C++ VII

Classes, Inheritance

Classes

- The concept of a class you should already know well
- Syntax:
  - Declare the class, its member variables, and functions as seen on right
  - Then define the functions
    - `::` is the *scope resolution operator*, determining scope (here, which class the function belongs to)
- Classes have both constructors and destructors (see right)
- Three levels of access for members: public, private, and protected

```
1  #include <iostream>
2
3  using namespace std;
4
5  class Computer{
6    public:
7      Computer();
8      ~Computer();
9      void setspeed (int p);
10     int readspeed();
11
12   protected:
13     int processorspeed;
14 }; // Do Not forget the trailing semi-colon
15
16 Computer::Computer(){
17     processorspeed = 0;
18 }
19
20 Computer::~Computer(){}
21
22 void Computer::setspeed (int p){
23     processorspeed = p;
24 }
25
26 int Computer::readspeed(){
27     return processorspeed;
28 }
29
30 int main(){
31     Computer compute;
32     compute.setspeed ( 100 );
33     cout<< compute.readspeed();
34 }
```

Constructors, Destructors, Restrictions

- Constructors and Destructors
  - Constructors work basically the same way they do in Java
  - Destructors are called when the object is no longer being used
    - End of program, when class reaches end of its scope, when the object's memory is freed
    - Destructors do not accept arguments
  - Default constructors and destructors are provided if you don't specifically implement them
- Three levels of access for members: public, private, and protected
  - Public: can be used anywhere in the program
  - Private: can only be used in the class itself; they are not inherited
  - Protected: can be used by subclasses

Inheritance

- Inheritance works basically as it does in Java
  - overriding functions, polymorphism
- Syntax: see example on right

```
1  class Animal{
2    public:
3    Animal();
4    ~Animal();
5    void eat();
6    void sleep();
7    void drink();
8
9  private:
10   int legs;
11   int arms;
12   int age;
13 };
14
15 class Cat : public Animal{
16   public:
17   int fur_color;
18   void purr();
19   void fish();
20   void markTerritory();
21 };
```