6651 Comments on lecture 2

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1. in the divide and conquer algorithm for MaxSubarray, make sure you understand how the values: left, right, cross, are computed. See the lecture slides on page 18. As an exercise, use the array A given on slides page 12, this array has length 16. **Suppose we run the algorithm $MaxSubarray(A, 1, 18)$, what would be the values for left, right, and cross, respectively?**

2. We didn't have time to explain the following method: using recursion tree to understand recurrence. Read and understand it yourself, see slides page 20-21. As an exercise, given the following recurrences:

   - $T(n) = T(n/2) + n$,
   - $T(n) = 2T(n/2) + n$,
   - $T(n) = 3T(n/2) + n$.

   Firstly, apply the master theorem to solve these recurrences. Then, apply the recursion tree method to solve them.

3. for the closest-pair problem, in class we showed that one important observation is that if a square of side length δ contains 5 points, then at least 2 points would have distance $\leq \delta/\sqrt{2} < \delta$. This is also pointed out on slides page 43-44. The details of the proof is not given in the slides, but we discussed the proof in detail in class. **Try reconstruct the proof.**

4. without reviewing the lecture slides, **try reconstruct the algorithm for integer multiplication using divide and conquer strategy.** make sure you understand the simple but key observation that improved the time efficiency.

   For the above, use the TA(teaching assistant) office hours if you have difficulty.

References