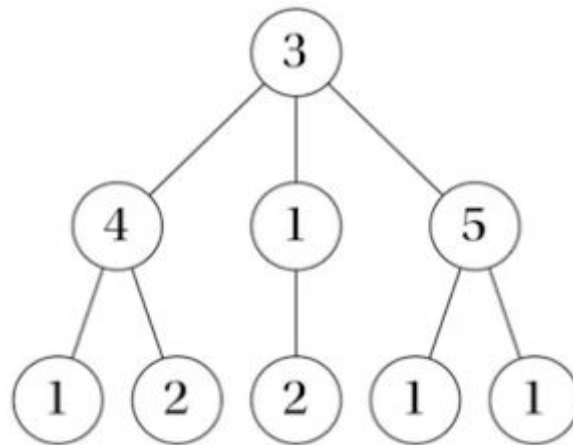


QUESTION 1: Dynamic Programming

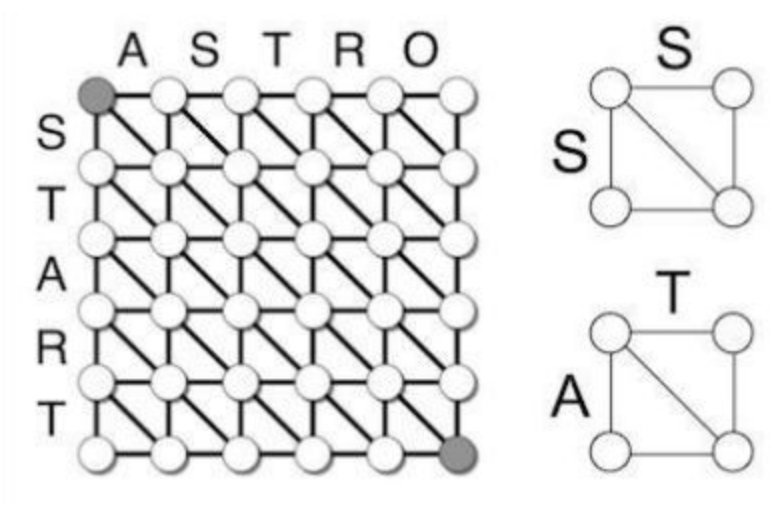
Maximum independent set. Try to maximize the value of nodes you can select. Can take any subset of the nodes as long as no two nodes you take are connected by an edge. (a) What is the maximum value of the independent set? (b) Describe a dynamic programming algorithm that can find the maximum independent set from a tree - a rooted graph with no loops - of any size.



Important! Your answer should include (a) a numerical answer corresponding to the maximum independent set, and (b) a narrative description or fully annotated code of a dynamic programming algorithm that can find the maximum independent set from any tree. This description (b) should include the ordered series of logical steps through which your algorithm proceeds. NOTE: You do not need to provide working code. It is only important that you articulate the logic of your algorithm.

QUESTION 2: Reductions & Translations

(a) Assign weights (numerical values) to the edit distance rules - insertion, deletion, substitution, copy - and describe how those operations relate to the graphical representation. It may be helpful to use the examples of the two subgraphs included below and label the edges with the rule (insertion, deletion, substitution, copy) represented. (b) Find the shortest path from "ASTRO" to "START" - from the node in the upper left to the node in the bottom right. What is the weight of this path? Include a trace of the path with the weights of all included edges labeled.



The questions correspond to the [Dynamic Programming \(QUESTION 1\)](#) and [Reductions & Translations \(QUESTION 2\)](#) Quizzes, where you can find more explanation.

Download the quiz videos [here](#). Download a pdf worksheet of the Reductions & Translations (QUESTION 2) problem [here](#).