Week 2 Quiz

Your last recorded submission was on 2025-02-04, 23:13 Due date: 2025-02-05, 23:59 IST. IST

All questions carry equal weightage. You may submit as many times as you like within the deadline. Your final submission will be graded.

1) Having collected Aadhaar information for each SIM card, a government agency wants to check that all the Aadhaar numbers entered in SIM card applications are actually valid, by comparing SIM card applications against the list of registered Aadhaar numbers. Which of the following is likely to be the best strategy for this? ***2 points***

- ○ Use a nested loop. For each SIM card application S, and for each Aadhaar number A, check if the Aadhaar number listed in S is the same as A.
- ○ Sort the SIM card applications and use binary search to speed up the process.
- ○ Sort the registered Aadhaar numbers and use binary search to speed up the process.
- ◉ Sort both the SIM card applications and registered Aadhaar numbers and merge the two lists.

2) Suppose our aim is to sort an array in descending order. Which of the following statements is true? ***2 points***

- ○ Input in ascending order is worst case for both selection sort and insertion sort.
- ◉ Input in ascending order is worst case for insertion sort but not for selection sort.
- ○ Input in descending order is worst case for both selection sort and insertion sort.
- ○ Input in ascending order is worst case for selection sort but not for insertion sort.

3) Suppose we want to sort an array in ascending order. We have a stable implementation of quicksort that alternately chooses the first and last element of the array as the pivot with each recursive call. Which of the following is **not true** for this implementation? ***2 points***

- ◉ The worst case behaviour is O(n log n).
- ○ The average case behaviour is O(n log n).

- The worst case behaviour is $O(n^2)$.
- The average case behaviour is asymptotically better than the worst case behaviour.

4) Which of the following statements is ***not*** true? ***2 points***

- Quicksort and merge sort are both examples of divide and conquer algorithms.
- (selected) If we randomly choose a pivot element each time, quicksort will always terminate in time O(n log n).
- For every fixed strategy to choose a pivot for quicksort, we can construct a worst case input that requires time $O(n^2)$.
- If we could find the median in time O(n), quicksort would have worst case complexity O(n log n).

5) We have a list of pairs [("Shweta",71),("Sunita",85),("Tariq",71),("Brinda",85), ("Salma",72),("Uday",60)], where each pair consists of a student's name and his/her marks in a course. We sort these pairs in ascending order of marks. Which of the folllowing corresponds to a stable sort of this input? ***2 points***

- [("Uday",60),("Tariq",71),("Shweta",71),("Salma",72).("Sunita",85),("Brinda",85)]
- [("Uday",60),("Shweta",71),("Tariq",71),("Salma",72),("Sunita",85),("Brinda",85)]
- [("Uday",60),("Tariq",71),("Shweta",71),("Salma",72),("Brinda",85),("Sunita",85)]
- (selected) [("Uday",60),("Shweta",71),("Tariq",71),("Salma",72),("Brinda",85),("Sunita",85)]

You may submit any number of times before the due date. The final submission will be considered for grading.

Submit Answers