COP 3804
Intermediate Java Programming

Examination 5

Name: ______________________________

Sample

This exam has 3 additional pages. Please answer each question on the page on which it is asked. You may write on the back of the **facing** page if you need to.

1. (a) For each of the following operations, state whether `ArrayList` is much better, `LinkedList` is much better, or whether both are basically the same.

   - `add( 0, x )`
   - `get( idx )`
   - `remove( x )`
   - `add( x )`

   (b) For each of the following, state whether it is true for `Lists` only, `Sets` only, both `Lists` and `Sets`, or neither `Lists` nor `Sets`.

   - has an efficient `contains` operation
   - allows duplicates
   - supports `add` and `remove` of a single object

2. Class Multiset, shown below is used to maintain a collection of Strings, **in which duplicates are allowed**. It stores a map in which the key is a String, and the value is the number of occurrences of the String.

```
class MultiSet
{
   // Constructor and most methods not shown

   private Map<String,Integer> counts;

   // Return size of the MultiSet
   // If counts  = [ hello=2, world=1, zebra=1 ]
   // This routine returns 4
   public int size( )
     { /* You provide implementation */ }

   // Return true if x is in this Multiset
   public boolean contains( String x )
     { /* You provide implementation */ }

   // Add a new item
   public void add( String x )
     { /* You provide implementation */ }

   // Remove an item.
   // If x is not found, return false.
   // If x is present with count 1, remove it from the map.
   // If x is present with count > 1, lower the count by 1.
   // If x was present return true.
   public boolean remove( String x )
     { /* You provide implementation */ }
}
```

(a) Implement contains.

(b) Implement add.

(c) Implement remove.

(d) Implement size.

3. Suppose a database contains a table named Schedule, with columns Name, Number, Section, AvailableSeats. An example of five rows in this table could be

COP	2250	01	0
COP	2250	02	5
COP	2250	03	0
COP	2250	04	7
COP	3804	01	3

This database might model the Spring 2010 schedule, and there can be several sections of a given course.

Method `closedSections` prints all sections of the specified course that have no available seats. It takes a `Connection` object, so you do not need to worry about opening the database. AS an example invoking `closedSeats( c, "COP", "2250" )` with an appropriate `Connection c` will print `01 03`.

Implement `closedSections` below. You do not have to use any `import` directives, and you can propogate `SQLExceptions`.

```
public static void closedSections( Connection c, String name, String number )
                                      throws SQLException
{
```