CSE 101 Homework 5

Fall 2018

This homework is due on gradescope Friday December 7th at 11:59pm. Remember to justify your work even if the problem does not explicitly say so. Writing your solutions in \LaTeX is recommend though not required.

**Question 1** (Date Planning, 50 points). Debbie is trying to find a spouse. Over the next $n$ calendar days she has $m$ suitors to consider. For each suitor, she has the option of dating them for a fixed interval of days (from day $s_i$ to day $e_i$). Each suitor has a known probability $p_i$ of proving to be a good match for Debbie, and probabilities $p_{i,d}$ that Debbie will find out on day $d$ of dating them that they will not be a good match.

Debbie does not want to date more than one suitor at a time and once she starts dating one of them will continue to do so until she determines one way or the other whether or not they are a match.

Provide a polynomial time algorithm to determine the best probability Debbie can obtain of finding a match during this time period.

**Question 2** (Longest Common Substring on a Budget, 50 points). Give an algorithm that given three strings $a_1a_2\ldots a_n$, $b_1b_2\ldots b_n$, and $c_1c_2\ldots c_n$, a cost assigned to each character and a real number $V$ computes the length of the longest sequence $x_1x_2\ldots x_k$ that is a common subsequence of each of the three sequences and so that the total cost of all the characters in our sequence is at most $V$. Your algorithm should run in polynomial time. Note that the costs are not necessarily integers, and so algorithms that produce a table with an entry for every possible value of the cost will be too slow.

**Question 3** (Extra credit, 1 point). Where have I been getting character names for homework problems from this quarter?