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

Question 1 –

• 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
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 insertion sort
- 1) What are the conditions for the while?
- 2) Complete the body of the while

### 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

### 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