15-111: Midterm Exam - I

Practice Test

1. Examine the following code segment

```
public class Demo
{
      public static void main(String[] args)
      {
            FooBar obj1 = new FooBar();
            FooBar.number = 5;
            FooBar obj2 = new FooBar();
            FooBar.number++;
            System.out.println(obj1.getX());
      }
}
public class FooBar
{
      private int x;
      public static int number = 0;
      public FooBar () {number++;}
      public int getX() {x = number; return x;}
}
```

What is the output if this code is compiled?

a. 1
b. 5
c. 6
d. 7

2. Examine the following code segment

```
Integer[][] A = {{1,2},{3,4},{5,6}};
Integer[][] B = new Integer[3][];
System.arraycopy(A, 0, B, 0, A.length);
```

What are the results of the following comparisons (circle either T or F)?

T / F `A == B;`

T / F `A[0] == B[0];`

T / F `A[0][1] == B[0][1];`

T / F `A.equals(B);`

T / F `Arrays.equals(A, B);`

3. What does this code do? Explain it in plain English.

```
public boolean isMystery(Bag<Character> bag )
{
      Stack<Character> stk = new Stack<Character>();
      for(Character x : bag) stk.push(x);
      Iterator<Character> itr = bag.iterator();
      while(!stk.isEmpty())
      if(!itr.next().equals(stk.pop())) return false;
      return true;
}
```

Answer:

4. Consider the following Java class

```
public class Temp
{
      public static int size = 0;

      public void ex3()
      {
            int size = 2;
            size = incrementSizeBy2(size);
            System.out.println(this.size);

      }
      private int incrementSizeBy2( int num )
      {
            int size = num + 2;
            return size;
      }
}
```

What is the output of the following call `new Temp().ex3()`?

Answer: _____

5. Predict the output for each of the following statements

a) `"Tomorrow".substring(3,5)` _____

b) `"Tomorrow".substring(5)` _____

c) `"Tomorrow".substring(5,5).length()` _____

d) `"Tomorrow".indexOf("o")` _____

e) `"Tomorrow".indexOf("o",3)` _____

f) `'a' + 1 == 'b'` _____

g) `'z' - 'a'` _____

h) `(char)('9' - 0)` _____

i) `"Tomorrow" == "Tomorrow"` _____

j) `"Tomorrow" == new String("Tomorrow")` _____

k) `"Tomorrow".equals(new String("Tomorrow"))` _____

l) `"Tomorrow".split("r")[0];` _____

m) `"Tomorrow".split("r")[1];` _____

n) `"Tomorrow".split("r+")[1];` _____

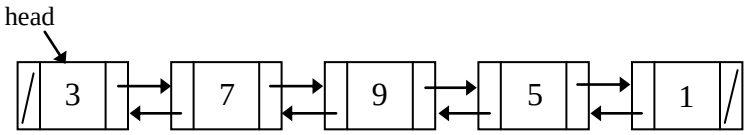
6. An iterator over a HashSet object returns the items in

a) insertion order

b) comparable order

c) random order\

7. Given a doubly linked list where each node has two references (**`prev`** and **`next`**): one that points to a previous node and another to a next node.



Write the statements to insert a new node

```
Node toInsert = new Node(6);
```

containing the **6** between the node with the **5** and the node with the **9**. You do not need to write the whole method but just the statements to make the connections. You assume the Node class as it was given in the lab assignment "Josephus Game".

8. Given an efficient circular array-based queue `q` capable of holding 10 objects. Show the final contents of the array after the following code is executed:

```
for (int k = 1; k <= 7; k++)
   q.enqueue(k);
for (int k = 1; k <= 7; k++)
   q.enqueue(q.dequeue());
```

Final answer:

0	1	2	3	4	5	6	7	8	9

9. Implement a Java method that removes each and every item equal the `keyItem` from a singly-linked list. The list is not changed in any other way – if the requested item is not contained within the list, the method leaves the list in its prior condition You assume the LinkedList and Node classes given in the lecture.

```
public void removeAllMatchingItems(Object keyItem)
```

10. Implement a method that sorts characters in a given string

```
public String sort( String str )
```

11. Implement a method that prints a given **HashSet** using an **Iterator interface**

```
public void printSet( HashSet<String> hs )
```

12. Implement a method that returns a sorted list of keys in a given `Map`

```
public List<String> sortAllKeys(Map<String,Set<String>> map)
```