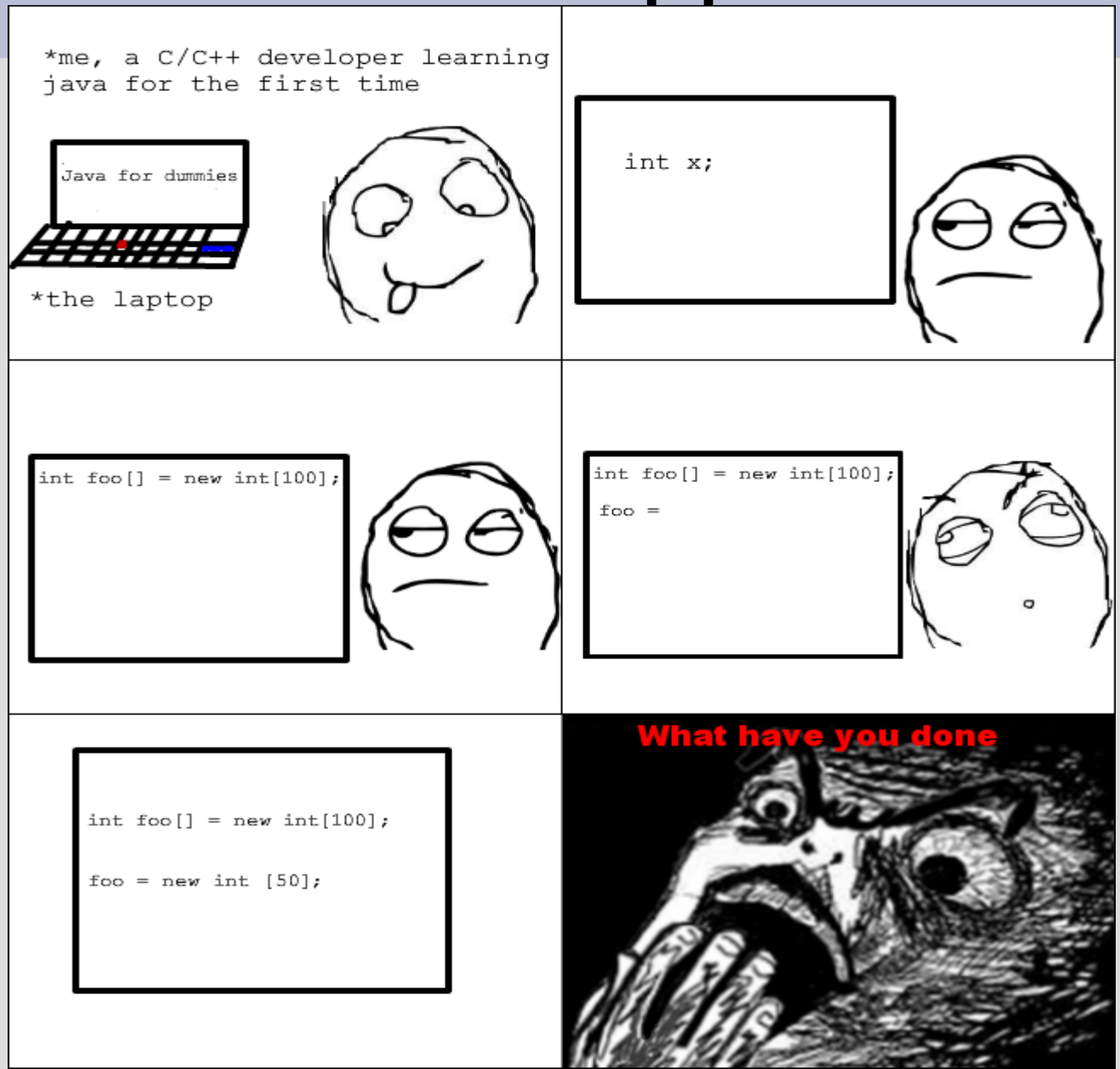
Operator =

Ch 11.4 & Appendix F



Announcements

Midterm 1 scores on moodle now

- has +6 point adjustment

Highlights

- Overload equals

```
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 with classes
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?

```
class rng{
private:
    double* array;
public:
    rng();
    rng(const rng &original) //write me!
};
```

What if this was a normal array?

(see: copyArray.cpp)

```
rng::rng()
{
    array = new double[10];
    for(int i=0; i < 10; i++)
    {
        array[i] = rand()%100; /0-99
    }
}
```

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)

Overload =

What is the difference between copy and '='?

Overload =

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 same idea: not sharing the same address)

The “proper” way to implement '=' is
nuanced... see code comments if you care
(See: overloadEquals.cpp)

TLDR

When using “new” in a constructor, you also should make:

1. Destructor
2. Copy constructor
3. Overload '=' operator

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

this

Consider the following code:

```
BadPublic test;
test.x=3;

int* intPtr = &(test.x);
intPtr = test.getX();

BadPublic* bpPtr = &test;
bpPtr = test.getMe();
```

```
class BadPublic {
public:
    int x;
    int* getX();
    BadPublic* getMe();
};
```

How do we write getX() and getMe()?

this

Q: It seems you should have information about yourself, but how do you access that?

A: Inside every class, there is a this pointer, that points to yourself

this points to itself


```
BadPublic* getMe()
{
    return this;
}
```

(See: thisSelfPointer.cpp)

typedef

Side note: If you want to rename types, you can do that with typedef command:

original name

new synonymous name

```
typedef int DefinatelyNotAnInt;
DefinatelyNotAnInt x;
x=3;
int y = x;
cout << y;
```

(See: redefiningTypes.cpp)

If you have always been bothered that we use "double" instead of "real", go ahead and fix it!