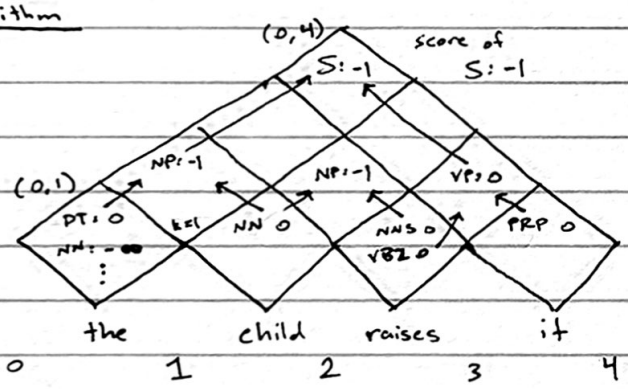
CKY Algorithm

- Compute most likely tree for a given sentence $\bar{x}$

$$\underset{T}{\text{argmax}}\ P(T \mid \bar{x}) = \underset{T}{\text{argmax}}\ P(T, \bar{x})$$

Viterbi:

- CKY Algorithm



* Read about this online!!

* Runtime: $O(n^3 G)$

$t[i, j, x]$: score of best derivation of x over span (i, j)

Base: $t[i, i+1, x] = \log P(w_i \mid x)$

Recurrent: $t[i, j, x] = \max_k \max_{r: x \to x_1, x_2} \log P(x \to x_1, x_2) + t[i, k, x_1] + t[k, j, x_2]$

Example Grammar

1.0 DT → the
1.0 NN → child
1.0 NNS → raises
1.0 VBZ → raises
1.0 PRP → it

1.0 S → NP VP
0.5 NP → DT NN
0.5 NP → NN NNS
1.0 VP → VBZ PRP

* log(0.5) = -1

- Look into :
  - Vertical Markovization
  - Horizontal Markovization
  - Lexicalization

↓

These refinements make PCFG's work