# Assignment 19

Structure

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

// 1. Define a structure Employee with member variables id, name, salary
struct Employee {
    int id;
    char name[100];
    float salary;
};

struct Student {
        int rollNo;
        char name[50];
};

struct Time {
    int hours;
    int minutes;
    int seconds;
};

struct Time getTimeDifference(struct Time t1, struct Time t2) {
    struct Time difference;
    int time1Seconds = t1.hours * 3600 + t1.minutes * 60 + t1.seconds;
    int time2Seconds = t2.hours * 3600 + t2.minutes * 60 + t2.seconds;
    int secondsDifference = time2Seconds - time1Seconds;
    if (secondsDifference < 0) {
```

```
        secondsDifference = -secondsDifference;
    }
    difference.hours = secondsDifference / 3600;
    difference.minutes = (secondsDifference % 3600) / 60;
    difference.seconds = (secondsDifference % 3600) % 60;
    return difference;
}

struct Marks {
        int rollNo;
        char name[50];
        float chemMarks;
        float mathsMarks;
        float phyMarks;
};


// Function to take input employee data from the user
void inputEmployeeData(struct Employee* emp) {
    printf("Enter Employee ID: ");
    scanf("%d", &emp->id);
    printf("Enter Employee Name: ");
    scanf(" %s", emp->name);
    printf("Enter Employee Salary: ");
    scanf("%f", &emp->salary);
}

// Function to display employee data
void displayEmployee(struct Employee emp) {
    printf("| %-4d | %-20s | %-10.2f |\n", emp.id, emp.name, emp.salary);
```

```
}

// Function to find the highest salary employee from an array of employees
struct Employee findHighestSalaryEmployee(const struct Employee employees[10]) {
    struct Employee highestSalaryEmployee = employees[0];
    for (int i = 1; i < 10; i++) {
        if (employees[i].salary > highestSalaryEmployee.salary) {
            highestSalaryEmployee = employees[i];
        }
    }
    return highestSalaryEmployee;
}

// Function to sort employees according to their salaries
void sortEmployeesBySalary(struct Employee employees[10]) {
    for (int i = 0; i < 10; i++) {
        for (int j = i + 1; j < 10; j++) {
            if (employees[i].salary > employees[j].salary) {
                struct Employee temp = employees[i];
                employees[i] = employees[j];
                employees[j] = temp;
            }
        }
    }
}
// Function to sort employees according to their names
void sortEmployeesByName(struct Employee employees[10]) {
    for (int i = 0; i < 10; i++) {
        for (int j = i + 1; j < 10; j++) {
```

```
            if (strcmp(employees[i].name, employees[j].name) > 0) {
                struct Employee temp = employees[i];
                employees[i] = employees[j];
                employees[j] = temp;
            }
        }
    }
}


int main() {
    struct Employee employees[10];

    //2. Write a function to take input employee data from the user.
    printf("Enter data for 10 employees:\n");
    for (int i = 0; i < 10; i++) {
        printf("Employee %d:\n", i + 1);
        inputEmployeeData(&employees[i]);
    }
    //3. Write a function to display employee data.
    printf("\n Employee data:\n");
    printf("| %-4s | %-20s | %-10s |\n", "ID", "Name", "Salary");
    printf("|------|----------------------|------------|\n");
    for (int i = 0; i < 10; ++i) {
        displayEmployee(employees[i]);
    }
    printf("\n");

    //4. Write a function to find the highest salary employee from a given array
of 10 employees.
```

```c
struct Employee highestSalaryEmployee = findHighestSalaryEmployee(employees);
printf("\nEmployee with the highest salary:\n");
printf("| %-4s | %-20s | %-10s |\n", "ID", "Name", "Salary");
printf("|------|----------------------|------------|\n");
displayEmployee(highestSalaryEmployee);
printf("\n");

//5. Write a function to sort employees according to their salaries
sortEmployeesBySalary(employees);
printf("\nEmployees sorted by salary:\n");
printf("| %-4s | %-20s | %-10s |\n", "ID", "Name", "Salary");
printf("|------|----------------------|------------|\n");
for (int i = 0; i < 10; ++i) {
    displayEmployee(employees[i]);
}
printf("\n");

//6. Write a function to sort employees according to their names
sortEmployeesByName(employees);
printf("\nEmployees sorted by name:\n");
printf("| %-4s | %-20s | %-10s |\n", "ID", "Name", "Salary");
printf("|------|----------------------|------------|\n");
for (int i = 0; i < 10; ++i) {
    displayEmployee(employees[i]);
}
printf("\n");

//7. Write a program to calculate the difference between two time periods.
struct Time startTime, endTime, difference;
```

```
    printf("Enter start time (hours minutes seconds): ");
    scanf("%d %d %d", &startTime.hours, &startTime.minutes, &startTime.seconds);
    printf("Enter end time (hours minutes seconds): ");
    scanf("%d %d %d", &endTime.hours, &endTime.minutes, &endTime.seconds);
    difference = getTimeDifference(startTime, endTime);
    printf("Time difference: %d hours, %d minutes, %d
seconds\n",difference.hours, difference.minutes, difference.seconds);


    //8. Write a program to store information of 10 students and display them
using structure.
    struct Student students[10];
    printf("Enter data for 10 students:\n");
    for (int i = 0; i < 10; ++i) {
        printf("Enter data for student %d:\n", i + 1);
        printf("Enter Roll Number: ");
        scanf("%d", &students[i].rollNo);
        printf("Enter Name: ");
        scanf("%s", students[i].name);
    }
    printf("\nStudent Information:\n");
    printf("| %-9s | %-20s |\n", "Roll No", "Name");
    for (int i = 0; i < 10; ++i) {
        printf("|-----------|----------------------|\n");
        printf("| %-9d | %-20s |\n", students[i].rollNo, students[i].name);



    }


    //9. Write a program to store information of n students and display them
using structure
    int n;
```

```
    printf("Enter the number of students: ");
    scanf("%d", &n);
    printf("Enter data for %d students:\n", n);
    for (int i = 0; i < n; ++i) {
        printf("Enter data for student %d:\n", i + 1);
        printf("Enter Roll Number: ");
        scanf("%d", &students[i].rollNo);
        printf("Enter Name: ");
        scanf("%s", students[i].name);
    }
    printf("\nStudent Information:\n");
    printf("| %-9s | %-20s |\n", "Roll No", "Name");
    for (int i = 0; i < n; ++i) {
        printf("|-----------|----------------------|\n");
        printf("| %-9d | %-20s |\n", students[i].rollNo, students[i].name);
    }
    //10. Write a program to enter the marks of 5 students in Chemistry,
Mathematics and Physics
    //using a structure named Marks having elements roll no.. name, chem_marks,
maths_marks and
    //phy_marks and then display the percentage of each student.
    struct Marks studentMarks[5];
    printf("Enter marks for 5 students in Chemistry, Mathematics, and Physics
(out of 100):\n");
    for (int i = 0; i < 5; ++i) {
        printf("Enter data for student %d:\n", i + 1);
        printf("Enter Roll Number: ");
        scanf("%d", &studentMarks[i].rollNo);
        printf("Enter Name: ");
        scanf("%s", studentMarks[i].name);
```

```
        printf("Enter Chemistry Marks: ");
        scanf("%f", &studentMarks[i].chemMarks);
        printf("Enter Mathematics Marks: ");
        scanf("%f", &studentMarks[i].mathsMarks);
        printf("Enter Physics Marks: ");
        scanf("%f", &studentMarks[i].phyMarks);
    }
    printf("\nStudent Percentage:\n");
    printf("| %-9s | %-20s | %-10s |\n", "Roll No", "Name", "Percentage" );
    for (int i = 0; i < 5; ++i) {
        float totalMarks = studentMarks[i].chemMarks + studentMarks[i].mathsMarks
+ studentMarks[i].phyMarks;
        float percentage = (totalMarks / 300) * 100;
        printf("|-----------|----------------------|------------|\n");
        printf("| %-9d | %-20s | %-10f |\n", studentMarks[i].rollNo,
studentMarks[i].name, percentage);
    }


    return 0;
}
```

```
Enter data for 10 employees:
Employee 1:
Enter Employee ID: 10
Enter Employee Name: firoz
Enter Employee Salary: 100000
Employee 2:
Enter Employee ID: 11
Enter Employee Name: ahmad
Enter Employee Salary: 99000
Employee 3:
Enter Employee ID: 12
Enter Employee Name: harshit
Enter Employee Salary: 87000
Employee 4:
Enter Employee ID: 13
Enter Employee Name: hammad
Enter Employee Salary: 99900
Employee 5:
Enter Employee ID: 14
Enter Employee Name: areez
Enter Employee Salary: 69000
Employee 6:
Enter Employee ID: 15
Enter Employee Name: kaif
Enter Employee Salary: 83000
Employee 7:
Enter Employee ID: 16
Enter Employee Name: kashif
Enter Employee Salary: 92000
Employee 8:
Enter Employee ID: 17
Enter Employee Name: aabid
Enter Employee Salary: 95000
```

```
Employee 9:
Enter Employee ID: 18
Enter Employee Name: rehan
Enter Employee Salary: 42000
Employee 10:
Enter Employee ID: 19
Enter Employee Name: yousuf
Enter Employee Salary: 50000

 Employee data:
| ID    | Name                    | Salary      |
|-------|-------------------------|-------------|
| 10    | firoz                   | 100000.00   |
| 11    | ahmad                   | 99000.00    |
| 12    | harshit                 | 87000.00    |
| 13    | hammad                  | 99900.00    |
| 14    | areez                   | 69000.00    |
| 15    | kaif                    | 83000.00    |
| 16    | kashif                  | 92000.00    |
| 17    | aabid                   | 95000.00    |
| 18    | rehan                   | 42000.00    |
| 19    | yousuf                  | 50000.00    |


Employee with the highest salary:
| ID    | Name                    | Salary      |
|-------|-------------------------|-------------|
| 10    | firoz                   | 100000.00   |
```

Employees sorted by salary:

| ID | Name | Salary |
|---|---|---|
| 18 | rehan | 42000.00 |
| 19 | yousuf | 50000.00 |
| 14 | areez | 69000.00 |
| 15 | kaif | 83000.00 |
| 12 | harshit | 87000.00 |
| 16 | kashif | 92000.00 |
| 17 | aabid | 95000.00 |
| 11 | ahmad | 99000.00 |
| 13 | hammad | 99900.00 |
| 10 | firoz | 100000.00 |

Employees sorted by name:

| ID | Name | Salary |
|---|---|---|
| 17 | aabid | 95000.00 |
| 11 | ahmad | 99000.00 |
| 14 | areez | 69000.00 |
| 10 | firoz | 100000.00 |
| 13 | hammad | 99900.00 |
| 12 | harshit | 87000.00 |
| 15 | kaif | 83000.00 |
| 16 | kashif | 92000.00 |
| 18 | rehan | 42000.00 |
| 19 | yousuf | 50000.00 |

```
Enter start time (hours minutes seconds): 19 11 20
Enter end time (hours minutes seconds): 19 56 56
Time difference: 0 hours, 45 minutes, 36 seconds
```

```
Enter data for 10 students:
Enter data for student 1:
Enter Roll Number: 041
Enter Name: firoz
Enter data for student 2:
Enter Roll Number: 040
Enter Name: harshit
Enter data for student 3:
Enter Roll Number: 030
Enter Name: ahmad
Enter data for student 4:
Enter Roll Number: 025
Enter Name: hammad
Enter data for student 5:
Enter Roll Number: 029
Enter Name: hammad
Enter data for student 6:
Enter Roll Number: 069
Enter Name: ahmar
Enter data for student 7:
Enter Roll Number: 051
Enter Name: areez
Enter data for student 8:
Enter Roll Number: 038
Enter Name: kaif
Enter data for student 9:
Enter Roll Number: 037
Enter Name: kashif
Enter data for student 10:
Enter Roll Number: 099
Enter Name: rehan
```

Student Information:

| Roll No | Name |
|---|---|
| 41 | firoz |
| 40 | harshit |
| 30 | ahmad |
| 25 | hammad |
| 29 | hammad |
| 69 | ahmar |
| 51 | areez |
| 38 | kaif |
| 37 | kashif |
| 99 | rehan |

Enter the number of students: 6

```
Enter the number of students: 6
Enter data for 6 students:
Enter data for student 1:
Enter Roll Number: 01
Enter Name: firoz
Enter data for student 2:
Enter Roll Number: 02
Enter Name: ahmad
Enter data for student 3:
Enter Roll Number: 03
Enter Name: hammad
Enter data for student 4:
Enter Roll Number: 04
Enter Name: aabid
Enter data for student 5:
Enter Roll Number: 05
Enter Name: mishkat
Enter data for student 6:
Enter Roll Number: 06
Enter Name: bushra
```

```
Student Information:
| Roll No    | Name                        |
|------------|-----------------------------|
| 1          | firoz                       |
|------------|-----------------------------|
| 2          | ahmad                       |
|------------|-----------------------------|
| 3          | hammad                      |
|------------|-----------------------------|
| 4          | aabid                       |
|------------|-----------------------------|
| 5          | mishkat                     |
|------------|-----------------------------|
| 6          | bushra                      |
Enter marks for 5 students in Chemistry:
```

```
Enter marks for 5 students in Chemistry,
Enter data for student 1:
Enter Roll Number: 10
Enter Name: firoz
Enter Chemistry Marks: 86
Enter Mathematics Marks: 99
Enter Physics Marks: 89
Enter data for student 2:
Enter Roll Number: 11
Enter Name: ahmad
Enter Chemistry Marks: 75
Enter Mathematics Marks: 68
Enter Physics Marks: 90
Enter data for student 3:
Enter Roll Number: 12
Enter Name: harshit
Enter Chemistry Marks: 85
Enter Mathematics Marks: 96
Enter Physics Marks: 86
Enter data for student 4:
Enter Roll Number: 13
Enter Name: hammad
Enter Chemistry Marks: 69
Enter Mathematics Marks: 88
Enter Physics Marks: 84
Enter data for student 5:
Enter Roll Number: 14
Enter Name: areez
```

```
Student Percentage:
| Roll No    | Name                    | Percentage  |
|------------|-------------------------|-------------|
| 10         | firoz                   | 91.333336   |
|------------|-------------------------|-------------|
| 11         | ahmad                   | 77.666664   |
|------------|-------------------------|-------------|
| 12         | harshit                 | 89.000000   |
|------------|-------------------------|-------------|
| 13         | hammad                  | 80.333336   |
|------------|-------------------------|-------------|
| 14         | areez                   | 97.000000   |
PS D:\cumputer suff\ASSigment>
```