Old MacDonald – Application of Abstract and Interface

I. Create an **abstract** class called **Animal**. Include Java documentation (Javadoc).
   A) Create two **String** instance variables: **latinName** and **commonName**.
   B) Write an accessor and mutator for both names.
   C) Write the following method. Is it a concrete or abstract method?
      1) **speak**
   D) Implement **Comparable**
      1) What method is appropriate to write? Use common name for the comparison.

II. Create a **Chicken** class that has **Animal** as its superclass. Include Java documentation (Javadoc).
   A) Write a constructor with no parameters and one constructor with one parameter. The one with no parameters calls the constructor with one parameter. They look like:

```
public Chicken( )
{
    this("chicken");
}
public Chicken(String chickenType)
{
    super("Gallus Gallus domesticus",chickenType);
}
```
   B) What method do you need to write because you extended Animal?   Have a chicken say, "bawk".

III. Create a **Rooster** class that extends **Chicken**. Include Java documentation (Javadoc).
   A) Write a constructor with no parameters.
   B) Have a rooster say, "cock-a-doodle-do".

IV. Create a **Chick** class that extends **Chicken**. Include Java documentation (Javadoc).
   A) Write a constructor with no parameters.
   B) Have a chick say, "peep".

V. Create a **Pig** class that has **Animal** as its superclass. Include Java documentation (Javadoc).
   A) Write a constructor with no parameters. Look up the Latin name on the Internet.
   B) What method do you need to write because you extended Animal?   Have a pig say, "oink".

VI. Write the tester and call it **OldMacDonaldsFarm**.
   A) The constructor is:
```
public OldMacDonaldsFarm()
{
    farmerName = "Old MacDonald";
    farmAnimals = new ArrayList<Animal>( );
}
```
   B) Import **java.util.ArrayList;**
   C) Based upon the constructor, determine the instance variables.

D) The `main` is:

```
public static void main (String [ ] args)
{
    OldMacDonaldsFarm singer = new OldMacDonaldsFarm( );
    singer.farmAnimals.add(new Chicken( ));
    singer.singVerse( );
    singer.farmAnimals.add(new Chick());
    singer.singVerse( );
    singer.farmAnimals.add(new Rooster( ));
    singer.singVerse( );
    singer.farmAnimals.add(new Pig( ));
    singer.singVerse( );
}
```

E) Write **singVerse**. This is so much fun to write.

  1) I recommend two local variables:

```
String phrase1 = farmerName + " had a farm," ;
String ei = " E-I-E-I-O";
```

Here is what the song's output should look like:

```
Old MacDonald had a farm, E-I-E-I-O and on his farm he had some chickens, E-I-E-I-O.
With a bawk-bawk here, and a bawk-bawk there,
Here a bawk, there a bawk, every where a bawk-bawk,
Old MacDonald had a farm, E-I-E-I-O.


Old MacDonald had a farm, E-I-E-I-O and on his farm he had some chicks, E-I-E-I-O.
With a peep-peep here, and a peep-peep there,
Here a peep, there a peep, every where a peep-peep,
With a bawk-bawk here, and a bawk-bawk there,
Here a bawk, there a bawk, every where a bawk-bawk,
Old MacDonald had a farm, E-I-E-I-O.


Old MacDonald had a farm, E-I-E-I-O and on his farm he had some roosters, E-I-E-I-O.
With a cock-a-doodle-do-cock-a-doodle-do here, and a cock-a-doodle-do-cock-a-doodle-do there,
Here a cock-a-doodle-do, there a cock-a-doodle-do, every where a cock-a-doodle-do-cock-a-doodle-do,
With a peep-peep here, and a peep-peep there,
Here a peep, there a peep, every where a peep-peep,
With a bawk-bawk here, and a bawk-bawk there,
Here a bawk, there a bawk, every where a bawk-bawk,
Old MacDonald had a farm, E-I-E-I-O.


Old MacDonald had a farm, E-I-E-I-O and on his farm he had some pigs, E-I-E-I-O.
With a oink-oink here, and a oink-oink there,
Here a oink, there a oink, every where a oink-oink,
With a cock-a-doodle-do-cock-a-doodle-do here, and a cock-a-doodle-do-cock-a-doodle-do there,
Here a cock-a-doodle-do, there a cock-a-doodle-do, every where a cock-a-doodle-do-cock-a-doodle-do,
With a peep-peep here, and a peep-peep there,
Here a peep, there a peep, every where a peep-peep,
With a bawk-bawk here, and a bawk-bawk there,
Here a bawk, there a bawk, every where a bawk-bawk,
Old MacDonald had a farm, E-I-E-I-O.
```

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