Exam 1 self analysis

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2. (Comparing functions)

1) Approach: Compare growth rates using algebraic and logarithmic analysis.
2) Approach's Success: Yes, the approach successfully compared growth rates and proved the given inequalities.
3) Solution Understanding: Yes, I understand the provided solution and its steps.
4) Improvement: To better tackle similar questions, I can deepen my understanding of function properties and strengthen my mathematical reasoning for more robust proofs.

3. (Recurrence resolution)

1) Approach: Apply the Master theorem to analyze the given recurrence.
2) Approach's Success: Yes, the approach successfully determined an upper bound for T(n).
3) Solution Understanding: Yes, I understand the solution provided, including the Master theorem's application and recurrence tree analysis.
4) Improvement: To better handle such questions in the future, I can practice more with different types of recurrences and strengthen my understanding of the Master theorem's conditions and implications.

4. (Note picking)

1. Approach: For (a), I used a nested loop to find the maximum denomination and index. For (b), I iterated through the array once to find the maximum denomination and index.
2. Approach's Success: Yes, both approaches successfully find the maximum denomination and index.
3. Solution Understanding: Yes, I understand the provided solutions for both (a) and (b).
4. Improvement: To improve, I can focus on devising more efficient algorithms from the outset and practice optimizing algorithms to achieve better time complexity for similar problems in the future.

5. (Function anomalies)

1. Approach: For (a), I iterated through the array and checked pairs for function anomalies. For (b), I observed that an index pair (i, j) is a functioning anomaly if A[i] > A[j] and i < j.
2. Approach's Success: Yes, both approaches successfully calculated the number of function anomalies.
3. Solution Understanding: Yes, I understand the provided solutions for both (a) and (b).
4. Improvement: To better tackle similar questions in the future, I can focus on developing more efficient algorithms and optimizing the time complexity using techniques like divide and conquer.

6. (k-Selects Sort)

1. Approach: For (a), I analyzed the algorithm's behavior and its steps. For (b), I calculated the time complexity for each step. For (c), I determined the value of k for which k-Selects Sort is as efficient as Merge sort.
2. Approach's Success: Yes, I successfully analyzed the algorithm's correctness, time complexity, and efficiency conditions.
3. Solution Understanding: Yes, I understand the provided solutions for all parts (a), (b), and (c).
4. Improvement: To better tackle similar questions in the future, I can practice more with analyzing algorithms' correctness, time complexities, and efficiency comparisons for various scenarios, further honing my analytical skills.

7. (Coconut Breaking)

1. Approach: For (a), I looped through the floors, checking if the coconut broke on each floor. For (b), I used a more efficient nested loop approach to track if the coconut breaks from higher floors.
2. Approach's Success: Yes, my approach worked for both (a) and (b) after improving the algorithm in (b).
3. Solution Understanding: Yes, I understand the provided solutions for both (a) and (b).

4. Improvement: To better tackle similar questions in the future, I can consider scenarios where the algorithm needs to account for higher floors that might also result in coconut breaking. This will help ensure the correctness of the solution from the start.

8. (Extra Credit)

1. Approach: I initially tried to prove the statement by using the given inequalities for the main question. I provided proof and disproof for the extra credit by considering different scenarios.

2. Approach's Success: My approach proved the statement for the main question. However, for the extra credit, I successfully proved the statement under certain conditions and provided a counterexample to disprove it.

3. Solution Understanding: Yes, I understand the provided solution for both the main question and the extra credit.

4. Improvement: To better tackle such questions in the future, I can consider a wider range of scenarios and conditions to ensure the accuracy of the proof or disproof.