

Conditionals & Intro to Error Handling

Brandon Krakowsky



Penn
Engineering

About Code Blocks

- Java uses curly braces { } to surround “code blocks” (groups of statements)
 - Code blocks are typically indented 4 spaces (single tab)
- For example, here’s a conditional

```
if (myVar == true) {  
    //code block  
}
```



About Code Blocks

- Java uses curly braces { } to surround “code blocks” (groups of statements)
 - Code blocks are typically indented 4 spaces (single tab)
- For example, here’s a conditional

```
if (myVar == true) {  
    //code block  
}
```

- And here’s a method (function)

```
public void myMethod() {  
    //code block  
}
```

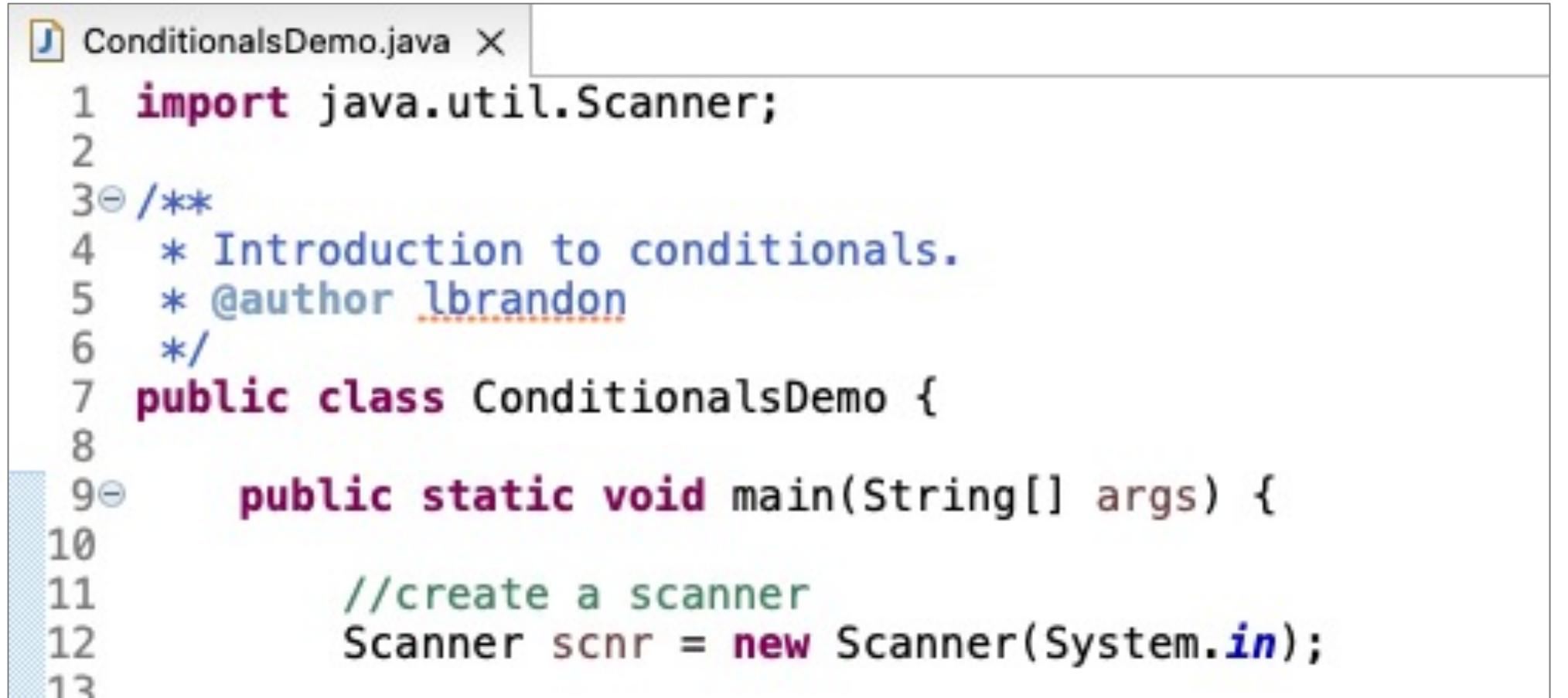
- For purposes of style, an opening brace { should go at the end of a line, not on a line by itself



Flow Control: Conditionals

if...else if...else

- Allows us to make decisions and execute code blocks based on logical conditions



```
ConditionalsDemo.java X
1 import java.util.Scanner;
2
3 /**
4  * Introduction to conditionals.
5  * @author lbrandon
6 */
7 public class ConditionalsDemo {
8
9     public static void main(String[] args) {
10
11         //create a scanner
12         Scanner scnr = new Scanner(System.in);
13     }
}
```

if...else if...else

- Allows us to make decisions and execute code blocks based on logical conditions
- *if* condition is true, execute statements in body of *if*

```
13
14     //ask the user for an int to evaluate
15     System.out.print("2 + 2 = ");
16     int x = scnr.nextInt();
17
18     //if condition is true, execute statements in body of if
19     if (x != 4) {
20         System.out.println("... try again");
21     }
22
23     System.out.println();
24
```

if...else if...else

- Allows us to make decisions and execute code blocks based on logical conditions
- *if* condition is true, execute statements in body of *if*,
else (otherwise), execute statements in body of *else*

```
25  
26 //ask the user for an int to evaluate  
27 System.out.print("2 + 2 = ");  
28 x = scnr.nextInt();  
29  
30 //if condition is true, execute statements in body of if  
31 if (x == 4) {  
32     System.out.println("Basic arithmetic holds");  
33 //else (otherwise), execute statements in body of else  
34 } else {  
35     System.out.println("...try again");  
36 }  
37  
38 System.out.println();  
39
```

if...else if...else

- *if* condition is true, execute statements in body of *if*,
else if another condition is true, execute statements in body of *else if*,
else (otherwise), execute statements in body of *else*

```
40
41     //ask the user for an int to evaluate
42     System.out.print("Enter your age: ");
43     int age = scnr.nextInt();
44
45     //if condition is true, execute statements in body of if
46     if (age < 100) {
47         System.out.println("In " + (100 - age) + " years you will be 100 years old");
48     //else if another condition is true, execute statements in body of else if
49     } else if (age == 100) {
50         System.out.println("You are " + age + " years old");
51     //else (otherwise), execute statements in body of else
52     } else {
53         System.out.println("A century and going strong!");
54     }
55
56     System.out.println();
57
```

if...else if...else

- You can have multiple *else if* conditions!

```
58
59     //ask the user for an int to evaluate
60     System.out.print("Enter your age: ");
61     age = scnr.nextInt();
62
63     //You can have multiple else if conditions!
64     if (age == 0) {
65         System.out.println("Seriously?");
66     } else if (age < 100) {
67         System.out.println("In " + (100 - age) + " years you will be 100 years old");
68     } else if (age == 100) {
69         System.out.println("You are " + age + " years old");
70     } else {
71         System.out.println("A century and going strong!");
72     }
73
74     //close scanner
75     scnr.close();
76
77 }
78 }
79 }
```

if...else if...else - Exercise

- Prompt the user for a numerical grade and print the appropriate letter grade
 - Get user input of a numerical grade
 - Test the range of the number using flow control
 - Print the appropriate letter grade. For example, if the user enters a number between 90 – 100, give them an “A”.



if...else if...else - Exercise

- Prompt the user for a numerical grade and print the appropriate letter grade

```
J NumericToLetterGrade.java X
1 import java.util.Scanner;
2
3 /**
4  * Prompts the user for a numerical grade and prints the appropriate letter grade.
5  * @author lbrandon
6  */
7 public class NumericToLetterGrade {
8
9     public static void main(String[] args) {
10
11         //create a scanner
12         Scanner scnr = new Scanner(System.in);
13
14         //get input of numeric grade
15         System.out.print("Enter your grade: ");
16         int grade = scnr.nextInt();
17 }
```



if...else if...else - Exercise

- Prompt the user for a numerical grade and print the appropriate letter grade

```
17
18     if (grade >= 90) {
19         System.out.println("A");
20     } else if (grade >= 80) {
21         System.out.println("B");
22     } else if (grade >= 70) {
23         System.out.println("C");
24     } else if (grade >= 60) {
25         System.out.println("D");
26     } else {
27         System.out.println("F");
28     }
29
30     //close scanner
31     scnrl.close();
32 }
33 }
34 }
```

Multiple *if* Conditionals

```
MultipleIfConditionals.java X
1 import java.util.Scanner;
2
3 public class MultipleIfConditionals {
4
5     public static void main(String[] args) {
6
7         //create a scanner
8         Scanner scnr = new Scanner(System.in);
9
10        //Ask the user to input an int to evaluate
11        System.out.print("Please input an integer: ");
12        int number = scnr.nextInt();
13    }
}
```

Multiple *if* Conditionals

```
L3
14     //if number is greater than 20
15     if (number > 20) {
16         System.out.println("Your input: " + number + " > 20");
17     }
18
19     //if number is greater than 10
20     if (number > 10) {
21         System.out.println("Your input: " + number + " > 10");
22     }
23
24     //if number is greater than 0
25     if (number > 0) {
26         System.out.println("Your input: " + number + " > 0");
27     }
28
29     //close scanner
30     scnrl.close();
31 }
32 }
33 }
```

Catching Errors

- What if you don't input an int?
 - For example, what if your input is "twenty-two"?



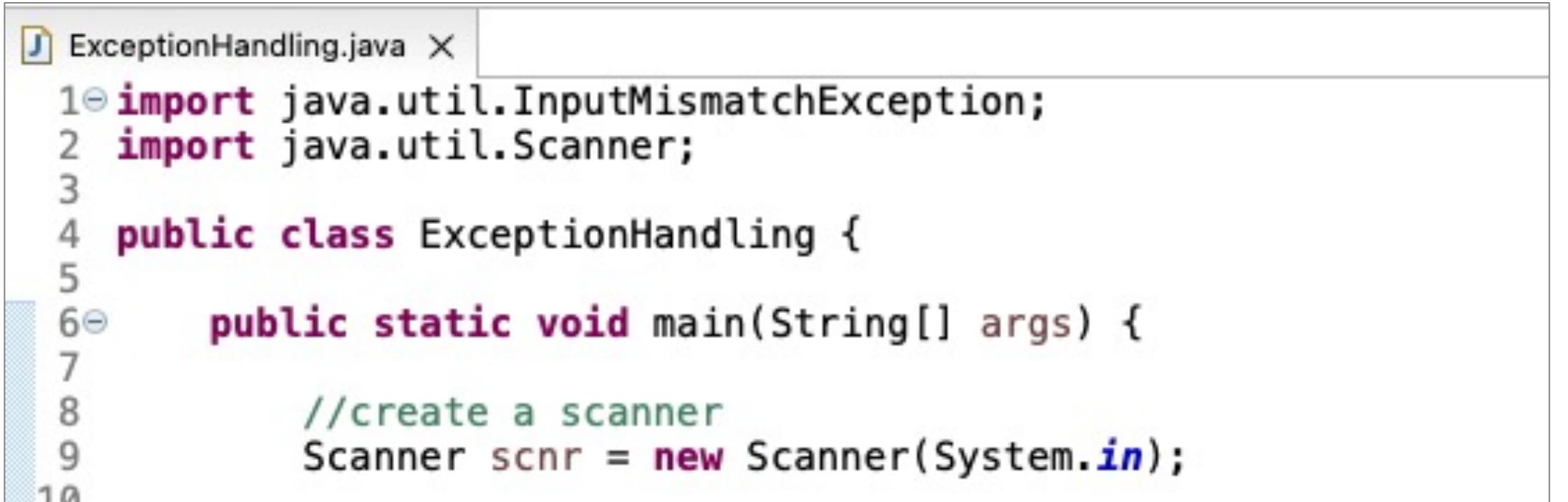
Catching Errors

- What if you don't input an int?
 - For example, what if your input is "twenty-two"?
- You'll get an error (more specifically an Exception)!
 - But you can catch errors (Exceptions) like this



Catching Errors

- What if you don't input an int?
 - For example, what if your input is "twenty-two"?
- You'll get an error (more specifically an Exception)!
 - But you can catch errors (Exceptions) like this



The screenshot shows a code editor window with a file named "ExceptionHandling.java". The code is as follows:

```
1 import java.util.InputMismatchException;
2 import java.util.Scanner;
3
4 public class ExceptionHandling {
5
6     public static void main(String[] args) {
7
8         //create a scanner
9         Scanner scnr = new Scanner(System.in);
10    }
```

Catching Errors

- Here's how you can handle incorrect input using a *try ... catch*

```
10
11     //Ask the user to input an int to evaluate
12     System.out.print("Please input an integer: ");
13
14     //Try to get input as an int
15     try {
16         int number = scnr.nextInt();
17
18         System.out.println(number + " is indeed an integer!");
19
20         //Catch the raised exception if there is an error
21         //-- i.e. the input is not an int
22     } catch (InputMismatchException e) {
23
24         System.out.println("Your input is not an integer.");
25
26     }
27
28     //close scanner
29     scnr.close();
30
31 }
32 }
33 |
```



Catching Errors

- Here's our full code asking the user to input an integer to evaluate

```
10
11     //Ask the user to input an int to evaluate
12     System.out.print("Please input an integer: ");
13
14     //Try to get input as an int
15     try {
16         int number = scnr.nextInt();
17
18         //if number is greater than 20
19         if (number > 20) {
20             System.out.println("Your input: " + number + " > 20");
21         }
22
23         //if number is greater than 10
24         if (number > 10) {
25             System.out.println("Your input: " + number + " > 10");
26         }
27
28         //if number is greater than 0
29         if (number > 0) {
30             System.out.println("Your input: " + number + " > 0");
31         }
32
33     //Catch the raised exception if there is an error
34     //i.e. the input is not an int
35     } catch (InputMismatchException e) {
36
37         System.out.println("Your input is not an integer.");
38
39     }
40
```



Catching Errors

- Here's our full code asking the user to input an integer to evaluate

```
40
41     //close scanner
42     scnr.close();
43
44 }
45 }
46 }
```

Leap Year?

Leap Year?

```
J LeapYear.java X
1 import java.util.InputMismatchException;
2 import java.util.Scanner;
3
4 /**
5  * Calculates if a given year is a leap year.
6  * A year is a leap year if the following conditions are satisfied:
7  * - The year is a multiple of 400
8  * - The year is a multiple of 4 and not a multiple of 100
9 *
10 * @author lbrandon
11 *
12 */
13 public class LeapYear {
14
15     public static void main(String[] args) {
16
17         //create a scanner
18         Scanner scan = new Scanner(System.in);
19 }
```



Leap Year?

```
19  
20     try {  
21         System.out.println("Input a year (int): ");  
22         //try to get user input of int  
23         int year = scan.nextInt();  
24     }  
25 }
```

Leap Year?

```
26
27     //if a year is multiple of 400, then it is a leap year
28     //divide by 400 and check for remainder of 0
29     if (year % 400 == 0) {
30         System.out.println(year + " is a leap year");
31
32     //if a year is multiple of 4 and not multiple of 100, then it is a leap year
33     //divide by 4 and check for remainder of 0
34     //divide by 100 and check for remainder of > 0
35     } else if ((year % 4 == 0) && (year % 100 != 0)) {
36         System.out.println(year + " is a leap year");
37
38     } else {
39         System.out.println(year + " is not a leap year");
40     }
41
```

Leap Year?

```
42
43     //another way to do it
44     boolean isDivisibleBy400 = year % 400 == 0;
45     boolean isDivisibleBy4 = year % 4 == 0;
46     boolean isDivisibleBy100 = year % 100 == 0;
47
48     //multiple of 400 or multiple of 4 and not multiple of 100
49     boolean isLeapYear = isDivisibleBy400 || (isDivisibleBy4 && !isDivisibleBy100);
50     if (isLeapYear) {
51         System.out.println(year + " is a leap year");
52     } else {
53         System.out.println(year + " is not a leap year");
54     }
```

Leap Year?

```
55
56     } catch (InputMismatchException e) {
57
58         //display something useful for the user
59         System.out.println("Your input is not an integer.");
60     }
61
62     //close the scanner
63     scan.close();
64 }
65 }
66 }
```

Even or Odd?

Even or Odd?

```
J EvenOrOdd.java X
1 import java.util.InputMismatchException;
2 import java.util.Scanner;
3
4 /**
5  * Determines if given number is even or odd.
6  * @author lbrandon
7  *
8 */
9 public class EvenOrOdd {
10
11    public static void main(String[] args) {
12
13        //create scanner
14        Scanner scan = new Scanner(System.in);
15    }
}
```

Even or Odd?

```
15  
16     try {  
17         System.out.println("Input an int: ");  
18  
19         //try to get user input of int  
20         int input = scan.nextInt();  
21
```

Even or Odd?

```
21
22     //if value is multiple of 2, it's even
23     if (input % 2 == 0) {
24         System.out.println("EVEN!");
25
26     //if value is not multiple of 2. it's odd
27     } else if (input % 2 == 1) {
28         System.out.println("ODD!");
29
30     | //nested if conditional
31     | if (input > 10) {
32         |     System.out.println("AND VERY BIG!");
33     }
34 }
```

Even or Odd?

```
35
36     } catch (InputMismatchException e) {
37
38         //display something useful for the user
39         System.out.println("Your input is not an integer.");
40     }
41
42     //close the scanner
43     scan.close();
44 }
45 }
```

Calculate Absolute Value

Calculate Absolute Value

```
J AbsoluteValue.java X
1⑩ import java.util.InputMismatchException;
2 import java.util.Scanner;
3
4⑩ /**
5  * Calculates absolute value of given number.
6  * @author lbrandon
7  *
8  */
9 public class AbsoluteValue {
10
11⑩     public static void main(String[] args) {
12
13         //create scanner
14         Scanner scnr = new Scanner(System.in);
15
16         System.out.println("Please enter a number (double) to get it's absolute value: ");
17 }
```

Calculate Absolute Value

```
17  
18     //try to get input of a particular number (double)  
19     //and print the absolute value  
20     try {  
21         double value = scnr.nextDouble();  
22  
23         //if value is < 0, print negated value  
24         if (value < 0) {  
25             System.out.println(-value);  
26         }  
27  
28         //if value is >= 0, print value as is  
29         if (value >= 0) {  
30             System.out.println(value);  
31         }  
32     //catch possible Exception, if input isn't a double  
33 } catch (InputMismatchException e) {  
34  
35     System.out.println("Your input is not a double.");  
36  
37 }
```

Calculate Absolute Value

```
38  
39     //close the scanner  
40     scnrf.close();  
41  
42 }  
43 }  
44 }
```

CIT591 Schedule

CIT591 Schedule

```
J CIT591Calendar.java X
1 import java.util.Scanner;
2
3 /**
4  * Provides the CIT591 schedule for a given day of the week.
5  * @author lbrandon
6  *
7 */
8 public class CIT591Calendar {
9
10    public static void main(String[] args) {
11
12        //create a scanner
13        Scanner scan = new Scanner(System.in);
14
15        System.out.println("Enter a day of the week (Mon - Fri): ");
16
17        //get user input of day of the week as a string
18        String day = scan.next();
19}
```



CIT591 Schedule

```
19
20     //use the equals method to compare Objects (like Strings)
21     if (day.equals("Mon") || day.equals("Wed")) {
22         System.out.println("You have class at 3:30");
23
24         if (day.equals("Mon")) {
25             System.out.println("You might also have homework due");
26         }
27     } else if (day.equals("Thu")) {
28         System.out.println("You have recitation at 5:15");
29     } else {
30         System.out.println("No CIT 591 today :(");
31     }
32
33     //close the scanner
34     scan.close();
35 }
36 }
37 }
```

Homework 3

Homework 3

Will be assigned by tonight, Wednesday, 09/14/22 at midnight and due Wednesday, 09/21/22 at midnight

- In this assignment, you will implement a **supermarket “game”** that allows the customer to shop for specific items
- The topics are:
 - Getting user input
 - Error checking
 - Variables & data types
 - Conditionals
- To complete the assignment:
 - Submit your completed *.java* file to Canvas

