L9 PROBLEM 4 (5/5 points)

Note: Before you begin the next set of exercises, you may wish to review these notes on Big O notation (/c4x/MITx/6.00.1_4x/asset/handouts_Big_O_Notes.pdf).

Determine the complexity of the following tasks.

1. 6.00.1x staff decide to hold an online chess tournament, and *n* 6.00.1x students respond to participate in it. If the tournament is a single-elimination tournament (this means you are eliminated when you lose once), how many games do we need to decide the winner, in terms of *n*? Assume there will be no draws or byes.

   - $O(1)$
   - ✓ $O(n)$
   - $O(n^2)$
   - $O(\log n)$
   - $O(n \log n)$
   - It depends on how the tournament is organized.

2. You are asked to write an *n* page research paper. You've written plenty of research papers in your time, and you know it always takes you 30 minutes to write one page of a research paper. In terms of *n*, what is the complexity order that describes the amount of time this research paper will take to write?

   - $O(1)$
   - ✓ $O(n)$
   - $O(n^2)$
   - $O(\log n)$
   - $O(n \log n)$

3. You are asked to write an *n* page personal essay. You've written plenty of personal essays in your time, and you know it always takes you two hours to write a personal essay, no matter the length. In terms of *n*, what is the complexity order that describes the amount of time this personal essay will take to write?

   - ✓ $O(1)$
   - $O(n)$
   - $O(n^2)$
   - $O(\log n)$
   - $O(n \log n)$

4. You just dropped a box of glass toys and *n* toys in the box broke in half. You'd like to match the halves of the toys so that you could glue them together, but the only way to tell whether two halves belonged to one toy is to physically pick up the two pieces and try to fit them together. Express how long this matching process will take in terms of *n*.

   - $O(1)$
   - $O(n)$

- $O(n^2)$ ✔
- $O(\log n)$
- $O(n \log n)$

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