# CECS 282 - Homework 11

Complete these problems on a separate sheet of paper. Due April 28.

Use the following classes to answer the questions below:

```
class Animal {
public:
   Animal() {cout << "Construct Animal" << endl;}
   virtual ~Animal() {cout << "Destruct Animal" << endl;}
   virtual void Speak() = 0;
};

class Dog :  public Animal {
public:
   Dog() :  Animal() { cout << "Construct Dog" << endl;}
   virtual ~Dog() {cout << "Destruct Dog" << endl;}
   virtual void Speak() {cout << "Meow" << endl;}
   void Beg() {cout << "Feed me!"  << endl;
};

class Cat :  public Animal {
public:
   Cat() :  Animal() { cout << "Construct Cat" << endl;}
   virtual ~Cat() {cout << "Destruct Cat" << endl;}
   virtual void Speak() {cout << "Woof" << endl;}
};
```

1. Reading from *C++ How to Program*:
   (a) Chapter 12.5
2. Give the output of the following program fragment:
   ```
   int main() {
      Animal *a = new Cat();
      a->Speak();
      delete a;
   }
   ```
3. Which of the following assignments are allowed in C++? Circle all that apply.
   (a) `Animal *a = new Cat();`
   (b) `Animal *b = new Animal();`
   (c) `Cat *c = new Animal();`
   (d) `Dog *d = new Cat();`
   (e) `Cat *e = new Cat();`
4. The `Animal` pointer `ptr` below actually points to a `Dog` object. With one line of code, show how to call the `Beg()` function on the `Dog` object that `ptr` points to.
   ```
   Animal *ptr = new Dog();
   // your code here
   ```
5. In your own words, describe the "diamond of death" problem of multiple inheritance in C++.