Homework 7: Sorting

Instructor: Mehmet Emre

CS 32 Spring '22

Due: 05/04 12:30pm
Name & Perm # (no partners allowed): Bharat Kathi (5938444)

Reading: DS 13.1, also review DS 12.1, 2.6, 6.1

Please also read the handout at `http://cs.ucsb.edu/~richert/cs32/misc/h07-handout.pdf`

1 (10 pts)

Briefly explain: What does it mean to say that an algorithm has *quadratic* worst-case run time?

Answer: This means that the Big O notation for the worst-case runtime is $O(n^2)$. Specifically, it means that for the given n inputs, the algorithm will perform some factorm of n^2 operations in its worst-case execution.

2

Show the steps of bubble sort following the example of the solved problems on the handout for the algorithm and the format of your answer. **Stop after the first pass with no swaps.**

2.1 5 pts

initial values	8	5	3	10	2
i = 4	5	3	8	2	10
i = 3	3	5	2	8	10
i = 2	3	2	5	8	10
i = 1	2	3	5	8	10

2.2 5 pts

initial values	40	42	-3	10	0
i = 4	40	-3	10	0	42
i = 3	-3	10	0	40	42
i = 2	-3	0	10	40	42
i = 1	-3	0	10	40	42

3

Show the steps of **insertion sort** *following the example of the solved problems on the handout* for the algorithm and the format of your answer.

3.1 5 pts

initial values	8	5	3	10	2
i = 0	10	8	5	3	2
i = 1	8	10	5	3	2
i = 2	5	8	10	3	2
i = 3	3	5	8	10	2
i = 4	2	3	5	8	10

3.2 5 pts

initial values	40	42	-3	10	0
i = 0	40	42	-3	10	0
i = 1	40	42	-3	10	0
i = 2	-3	40	42	10	0
i = 3	-3	10	40	42	0
i = 4	-3	0	10	40	42

4

Show the steps of **selection sort** *following the example of the solved problems on the handout* for the algorithm and the format of your answer. **Show all rows even for passes that no swaps occur.**

4.1 5 pts

initial values	8	5	3	10	2
i = 4	8	5	3	2	10
i = 3	2	5	3	8	10
i = 2	2	3	5	8	10
i = 1	2	3	5	8	10

4.2 5 pts

initial values	40	42	-3	10	0
i = 4	40	0	-3	10	42
i = 3	10	0	-3	40	42
i = 2	-3	0	10	40	42
i = 1	-3	0	10	40	42