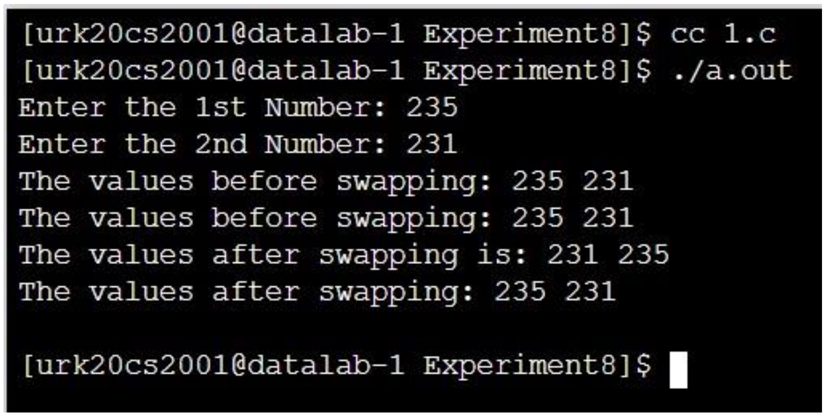
## Program:

```
#include<stdio.h>

void swap(int number1, int number2)
```

```
{ int temp;
   printf("T
   he
   values
   before
   swappin
   g: %d
   %d \n",
   number1
   ,
   number2
   ); temp
   =
   number1
   ;
   number1
   =
   number2
   ;
   number2 = temp;
   printf("The values after swapping is: %d %d \n", number1, number2);
}

int main() {
   int num1, num2;     printf("Enter
the 1st Number: ");     scanf("%d",
&num1);
```

```
    printf("Enter the 2nd Number: ");
scanf("%d", &num2);


    printf("The values before swapping: %d %d \n", num1, num2);
swap(num1, num2);
    printf("The values after swapping: %d %d \n \n", num1, num2);


    return 0;
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment8]$ cc 1.c
[urk20cs2001@datalab-1 Experiment8]$ ./a.out
Enter the 1st Number: 235
Enter the 2nd Number: 231
The values before swapping: 235 231
The values before swapping: 235 231
The values after swapping is: 231 235
The values after swapping: 235 231

[urk20cs2001@datalab-1 Experiment8]$ 
```

## 2)Aim:

To write a C program to pass an array in a function. Search and replace the element with 0 inside the function. Print the array before function call and after function call.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables arr[5], I, number. int *arr, int number inside the function.

**Step4:** Get the input from the user.

**Step5:** Passing the array inside of the function to get the required result.

**Step6:** Print the result.

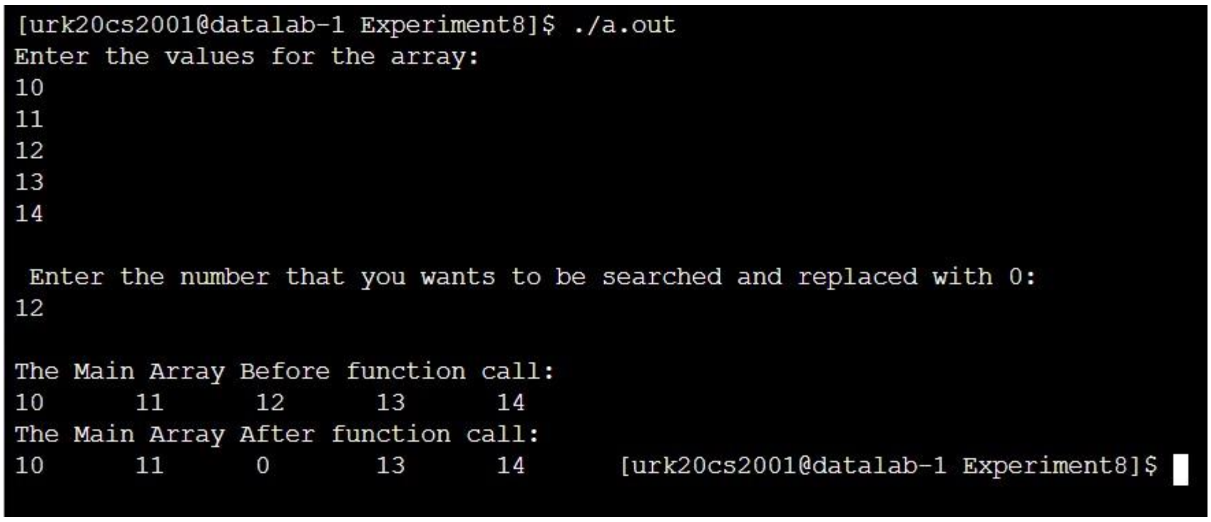
**Step7:** End.

## Program:

```
#include<stdio.h>
int main() {
   int arr[5], i, number;
```

```
    printf("Enter the values for the array: \n");
for(i=0; i<5; i++)
    {
        scanf("%d", &arr[i]);
    }
    printf("\n Enter the number that you wants to be searched and replaced with 0: \n");
scanf("%d", &number);

    printf("\nThe Main Array Before function call: \n");
for(i=0; i<5; i++)
    {
        printf("%d\t", arr[i]);
    }
    search(arr, number);

    printf("\nThe Main Array After function call: \n");
for(i=0; i<5; i++)
    {
        printf("%d\t", arr[i]);
    }
}

void search(int *arr, int number)
{
    int i;
    for(i=0; i<5; i++)
    {
        if(*arr == number)
*arr = 0;         arr++;
    }

}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment8]$ ./a.out
Enter the values for the array:
10
11
12
13
14

 Enter the number that you wants to be searched and replaced with 0:
12

The Main Array Before function call:
10      11      12      13      14
The Main Array After function call:
10      11      0       13      14      [urk20cs2001@datalab-1 Experiment8]$
```

**3)Aim:**

To write a C program to pass a character array in a function. Convert the character array to uppercase inside the function. And print the array before function call and after function call.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variales int i and char str[10].

**Step4:** Get the input string from the user.

**Step5:** Passing the character array in a function converting the character array to uppercase inside the function.

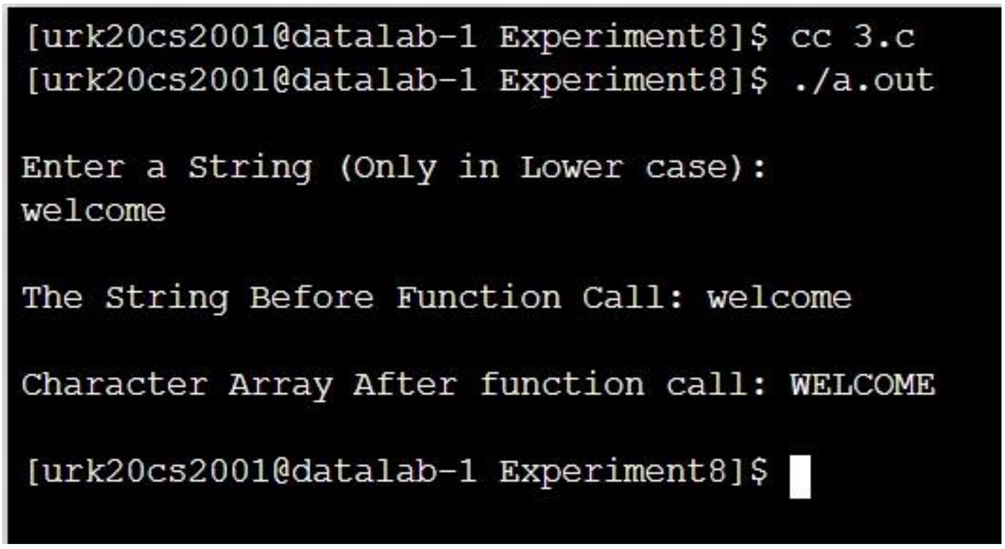
**Step6:** Print the results.

**Step7:** End.

## Program:

```
#include<stdio.h>
#include<string.h> void
convert(char *str)
{
   int i;

   while(*str != '\0')
   {
      *str = toupper(*str);
str++;
   }
}

int main()
{
   int i;
char str[10];


   printf("\nEnter a String (Only in Lower case): \n");
scanf("%s", &str);
   printf("\nThe String Before Function Call: %s\n", str);


   convert(str);


   printf("\nCharacter Array After function call: %s\n\n", str); }
```

## Output:



```
[urk20cs2001@datalab-1 Experiment8]$ cc 3.c
[urk20cs2001@datalab-1 Experiment8]$ ./a.out

Enter a String (Only in Lower case):
welcome

The String Before Function Call: welcome

Character Array After function call: WELCOME

[urk20cs2001@datalab-1 Experiment8]$
```

## 4)Aim:

To write a C program to store an array using pointer as an argument and dynamic memory allocation.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables int *ptr, n, i.

**Step4:** Get the array size as an input from the user.

**Step5:** sorting the array using pointer.

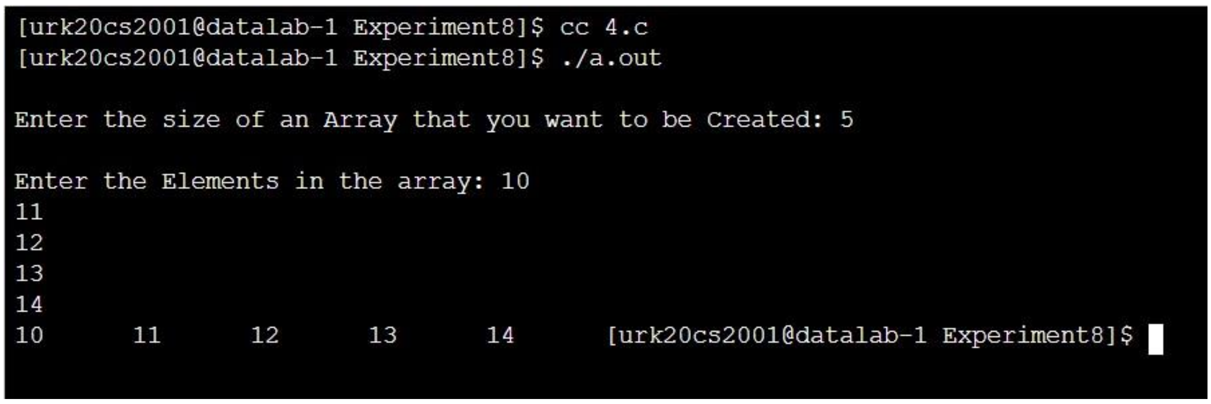
**Step6:** Print the results.

**Step7:** End.

## Program:

```
#include<stdio.h>
#include<stdlib.h>

void sorting(int n, int *ptr)
{
    int i, j, t;

    for(i=0; i<n; i++)
    {
        for(j=i+1; j<n; j++)
        {
            if(*(ptr+j) < *(ptr + i))
            {
                t = *(ptr + i);
                *(ptr + i) = *(ptr + j);
                *(ptr + j) = t;
            }
        }
    }
}

int main()
{       int
*ptr;
int n, i;


   printf("\nEnter the size of an Array that you want to be Created: ");
scanf("%d", &n);


   ptr = (int*)malloc(n*sizeof(int));
if(ptr == NULL)
   {
      printf("Memory Not Allocated. \n");
exit(0);    }    else
   {
      printf("\nEnter the Elements in the array: ");
      for(i=0; i<n; i++)
      {
         scanf("%d", &ptr[i]);
      }
}
   sorting(n, ptr);    for(i=0;
i<n; i++)       printf("%d\t",
*(ptr + i));    return 0;
}
```

## Output:



```
[urk20cs2001@datalab-1 Experiment8]$ cc 4.c
[urk20cs2001@datalab-1 Experiment8]$ ./a.out

Enter the size of an Array that you want to be Created: 5

Enter the Elements in the array: 10
11
12
13
14
10      11      12      13      14      [urk20cs2001@datalab-1 Experiment8]$
```

## Result:

Thus the program for experimenting Usage of Pointer in C programming are coded, compiled and executed successfully.

| | |
|---|---|
| **Exp no: 9** | **Structures In C Programming** |
| **Date: 8-12-2020** | |

## 1)Aim:

To write a C program to create a structure date to Instantiate DOB and Current date to calculate the age of the person

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables currentDate, birthdate, calculateDate and other required varables etc..,

**Step4:** Create a Structure of functions.

**Step5:** Get the Input from the user to ask current date details and Birth date details.

**Step6:** Calculate the structure of dates using If else conditions inside of functions.

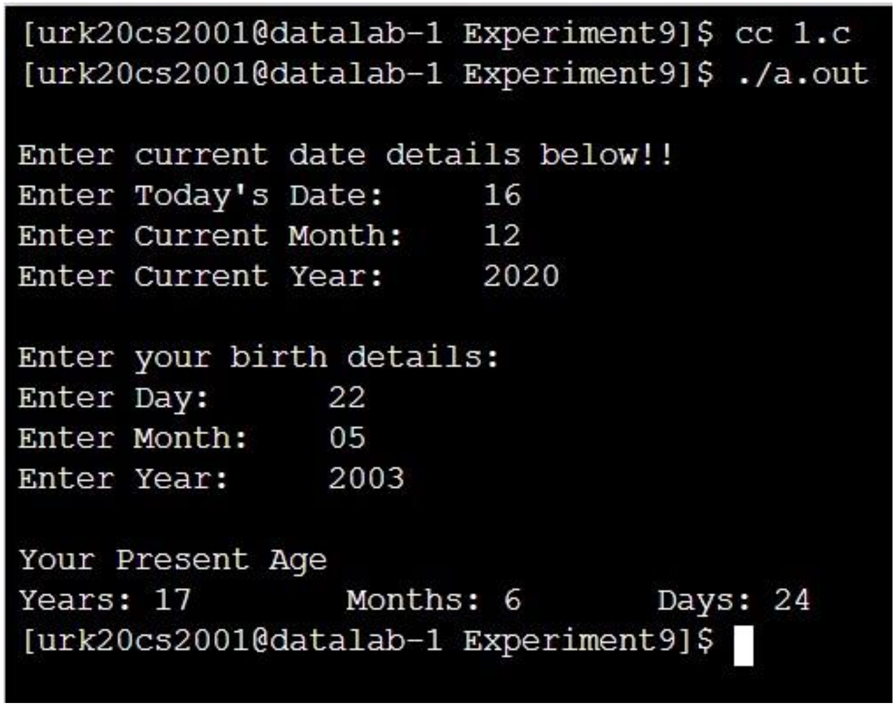
**Step7:** Print the results.

**Step8:** End.

**Program:**

```
#include<stdio.h>

#include<stdlib.h>


int currentDate, birthDate, calculatedDate, currentMonth, birthMonth, calculatedMonth,
currentYear, birthYear, calculatedYear;


void year(int currentDate, int currentMonth, int currentYear, int birthDate, int birthMonth, int
birthYear)

{

   if(birthDate > currentDate)

   {

      currentMonth = currentMonth - 1;

currentDate = currentDate + 30;

   }

   if(birthMonth > currentMonth)

   {

      currentYear = currentYear - 1;

currentMonth = currentMonth + 12;

   }

   if(birthYear > currentYear)

   {

exit(0);

   }


   calculatedDate = currentDate - birthDate;

calculatedMonth = currentMonth - birthMonth;

calculatedYear = currentYear - birthYear;


   printf("\nYour Present Age \nYears: %d\t Months: %d\t Days: %d\n", calculatedYear,
calculatedMonth, calculatedDate);

}

int main() {
    printf("\nEnter current date details below!! ");

    printf("\nEnter Today's Date: \t");
scanf("%d", &currentDate);

    printf("Enter Current Month: \t");
scanf("%d", &currentMonth);

    printf("Enter Current Year: \t");
scanf("%d", &currentYear);

    printf("\nEnter your birth details: \n");

    printf("Enter Day: \t");
scanf("%d", &birthDate);

    printf("Enter Month: \t");
scanf("%d", &birthMonth);

    printf("Enter Year: \t");
scanf("%d", &birthYear);

    year(currentDate, currentMonth, currentYear, birthDate, birthMonth, birthYear);

    return 0;
}
```

## Output:



```
[urk20cs2001@datalab-1 Experiment9]$ cc 1.c
[urk20cs2001@datalab-1 Experiment9]$ ./a.out

Enter current date details below!!
Enter Today's Date:     16
Enter Current Month:    12
Enter Current Year:     2020

Enter your birth details:
Enter Day:      22
Enter Month:    05
Enter Year:     2003

Your Present Age
Years: 17       Months: 6       Days: 24
[urk20cs2001@datalab-1 Experiment9]$ 
```

## 2)Aim:

To write a C program using structure to create a payroll report of employees in an organization.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables int empno, char name[10], allowances, basicPay, deductions, nPay.

**Step4:** Get the employee name, number and basic pay etc…,

**Step5:** Calculating the values.

**Step6:** Print the results.

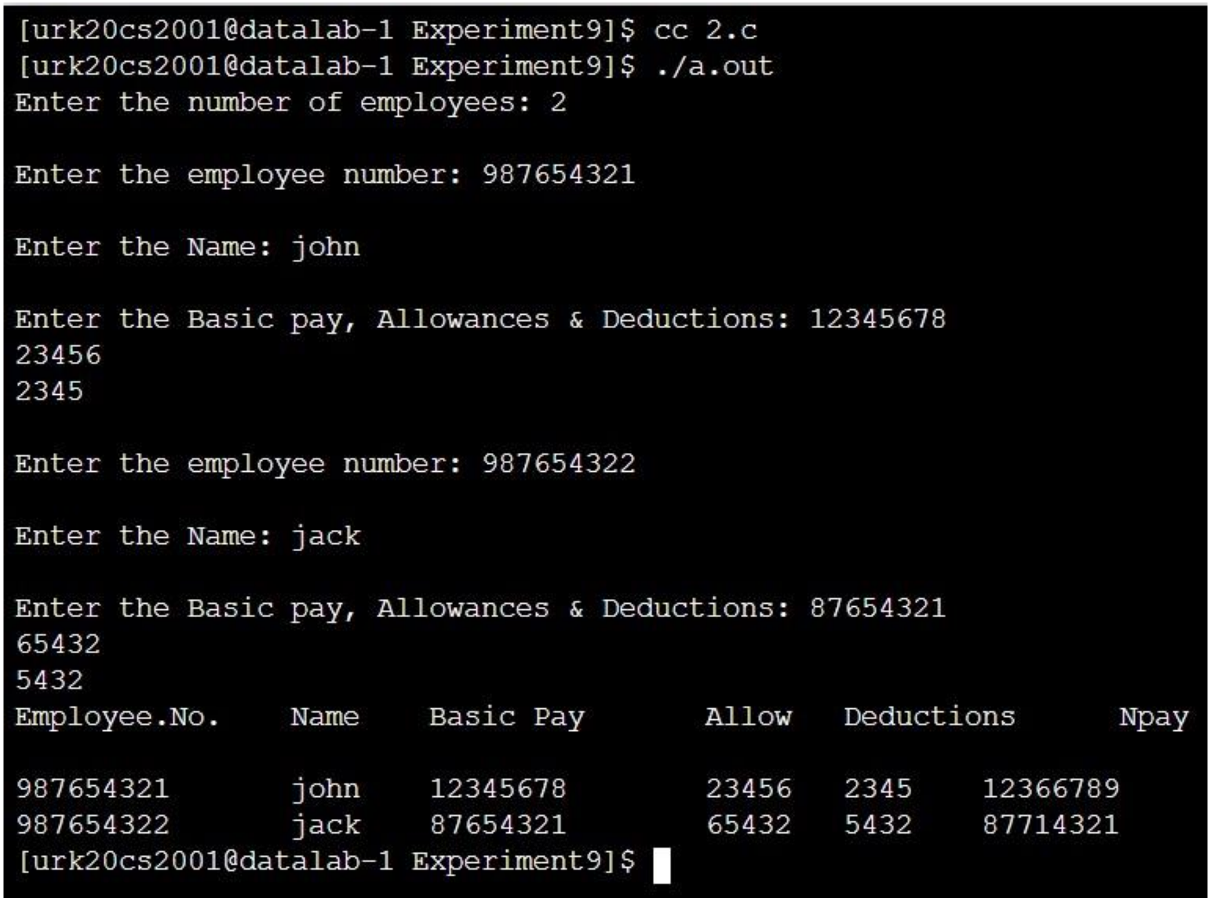
**Step7:** End.

## Program:

```
#include<stdio.h>


struct emp {
int empno;
char name[10];
   int allowances, basicPay, deductions, nPay;
}e[10];

void main() {
   int i, n;


   printf("Enter the number of employees: ");
scanf("%d", &n);


   for(i=0; i<n; i++)
   {
      printf("\nEnter the employee number: ");
scanf("%d", &e[i].empno);
```

```
        printf("\nEnter the Name: ");
scanf("%s", e[i].name);


        printf("\nEnter the Basic pay, Allowances & Deductions: ");
scanf("%d %d %d", &e[i].basicPay, &e[i].allowances, &e[i].deductions);


        e[i].nPay = e[i].basicPay + e[i].allowances - e[i].deductions;
    }


    printf("Employee.No.\tName\tBasic Pay\tAllow\tDeductions\tNpay\n\n");


    for(i=0; i<n; i++)
    {
        printf("%d\t%s\t%d\t%d\t%d\t%d\n", e[i].empno, e[i].name, e[i].basicPay,
e[i].allowances, e[i].deductions, e[i].nPay);
    }
getchar();
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment9]$ cc 2.c
[urk20cs2001@datalab-1 Experiment9]$ ./a.out
Enter the number of employees: 2

Enter the employee number: 987654321

Enter the Name: john

Enter the Basic pay, Allowances & Deductions: 12345678
23456
2345

Enter the employee number: 987654322

Enter the Name: jack

Enter the Basic pay, Allowances & Deductions: 87654321
65432
5432
Employee.No.    Name    Basic Pay       Allow   Deductions      Npay

987654321       john    12345678        23456   2345    12366789
987654322       jack    87654321        65432   5432    87714321
[urk20cs2001@datalab-1 Experiment9]$
```

## 3)Aim:

To write a C program accept records of different states using arrays of structures.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables engineering, medical, management, university, total.

**Step4:** Calculating and arranging the details in a table format.

**Step5:** Print the results.

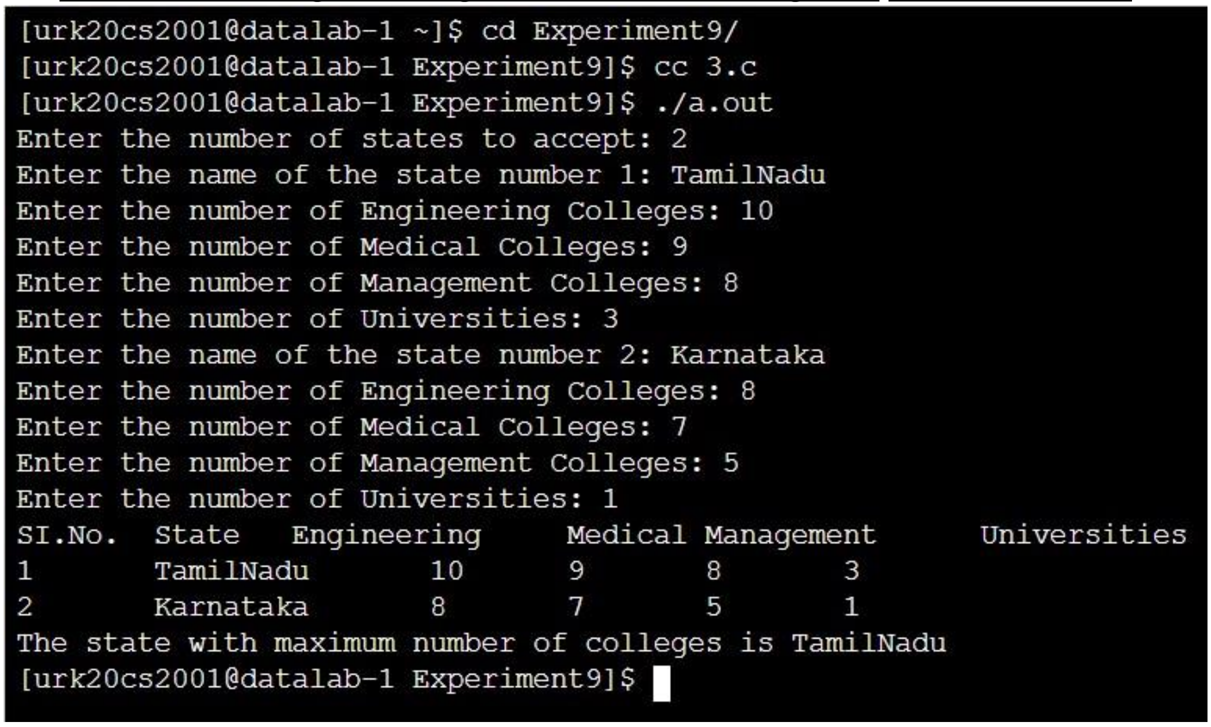
**Step6:** End.

## Program:

```
#include<stdio.h>

struct names{
char state[10];
    int engineering, medical, management, university, total;
};

int main() {
    int n, i, max=0;

    printf("Enter the number of states to accept: ");
    scanf("%d", &n);

    struct names arr[n];

    for(i=0; i<n; i++)
    {
        printf("Enter the name of the state number %d: ", i+1);
scanf("%s", &arr[i].state);

        printf("Enter the number of Engineering Colleges: ");
scanf("%d", &arr[i].engineering);
```

```
        printf("Enter the number of Medical Colleges: ");
scanf("%d", &arr[i].medical);

        printf("Enter the number of Management Colleges: ");
scanf("%d", &arr[i].management);

        printf("Enter the number of Universities: ");
scanf("%d", &arr[i].university);

        arr[i].total = arr[i].engineering + arr[i].medical + arr[i].management + arr[i].university;

        if(arr[i].total > arr[max].total)
max = i;
    }

    printf("SI.No.\tState\tEngineering\tMedical\tManagement\tUniversities\n");

    for(i=0; i<n; i++)
    {
        printf("%d\t%s\t%d\t%d\t%d\t%d\n", i+1, arr[i].state, arr[i].engineering, arr[i].medical,
arr[i].management, arr[i].university);
    }

    printf("The state with maximum number of colleges is %s \n", arr[max].state); }
```

**Output:**



```
[urk20cs2001@datalab-1 ~]$ cd Experiment9/
[urk20cs2001@datalab-1 Experiment9]$ cc 3.c
[urk20cs2001@datalab-1 Experiment9]$ ./a.out
Enter the number of states to accept: 2
Enter the name of the state number 1: TamilNadu
Enter the number of Engineering Colleges: 10
Enter the number of Medical Colleges: 9
Enter the number of Management Colleges: 8
Enter the number of Universities: 3
Enter the name of the state number 2: Karnataka
Enter the number of Engineering Colleges: 8
Enter the number of Medical Colleges: 7
Enter the number of Management Colleges: 5
Enter the number of Universities: 1
SI.No.  State   Engineering     Medical Management      Universities
1       TamilNadu       10      9       8       3
2       Karnataka       8       7       5       1
The state with maximum number of colleges is TamilNadu
[urk20cs2001@datalab-1 Experiment9]$
```

## Result:

Thus the program for experimenting the Structures in C programming are coded, compiled and executed successfully.

| Exp no: 10 | File Handling |
|---|---|
| Date: 12-12-2020 | |

## 1)Aim:

To write a C program for student information storage and retrieval using file handling.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables char text, ch *fp and other required variables.

**Step4:** Get the Student Information from an user.

**Step5:** Creating a file to saving that informations.

**Step 6:** Print the results.

**Step7:** End.

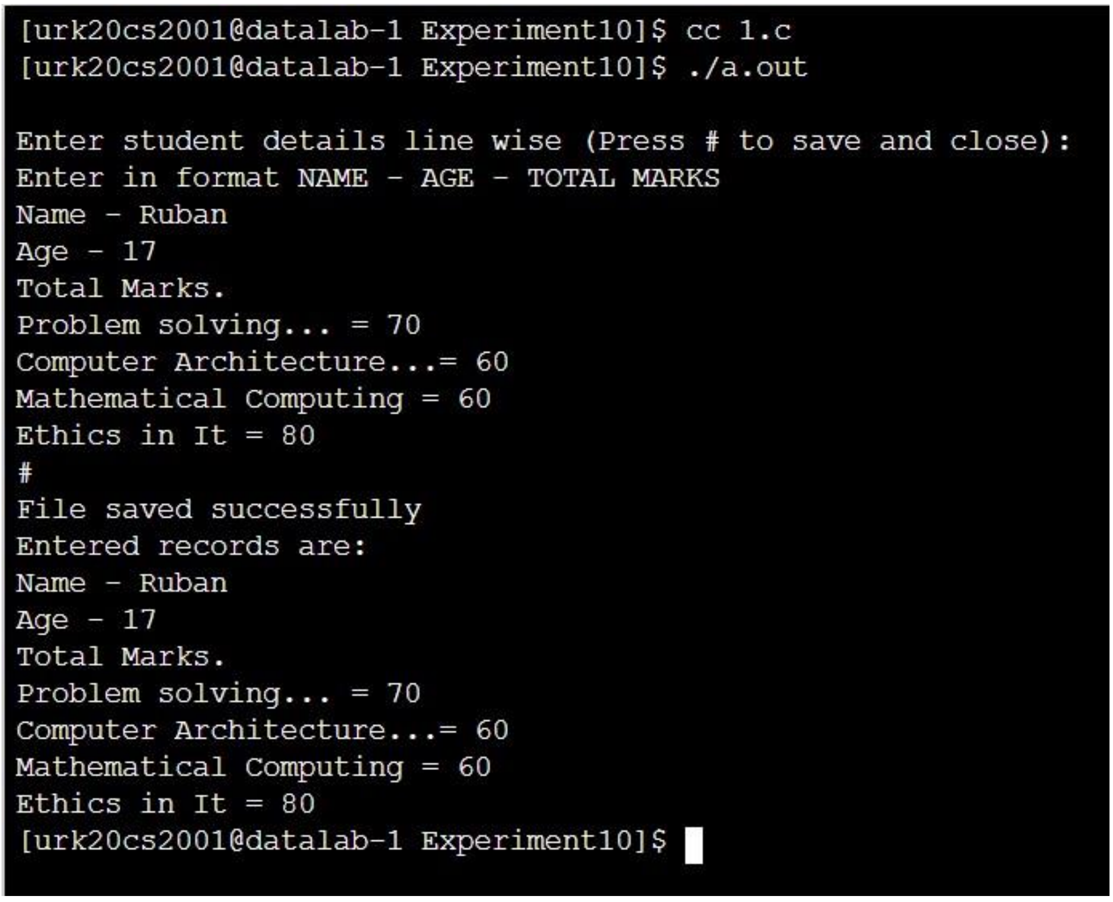
## Program:

```
#include<stdio.h>

#define SIZE 1024

int main() {
   char text[SIZE] = {0},record[100];
   char ch;
int cnt=0,len;
   FILE *fp;

   fp = fopen("file1.txt", "w");

   if(fp==NULL)
   {
      printf("Error in creating file");
return -1;
   }

   printf("\nEnter student details line wise (Press # to save and close): \n");

   printf("Enter in format NAME - AGE - TOTAL MARKS \n");
while(1)
```

```
   {
ch=getchar();
if(ch=='#')
      {
break;        }
fputc(ch,fp);
   }
fclose(fp);
   printf("File saved successfully\n");

   fp=fopen("file1.txt", "r");
if(fp==NULL)
   {
      printf("Error in opening file.\n");
return -1;
   }

   printf("Entered records are: \n");

   cnt=0;

   while((ch=fgetc(fp))!=EOF)
   {
      if(ch==0x0A)
      {
record[cnt++]='\0';
cnt=0;            printf("%s\n",
record);            continue;
      }
      record[cnt++]=ch;
```

```
    }
fclose(fp);
return 0;
}
```

**Output:**



```
[urk20cs2001@datalab-1 Experiment10]$ cc 1.c
[urk20cs2001@datalab-1 Experiment10]$ ./a.out

Enter student details line wise (Press # to save and close):
Enter in format NAME - AGE - TOTAL MARKS
Name - Ruban
Age - 17
Total Marks.
Problem solving... = 70
Computer Architecture...= 60
Mathematical Computing = 60
Ethics in It = 80
#
File saved successfully
Entered records are:
Name - Ruban
Age - 17
Total Marks.
Problem solving... = 70
Computer Architecture...= 60
Mathematical Computing = 60
Ethics in It = 80
[urk20cs2001@datalab-1 Experiment10]$
```

## 2)Aim:

To write a C program to copy a file from one location to another.

## Algorithm:

**Step1:** Start.

**Step2:** Include the required header files.

**Step3:** Declare the variables *fp, *fp1, char name, file, x and z.

**Step4:** Get the input from the user.

**Step5:** Type the input in a new created file.

**Step6:** Copy the text from the File.txt to File1.txt.

**Step7:** Print the results.

**Step8:** End.

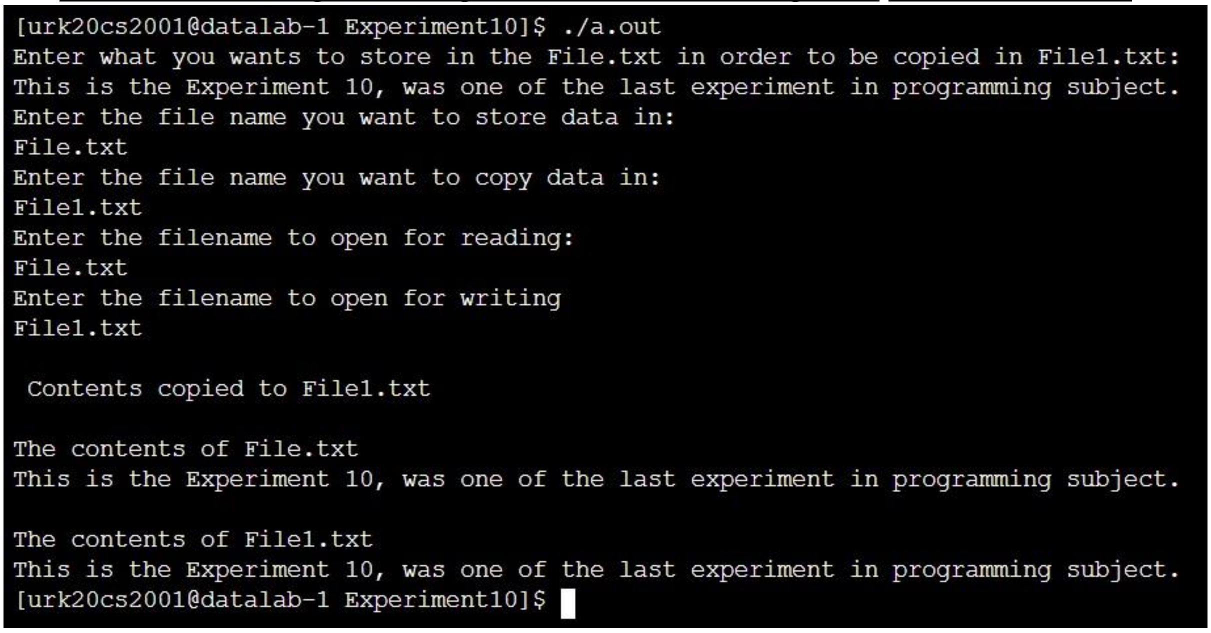
## Program:

```
#include<stdio.h>
#include<stdlib.h>
#include<string.h>

int main()
{
    FILE *fp, *fp1;
    char name[100], file[100], x[100], z[100];

    printf("Enter what you wants to store in the File.txt in order to be copied in File1.txt:\n");
scanf("%[^\n]%*c", name);

    printf("Enter the file name you want to store data in: \n");
scanf("%s", file);

    strcpy(x, file);
fp=fopen(file, "w+");
fprintf(fp, "%s\n", name);
fclose(fp);

    printf("Enter the file name you want to copy data in:\n");
scanf("%s", file);

    strcpy(z, file);

    fp1=fopen(file, "w+");
fclose(fp1);

    FILE *fptr1, *fptr2;
char filename[100], c;

    printf("Enter the filename to open for reading: \n");
scanf("%s", filename);

    fptr1=fopen(filename, "r");

    if(fptr1==NULL)
    {       printf("Cannot open file %s \n"<
filename);       exit(0);
```

```
    }


    printf("Enter the filename to open for writing \n");
scanf("%s", filename);


    fptr2=fopen(filename, "w");


    if(fptr2==NULL)
    {
        printf("Cannot open file %s \n", filename);
exit(0);
    }


    c=fgetc(fptr1);
while(c!=EOF)
    {        fputc(c,
fptr2);
c=fgetc(fptr1);
    }
    printf("\n Contents copied to %s\n", filename);
fclose(fptr1);    fclose(fptr2);


    FILE *fps, *fps1;


    printf("\nThe contents of %s \n", x);
    fps=fopen(x, "r");
    if(fps==NULL)
    {
        printf("Cannot open file \n");
exit(0);
    }
```

```
   c=fgetc(fps);
while(c!=EOF)
   {
printf("%c", c);
c=fgetc(fps);     }
fclose(fps);


   printf("\nThe contents of %s \n", z);
fps1=fopen(z, "r");


   if(fps1==NULL)
   {        printf("Cannot open
file\n");        exit(0);
   }
   c=fgetc(fps1);
while(c!=EOF)
   {
printf("%c", c);
c=fgetc(fps1);
   }


   fclose(fps1);
return 0;
}
```

## Output:



```
[urk20cs2001@datalab-1 Experiment10]$ ./a.out
Enter what you wants to store in the File.txt in order to be copied in File1.txt:
This is the Experiment 10, was one of the last experiment in programming subject.
Enter the file name you want to store data in:
File.txt
Enter the file name you want to copy data in:
File1.txt
Enter the filename to open for reading:
File.txt
Enter the filename to open for writing
File1.txt

 Contents copied to File1.txt

The contents of File.txt
This is the Experiment 10, was one of the last experiment in programming subject.

The contents of File1.txt
This is the Experiment 10, was one of the last experiment in programming subject.
[urk20cs2001@datalab-1 Experiment10]$ 
```

## Result:

Thus the program for experimenting File Handling in C programming are coded, compiled and executed successfully.