

CS 230
Programming Languages

11 / 21 / 2022

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Today's Topics

- Questions? / Comments?
- More C++

C++

- You can write C++ programs in many different IDE's, including Eclipse, but you can also write code in a text editor and compile it (using GNU C++ compiler) at the command line like:
- `g++ mycode.cpp -o mycode.o`
- then to execute your program do:
- `./mycode.o`

C++

- More types

- objects

- a simple declaration in Java creates a reference to a class
 - `Card a; // a is a Card reference`
 - a simple declaration in C++ creates an object of that class by calling the default constructor
 - `string a; // actually calls string's default constructor`
 - `string s1("Hello"); // calls a different constructor`
 - `string s2 = string("Bye"); // also calls a constructor`
 - `s1 = s2; // actually makes a COPY`

C++

- More types

- objects

- `string s1("Hello");` // calls a different constructor
 - `string s2 = string("Bye");` // also calls a constructor
 - `s1 = s2;` // actually makes a COPY
 - `s2 = "So long";` // doesn't affect s1

C++

- More types
 - objects/references
 - In Java we can have:

`Card a;` // a reference to a Card (does NOT call Card's default constructor)

`Card b = new Card(2, 2);`

`a = b;` // a and b now both refer to the same object

`b.setRank(5);` // the ONE object has rank 5 and both a and b refer to it

- This is the typical behavior in Java for classes

C++

- More types
 - objects/references
 - In C++ we can have:

```
Card *a; // a pointer to Card (does NOT call Card's default constructor)
```

```
Card *b = new Card(2, 2);
```

```
a = b; // a and b now both refer to the same object
```

```
b->setRank(5); // the ONE object has rank 5 and both a and b refer to it
```

C++

- a struct is a record in C++ and in C e.g.

```
struct PhoneNumber
```

```
{
```

```
    int areaCode; // first 3 digits, e.g. 518
```

```
    int exchange; // next 3 digits e.g. 580
```

```
    int last4;    // last 4 digits e.g. 5294
```

```
}
```

- if you know structs from C, they are different in C++. In C++ they are essentially the same as classes except that by default a struct's members are public and by default a class's members are private.

C++

- classes in C++
 - can have multiple inheritance
 - typically divided into header and implementation (usually in different files)
 - class definitions end with a semicolon
 - divided into sections public: private: protected:
 - inline functions - code in the definition, for speed (one liners)
 - header (interface) file vs. implementation file
 - prototypes of functions and classes must appear before use
 - extern (says variable is declared elsewhere and nothing more is allocated)
 - let's look at the Card.h and Card.cpp files