CS660: Algorithms - Lecture 6

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Edit distance

- Given two strings A, B (e.g., two DNA sequences).
- The minimum number of character insertions, deletions, and substitutions to transform A to B.
- Example: *FOOD* and *MONEY*. Edit distance is 4.
- Define the table ED where $ED[i, j]$ is the edit distance between $A[1 \ldots i]$ and $B[1 \ldots j]$.
- Initialization:
  - $ED[0, j] = j$ and $ED[j, 0] = 0$. Transforming the empty string to a string of length j requires j insertions.

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- Initialization:
  - $ED[0, j] = j$ and $ED[j, 0] = 0$. Transforming the empty string to a string of length j requires j insertions.
- Filling the table:
- For $i = 1$ to m:
  - $ED[i, 0] \leftarrow i$.
  - For $j = 1$ to n:
    - $ins \leftarrow ED[i, j - 1] + 1$
    - $del \leftarrow ED[i - 1, j] + 1$
    - If $A[i] = B[j]$ then $rep \leftarrow ED[i - 1, j - 1]$
    - Else, $rep \leftarrow ED[i - 1, j - 1] + 1$.
    - $ED[i, j] \leftarrow min\{ins, del, rep\}$.
- Read 3.7.

Practice dynamic programming (frequent interview questions)

Given a string *s*, find the longest palindromic substring in *s*. `https://leetcode.com/problems/longest-palindromic-substring/`

Practice dynamic programming (frequent interview questions)

Given a 2D binary matrix filled with 0's and 1's, find the largest rectangle containing only 1's and return its area.
`https://leetcode.com/problems/maximal-rectangle/`