First Name: Last Name:

Q1: Read the instructions for question Q1 in the assignment document. For each of the two sub-questions, check the box that corresponds to the answer.

- (a): Which case do we have?
- (b): What is the asymptotic notation for T(n)?

Case 1

Case 2

Case 3

None of the above

 $T(n) \in \Theta(n^3)$

 $T(n) \in \Theta(n^3 \log n)$

 $T(n) \in \Theta(n^4)$

None of the above

Q2: Read the instructions for question Q2 in the assignment document. For each of the five sub-questions, check the box that corresponds to the answer.

(a): Which case do we have for $T_A(n)$?

Case 1

Case 2

Case 3

None of the above

(b): What is the asymptotic notation for $T_A(n)$?

 $T_A(n) \in \Theta(n^{\log_2 7})$

 $T_A(n) \in \Theta(n^{\log_2 7} \log n)$

 $T_A(n) \in \Theta(n^3 \log n)$

None of the above

(c): Which case do we have for $T_B(n)$?

Case 1

Case 2

Case 3

None of the above

(d): What is the asymptotic notation for $T_B(n)$?

 $T_B(n) \in \Theta(n^3)$

 $T_B(n) \in \Theta(n^3 \log n)$

 $T_B(n) \in \Theta(n^2)$

None of the above

(e): Which algorithm is asymptotically faster?

Algorithm A is faster.

Algorithm B is faster.

None of the above.

Q3: Read the instructions for question Q3 in the assignment document. For each of the two sub-questions, check the box that corresponds to the answer.

(a): Answer for Quicksort

(b): Answer for mergesort

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12

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None of the above

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Q4: Read the instructions for question Q4 in the assignment document. For each of the four sub-questions, check the box that corresponds to the answer.

(a): What is the 2nd element-wise comparison?

 $19 \le 22$?

 $16 \le 22$?

 $13 \le 22$?

 $25 \le 22$?

 $19 \le 13$?

 $16 \le 13$?

 $16 \le 19$?

None of the above

(b): What is the 4th element-wise comparison?

 $19 \le 22$?

 $16 \le 22$?

 $13 \le 22$?

 $25 \le 22$?

 $19 \le 13$?

 $16 \le 13$?

 $16 \le 19$?

None of the above

(c): What is the 6nd element-wise comparison?

 $19 \le 22$?

 $16 \le 22$?

 $13 \le 22$?

 $25 \le 22$?

19 ≤ 13?

 $16 \le 13$?

 $16 \le 19$?

None of the above

(d): What is the 7th element-wise comparison?

 $19 \le 22$?

 $16 \le 22$?

 $13 \le 22$?

 $25 \le 22$?

 $19 \le 13$?

 $16 \le 13$?

 $16 \le 19$?

Q5: Read the instructions for question Q5 in the assignment document. For each of the five sub-questions, check the box that corresponds to the answer.

(b):

- (a): The comparison at the 2nd node on the path:
 - $a_1 > a_3$?
 - $a_2 > a_3$?
 - $a_1 > a_4$?
 - $a_3 > a_4$?
 - $a_1 > a_5$?
 - $a_4 > a_5$?

None of the above

The comparison at the 3rd node on the path:

- $a_1 > a_3$?
- $a_2 > a_3$?
- $a_1 > a_4$?
- $a_3 > a_4$?
- $a_1 > a_5$?
- $a_4 > a_5$?

None of the above

- (c): The comparison at the 4th node on the path:
 - $a_1 > a_3$?
 - $a_2 > a_3$?
 - $a_1 > a_4$?
 - $a_3 > a_4$?
 - $a_1 > a_5$?
 - $a_4 > a_5$?

None of the above

- (d): The comparison at the 5th node on the path:
 - $a_1 > a_3$?
 - $a_2 > a_3$?
 - $a_1 > a_4$?
 - $a_3 > a_4$?
 - $a_1 > a_5$?
 - $a_4 > a_5$?

None of the above

- (e): The comparison at the 6th node on the path:
 - $a_1 > a_3$?
 - $a_2 > a_3$?
 - $a_1 > a_4$?
 - $a_3 > a_4$?
 - $a_1 > a_5$?
 - $a_4 > a_5$?

 $\Theta(n^2)$

None of the above

Q6: Read the instructions for question Q6 in the assignment document. For each of the five sub-questions, check the box that corresponds to the answer.

(a):	Length of shortest root-leaf path for insertion sort:	(b):	Length of longest root-leaf path for insertion sort:
	$\Theta(1)$		$\Theta(1)$
	$\Theta(\log n)$		$\Theta(\log n)$
	$\Theta(n)$		$\Theta(n)$
	$\Theta(n \log n)$		$\Theta(n \log n)$
	$\Theta(n^2)$		$\Theta(n^2)$
	None of the above		None of the above
(c):	Length of shortest root-leaf path for quicksortsort:	(d):	Length of longest root-leaf path for quicksort:
	$\Theta(1)$		$\Theta(1)$
	$\Theta(\log n)$		$\Theta(\log n)$
	$\Theta(n)$		$\Theta(n)$
	$\Theta(n \log n)$		$\Theta(n \log n)$
	$\Theta(n^2)$		$\Theta(n^2)$
	None of the above		None of the above
(e):	Length of shortest root-leaf path for mergesort:	(f):	Length of longest root-leaf path for mergesort:
	$\Theta(1)$		$\Theta(1)$
	$\Theta(\log n)$		$\Theta(\log n)$
	$\Theta(n)$		$\Theta(n)$
	$\Theta(n \log n)$		$\Theta(n \log n)$

 $\Theta(n^2)$