Homework 8 : Pig

HW deadline as per Canvas.

This homework deals with the following topics:

- Setting up the Java programming environment and Eclipse (if you haven't done so already)
- Getting you started with class-based object oriented programming

Importing a Java Program into Eclipse

If needed, please reference "Importing a Java Program into Eclipse" for information on importing Java files into Eclipse.

The Assignment

Pig is a very simple game. Two players take turns; on each turn, a player rolls a six-sided die ("die" is the singular of "dice") as many times as she wishes, or until she rolls a 6. Each number she rolls, except a 6, is added to her score this turn; but if she rolls a 6, her score for this turn is zero, and her turn ends. At the end of each turn, the score for that turn is added to the player's total score. The first player to reach or exceed 50 wins.

For example:

- Alice rolls 3, 5, 3, 1, and stops. Her score is now 12.
- Bob rolls 5, 4, 1, 1, 2, and stops. His score is now 13.
- Alice rolls 5, 3, 3, 5, 4, and stops. Her score is now 32 (12 + 20).
- Bob rolls 4, 6. He has to stop, and his score is still 13 (13 + 0).
- etc.

As defined above, the first player has an advantage. To make the game more fair, we will say that if the first player reaches or exceeds 50, the second player gets one additional turn. (If the second player is the first to reach 50, the first player does not get an additional turn.)

Your assignment is to implement the game of Pig. You will play against the computer. The computer always goes first, so you get one more turn if the computer is the first to reach 50. If both players are tied with 50 or more, each gets another turn until the tie is broken.

Each player must roll the die at least once per turn.

Additionally, the program should ask if the user wants to play again. Any response that begins with 'y' (capital or lowercase) should play again. Any response that begins with 'n' (capital or lowercase) means the user wants to exit. Any response that begins with any other character should ask the user again.

Details

We are providing you with a "skeleton" of the game (Pig.zip) -- the classes and methods have been defined, but just about all of the actual code has been deleted. Your task is to finish the program by adding the necessary code. Javadoc-style comments (included) tell you what must be done in each method.

Below are the classes in the project. Note, each class file declares the **hw8** package (at the top) because the entire program sits in the "hw8" subdirectory. Do not remove the package declaration in each file or change the structure of the program.

- **The *GameControl* Class**

  The *GameControl* class controls the entire game. It has a *main* method which serves as the entry point to the entire program and it will be the file you will "run".

  The *GameControl* class will take care of creating one computer and one human instance, controlling the play of the game, and printing the final results of the game.

  The *GameControl* class should have (at least) the following instance variables: *human*, *computer*, and *random*.

- **The *Human* Class**

  The *Human* class represents a human player in the game.

  The *Human* class will take care of looking at his/her score and let the player decide whether to roll the dice again.

  The *Human* class should have (at least) the following instance variables: *name*, and *score*

- **The *Computer* Class**

  The *Computer* class represents a computer player in the game.

  The *Human* class will take care of looking at its own score and decide whether to roll the dice again.

  The *Computer* class should also have (at least) the following instance variables: *score*

Note: You are always encouraged to write additional helper methods!

Program Output

Print out what the program is doing as it goes along. Here are some runs of my program -- yours should provide similar information.

```
Welcome to Pig!

Please input your name
Jeff
Welcome Jeff
Computer's roll: 2
Computer's score in this round: 2
Computer's total score is: 2
```

```
Jeff's roll: 2
Do you want to roll again?
y
Jeff's roll: 1
Do you want to roll again?
y
Jeff's roll: 3
Do you want to roll again?
y
Jeff's roll: 2
Do you want to roll again?
y
Jeff's roll: 4
Do you want to roll again?
n
Jeff's score in this round: 12
Human's total score is: 12

Computer's roll: 3
Computer's roll: 1
Computer's roll: 5
Computer's roll: 2
Computer's score in this round: 11
Computer's total score is: 13

Jeff's roll: 3
Do you want to roll again?
y
Jeff's roll: 3
Do you want to roll again?
y
Jeff's roll: 3
Do you want to roll again?
y
Jeff's roll: 4
Do you want to roll again?
n
Jeff's score in this round: 13
Human's total score is: 25

Computer's roll: 5
Computer's roll: 3
Computer's roll: 5
```

```
Computer's score in this round: 13
Computer's total score is: 26

Jeff's roll: 4
Do you want to roll again?
y
Jeff's roll: 1
Do you want to roll again?
y
Jeff's roll: 4
Do you want to roll again?
y
Jeff's roll: 2
Do you want to roll again?
n
Jeff's score in this round: 11
Human's total score is: 36

Computer's roll: 2
Computer's roll: 6
Computer's score in this round: 0
Computer's total score is: 26

Jeff's roll: 2
Do you want to roll again?
y
Jeff's roll: 3
Do you want to roll again?
y
Jeff's roll: 1
Do you want to roll again?
y
Jeff's roll: 3
Do you want to roll again?
n
Jeff's score in this round: 9
Human's total score is: 45

Computer's roll: 1
Computer's roll: 4
Computer's roll: 6
Computer's score in this round: 0
Computer's total score is: 26
```

```
Jeff's roll: 4
Do you want to roll again?
y
Jeff's roll: 6
Jeff's score in this round: 0
Human's total score is: 45

Computer's roll: 1
Computer's roll: 6
Computer's score in this round: 0
Computer's total score is: 26

Jeff's roll: 2
Do you want to roll again?
y
Jeff's roll: 3
Do you want to roll again?
n
Jeff's score in this round: 5
Human's total score is: 50

Human gets 50
Computer gets 26
Human wins!
--------------------
Do you want to play again?
y
Please input your name
Ben
Welcome Ben
Computer's roll: 6
Computer's score in this round: 0
Computer's total score is: 0

Ben's roll: 6
Ben's score in this round: 0
Human's total score is: 0

Computer's roll: 2
Computer's score in this round: 2
Computer's total score is: 2
```

```
Ben's roll: 4
Do you want to roll again?
y
Ben's roll: 3
Do you want to roll again?
y
Ben's roll: 2
Do you want to roll again?
y
Ben's roll: 3
Do you want to roll again?
n
Ben's score in this round: 12
Human's total score is: 12

Computer's roll: 3
Computer's roll: 5
Computer's roll: 3
Computer's score in this round: 11
Computer's total score is: 13

Ben's roll: 6
Ben's score in this round: 0
Human's total score is: 12

Computer's roll: 5
Computer's score in this round: 5
Computer's total score is: 18

Ben's roll: 2
Do you want to roll again?
n
Ben's score in this round: 2
Human's total score is: 14

Computer's roll: 5
Computer's score in this round: 5
Computer's total score is: 23

Ben's roll: 1
Do you want to roll again?
n
Ben's score in this round: 1
```

```
Human's total score is: 15

Computer's roll: 5
Computer's score in this round: 5
Computer's total score is: 28

Ben's roll: 1
Do you want to roll again?
n
Ben's score in this round: 1
Human's total score is: 16

Computer's roll: 6
Computer's score in this round: 0
Computer's total score is: 28

Ben's roll: 1
Do you want to roll again?
n
Ben's score in this round: 1
Human's total score is: 17

Computer's roll: 4
Computer's score in this round: 4
Computer's total score is: 32

Ben's roll: 2
Do you want to roll again?
n
Ben's score in this round: 2
Human's total score is: 19

Computer's roll: 3
Computer's score in this round: 3
Computer's total score is: 35

Ben's roll: 3
Do you want to roll again?
n
Ben's score in this round: 3
Human's total score is: 22

Computer's roll: 5
```

```
Computer's score in this round: 5
Computer's total score is: 40

Ben's roll: 6
Ben's score in this round: 0
Human's total score is: 22

Computer's roll: 4
Computer's score in this round: 4
Computer's total score is: 44

Ben's roll: 2
Do you want to roll again?
n
Ben's score in this round: 2
Human's total score is: 24

Computer's roll: 1
Computer's score in this round: 1
Computer's total score is: 45

Ben's roll: 2
Do you want to roll again?
n
Ben's score in this round: 2
Human's total score is: 26

Computer's roll: 6
Computer's score in this round: 0
Computer's total score is: 45

Ben's roll: 5
Do you want to roll again?
n
Ben's score in this round: 5
Human's total score is: 31

Computer's roll: 1
Computer's score in this round: 1
Computer's total score is: 46

Ben's roll: 3
Do you want to roll again?
```

```
n
Ben's score in this round: 3
Human's total score is: 34

Computer's roll: 3
Computer's score in this round: 3
Computer's total score is: 49

Ben's roll: 2
Do you want to roll again?
n
Ben's score in this round: 2
Human's total score is: 36

Computer's roll: 2
Computer's score in this round: 2
Computer's total score is: 51

Ben's roll: 2
Do you want to roll again?
n
Ben's score in this round: 2
Human's total score is: 38

Human gets 38
Computer gets 51
Computer wins!
--------------------
Do you want to play again?
n
Goodbye!
```

Comments & Style

Write comments using // for any non-trivial lines of code. In general, all of the style conventions from Python also apply in Java. The main differences are in naming conventions (lowercase and underscores versus camelCase) and the syntax for comments (/* */ versus ‘’’ ‘’’ and // versus #). The content of your comments should be very similar.

Javadocs

If not already added, please add javadocs to all class definitions, methods, and instance variables.

What to Submit

Please submit all the classes in your entire Java project. Make sure it includes everything in your "src" folder. Do not remove the package declaration in each file and keep the entire program in the "hw8" subdirectory.

Evaluation

1. Did you set up the project correctly? Does it compile and is everything named correctly? (2 pts)
2. Does your code function? Does it do what the specifications require? (9 pts)
    a. Can we play the game? Does the print out make sense?
    b. Does the game accurately pick the winner (if there is one)?
3. Did you implement the methods correctly? Does your code pass our tests? (4 pts)
4. Did you follow good programming practices? (4 pts)
    a. Did you reuse code to avoid repetition (e.g. put repeated code in a helper method)?
    b. Did you add javadocs to methods and comment all non-trivial code?
    c. Did you indent properly and use { brackets } correctly for code blocks?
    d. Did you name variables descriptively with camelCase?
5. Did you submit the correct file(s) and nothing else? (1 pt)