Select the BEST answer for the following questions:

_____ 1. Which of the following is NOT true about a constructor of a class?
   a. A constructor must have the same name as the class.
   b. A constructor does not have a return type.
   c. A constructor must always be declared within a class (no default constructor is provided).
   d. A constructor initializes an instance of a class.

_____ 2. Why are modifiers, or getters and setters such as getName() and setName(), necessary for some variables?
   a. Modifiers are the only way to access instance variables with public visibility from outside of the class.
   b. Modifiers are the only way to access instance variables with private visibility from outside of the class.
   c. Modifiers are the only way to access static instance variables from outside of the class.
   d. Modifiers are the only way to access instance variables with public visibility from a super class.

_____ 3. Having fixed length is a characteristic of a _________ structure.
   a. Dynamic
   b. Static

_____ 4. A _________ data structure takes up a fixed amount of space in memory.
   a. Dynamic
   b. Static

_____ 5. A _________ data structure is easier to index than a _________ structure.
   a. Dynamic, Static
   b. Static, Dynamic

_____ 6. It is harder to insert and delete in the middle of a _________ data structure than in _________ one
   a. Dynamic, Static
   b. Static, Dynamic
7. Explain the process of adding another element to an array that is already full:
   a. Just add the element. The array is a dynamic structure and can easily accommodate more elements.
   b. Create another array of greater size, copy everything from the old shorter array, and then add the new element.
   c. None of the above.

8. The main difference between a tree and a graph is that:
   a. A tree **may** have cycles, while a graph **must** have cycles.
   b. A tree **may** have cycles, while a graph **cannot** have cycles.
   c. A tree **cannot** have cycles, while a graph **may** have cycles.
   d. A tree **cannot** have cycles, while a graph **must** have cycles.

9. A graph is a type of tree.
   a. True
   b. False

10. What is true of both abstract classes and interfaces?
    a. Both can contain regular methods.
    b. Both cannot be instantiated.
    c. Both use the Java keyword extends.
    d. Both require its child class to override all of its methods.

11. Abstract classes use the Java keyword ________, while interfaces use ________.
    a. throws, implements
    b. extends, throws
    c. extends, implements
    d. implements, extends

12. Abstract classes and interfaces both cannot be instantiated.
    a. True.
    b. False.

13. Abstract classes and interfaces both can contain regular, non-abstract methods.
    a. True.
    b. False.

14. Abstract classes and interfaces both require its child class or implementing class to override all of its methods (By require, we mean that Java will throw an error if you do not).
    a. True.
    b. False.
15. Which of the following describes an in-order traversal?
   a. PLR; Visit Parent then Left child then Right child.
   b. LPR; Visit Left child then Parent then Right child.
   c. LRP; Visit Left child then Right child then Parent.

16. Which of the following describes a post-order traversal?
   a. PLR; Visit Parent then Left child then Right child.
   b. LPT; Visit Left child then Parent then Right child.
   c. LRP; Visit Left child then Right child then Parent.

17. Which of the following describes a pre-order traversal?
   a. PLR; Visit Parent then Left child then Right child.
   b. LPT; Visit Left child then Parent then Right child.
   c. LRP; Visit Left child then Right child then Parent.

18. For a Stack, insertion is at the _________ and removal at the _________.
   a. First (head), last (tail)
   b. Last (tail), first (head)
   c. Last (tail), last (tail)
   d. First (head), first (head)
   e. Both a and b, because it does not matter which occurs at what end as the operations occur at different ends.
   f. Both c and d, because it does not matter which occurs at what end as the operations occur at the same end.

19. For a Queue, insertion is at the _________ and removal at the _________.
   a. First (head), last (tail)
   b. Last (tail), first (head)
   c. Last (tail), last (tail)
   d. First (head), first (head)
   e. Both a and b, because it does not matter which occurs at what end as the operations occur at different ends.
   f. Both c and d, because it does not matter which occurs at what end as the operations occur at the same end.

20. In continuous simulations, time is advanced from event to event.
   a. True.
   b. False.

21. A circular LinkedList is a LinkedList where the last node points back to the first node.
   a. True.
   b. False.
SUMMER 2007 CS1316 OPTIONAL QUIZ 4

Consider the following code for questions 22 -25:

```java
1  public class Person{
2   String name;
3  public Person(String name){
4    this.name = name;
5  }
6  public void speak(){
7    System.out.println("My name is "+name+. I am a Person.");
8  }
9 }
10 public class Student extends Person{
11   String major;
12  public Student(String name, String major){
13    super(name);
14    this.major = major;
15  }
16  public void speak(){
17    super.speak();
18    System.out.println("My major is "+major+. "");
19  }
20 }
```

22. What is happening in line 13?
   a. The Student class is calling a constructor in the parent class.
   b. The Student class is calling a method (but not a constructor) in the parent class.
   c. The Student class is calling a constructor in the child class.
   d. The Student class is calling a method (but not a constructor) in the child class.

23. What is happening in line 17?
   a. The Student class is calling a constructor in the parent class.
   b. The Student class is calling a method (but not a constructor) in the parent class.
   c. The Student class is calling a constructor in the child class.
   d. The Student class is calling a method (but not a constructor) in the child class.

24. What will print out in the interaction pane, after the following lines of code:

   ```java
   Student steve = new Student("Steve", "ISYE");
   steve.speak();
   ```

   a. My major is ISYE.
   b. My name is Steve. I am a Person.
   c. My name is Steve. I am a Person.
   d. Some exception will occur.
______ 25. What will print out in the interaction pane, after the following lines of code:

```java
Person lucy = new Student("Lucy", "EE");
lucy.speak();
```

a. My name is Lucy. I am a Person.
b. My major is EE.
c. My name is Lucy. I am a Person.
   My major is EE.
d. Some exception will occur.