Structure

1. Define a structure Employee with member variables id, name, salary

```c
#include <stdio.h>
#include <string.h>
struct Employee
{
    int id;
    char name[50];
    float salary;
};

int main()
{
    struct Employee e;
    printf("Enter employee ID : ");
    scanf("%d", &e.id);
    fflush(stdin);
    printf("Enter employee Name : ");
    fgets(e.name, 50, stdin);
    e.name[strlen(e.name) - 1] = '\0';
    printf("Enter employee Salary : ");
    scanf("%f", &e.salary);

     printf("\nEmployee ID : %d\nEmployee Name : %s\nEmployee Salary : Rs.
%.2f/-", e.id, e.name, e.salary);

    return 0;
}
```

```
================================================================================
Enter employee ID : 87
Enter employee Name : Shekh Akhtar Quraishi
Enter employee Salary : 22356.456

Employee ID : 87
Employee Name : Shekh Akhtar Quraishi
Employee Salary : Rs. 22356.46/-
```

2. Write a function to take input employee data from the user. [Refer structure from question 1]

```c
#include <stdio.h>
#include <string.h>
struct Employee
{
    int id;
    char name[50];
    float salary;
};
struct Employee input()
{
    struct Employee e;
    printf("Enter employee ID : ");
    scanf("%d", &e.id);
    fflush(stdin);
    printf("Enter employee Name : ");
    fgets(e.name, 50, stdin);
    e.name[strlen(e.name) - 1] = '\0';
    printf("Enter employee Salary : ");
    scanf("%f", &e.salary);
    return e;
}
```

```
void display(struct Employee e1)
{
     printf("\nEmployee ID : %d\nEmployee Name : %s\nEmployee Salary : Rs.
%.2f/-", e1.id, e1.name, e1.salary);
}
int main()
{
    display(input());
    return 0;
}
================================================================================
Output:
Enter employee ID : 123
Enter employee Name : Shekh Akhtar Quraishi
Enter employee Salary : 21566.3546

Employee ID : 123
Employee Name : Shekh Akhtar Quraishi
Employee Salary : Rs. 21566.36/-
```

3. Write a function to display employee data. [Refer structure from question 1]

```
#include <stdio.h>
#include <string.h>
struct Employee
{
    int id;
    char name[50];
    float salary;
};
struct Employee input()
{
    struct Employee e;
    printf("Enter employee ID : ");
    scanf("%d", &e.id);
    fflush(stdin);
    printf("Enter employee Name : ");
    fgets(e.name, 50, stdin);
    e.name[strlen(e.name) - 1] = '\0';
    printf("Enter employee Salary : ");
    scanf("%f", &e.salary);
    return e;
}

void display(struct Employee e1)
{
     printf("\nEmployee ID : %d\nEmployee Name : %s\nEmployee Salary : Rs.
%.2f/-", e1.id, e1.name, e1.salary);
}
int main()
{
    display(input());
    return 0;
}
================================================================================
Output:
Enter employee ID : 123
Enter employee Name : Shekh Akhtar Quraishi
Enter employee Salary : 21566.3546

Employee ID : 123
Employee Name : Shekh Akhtar Quraishi
Employee Salary : Rs. 21566.36/-
```

4. Write a function to find the highest salary employee from a given array of 10 employees. [Refer structure from question 1]

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

// defining structure
struct Employee
{
    int id;
    char name[50];
    float salary;
};

// defining input function for taking input from user
struct Employee input()
{
    struct Employee e;
    printf("Enter employee ID : ");
    scanf("%d", &e.id);
    fflush(stdin);
    printf("Enter employee Name : ");
    fgets(e.name, 50, stdin);
    e.name[strlen(e.name) - 1] = '\0';
    printf("Enter employee Salary : ");
    scanf("%f", &e.salary);
    return e;
}

// defining highest salary function to sort salary-wise
void highestSalary(struct Employee e[], int size)
{
    int i, j;
    struct Employee temp;
    for (i = 0; i < size - 1; i++)
    {
        for (j = i + 1; j < size; j++)
        {
            if (e[i].salary > e[j].salary)
            {
                temp = e[i];
                e[i] = e[j];
                e[j] = temp;
            }
        }
    }
}

// below function is display function to display employee detail
void display(struct Employee e1)
{
     printf("\nEmployee ID : %d\nEmployee Name : %s\nEmployee Salary : Rs.
%.2f/-\n", e1.id, e1.name, e1.salary);
}

// main function
int main()
{
    struct Employee em[10];
    int i, n;
     printf("How many employees data do you want to input (Max 10 employee):
");
    scanf("%d", &n);
                    printf("======================Enter     %d     employee
details======================\n", n);
```

```
    for (i = 0; i < n; i++)
        em[i] = input();

    highestSalary(em, n); // calling highestSalary function

    printf("\nThe highest salary employee");
    display(em[n - 1]); // calling display function
    return 0;
}
```

```
Output:
How many employees data do you want to input (Max 10 employee): 10
======================Enter 10 employee details======================
Enter employee ID : 1
Enter employee Name : Akhtar
Enter employee Salary : 15560
Enter employee ID : 2
Enter employee Name : Mukesh
Enter employee Salary : 17895.58
Enter employee ID : 3
Enter employee Name : Tarun
Enter employee Salary : 32589.785
Enter employee ID : 4
Enter employee Name : Gautam
Enter employee Salary : 45879.56
Enter employee ID : 5
Enter employee Name : Vijendra
Enter employee Salary : 7895.45
Enter employee ID : 6
Enter employee Name : Dhanmohan
Enter employee Salary : 124587
Enter employee ID : 7
Enter employee Name : Gajendra
Enter employee Salary : 10000
Enter employee ID : 8
Enter employee Name : Ankit
Enter employee Salary : 40000
Enter employee ID : 9
Enter employee Name : Akash
Enter employee Salary : 9000
Enter employee ID : 10
Enter employee Name : Abhijeet
Enter employee Salary : 18000.5976

The highest salary employee
Employee ID : 6
Employee Name : Dhanmohan
Employee Salary : Rs. 124587.00/-
```

5. Write a function to sort employees according to their salaries [refer structure from question 1]

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

// defining structure
struct Employee
{
    int id;
    char name[50];
    float salary;
};

// defining input function for take input from user
struct Employee input()
{
```

```
    struct Employee e;
    printf("Enter employee ID : ");
    scanf("%d", &e.id);
    fflush(stdin);
    printf("Enter employee Name : ");
    fgets(e.name, 50, stdin);
    e.name[strlen(e.name) - 1] = '\0';
    printf("Enter employee Salary : ");
    scanf("%f", &e.salary);
    return e;
}

// defining highest salary function to sort salary-wise
void highestSalary(struct Employee e[], int size)
{
    int i, j;
    struct Employee temp;
    for (i = 0; i < size - 1; i++)
    {
        for (j = i + 1; j < size; j++)
        {
            if (e[i].salary > e[j].salary)
            {
                temp = e[i];
                e[i] = e[j];
                e[j] = temp;
            }
        }
    }
}

// below function is display function to display employee detail
void display(struct Employee e1)
{
     printf("\nEmployee ID : %d\nEmployee Name : %s\nEmployee Salary : Rs.
%.2f/-\n", e1.id, e1.name, e1.salary);
}

// main function
int main()
{
    struct Employee em[10];
    int i, n;
     printf("How many employees data do you want to input (Max 10 employee):
");
    scanf("%d", &n);
                    printf("======================Enter     %d     employee
details======================\n", n);
    for (i = 0; i < n; i++)
        em[i] = input();

    highestSalary(em, n); // calling highestSalary function

    printf("\nSorted employees according to their salaries");
    for (i = 0; i < n; i++)
        display(em[i]);

    return 0;
}
================================================================================
Output:
How many employees data do you want to input (Max 10 employee): 5
======================Enter 5 employee details======================
Enter employee ID : 145
```

```
Enter employee Name : Gautam Sharma
Enter employee Salary : 15000
Enter employee ID : 258
Enter employee Name : Shekh Akhtar
Enter employee Salary : 17000
Enter employee ID : 369
Enter employee Name : Tarun
Enter employee Salary : 3000
Enter employee ID : 148
Enter employee Name : Mukesh
Enter employee Salary : 2000
Enter employee ID : 357
Enter employee Name : Vijendra
Enter employee Salary : 5000.568

Sorted employees according to their salaries
Employee ID : 148
Employee Name : Mukesh
Employee Salary : Rs. 2000.00/-

Employee ID : 369
Employee Name : Tarun
Employee Salary : Rs. 3000.00/-

Employee ID : 357
Employee Name : Vijendra
Employee Salary : Rs. 5000.57/-

Employee ID : 145
Employee Name : Gautam Sharma
Employee Salary : Rs. 15000.00/-

Employee ID : 258
Employee Name : Shekh Akhtar
Employee Salary : Rs. 17000.00/-
```

6. Write a function to sort employees according to their names [refer structure from question 1]

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

// defining structure
struct Employee
{
    int id;
    char name[50];
    float salary;
};

// defining input function for take input from user
struct Employee input()
{
    struct Employee e;
    printf("Enter employee ID : ");
    scanf("%d", &e.id);
    fflush(stdin);
    printf("Enter employee Name : ");
    fgets(e.name, 50, stdin);
    e.name[strlen(e.name) - 1] = '\0';
    printf("Enter employee Salary : ");
    scanf("%f", &e.salary);
    return e;
}

// defining name wise function to sort array name-wise
```

```c
void namewiseSort(struct Employee e[], int size)
{
    int i, j, result;
    struct Employee temp;
    for (i = 0; i < size - 1; i++)
    {
        for (j = i + 1; j < size; j++)
        {
            result = strcmp(e[i].name, e[j].name);
            if (result > 0)
            {
                temp = e[i];
                e[i] = e[j];
                e[j] = temp;
            }

        }
    }
}

// below function is display function to display employee detail
void display(struct Employee e1)
{
     printf("\nEmployee ID : %d\nEmployee Name : %s\nEmployee Salary : Rs.
%.2f/-\n", e1.id, e1.name, e1.salary);
}

// main function
int main()
{
    struct Employee em[10];
    int i, n;
     printf("How many employees data do you want to input (Max 10 employee):
");
    scanf("%d", &n);
                    printf("======================Enter     %d     employee
details======================\n", n);
    for (i = 0; i < n; i++)
        em[i] = input();

    namewiseSort(em, n); // calling highestSalary function

    printf("\nSorted employees according to their names");
    for (i = 0; i < n; i++)
        display(em[i]);

    return 0;
}
```

==========

```
Output:
How many employees data do you want to input (Max 10 employee): 5
======================Enter 5 employee details======================
Enter employee ID : 123
Enter employee Name : zameer
Enter employee Salary : 5000
Enter employee ID : 456
Enter employee Name : vijendra
Enter employee Salary : 6000
Enter employee ID : 789
Enter employee Name : akhtar
Enter employee Salary : 8000
Enter employee ID : 147
Enter employee Name : gautam
Enter employee Salary : 6000
```

```
Enter employee ID : 369
Enter employee Name : mukesh
Enter employee Salary : 8975

Sorted employees according to their names
Employee ID : 789
Employee Name : akhtar
Employee Salary : Rs. 8000.00/-

Employee ID : 147
Employee Name : gautam
Employee Salary : Rs. 6000.00/-

Employee ID : 369
Employee Name : mukesh
Employee Salary : Rs. 8975.00/-

Employee ID : 456
Employee Name : vijendra
Employee Salary : Rs. 6000.00/-

Employee ID : 123
Employee Name : zameer
Employee Salary : Rs. 5000.00/-
```

7. Write a program to calculate the difference between two time periods.

```
#include <stdio.h>
struct time
{
    int h, m, s;
};
void difference(struct time t1, struct time t2)
{
    struct time difference;
    if (t1.s < t2.s)
    {
        if (t1.m < t2.m)
        {
            --t1.h;
            t1.m = t1.m + 60;
        }
        t1.m--;
        t1.s = t1.s + 60;
    }

    difference.s = t1.s - t2.s;
    difference.m = t1.m - t2.m;
    difference.h = t1.h - t2.h;
     printf("Difference : %d Hours %d Minutes %d Seconds\n", difference.h,
difference.m, difference.s);
}
int main()
{
    struct time t1, t2;

    printf("Enter time-1 (HH:MM:SS) : ");
    scanf("%d:%d:%d", &t1.h, &t1.m, &t1.s);
    printf("Enter time-2 (HH:MM:SS) : ");
    scanf("%d:%d:%d", &t2.h, &t2.m, &t2.s);
    if (t1.h > 24 || t1.m > 60 || t1.s > 60 || t2.h > 24 || t2.m > 60 || t2.s
> 60)
    {
        printf("Invalid input");
        return 0;
```

```
    }
    (t1.h > t2.h) ? difference(t1, t2) : difference(t2, t1);
    return 0;
}
================================================================================
Output:
Enter time-1 (HH:MM:SS) : 10:60:60
Enter time-2 (HH:MM:SS) : 22:51:1
Difference : 11 Hours 50 Minutes 1 Seconds
```

8. Write a program to store information of 10 students and display them using structure.

```
#include <stdio.h>
#include <string.h>
struct Student
{
    int roll, age;
    char name[50];
};
struct Student input()
{
    struct Student e;
    printf("Enter student roll number : ");
    scanf("%d", &e.roll);
    fflush(stdin);
    printf("Enter student name : ");
    fgets(e.name, 50, stdin);
    e.name[strlen(e.name) - 1] = '\0';
    printf("Enter age : ");
    scanf("%d", &e.age);
    return e;
}

void display(struct Student e1)
{
      printf("\nStudent roll number : %d\nStudent name : %s\nStudent age :
%d\n", e1.roll, e1.name, e1.age);
}
int main()
{
    struct Student a[10];
    int i;
    printf("Enter 10 students informations\n");
    for (i = 0; i < 10; i++)
        a[i] = input();
    for (i = 0; i < 10; i++)
        display(a[i]);
    return 0;
}
================================================================================
Output:
Enter 10 students informations
Enter student roll number : 1
Enter student name : Akhtar
Enter age : 26
Enter student roll number : 2
Enter student name : Gautam
Enter age : 25
Enter student roll number : 3
Enter student name : Vijendra
Enter age : 27
Enter student roll number : 4
Enter student name : Mukesh
Enter age : 28
Enter student roll number : 5
```

```
Enter student name : Tarun
Enter age : 24
Enter student roll number : 6
Enter student name : Ankit
Enter age : 30
Enter student roll number : 7
Enter student name : Akash
Enter age : 28
Enter student roll number : 8
Enter student name : Ghanshyam
Enter age : 28
Enter student roll number : 9
Enter student name : Gajendra
Enter age : 30
Enter student roll number : 10
Enter student name : Manish
Enter age : 27

Student roll number : 1
Student name : Akhtar
Student age : 26

Student roll number : 2
Student name : Gautam
Student age : 25

Student roll number : 3
Student name : Vijendra
Student age : 27

Student roll number : 4
Student name : Mukesh
Student age : 28

Student roll number : 5
Student name : Tarun
Student age : 24

Student roll number : 6
Student name : Ankit
Student age : 30

Student roll number : 7
Student name : Akash
Student age : 28

Student roll number : 8
Student name : Ghanshyam
Student age : 28

Student roll number : 9
Student name : Gajendra
Student age : 30

Student roll number : 10
Student name : Manish
Student age : 27
```

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

```c
#include <stdio.h>
#include <string.h>
struct student
{
    int id, age;
```

```
    char name[50];
};

struct student input()
{
    struct student std;
    printf("Enter student roll number : ");
    scanf("%d", &std.id);
    fflush(stdin);
    printf("Enter student name : ");
    fgets(std.name, 50, stdin);
    std.name[strlen(std.name) - 1] = '\0';
    printf("Enter student age : ");
    scanf("%d", &std.age);
    return std;
}

void display(struct student s)
{
    printf("\nStudent roll number     :       %d\n", s.id);
    printf("Student name            :       %s\n", s.name);
    printf("Student age             :       %d\n", s.age);
}

int main()
{
    int i, n;
    struct student st[50];
    printf("Enter number of student to store information : ");
    scanf("%d", &n);
                printf("==============================Enter    %d    students
informations==============================\n", n);
    for (i = 0; i < n; i++)
        st[i] = input();

                    printf("\n==============================%d     students
informations==============================\n", n);
    for (i = 0; i < n; i++)
        display(st[i]);

    return 0;
}
```

==========

Output:

```
Enter number of student to store information : 3
==============================Enter               3               students
informations==============================
Enter student roll number : 123
Enter student name : Sehkh Akhtar
Enter student age : 27
Enter student roll number : 456
Enter student name : Gautam Sharma
Enter student age : 28
Enter student roll number : 789
Enter student name : Vijendra Kumar
Enter student age : 26

==============================3                               students
informations==============================

Student roll number     :       123
Student name            :       Sehkh Akhtar
Student age             :       27
```

```
Student roll number     :       456
Student name            :       Gautam Sharma
Student age             :       28

Student roll number     :       789
Student name            :       Vijendra Kumar
Student age             :       26
```

10. Write a program to enter the marks of 5 students in Chemistry, Mathematics and Physics (each out of 100) 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.

```c
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
struct student
{
    int roll, chem_marks, maths_marks, phy_marks;
    float percent;
    char name[50];
};

struct student input()
{
    struct student std;
    printf("Enter student roll number : ");
    scanf("%d", &std.roll);
    fflush(stdin);
    printf("Enter student name : ");
    fgets(std.name, 50, stdin);
    std.name[strlen(std.name) - 1] = '\0';
    printf("Enter Chemistry, Mathematics and Physics marks respectively (each
out of 100) : ");
    scanf("%d%d%d", &std.chem_marks, &std.maths_marks, &std.phy_marks);
    if (std.chem_marks < 0 || std.chem_marks > 100 || std.maths_marks < 0 ||
std.maths_marks > 100 || std.phy_marks < 0 || std.phy_marks > 100)
    {
        printf("Invalid marks input");
        exit(0);
    }

    std.percent = (std.chem_marks + std.maths_marks + std.phy_marks) / 3.0;
    return std;
}

void display(struct student s)
{
    printf("\nStudent roll number                         :       %d\n",
s.roll);
    printf("Student name                                :       %s\n",
s.name);
    printf("Chemistry, Mathematics and Physics marks    :       %d,    %d,
%d\n", s.chem_marks, s.maths_marks, s.phy_marks);
    printf("Student percentage                          :       %.2f %\n",
s.percent);
}

int main()
{
    int i;
    struct student st[5];
```

```
                printf("==============================Enter    5    students
informations==============================\n");
    for (i = 0; i < 5; i++)
        st[i] = input();

                    printf("\n==============================5     students
informations==============================\n");
    for (i = 0; i < 5; i++)
        display(st[i]);

    return 0;
}
================================================================================
Output:
==============================Enter               5               students
informations==============================
Enter student roll number : 1
Enter student name : Akhtar
Enter Chemistry, Mathematics and Physics marks respectively (each out of 100)
: 89 65 82
Enter student roll number : 2
Enter student name : Gautam
Enter Chemistry, Mathematics and Physics marks respectively (each out of 100)
: 56 87 95
Enter student roll number : 3
Enter student name : Vijendra
Enter Chemistry, Mathematics and Physics marks respectively (each out of 100)
: 56 82 97
Enter student roll number : 4
Enter student name : Mukesh
Enter Chemistry, Mathematics and Physics marks respectively (each out of 100)
: 45 62 82
Enter student roll number : 5
Enter student name : Tarun
Enter Chemistry, Mathematics and Physics marks respectively (each out of 100)
: 45 62 83

==============================5                                   students
informations==============================

Student roll number                         :       1
Student name                                :       Akhtar
Chemistry, Mathematics and Physics marks    :       89,   65,   82
Student percentage                          :       78.67 %

Student roll number                         :       2
Student name                                :       Gautam
Chemistry, Mathematics and Physics marks    :       56,   87,   95
Student percentage                          :       79.33 %

Student roll number                         :       3
Student name                                :       Vijendra
Chemistry, Mathematics and Physics marks    :       56,   82,   97
Student percentage                          :       78.33 %

Student roll number                         :       4
Student name                                :       Mukesh
Chemistry, Mathematics and Physics marks    :       45,   62,   82
Student percentage                          :       63.00 %

Student roll number                         :       5
Student name                                :       Tarun
Chemistry, Mathematics and Physics marks    :       45,   62,   83
Student percentage                          :       63.33 %
```