Each question worth 5 points for total of 100

1. Which of the following statements are true?

A. Recursive methods run faster than non-recursive methods.
B. In some cases, however, using recursion enables you to give a natural, straightforward, simple solution to a program that would otherwise be difficult to solve.
C. A recursive method can always be replaced by a non-recursive method.
D. Recursive methods usually take more memory space than non-recursive methods.

2. An instance of _______ describes system errors. If this type of error occurs, there is little you can do beyond notifying the user and trying to terminate the program gracefully.

A. RuntimeException
B. Exception
C. Error
D. Throwable
E. NumberFormatException

3. An instance of _______ describes the errors caused by your program and external circumstances. These errors can be caught and handled by your program.

A. RuntimeException
B. Exception
C. Error
D. Throwable
E. NumberFormatException

4. An instance of _______ are unchecked exceptions.

A. RuntimeException
B. Exception
C. Error
D. Throwable
E. NumberFormatException
5. Show the output of the following program:

```java
public class Test {
    public static void main(String[] args) {
        System.out.println("Sum is " + xMethod(5));
    }

    public static int xMethod(int n) {
        if (n == 1)
            return 1;
        else
            return n + xMethod(n - 1);
    }
}
```

6. What method do you use to set the location of a frame on the screen?
   a. setPosition
   b. setLocation
   c. setSize
   d. setDimension

7. What is the default layout manager for a JPanel?
   a. FlowLayout
   b. BorderLayout
   c. GridLayout
   d. No default layout manager

8. A frame can be placed inside a frame.
   a. true
   b. false

9. Analyze the following recursive method.

    ```java
    public static long factorial(int n) {
        return n * factorial(n - 1);
    }
    ```

    a. Invoking factorial(0) returns 0.
    b. Invoking factorial(1) returns 1.
    c. Invoking factorial(2) returns 2.
    d. Invoking factorial(3) returns 6.
    e. The method runs infinitely and causes a StackOverflowError.
10. What is the return value for xMethod(4) after calling the following method?

```java
static int xMethod(int n) {
    if (n == 1)
        return 1;
    else
        return n + xMethod(n - 1);
}
```

a. 12  
b. 11  
c. 10  
d. 9  

11. Analyze the following two programs:

A:
```java
public class Test {
    public static void main(String[] args) {
        xMethod(5);
    }

    public static void xMethod(int length) {
        if (length > 1) {
            System.out.print((length - 1) + " ");
            xMethod(length - 1);
        }
    }
}
```

B:
```java
public class Test {
    public static void main(String[] args) {
        xMethod(5);
    }

    public static void xMethod(int length) {
        while (length > 1) {
            System.out.print((length - 1) + " ");
            xMethod(length - 1);
        }
    }
}
```

a. The two programs produce the same output 5 4 3 2 1.  
b. The two programs produce the same output 1 2 3 4 5.  
c. The two programs produce the same output 4 3 2 1.  
d. The two programs produce the same output 1 2 3 4.  
e. Program A produces the output 4 3 2 1 and Program B prints 4 3 2 1 1 1 .... 1 infinitely.
12. How many times is the factorial method in Listing 20.1 invoked for factorial(5)?

A. 6  
B. 3  
C. 5  
D. 4

13. Analyze the following recursive method.

```java
public static long factorial(int n) {
    return n * factorial(n - 1);
}
```

A. Invoking factorial(0) returns 0.  
B. Invoking factorial(1) returns 1.  
C. Invoking factorial(2) returns 2  
D. Invoking factorial(3) returns 6.  
E. The method runs infinitely and causes a StackOverflowError.

14. A Java exception is an instance of __________.
   a. RuntimeException  
   b. Exception  
   c. Error  
   d. Throwable  
   e. NumberFormatException

15. What is the default layout manager for the content pane of a JFrame?
   a. FlowLayout  
   b. BorderLayout  
   c. GridLayout  
   d. No default layout manager

16. An instance of __________ are unchecked exceptions.
   a. RuntimeException  
   b. Exception  
   c. Error  
   d. Throwable  
   e. NumberFormatException

17. Which of the following classes is a heavyweight component?
   a. JButton  
   b. JTextField  
   c. JPanel  
   d. JFrame
18. What is best to describe the relationship between a container and a Swing GUI object in the container?
   a. Association
   b. Aggregation
   c. Composition
   d. Inheritance

19. What is best to describe the relationship between JComponent and JButton?
   a. Association
   b. Aggregation
   c. Composition
   d. Inheritance

20. Fill in the code to complete the following method for computing factorial.

```java
/** Return the factorial for a specified index */
public static long factorial(int n) {
    if (n == 0) // Base case
        return 1;
    else
        return ______________; // Recursive call
}
```

a. n * (n - 1)
b. n
c. n * factorial(n - 1)
d. factorial(n - 1) * n
e. c or d
Practice Exam 3 Key

1. BCD
2. C
3. B
4. ACE
5. Sum is 15
6. B
7. A
8. A
9. E
10. C \(4 + 3 + 2 + 1 = 10\)
11. In Program B, \text{xmethod}(5) invokes \text{xmethod}(4), \text{xmethod}(4) invokes \text{xmethod}(3), \text{xmethod}(3) invokes \text{xmethod}(2), \text{xmethod}(2) invokes \text{xmethod}(1), \text{xmethod}(1) returns control to \text{xmethod}(2), \text{xmethod}(2) invokes \text{xmethod}(1) because of the while loop. This continues infinitely.
12. D
13. E
14. D
15. C
16. ACE
17. D
18. C
19. D
20. E