Assignment - 21 (Structure)

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

struct Employee

{

int id;

char name[40];

float salary;

};

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

question 1 ]

#include<stdio.h>

#include<string.h>

struct Employee

{

int id;

char name[40];

float salary;

};

struct Employee EmployeeDatainput()

{

struct Employee e;

printf("Enter employee id: ");

scanf("%d", &e.id);

printf("Enter name of employee: ");

fflush(stdin);

fgets(e.name, 40, stdin);

e.name[strlen(e.name) - 1] = '\0';

printf("Enter salary of employee: ");

scanf("%f", &e.salary);

return e;

}

int main()

{

struct Employee emp;

emp = EmployeeDatainput();

printf("The data entered for the employee is:\n");

printf("Employee Id: %d\n", emp.id);

printf("Name: %s\n", emp.name);

printf("Salary: %f", emp.salary);

return 0;

}

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[40];

float salary;

};

void displayEmployeeData(struct Employee e)

{

printf("Employee data is:\n");

printf("Employee Id: %d\n", e.id);

printf("Name: %s\n", e.name);

printf("Salary: %f", e.salary);

}

int main()

{

struct Employee emp;

emp.id = 101;

strcpy(emp.name, "Demo User");

emp.salary = 12500.50;

displayEmployeeData(emp);

return 0;

}

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

employees. [ Refer structure from question 1]

#include<stdio.h>

#include<string.h>

struct Employee

{

int id;

char name[40];

float salary;

};

struct Employee EmployeeDatainput()

{

struct Employee e;

printf("Enter employee id: ");

scanf("%d", &e.id);

printf("Enter name of employee: ");

fflush(stdin);

fgets(e.name, 40, stdin);

e.name[strlen(e.name) - 1] = '\0';

printf("Enter salary of employee: ");

scanf("%f", &e.salary);

return e;

}

void inputAllEmployeesData(struct Employee emps[], int size)

{

int i;

for(i = 0; i < size; i++)

{

printf("\n\nEnter Data for employee %d ->\n", i + 1);

emps[i] = EmployeeDatainput();

}

}

void displayEmployeeData(struct Employee e)

{

printf("Employee data is:\n");

printf("Employee Id: %d\n", e.id);

printf("Name: %s\n", e.name);

printf("Salary: %f", e.salary);

}

void displayAllEmployeesData(struct Employee emps[], int size)

{

int i;

for(i = 0; i < size; i++)

{

printf("\n\nData of Employee %d ->\n", i + 1);

displayEmployeeData(emps[i]);

}

}

struct Employee highestSalaryEmployee(struct Employee emps[], int size)

{

int i, highestSalary = emps[0].salary, highestSalaryIndex = 0;

for(i = 1; i < size; i++)

{

if(emps[i].salary > highestSalary)

{

highestSalary = emps[i].salary;

highestSalaryIndex = i;

}

}

return emps[highestSalaryIndex];

}

int main()

{

struct Employee emps[10];

inputAllEmployeesData(emps, 10);

printf("\nDetails of Employee with the highest salary are:\n");

displayEmployeeData(highestSalaryEmployee(emps, 10));

return 0;

}

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

question 1]

#include<stdio.h>

#include<string.h>

void swapNums(int \*num1, int \*num2)

{

\*num1 = \*num1 + \*num2;

\*num2 = \*num1 - \*num2;

\*num1 = \*num1 - \*num2;

}

void swapFloatingNums(float \*num1, float \*num2)

{

\*num1 = \*num1 + \*num2;

\*num2 = \*num1 - \*num2;

\*num1 = \*num1 - \*num2;

}

char \* maxLengthStringBetween2Strings(char s1[], char s2[])

{

int lens1 = strlen(s1), lens2 = strlen(s2);

if(lens1 > lens2)

return s1;

else

return s2;

}

void swapStrings(char \*s1, char \*s2)

{

char temp[strlen(maxLengthStringBetween2Strings(s1, s2))];

strcpy(temp, s1);

strcpy(s1, s2);

strcpy(s2, temp);

}

struct Employee

{

int id;

char name[40];

float salary;

};

struct Employee EmployeeDatainput()

{

struct Employee e;

printf("Enter employee id: ");

scanf("%d", &e.id);

printf("Enter name of employee: ");

fflush(stdin);

fgets(e.name, 40, stdin);

e.name[strlen(e.name) - 1] = '\0';

printf("Enter salary of employee: ");

scanf("%f", &e.salary);

return e;

}

void inputAllEmployeesData(struct Employee emps[], int size)

{

int i;

for(i = 0; i < size; i++)

{

printf("\n\nEnter Data for employee %d ->\n", i + 1);

emps[i] = EmployeeDatainput();

}

}

void displayEmployeeData(struct Employee e)

{

printf("Employee data is:\n");

printf("Employee Id: %d\n", e.id);

printf("Name: %s\n", e.name);

printf("Salary: %f", e.salary);

}

void displayAllEmployeesData(struct Employee emps[], int size)

{

int i;

for(i = 0; i < size; i++)

{

displayEmployeeData(emps[i]);

}

}

void sortEmployeesOnSalaryBasis(struct Employee arr[], int size)

{

int i, count = -1;

while(count)

{

count = 0;

for(i = 0; i < size - 1; i++)

if(arr[i].salary > arr[i + 1].salary)

{

swapNums(&arr[i].id, &arr[i + 1].id);

swapStrings(arr[i].name, arr[i + 1].name);

swapFloatingNums(&arr[i].salary, &arr[i + 1].salary);

count++;

}

}

}

int main()

{

struct Employee emps[10];

inputAllEmployeesData(emps, 10);

sortEmployeesOnSalaryBasis(emps, 10);

printf("\nDetails of Employees after sorting on salary basis are:\n");

displayAllEmployeesData(emps, 10);

return 0;

}

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

question 1]

#include<stdio.h>

#include<string.h>

void swapNums(int \*num1, int \*num2)

{

\*num1 = \*num1 + \*num2;

\*num2 = \*num1 - \*num2;

\*num1 = \*num1 - \*num2;

}

void swapFloatingNums(float \*num1, float \*num2)

{

\*num1 = \*num1 + \*num2;

\*num2 = \*num1 - \*num2;

\*num1 = \*num1 - \*num2;

}

char \* maxLengthStringBetween2Strings(char s1[], char s2[])

{

int lens1 = strlen(s1), lens2 = strlen(s2);

if(lens1 > lens2)

return s1;

else

return s2;

}

void swapStrings(char \*s1, char \*s2)

{

char temp[strlen(maxLengthStringBetween2Strings(s1, s2))];

strcpy(temp, s1);

strcpy(s1, s2);

strcpy(s2, temp);

}

struct Employee

{

int id;

char name[40];

float salary;

};

struct Employee EmployeeDatainput()

{

struct Employee e;

printf("Enter employee id: ");

scanf("%d", &e.id);

printf("Enter name of employee: ");

fflush(stdin);

fgets(e.name, 40, stdin);

e.name[strlen(e.name) - 1] = '\0';

printf("Enter salary of employee: ");

scanf("%f", &e.salary);

return e;

}

void inputAllEmployeesData(struct Employee emps[], int size)

{

int i;

for(i = 0; i < size; i++)

{

printf("\n\nEnter Data for employee %d ->\n", i + 1);

emps[i] = EmployeeDatainput();

}

}

void displayEmployeeData(struct Employee e)

{

printf("Employee data is:\n");

printf("Employee Id: %d\n", e.id);

printf("Name: %s\n", e.name);

printf("Salary: %f", e.salary);

}

void displayAllEmployeesData(struct Employee emps[], int size)

{

int i;

for(i = 0; i < size; i++)

{

displayEmployeeData(emps[i]);

}

}

void sortEmployeesOnNameBasis(struct Employee arr[], int size)

{

int i, count = -1;

while(count)

{

count = 0;

for(i = 0; i < size - 1; i++)

if(strcmp(arr[i].name, arr[i + 1].name) > 0)

{

swapNums(&arr[i].id, &arr[i + 1].id);

swapStrings(arr[i].name, arr[i + 1].name);

swapFloatingNums(&arr[i].salary, &arr[i + 1].salary);

count++;

}

}

}

int main()

{

struct Employee emps[10];

inputAllEmployeesData(emps, 10);

sortEmployeesOnNameBasis(emps, 10);

printf("\nDetails of Employees after sorting on name basis are:\n");

displayAllEmployeesData(emps, 10);

return 0;

}

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

#include<stdio.h>

struct Time

{

int hour;

int minute;

int second;

};

struct Time inputTimeData()

{

struct Time t;

printf("Enter hours: ");

scanf("%d", &t.hour);

printf("Enter minutes: ");

scanf("%d", &t.minute);

printf("Enter seconds: ");

scanf("%d", &t.second);

return t;

}

int main()

{

struct Time t1, t2;

int totalTimePeriodT1, totalTimePeriodT2;

printf("\nEnter data for first time period:\n");

t1 = inputTimeData();

printf("\nEnter data for second time period:\n");

t2 = inputTimeData();

totalTimePeriodT1 = t1.hour \* 3600 + t1.minute \* 60 + t1.second;

totalTimePeriodT2 = t2.hour \* 3600 + t2.minute \* 60 + t2.second;

printf("Difference between first time period and second time period is %d seconds.", totalTimePeriodT1 - totalTimePeriodT2);

return 0;

}

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

#include<stdio.h>

#include<string.h>

struct Student

{

int rollNumber;

char name[40];

float marks;

};

struct Student studentDatainput()

{

struct Student s;

printf("Enter student roll number: ");

scanf("%d", &s.rollNumber);

printf("Enter name of student: ");

fflush(stdin);

fgets(s.name, 40, stdin);

s.name[strlen(s.name) - 1] = '\0';

printf("Enter marks of student: ");

scanf("%f", &s.marks);

return s;

}

void displayStudentData(struct Student s)

{

printf("Student Roll Number: %d\n", s.rollNumber);

printf("Student Name: %s\n", s.name);

printf("Student Marks: %f", s.marks);

}

int main()

{

struct Student students[10];

int i;

for(i = 0; i < 10; i++)

{

printf("Enter Details for student %d:\n", i + 1);

students[i] = studentDatainput();

}

for(i = 0; i < 10; i++)

{

printf("\nDetails of Student %d are:\n", i + 1);

displayStudentData(students[i]);

}

return 0;

}

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

#include<stdio.h>

#include<string.h>

struct Student

{

int rollNumber;

char name[40];

float marks;

};

struct Student studentDatainput()

{

struct Student s;

printf("Enter student roll number: ");

scanf("%d", &s.rollNumber);

printf("Enter name of student: ");

fflush(stdin);

fgets(s.name, 40, stdin);

s.name[strlen(s.name) - 1] = '\0';

printf("Enter marks of student: ");

scanf("%f", &s.marks);

return s;

}

void displayStudentData(struct Student s)

{

printf("Student Roll Number: %d\n", s.rollNumber);

printf("Student Name: %s\n", s.name);

printf("Student Marks: %f", s.marks);

}

int main()

{

int i, size;

printf("Enter number of students whose data is to be stored: ");

scanf("%d", &size);

struct Student students[size];

for(i = 0; i < size; i++)

{

printf("Enter Details for student %d:\n", i + 1);

students[i] = studentDatainput();

}

for(i = 0; i < size; i++)

{

printf("\nDetails of Student %d are:\n", i + 1);

displayStudentData(students[i]);

}

return 0;

}

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.

#include<stdio.h>

#include<string.h>

struct Marks

{

int rollNumber;

char name[40];

float chem\_marks;

float maths\_marks;

float phy\_marks;

};

struct Marks studentDatainput()

{

struct Marks s;

printf("Enter student roll number: ");

scanf("%d", &s.rollNumber);

printf("Enter name of student: ");

fflush(stdin);

fgets(s.name, 40, stdin);

s.name[strlen(s.name) - 1] = '\0';

printf("Enter marks obtained in chemistry: ");

scanf("%f", &s.chem\_marks);

printf("Enter marks obtained in mathematics: ");

scanf("%f", &s.maths\_marks);

printf("Enter marks obtained in physics: ");

scanf("%f", &s.phy\_marks);

return s;

}

void displayStudentData(struct Marks s)

{

printf("Student Roll Number: %d\n", s.rollNumber);

printf("Student Name: %s\n", s.name);

printf("Student Marks in Chemistry: %f", s.chem\_marks);

printf("Student Marks in Mathematics: %f", s.maths\_marks);

printf("Student Marks in Physics: %f", s.phy\_marks);

}

int main()

{

struct Marks students[5];

int i;

for(i = 0; i < 5; i++)

{

printf("Enter Details for student %d:\n", i + 1);

students[i] = studentDatainput();

}

for(i = 0; i < 5; i++)

{

printf("\nPercentage of Student %d is: %lf", i + 1, (students[i].chem\_marks + students[i].maths\_marks + students[i].phy\_marks) / 3.0);

}

return 0;

}