Announcements

• No Reading or RQ for next
• Assignments and APTs due this week!
  – Note Fewer late days!!!

  – Problem with Final Exam Date? Or have accommodations, must fill out form on course web page to reschedule exam

• Finish lecture notes from last time
• Today – Sorting how’s
Announcements (cont)

• Regrades for Exam 2
  – give to Prof. Rodger

• Be a UTA for CompSci 101
  – Rewarding and learning experience!
Sorting

• In python:
  – alist = [8, 5, 2, 3, 1, 6, 4]
  – alist.sort() OR result = sorted(alist)
  – Now alist OR result is [1, 2, 3, 4, 5, 6, 8]

• How does one sort elements in order? How does “sort” work?
Selection Sort

• Sort a list of numbers.

• Idea:
  – Repeat
    • Find the smallest element in part of list not sorted
    • Put it where it belongs in sorted order

• Sort example

| Sorted, won’t move | final position | ??? |

• Sort the list of numbers using Selection Sort.
• The body of the loop is one pass.
• Show the elements after each pass.
• [9, 5, 1, 4, 3, 6]
Question 2: Code for Selection Sort

• Snarf the code for today.
• Fill in the missing code for selection sort
• 1) First finish minIndex – returns the index of the minimum element in list items, between “start” and the right end of the list
• 2) Complete the body of the for loop in Selection sort
Bubble Sort

• Sort a list of numbers.

• Idea:
  – Repeat til sorted
    • Compare all adjacent pairs, one at a time. If out of order then swap them

• Sort example

| ??? | Sorted, won’t move final position |
Question 3 -

• Sort the list of numbers using BubbleSort.
• The body of the loop is one pass.
• Show the elements after each pass.
• [9, 5, 1, 4, 3, 6]
Question 4:
Code for Bubblesort

• Fill in the missing code for bubblesort
• 1) What is the range of the second for loop?
• 2) Complete the body of the 2cd for loop
Insertion Sort

• Sort a list of numbers.

• Idea:
  – Sort by repeated inserting another element
    • Leftmost element is sorted part of list
    • Insert another element in that sublist keeping it sorted
    • Insert another element in that sublist keeping it sorted
    • Etc.

• Sort example

| Sorted relative to each other | ??? |
Question 5 -

• Sort the list of numbers using InsertionSort.
• The body of the loop is one pass.
• Show the elements after each pass.
• [9, 5, 1, 4, 3, 6]
Question 6: Code for InsertionSort

- Fill in the missing code for insertionsort
- 1) What are the conditions for the while?
- 2) Complete the body of the while
Wrap up Sorting

• Question 7:
  – Compare these three sorts.
    • How are they the same?
    • How are they different?

• Different ways to sort?
  – Over 50 sorting algorithms

• What sorting algorithm does Python sort use?

• Does President Obama know his sorts?

• Sorting animations
  http://www.sorting-algorithms.com/
Merge Sort

- Idea: Divide and Conquer
- Divide array into two halves
- Sort both halves (smaller problem)
- Merge the two sorted halves

- Learn about this and other sorts in CompSci 201, also how to analyze them to determine which one works best.

- Timsort
- Shellsort