VISVESVARAYA TECHNOLOGICAL UNIVERSITY

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C PROGRAMMING LAB RECORD

Submitted by

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Under the Guidance of
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in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING

B.M.S. COLLEGE OF ENGINEERING
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B.M.S. COLLEGE OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DECLARATION

I, Umang Goel, student of 2nd Semester, B.E., Department of Computer Science and Engineering, B. M. S. College of Engineering, Bangalore, hereby declare that, this laboratory work for "C Programming" course has been carried out by me under the guidance of Prof. Rekha G S, Assistant Professor, Department of CSE, B. M. S. College of Engineering, Bangalore during the academic semester April 2021 - June 2021.

I also declare that to the best of my knowledge and belief, the development reported here is not a part of any other report by any other students.

UMANG GOEL (1BM20CS176)

1. Develop a C program to convert degrees Fahrenheit into degrees Celsius.

CODE:

```
#include <stdio.h>
int main()
{
    float f;
    printf("Enter temp in F : ");
    scanf("%f",&f);
    float c = (f-32)*5/9;
    printf("Temp in Celsius : %.2f°C\n",c);
}
```

OUTPUT:

```
Enter temp in F : 212.0
Temp in Celsius : 100.00°C
```

2. Develop a C program to find the area of a triangle given its sides as input using functions.

CODE:

```
#include <stdio.h>
#include <math.h>
double area(double a, double x, double y);
int main()
{
   double a,b,c;
   printf("Enter side 1 : ");
   scanf("%lf",&a);
   printf("Enter side 2 : ");
   scanf("%lf",&b);
   printf("Enter side 3 : ");
   scanf("%lf",&c);
   double x = area(a,b,c);
   printf("Area = %5.2lf \n",x);
}
double area(double a,double b,double c)
{
   double ar;
   double s = (a+b+c)/2;
   ar = sqrt(s*(s-a)*(s-b)*(s-c));
   return ar;
}
```

OUTPUT:

```
Enter side 1 : 3
Enter side 2 : 4
Enter side 3 : 5
Area =  6.00 square units
```

3. Develop a C program to find all possible roots of a quadratic equation.

CODE:

```
#include<stdio.h>
#include<math.h>
int main(){
    float a,b,c,d1;
    printf("Enter the coefficients a,b,c : ");
    scanf("%f",&a);
    scanf("%f",&b);
    scanf("%f",&c);
    printf("\nThe roots of the equation %.2fx^2 + %.2fx + %.2f = 0 are :",a,b,c);
    float d = sqrt(b*b-4*a*c);
    if(d>0)
    {float x1 = (-b + d)/(2*a);
    float x2 = (-b-d)/(2*a);
    printf("\nThe roots are real and distinct\nroot 1 : %.3f\nroot 2 : %.3f\n",x1,x2);}
    else if(d==0){
    float x1 = -b/(2*a);
    printf("\nThe roots are equal\nroot 1 : %.3f\nroot 2 : %.3f\n",x1,x1);
    }
    else{
    d = (b*b-4*a*c);
    printf("The roots are imaginary\n root 1 : %.3f + i%.3f", -b/(2*a), sqrt(-d)/(2*a));
    printf("\n root 2 : %.3f - i%.3f\n", -b/(2*a), sqrt(-d)/(2*a));
    }
}
```

OUTPUT :

```
Enter the coefficients a,b,c : 2 3 1
The roots of the equation 2.00x^2 + 3.00x + 1.00 = 0 are :
The roots are real and distinct
root 1 : -0.500
root 2 : -1.000


Enter the coefficients a,b,c : 1 2 1
The roots of the equation 1.00x^2 + 2.00x + 1.00 = 0 are :
The roots are equal
root 1 : -1.000
root 2 : -1.000


Enter the coefficients a,b,c : 1 1 1
The roots of the equation 1.00x^2 + 1.00x + 1.00 = 0 are :
The roots are imaginary
 root 1 : -0.500 + i0.866
 root 2 : -0.500 - i0.866
```

4. Develop a C program to determine whether the entered character is a vowel or consonant using switch case statement.

CODE:

```
#include<stdio.h>
int main(){
   char c;
   printf("Enter a char : ");
   scanf("%c",&c);
   switch (c){
      case 'a' :
      case 'A' :
      case 'e' :
      case 'E' :
      case 'i' :
      case 'I' :
      case 'o' :
      case 'O' :
      case 'u' :
      case 'U' :
         printf("%c is a vowel.\n",c);
         break;
      default :
         printf("%c is a consonant.\n",c);
   }
}
```

OUTPUT :

```
Enter a char : a
a is a vowel.

Enter a char : X
X is a consonant.
```

```
Enter a char : E
E is a vowel.
```

5. Develop a C program to print even numbers from M to N.

CODE :

```
#include<stdio.h>
int main(){
   int m,n;
   printf("Enter m : ");
   scanf("%d",&m);
   printf("Enter n : ");
   scanf("%d",&n);
   while(m<=n){
      if (m%2==0)
      printf("%d\n",m);
      m++;
   }
}
```

OUTPUT :

```
Enter m : 33
Enter n : 50
Even numbers between 33 and 50 :
34
36
38
40
42
44
46
48
50
```

6. Develop a program to calculate the sum of squares of first n odd numbers.

CODE :

```
#include<stdio.h>
int main(){
    int n;
    printf("Enter n : ");
    scanf("%d",&n);
    int s=0;
    for(int i=0;i<(2*n);i++){
        if(i%2!=0)
        s+=(i*i);
    }
    printf("\nSum of first %d odd numbers = %d\n",n,s);
}
```

OUTPUT :

```
Enter n : 5
Sum of first 5 odd numbers = 165
```

7. Develop a program to perform addition of two Matrices.

CODE :

```
#include <stdio.h>
int main(){
int n,m,i,j;
printf("Enter number of rows : ");
scanf("%d",&n);
printf("Enter number of columns : ");
scanf("%d",&m);
int arr1[n][m],arr2[n][m],arr3[n][m];
printf("Enter matrix 1 : \n");
for(i=0;i<n;i++){
   for(j=0;j<m;j++){
      //printf("Enter element [%d][%d] - ",i+1,j+1);
      scanf("%d",&arr1[i][j]);
   }
}
printf("Enter matrix 2 : \n");
for(i=0;i<n;i++){
   for(j=0;j<m;j++){
      //printf("Enter element [%d][%d] - ",i+1,j+1);
      scanf("%d",&arr2[i][j]);
   }
}
printf("Addition of matrices : \n");
for(i=0;i<n;i++){
   for(j=0;j<m;j++){
      arr3[i][j]=arr1[i][j]+arr2[i][j];
   }
}
for(i=0;i<n;i++){
   for(j=0;j<m;j++){
      printf(" %d ",arr3[i][j]);
   }
   printf("\n");
}
```

```
}
```

OUTPUT :

```
Enter number of rows : 3
Enter number of columns : 3
Enter matrix 1 :
1 2 3
4 5 6
7 8 9
Enter matrix 2 :
9 8 7
6 5 4
3 2 1
Addition of matrices :
 10  10  10
 10  10  10
 10  10  10
```

8. Develop a C program to copy one string to another string and find its length without using built in functions.

CODE :

```
#include<stdio.h>
int main(){
    char str1[100],str2[100];
    int i=0;
    printf("Enter a string : ");
    gets(str1);
    for(int i=0;i<100;i++){
        str2[i]=str1[i];
    }
    while(str2[i]!='\0'){
        i++;
    }
    printf("The copied string : ");
    puts(str2);
    printf("\nlength = %d\n",i);
}
```

OUTPUT :

```
Enter a string : BMSCE, Bangalore
The copied string : BMSCE, Bangalore
length = 16
```

9. Develop a C program to create student structure, read two student details (Student roll number, name, section, department, fees, and results i.e., total marks obtained) and print the student details who has scored the highest.

CODE :

```
#include<stdio.h>
struct student{
    long int rno;
    char name[50];
    char sec[3];
    char dept[3];
    int fees;
    float marks;
    };
int main(){
    int i;
    struct student s1,s2,sh;
    printf("\nEnter student 1 details : ");
    printf("enter roll no : ");
    scanf("%ld",&s1.rno);
    printf("enter name : ");
    scanf("%s",s1.name);
    printf("enter section : ");
    scanf("%s",s1.sec);
    printf("enter dept : ");
    scanf("%s",s1.dept);
    printf("enter fees : ");
    scanf("%d",&s1.fees);
    printf("enter marks : ");
    scanf("%f",&s1.marks);
    printf("\nEnter student 2 details : ");
    printf("enter roll no : ");
    scanf("%ld",&s2.rno);
    printf("enter name : ");
```

```
    scanf("%s",s2.name);
    printf("enter section : ");
    scanf("%s",s2.sec);
    printf("enter dept : ");
    scanf("%s",s2.dept);
    printf("enter fees : ");
    scanf("%d",&s2.fees);
    printf("enter marks : ");
    scanf("%f",&s2.marks);
    if(s1.marks>s2.marks){
        sh = s1;
        printf("Student with higher score : ");
        printf("Roll No : %ld\n",sh.rno);
        printf("Name : %s\n",sh.name);
        printf("Section : %s\n",sh.sec);
        printf("Dept : %s\n",sh.dept);
        printf("Fees : %d\n",sh.fees);
        printf("Marks : %f\n",sh.marks);}
    else if(s1.marks<s2.marks){
        sh = s2;
        printf("Student with higher score : ");
        printf("Roll No : %ld\n",sh.rno);
        printf("Name : %s\n",sh.name);
        printf("Section : %s\n",sh.sec);
        printf("Dept : %s\n",sh.dept);
        printf("Fees : %d\n",sh.fees);
        printf("Marks : %f\n",sh.marks);
    }
    else
        printf("both students have same marks\n");
}
```

OUTPUT :

```
Enter student 1 details :
enter roll no : 45
enter name : Umang
enter section : CN
enter dept : CSE
enter fees :
58000
enter marks : 323

Enter student 2 details :
enter roll no : 30
enter name : Nayan
enter section : PF
enter dept : ECE
enter fees : 19900
enter marks : 320
Student with higher score :
Roll No : 45
Name : Umang
Section : CN
Dept : CSE
Fees : 58000
Marks : 323.000000
```

10. Develop a C program to perform arithmetic operations (addition, subtraction, multiplication, division and remainder) on two integers using pointers.

CODE :

```
#include<stdio.h>
int ops(int *, int *, int *, int *, int*, float *, int *);
int main()
{
    int a,b;
    int add,sub,mul,rem;
    float quo;
    printf("Enter num 1: ");
    scanf("%d",&a);
    printf("Enter num 2: ");
    scanf("%d",&b);
    ops(&a, &b, &add, &sub, &mul, &quo, &rem);
    printf("\n");
    printf("Sum        :%d\n",add);
    printf("Difference :%d\n",sub);
    printf("Quotient   :%0.2f\n",quo);
    printf("Product    :%d\n",mul);
    printf("Remainder  :%d\n",rem);
}
int ops(int *a, int *b, int *add, int *sub, int *mul, float *quo, int *rem)
{
    *add=*a+*b;
    *sub=*a-*b;
    *mul=*a**b;
    *quo=(float)(*a)/(*b);
    *rem=(*a)%(*b);
}
```

OUTPUT:

```
Enter num 1: 8
Enter num 2: 20

Sum        :28
Difference :-12
Quotient   :0.40
Product    :160
Remainder  :8
```