CSI 202 — Computer Science II

Homework #06

1. Build an Animal hierarchy. All Animals have a string `type`. Animal is an abstract class because many of its functions cannot be implemented without an instantiated derived class. Animal should have functions sleep, getWeight, getLength and getType. A nondescript Animal sleeps for 8 hours.

2. Cat is a derived class of Animal. Cats should have the type "Cat". Cats must override the sleep method to display a message announcing that it sleeps for 12 hours. Cats must also override the getWeight and getLength methods to return 5 and 5.

3. Dragon is a derived class of Cat. Dragons should have the type "Dragon". Dragons must override the getWeight and getLength methods to return 5000 and 100.

4. Dog is a derived class of Animal. Dogs should have the type "Dog". Dogs must also override the getWeight and getLength methods to return 10 and 7.

5. Things to think about:

    (a) Should Animal have a constructor and what kind of function should it be?

    (b) Should Animal have a destructor and what kind of function should it be?

    (c) What type of functions should sleep, getWeight, getLength, and getType be and why?

    (d) Where should the class data members be defined and why?

6. An Example main and output:

```cpp
#include <iostream>
using namespace std;

#include "Animal.h"
#include "Cat.h"
#include "Dog.h"
#include "Dragon.h"

int main()
{
  Animal *a[3];
  a[0] = new Cat();
  a[1] = new Dragon();
  a[2] = new Dog();

  for(int i = 0; i < 3; i++)
    {
      cout << a[i]->getType() << endl;
      cout << a[i]->getWeight() << " " << a[i]->getLength() << endl;
      a[i]->sleep();
      cout << endl;
    }
}
/***********************************************************************/

Cat
5 5
Sleeping 12 hours

Dragon
5000 100
Sleeping 12 hours

Dog
10 7
Sleeping 8 hours
```