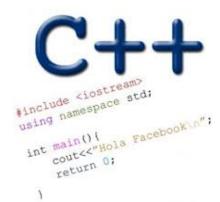
## THE BIG FOUR

Problem Solving with Computers-II



Read the syllabus. Know what's required. Know how to get help.

**CLICKERS OUT** 

## The Big Four

- 1. Constructor
- 2. Destructor
- 3. Copy Constructor
- 4. Copy Assignment

#### Constructor and Destructor

Every class has the following special methods:

- Constructor: Called right AFTER new objects are created in memory
- Destructor: Called right BEFORE an object is deleted from memory

The compiler automatically generates default versions, but you can override them

### Constructor (last class)

```
void foo(){
    Quadratic p;
    Quadratic* q = new Quadratic;
    Quadratic w(10, 5, 1);
How many times is the constructor
called in the above code?
A. Never
B. Once
C. Twice
D. Thrice
```

#### Initialization lists

- \* Used to initialize member variables at the time they are created
- \* Must be used to initialize constant member variables

#### Destructor

- Must have the same name as the class preceded by a ~ (tilda)
- Does not have a return type
- Called right BEFORE an object is deleted from memory

#### Destructor

```
void foo(){
    Quadratic p;
    Quadratic *q = new Quadratic;
}
```

The destructor of which of the objects is called after foo() returns?

```
A.p
B.q
C.*q
D. None of the above
```

## Copy constructor

Creates a new object and initializes it using an existing object

### Copy constructor

In which of the following cases is the copy constructor called?

```
A. Quadratic p1; Quadratic p2(1, 2, 3);
B. Quadratic p1(1, 2, 3); Quadratic p2(p1);
C. Quadratic *p1 = new Quadratic(1, 2, 3);
Quadratic p2 = *p1;
D. B&C
E. A, B & C
```

## Copy assignment

Default behavior: Copies the member variables of one object into another

```
Quadratic p1(1, 2, 3); // Parametrized constructor Quadratic p2; p2 = p1; // Copy assignment function is called
```

```
double foo(Quadratic p) {
    return p.evaluate(10);
}
int main() {
    Quadratic q(1, 2, 3);
    foo(q);
    }
```

Which of the following special methods is called as a result of calling foo?

- A. Parameterized constructor
- B. Copy constructor
- C. Copy Assignment
- D. Destructor

# Summary

- Classes have member variables and member functions (method). An object is a variable where the data type is a class.
- You should know how to declare a new class type, how to implement its member functions, how to use the class type.
- Prequently, the member functions of an class type place information in the member variables, or use information that's already in the member variables.
- New functionality may be added using non-member functions, friend functions, and operator overloading (next lectures)

### Next time

Linked Lists and operator overloading