Java Assignment on Classes, Objects and Abstract Classes

1. Write an application that generate~ the first 15 numbers in the Fibonacci series (i.e., 1 1 2 3 5 8 13 21...). A number in this series is calculated by adding together the two numbers that precede it.

2. Write an application to find all the prime numbers between 100 and 200.

3. Write an application that searches through its command line arguments. If an argument is found that does not begin with an uppercase letter display an error message and terminate.

4. Write an application that defines a Circle class with two constructors. The first form accepts a double value that represents the radius of the circle. This constructor assumes that the Circle is centered at the origin. The second form accepts three double values. The first two arguments define the coordinates of the center and the third argument defines the radius.

5. Write an application that creates ten Rock objects and saves these in an array, Randomly select a mass between 1 and 10 kilograms for each rock as it is created. After all rocks have been created, display their individual masses and the total mass of all rocks.

6. Write an application that demonstrates a class inheritance hierarchy. Class M extends Object and has two instance variables of type float and String. Class N extends M and has 'one instance variable of type Double. Instantiate class N. Initialize and display its variables.

7. Write an application that illustrates how to access a hidden variable. Class G declares static variable x. Class H extends G. Class H also declares a variable x. A display( ) method in H displays both of these variables.

8. Write the following application: Class S1 declares an instance variable named s1 of type int. Class T1 extends S1 and declares an instance variable t1 of type int. Class U1 extend T1 and declares an instance variable u1 of type int. The constructor for that class initializes these variables. Each Constructor also displays a string to indicate that it has started execution.

9. The abstract Fruit class has four subclasses named Apple. Banana, Orange and Strawberry. Write an application that demonstrates how to establish this class hierarchy. Declare one instance variable of type String that indicates the color of a fruit. Crate and display instances of these objects. Override the toString() method of Object to return a string with the name of the fruit and its color.

10. The abstract Airplane class has three subclasses named B747, B757 and B767. Each airplane type can transport a different number of passengers. Each airplane object has a unique serial number. Write an application that declares this class hierarchy. Instantiate several types of airplanes and display them. Override the toString( ) method of Object to return a string with the type serial number and Capacity.

11. The abstract Monster class has three concrete subclasses named Vampire, Werewolf and Zombie. Create six different monsters of different types and store them in a one-dimensional array. Create a loop that displays the type of each monster.