

EXPERIMENT 2

Aim:

1. Create a structure Student in C with student name, student roll number and student address as its data members. Create the variable of type student and print the values.
2. Modify the above program to implement arrays of structure. Create an array of 5 students and print their values.
3. Create a structure Organization with organization name and organization ID as its data members. Next, create another structure Employee that is nested in structure Organization with employee ID, employee salary and employee name as its data members. Write a program in such a way that there are two organizations and each of these contains two employees.

Theory:

- **Definition:** A struct is a user-defined data type in C that groups related variables of different types into a single unit.
- **Members:** Each variable within a struct is called a member and can be of any data type, including other structs.
- **Usage:** Structures help organize complex data, encapsulating it in a manageable format.
- **Advantages:** They enhance code readability and maintainability by logically grouping related data.
- **Modeling:** Structures are useful for representing real-world entities and aligning data in memory efficiently.

Structure:

Code:

```
#include <stdio.h>
#include <string.h>

typedef struct Student {
    char name[30];
    int roll_no;
    char address[100];
}
Student;

int main(void)
{
    Student s1;
    printf("Enter the name of the student: ");
    scanf("%s", &s1.name);
    printf("Enter the roll no of the student: ");
    scanf("%d", &s1.roll_no);
    printf("Enter the address of the student: ");
    scanf("%s", &s1.address);

    printf("%s\n", s1.name);
    printf("%d\n", s1.roll_no);
    printf("%s\n", s1.address);
}
```

```
    return 0;
}
```

Output:

```
Enter the name of the student: Hello
Enter the roll no of the student: 153
Enter the address of the student: Hellohello
Hello
153
Hellohello
```

Array of Structure:

Code:

```
#include <stdio.h>
#include <string.h>

typedef struct Student {
    char name[30];
    int roll_no;
    char address[100];
}
Student;

int main(void)
{
    Student students[5];
    int i;

    for (i = 0; i < 5; i++) {
        printf("Enter the name of student %d: ", i + 1);
        scanf("%s", students[i].name);
        printf("Enter the roll no of student %d: ", i + 1);
        scanf("%d", &students[i].roll_no);
        printf("Enter the address of student %d: ", i + 1);
        scanf("%s", students[i].address);
    }

    printf("\nStudent Details:\n");
    for (i = 0; i < 5; i++) {
        printf("Student %d:\n", i + 1);
        printf("Name: %s\n", students[i].name);
        printf("Roll No: %d\n", students[i].roll_no);
        printf("Address: %s\n\n", students[i].address);
    }
}
```

```

return 0;
}

```

Output:

INPUT	OUTPUT
<pre> Enter the name of student 1: Helloone Enter the roll no of student 1: 153 Enter the address of student 1: helloone Enter the name of student 2: Hellotwo Enter the roll no of student 2: 153 Enter the address of student 2: hellotwo Enter the name of student 3: Hellothree Enter the roll no of student 3: 153 Enter the address of student 3: hellothree Enter the name of student 4: Hellofour Enter the roll no of student 4: 153 Enter the address of student 4: hellofour Enter the name of student 5: Hellofive Enter the roll no of student 5: 153 Enter the address of student 5: hellofive </pre>	<pre> Student Details: Student 1: Name: Helloone Roll No: 153 Address: helloone Student 2: Name: Hellotwo Roll No: 153 Address: hellotwo Student 3: Name: Hellothree Roll No: 153 Address: hellothree Student 4: Name: Hellofour Roll No: 153 Address: hellofour Student 5: Name: Hellofive Roll No: 153 Address: hellofive </pre>

Nested Array of Structure:

Code:

```
#include <stdio.h>
```

```
#define ORGANIZATIONS 2
```

```
#define EMPLOYEES 2
```

```
typedef struct Employee
```

```
{
```

```
    char name[30];
```

```
    float salary;
```

```
    int id;
```

```
}
```

```
Employee;
```

```
typedef struct Organization {
```

```
    int name[30];
```

```

    int id;
    Employee employees[2];
}
Organization;

int main(void)
{
    Organization organizations[2];

    for (int i = 0; i < ORGANIZATIONS; i++) {
        printf("Enter the name of organization %d: ", i + 1);
        scanf("%s", organizations[i].name);
        printf("Enter the ID of organization %d: ", i + 1);
        scanf("%d", &organizations[i].id);

        for (int j = 0; j < EMPLOYEES; j++) {
            printf("\tEnter the name of employee %d in organization %d: ", j + 1, i + 1);
            scanf("%s", organizations[i].employees[j].name);
            printf("\tEnter the ID of employee %d in organization %d: ", j + 1, i + 1);
            scanf("%d", &organizations[i].employees[j].id);
            printf("\tEnter the salary of employee %d in organization %d: ", j + 1, i + 1);
            scanf("%f", &organizations[i].employees[j].salary);
            printf("\n");
        }
    }

    printf("\nOrganization Details:\n");
    for (int i = 0; i < ORGANIZATIONS; i++) {
        printf("Organization %d:\n", i + 1);
        printf("Name: %s\n", organizations[i].name);
        printf("ID: %d\n", organizations[i].id);

        for (int j = 0; j < EMPLOYEES; j++) {
            printf("\tEmployee %d:\n", j + 1);
            printf("\tName: %s\n", organizations[i].employees[j].name);
            printf("\tID: %d\n", organizations[i].employees[j].id);
            printf("\tSalary: %.2f\n", organizations[i].employees[j].salary);
            printf("\n");
        }
        printf("\n");
    }

    return 0;
}

```

Output:

INPUT	OUTPUT
<pre>Enter the name of organization 1: google Enter the ID of organization 1: 1 Enter the name of employee 1 in organization 1: helloone Enter the ID of employee 1 in organization 1: 1 Enter the salary of employee 1 in organization 1: 123 Enter the name of employee 2 in organization 1: hellotwo Enter the ID of employee 2 in organization 1: 2 Enter the salary of employee 2 in organization 1: 1234 Enter the name of organization 2: openai Enter the ID of organization 2: 2 Enter the name of employee 1 in organization 2: hellothree Enter the ID of employee 1 in organization 2: 1 Enter the salary of employee 1 in organization 2: 1234 Enter the name of employee 2 in organization 2: hellofour Enter the ID of employee 2 in organization 2: 2 Enter the salary of employee 2 in organization 2: 12345</pre>	<pre>Organization Details: Organization 1: Name: google ID: 1 Employee 1: Name: helloone ID: 1 Salary: 123.00 Employee 2: Name: hellotwo ID: 2 Salary: 1234.00 Organization 2: Name: openai ID: 2 Employee 1: Name: hellothree ID: 1 Salary: 1234.00 Employee 2: Name: hellofour ID: 2 Salary: 12345.00</pre>