**CSE 115 Lab on 2D array & Structure– Ara2**

1. **Matrix multiplication using 2D array:**

|  |
| --- |
| void main()  {  int A[100][100], B[100][100], C[100][100];  int i, j, k, rowsA, columnsA, rowsB, columnsB;  int sum;  printf("Number of rows in A: ");  scanf("%d",&rowsA);  printf("Number of columns in A: ");  scanf("%d",&columnsA);  printf("Number of rows in B: ");  scanf("%d",&rowsB);  printf("Number of columns in B: ");  scanf("%d",&columnsB);  if(columnsA != rowsB) {  printf("Invalid dimensions\n");  return;  }  for(i=0;i<rowsA;i++)  {  for(j=0;j<columnsA;j++)  {  printf("A[%d][%d]: ",i, j);  scanf("%d",&A[i][j]);  }  }  for(i=0;i<rowsB;i++)  {  for(j=0;j<columnsB;j++)  {  printf("B[%d][%d]: ",i, j);  scanf("%d",&B[i][j]);  }  }  printf("Result:\n");  for(i=0;i<rowsA;i++)  {  for(j=0;j<columnsB;j++)  {  printf("%10d ",C[i][j]);  }  printf("\n");  }  } |

1. **Structure variable declaration:**

|  |  |
| --- | --- |
| struct person  {  char name[50];  int cit\_no;  float salary;  };  void main(){  struct person p1, p2, p[20];  } | struct person  {  char name[50];  int cit\_no;  float salary;  }p1 ,p2 ,p[20]; |

**2. C Program that reads two distances (in feet+inches) and prints their sum:**

#include <stdio.h>

struct Distance{

int feet;

float inch;

}d1,d2,sum;

int main(){

printf("1st distance\n");

printf("Enter feet: ");

scanf("%d",&d1.feet); /\* input of feet for structure variable d1 \*/

printf("Enter inch: ");

scanf("%f",&d1.inch); /\* input of inch for structure variable d1 \*/

printf("2nd distance\n");

printf("Enter feet: ");

scanf("%d",&d2.feet); /\* input of feet for structure variable d2 \*/

printf("Enter inch: ");

scanf("%f",&d2.inch); /\* input of inch for structure variable d2 \*/

sum.feet=d1.feet+d2.feet;

sum.inch=d1.inch+d2.inch;

if (sum.inch>12){ //If inch is greater than 12, changing it to feet.

++sum.feet;

sum.inch=sum.inch-12;

}

printf("Sum of distances=%d\'-%.1f\"",sum.feet,sum.inch);

}

1. **Array of structs (using 10 entries):**

#include <stdio.h>

struct student{

char name[50];

int roll;

float marks;

}s[10];

void main(){

int i;

printf("Enter information of students:\n");

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

{

s[i].roll=i+1;

printf("\nFor roll number %d\n",s[i].roll);

printf("Enter name: ");

scanf("%s",s[i].name);

printf("Enter marks: ");

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

printf("\n");

}

printf("Displaying information of students:\n\n");

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

{

printf("\nInformation for roll number %d:\n",i+1);

printf("Name: ");

puts(s[i].name);

printf("Marks: %.1f",s[i].marks);

}

}

**EXERCISE:**

1. **Create a struct called Student (see below) and read the records of two students using it. Then print the name and id of the student who has higher CGPA than the other.**

struct Student{

char name[50];

int id;

float CGPA;

};

1. **Create a struct called BirthCertificate (see below) and read the info of two persons using it. Then print the name of the person who is older than the other. Also print his/her parents’ names.**

struct BirthCertificate {

int day, month, year; //to represent birthdate

char name[100], fatherName[100], motherName[100];

};

1. **Create a struct called “Employee” with the following members:**
2. **Name**
3. **Date of Birth (D.O.B., in short)**
4. **Starting Date**
5. **Salary**

**Create an array of 4 employee variables; then read user input to fill up this array. Then display the info of the employee who gets the highest salary.**

**Sample input/output:**

Name: **Bob Marley**

D.O.B: **1/4/1993**

Starting date: **12/6/2016**

Salary: **20000**

Name: **Rob Harfey**

D.O.B: **2/11/1982**

Starting date: **16/12/2016**

Salary: **20000**

Name: **katty Harley**

D.O.B: **12/4/1993**

Starting date: 2/6/2016

Salary: 30000

Name: **Betty Simpson**

D.O.B: **3/11/1980**

Starting date: **25/11/2016**

Salary: **10000**

Info of employee with highest salary:

Name: katty Harley

D.O.B: 12/4/1993

Starting date: 2/6/2016

Salary: 30000

**Hint: You can use scanf("%d/%d/%d", &d, &m, &y); command to read dates in the above format.**

**Bonus: Print the info of the employee who joined most recently (for the above inputs, the most recently joined employee is: Rob Harfey with starting date: 16/12/2016). You must create another struct for DOB and starting date (see nested structure). You can use the logic of comparing two dates in exercise 2 here.**

**Assignment:**

1. **Declare the structure\* needed for your project. Declare a 100 element array of that structure. Also declare an integer variable called num (with initial value zero) which indicates the number of *valid* (*i.e.,* elements read from user) elements in that array of structure variables. Declare the structure, array of structure, and num globally (outside all functions) and declare them before main function.**

***\* If you need more than one struct, you must declare them as well; for e.g. when you want to use a nested structure.***

1. **In main function, read the number of elements to be entered by user and assign that value to num (ask user to enter a value <= 100). Then read first num elements of your array of struct from user.**
2. **In main function, print the valid elements in your array of struct using a loop.**