CIS 181: Object-Oriented Programming II

Homework #1 (30 pts total)

Objectives

- To practice creating a class diagram.
- To practice creating a state diagram.

Requirements:

- **Design a class diagram:**
  - I'm feeling a bit hungry… let's make a cookie called Unbelievably Massive & Lick-able (UML) cookies (aka sugar cookies with vanilla frosting). What goes into making such a cookie I wonder…:
    i. Sugar Cookie:
       1. Butter
       2. Sugar
       3. Baking powder
       4. Salt
       5. Vanilla extract
       6. Egg
       7. Flour
       8. Baking Soda
       9. Milk

    ii. Frosting:
       1. Confectioners' Sugar (a specific type of sugar)
       2. Vanilla Bean Powder
       3. Butter
       4. Evaporated Milk (a specific type of milk)
       5. Vanilla extract

  Create a class diagram to represent a UML Cookies. (Hint: every ingredient I listed above, should be a class in your class diagram.
  10 pts for correctness (correct arrows)
  10 pts for having all necessary classes
  NOTE: No attributes or methods should be filled in. We only want skeleton classes.

- **Design a state diagram:** "Designing a Sentinel AI". Congratulations, you're been picked to work on a strategy video game. The game revolves around building a fort, and protecting the fort from invaders. Your job is to design the AI for sentinel robots that protect a fort. You must produce and show a state diagram of the AI to your boss. In an agreement with your other teammate, they provide you with the list of states and transitions, and you are to make the state diagram. This list is provided below:

  States:
  - Patrol – The sentinel simply moves around the perimeter of the fort.

- Attack – The sentinel attacks enemy robots.
- In Recharge Dock – Teleports to Recharge Dock and is recharging.
- In Repair Dock – Teleports to Repair Dock and is being repaired.

Transitions:

- Detects Enemy
- Enemy stops functioning or retreats
- Battery Level drops below 5%
- Sustains Critical Damage
- Receives Repairs Complete Signal
- Receives Recharge Cycle Complete Signal

In order of priority, Recharge > Repair > Attack > Patrol. When the AI leaves the dock, you can assume that it will always for into the Patrol state.

Don't forget to show the initial state (Patrol) with an arrow coming in from nowhere.

5 pts for correctness
5 pts for having all necessary transitions and states.

Deliverable:

- Electronic Submission on Canvas: If you know you can't rely on your handwriting, or simply hate using an eraser, you may use any drawing tool to create your diagrams as long as you can save it as a jpeg or png file. I recommend using dia (found here: http://dia-installer.de/index_en.html). If the solution is unreadable, or very poor in quality, the assignment will not be graded.