Big O and Sample Problems

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Before we begin

- Make sure you have Java & Java JDK downloaded on your computer
  - can run **`java -version`** in terminal to check
- Make sure you have IntelliJ downloaded on your computer

- *Suggested:* Watch previous Java tutorials

Big O

What is Big O?

The Big O of an algorithm is a way to denoting the efficiency of an algorithm. It tells you how long it takes a algorithm to complete as a function of its inputs.

Big O Notation

Big O Notation is done based on the size of the input and does not include any coefficients to the size of the input, only exponents and functions like log

Example (where N is the size of the input):

- O(N) ← runs over everything a multiple of the N
  - e.g. a single for loop over an array
- $O(N^2)$ ← runs over everything a multiple of N^2 times
  - e.g. printing out a square figure based on the length of one of the square's sides

Sample Problems

What is the Big O of the following code?

Time Limit: 2 minutes

```
int[] array = {1, 2, 3, 4, 5};
for (int i = 0; i < array.length; ++i) {
   System.out.println("*");
}
```

What is the Big O of the following code?

Time Limit: 2 minutes

```
int[] array = {1, 2, 3, 4, 5};
for (int i = 0; i < array.length; ++i) {
    for (int j = 0; j < array.length; ++j) {
        System.out.println("*");
        }
}
```

Note

The following sample problems are going to be from from codingbat.com. I would encourage you to go there, make an account, and keep practicing your coding.

CodingBat Problems

Problems Done on Coding Bat

Warmup 2

- stringBits
- arrayFront9
- stringX
- stringTimes

Array 2

- tripleUp
- tenRun
- matchUp
- either24

Practice for Later

Write a simple hangman program that lets the user play hangman. It should take in the letter guesses as user input and stop the game when the user has reached a certain number of wrong guesses or they have found the whole word. You can design the program in any way that you like just keep in mind all the things we have learned along the way. You should show the user the intermediate version of the word they are guessing with asterisks for the unguessed letters and the letters where they have guessed correctly.

The End