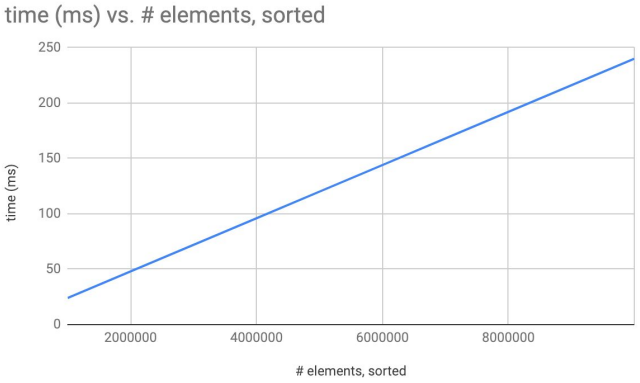
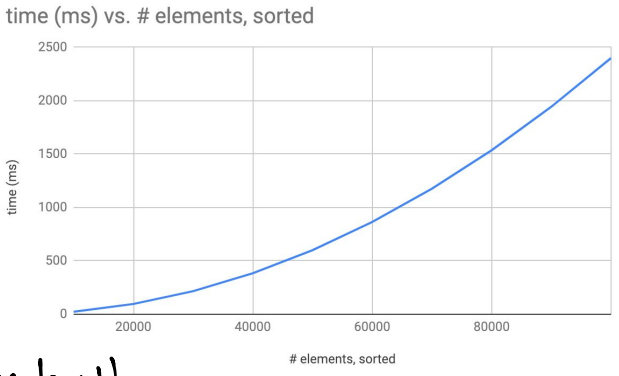
```
class Sort1 {
  public static boolean isSorted1(int[] arr) {
    for(int i = 0; i < arr.length - 1; i += 1) {
      if(arr[i] > arr[i + 1]) { return false; }
    }
    return true;
  }
}
```




```
class Sort2 {
  public static boolean isSorted2(int[] arr) {
    for(int i = 0; i < arr.length; i += 1) {
      for(int j = i + 1; j < arr.length; j += 1) {
        if(arr[i] > arr[j]) { return false; }
      }
    }
    return true;
  }
}
```



n = arr.length

```
boolean isSorted1(int[] arr) {

  for(int i = 0;

      i < arr.length - 1;

      i += 1) {

    if(arr[i] > arr[i + 1]) {

      return false;
    }
  }

  return true;
}
```

```
// # of times evaluated
// in sorted order          unordered at index k, k+1
//    1                        1
//    n                        k+1
//   n-1                       k
//   n-1                       k+1
//    0                        1

//    1                        0

1 + n + (n-1) + (n-1) + 1
```

```
boolean isSorted2(int[] arr) {

  for(int i = 0;

      i < arr.length;

      i += 1) {

    for(int j = i + 1;

        j < arr.length;

        j += 1) {

      if(arr[i] > arr[j]) {  ←

        return false;
      }
    }
  }
  return true;
}
```

```
// # of times evaluated
// in sorted order          unordered at index k, k+1
//    1
//   n+1
//    n
//    n
//  n(n+1)/2
//  ← same
//   (n-1)*n/2
//    0

//    1

1 + n+1 + n ...
```

$$\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$$

```
boolean find( String[] theList, String toFind ) {


    for ( int i = 0;

          i < theList.length;

          i += 1 ) {

        if ( theList[i].equals( toFind )) {

            return true;
        }
    }
    return false;
}
```

```
// # of times evaluated
// toFind NOT FOUND      toFind FIRST      toFind at index k
//      1                    1                  1
//     n+1                   1                 k+1
//      n                    0                  k
//      n                    1                 k+1
//      0                    1                  1
//      1                    0                  0
```

WORST CASE — BEST CASE — AVERAGE CASE?

```
boolean find( String[] theList, String toFind ) {


    boolean found = false;

    for ( int i = 0;

          i < theList.length;

          i += 1 ) {

        if ( theList[i].equals( toFind )) {

            found = true;
        }
    }
    return found;
}
```

```
// # of times evaluated
// toFind NOT FOUND      toFind FIRST      toFind at index k
//
//
//
//
//
//
//
//
```

ALL CASES ARE SIMILAR

$Count_{isSorted1}(n) = 1 + n + n-1 \cdots$

$Count_{isSorted2}(n) = 1 + n + \frac{n(n+1)}{2} \cdots$

$Count_{find1}(n) = 1 + n \cdots$

$Count_{find2}(n) = 1 + n \cdots$