CONTAINERS AND COMPARATORS

Comparing and organizing container data with comparators

Delroy A. Brinkerhoff

DATA CLASS

```
class Employee
{
    private:
        string  name;
        int     position;
        int     id;
```

ALPHABETICAL BY NAME COMPARATOR

```
class compByName
{
    public:
        bool operator()(const Employee& e1, const Employee& e2) const
        {
            return e1.getName() <= e2.getName();
        }
};
```

GROUPED BY POSITION, SORTED BY ID COMPARATOR

enum { OFFICER, MANAGER, ENGINEER };

```
class compByNumber
{
    public:
        bool operator()(const Employee& e1, const Employee& e2) const
        {
            if (e1.getPosition() == e2.getPosition())
                return e1.getID() <= e2.getID();
            return e1.getPosition() <= e2.getPosition();
        }
};
```

SORTING OBJECTS WITH COMPARATORS

```
vector<Employee> employees;

employees.push_back(Employee("Dilbert", ENGINEER, 400));
employees.push_back(Employee("Alice", ENGINEER, 100));
employees.push_back(Employee("Wally", ENGINEER, 200));
employees.push_back(Employee("Asok", ENGINEER, 700));
employees.push_back(Employee("PHB", MANAGER, 600));
employees.push_back(Employee("Richard", MANAGER, 500));
employees.push_back(Employee("Catbert", OFFICER, 300));

sort(employees.begin(), employees.end(), compByName());
sort(employees.begin(), employees.end(), compByNumber());
```

OUTPUT

compByName()

```
Alice     2  100
Asok      2  700
Catbert   0  300
Dilbert   2  400
PHB       1  600
Richard   1  500
Wally     2  200
```

compByNumber()

```
Catbert   0  300
Richard   1  500
PHB       1  600
Alice     2  100
Wally     2  200
Dilbert   2  400
Asok      2  700
```

OBJECT TO OBJECT MAPPING

```
map<Employee, Employee, compByName> employees;
map<Employee, Employee, compByNumber> employees;
```

```
Employee e1("Dilbert", ENGINEER, 400);
Employee e2("Alice", ENGINEER, 100);
Employee e3("Wally", ENGINEER, 200);
Employee e4("Asok", ENGINEER, 700);
Employee e5("PHB", MANAGER, 600);
Employee e6("Richard", MANAGER, 500);
Employee e7("Catbert", OFFICER, 300);
```

```
employees[e1] = e5;
employees[e2] = e5;
employees[e3] = e6;
employees[e4] = e6;
employees[e5] = e7;
employees[e5] = e7;
employees[e7] = e7;
```

OUTPUT

compByName()

```
Alice     2  100  Reports to: PHB       1  600
Asok      2  700  Reports to: Richard   1  500
Catbert   0  300  Reports to: Catbert   0  300
Dilbert   2  400  Reports to: PHB       1  600
PHB       1  600  Reports to: Catbert   0  300
Richard   1  500  Reports to: Catbert   0  300
Wally     2  200  Reports to: Richard   1  500
```

compByNumber()

```
Catbert   0  300  Reports to: Catbert   0  300
Richard   1  500  Reports to: Catbert   0  300
PHB       1  600  Reports to: Catbert   0  300
Alice     2  100  Reports to: PHB       1  600
Wally     2  200  Reports to: Richard   1  500
Dilbert   2  400  Reports to: PHB       1  600
Asok      2  700  Reports to: Richard   1  500
```