



FEU INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING • COLLEGE OF COMPUTER STUDIES

Structures

CSPROG2

Computer Programming 2 for CS



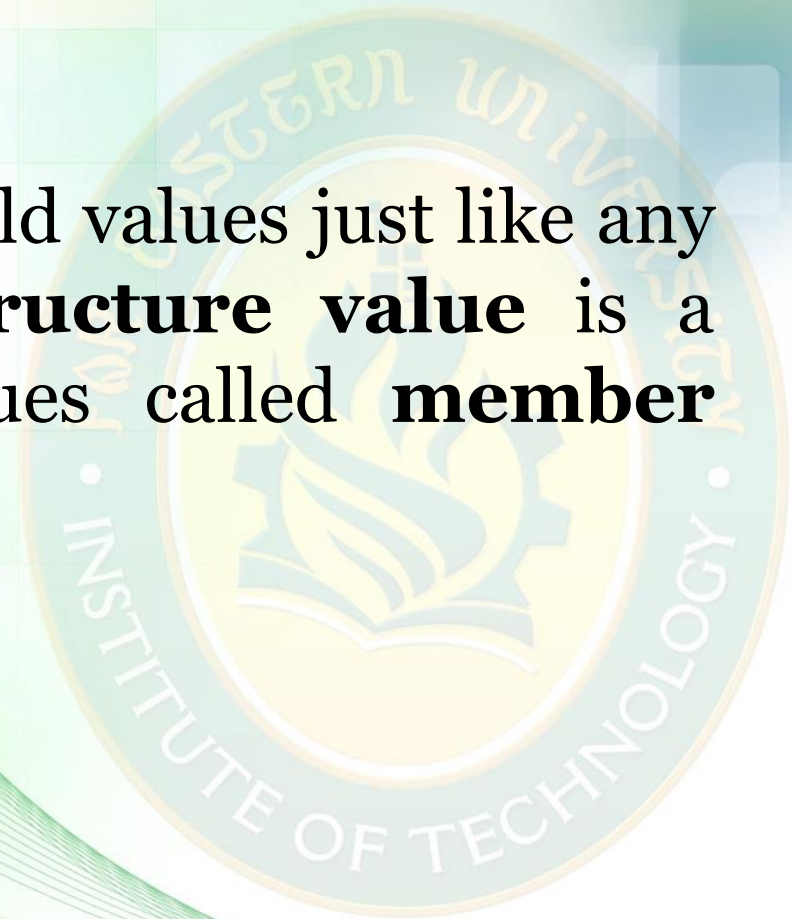
STRUCTURE

- A **structure** is a group of elements which are of different type. Each of the elements is identified by its own identifier and they are called member.
- A structure can be thought of as an object without any member functions. The important property of structures is that the data in a structure can be a collection of data items of diverse types.



STRUCTURE

- A structure variable can hold values just like any other variable can. A **structure value** is a collection of smaller values called **member values**.





Source Code:

```
#include <iostream>
using namespace std;

struct Student{
    int id;
    char name[30];
    double grade;
} ;
```



Sample Code

```
void newLine();

int main()
{
    Student stud;
    cout << "Enter student records: \n";
    cout << "ID: ";
    cin >> stud.id;
    newLine();
    cout << "Name: ";
    cin.getline(stud.name, 29);
    cout << "Grades: ";
    cin >> stud.grade;
```




Sample Code

```
cout << "\n\n";  
cout << "Display student records\n";  
cout << "ID: " << stud.id << endl;  
cout << "Name: " << stud.name << endl;  
cout << "Grades: " << stud.grade << endl;  
  
system("pause > 0");  
return 0;  
}
```



Sample Code

```
void newLine()  
{  
    char s;  
    do{cin.get(s);}while(s!='\n');  
}
```



Arrays of Structure

ENTER 5 ITEMS:

ITEM 1

ID: 101

Name: 555 Sardines

Price: 17.50

ITEM 2

ID: 102

Name: 555 Century Tuna

Price: 19.75

ITEM 3

ID: 103

Name: Ligo Sardines

Price: 15.50

ITEM 4

ID: 104

Name: Hakata Sardines

Price: 19

ITEM 5

ID: 105

Name: 555 Century Tuna Adobo

Price: 23.75

Item #	Item Code	Name	Price
1	101	555 Sardines	17.50
2	102	555 Century Tuna	19.75
3	103	Ligo Sardines	15.50
4	104	Hakata Sardines	19.00
5	105	555 Century Tuna Adobo	23.75



Source Code:

```
#include <iostream>
#include <iomanip>
using namespace std;
struct item{
    int id;
    char name[50];
    double price;
};
void newLine();
```





```
int main()
{
    item itm[5];
    int i;
    cout << "ENTER 5 ITEMS:\n";
    for(i=0; i<5; i++)
    {
        cout << "\nITEM " << (i+1) << endl;
        cout << "ID: ";
        cin >> itm[i].id;
        newLine();
        cout << "Name: ";
        cin.getline(itm[i].name,49);
        cout << "Price: ";
        cin >> itm[i].price;
    }
}
```





```
cout << setw(10) << "Item #"
        << setw(16) << "Item Code"
        << setw(30) << "Name"
        << setw(10) << "Price";

cout.setf(ios::fixed);
cout.setf(ios::showpoint);
cout.precision(2);
for(i=0; i<5; i++)
{
    cout << endl;
    cout << setw(10) << i+1
        << setw(16) << itm[i].id
        << setw(30) << itm[i].name
        << setw(10) << itm[i].price;
}
```




```
    system("pause > 0");  
    return 0;  
}  
void newLine()  
{  
    char s;  
    do{  
        cin.get(s);  
    }while(s!='\n');  
}
```



Structures and Functions

```
Enter Item Information  
ID: 111  
Name: 1G DDR3 Kingston Memory  
Price: 1800
```

```
Item Information:  
ID: 111  
Name: 1G DDR3 Kingston Memory  
Price: 1800
```




Source code:

```
#include <iostream>
using namespace std;
struct ItemRec
{
    int id;
    char name[50];
    double price;
} item;
void inputItem();
void displayItem();
void newLine();
```





```
int main()  
{  
    cout << "Enter Item Information\n";  
    inputItem();  
    displayItem();  
    system("pause>0");  
    return 0;  
}
```





```
void inputItem()  
{  
    cout << "ID: ";  
    cin >> item.id;  
    newLine();  
    cout << "Name: ";  
    cin.getline(item.name, 49);  
    cout << "Price: ";  
    cin >> item.price;  
}
```





```
void displayItem()
{
    cout << "\n\nItem Information:\n";
    cout << "ID: " << item.id << endl;
    cout << "Name: " << item.name
         << endl;
    cout << "Price: " << item.price
         << endl;
}
```




```
void newLine()  
{  
    char s;  
    do{  
        cin.get(s);  
    }while(s!='\n');  
}
```





Initialization of Structure (output)

```
EMPLOYEE RECORD
```

```
ID: 101
```

```
Name: Juan Dela Cruz
```

```
Salary: 15000
```

```
Enter new salary: 16700
```

```
EMPLOYEE NEW RECORD
```

```
ID: 101
```

```
Name: Juan Dela Cruz
```

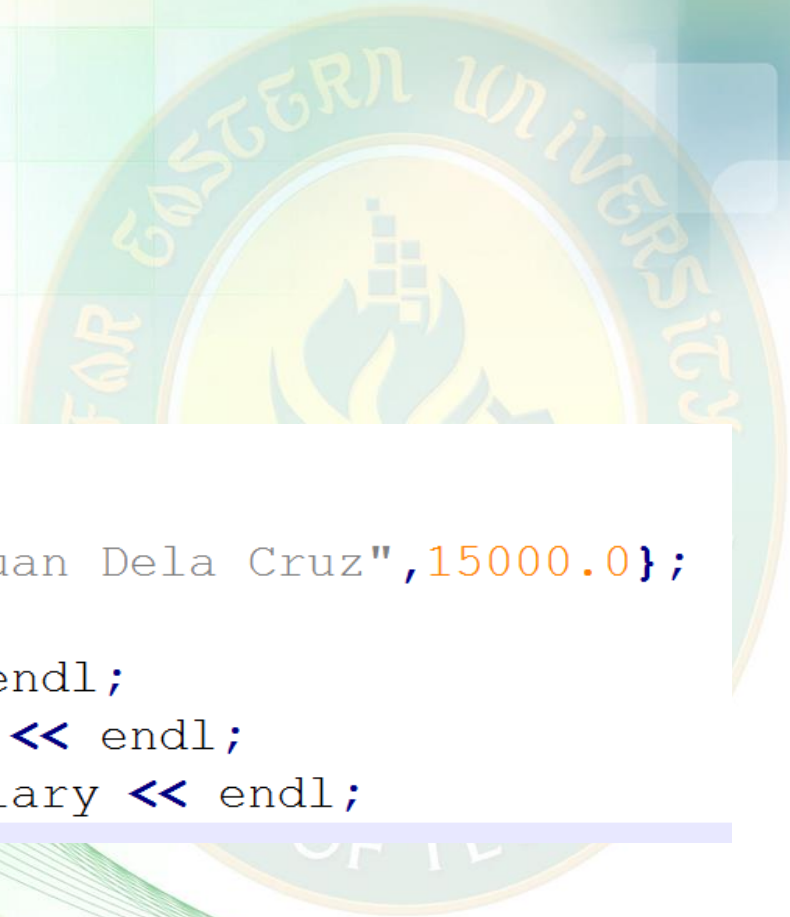
```
Salary: 16700
```



Initialization of Structure

```
#include <iostream>
using namespace std;

struct employeeRecord
{
    int id;
    char name[50];
    double salary;
};
```

```
int main()  
{  
    employeeRecord emp = {101, "Juan Dela Cruz", 15000.0};  
    cout << "EMPLOYEE RECORD\n";  
    cout << "ID: " << emp.id << endl;  
    cout << "Name: " << emp.name << endl;  
    cout << "Salary: " << emp.salary << endl;  
}
```



```
cout << endl;  
  
cout << "EMPLOYEE NEW RECORD\n";  
cout << "ID: " << emp.id << endl;  
cout << "Name: " << emp.name << endl;  
cout << "Salary: " << emp.salary << endl;  
  
system("pause>0");  
return 0;  
}
```




Structures and Pointers

```
Enter employee's record:  
ID: 2002  
Name: Juan Dela Cruz  
Address: 123 Dalandan St., Sampaloc Manila  
Contact Number: 09225561234  
Salary: 19800
```

```
Employee Information  
ID: 2002  
Name: Juan Dela Cruz  
Address: 123 Dalandan St., Sampaloc Manila  
Contact Number: 09225561234  
Salary: 19800
```



Source Code:

```
#include <iostream>
using namespace std;

struct EmployeeRec{
    int id;
    char name[50];
    char address[100];
    char contactNo[15];
    double salary;
};

void newLine();
```




```
int main()  
{  
    EmployeeRec *emp;  
    emp = new EmployeeRec;  
    cout << "Enter employee's record: \n";  
    cout << "ID: ";  
    cin >> emp->id;  
    newLine();  
    cout << "Name: ";  
    cin.getline(emp->name, 49);  
    cout << "Address: ";  
    cin.getline(emp->address, 99);  
    cout << "Contact Number: ";  
    cin.getline(emp->contactNo, 14);
```



```
cout << "Salary: ";  
cin >> emp->salary;  
cout << endl;  
cout << "Employee Information \n";  
cout << "ID: " << emp->id << endl;  
cout << "Name: " << emp->name << endl;  
cout << "Address: " << emp->address << endl;  
cout << "Contact Number: " << emp->contactNo <<  
endl;  
  
cout << "Salary: " << emp->salary;  
system("pause>0");  
return 0;  
}
```




```
void newLine()  
{  
    char s;  
    do{ cin.get(s); }while(s!='\n');  
}
```





Passing Structures to Functions

Output: CASE 1

```
Enter Student Record:  
ID: 201050025  
Name: Juan Dela Cruz  
Grades: 88.75  
  
Student Record  
ID: 201050025  
Name: Juan Dela Cruz  
Grades: Juan Dela Cruz  
Remarks: PASSED
```

Output: CASE 2

```
Enter Student Record:  
ID: 101  
Name: Juan Dela Cruz  
Grades: 73.75  
  
Student Record  
ID: 101  
Name: Juan Dela Cruz  
Grades: Juan Dela Cruz  
Remarks: FAILED
```




Source Code:

```
#include <iostream>
#include <string>
#include <iomanip>
using namespace std;
struct studRecord{
    int id;
    char name[50];
    double grades;
};
void newLine();
void showStudRecord(studRecord stud);
```





```
int main()
{
    studRecord s;
    cout << "Enter Student Record: \n";
    cout << "ID: ";
    cin >> s.id;
    newLine();
    cout << "Name: ";
    cin.getline(s.name,49);
    cout << "Grades: ";
    cin >> s.grades;
    cout << endl;
    showStudRecord(s);
    system("pause>0");
    return 0;
}
```





```
void showStudRecord(studRecord stud)
{
    cout << "Student Record\n";
    cout << "ID: " << stud.id << endl;
    cout << "Name: " << stud.name << endl;
    cout << "Grades: " << stud.name << endl;
    if(stud.grades < 75)
        cout << "Remarks: FAILED";
    else
        cout << "Remarks: PASSED";
}

void newLine()
{
    char s;
    do{
        cin.get(s);
    }while(s!='\n');
}
```





Structure Declared in a Structure

```
Enter account balance: PhP 10000
Enter account interest: 10
Enter the number of months until maturity: 12

Old Account
When your CD matures in
12 months,
it will have a balance of PhP11000

New Account
When your CD matures in 12 months,
it will have a balance of PhP13200
```




Structure within a Structure

DECLARATION 1

```
struct Book_Details{  
    string title;  
    double price;  
};  
  
struct Student_Details{  
    string studentName;  
    int age;  
    Book_Details Book_Bought;  
};
```

DECLARATION 2

```
struct Student_Details{  
    string studentName;  
    int age;  
    struct{  
        string title;  
        double price;  
    }Book_Bought;  
};
```



Source Code

```
#include <iostream>
#include <string>
using namespace std;

struct Student_Details{
    char studentName[50];
    int age;
    struct{
        char title[50];
        double price;
    }Book_Bought;
};

void newLine();
```





```
int main()
{
    Student_Details sd;
    cout << "ENTER THE FOLLOWING INFORMATION: \n";
    cout << "Name: ";
    cin.getline(sd.studentName,49);
    cout << "Age: ";
    cin >> sd.age;
    newLine();
    cout << "Book Title: ";
    cin.getline(sd.Book_Bought.title,49);
```



```
cout << "Book Price: ";  
    cin >> sd.Book_Bought.price;  
    cout << "\n\n";  
    cout << "INFORMATION DETAILS:\n";  
    cout << sd.studentName << endl;  
    cout << sd.age << endl;  
    cout << sd.Book_Bought.title << endl;  
    cout << sd.Book_Bought.price << " Pesos"  
<<endl;  
    system("pause > 0");  
    return 0;  
}
```




```
void newLine()  
{  
    char s;  
    do{  
        cin.get(s);  
    }while (s!='\n');  
}
```

