CS 102: Practice Test Problems for Test 1

1. What is the output to the screen?

```java
public class Question1{
    public static void main (String[] args){
        int[] a = {6,7,12,0,0,14};
        for (int i=0; i<a.length; i++)
            System.out.print(a[i] + " ");
        System.out.println();
        ch(a);
        for (int i=0; i<a.length; i++)
            System.out.print(a[i] + " ");
        System.out.println();
    }
    public static void ch (int[] ar){
        int temp = ar[0];
        for (int i=0; i<ar.length - 1; i++)
            ar[i] = ar[i+1];
        ar[ar.length - 1] = temp;
    }
}
```

2. Put the classes Bird, Bald Eagle, Ostrich, Duck, Mallard, Golden Eagle, Owl, Eagle, Penguin in a class hierarchy.

3. What is the output of the following code fragment?

```java
String[] b = {"help","auto",argue"};
System.out.println(b.length + "\n" + b[2]);
```

4. Write a method

```java
public static void printAsterisks(int[] ar)
```

which accepts the parameter `ar`, an array of integers, and prints out for each value stored in the array at index `index`, a line of `ar[index]` asterisks. For example, if `ar` holds the array `{3,4,5,0,1}`, the output to the screen should be
5. (a) Write a method `product` which takes in two `int` parameters and returns their product.
   (b) Overload the method `product` to take in three `int` parameters and returns the product of all three parameters.

6. Consider the following three classes `P`, `Q`, and `R`:

   ```java
   public class P{
       public String toString() { return "Prince"; }
   }
   public class Q extends P{
       public String toString() { return "Queen"; }
   }
   public class R extends P{
       public String toString() { return "Royal"; }
   }
   
   What is the output to the screen of the following driver class?
   ```

   ```java
   public class PQRDriver{
       public static void main (String[] args){
           P[] ar = new P[3];
           for (int i=0; i<3; i++)
               System.out.println(ar[i]);
       }
   }
   ```

7. What is `late binding` and how is this related to Java’s implementation of polymorphism?

8. There is an error in the following lines of code. Rewrite the code to fix it. (Assume `ar` is an array.)
for (int i=1; i<=ar.length; i++)
    System.out.println(ar[i]);

9. Assume there is a method

    public static boolean isPrime (int n)

which returns true if the parameter n is a prime number, and which returns false otherwise.

Write a code fragment which declares an array a of 100 ints and stores in this array the first 100 prime numbers. (Call the method isPrime mentioned above; you do not have to implement the isPrime method itself. The first prime number is 2.)

10. Consider the following two classes Parent and Child. There is an error concerning the visibility of data in the following code. Fix it.

    public class Parent{
        private int n;
        public Parent(int num){ n=num; }
        public int getN(){ return n; }
    }
    public class Child extends Parent{
        public Child(int a){ super(a); }
        public double reciprocal(){ return 1./n;}
    }

11. Consider the following class Num, which is a user-defined wrapper class for an integer.

    public class Num{
        private int n;
        public Num(int x){n=x;}
        public void setNum(int x){n=x;}
        public int getNum(){return n;}
        public String toString(){return n+"";}
    }
(a) Write a method (of a class other than Num)

    public static void switchNums(Num n1, Num n2)

    which switches the values of n1 and n2.

(b) Is it possible to have a method

    public static void switchInts(int x1, int x2)

    which switches the values of the two int variables passed into the method? Explain your answer.