Copy constructor and '='

Ch 11.4 & Appendix F

*me, a C/C++ developer learning java for the first time

Java for dummies

*the laptop

int x;

int foo[] = new int[100];

int foo[] = new int[100];
foo =

What have you done

int foo[] = new int[100];
foo = new int[50];
Announcements

Vote on moodle for Monday's topic
Highlights

- Overload equals

```cpp
classy x;
classy y;
y=x; // equals operator
```
Review: Copy constructor

To avoid double deleting (crashes program) or multiple pointers looking at the same spot...

We have to redefine the copy constructor if we use dynamic memory

The **copy constructor** is another special constructor (same name as class):

```
Dynamic();
~Dynamic();
Dynamic(const Dynamic &d);
```
Review: Copy constructor

When exactly does a copy constructor run?

1. You use an '==' sign when declaring a class instance
2. You call-by-value a class as an input to a function (i.e. do not use &)
3. You return an inputted class to function

(see: copyCout.cpp)
Copy constructor: arrays

How would you copy a dynamically created array inside a class?

```cpp
class rng{
private:
    double* array;
public:
    rng();
    rng(const rng &original) //write me!
};
rng::rng()
{
    array = new double[10];
    for(int i=0; i < 10; i++)
    {
        array[i] = rand()%100; //0-99
    }
}
```

What if this was a normal array?

(see: copyArray.cpp)
Copy constructor vs. '=='

There is actually two ways in which you can use the '==' sign...

1. The copy constructor, if you ask for a box on that same line:
   ```
   classy x;
   classy y = x; // copy constructor
   ```

2. Operator overload, if you already have a box when using '==':
   ```
   classy x;
   classy y; // y gets box
   y=x; // equals operator
   ```

(See: copyVsEquals.cpp)
What is the difference between copy and '='?

“copy” is a constructor, so it creates new boxes.

 '=' is changing the value of an existing box.

(but the idea of not sharing is the same)

The “proper” way to implement '==' is nuanced... see code comments if you care.

(See: overloadEquals.cpp)
When using pointers in a class or dynamic memory, you should create:

1. Deconstructor
2. Copy constructor
3. Overload ‘=’ operator

Typically the built-in functions are not sufficient if you use a “new” or ‘*’