

Name \_\_\_\_\_

Answer 9 of the following questions. Indicate which of the questions you wish to be graded. Answer essay questions as briefly as possible.

1. Assume we have a method called `trimBlanks()` on the `String` class that removes all leading and trailing spaces. That is it repeatedly removes the first character of the string as long as it is a space and repeatedly removes the last character of the string as long as it is a space. Write XUnit (where X = J, R, S, Cpp) test(s) for the method. C++ people can assume that all C++ strings are an instance of the `String` class.
2. The following methods are from classes B & C that have a common superclass A. Rewrite the methods using the Template method. Show all the methods you would create and which classes they would be in.

<pre> Class B Key keyFrom(HttpRequest aRequest) {     if (aRequest.identifier().size() &lt; depth() ) {         if (aRequest.hasPostDataAt( "Command"))             return aRequest.postDataAt("Command");         else             return defaultKey();     }     if (containsAction(matchingElement(aRequest)) {         aRequest.decodeFormData();     }     return matchingElement(aRequest); } </pre>	<pre> Class C Key keyFrom(HttpRequest aRequest) {     if (aRequest.identifier().size() &lt; depth() ) {         return defaultKey();     }     return matchingElement(aRequest); } </pre>
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3. Explain
  - A. Information Hiding
  - B. Encapsulation
  - C. Abstraction
4. We now have three different ways to produce a list of all odd valued integers in a linked list. Select two of the methods and discuss the pros and cons of each way.
5. In object-oriented programming programmers are told to avoid `if (case)` statements and replace them with polymorphism. What is gained by using polymorphism and what is lost by using polymorphism.

6. Sometimes one needs to modify a class but for some reason are not allowed to alter the class. What design pattern can be used in this situation? Explain how it can be used.
7. Explain one of the following types of coupling: Data Coupling, Control Coupling, Inside Internal Object Coupling.
8. Explain one of the following types of cohesion: Logical, Temporal, Procedural, Communication, Sequential. Give an example.
9. One issue in the composite pattern is who should declare the child management operations: the Composite or the Component classes. What are the trade-offs involved in deciding where to declare the child management operations.
10. Using iterators to traverse a collection is considered good. In the code given below using the iterator takes more lines of code to accomplish the same task. Explain how using the iterator is better than the other solution.

<pre>var numbers = new LinkedList();  code to add numbers  Iterator list = numbers.iterator(); while ( list.hasNext() ) {     Integer a = (Integer) list.next();     int    b = a.intValue();     if ((b % 2) == 0)         System.out.println( x ); }</pre>	<pre>var numbers = new LinkedList();  code to add numbers  for (int k =0; k &lt; numbers.size(); k++ ) {     Integer a = (Integer) numbers.get(k);     int    b = a.intValue();     if ((b % 2) == 0)         System.out.println( x ); }</pre>
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11. Explain how the Command pattern works.