Assignment-11

Array of Structures

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```c
/*1.Define a structure named Student having members name, rollno and marks in 5
    subjects.
    WAP to read record of 10 students.
    Calculate total marks and percentage of each student and print them.*/
#include <stdio.h>
#include <string.h>

struct Student
{
    char name[20], roll[10];
    float marks[5];
};
int main()
{
    struct Student s[10];
    int i, n;
    float sum[5];
    printf("Enter the value you want to record (max 10): ");
    scanf("%d", &n);
    for (i = 0; i < n; i++)
    {
        sum[i] = 0;
        printf("\nStudent %d\n", i+1);
        printf("Enter the student's name : ");
        scanf(" %[^\n]s", &s[i].name);
        printf("Enter the student's roll no. : ");
        scanf("%d", &s[i].roll);
        for (int j = 0; j < 5; j++)
        {
            printf("Enter the marks in subject %d : ", j + 1);
            scanf("%f", &s[i].marks[j]);
            sum[i] += s[i].marks[j];
        }
    }
    printf("Student name\t\tTotal marks\t\tPercentage\n");
    for (i = 0; i < n; i++)
    {
        printf("%s\t\t%.2f\t\t\t%.2f%%\n", s[i].name, sum[i], (sum[i] / 500) * 10
0);
    }
    return 0;
}
```

```c
/*2.Define a structure name Employee having its member empid, name, address,
      and salary.WAP to read record of 10 employees and
   (a)Display record of all employees who live in 'DHARAN'.
   (b)Display record of all employees who does not live in 'DHARAN'.
   (c)Display record of all employees whose salary ranges between 15000 to 20000.
   (d)Display record of all employees after increasing the salaries of all
      employees by 10%.
   (e)Increase the salary by 10% of only those employees who lives in
      'BIRATNAGAR' .
    Display record of all employees.
*/
#include<stdio.h>
#include<string.h>

struct Employee{
    char id[20], name[20], address[20];
    float salary;
};
 char * lower(char[20]);
int main(){
    struct Employee emp[10];
    int i,n,j;
    printf("Enter the value you want to record (max 10): ");
    scanf("%d",&n);
    for(i=0;i<n;i++){
        printf("\nEmployee %d\n", i+1);
        printf("Enter the employee's id : ");
        scanf(" %s",&emp[i].id);
        printf("Enter the employee's name : ");
        scanf(" %s",&emp[i].name);
        printf("Enter the %s's address : ",emp[i].name);
        scanf(" %s",&emp[i].address);
        printf("Enter the %s's salary : ",emp[i].name);
        scanf(" %f",&emp[i].salary);
    }
    printf("Record of all employees who lives in dharan :\n");
    printf("ID\t\tName\t\tAddress\t\tSalary\n");
    for(j=0;j<n;j++){
        for(i=0;i<strlen(emp[i].address);i++){
            if(emp[i].address[i]<90)
            emp[i].address[i] +=32;
        }
    }

    for(i=0;i<n;i++){
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        if(strcmp(lower(emp[i].address),"dharan")==0){
            printf("%s\t\t%s\t\t%s\t\t%.3f\n",emp[i].id,emp[i].name,emp[i].addres
s,emp[i].salary);
        }
    }
    printf("Record of all employees who doesn't live in dharan :\n");
    printf("ID\t\tName\t\tAddress\t\tSalary\n");

    for(i=0;i<n;i++){
        if(strcmp(lower(emp[i].address),"dharan") != 0 )
        {
            printf("%s\t\t%s\t\t%s\t\t%.3f\n",emp[i].id,emp[i].name,emp[i].addres
s,emp[i].salary);
        }
    }
    printf("Record of all employees whose salary range from 15000-20000 :\n");
    printf("ID\t\tName\t\tAddress\t\tSalary\n");
    for(i=0;i<n;i++){
        if(emp[i].salary>=15000 && emp[i].salary<=20000){
            printf("%s\t\t%s\t\t%s\t\t%.3f\n",emp[i].id,emp[i].name,emp[i].addres
s,emp[i].salary);
        }
    }
    printf("Record of all employees after increasing salary by 10%% :\n");
    printf("ID\t\tName\t\tAddress\t\tSalary\n");
    for(i=0;i<n;i++)
            printf("%s\t\t%s\t\t%s\t\t%.3f\n",emp[i].id,emp[i].name,emp[i].addres
s,emp[i].salary + (0.1*emp[i].salary));
    printf("Record of all employees after increasing salary by 10%% who live in b
iratnagar :\n");
    printf("ID\t\tName\t\tAddress\t\tSalary\n");
    for(i=0;i<n;i++){
        if(strcmp(lower(emp[i].address),"biratnagar")==0)
        printf("%s\t\t%s\t\t%s\t\t%.3f\n",emp[i].id,emp[i].name,emp[i].address,em
p[i].salary + (0.1*emp[i].salary));
    }
}
char * lower(char s[]){
    int i;
    for(i=0;i<strlen(s);i++){
        if(s[i]<96)
        s[i] += 32;
    }
    return s;
}
```

```c
/*3.Define a structure:Name(fname, mname, lastname)Person(age, contact, address).
    WAP to nest the structure Name within structure Person and
    read the record of 10 persons and display it.*/

#include <stdio.h>

struct name
{
    char fname[20], mname[20], lastname[20];
};

struct person
{
    struct name fullname;
    int age,contact;
    char address[15];
} p[10];

int main()
{
    for (int i = 0; i < 10; i++)
    {
        printf("\nPerson %d\n", i + 1);
        printf("Enter First Name: ");
        scanf("%s", p[i].fullname.fname);
        printf("Enter Middle Name: ");
        scanf("%s", p[i].fullname.mname);
        printf("Enter Surname: ");
        scanf("%s", p[i].fullname.lastname);
        printf("Enter Age: ");
        scanf("%d", &p[i].age);
        printf("Enter Contact No.: ");
        scanf("%d", &p[i].contact);
        printf("Enter Address: ");
        scanf("%s", p[i].address);
    }


    for (int i = 0; i < 10; i++)
    {
        printf("\nPerson %d\n", i + 1);
        printf("First Name: \t %s \n", p[i].fullname.fname);
        printf("Middle Name: \t %s \n", p[i].fullname.mname);
        printf("Surname: \t %s \n", p[i].fullname.lastname);
        printf("Age: \t\t %d \n", p[i].age);
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        printf("Contact No.: \t %d \n", p[i].contact);
        printf("Address: \t %s \n", p[i].address);
    }
    return 0;
}
```

```
/*4. Define a structure name Complex with its member real and img.
     Write a user defined function named addComplex() to add two given Complex
      numbers.The function should take two Complex type arguments and also
      return Complex type. WAP to implement the UDF in main program.*/
#include <stdio.h>

struct complex
{
    int real;
    int img;
} p[3];

struct complex addcomplex(struct complex, struct complex);

int main()
{
    for (int i = 0; i < 2; i++)
    {
        printf("Number %c\n", 65 + i);
        printf("Enter the real part of number: ");
        scanf("%d", &p[i].real);
        printf("Enter the imaginary part of number: ");
        scanf("%d", &p[i].img);
    }
    p[2] = addcomplex(p[0], p[1]);
    printf("The sum is %d+%di", p[2].real, p[2].img);
    return 0;
}
struct complex addcomplex(struct complex x, struct complex y)
{
    struct complex z;
    z.real = x.real + y.real;
    z.img = x.img + y.img;
    return z;
}
```

```c
/*5.Define a structure name Time with its member hr, min and sec.
    Write a user defined function named timeDiff() to calculate the
    difference between two time periods.The function should take two
    Time type arguments and also return Time type.WAP to implement the UDF in mai
n program.
*/
#include<stdio.h>
#include<string.h>
struct Time{
    int hour, min, sec;
}t1,t2;

struct Time timeDiff(struct Time, struct Time);
int main(){
    printf("Enter the Hour, Minute and Second for Time1: ");
    scanf("%d %d %d",&t1.hour,&t1.min,&t1.sec);
    printf("Enter the Hour, Minute and Second for Time2: ");
    scanf("%d %d %d",&t2.hour,&t2.min,&t2.sec);
    struct Time t3 = timeDiff(t1,t2);
    printf("The difference of Time is %d hour, %d minute and %d second.",t3.hour,
t3.min,t3.sec);
    return 0;
}

struct Time timeDiff(struct Time t1, struct Time t2){
    struct Time t3;
    t3.sec = t1.sec - t2.sec;
    t3.min = t1.min - t2.min;
    t3.hour = t1.hour - t2.hour;
    if(t3.hour<0 || t1.sec>60||t2.sec>60||t1.min>60||t2.min>60){
        printf("Input error...\n");
        main();
    }
    if(t3.sec<0){
        t3.min--;
        t3.sec += 60;
    }
    if(t3.min<0){
        t3.hour--;
        t3.min += 60;
    }
    return t3;
}
```

```c
/*6.Define a structure named Student having members name and rollno.
    WAP to read record of 10 students.
    Sort the students record in ascending order according to their roll numbers.
*/
#include<stdio.h>
#include<string.h>

struct Student{
   char name[20];
   int roll;
}s1[10],s2[10];
int main(){
   int i,j,n;
   printf("Enter the value you want to record (max 10): ");
    scanf("%d",&n);
   for(i=0;i<n;i++){
      printf("Enter the student's name : ");
      scanf("%s",&s1[i].name);
      printf("Enter the roll no. : ");
      scanf("%d",&s1[i].roll);
   }
   for(i=0;i<n;i++){
      for(j=i;j<n;j++){
         if(s1[i].roll>s1[j].roll){
            strcpy(s2[i].name,s1[i].name);
            strcpy(s1[i].name,s1[j].name);
            strcpy(s1[j].name,s2[i].name);
            s2[i].roll = s1[i].roll;
            s1[i].roll = s1[j].roll;
            s1[j].roll = s2[i].roll;
         }
      }
   }
   printf("Students record in ascending order acc. to their roll numbers.\n");
   printf("Name\t\tRoll No.\n");
   for(i=0;i<n;i++)
   printf("%s\t\t%d\n",s1[i].name,s1[i].roll);
   return 0;
}
```