Quiz 5

Q1: Divide and Conquer vs. DP

(2 points) What's the key difference between divide and conquer and dynamic programming?

Answer: Divide and conquer: subproblems do not overlap. Dynamic programming: subproblems overlap.

Q2: Maximum Subarray

(4 points) When solving the maximum subarray problem using divide and conquer, how many subproblems there are **in total** and what they are?

Answer: 3 subproblems.

1. The maximum subarray can be found that's entirely in the left half.
2. The maximum subarray can be found that's entirely in the right half.
3. The maximum subarray can be found that crosses the middle.

Q3: Activity Selection

(2 points) For the activity selection problem, give an example to show why choosing the compatible activity that finishes last would not work.

Answer: a_1 starts at 1 and finishes at 10, a_2 starts at 2 and finishes at 4, a_3 starts at 5 and finishes at 7.

Q4: Rod Cutting

(1 point) Suppose we can sell a rod of length 1 for 2 dollars, of length 2 for 4 dollars, of length 3 for 5 dollars, and of length 4 for 7 dollars. Given a rod of length 4, what is the maximum revenue we can make?

Answer: 8

Explanation: cut into two pieces, each is of length 2.