**Comprehensive Exam – Feedback for Jia Deng**

Grade: 4.91/10

Question 1: (0.38/1)

(a) When you insert an element in an ordered (sorted) array, you may need to sort everything to keep the array sorted. Thus, the complexity is O(n).

(b) A doubly linked list has a pointer to the predecessor and the successor, therefore if you are given an element you can immediately access both, making the complexity O(1).

(c) The upper bound for the search operation in a min-heap is O(n).The insert in the min-heap swaps at most once per level (the tree is “somewhat ordered”), thus the complexity is O(log n).

For the successor and predecessor, you may need to traverse everything, thus the upper bound would be O(n).

(d) For the hash table, on average you would expect a complexity of 1 for search and insert. However, the Big-O notation represents the worst-case scenario or upper bound, which would be O(n).

Hash tables aren’t ordered, so the successor and predecessor would be O(n).

Question 2: (0.67/1)

The explanations could be improved for better reader comprehension. There is no explanation on the difference between (a) and (c).

Question 3: (0.67/1)

(a) Requirements analysis involves identifying the software requirements, that is, the needs/expectations of the stakeholder(s). What is described here is more about how to measure success or performance of the proposed system.

Question 4: (0.72/1)

(c) As per the man information of fork(), the pid of the child is returned in the parent and zero is returned in the child.

(d) The correct answer is avoidance. However, one could argue to some extent that by avoiding you prevent a deadlock, even though semantically speaking it’s not exactly the same.

Question 5: (0.5/1)

No explanation was provided.

Question 6: (0.05/1)

IP stack has five layers: application, transport, network, link and physical. The description provided for the application and network layers is incorrect. (b) was not addressed.

Question 7: (0.85/1)

You should state what search algorithm you are using, not all search algorithms have that complexity.

Question 8: (0.07/1)

(a) The a’s and b’s follow a specific structure, not described here.

(b) A parse tree is supposed to show how you used the grammar to derive the expression.

(c) An LL(1) grammar has no multiple entry in the parsing table. You aren’t showing this here.

Question 9: (0/1)

You are not explaining or demonstrating that it is polynomial.

Question 10: (1/1)