INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad – 500 043

LABORATORY WORK SHEET

Date: 14/06/2022

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Exp No: 02 Experiment Name: CONTROL STRUCTURES

DAY TO DAY EVALUATION:

	Preparation	Algorithm / Performance in the Lab	Source Code / Calculations and Graphs	Program Execution / Results and Error Analysis	Viva	Total
Max. Marks	4	4	4	4	4	20
Obtained	4	4	4	4	4	20

Signature of Lab I/C

22/6/22

START WRITING FROM HERE:

AIM: Design & develop a flow chart and algorithm to read a year as an input & find whether it is leap year or not. Implement a c program for the same and execute for all possible inputs with appropriate messages. Also considerate end of the countries

PROGRAM:

```
# include <stdio.h>
int main()
{
   int year;
   printf("Enter a year:");
   scanf("%d", &year);
   if (((year%4==0) && (year%100!=0)) || (year%400==0))
      printf("%d is a leap year", year);
   else
      printf("%d is not a leap year", year);
```

```
    return 0;
}
```

INPUT: Enter a year:
2021

OUTPUT: 2021 is not a leap year

b) AIM: Design and develop a flowchart and algorithm to find if square root of a given number N. Implement a C program for the same & execute for all possible inputs with appropriate messages. (NOTE: Don't use library function sqrt(n), Hint: Use Newton Raphson method to find the square root)

PROGRAM:

```
# include <stdio.h>
# include <math.h>
Void main()
{
float n,s; int i;
printf("Enter the number to find the square root:");
scanf("%f",&n);
if (n>0)
{
s=n/2;
for (i=0; i<n; i++)
s= (s+(n/s))/2;
printf("Square root of %f is %f", n,s);
}
else
printf("Not possible to find the square root");
}
```

INPUT: Enter the number to find the square root:
25

OUTPUT: Square root of 25.000000 is 5.000000

c) AIM: Design & develop a flow chart & algorithm to generate a fibonacci sequence upto a given no. N. A fibonacci sequence is defined as follows: The first & second terms in the sequence are 0 & 1. Subsequent terms are found by adding the preceding two terms in the sequence. Implement a C program for the development of flowchart / algorithm and execute the same to generate the first N terms of the sequence.

PROGRAM:

```
# include<stdio.h>
main()
{
int a=0,b=1,c,n,i;
Printf ("Enter no. of terms:");
scanf ("%d", &n);
printf("The fibonacci sequence is:");
printf("%d %d ",a,b);
for(i=3; i<=n; i++)
{
c=a+b
printf("%d",c);
a=b;
b=c;
}
}
```

INPUT: Enter no. of terms:
5

OUTPUT: The fibonnaci sequence is:
0 1 1 2 3

d) AIM: Design and develop a flow chart & algorithm that takes three co-efficients (a, b & c) of a quadratic eq" ($ax^2+bx+c=0$) as input & compute all possible roots. Implement c program for the developed flowchart/algorithm & execute the same to output the possible roots for a given set of co efficients with appropriate messages.

PROGRAM:

```
#include<stdio.h>
#include<math.h>
main()
{
float a,b,c,d,r1,r2,imp,rp;
clrscr();
printf("Enter a,b,c:");
scanf("%f%f%f",&a,&b,&c);
d=b*b-4.0*a*c;
if(d==0)
{
printf("Roots are real & equal");
r1=(-b/2)*a;
r2=r1;
printf("root1=%f",r1);
printf("root2=%f",r2);
}
elseif(d>0)
{
printf("Roots are real & unequal");
r1=(-b+sqrt(d))/2*a;
r2=(-b-sqrt(d))/2*a;
printf("roots are complex");
rp=(-b/2)*a;
imp=sqrt(d)/2*a;
printf("root1=%f+i%f",rp,imp);
printf("root2=%f-i%f",rp,imp);
}
}
```

INPUT:

Enter a,b,c: 1 5 3

OUTPUT:

Root are real & unequal

r1 = -0.697224

r2 = -4.302776