OOSD: Practice Problems 7

1. Determine what is printed by this code fragment without compiling and executing the code.

```
int p = 197;
int q = 163;

System.out.println("p&q = " +  p&q);
System.out.println("p|q = " +  p|q);
System.out.println("p^q = " +  p^q);
System.out.println("~p = " +  ~p);
System.out.println("p<<5 = " +  p<<5);
System.out.println("p>>>3 = " +  p>>>3);

int r = -10000;
int s = 0xabcd;

System.out.println("s&r = " +  s&r);
System.out.println("s|r = " +  s|r);
System.out.println("s^r = " +  s^r);
System.out.println("~s = " +  ~s);
System.out.println("s<<6 = " +  s<<6);
System.out.println("s>>4 = " +  s>>4);
```

2. Implement byte arithmetic using class methods called *add*, *sub*, *mul*, *div*, and *mod*. For example, the *add* method has the signature:

```
static byte add(byte m, byte n)
```

   If any operation overflows as byte arithmetic or if division by zero is attempted, your methods should throw an ArithmeticException, which is an unchecked exception.

3. Write a method

```
static int multiply(int m, int n)
```

   that computes the product of the two integers *m* and *n* using only the operations +, &, >>, <<, and ==.

4. You have $1,000 in one-dollar bills and 10 empty sacks. How can you distribute the bills among the sacks so that you can provide any whole number of dollars from $1 to $1,000 merely by combining sacks? Each sack must contain at least one bill.