

Some notes on Edit distance (Class Notes Algorithms)

Food \rightarrow Mood
 $= 1$

The edit distance between 2 strings is the min number of edits

ex/

the edit distance between Food \rightarrow Money can be derived from the following steps:

Food \rightarrow Mood 1

Mood \rightarrow Mond 2

Mond \rightarrow Moned 3

Moned \rightarrow Money 4

Let's analyze this recursive structure:

We can define the $\text{edit}(i, j)$ as the edit distance between the prefixes $A[1 \dots i]$ and $B[1 \dots j]$. We want to find $\text{Edit}(n, m)$ with two words $A[1 \dots n]$ and $B[1 \dots m]$

There are three possibilities for the last column

- Insertion
- Substitution
- removal

$$\text{Edit}(i, j) = \begin{cases} i & \text{if } j = 0 \\ j & \text{if } i = 0 \\ \min \begin{cases} \text{Edit}(i, j-1) + 1 \\ \text{Edit}(i-1, j) + 1 \\ \text{Edit}(i-1, j-1) + [A[i] \neq B[j]] \end{cases} & \text{otherwise} \end{cases}$$

We can define the following recurrence

Some notes on edit distance cont...

Let's use the dynamic programming template from Erickson to transform

- Subproblems: we are looking at $Edit(i, j)$ where $i \leq n$ and $j \leq m$

- Memoization Structure: we can memoize all possible values with 2D arr
 $Edit[m, n]$

- Dependency: $Edit(i, j)$ is dependent on

0 2 6 5 1 3 1 5