**Week 2 Assignment**

**Quick Sort and Binary Search**

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CPT 307: Data Structures & Algorithms

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**How Computers Find and Arrange Stuff Using Java**

When we use computers, we often need to look for stuff or put things in order. Java is a computer language that helps do this really well. We're going to talk about two cool ways Java can do this: one way to arrange things (QuickSort) and one way to find things (Binary Search).

**QuickSort: Making Order from Chaos**

Imagine you have a messy room with toys all over the place. QuickSort is like deciding to organize these toys into two piles: one pile has toys that are smaller than your favorite toy, and the other pile has toys that are bigger. Then, you do the same sorting thing with each pile until everything is neatly arranged. QuickSort in Java does this with numbers or any kind of data, making everything tidy and in order, bit by bit.

**Binary Search: The Fast Finder**

Now, imagine you have a bookshelf with all your books arranged from smallest to biggest. If you want to find your favorite book quickly, you shouldn’t look at every single book. Instead, you'd start in the middle, see if your favorite book is bigger or smaller than the middle book, and then only look in that half of the bookshelf. You keep doing this, cutting the number of books to look through in half each time, until you find your book. Binary Search in Java does exactly this but with data, making it super quick to find what you're looking for.

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**Result**

QuickSort and Binary Search are like superpowers for the computer, helping it quickly organize and find stuff. QuickSort is great because it sorts things really fast, much quicker than trying to do it one by one. And Binary Search helps find things super-fast in a list that's already in order, way faster than looking at everything one by one. Together, they make working with data in Java a breeze.