# **Chapter 4 Lab**

**Important:** Make sure you include the 3 header comments listed in previous lab assignments.  
For each project, once your program is completed and runs, copy the code into a text file named Lab4A.txt or Lab4B.txt) and submit it in this assignment. Paste both classes for each program into the same document.  
**Also, in Eclipse, go to the File tab and click Close All to close previous projects before starting a new one.**

## Part 1:

1. Create a Java project called **Lab4A** and a class named **Lab4A**.
2. Create a second new class named **DiceBot**.
3. In the **DiceBot** class:
   1. Add the following private instance variable: **value** (int)
   2. Add a constructor that receives 1 int parameter named **inValue** and sets **value** equal to **inValue**. (Refer to the Tutorial3 program constructor if needed to remember how to do this.)
   3. Add a public int method named **getValue** (no parameter) that returns **value**.
   4. Add a public void method named **rollDice** (no parameter) that generates a random number between 1 and 6, and sets **value** equal to it. *(****Important*** *– look at the last slide on generating random numbers in the PowerPoint to see how to get a random number from 1 to x instead of from 0 to x)*
   5. Add a public void method named **drawDice** that will draw the face of the dice based on its value. **(Use a switch statement to determine which face to draw.)** It should look like one of the following options:

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1. Back in the main **Lab4A** class.
   1. Declare 2 int variables, **d1** and **d2**
   2. Declare and instantiate a **DiceBot** object named **die1** sending 1 as the parameter.
   3. Declare and instantiate a **DiceBot** object named **die2** sending 1 as the parameter.
   4. Call **rollDice** for the **die1** object.
   5. Call **rollDice** for the **die2** object.
   6. Call the **getValue** method for **die1** and put the returned value into **d1**
   7. Call the **getValue** method for **die2** and put the returned value into **d2**
   8. If both dice have the same values, print “Doubles”
   9. Otherwise, determine which die has a larger value and print a statement saying which one is larger. (die1 or die2)
   10. Call **drawDice** for each object.

## Part 2:

1. Create a Java project called **Lab4B** and a class named **Lab4B**.
2. Create a second new class named **Calendar**.
3. In the **Calendar** class:
   1. Add the following private instance variables:
      1. month (int)
      2. year (int)
      3. days (int)
   2. Add a constructor that receives 2 parameters (one for month & one for year) and sets each instance variable equal to the corresponding parameter. (**Remember** - do not give the parameters the same name as the instance variables)
   3. Add a public void method named **setDays** (no parameter) that will set **days** equal to the number of days in that month.
      1. Use Google to determine which months have 30 days and which have 31
      2. February has 28 days, except during a leap year, when it has 29. You will need to determine if the year is a leap year using the following rule:
         1. Any year divisible by 100 is NOT a leap year, unless it is also divisible by 400.
         2. All other years that are divisible by 4 are leap years.

*2020 is a leap year because it is divisible by 4 but not by 100*

*2100 is not a leap year because it is divisible by 100 but not by 400*

*2000 is a leap year because it is divisible by 100 and by 400*

* 1. Add a public String method **toString** (no parameters). It should create and return a String variable with all the **Calendar** instance data – with labels (like you did in Lab3.)

1. Back in the main **Lab4B** class.
   1. Declare and instantiate a **Calendar** object named **date1** sending the following parameters to the constructor (5,2019)
   2. Declare and instantiate a **Calendar** object named **date2** sending the following parameters to the constructor (2,2019)
   3. Declare and instantiate a **Calendar** object named **date3** sending the following parameters to the constructor (2,2000)
   4. Declare and instantiate a **Calendar** object named **date4** sending the following parameters to the constructor (12,2020)
   5. Call **setDays** for all 4 objects
   6. Use our **toString** shortcut to print all of theinformation for each object. (Go back and look at the Lab3Tutorial if you need a reminder of how to do it.)
   7. Print a blank line between each one.