**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Score \_\_\_\_\_ / 24**

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**CS 245 – Object-Oriented Programming**

**Homework on Supporting Java Tools**

*Show your work for all problems*. Do not use a computer program to compute the answers to these problems.

1. Which of the following is true of unit tests?
   1. Unit tests are good for verifying that complicated user interaction behaves as expected.
   2. Unit tests are typically used to test small code modules rather than large sections of code.
   3. Unit tests are used to test the performance of a block of code.
   4. Unit tests focus only on state, not on behavior.
2. If I want to test whether an entire application works as it should, rather than just part of it, I would use
   1. An integration test
   2. A unit test
   3. A performance test
   4. A blood test
3. Write a class called TextAnalyzer that, in addition to main, has two functions, one called countVowels, and the other called countWords. countVowels takes in a string and returns the number of vowels in it. countWords takes in a string and returns the number of words in it.

Then write a class called TextAnalyzerTest that uses the JUnit framework to test the functions countVowels and countWords for TextAnalyzer.

Paste your code for both TextAnalyzer and TextAnalyzerTest here. (6 points).

1. Paste a screen shot of the window that shows that your TextAnalzyerTest found no errors in your TextAnalyzer implementation. Feel free to perform your test either from the command line (using the TestRunner class) or from Eclipse. (2 points)
2. Which of the following is not an advantage of dividing code into packages.
   1. It groups together classes that serve a similar purpose.
   2. It helps prevent class naming collisions.
   3. It helps code run more efficiently, because the compiler generates optimized code for classes placed in packages.
   4. It provides an opportunity to distribute executable modules without releasing their source code.
3. What is a jar file?
   1. A java archive.
   2. A group of files all packaged into one file.
   3. Something that can contain both Java-specific files and other files
   4. Something that can be added to the build path or class path so that you can access the class files within it.
   5. All of the above
   6. Options a, b, and d, but not c.
   7. Options a, b, and c, but not d.
4. Suppose I have added the line  
   package com.klump.shapes;  
   at the top of a java file. If I am in the folder c:\temp\, and I compile the file Circle.java using the line  
   javac –d . Circle.java  
   in what folder will Circle.class be written?
5. What is the purpose of the option  
   -d .   
   when you compile a file in java?
   1. It tells the compiler to use the current directory as the reference for where to place .class files.
   2. It tells the compiler to use the system’s root directory as the reference for where to place .class files.
   3. It tells the compiler to place all .class files, even those that correspond to classes that belong to various packages, in the current folder.
   4. It tells the compiler to place all .class files, even those that correspond to classes that belong to various packages, in the system root folder.
6. What is the purpose of the build path (also called the classpath) in Java?
   1. It tells the compiler where to place .class files when it compiles them.
   2. It tells the compiler where to find supporting .class files that it might need to import.
   3. It tells the compiler where to copy .java files during the compile process.
   4. It helps the compiler determine where to write javadoc documentation.
7. Suppose I am in a folder that has a subfolder called widgets that contains several .class files. Write the command-line instruction that will create a jar file called widgets.jar that contains the .class files in the widgets subfolder.
8. Suppose I have a class called Snuffleupagus that is contained in a package called sesame.street. Suppose I want to use that class in a new source file that I’m using. Write the line I would have to include in that new source file in order to be able to use the Snuffleupagus class.
9. Suppose I have a class called BigBird for which I want to create javadoc documentation. Write the command-line instruction needed to write the javadoc html files to a subfolder of the current folder called docs.
10. Suppose I have a class called EmployeeName. One of the functions in it is called getInitials. The getInitials function will return a string that specifies the person’s initials. It will take in two parameters. The first is a Boolean that indicates whether the middle intitial should be included. The second is a string that indicates what characters should separate each initial in the returned string. Write the javadoc documentation that would be needed to show the purpose of the function, the returned String’s meaning, and the meaning of the two parameters. (2 points)
11. Suppose I have collected the names of people in several separate files based on their starting letter. The names in the first file begin with A through G, the names in the second file begin with H through N, the names in the third file beginning with O through T, and the names in the fourth file contain names beginning with U through Z. None of the files are sorted. instead, the names that appear in each file occur in any order. Describe in detail how I could take advantage of multithreading to create one sorted list of all the names. Make sure you include details such as what your Thread class would do and what your main class that uses the Threads would do. (3 points)
12. If I have an octo-core CPU but I have written an application as single-threaded rather than multi-threaded, what is the maximum percentage of the CPU the application will use?