

KONGUNADU

ARTS AND SCIENCE COLLEGE

(Autonomous)

Re-accredited by NAAC with 'A+' Grade (4th Cycle)

College of Excellence (UGC)

31st Rank among Colleges in NIRF 2022

G. N. Mills (Post), Coimbatore - 641 029

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DEPARTMENT OF MATHEMATICS

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LABMANUAL

B.Sc MATHEMATICS
Skill Based Subject
Programming in C - Practical

2022-2023

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Lab Manual for
Fundamental of Computer Programming in C-LAB

List of C Programs

1) Program to identify Prime numbers

Program Code:

```
#include<stdio.h>
#include<conio.h>
voidmain()
{
int n,a,b=0;
clrscr();
printf("\nEnter a number:");
scanf("%d",&n);
for(a=2;a<n;a++)
{
if(n%a==0)
{ b=
1;
break;
}
}
if(n==1)
{
printf("\nGiven number %d is neither prime nor composite",n);
}
else
{
if(b==1)
{
```

```
printf("\nGiven number %d is not a prime number",n);  
}  
else  
{  
printf("\nGiven number %d is a prime number",n);  
}  
}  
getch();  
}
```

Output:

Enter a number:5

Given number 5 is a prime number

Enter a number:10

Given number 10 is not a prime number

Enter a number:1

Given number 1 is neither prime nor composite

2) Program to find simple interest.

Program Code:

```
#include<stdio.h>
#include<conio.h>
voidmain()
{
float p, rate, time, si;
clrscr();
printf("Enter the principal amount: \n");
scanf("%f",&p);
printf("Enter the rate of amount: \n");
scanf("%f",&rate);
printf("Enter time period in year: \n");
scanf("%f",&time);
si=(p*time*rate)/100;
printf("Simple Interest :%2f",si);
getch();
}
```

Output:

Enter the principal amount:5000.00

Enter the rate of the amount:0.5

Enter the time period in year:10

Simple Interest:250.00

3) To find the solution of the quadratic equation.

Program Code:

```
#include<stdio.h>
#include<math.h>
#include<conio.h>
voidmain()
{
int a,b,c,d;
float r1,r2,rp,ip;
clrscr();
printf("\nTo Solve Quadratic Equation:");
printf("\n Enter the values for a,b& c:");
scanf("%d %d %d",&a,&b,&c);
d=b*b-4*a*c;
if(d<0)
{
d=-d;
rp=(float)-b/(2*a);
ip=sqrt(d)/(2*a);
printf("\n Root1=%.2f+i%.2f",rp,ip);
printf("\n Root2=%.2f-i%.2f",rp,ip);
}
else
{
r1=(-b+sqrt(d))/2*a;
r2=(-b-sqrt(d))/2*a;
printf("\n Root1=%.2f\n Root2=%.2f",r1,r2);
}
```

```
getch();  
}
```

Output:

To Solve Quadratic Equation:Enter values of a, b & c:12 3

Root1=(-1.00)+i(1.41)

Root2=(-1.00)-i(1.41)

4) To find the factorial of a number.

Program Code:

```
#include<stdio.h>
#include<conio.h>
voidmain()
{
int i,n;
long fact=1;
clrscr();
printf("\nEnter the integer number:");
scanf("%d",&n);
for(i=1;i<=n;i++)
{
fact=fact*i;
}
printf("\nThe factorial of %d is %d",n,fact);
getch();
```

Output:

Enter the integer number:6

The factorial of 6 is 720

5) To frame Fibonacci series.

Program Code:

```
#include<stdio.h>
#include<conio.h>
voidmain()
{
int a=0,b=1,c=0,r;
clrscr();
printf("\nEnter any range:");
scanf("%d",&r);
printf("\n%d",a);
printf("\n%d",b);
while(c<=r)
{
c=a+b;
if(c<=r)
printf("\n%d",c);
a=b;
b=c;
}
getch();
}
```

Output:

Enter any range:7

0

1

1

2

3

5

6) To find the arithmetic mean of n numbers.

Program Code:

```
#include<stdio.h>
#include<conio.h>
voidmain()
{
int size,i;
float num,sum,am;
clrscr();
printf("Enter the number of values:\n");
scanf("%d",&size);
sum=0;
printf("Enter%dvalues",size);
for(i=1;i<=size;i++)
{
scanf("%f",&num);
sum=sum+num;
}
am=sum/size;
printf("Arithmetic Mean=%0.2f",am);
getch();
}
```

Output:

Enter the number of values: 4

Enter 4 numbers

1

3

4

5

Mean=3.25

7) To find the median of n numbers.

Program Code:

```
#include<stdio.h>
#include<conio.h>
voidmain()
{
int n,i,j,a[20],temp;
float med;
clrscr();
printf("Enter the number of values \n");
scanf("%d",&n);
printf("Enter %d values \n",n);
for(i=1;i<=n;i++)
{
scanf("%d",&a[i]);
}
for(i=1;i<=n;i++)
{
for(j=i+1;j<=n;j++)
{
if(a[i]>a[j])
{
temp=a[i];a[i]=a[j];a[j]=temp;
}
}
}
printf("Values in ascending order \n");
for(i=1,i<=n,i++)
{
```

```
printf("%d\t",a[j]);
printf("\n");
}
if(n%2==0)
{
med=(a[n/2]+a[(n/2)+1])/2.0;
}
else
{
med=(a[(n+1)/2]);
}
printf("Median=%.2f",med);
getch();
}
```

Output:

Enter the number of values 5

Enter 5 values

35412

Values in ascending order

2

3

4

5

Median=3.

8) To find the multiplication of two matrices.

Program Code:

```
#include<stdio.h>
#include<conio.h>
voidmain()
{
int a[10][10],b[10][10],multi[10][10],row1,column1,row2,column2;
int i,j,k,r,c;
clrscr();
//Getting order of two matrices//
printf("\nEnter the order of the first matrix:");scanf("%d%d",&row1,&column1);
printf("\nEnter the order of the second matrix:");scanf("%d%d",&row2,&column2);
if(column1==row2)
{
r=row1;
c=column2;
//Gettingfirstmatricelement//
printf("\nEnter the element of first matrix:\n");
for(i=1;i<=row1;i++)
{
for(j=1;j<=column1;j++)
{
scanf("%d",&a[i][j]);
}
}
//Gettingsecondmatricelement//
printf("\nEnter the element of second matrix:\n");
for(i=1;i<=row2;i++)
```

```

{
for(j=1;j<=column2;j++)
{
scanf("%d",&b[i][j]);
}
}
//Multiplication process//
printf("\nMultiplication of the matrices:\n");
for(i=1;i<=r;i++)
{
for(j=1;j<=c;j++)
{
multi[i][j]=0;for(k=1;k<=row2;k++)
{
multi[i][j]+=a[i][k]*b[k][j];
}
}
}
//Printing process//for(i=1;i<=r;i++)
{
for(j=1;j<=c;j++)
{
printf("%d\t",multi[i][j]);
}
printf("\n");
}
}
else
printf("\n Given order of matrices cannot perform the multiplication process.");

```



```
getch();  
}
```

Output:

Enter the order of the first matrix: 2 3

Enter the order of the second matrix:34

Enter the element of first matrix:

12 3

45 6

Enter the element of second matrix:

12 34

56 78

12 34

Multiplication of the matrices:

142026 32

355065 80

Enter the order of the first matrix: 2 2

Enter the order of the second matrix:33

Given order of matrix cannot perform the multiplication process.

9) To find the inverse of trigonometric functions.

Program Code:

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
voidmain()
{
double x;
double result1,result2,result3;
clrscr();
printf("Enter the value:\n");
scanf("%lf",&x);
result1=asin(x);
result2=acos(x);
result3=atan(x);
printf("Inverse of sin%.2f=%.2lf\n",x,result1);
printf("Inverse of cos%.2f=%.2lf\n",x,result2);
printf("Inverse of tan%.2f=%.2lf\n",x,result3);
getch();
}
```

Output:

Enter the value:

0

Inverse of sin 0.00=0.00

Inverse of cos 0.00=1.57

Inverse of tan 0.00=0.00

10) To find whether a given word is palindrome or not.

Program Code:

```
#include<stdio.h>
#include<conio.h>
#include<string.h>
int main()
{
char a[100],b[100];
clrscr();
printf("Enter the string:");
gets(a);
strcpy(b,a);
strrev(b);
if(strcmp(a,b)==0)
printf("The string is palindrome \n");
else
printf("The string is not a palindrome \n");
getch();
}
```

Output

Enter the string: Welcome

The string is not a palindrome

Enter the string: Dad

The string is palindrome

11) To find the correlation and regression.

Program Code:

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
voidmain()
{
int n,i,x[20],y[20];
float r,sumx=0,sumy=0,sumxy=0,sumsqx=0,sumsqy=0,nr,dr,bxy,byx;
clrscr();
printf("Enter the number of values \n");
scanf("%d",&n);
printf("Enter %d values of x \n",n);for(i=1;i<=n;i++)
{
scanf("%d",&x[i]);
sumx=sumx+x[i];
sumsqx=sumsqx+(x[i]*x[i]);
}
printf("Enter %d values of y \n",n);
for(i=1;i<=n;i++)
{
scanf("%d",&y[i]);
sumy=sumy+y[i];
sumsqy=sumsqy+(y[i]*y[i]);
}
for(i=1;i<=n;i++)
{
sumxy=sumxy+(x[i]*y[i]);
}
```

```

nr=(n*sumxy)-(sumx*sumy);
dr=sqrt((n*sumsqx)-(sumx*sumx))*sqrt((n*sumsqy)-(sumy*sumy));
r=nr/dr;
printf("Correlationr=%f\n",r);
bxy=nr/((n*sumsqy)-(sumy*sumy));
byx=nr/((n*sumsqx)-(sumx*sumx));
printf("Regression coefficient of x on y: bxy=%f\n",bxy);
printf("Regression coefficient of y on x: byx=%f\n",byx);
getch();
}

```

Output

Enter the number of values 3

Enter 3 values of x 251432

Enter 3 values of y 152643

Correlationr = 0.496089

Regression coefficient of x on y: bxy=0.319095

Regression coefficient of y on x

12) To find the trace of the matrix.

Program Code:

```
#include<stdio.h>
#include<conio.h>
voidmain()
{
int i,j,n,a[10][10],sum=0;
clrscr();
printf("Enter the number of rows and columns \n");
scanf("%d",&n);
printf("Enter of number of values of matrix A \n");
for(i=1;i<=n;i++)
{
for(j=1;j<=n;j++)
{
scanf("%d",&a[i][j]);
}
}
for(i=1;i<=n;i++)
{
for(j=1;j<=n;j++)
{
if(i==j)
{
sum=sum+a[i][j];
}
}
}
printf("Trace of the matrix A = %d",sum);
```

```
getch();  
}
```

Output

Enter the number of rows and columns 3

Enter the number of values of matrix A

4 5 6

7 8 3

1 4 5

Trace of the matrix A = 17

13) To find the standard deviation.

Program Code:

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
voidmain()
{
int n,i;
float d,x[20],sumx=0,sumsqx=0,mean;
clrscr();
printf("Enter the number of values \n");
scanf("%d",&n);
printf("Enter %d values \n",n);
for(i=1;i<=n;i++)
{
scanf("%f",&x[i]);
sumx=sumx+x[i];
sumsqx=sumsqx+(x[i]*x[i]);
}
mean=sumx/n;
sd=sqrt(sumsqx/n-mean*mean);
printf("Standard Deviation=%f",sd);
getch();
}
```


Output

Enter the number of values 5

Enter 5 values

2

4

6

8

0

Standard Deviation=2.828427

14) To find the roots using bisection method.

Program Code:

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
void main( )
{
    int i;
    float x1,x2,x3;
    float f(float);
    clrscr( );
    printf("The given equation is  $x^3-4x-9=0$  \n\n");
    printf("Enter the values of x1 and x2:");
    scanf("%f%f",&x1,&x2);
    printf("\n I\tx1\tx2\tx3\n\n");
    i=1;
    iter:
    x3=(x1+x2)/2.0;
    printf("%2d%10.4f%10.4f%10.4f\n",i,x1,x2,x3);
    if(fabs(f(x3))>0.0001)
    {
        if(f(x3)<0.0)
            x1=x3;
        else
            x2=x3;
        i=i+1;
        goto iter;
    }
    printf("\n\n The root of the given equation is %f\n\n",x3);
```

```
getch( );  
}  
float f(float a)  
{  
float d;  
d=pow(a,3)-4*a-9;  
return(d);  
}
```

Output:

The given equation is $x^3-4x-9=0$

Enter the values of x1 and x2: 23

I	x1	x2	x3
1	2.0000	3.0000	2.5000
2	2.5000	3.0000	2.7500
3	2.5000	2.7500	2.6250
4	2.6250	2.7500	2.6875
5	2.6875	2.7500	2.7188
6	2.6875	2.7188	2.7031
7	2.7031	2.7188	2.7109
8	2.7031	2.7109	2.7070
9	2.7031	2.7070	2.7051
10	2.7051	2.7070	2.7061
11	2.7061	2.7070	2.7065
12	2.7061	2.7065	2.7063
13	2.7063	2.7065	2.7064
14	2.7064	2.7065	2.7065
15	2.7065	2.7065	2.7065
16	2.7065	2.7065	2.7065

The root of the given equation is 2.706528

15) To find the roots using Newton Raphson method.

Program Code:

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
voidmain()
{
int i;
float f( float a);
float fl(floata);
float x[10];
clrscr( );
printf("\n The given equation is : e^x-4*x=0\n");
printf("\n The initial guess x[0]=");
scanf("%f",&x[0]);
printf("\n Iteration \n\n");
i=0;
iter:
x[i+1]=x[i]-(f(x[i])/fl(x[i]));
printf("%d\t\t%f\n",i+1,x[i+1]);
if(fabs(x[i+1]-x[i])>0.00005)
{
i=i+1;
gotoiter;
}
printf("\n The root is : %f",x[i+1]);
getch( );
}
float f(float a)
```

```

{
float d;
d=exp(a)-4*a;
return(d);
}
float f1(float a)
{
float d1;
d1=exp(a)-4;
return(d1);
}

```

Output:

The given equation is : $e^x - 4x = 0$

The initial guess $x[10] = 5$

ITERATION	X
1	4.110793
2	3.329113
3	2.718702
4	2.334689
5	2.178595
6	2.153872
7	2.153293
8	2.153292

The root is: 2.153292.

