CSCI 2916 Lab 9 – Week 10

Lab: Freezing and Boiling

The following table lists the freezing and boiling points of several substances.

Substance	Freezing Point	Boiling Point
Ethyl Alcohol	-173	172
Oxygen	-362	-306
Water	32	212

Design a class called FreezingAndBoiling that stores a temperature in a temperature field and has the appropriate setter (mutators) and getter (accessor) methods for the field. In addition to appropriate constructors, the class should have the following methods:

- isEthylFreezing. This method should return the boolean value true if the temperature stored in the temperature field is at or below the freezing point of ethyl alcohol. Otherwise, the method should return false.
- isEthylBoiling. This method should return the boolean value true if the temperature stored in the temperature field is at or above the boiling point of ethyl alcohol. Otherwise, the method should return false.
- isOxygenFreezing. This method should return the boolean value true if the temperature stored in the temperature field is at or below the freezing point of oxygen. Otherwise, the method should return false.
- isOxygenBoiling. This method should return the boolean value true if the temperature stored in temperature field is at or above the boiling point of oxygen. Otherwise, the method should return false.
- isWaterFreezing. This method should return the boolean value true if the temperature stored in the temperature field is at or below the freezing point of water. Otherwise, the method should return false.
- isWaterBoiling. This method should return the boolean value true if the temperature stored in the temperature field is at or above the boiling point of water. Otherwise, the method should return false.

1. Create a UML class diagram for the FreezingAndBoiling class.
2. Write a program that demonstrates the class. The program should ask the user to enter a temperature, and then display a list of the substance that will freeze at that temperature and those that will boil at that temperature.
3. Submit the UML class diagram, the class file and the demo file

Sample Run 1 (computer prompt/output in **bold,** user input in *italic)*:
Enter a temperature: *200*
Ethyl alcohol will boil.
Oxygen will boil.

Sample Run 2:
Enter a temperature: *20*
Water will freeze.
Oxygen will boil.

Guidelines for a good program:

- The program works, following the dialog and rules above.
- The code is clear and understandable:
    - Properly indented
    - Blank lines separate logical sections of code
    - Preamble documentation is included
    - Review program assignment rubric

Representative variable names
Appropriate comments included
Include Javadoc comments for each method