CS 252

W, 15 May 2024
Problem 1

\[ M = \text{Biggest substring sum} \]

\[ M_a \sim 2 \]

\[ M_1 = \max \text{ for inside } \]

\[ \frac{N}{2} \]

\[ L \]

\[ \frac{N}{2} \]

\[ R \]

\[ M_2 = \max \text{ for inside } \]

\[ M_3 = \max \text{ that includes some of } L + \text{some of } R \]
Minimum edit distance

Costs
- deletion: 1
- insertion: 1
- substitution: 1

s \text{ broke} \\
\text{book}
$D[j, k] = \min \text{ edit distance from } s[1..j] + s + t[1..k]$

Recurrence?

Base cases?

$D[m, n]$ is the prob.
We're trying to solve
<table>
<thead>
<tr>
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<th>0</th>
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<th>3</th>
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**Strategies:**
- brok
- brok → bok
- brok → del
- del → bok
- del → brok
- brok → del
- del → brok
- brok → del
- del → brok
- brok → del

What's the min cost of brok → bo?
\[
D_{j,k} = \min (D_{j-1,k-1} + 1 \text{ if } s[j] \neq t[k], D_{j-1,k}, D_{j,k-1} + 1, D_{j,k} + 1)
\]

\(j=1, \ k=1\)

\[
\begin{array}{c|cccccc}
  & 0 & 1 & 2 & 3 & 4 & 5 \\
\hline
  k \downarrow & 0 & 1 & 2 & 3 & 4 & 5 \\
  0 & & & & & & \\
  1 & & & & & & \\
  2 & & & & & & \\
  3 & & & & & & \\
  4 & & & & & & \\
\end{array}
\]
\[
D_{i, j, k}\n\]
\[
= \min (\begin{cases} 
D_{i-1, j, k-1} + 1 & \text{if } s[i] \neq t[k] \\
D_{i-1, j, k-1} & \text{if } s[i] = t[k] \\
D_{i-1, j, k} + 1, & D_{i, j-1, k} + 1 
\end{cases}) 
\]

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\[
D[j, k] = \min ( \begin{cases} 
D[j-1, k-1] + 1 & \text{if } s[j] \neq t[k], \\
D[j-1, k-1] & \text{if } s[j] = t[k], \\
D[j-1, k] + 1, \\
D[j, k-1] + 1 
\end{cases} ) 
\]
Longest palindromic substring of $S[1..n]$

$$P[j,k] = \begin{cases} 
\text{true} & \text{if } S_j, \ldots, S_k \text{ is a pal.} \\
\text{false} & \text{if not}
\end{cases}$$

Recurrence?

Base case?
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T</td>
<td>F</td>
<td>?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>T</td>
<td>F</td>
<td>?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>T</td>
<td>F</td>
<td>?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- The grid shows a sequence of 'T's and 'F's with some '?'s.
- The sequence is not fully completed.
- The sequence above the grid reads 'banananas'.

- The grid is marked with a 'S' on top.
- The grid is marked with a 'D' on the bottom.

- The grid is marked with an orange wavy line from 1 to 7.
- The grid is marked with another orange line going diagonally from 2 to 6.