

## JAVA Programming Language Homework VII: Threads & Collection

ID:

Name:

1. Given the following Java code:

```
1. class A extends Thread {
2.     public void m1() {
3.         System.out.print("A" );
4.     }
5.
6.     public void m2() {
7.         synchronized(System.out) {
8.             try {
9.                 Thread.sleep(1000) ;
10.                System.out.print("B");
11.            }
12.            catch(InterruptedException e) {}
13.        }
14.    }
15.
16.    public void run() {
17.        this.m1();
18.        this.m2();
19.    }
20.
21.    public static void main(String args[ ]) {
22.        A obj1 = new A();
23.        obj1.start();
24.        A obj2 = new A();
25.        obj2.start();
26.    }
27. }
```

Which of the following are possible results of attempting to compile and run the program?

- A. ABAB
- B. BABA
- C. AABB

D. BBAA

E. ABBA

**ANS:**

2. Given the following Java code:

```
1. class A implements Runnable {
2.     boolean obj1_ok = false;
3.     A() {
4.         Thread obj1 = new Thread(this, "o");
5.         Thread obj2 = new Thread(this, "x");
6.         obj2.start();
7.         obj1.start();
8.     }
9.
10.    public synchronized void my() {
11.        if(Thread.currentThread().getName().equals("x")) {
12.            while( !obj1_ok) {
13.                try {
14.                    System.out.print("A");
15.                    wait();
16.                } catch(InterruptedException e) {}
17.            }
18.        }
19.        System.out.print("B");
20.        obj1_ok = true;
21.        notifyAll();
22.    }
23.
24.    public void run() {
25.        my();
26.    }
27.    public static void main (String[] args) {
28.        A obj = new A();
29.    }
30. }
```

Which of the following are possible results of attempting to compile and run the program?

- A. ABA
- B. BAB
- C. AAB
- D. BBA
- E. ABB

**ANS:**

3. Which interface offers the specified behavior as below?

- (1) Entries are stored as key/value pairs.
- (2) Old entries will be replaced if duplicated.

- A. Map
- B. Set
- C. List
- D. Tree
- E. Collections

**ANS:**

4. To create an instance of a new Map which has same an iteration order with an existing instance of a Map, which concrete implementation of the Map interface should be used for the new instance?

- A. TreeMap
- B. HashMap
- C. LinkedHashMap
- D. The answer depends on the implementation of the existing instance
- E. None of the above.

**ANS:**

5. With an immutable class obj which contains a field of type int and a large array of primitives of type double, to develop a hashCode method based one of these three options, which of the three is most likely to optimize the performance of a Hashtable without violating any of the rules for coding a hashCode method?

- A. Obtain the hashCode using both the int field and the array.
- B. Obtain the hashCode using only the int field.
- C. Obtain the hashCode using both the int field and the array, but only calculate the hashCode once and store the value for future use in an instance variable.

**ANS:**

6. Given the following Java code:

```
1. class A {
2.     private int[] val;
3.     private int hash;
4.     public static void main (String[] args) {
5.         A a = new A(new int[] {1,2,3});
6.         System.out.print(a.hashCode());
7.     }
8.     public int hashCode() {
9.         int h = hash, off = 0;
10.        if (h == 0) {
11.            int val_len = val.length, a = 0;
12.            while( a++ < val_len) {
13.                h = 30*h + val[off];
14.                off++;
15.            }
16.            hash = h;
17.        }
18.        return h;
19.    }
20.    // The equals method has been omitted for clarity
21.    A( int[] val) {this.val = val;}
22. }
```

What is the result?

- A. 963
- B. 1085
- C. 31706
- D. 35535
- E. 1895

**ANS:**

7. Given the following Java code: [5 points]

```
1.      import java.util.*;
2.      class A {
3.          public static void main (String[ ] args) {
4.              Object a = new HashSet( );
5.              System.out.print((a instanceof Collection)+"");
6.              System.out.print((a instanceof Set)+"");
7.              System.out.print((a instanceof List)+"");
8.              System.out.print((a instanceof Map)+"");
9.          }
10.     }
```

What is the result of attempting to compile and run the program?

- A. false,false,false,false
- B. true,true,false,false
- C. true,true,true,true,
- D. false,false,true,true,
- E. None of the above.

**ANS:**

8. To implement the most efficient way for a First In First Out queue, which of the following classes provide the most suitable solution?

- A. ArrayList
- B. LinkedHashMap
- C. HashSet
- D. LinkedList
- E. TreeMap
- F. TreeSet
- G. HashMap
- H. Hashtable
- I. Array

**ANS:**

9. Which of the following statements are true?

- A. Garbage collection ensures programs will never run out of memory
- B. You are not able to predict at what point Garbage Collection will occur.
- C. Both references and primitives are subject to garbage collection
- D. Once an object is not referred by any other objects it will be garbage collected immediately.

**ANS:**

10. Which statements about garbage collection are true?

- A. You are able to run the garbage collector anytime you want.
- B. In general, the garbage collector will start to run when low memory situations occurs.
- C. Garbage collector immediately runs when you set the references to null.
- D. When it runs it releases the memory allocated by an object.

**ANS:**