CSE1322 Assignment 3

Background:

Pokémon GO continues to be one of the highest grossing mobile games. In the game, you encounter wild pokemon, which you can attempt to catch. Each game for Pokemon uses slightly different rules for catching. Generally the user throws a ball, and has a chance of catching the Pokemon. There are better balls which increase your chances, there are also items you can give the Pokemon (berries) which increase the likelihood of catching, finally the way you throw the ball can increase your chances. In the end, all these factors are plugged into the unified catch formula. This formula gives a number between 0 and 1. The computer picks a random number between 0 and 1, if the picked number is lower than the formula number, you caught the pokemon, if not, you didn't.

For this assignment you'll be implementing the encounter and catch mechanism as well as the Pokedex features where you store the pokemon you catch.

Steps:
- Create a class called Pokemon
    - It must have a private integer called level
    - It must have a private double called baseCatchRate.
    - A constructor which takes in a new level (int) and a new baseCatchRate (double) and sets the two class attributes.
    - A method getLevel() which returns an int (the current level)
    - A method getBaseCatchRate() which returns a double (the base catch rate).
- Create a class called Bulbasaur which inherits from Pokemon
    - It must have a constructor which takes in a level and calls the parent constructor passing it the level, and 0.2 (which is the base catch rate (20%) for a Bulbasaur).
    - It must have an override of toString (java) or ToString (C#) which returns the string "A level x Blubasaur". Where x is the correct level of this object.
- Create a class called Caterpie which inherits from Pokemon
    - It must have a constructor which takes in a level and calls the parent constructor passing it the level, and 0.5 (which is the base catch rate (50%) for a Caterpie).
    - It must have an override of toString (java) or ToString (C#) which returns the string "A level x Caterpie". Where x is the correct level of this object.
- Create a class called Charmander which inherits from Pokemon
    - It must have a constructor which takes in a level and calls the parent constructor passing it the level, and 0.2 (which is the base catch rate (20%) for a Charmander).
    - It must have an override of toString (java) or ToString (C#) which returns the string "A level x Charmander". Where x is the correct level of this object.
- Create a class called Pokedex.
    - It must have a private ArrayList (Java)/List (C#) called myPokedex of Pokemon.

- ○ It must have a method called addToDex which takes in a Pokemon and adds it to the myPokedex ArrayList/List.
- ○ It must have an override of toString (Java)/ToString (C#) which returns all the pokemon in the pokedex. They should be returned one Pokemon per line, using the toString/ToString in the respective Pokemon classes.
- In your Main Object, you'll need to create:
  - ○ A method called spawn(). It will take in no parameters, and will return a Pokemon.
    - ■ Start by picking a random number between 0 and 20. This will be the level
    - ■ Next pick a random number between 0 and 3. If this number is 1 you'll spawn a new Bulbasaur. If this number is 2, you'll spawn a new Charmander. If this number is anything else, you'll spawn a new Caterpie.
    - ■ Hint you'll need to utilize polymorphism when creating this encounter pokemon.
    - ■ Print out a statement like "You encounter A level 3 Bulbasaur". Obviously replace the level and pokemon name with the appropriate answer for what you've picked.
  - ○ A method called throwBall() which takes no parameters and returns a float.
    - ■ Ask the user what type of ball they wish to use? (Poke, Great, Ultra).
    - ■ Read in and store their answer.
      - ● If they choose a Poke ball, set ballMultiplier (a float) to 1.
      - ● If they choose a Great ball, set ballMultiplier to 1.5
      - ● If they choose an Ultra ball, set ballMultiplier to 2
    - ■ Next ask what berry they wish to use (None, Razz, SilverPinap, GoldenRazz)
      - ● If they choose Razz, set berryMultiplier (a float) to 1.5
      - ● If they choose SilverPinap, set berryMultiplier to 1.8
      - ● If they choose GoldenRazz, set berryMultiplier to 2.5
      - ● Otherwise set berryMultiplier to 1.
    - ■ Finally ask them if it's a curveball (Yes or No).
      - ● If they choose Yes, set curveMultiplier to 1.7.
      - ● Otherwise set curveMultiplier to 1.
    - ■ Multiply the 3 numbers together (ballMultiplier, berryMultiplier and curveMultiplier) and return the value.
  - ○ Write a main method as follows:
    - ■ Create an instance of Pokedex called myDex
    - ■ Call your Spawn method, and get a new encounter pokemon.
    - ■ Using a loop, you'll keep asking them which ball to throw until they catch the pokemon.
      - ● First set an attribute called cpm to 0.49985844
        - ○ In case you are wondering, this number is related to the level of the pokemon, we are always assuming a level 14 pokemon with this number.

- Next call your throwBall() method. It returns a multiplier that you'll need in a moment.
- Calculate the catchProbability. Use this formula:

$$Probability = 1 - \left(1 - \frac{BCR}{2 * CPM}\right)^{Multipliers}$$

  - BCR is the baseCatchRate from the encountered Pokemon.
  - Multipliers is what you got back from throwBall() method above.
- Pick a random number between 0 and 1.
  - If this number is lower than the catchProbability they have successfully caught the pokemon. If not, the pokemon jumped out of the ball.
  - If they caught the pokemon, print out a line like "A level 10 Bulbasaur Caught". Be sure the level and name of pokemon are correct. Then add the pokemon to the user's pokedex.
  - If they didn't catch the pokemon, print out a line like "Oops A level 10 Bulbasaur jumped out, try again!. Then go back to the top of your catch loop and repeat all the steps until they catch it.
    - After each successful catch, ask the user if they'd like to continue catching pokemon. As long as they say yes, spawn a new pokemon, and let them try to catch it.
    - Once they say No (they would not like to keep catching pokemon), print out all the pokemon in their pokedex.

Sample Output:

[Note, the types and levels of pokemon you'll encounter are random, so your output will differ. Also note that catching a pokemon is random too, so you may have to try multiple times to catch one, even with Ultra balls, and GoldenRazz berries and CurveThrows, they just make it more likely you'll catch it]

You encounter A level 6 Charmander
What type of ball do you wish to use? (Poke, Great, Ultra)
Poke
What berry do you wish to use? (None, Razz, SilverPinap, GoldenRazz)
None
Is this a curveball? (Yes or No)
No
Oops, A level 6 Charmander jumped out, try again!
What type of ball do you wish to use? (Poke, Great, Ultra)
Ultra

What berry do you wish to use? (None, Razz, SilverPinap, GoldenRazz)
GoldenRazz
Is this a curveball? (Yes or No)
Yes
Oops, A level 6 Charmander jumped out, try again!
What type of ball do you wish to use? (Poke, Great, Ultra)
Ultra
What berry do you wish to use? (None, Razz, SilverPinap, GoldenRazz)
GoldenRazz
Is this a curveball? (Yes or No)
Yes
A level 6 Charmander Caught!
Continue Catching Pokemon? (Y or N)
Y
You encounter A level 2 Caterpie
What type of ball do you wish to use? (Poke, Great, Ultra)
Poke
What berry do you wish to use? (None, Razz, SilverPinap, GoldenRazz)
None
Is this a curveball? (Yes or No)
No
Oops, A level 2 Caterpie jumped out, try again!
What type of ball do you wish to use? (Poke, Great, Ultra)
Poke
What berry do you wish to use? (None, Razz, SilverPinap, GoldenRazz)
None
Is this a curveball? (Yes or No)
No
A level 2 Caterpie Caught!
Continue Catching Pokemon? (Y or N)
N
You have the following pokemon:
A level 6 Charmander
A level 2 Caterpie

Submitting your answer:

Please follow the posted submission guidelines here:
https://ccse.kennesaw.edu/fye/submissionguidelines.php

Ensure you submit before the deadline listed on the lab schedule for CSE1322L here:
https://ccse.kennesaw.edu/fye/courseschedules.php