HW3

Problem 1.)
Provide binary search algorithm that takes a sorted list of strings and finds a specific string x. What is the runtime of your algorithm?

Problem 2.) What is the runtime of an algorithm that sorts n strings?

Problem 3.) Given to integers x, y such that the x, and y are n digits long each, for example if 202 is 3 digits long. Provide a divide and conquer algorithm based on the idea that
Given $X = X_L X_R$ where $X_L = X[1..\frac{n}{2}]\ and\ X_R = X[\frac{n}{2} + 1...n]$ and similarly you can breakup Y
Then $X * Y = (X_L * 10^{n/2} + X_r)(Y_L * 10^{n/2} + Y_r)$

Problem 4)

Suppose that instead of always selecting the first activity to finish, we instead select the last activity to start that is compatible with all previously selected activities. Describe how this approach is a greedy algorithm, and prove that it yields an optimal solution.

Problem 5)- This one is tricky. Enjoy doing it, but don'ts spend to much time on it.

Not just any greedy approach to the activity-selection problem produces a maximum-size set of mutually compatible activities. Give an example to show that the approach of selecting the activity of least duration from among those that are compatible with previously selected activities does not work. Do the same for the approaches of always selecting the compatible activity that overlaps the fewest other remaining activities and always selecting the compatible remaining activity with the earliest start time.

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