COMP 110
Introduction to Programming

Fall 2015
Time: TR 9:30 – 10:45
Room: AR 121 (Hanes Art Center)

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Previous Class

• What did we discuss?
Today

- Assignment 4: Extension!
  - ALL of it (parts A and B) will be due on Wed, 12/2

- Today
  - Sorting
  - Course Evaluation

Sorting

- Put elements of an array in some order
  - alphabetize names
  - order grades lowest to highest

- Two simple sorting algorithms
  - selection sort
  - insertion sort
Selection Sort at work

98  68  83  74  93

68  98  83  74  93

68  74  83  98  93

68  74  83  93  98  SORTED!

Insertion Sort

- Take an unsorted list and build a final sorted list by adding in one item at a time (we humans sort like this too)
- Insert each new item into an already sorted list
- Each unsorted element is inserted at the appropriate spot in the sorted subset until the list is sorted
**Insertion Sort: General Algorithm**

- Sort the first two values (swap, if necessary)
- Repeat:
  - insert list’s next value into the appropriate position relative to the first ones (which are already sorted)
- Each time insertion made, number of values in the sorted subset increases by one
- Other values in array shift to make room for inserted elements

**Insertion Sort at work**

```
98 → 68  83  74  93

68  98 → 83  74  93

68  83 → 98 → 74  93

68  74  83  98 → 93

68  74  83  93  98  SORTED!
```
**Insertion Sort**

- Outer loop controls the index in the array of the next value to be inserted
- Inner loop compares the current insert value with values stored at lower indexes
- Each iteration of the outer loop adds one more value to the sorted subset of the list, until the entire list is sorted

**Sorting Things other than numbers**

- characters
  - same as integers (compare with < and >)
- Strings
  - use the built-in compareTo method
- Other Objects
  - we write a compareTo method
  - use the compareTo method
### Swap

```java
private static void swap(int i, int j, int[] a) {
    int temp = a[i];
    a[i] = a[j];
    a[j] = temp;
}
```

- This method will swap the value of \(a[i]\) and \(a[j]\)
- Let's do this in Eclipse now!

### Demo (and attendance!)

http://www.sorting-algorithms.com/
Detour – Security and Privacy

Different slideset (not for exams; this is just FYI)

Course Evaluations

• Only 50 of you have done the evaluations so far

• So, let’s all take 10 mins to complete the course evaluations now
Next class

- Review for FINAL EXAM

HAPPY THANKSGIVING!

😊