Algorithms

DP Build Homework 1

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Teaching, Training and Coaching for more than a decade!

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Problem #1: LIS v2

- In the lecture, we used LIS pick-or-leave style to print an LIS sequence
- Now, apply it on the 2nd version (loop to find the next element)

Problem #2: Edit Distance

- We learned edit distance. We will focus in the printing on only changing the first string to the second string (second is fixed). Please print similar to the following cases
  - You can have some differences too :)
  - For simplicity, just refer to the indices in the original string
- You may copy cases from my code
- Also verify your own cases

```
Steps for: xy to axy
In xy insert at original idx 0 letter a
1 steps in total

Steps for: axy to xy
In axy delete original idx 0 letter a
1 steps in total

Steps for: axy to bxy
In axy change letter at original idx 0 letter a to letter b
1 steps in total

Steps for: axy to a
In axy delete the last 2 letters xy
2 steps in total

Steps for: a to axy
In a insert at the end xy
2 steps in total

Steps for: axy to axy
0 steps in total
```

```
Steps for: horse to ros
In horse change letter at original idx 0 letter h to letter r
In horse delete original idx 2 letter r
In horse delete the last 1 letters e
3 steps in total

Steps for: park to spake
In park insert at original idx 0 letter s
In park delete original idx 2 letter r
In park insert at the end e
3 steps in total

Steps for: spake to park
In spake delete original idx 0 letter s
In spake insert at original idx 3 letter r
In spake delete the last 1 letters e
3 steps in total

Steps for: spakehz to park
In spakehz delete original idx 0 letter s
In spakehz delete original idx 3 letter k
In spakehz delete original idx 4 letter e
In spakehz change letter at original idx 5 letter h to letter r
In spakehz change letter at original idx 6 letter z to letter k
5 steps in total
```

Problem #3: Brackets for MCM

- We learned to compute the optimal matrix chain multiplication
- Now time to print the way we bracket them
  - For simplicity, assume we have maximum 26 matrix
- { 2, 3 }
- { 2, 3 } x { 3, 4 }
- { 1, 2 } x { 2, 3 } x { 3, 4 }
- { 5, 10 } x { 10, 19 } x { 19, 7 } x { 7, 5 }
- { 40, 20} x { 20, 30 } x { 30, 10 } x { 10, 30 }

```
A
(AB)
((AB)C)
(((AB)C)D)
((A(BC))D)
```

"Acquire knowledge and impart it to the people."

"Seek knowledge from the Cradle to the Grave."