Structure

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CSC 322 Lab class 4

Introduction

We are going to cover today

- Union
- Typedef
- Enumeration

Revision on struct

- A structure is a user-defined data type available in C/c++ that allows to combining data items of different kinds. Structures are used to represent a record.

Union

- A union is a special data type available in C/c++ that allows storing different data types in the same memory location. You can define a union with many members, but only one member can contain a value at any given time. Unions provide an efficient way of using the same memory location for multiple purposes.
- **Defining a Union:** To define a union, you must use the **union** statement in the same way as you did while defining a structure. The union statement defines a new data type with more than one member for your program. The format of the union statement is as follows:

Syntax for declaring union

```
union union-name
 {
 datatype var1;
 datatype var2;
 - - - - - - - - - - - -
 datatype varN;
};
```

```
union Employee {
int Id;
 char Name[25];
int Age;
 long Salary;
 };
```

Definition

- Both Definition and accessing the members is Similar with structure's definition and accessing.

union union-name obj;

```
Employee E;
cout << "\nEnter Employee Id : ";
 cin >> E.Id;
cout << "\n\nEmployee Id : " << E.Id;
```

Difference with struct

	STRUCTURE	UNION
Keyword	The keyword **struct** is used to define a structure	The keyword **union** is used to define a union.
Size	When a variable is associated with a structure, the compiler allocates the memory for each member. The size of structure is **greater than or equal to the sum of sizes of its members.**	when a variable is associated with a union, the compiler allocates the memory by considering the size of the largest memory. So, size of **union is equal to the size of largest member.**
Memory	Each member within a structure is assigned unique storage area of location.	Memory allocated is shared by individual members of union.
Value Altering	Altering the value of a member will not affect other members of the structure.	Altering the value of any of the member will alter other member values.
Accessing members	Individual member can be accessed at a time.	Only one member can be accessed at a time.
Initialization of Members	Several members of a structure can initialize at once.	Only the first member of a union can be initialized.

Typedef

- Basically struct is used to define a structure. But when we want to use it we have to use the struct keyword in C. If we use the typedef keyword, then a new name, we can use the struct by that name, without writing the struct keyword.
- In C++, there is no difference between 'struct' and 'typedef struct' because, in C++, all struct/union/enum/class declarations act like they are implicitly typedef'ed, as long as the name is not hidden by another declaration with the same name.

Enumeration

C++ Enumeration

- Enum in C++ is a data type that contains fixed set of constants.
- It can be used for days of the week (SUNDAY, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY and SATURDAY) , directions (NORTH, SOUTH, EAST and WEST) etc

- enum improves type safety
- enum can be easily used in switch
- enum can be traversed
- enum can have fields, constructors and methods
- enum may implement many interfaces but cannot extend any class because it internally extends Enum class

Assignment

1 . An array stores details of 25 students (rollno, name, marks in three subject). Write a program to create such an array and print out a list of students who have failed in more than one subject. [hint : use struct]

2. Write a short comparison about the structure, union , enumeration and class.

Assignment

Deadline for submission is April 17.

- You are going to submit using the bot @Elicasebot
- You must compress your all details [.zip, .rar,…]
- Respect deadline and don’t cheat. The exercise is simple.