# Lab 8

**Theory:**

Structure is a user-defined data type in C language which allows us to combine data of different types together. Structure helps to construct a complex data type which is more meaningful. It is somewhat similar to an Array, but an array holds data of similar type only. But structure on the other hand, can store data of any type, which is practical more useful. In structure, data is stored in form of records.

Struct keyword is used to define a structure. Struct defines a new data type which is a collection of primary and derived data types.

**Syntax:**

Syntax:

```
struct [structure_tag]
{
   //member variable 1
   //member variable 2
   //member variable 3
}[structure_variables];
```

**Methodology:**

In the first program, details such as name, roll no and marks of five students were taken from the user and displayed using structure. In second program, we were asked to take data of n number of employees and to print the names of those employees whose address was Biratnagar. This too was done using structure. Third code was about printing the mark sheet of students by taking the name, roll number, school and marks from the users. This was a program written using basic structure of c. The third program was about finding the strong number using recursive function. All of the four programs were compiled using dev c++.

**Objectives:**

1. To be familiar with syntax and structure of C-programming.
2. To learn problem solving techniques using C.
3. To learn the basics of structure.

**Programs:**

- Run the code and correct the errors.

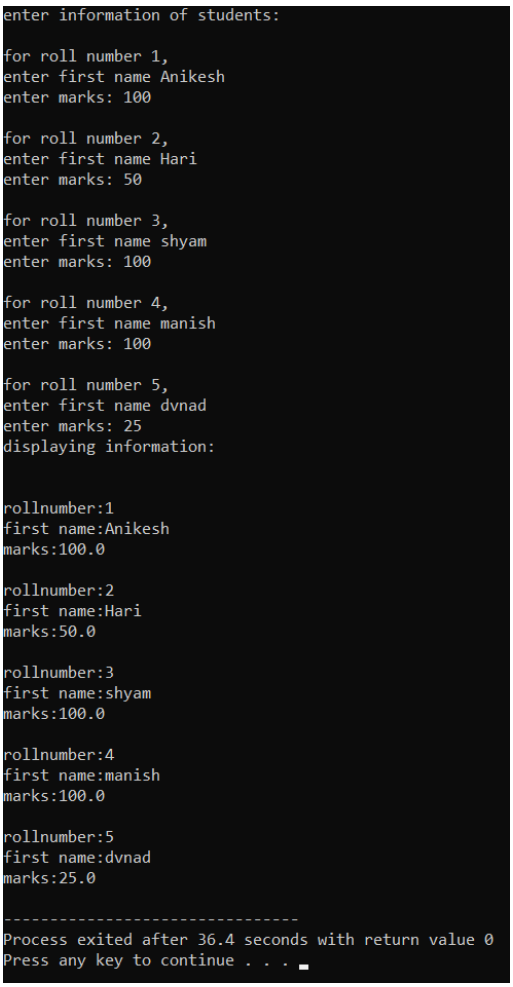
**Code:**

**Program 1:**

```
#include<stdio.h>
struct student{
        char firstname[50];
        int roll;
        float marks;
}s[5];
int main(){
int i;
```

```
printf("enter information of students:\n");
//storing information
for(i=0;i<5;++i){
        s[i].roll=i+1;
        printf("\nfor roll number %d,\n",s[i].roll);
        printf("enter first name ");
        scanf("%s",s[i].firstname);
                printf("enter marks: ");
                scanf("%f",&s[i].marks);
}
printf("displaying information:\n\n");
//displaying info
for(i=0;i<5;++i){
        printf("\nrollnumber:%d\n",i+1)
;
        printf("first name:");
        puts(s[i].firstname);
        printf("marks:%.1f",s[i].marks);
        printf("\n");
}
return 0;
}
```

**Output:**

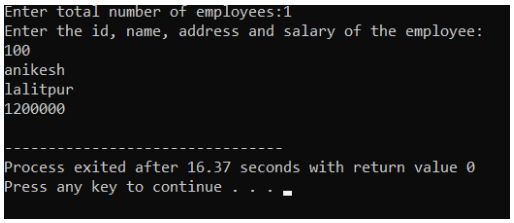



**Program 2:**

```
#include<stdio.h>
#include<string.h>
struct employee{
        int id;
        char name[30];
        float salary;
        char address[30];
}e[100];
int main(){
        int n,i;
        printf("Enter total number of employees:");
```

```
        scanf("%d",&n);
        for(i=1;i<=n;i++){
        printf("Enter the id, name, address and salary of the employee:\n");
        scanf("%d%s%s%f",&e[i].id,e[i].name,e[i].address,&e[i].salary);
}
        for(i=1;i<=n;i++){
if(0==strcmp(e[i].address ,"biratnagar")){
        printf("\n\n%s",e[i].name);
}}
return 0;
}
```

**Output:**




## Program 3:

```
#include<stdio.h>
#include<stdlib.h>
int main()
{
        int rollno,std,maths,science,english,hindi,computer;
        char name[30],school_name[30];

        printf("Enter your roll no:");
        scanf("%d",&rollno);
        printf("Enter your name:");
        scanf("%s",&name);
        printf("Enter your school name:");
        scanf("%s",&school_name);
        printf("Enter your standard:");
        scanf("%d",&std);
        printf("Enter marks of maths :");
        scanf("%d",&maths);
        printf("Enter marks of science:");
        scanf("%d",&science);
        printf("Enter marks of english:");
        scanf("%d",&english);
        printf("Enter marks of hindi:");
        scanf("%d",&hindi);
        printf("Enter marks of computer:");
        scanf("%d",&computer);
        printf("================================================================\n");
        printf("MARKSHEET OF STANDARD %d,%s\n",std,school_name);

        printf("===============
```

```
==========================
==================
=\n");
printf("Roll No: %d Student
name %s\n",rollno,name);
printf("-----------------------------------
\n");
printf("SUBJECT\t\t\tMARKS\n");
printf("-------------------------------
------\n");
printf("Maths\t\t\t%d\n",maths);
printf("Science\t\t\t%d\n",science);
printf("English\t\t\t%d\n",english);
printf("Hindi\t\t\t%d\n",hindi);
printf("Computer\t\t\t%d\n",computer);
printf("-----------------------------------
\n");
printf("Total
marks:\t\t%d\n",maths+science+english
+hindi+computer);
printf("====================
==========================
===============\n");
return 0;
```

## Output:

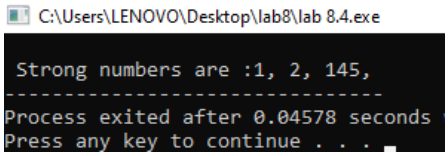
```
Enter your roll no:10
Enter your name:Anikesh
Enter your school name:prasphutan
Enter your standard:10
Enter marks of maths :50
Enter marks of science:78
Enter marks of english:97
Enter marks of hindi:52
Enter marks of computer:100
============================================================
MARKSHEET OF STANDARD 10,prasphutan
============================================================
Roll No: 10 Student name Anikesh
------------------------------------
SUBJECT                 MARKS
------------------------------------
Maths                   50
Science                 78
English                 97
Hindi                   52
Computer                        100
------------------------------------
Total marks:            377
============================================================

------------------------------
Process exited after 33.88 seconds with return value 0
Press any key to continue . . .
```

## Program No. 4

```
#include<stdio.h>
int factorial(int);
int main()
{
   int fact=1,sum=0;
   int r;
   printf("\n Strong numbers are :");
   for(int i=1;i<=1000;i++)
   {
      int k=i;
      while(k!=0){
         r=k%10;
         fact=factorial(r);



         k=k/10;
```

```
        sum=sum+fact;
      }
      if(sum==i){
      printf("%d, ",i);

        }
        sum=0;
   }
   return 0;
}
 int factorial(int f)
   {
      int mul=1;
      for(int i=1; i<=f;i++){
      mul=mul*i;
      }
      return mul;
   }
```

**Output:**




## Discussion and conclusion:

This lab was mainly focused on the program using structures. From this lab, we learned to define, declare and call the structures. The correct output was placed after each code but most importantly we came to know about basics of structure.