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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?

- [ ] Case 1
- [x] Case 2
- [ ] Case 3
- [ ] None of the above

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

- [ ] $T(n) \in \Theta(n^3)$
- [x] $T(n) \in \Theta(n^3 \log n)$
- [ ] $T(n) \in \Theta(n^4)$
- [ ] 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
- [x] Case 3
- [ ] None of the above

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

- [ ] $T_A(n) \in \Theta(n^{\log_2 7})$
- [ ] $T_A(n) \in \Theta(n^{\log_2 7} \log n)$
- [x] $T_A(n) \in \Theta(n^3 \log n)$
- [ ] None of the above

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

- [x] Case 1
- [ ] Case 2
- [ ] Case 3
- [ ] None of the above

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

- [x] $T_B(n) \in \Theta(n^3)$
- [ ] $T_B(n) \in \Theta(n^3 \log n)$
- [ ] $T_B(n) \in \Theta(n^2)$
- [ ] None of the above

(e): Which algorithm is asymptotically faster?

- [ ] Algorithm A is faster.
- [x] 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

- [x] 10
- [ ] 11
- [ ] 12
- [ ] 13
- [ ] None of the above

(b): Answer for mergesort

- [x] 10
- [ ] 11
- [ ] 12
- [ ] 13
- [ ] None of the above

Carefully read the instruction for each question in the assignment document

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?

- [ ] $19 \leq 22$?
- [x] $16 \leq 22$?
- [ ] $13 \leq 22$?
- [ ] $25 \leq 22$?
- [ ] $19 \leq 13$?
- [ ] $16 \leq 13$?
- [ ] $16 \leq 19$?
- [ ] None of the above

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

- [ ] $19 \leq 22$?
- [ ] $16 \leq 22$?
- [ ] $13 \leq 22$?
- [x] $25 \leq 22$?
- [ ] $19 \leq 13$?
- [ ] $16 \leq 13$?
- [ ] $16 \leq 19$?
- [ ] None of the above

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

- [ ] $19 \leq 22$?
- [ ] $16 \leq 22$?
- [ ] $13 \leq 22$?
- [ ] $25 \leq 22$?
- [ ] $19 \leq 13$?
- [x] $16 \leq 13$?
- [ ] $16 \leq 19$?
- [ ] None of the above

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

- [ ] $19 \leq 22$?
- [ ] $16 \leq 22$?
- [ ] $13 \leq 22$?
- [ ] $25 \leq 22$?
- [ ] $19 \leq 13$?
- [ ] $16 \leq 13$?
- [x] $16 \leq 19$?
- [ ] None of the above

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**.

(a): The comparison at the 2nd node on the path:

- [ ] $a_1 > a_3$?
- [x] $a_2 > a_3$?
- [ ] $a_1 > a_4$?
- [ ] $a_3 > a_4$?
- [ ] $a_1 > a_5$?
- [ ] $a_4 > a_5$?
- [ ] None of the above

(b): The comparison at the 3rd node on the path:

- [x] $a_1 > a_3$?
- [ ] $a_2 > a_3$?
- [ ] $a_1 > a_4$?
- [ ] $a_3 > a_4$?
- [ ] $a_1 > a_5$?
- [ ] $a_4 > a_5$?
- [ ] None of the above

(c): The comparison at the 4th node on the path:

- [x] $a_1 > a_3$?
- [ ] $a_2 > a_3$?
- [ ] $a_1 > a_4$?
- [ ] $a_3 > a_4$?
- [ ] $a_1 > a_5$?
- [ ] $a_4 > a_5$?
- [ ] None of the above

(d): The comparison at the 5th node on the path:

- [ ] $a_1 > a_3$?
- [x] $a_2 > a_3$?
- [ ] $a_1 > a_4$?
- [ ] $a_3 > a_4$?
- [ ] $a_1 > a_5$?
- [ ] $a_4 > a_5$?
- [ ] None of the above

(e): The comparison at the 6th node on the path:

- [ ] $a_1 > a_3$?
- [ ] $a_2 > a_3$?
- [ ] $a_1 > a_4$?
- [x] $a_3 > a_4$?
- [ ] $a_1 > a_5$?
- [ ] $a_4 > a_5$?
- [ ] 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:

- [ ] $\Theta(1)$
- [ ] $\Theta(\log n)$
- [x] $\Theta(n)$
- [ ] $\Theta(n \log n)$
- [ ] $\Theta(n^2)$
- [ ] None of the above

(b): Length of longest root-leaf path for insertion sort:

- [ ] $\Theta(1)$
- [ ] $\Theta(\log n)$
- [ ] $\Theta(n)$
- [ ] $\Theta(n \log n)$
- [x] $\Theta(n^2)$
- [ ] None of the above

(c): Length of shortest root-leaf path for quicksortsort:

- [ ] $\Theta(1)$
- [ ] $\Theta(\log n)$
- [ ] $\Theta(n)$
- [x] $\Theta(n \log n)$
- [ ] $\Theta(n^2)$
- [ ] None of the above

(d): Length of longest root-leaf path for quicksort:

- [ ] $\Theta(1)$
- [ ] $\Theta(\log n)$
- [ ] $\Theta(n)$
- [ ] $\Theta(n \log n)$
- [x] $\Theta(n^2)$
- [ ] None of the above

(e): Length of shortest root-leaf path for mergesort:

- [ ] $\Theta(1)$
- [ ] $\Theta(\log n)$
- [ ] $\Theta(n)$
- [x] $\Theta(n \log n)$
- [ ] $\Theta(n^2)$
- [ ] None of the above

(f): Length of longest root-leaf path for mergesort:

- [ ] $\Theta(1)$
- [ ] $\Theta(\log n)$
- [ ] $\Theta(n)$
- [x] $\Theta(n \log n)$
- [ ] $\Theta(n^2)$
- [ ] None of the above