

Let's build a tree for "engineering useless rings"

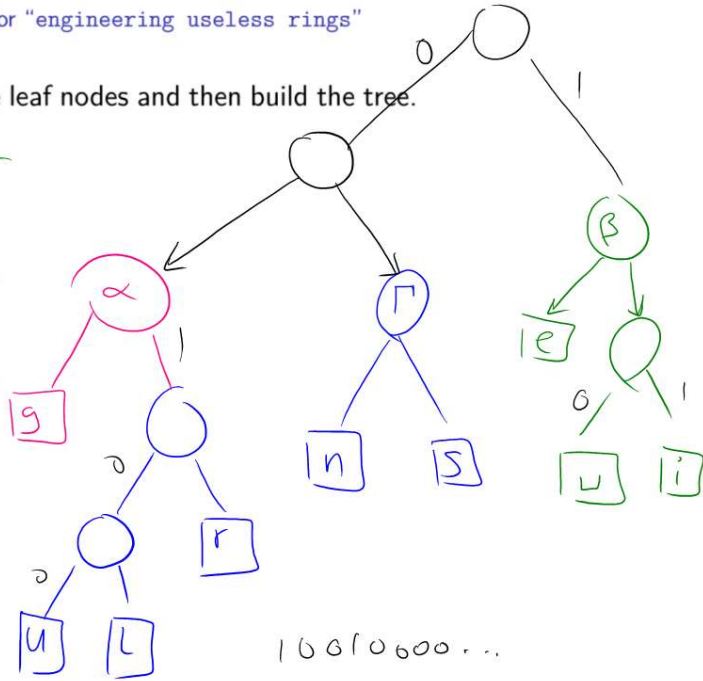
Step one: count the characters.

char	count
e	
n	
g	
i	
r	
␣	
u	
s	
l	

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Step two : Create leaf nodes and then build the tree.


char	count
e	5
n	4
s	4
g	3
i	3
r	2
.	2
u	1
l	1

$$\begin{array}{r} \alpha \quad \cancel{47} \\ \beta \quad \cancel{10} \\ \hline \Gamma \quad 8 \\ 15 \end{array}$$


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Why is this optimal?

Goal is to minimize $\sum_i f_i b_i$

 f_{freq} \times $\# \text{bits}$

Lempel-Ziv } not in my 161,
banana } just cool
algorithm

CompSci 161
Spring 2021 Lecture 23:
Greedy Algorithms:
Interval Coloring

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Interval Coloring

- ▶ n groups requested to use a study room
- ▶ group i would like to use it from s_i to f_i .
- ▶ Cannot put overlapping in same room
- ▶ Cannot reject a group.
- ▶ Minimize number of distinct rooms assigned
- ▶ Why is your algorithm correct?

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Interval Coloring Solution

Algorithm: When a group arrives, give lowest numbered room currently free.

- ▶ How many rooms will this use?

$\max \# \text{ overlap}$

- ▶ Could any solution use fewer? Why or why not?