C++ Programming

Structures 2

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Functions inside the struct

14_3.cpp

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

struct emplyee {
    string name;
    int age;
    double salary;
    char gender;

    void read_employee() {
        cout << "Enter employee 4 entries: ";
        cin >> name >> age;
        cin >> salary >> gender;
    }

    void print_employee() {
        cout << name << " has salary " << salary << "\n";
    }

    int get_age() {
        return age;
    }
    void set_age(int new_age) {
        age = new_age;
    }
};
```

```cpp
void print_employees() {
    for (int i = 0; i < added; ++i)
        emplyees_arr[i].print_employee();
}

int main() {
    emplyees_arr[added++].read_employee();
    emplyees_arr[added++].read_employee();
    print_employees();
    return 0;
}
```

Compare Functions

- We can write functions that compare structs, normally
- Notice, if both sides has same value ⇒ false
  - E.g. if a.name = b.name = “ali”
- Always code it in this style

```
40 bool compare_name(emplyee &a, emplyee &b) {
41     return a.name < b.name; // smaller name first
42 }
43
44 bool compare_salary(emplyee &a, emplyee &b) {
45     return a.salary > b.salary; // bigger salary salary
46 }
47
48 bool compare_name_salary(emplyee &a, emplyee &b) {
49     // smaller name first, if tie smaller salary
50     if (a.name != b.name)
51         return a.name < b.name;
52     return a.salary < b.salary;
53 }
```

Ordering array

```
54
55  int main() {
56      int arr[5] = { 5, 1, 3, 2, 4 };
57      sort(arr, arr + 5); // #include <algorithm>
58      for (int i = 0; i < 5; ++i)
59          cout << arr[i] << " ";
60      cout << "\n";
61
62      emplyees_arr[added++].read_employee();
63      emplyees_arr[added++].read_employee();
64      emplyees_arr[added++].read_employee();
65
66      sort(emplyees_arr, emplyees_arr + added, compare_name);
67      print_employees();
68
69      sort(emplyees_arr, emplyees_arr + added, compare_salary);
70      print_employees();
71
72      sort(emplyees_arr, emplyees_arr + added, compare_name_salary);
73      print_employees();
74
75      return 0;
76  }
77
```

```
1 2 3 4 5
Enter employee 4 entries: zein 10 90 M
Enter employee 4 entries: asmaa 30 60 F
Enter employee 4 entries: asmaa 15 30 F
******************
asmaa has salary 60
asmaa has salary 30
zein has salary 90
******************
zein has salary 90
asmaa has salary 60
asmaa has salary 30
******************
asmaa has salary 30
asmaa has salary 60
zein has salary 90
```

Structure of structure

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

struct full_name {
    string first, middle, last;

    void read() {
        cout << "Enter first middle last names: ";
        cin >> first >> middle >> last;
    }
};

struct emplyee {
    full_name emp_name;
    int age;
    double salary;

    void read() {
        emp_name.read();
        cout << "Enter employee age & salary: ";
        cin >> age >> salary;
    }

    void print() {
        cout << emp_name.first << " has salary " << salary << "\n";
    }
};
```

```
<terminated> ztemp [C/C++ Application] /home/moustafa/wo
Enter first middle last names: mostafa saad ibrahim
Enter employee age & salary: 100 200
mostafa has salary 200
```

Constructor

```
struct full_name {
    string first, middle, last;

    full_name() {
        // Empty constructor. Better always provide it
        first = middle = last = "";
    }

    full_name(string _first, string _last = "") {   // constructor
        first = _first;
        last = _last;
        middle = "";
    }
};


int main() {
    full_name my_name = full_name("ali");
    cout<<my_name.first<<"\n";

    full_name his_name = full_name("mostafa", "ibrahim");
    cout<<his_name.last;

    return 0;
}
```

"Acquire knowledge and impart it to the people."

"Seek knowledge from the Cradle to the Grave."