Goals:

By the end of this project you should be able to do the following:

- ➤ Handle exceptions that can occur in your program using a try-catch statement
- > Throw exceptions in your program

Directions:

Don't forget to add your Javadoc comments for your classes, constructor, and methods in this activity.

For this assignment, you will be creating two classes: Division and DivisionDriver

Division: methods

- Division has two public static methods:
 - intDivide: takes two int parameters (a numerator and denominator), performs integer division, and returns the int result of dividing the numerator by the denominator.
 - o decimalDivide: takes two **int** parameters (a numerator and denominator), performs floating point division (you'll have to use casting), and returns the result of dividing the numerator by the denominator.
- Test your methods in the Interactions pane:

```
Division.intDivide(10, 3)
3
Division.decimalDivide(10, 3)
3.33333333333333333
```

Division Driver

- DivisionDriver contains a main method only. The program will get a numerator and denominator from the user and print the integer division and decimal division result.
- Create a **dialog box** that will get the numerator and denominator as a String (you'll have to import the JOptionPane class in the javax.swing package):

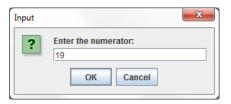
• Convert each to an integer value using the static parseInt method in the Integer class:

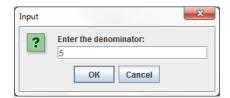
```
int num = _____(numInput);
int denom = _____(denomInput);
```

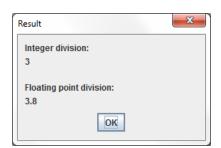
• Create a String object to hold the result of the division:

• Print the result in a dialog box:

• Test your method by running the driver program with numerator 19 and denominator 5:

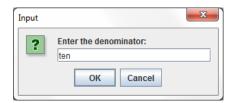






• Now try entering an invalid number in the dialogs (five and ten):





Your program should generate a run-time error in the form of a NumberFormatException exception:

```
----jGRASP exec: java DivisionDriver
Exception in thread "main" java.lang.NumberFormatException: For input string: "five"
at java.lang.NumberFormatException.forInputString(NumberFormatException.java:65)
at java.lang.Integer.parseInt(Integer.java:580)
at java.lang.Integer.parseInt(Integer.java:615)
at DivisionDriver.main(DivisionDriver.java:9)

----jGRASP wedge: exit code for process is 1.
----jGRASP: operation complete.
```

- The exception occurs when the parseInt method tries to convert the String "five" to an integer. The Java API listing for parseInt lists the exception that it might throw.
- Use a try-catch statement to catch the exception and tell the user what went wrong without creating a run-time error:

• Try entering invalid values five and ten once more for numerator and denominator once more. You should now get the following error:

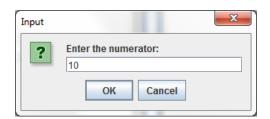


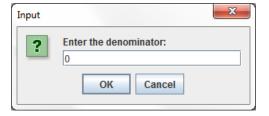
Exception Throwing

• Try the following in the interactions pane:

```
Division.intDivide(10, 0)
java.lang.ArithmeticException: / by zero
```

• Try to run your driver program with the numerator 10 and denominator 0:





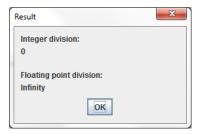
```
----jGRASP exec: java DivisionDriver

Exception in thread "main" java.lang.ArithmeticException: / by zero
at Division.intDivide(Division.java:7)
at DivisionDriver.main(DivisionDriver.java:12)
```

```
----jGRASP wedge: exit code for process is 1.
----jGRASP: operation complete.
```

- The exception is generated in the intDivide method and not caught/handled, so it is **propagated** to main where it is also not caught/handled. Next we want to catch the exception in the intDivide method so that it will not be propagated to the main method.
- In your intDivide method, add code that will return 0 if an ArithmeticException occurs and the division result otherwise:

Run DivisionDriver with inputs 10 and 0. The result should be 0 for integer division:



• Suppose that you do not want users to be able to divide by 0 in your decimalDivide method.

```
Division.decimalDivide(10, 0)
Infinity
```

The IllegalArgumentException in the Java API can be thrown if a particular argument (parameter) to a method is not allowed:

http://download.oracle.com/javase/6/docs/api/java/lang/IllegalArgumentException.html

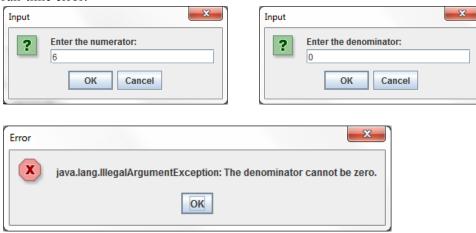
• In your decimalDivide method, throw an IllegalArgumentException if the denominator is zero:

• Test your method again in interactions. You should now see the exception:

```
Division.decimalDivide(10, 0) java.lang.IllegalArgumentException: The denominator cannot be zero.
```

• In your main method, add another catch statement to catch the exception that is thrown by the decimalDivide method. This time, print the exception text itself (stored by variable

• Now try dividing by 0 in your program. You will get the following error message instead of a run-time error:



- Run Checkstyle on each of your files and make any necessary corrections indicated by audit errors.
- Finally, submit your files to the grading system.