# Zoo Problem

You run a zoo which contains Animals.
So each Animal will be represented
by an abstract class.

Consider creating classes Animal, Cow, Horse, Snake, etc.

Your Animal class will have the following instance variables:

```
    private String name;
    private double weight;
    private int age;
```

Your Animal class will have the following constructors:

```
    Animal()
    Animal(String n, double weight, int age)
```

Your Animal class will have the following methods:

String makeNoise() - this will be an abstract method
double getWeight() - returns the weight of this animal

public String toString() - returns a String with information about this Animal
**********

You will have the following classes which all extend Animal:
Cow, Horse, Snake.

Cow will have an instance variable called:
private int num_spots
All variables should be initialized after either of the 2 constructors:
Cow()
Cow(String name, double weight, int age, int num_spots)

You will have the methods
String makeNoise() which returns "Moooo"
toString() - returns info about all variables including Animal things
**********
Horse will have an instance variable called:
private double top_speed
All variables should be initialized after either of the 2 constructors:
Horse()
Horse(String name, double weight, int age, double top_speed)

You will have the methods
String makeNoise() which returns "Whinny"
toString() - returns info about all variables including Animal things
**********
Snake will have an instance variable called:
private int num_fangs
All variables should be initialized after either of the 2 constructors:
Snake()
Snake(String name, double weight, int age, int num_fangs)

You will have the methods
String makeNoise() which returns "Hisssssss"
toString() - returns info about all variables including Animal things
**********
You will have a Zoo class that contains the following instance variables:

```
    private int actual_num_animals;
    private int num_cages;
    private Animal[] animals;
```

You will have the constructors:
Zoo() - default num_cages will be 3
Zoo(int num_cages)

You will have the following methods:

void add(Animal a) - adds an animal to your Zoo
double total_weight() - returns the total weight of all animals in the zoo
void make_all_noises() - Print out the noises made by all of the animals.
In otherwords, it calls the makeNoise() method for all animals in the zoo.
void print_all_animals() - prints the results of calling toString() on all animals in the zoo.

**********
Generate output by running the following main in the Zoo class: The results should go into the JH6_worksheet.txt

```
 public static void main(String[] args)
    {
        Zoo z = new Zoo();
        Snake sly = new Snake("Sly", 5.0 , 2, 2);
        Snake sly2 = new Snake("Slyme", 10.0 , 1, 2);
        Cow blossy = new Cow("Blossy", 900., 5,  10);
        Horse prince = new Horse("Prince", 1000., 5, 23.2);

        // Following not allowed because Animal is abstract
        //Animal spot = new Animal("Spot", 10., 4);

        z.add(sly);
        z.add(sly2);
        z.add(blossy);
        z.add(prince);

        z.make_all_noises();
        System.out.println("Total weight =" + z.total_weight());
        System.out.println("*************************");
        System.out.println("Animal Printout:");
        z.print_all_animals();

        System.out.println("********* Now we will make the Second Zoo");
        Zoo z2 = new Zoo(5);
        z2.add(sly);
        z2.add(sly2);
        z2.add(blossy);
        z2.add(prince);
        z2.add( new Horse("Warrior", 1200, 6, 25.3));
```

```
        z2.add( new Horse("Harry", 1100, 4, 21.3));
        System.out.println("Total weight of z2="+z2.total_weight());
        z2.make_all_noises();
        z2.print_all_animals();

    }
```