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COMP 250: Introduction to Computer Science

Assignment 2

Fall 2013

**Question 1**

a) An input of an array sorted in decreasing order will yield the worst possible running time for any fixed size *n*. This is because the value of the next element in the array will always be smaller than the value at the current index, so the conditional statement will always be true, and thus, a swap will occur for every value in the array.

b) T(n) for the BubbleSort algorithm

Tassign

Tcompare + Tconditional

Tassign

Tcompare + Tconditional

Tcompare + Tconditional

Tindex + Tassign

Tindex + Tindex + Tassign

Tindex + Tassign

Tarith + Tassign

Tarith + Tassign

Outside loop:

Tassign

Inside 1st loop:

n(Tcompare + Tconditional + 2Tassign + Tindex)

Inside 2nd loop:

n2 x (2Tcompare + 2Tconditional + 4Tindex + 4Tassign + Tarith)

Assuming that primitive operations have roughly the same run time:

T(n) = T + n(5T) + n2(13T)

c) The big-oh representation for this algorithm is O(n2)

**Question 2**

algo1(n): O(log n)

algo2(n): O(n)

algo3(n): O(1)

algo4(n): O(n2)