Assignment 19

Structure

#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.

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;

}