# CSC 211: Object Oriented Programming Structs

### Michael Conti

Department of Computer Science and Statistics University of Rhode Island

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Original design and development by Dr. Marco Alvarez

### Structures

```
struct structureName {
    member1;
    member2;
    member3;
    .
    .
    memberN;
};
```

Structures in C++ are user defined data types which are used to store multiple items (members) of possibly different data types

Structures

- Definition is generally outside any function
   new 'data type' will be available to all code that follows
- Structures can be declared in the same way as basic data types
- · Can also use { } notation for initialization
- Use the **dot operator** for accessing data members

```
DISPLAY 10.2 Member Values
      struct CDAccount
          double balance;
          double interestRate;
          int term; //months until maturity
      int main()
                                           balance
         CDAccount account;
                                           interestRate
                                                                           account
10
11
                                           term
12
                                           balance
                                                              1000.00
13
         account.balance = 1000.00;
14
                                           interestRate
                                                                           account
15
                                          balance
                                                              1000.00
16
         account.interestRate = 4.7;
17
                                                                           account
                                           interestRate
18
                                           term
                                           balance
                                                              1000.00
19
         account.term = 11:
20
                                           interestRate
                                                                   4.7
                                                                           account
21
                     from: Problem Solving with C++, 10th Edition, Walter Savitch
```

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# // defining the struct struct Point { int x; int y; }; int main() {

// creating a variable

struct Point p1;

```
Initializing ...

// defining the struct
struct Point {
   int x;
   int y;
};

int main() {
   // initializing (follows order)
   struct Point p1 = { 10, 20 };
}
```

## The dot operator

```
#include <iostream>

struct Point {
    int x;
    int y;
};

int main() {
    struct Point p1 = { 10, 20 };
    p1.x += 5;
    std:.cout << p1.x << ' ' << p1.y << '\n';
}</pre>
```

### Array of structures

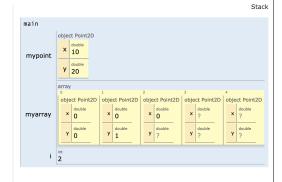
```
#include <iostream>
struct Point2D {
    double x;
    double y;
};
int main() {
    Point2D mypoint;
    Point2D myarray[5];
    mypoint.x = 10;
    mypoint.y = 20;
    for (int i = 0 ; i < 5 ; i ++) {
        myarray[i].x = 0;
        myarray[i].y = i;
    }
}</pre>
```

### Passing structures to functions

```
DISPLAY 10.1 A Structure Definition
       //Program to demonstrate the CDAccount structure type.
                                                                                                         //Uses iostream
                                                                                                           void getData(CDAccount& theAccount)
      #include <iostream>
       using namespace std;
//Structure for a bank certificate of deposit:
                                                                                                              cout << "Enter account balance: $";
cin >> theAccount.balance;
        struct CDAccount
                                                                                                              cout << "Enter account interest rate: ";
cin >> theAccount.interestRate;
                                                                                                              cout << "Enter the number of months until maturity\n"
           double interestRate:
                                                                                                                    << "(must be 12 or fewer months): ";
9
10
11
12
           int term; //months until maturity
                                                                                                              cin >> theAccount.term;
        void getData(CDAccount& theAccount);
       //Postcondition: theAccount.balance and theAccount.interestRate
        //have been given values that the user entered at the keyboard.
       int main()
           CDAccount account:
           getData(account);
           rateFraction = account.interestRate / 100.0;
interest = account.balance * rateFraction * (account.term / 12.0);
account.balance = account.balance + interest;
           cout.setf(ios::fixed):
            cout.setf(ios::showpoint);
           cout.precision(2);
cout << "When your CD matures in "
                  << account.term << " months,\n"
<< "it will have a balance of $"</pre>
                  << account.balance << endl;
                                                 from: Problem Solving with C++, 10th Edition, Walter Savitch
```

# pythontutor.com

### C++ (gcc 4.8, C++11) EXPERIMENTAL! known limitations



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