## Abstract

In order to better understand the differences between Java arrays and those of other languages, one experiment we must conduct will involve sorting. We will be using five different arrays of five different sizes. Each array is filled with the numbers corresponding to their index. After, we will perform binary searches on all five arrays and compare the times.

## Experiment

- Array Dimension: Single dimension
- Array Sizes:
    - 3,000,000
    - 15,000,000
    - 7,500,000
    - 3,750,000
    - 1,875,000
- Operation: Binary Search

In a new Java file, we will have a main method and a makeArray() method that will do most of the work. The Binary Search will utilize Arrays.binarySearch() from the java.util.Arrays library. The main method will send the size of the array and the int to look for. The makeArray() will perform the function and then return how much time it took for each array size. Using a common factor, we will be searching for 500 in every array.

## Results

| | |
|---|---|
| 3,000,000 | 26,900 ns |
| 15,000,000 | 18,800 ns |
| 7,500,000 | 13,300 ns |
| 3,750,000 | 4,800 ns |
| 1,875,000 | 2,700 ns |

## Conclusion

When the array is significantly larger, the time of the binary search will take longer. As seen with the first two arrays, when the array is double the other, the time will also approximately double.