Sorting

- So, the binary search is a very fast search algorithm.

- But, the list has to be sorted before we can search it with binary search.

- To be really efficient, we also need a fast sort algorithm.

Common Sort Algorithms

Bubble Sort   Heap Sort

Selection Sort   Merge Sort

Insertion Sort   Quick Sort

- There are many known sorting algorithms.   Bubble sort is the slowest, running in **n^2 time**. Quick sort is the fastest, running in **$n \lg n$ time**.

- As with searching, the faster the sorting algorithm, the more complex it tends to be.

- We will examine two sorting algorithms:
  - Bubble sort
  - Insertion sort

Bubble Sort - Let's Do One!

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Bubble Sort Code

```c
void bubbleSort (int a[ ] , int size)
{
    int i, j, temp;
    for ( i = 0; i < size; i++ )    /* controls passes through the list */
    {
            for ( j = 0; j < size - 1; j++ )   /* performs adjacent comparisons */
            {
                    if ( a[ j ] > a[ j+1 ] )   /* determines if a swap should occur */
                    {
                            temp = a[ j ];      /* swap is performed */
                            a[ j ] = a[ j + 1 ];
                            a[ j+1 ] = temp;
                    }
            }
    }
}
```