

CS 367 - Introduction to Data Structures

Thursday, April 28, 2016

Final Exam

- Sunday, May 8th, 2:45 to 4:45 pm
- UW ID required
- See posted exam information

Program 5 due 10 pm **Friday**, May 6th

Homework 10 due 10 pm **Wednesday**, May 4th

Last Time

Hashing

- choosing table size
- expanding a hash table
- handling collisions

Java Support for Hashing

Today

Tree Map vs. Hash Map (from last time)

Sorting Intro

Basic Sorts

- bubble sort
- insertion sort
- selection sort

Next Time

Read: continue *Sorting*

Better Sorts

- heap sort
- merge sort
- quick sort

Sorting

Problem

Solution

Complexity

In-Place Sorts

Basic In-Place Comparison Sorts

Bubble Sort

Idea

Pseudocode

```
int passes = A.length-1;
for (int i = 0; i < passes ; i++) {
    for (int j = A.length-1; j > i; j--) {
        if (A[j] < A[j-1]) {
            swap(A[j], A[j-1]);
        }
    }
}
```

Analysis

best case

worst case

kind of array

comparisons

swaps

total

Insertion Sort

Idea

Pseudocode (linear insertion)

```
for (int i = 1; i < A.length; i++) {
    int temp = A[i];

    int j;
    for (j = i-1; j >= 0 && A[j] > temp; j--)
        A[j+1] = A[j];

    A[j+1] = temp;
}
```

Analysis

best case

worst case

kind of array

comparisons

shifts

total

Selection Sort

Idea

Pseudocode

```
int passes = A.length-1;
for (int i = 0; i < passes; i++) {
    int minIndex = i;

    for (int j = i+1; j < A.length; j++) {
        if (A[j] < A[minIndex])
            minIndex = j;
    }

    swap(A[minIndex], A[i]);
}
```

Analysis

best case

worst case

kind of array

comparisons

swaps

total