

## Written Assignment III COP3502H

**Due: Wednesday, 4/11/07 in class**

Make sure you show all your work and start early.

From “Data Structures, Algorithms, and Software Principles in C”

1. page 547, #1,2
2. page 551, #1
3. page 571, #1

Also do this problem:

Professors Howard, Fine, and Howard have proposed the following sorting algorithm:

```
STOOGESORT(A, i, j)
```

```
    if A[i] > A[j]
        swap (A[i], A[j]);
    if i+1 ≥ j
        return;
    k = ⌊(j-i+1)/3⌋;           // round down
    STOOGESORT(A, i, j-k);    // first two-thirds
    STOOGESORT(A, i+k, j);    // last two-thirds
    STOOGESORT(A, i, j-k);    // first two thirds again
```

- a). Argue that `STOOGESORT(A, 1, length[A])` correctly sorts the input array `A[1..n]`, where `n=length[A]`.
- b). Give a recurrence for the worst-case running time of `STOOGESORT`. Solve the recurrence relation and find the running time using Big-O notation.
- c). Compare the worst case running time of `STOOGESORT` with that of insertion sort, merge sort, bubble sort, and quicksort. Do the professors deserve tenure?