

CS161: Introduction to Computer Science  
Homework Assignment 5  
Due: 2/22 by 11:59pm

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## Pair of Dice

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In this week's assignment, you will write a class whose instance variables themselves have class type. In particular, this assignment asks you to write a Java class called `PairOfDice` that represents a pair of dice.

You can use the `Die` class that we discussed in class to implement `PairOfDice`.

While I encourage you to write a separate class with a `main` method to test your `PairOfDice` class, it is not required for this assignment.

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## Programming Questions

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Open BlueJ and create a new project named `hw5`.

1. Create a new Java class named `Die`. This class should represent a single die. I recommend you use the code posted on the course webpage for the date 2/8.

The only difference between your `Die` class and the one on the course webpage is that your `Die` class should represent a dice with  $n$  sides. That is, your `Die` class should be more general than the one discussed in class. Modify the constructor to take a single `int` parameter representing the number of sides of the die. You will also need to modify the instance variables.

2. Once you've finished the `Die` class, create a new Java class named `PairOfDice`. This class should represent a pair of dice! Your class should have the following methods,
  - A constructor that takes no parameter. This constructor should create two 6-sided dice.
  - A constructor that takes a single `int` parameter representing the number of sides for both dice.
  - A constructor that takes two `int` parameters representing the number of sides for both dice respectively. In this case, the dice can have a different number of sides.
  - The class isn't much good unless we can roll our pair of dice, so we'll need a `roll` method that rolls them both and returns the sum of both dice.
  - You should add an accessor method called `getNumRolls` that returns the number of times we've rolled the dice.
  - Add a `toString` method that builds and returns a string representing the state of the object. Your string should display the face values for both dice along with the number of times the dice have been rolled.

3. Finally, comment your code appropriately. A block comment should be placed before the class with your name and a description of the class. Place block comments before each of the methods in the `PairOfDice` class. Use inline comments (`//`) for any code you think needs additional explanation.

Below is an example of how you might use your `PairOfDice` class:

```

public static void main(String[] args){
    // Create a 10-sided die and a 20-sided die
    System.out.println("Creating a 10-sided and 20-sided dice...");
    PairOfDice pair = new PairOfDice(10, 20);

    // Roll the pair of dice
    int sum = pair.roll();
    int rolls = pair.getNumRolls();
    System.out.println("The sum is " + sum);
    System.out.println("The number of rolls is " + rolls);
    System.out.println(pair);

    // Roll them again
    sum = pair.roll();
    rolls = pair.getNumRolls();
    System.out.println("\nThe sum is " + sum);
    System.out.println("The number of rolls is " + rolls);
    System.out.println(pair);

    // Create two 8-sided die
    System.out.println("\n\nCreating two 8-sided dice...");
    PairOfDice pair2 = new PairOfDice(8);

    sum = pair2.roll();
    rolls = pair2.getNumRolls();
    System.out.println("\nThe sum is " + sum);
    System.out.println("The number of rolls is " + rolls);
    System.out.println(pair);
}

```

Here is what would be printed to the screen:

```

BlueJ: Terminal Window - hw5
Creating a 10-sided and 20-sided dice...
The sum is 13
The number of rolls is 1
[die1=3, die2=10, numRolls=1]

The sum is 19
The number of rolls is 2
[die1=2, die2=17, numRolls=2]

Creating two 8-sided dice...
The sum is 13
The number of rolls is 1
[die1=2, die2=17, numRolls=2]

```

## Submitting your lab assignment

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Submit your `hw5` folder with your `Die` and `PairOfDice` class inside. If you wrote a third class with a `main` method to test your `PairOfDice` class, feel free to include that as well.

Don't forget to rename your folder *before* zipping it and submitting it to Moodle.