

## Laboratory 4

### 1. Questions

1. Create a structure named company which has name, address, phone and noOfEmployee as member variables. Read name of company, its address, phone and noOfEmployee. Finally display these members' value
2. Create a structure TIME with members hours, minutes and seconds. Write a C program to add two time objects by passing structure variables to function and display result in H: M: S format.
3. Write a program to read RollNo, Name, Address, Age & average-marks of 'n' students in a class. Print the list of students and the youngest and eldest student in the class.

### 2. Algorithm

#### **2.1 program to read name of company, its address, phone and No. Of Employee. Finally display these members' value**

Step1: start

Step2: struct company{

    char name[20];

    char address[50];

    long long int ph\_num;

    int num\_em;

};

struct company company\_data;

Step3: void read\_data()

    scanf("%s",&company\_data.name);

    gets(company\_data.address);

    scanf("%lld",&company\_data.ph\_num);

    scanf("%d",&company\_data.num\_em);

Step4: void print\_data()

```
printf("\n\n Company Data:\n\n");

printf("Name of Company : %s \n",company_data.name);

printf("Address of Company : %s\n",company_data.address);

printf("Phone number of Company : +91 %lld\n",company_data.ph_num);

printf("Number of Employees in the Company%d\n",company_data.num_em);

Step5: stop
```

**2.2 program to add two time objects by passing structure variables to function and display result in H: M: S format.**

```
Step1: start

Step2: struct time

        {int s,m,h;};

        struct time T1, T2;

Step3: input data

        printf("Enter the 1st time object\n");

        scanf("%d%d%d",&T1.h,&T1.m,&T1.s);

        printf("Enter the 2nd time object\n");

        scanf("%d%d%d",&T2.h,&T2.m,&T2.s);

Step4: int min, sec, hr;

        sec = T1.s + T2.s;

        min = T1.m + T2.m + sec/60;

        sec = sec%60;

        hr = T1.h + T2.h + min/60;

        min = min%60;

Step5: print added time

        printf("Hours = %d, min = %d, sec = %d\n", hr,min,sec);

Step6: stop
```

**2.3 a program to read RollNo, Name, Address, Age & average-marks of 'n' students in a class.****Print the list of students and the youngest and eldest student in the class.**

Step1: start

Step2: struct student{

int rl;

char name[10];

char address[20];

int age;

float marks;

};

struct student s[20];

Step3: input numbers of students, count

Step4: input data

```
scanf("%d%s%s%d%f",&s[i].rl,&s[i].name,&s[i].address,&s[i].age,
&s[i].marks);
```

Step5: output data

```
printf("\nRoll no: %d name: %s address: %s age: %d marks:
%f",s[i].rl,s[i].name,s[i].address,s[i].age,s[i].marks);
```

Step6: for calculating eldest and oldest student of the class

int old=s[0].age;

int eld=s[0].age;

for ( int i = 1; i &lt; n ; i++)

{ if (s[i].age &gt; old){

old=s[i].age;

o=i; }

if (s[i].age &lt; eld){

eld=s[i].age;

e=i; }

}

Step7: print eldest and oldest student details

```
    printf("\nEldest student: ");

    printf("\nRoll no: %d name: %s address: %s age: %d marks:
%f",s[e].rl,s[e].name,s[e].address,s[e].age,s[e].marks);

    printf("\nOldest student: ");

    printf("\nRoll no: %d name: %s address: %s age: %d marks:
%f",s[o].rl,s[o].name,s[o].address,s[o].age,s[o].marks);
```

Step8: stop

### 3. Program

```
1 #include <stdio.h>
2
3
4 struct company{
5     char name[20];
6     char address[50];
7     long long int ph_num;
8     int num_em;
9 };
10 struct company company_data;
11
12 void read_data();
13 void print_data();
14
15 int main(int argc, char const *argv[]) {
16     fflush(stdin);
17     read_data();
18     print_data();
19     return 0;
20 }
21
22 void read_data(){
23
24     printf("Enter Name of Company : ");
25     scanf("%s",&company_data.name);
26     char c;
27     scanf("%c",&c);
28
29     printf("Enter address of Company : ");
30     gets(company_data.address);
31
32     printf("Enter phone number of Company : +91 ");
33     scanf("%lld",&company_data.ph_num);
34
35     printf("Enter Number of Employees in the Company : ");
36     scanf("%d",&company_data.num_em);
37 }
38
39 void print_data(){
40     printf("\n\n Company Data:\n\n");
41     printf("Name of Company : %s \n",company_data.name);
42
43     printf("Address of Company : %s\n",company_data.address);
44
45     printf("Phone number of Company : +91 %lld\n",company_data.ph_num);
46
47     printf("Number of Employees in the Company %d\n",company_data.num_em);
48 }
49
```

Figure 1 1 program to read name of company, its address, phone and No. Of Employee. Finally display these members' value

```
1 #include <stdio.h>
2 #include <stdlib.h>
3 struct time
4 {
5     int s,m,h;
6 };
7 struct time T1, T2;
8 void add(struct time T1, struct time T2)
9 {
10     int min, sec, hr;
11     sec = T1.s + T2.s;
12     min = T1.m + T2.m + sec/60;
13     sec = sec%60;
14     hr = T1.h + T2.h + min/60;
15     min = min%60;
16     printf("Hours = %d, min = %d, sec = %d\n", hr,min,sec);
17 }
18
19 int main(int argc, char const *argv[])
20 {
21     printf("Enter the 1st time object\n");
22     scanf("%d%d%d",&T1.h,&T1.m,&T1.s);
23     printf("Enter the 2nd time object\n");
24     scanf("%d%d%d",&T2.h,&T2.m,&T2.s);
25     add (T1,T2);
26     return 0;
27 }
```

Figure 2 program to add two time objects by passing structure variables to function and display result in H: M: S format.

```

1 #include <stdio.h>
2
3 struct student{
4     int rl;
5     char name[10];
6     char address[20];
7     int age;
8     float marks;
9 };
10
11 struct student s[20];
12
13 void get_data(int n);
14 void print_data(int n);
15 void elder_older(int n);
16
17 int main(int argc, char const *argv[]) {
18     printf("Enter number of students: ");
19     int count;
20     scanf("%d",&count);
21     get_data(count);
22     print_data(count);
23     elder_older(count);
24     return 0;
25 }
26 void get_data(int n){
27     for (int i = 0; i < n; i++) {
28         printf("Enter student %d data :",i+1 );
29         scanf("%d %s %s %d %f",&s[i].rl,&s[i].name,&s[i].address,&s[i].age,&s[i].marks);
30     }
31 }
32 void print_data(int n){
33     for (int i = 0; i < n; i++) {
34         printf("\nDetails of student %d",i+1);
35         printf("\nRoll no: %d name: %s address: %s age: %d marks: %f",s[i].rl,s[i].name,s[i].address,s[i].age,s[i].marks);
36     }
37 }
38 }
39
40 void elder_older(int n){
41     int old=s[0].age;
42     int o;
43     int eld=s[0].age;
44     int e;
45     for ( int i = 1; i < n ; i++)
46     {
47         if (s[i].age > old){
48             old=s[i].age;
49             o=i;
50         }
51         if (s[i].age < eld){
52             eld=s[i].age;
53             e=i;
54         }
55     }
56 }
57 printf("\nEldest student: ");
58 printf("\nRoll no: %d name: %s address: %s age: %d marks: %f",s[e].rl,s[e].name,s[e].address,s[e].age,s[e].marks);
59 printf("\nOldest student: ");
60 printf("\nRoll no: %d name: %s address: %s age: %d marks: %f",s[o].rl,s[o].name,s[o].address,s[o].age,s[o].marks);
61
62 }

```

Figure 3

a program to read RollNo, Name, Address, Age & average-marks of 'n' students in a class. Print the list of students and the youngest and eldest student in the class.

## 4. Presentation of Results

```
(*_company_struct *)
Enter Name of Company : abc
Enter address of Company : baker street
Enter phone number of Company : +91 123456789
Enter Number of Employees in the Company : 25

Company Data:

Name of Company : abc
Address of Company : baker street
Phone number of Company : +91 123456789
Number of Employees in the Company 25
PS D:\RUAS\sem 03\DSA lab\programs> |
```

Figure 4 output of program to read name of company, its address, phone and No. Of Employee. Finally display these members' value

```
Enter the 1st time object
2 65 120
Enter the 2nd time object
3 22 500
Hours = 6, min = 37, sec = 20
PS D:\RUAS\sem 03\DSA lab\programs> |
```

Figure 5 output of program to add two time objects by passing structure variables to function and display result in H: M: S format.

```
Enter number of students: 3
Enter student 1 data :1 abc xyz 23 250
Enter student 2 data :2 min kkk 12 650
Enter student 3 data :3 jin mmm 55 450

Details of student 1
Roll no: 1 name: abc address: xyz age: 23 marks: 250.000000
Details of student 2
Roll no: 2 name: min address: kkk age: 12 marks: 650.000000
Details of student 3
Roll no: 3 name: jin address: mmm age: 55 marks: 450.000000
Eldest student:
Roll no: 2 name: min address: kkk age: 12 marks: 650.000000
Oldest student:
Roll no: 3 name: jin address: mmm age: 55 marks: 450.000000
PS D:\RUAS\sem 03\DSA lab\programs> |
```

Figure 6 output of a program to read RollNo, Name, Address, Age & average-marks of 'n' students in a class. Print the list of students and the youngest and eldest student in the class



## 5. Conclusions

### Learning Happened:

- A structure is a user defined data type in C. A structure creates a data type that can be used to group items of possibly different types into a single type
- 'struct' keyword is used to create a structure. Eg.,

```
struct address
{
    char name[50];
    char street[100];
    char city[50];
    char state[20];
    int pin;
};
```

- A structure variable can either be declared with structure declaration or as a separate declaration like basic types.
- Structure members are accessed using dot (.) operator.

Hence we can see the programs are compiled successfully without any error.