

CS 102: Practice Test Problems for Test 1

1. What is the output to the screen?

```
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?

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

4. Write a method

```
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:

```
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?

```
public class PQRDriver{
    public static void main (String[] args){
        P[] ar = new P[3];
        ar[0] = new P(); ar[1] = new Q(); ar[2] = new R();
        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.