Monday is Labor Day

Dynamic Programming
Text segmentation:

```
word word word
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Where does the first word end?

$\text{Splittable}(i) = \text{Is } A[i..n] \text{ splitable into words?}$

$O(n^2)$ time

Longest Increasing Subsequence

$LIS(i,j) = \text{length of longest incr subseq of } A[i..j] \text{ all bigger than } A[i]$
**Woodcutter's Problem**

- Long plank with cut marks
- Sawmill will make one cut, cost = length of plank
- What is the cheapest way to make all cuts?

Given array \( B[1..n] \) of board lengths

\[ x[j] = \sum_{i<j} B[i] \]

\[ B[i] = x[i] - x[i-1] \]

\[ \text{Length}(i,j) = x[j] - x[i-1] \]

\[ \text{WoodCut}(i,j) = \text{min. cost to cut plank containing boards } i..j \text{ into individual boards.} \]
\[
\text{Wood Cut}(i, j) = \begin{cases} 
\min \{ \text{Length}(i, j) + \text{Wood Cut}(k, l) \} & i \leq k < j \leq l \\
0 & \text{if } i = j
\end{cases}
\]

\( k = \text{index of last board in left chunk} \)

\( O(n^3) \)