CS 152 Computer Programming Fundamentals
Project 2: Guess a Number

Brooke Chenoweth

Spring 2025

1 Problem specification

In this program, the computer is thinking of a number between 1 and 15. The user will guess a number, and the computer will tell them if they guessed correctly.

More specifically, your program will do the following:

1. Select a random integer between 1 and 15.[1]
2. Prompt the user for their name.
3. Refer to the user by name when instructing them to pick a number between 1 and 15.
4. Tell the user the number they guessed.
5. Tell the user the random value the program picked.
6. If the user picked the program's number, congratulate them. If not, console them. In either case, use their name in the message.

1.1 Examples

Here are two sample transcripts to show the expected behaviour of the program. (User input is in italics.)

1.1.1 User guesses incorrectly

```
What is your name?
Brooke
Brooke, please pick a number between 1 and 15
3
You guessed 3
I was thinking of 7
```

[1] Include 1 and 15 in the possible values.

```
Better luck next time, Brooke
```

1.1.2 User guesses correctly

```
What is your name?
Bob
Bob, please pick a number between 1 and 15
6
You guessed 6
I was thinking of 6
Congratulations, Bob!  You guessed my number!
```

1.2 Additional Implementation Requirement – Use a Constant for Upper Bound

To make sure that you keep things flexible, I do not want you to use a hardcoded value of 15 all over your program. If I want to change the requirements to pick a number between 1 and 42 instead, it should only require you to change a single line in your program to make that happen.

So, just like there is a constant for the drinking age in the `ScannerDemo` example, you should make a constant for the upper end of the guessing range. This variable must be declared inside the class, but outside of the `main` method.[2] If you choose to make the variable `public`, make sure you include a javadoc comment above it. Alternatively, you may decide that this variable is only used within this particular file, and so can safely have `private` access instead. You must use the `static final` modifiers to make the variable belong to the whole class and not be able to be reassigned. Pick an appropriate type for the variable, give it a meaningful name (in capital letters[3] Assign it a value of 15 and use this variable everywhere you need to use the upper bound of the range.[4]

Even if your program has correct behavior, *you will not get full credit* if you ignore this requirement and hard code the value of 15 instead of using a constant.

2 Some hints and reminders

- To read values that the user types, we can use the `Scanner` class.
  - You will need to have the statement

```
import java.util.Scanner;
```

[2] or any other method, for that matter, butfor now all you have is `main`

[3] Constants are in all caps for our coding standards. Separate words with underscores if you use multiple words in the variable name.

[4] Computing the random number and telling the user what range they should pick from, at least.

at the top of your file to tell java you want to use that class. IntelliJ will suggest it to you if you forget.

- Create a `Scanner` with the line

```
Scanner scanIn = new Scanner(System.in);
```

  You don't have to use the same variable name I did, of course.

- The `nextLine` method will give you the next line typed by the user as a `String`.
- The `nextInt` method will give you the integer value of the user's input.

- The `Math.random()` method returns a random number between 0.0 (inclusive) and 1.0 (exclusive). To choose a random integer between 1 and N (inclusive), we can use `(int)(Math.random()*N) + 1`. (If we didn't add 1, the result would be somewhere from 0 to N-1.)

- Branching: We can choose between two instruction sequences with an `if` statement. The syntax is:

```
if(booleanExpression) {
    // statements executed if booleanExpression is true
} else {
    // statements executed if booleanExpression is false
}
```

- We can test to see if two numbers are equal by using the `==` operator.

- Use the `System.out.println` method to print a `String` to the console.

- You can concatenate `String`s with the `+` operator.

I have provided a small program named `ScannerDemo` which demonstrates these concepts. You can download it from the course website.

3 Turning in your assignment

Submit your **NumberGuesser.java** file to the Project 2 assignment in Canvas. Do not attach `.class` files or any other files.

4 Grading Rubric (total of 25 points)

[1 point]:	Attached one file in Canvas with file name `NumberGuesser.java`
[2 points]:	The source code contains neither errors nor warnings when viewed in IntelliJ.
[5 points]:	The code adheres to the coding standard specified on the course website.
[2 points]:	Upper bound of 15 is stored in a constant variable outside of main.
[2 points]:	The program selects a random integer between 1 and 15, using `Math.random()` in the computation.
[2 points]:	Prompts the user for their name.
[2 points]:	Reads the user's name from the console.
[2 points]:	Refers to the user by name and instructs them to pick a number.
[3 points]:	Outputs user's number and program's selected number.
[4 points]:	Tests user's number against program's number and prints personalized congratulation or condolence message depending on result.