## Programming Fundamentals

## LAB MANUALweek 10

## 

**Implementation of different programs using structures**

**Structure**

Structure is the collection of variables of different types under a single name for better visualization of problem. Arrays is also collection of data but arrays can hold data of only one type whereas structure can hold data of one or more types.

**How to define a structure in C++ programming?**

The struct keyword defines a structure type followed by an identifier (name of the structure). Then inside the curly braces, you can declare one or more members (declare variables inside curly braces) of that structure. For example:

**struct** person {

string name;

int age;

float salary;

};

Here a structure *person* is defined which has three members: *name*, *age* and *salary*.

When a structure is created, no memory is allocated. The structure definition is only the blueprint for the creating of variables. You can imagine it as a datatype. When you define an integer as below:

int foo;

The int specifies that, variable foo can hold integer element only. Similarly, structure definition only specifies that, what property a structure variable holds when it is defined.

## How to define a structure variable?

Once you declare a structure *person* as above. You can define a structure variable as:

person bill;

Here, a structure variable *bill* is defined which is of type structure person. When structure variable is defined, then only the required memory is allocated by the compiler.

## How to access members of a structure?

The members of structure variable is accessed using dot operator. Suppose, you want to access *age*of structure variable *bill* and assign it 50 to it. You can perform this task by using following code below:

bill.age = 50;

## Program 1:

C++ Program to assign data to members of a structure variable and display it.

#include<iostream>

usingnamespace std;

struct person {

char name[50];

int age;

float salary;

};

int main(){

person p1;

cout <<"Enter Full name: ";

cin.get(p1.name,50);

cout <<"Enter age: ";

cin >> p1.age;

cout <<"Enter salary: ";

cin >> p1.salary;

cout <<"\nDisplaying Information."<< endl;

cout <<"Name: "<< p1.name << endl;

cout <<"Age: "<< p1.age << endl;

cout <<"Salary: "<< p1.salary;

return0;

}

## Program 2:

/ This program demonstrates the use of a record (C++ struct)

#include <iostream>

using namespace std;

struct PersonRec

{

string lastName;

string firstName;

int age;

};

main()

{

PersonRec thePerson;

cout << "Enter first name: ";

cin >> thePerson.firstName;

cout << "Enter last name: ";

cin >> thePerson.lastName;

cout << "Enter age: ";

cin >> thePerson.age;

cout << "\n\nHello " << thePerson.firstName << ' '

<< thePerson.lastName << ". How are you?\n";

cout << "\nCongratulations on reaching the age of "

<< thePerson.age << ".\n";

}

**Program 3:**

**/// This program demonstrates the use of a nested struct**

#include <iostream>

using namespace std;

struct GradeRec

{

float percent;

char grade;

};

struct StudentRec

{

string lastName;

string firstName;

int age;

GradeRec courseGrade;

};

main()

{

StudentRec student;

cout << "Enter first name: ";

cin >> student.firstName;

cout << "Enter last name: ";

cin >> student.lastName;

cout << "Enter age: ";

cin >> student.age;

cout << "Enter overall percent: ";

cin >> student.courseGrade.percent;

if(student.courseGrade.percent >= 90)

{

student.courseGrade.grade = 'A';

}

else if(student.courseGrade.percent >= 75)

{

student.courseGrade.grade = 'B';

}

else

{

student.courseGrade.grade = 'F';

}

cout << "\n\nHello " << student.firstName << ' ' << student.lastName

<< ". How are you?\n";

cout << "\nCongratulations on reaching the age of " << student.age

<< ".\n";

cout << "Your overall percent score is "

<< student.courseGrade.percent << " for a grade of "

<< student.courseGrade.grade;

}

**goto Statement**

#include <cstdlib>

#include <iostream>

#include <conio.h>

using namespace std;

int main()

{

int b;

do{

start:

cout<<"Enter b :"<<endl;

cin >> b; //assume error checking etc

if(b < 2)

goto start;

else

cout<<"you can’t go to start"<<endl;

}while(b!=0);

}

**Task 01**

Make a program that uses a structure named student and contains two members namely Roll number andPF Score. Roll number should be initialized at the start of program.

User can enter PF Score of at most 3 students. Make use of switch statement, do while loop or goto to repeatedly display the main menu.

Output of the code should look like this:

