draw the histogram for the word sequence: " one more nice simple example of a binary search tree"

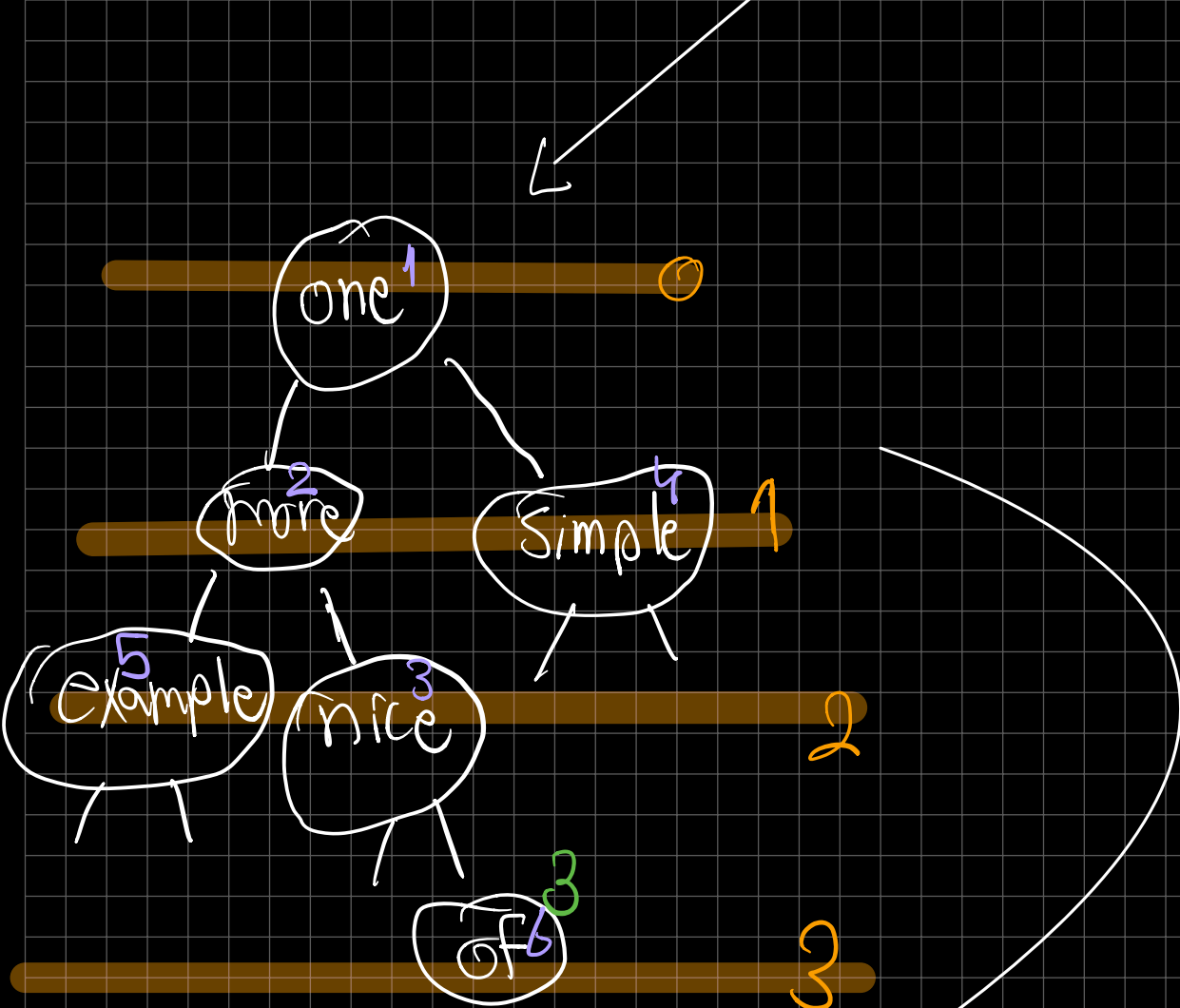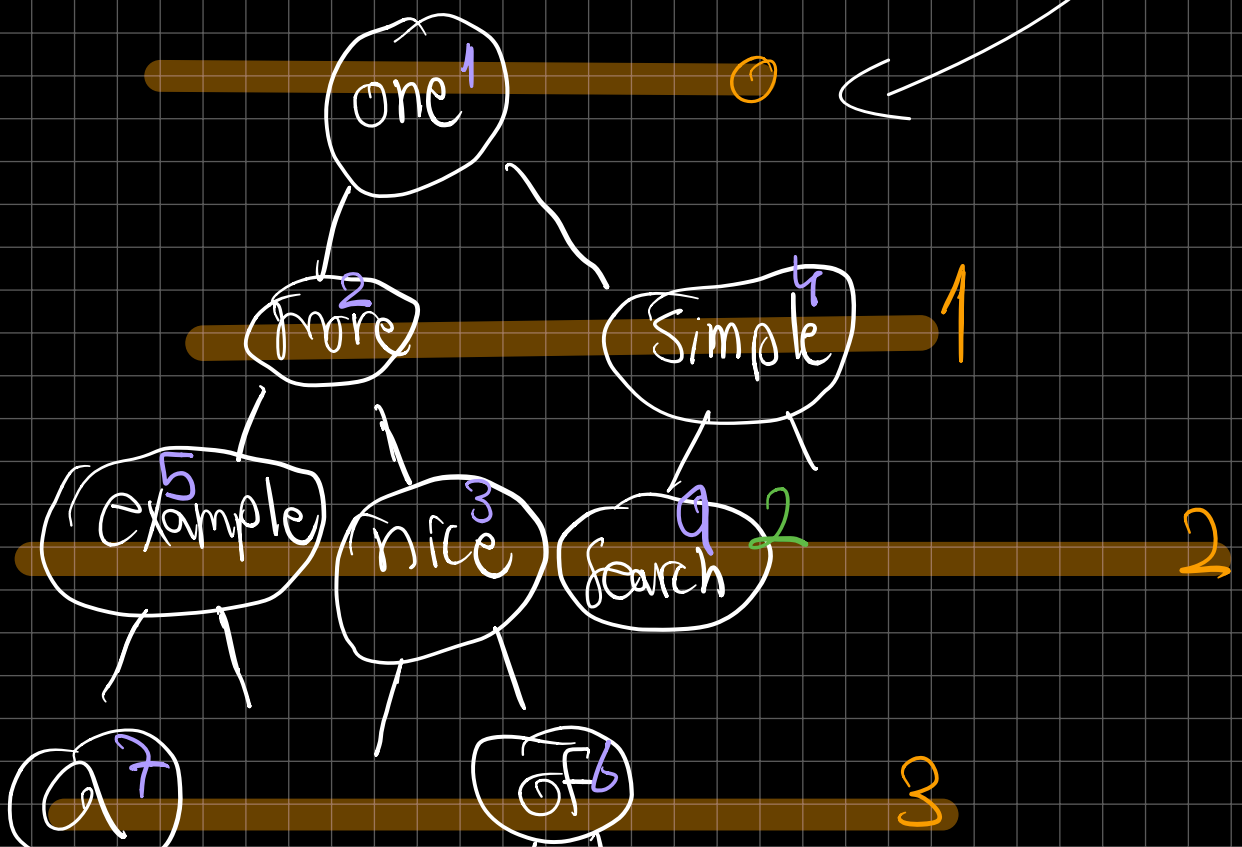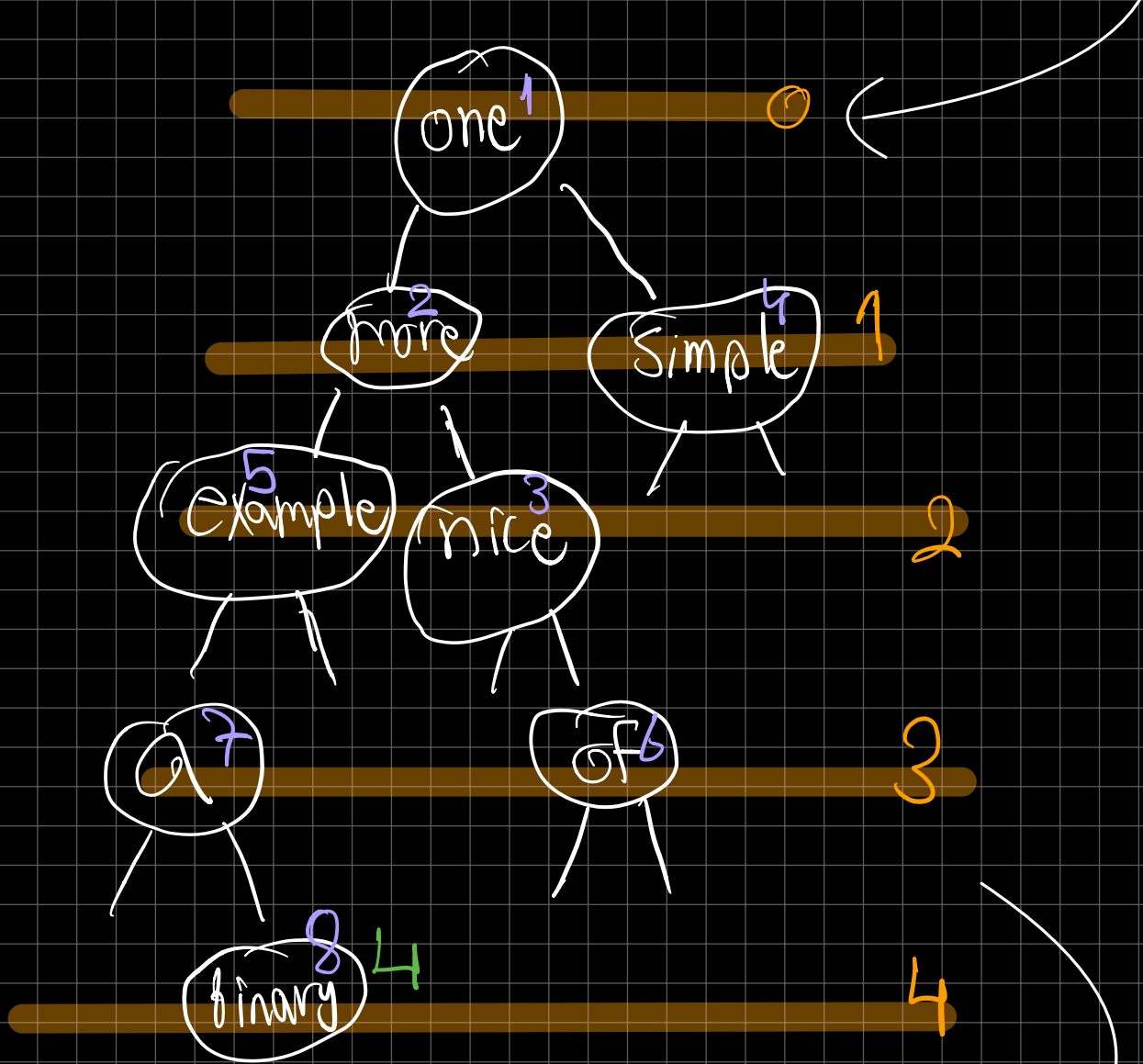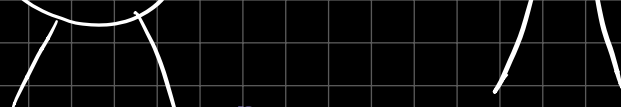**Sequece** **depth** **Soln.** **Comparisons**

Tree 1:

one [1] — 0

- more [2]
  - example [5]
  - nice [3] — 2
    - of [3] — 3
- simple [4] — 1

Tree 2:

one [1] — 0

- more [2]
  - example [5]
  - nice [3] — 2
    - a [7] [3]
    - of [6] — 3
- simple [4] — 1

one [1]   0

more [2]   Simple [4]   1

example [5]   nice [3]   2
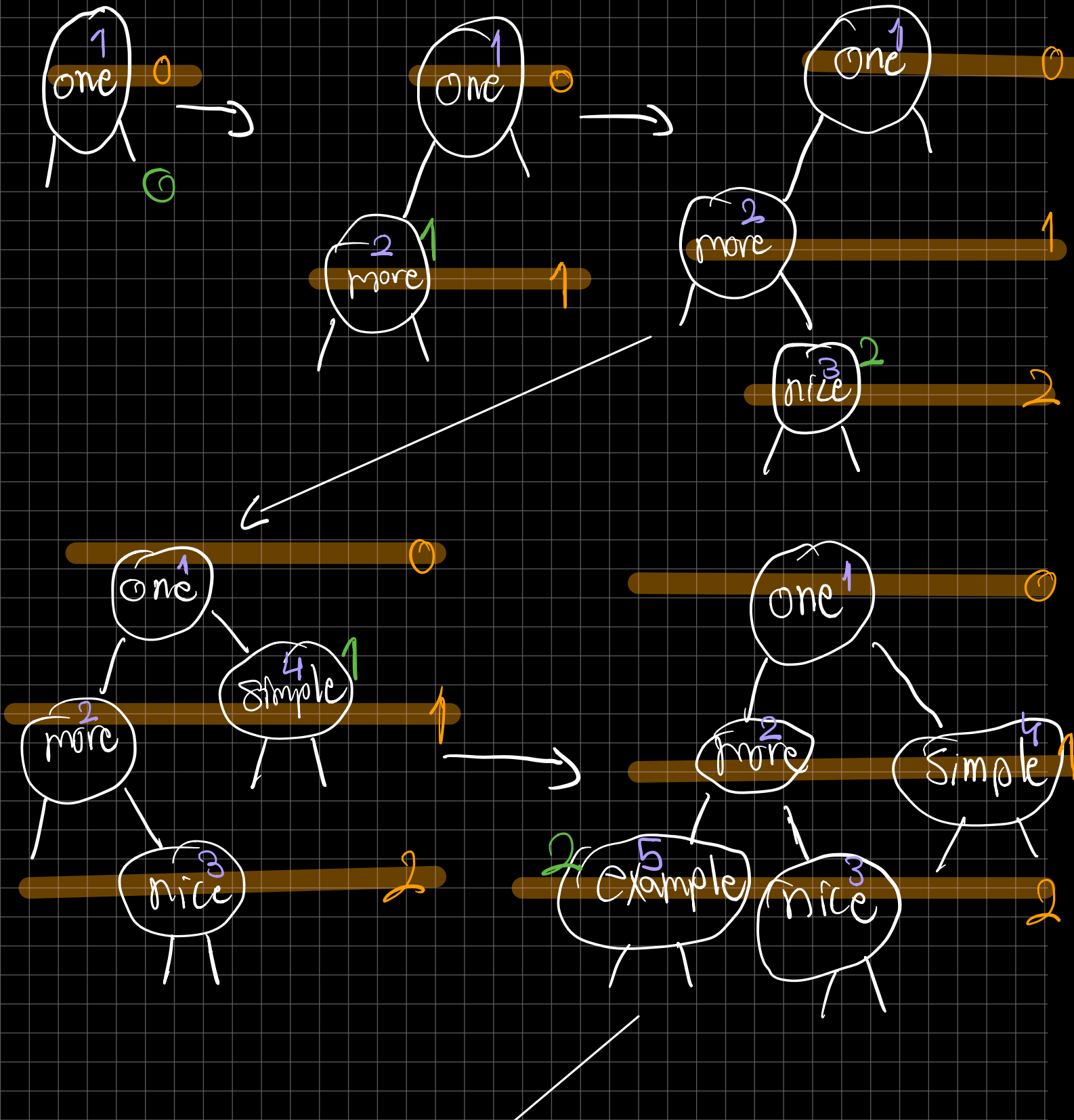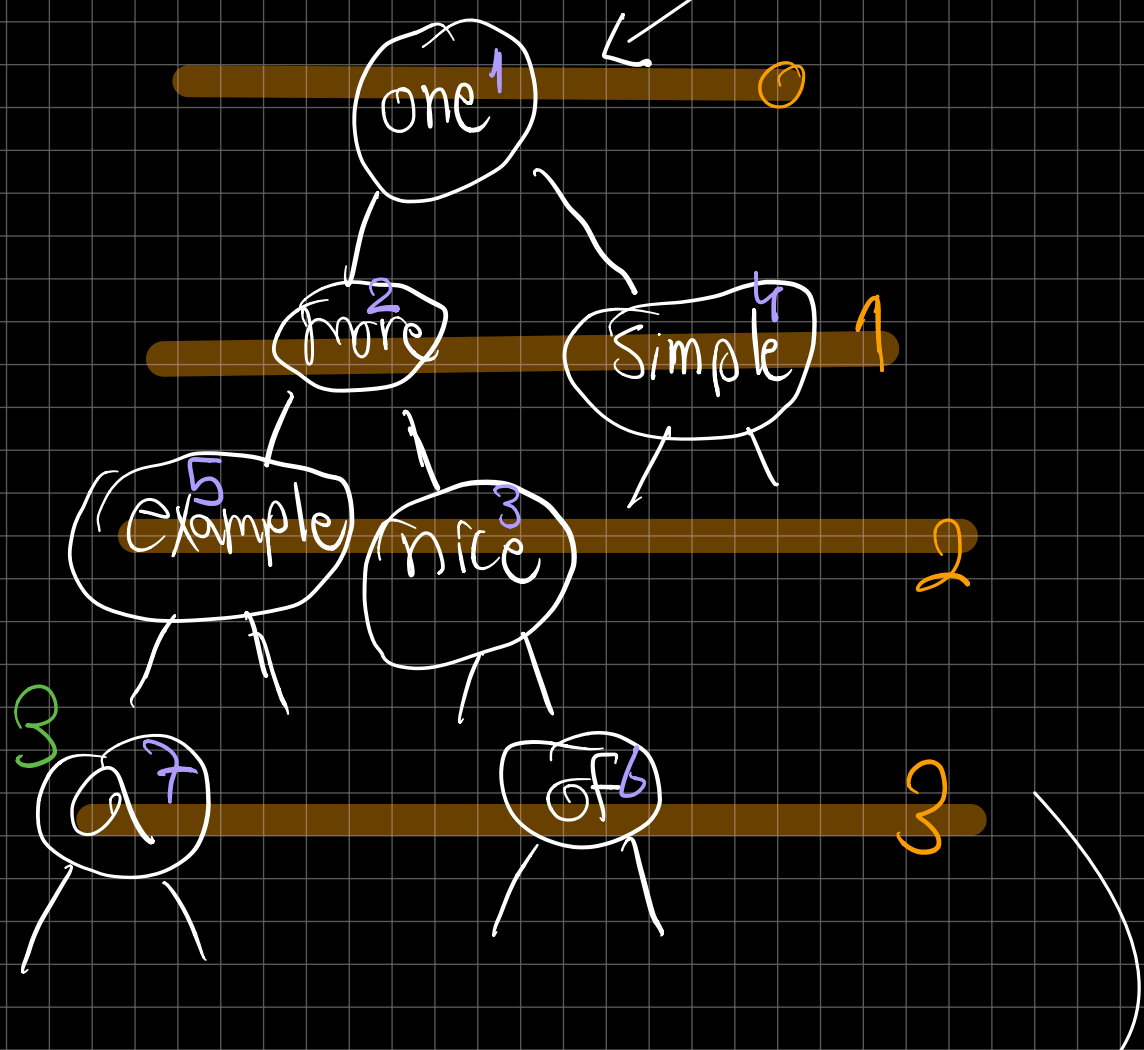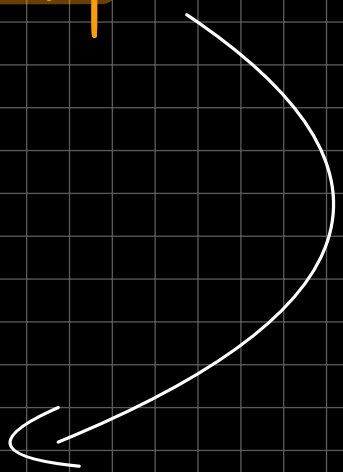
a [7]   of [6]   3

binary [8]   4   4

one [1]   0

more [2]   Simple [4]   1

example [5]   nice [3]   search [9]   2   2

a [7]   of [6]   3

$$\bar{d} = \sum d \cdot c_d \text{, and}$$

(average node depth)

Since $c_d = \dfrac{n_d}{N}$

↗ node depth

↘ number of nodes

then $N = \sum n_d = 10$

then $\bar{d} = \frac{1}{N} \sum_d d \cdot n_d = \frac{1}{10} [0*1 + 1*2 + 2 \times 4 + 3 \times 2 +$

$$4 \times 1]$$

$$= 2 \textcolor{red}{\#}$$

to get the standard deviation, we have to get the variance first:

$\sigma^2 = \bar{d^2} - \bar{d}^2 = \frac{1}{N} \sum_d d^2 \cdot n_d - 2 = \frac{1}{10} \cdot [0 \times 1 + 1 \times 2 + 4 \times 4$

$+ 9 \times 2 + 16 \times 1] - 2 = 8.2$

standard deviation $= \sqrt{\sigma^2} = \sigma = 1.095$