

CS 260 Homework 8

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1 8.1

Bubble sort

Initial List	1	7	3	2	0	5	0	8
pass 1	1	3	2	0	5	0	7	8
pass 2	1	2	0	3	0	5	7	8
pass 3	1	0	2	0	3	5	7	8
pass 4	0	1	0	2	3	5	7	8
pass 4	0	0	1	2	3	5	7	8

Insert Sort

Initial List	1	7	3	2	0	5	0	8
Pass 1	1	7	3	2	0	5	0	8
Pass 2	1	3	7	2	0	5	0	8
Pass 3	1	3	2	7	0	5	0	8
Pass 3 cont	1	2	3	7	0	5	0	8
Pass 4	1	2	3	0	7	5	0	8
Pass 4 cont	1	2	0	3	7	5	0	8
Pass 4 cont	1	0	2	3	7	5	0	8
Pass 4 cont	0	1	2	3	7	5	0	8
Pass 5	0	1	2	3	5	7	0	8
Pass 6	0	1	2	3	5	0	7	8
Pass 6 cont	0	1	2	3	5	0	7	8
Pass 6 cont	0	1	2	3	0	5	7	8
Pass 6 cont	0	1	2	0	3	5	7	8
Pass 6 cont	0	1	0	2	3	5	7	8
Pass 6 cont	0	0	1	2	3	5	7	8

2 8.2

Initial list	22	36	6	79	26	45	75	13	31	62	27	76	33	16	62	47
msort pass 1	22	36	6	26	45	13	31	27	33	16	47	76	75	62	62	79
msort pass 2	6	13	16	26	45	36	31	27	33	22	47	76	75	62	62	79
msort pass 3	6	13	16	22	45	36	31	27	33	26	47	62	62	76	75	79
msort pass 4	6	13	16	22	26	27	31	33	36	45	47	62	62	75	76	79

3 9.3

a: $T(n) = 4T(n/3) + n$

$$a = 4$$

$$b = 3$$

$$d = 1$$

$$\log_3 4 > 1$$

$$T(n) = \theta(n^{1.262})$$

b: $T(n) = 4T(n/3) + n^2$

$$a = 4$$

$$b = 3$$

$$d = 2$$

$$\log_3 4 < 2$$

$$T(n) = \theta(n^2)$$

c: $T(n) = 9T(n/3) + n^2$

$$a = 9$$

$$b = 3$$

$$d = 2$$

$$\log_3 9 = 2$$

$$T(n) = \theta(n^2 \log n)$$

4 9.4

a: $T(n) = T(n/2) + 1$

$$a = 1$$

$$b = 2$$

$$d = 0$$

$$\log_2 1 = 0$$

$$O(\log n)$$

$$\omega(\log n)$$

b: $T(n) = 2T(n/2) + \log n$

$$a = 2$$

$$b = 2$$

$$d = 0$$

$$\log_2 1 > 0$$

$$O(\log n)$$

$$\omega(\log n)$$

c: $T(n) = 2T(n/2) + n$

$$a = 2$$

$$b = 2$$

$$d = 1$$

$$\log_2 2 = 1$$

$$O(n \log n)$$

$$\omega(n \log n)$$

$$\text{d: } T(n) = 2T(n/2) + n^2$$

$$a = 2$$

$$b = 2$$

$$d = 2$$

$$\log_2 1 < 2$$

$$O(n)$$

$$\omega(n)$$