

Math 322

1st Friday's lecture is online only

↳ No in class lecture Friday

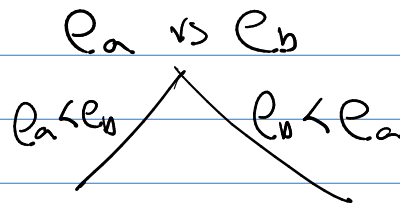
2nd HW Due Tues after break (not this Sat)

11.2 #11 e_1, e_2, e_3, e_4

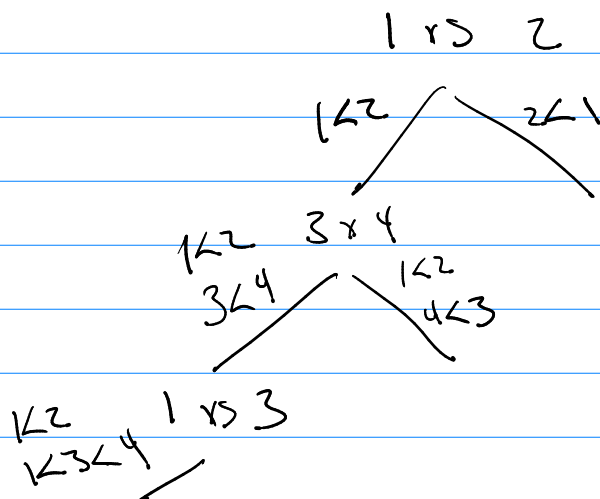
Leaves: (outcomes) $O_1 = 1 < 2 < 3 < 4$
 $O_2 = 1 < 2 < 4 < 3$

fork: $s_1 \ s_2 \ s_3 \ s_4$
 $4 \ 3 \ 2 \ 1 \rightarrow 4! = 24$

Internal vertex: (decision)

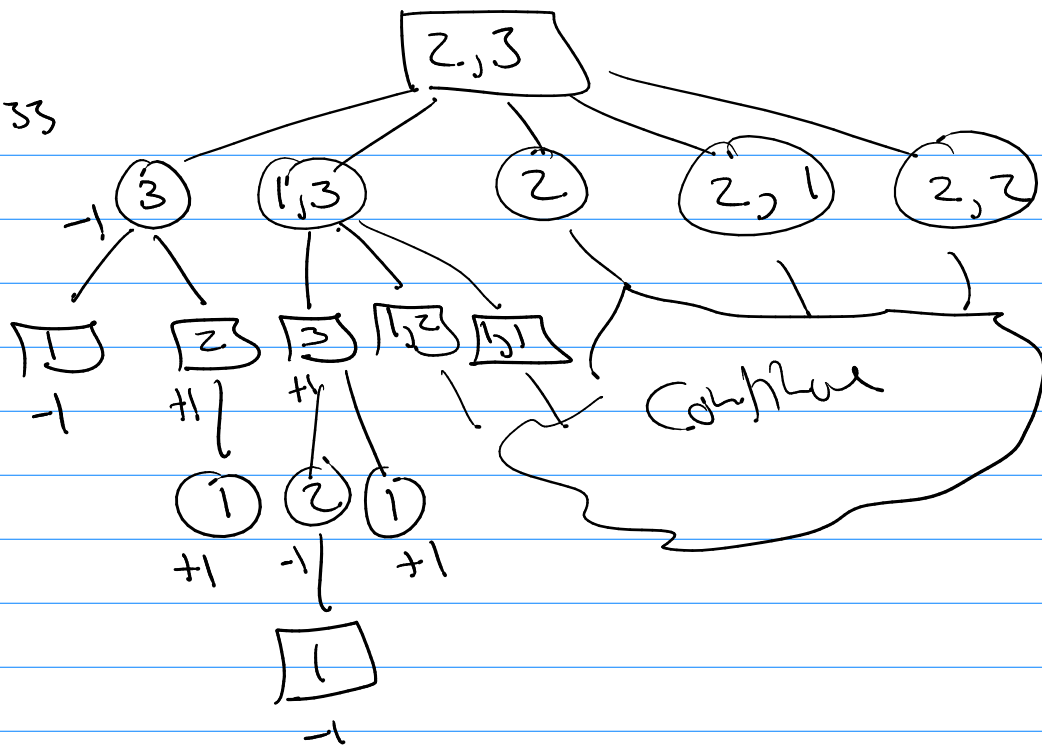


best case: $\lceil \log_2 24 \rceil = 5 \leq h$



EX

#33



Prefix Codes / Huffman

typical binary to ascii table is EX 6 bit system

that $2^6 = 64$ total bit strings

000 000 = a

000 001 = b

000 010 = c

000 011 = d

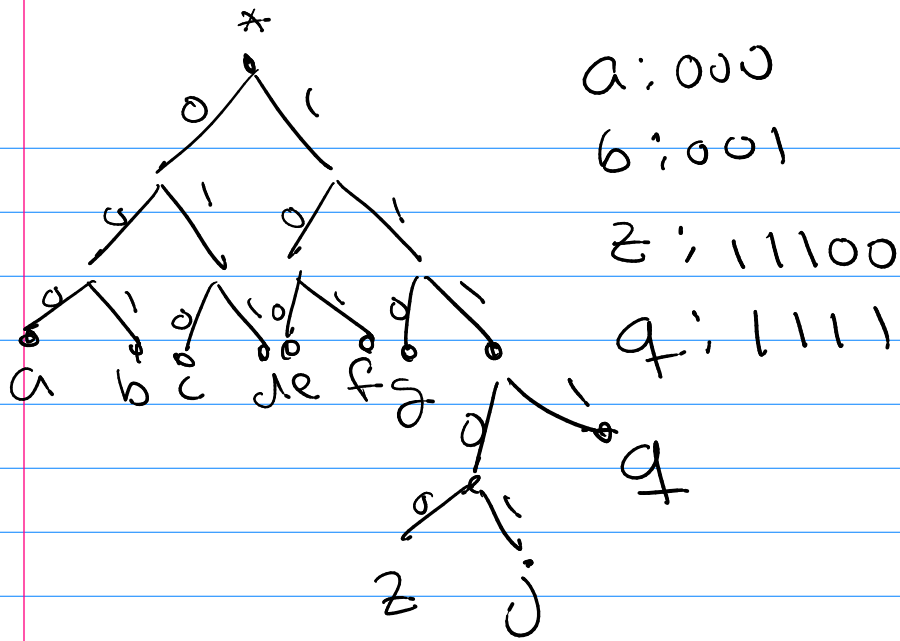
000 100 = e

000 101 = f

000 110 = g

000 111 = h

dad = 000 011, 000 000, 000 011



a: 000

b: 001

c: 11100

d: 11101

e: 11110

f: 11111

g: 1000

h: 1001

i: 1010

j: 1011

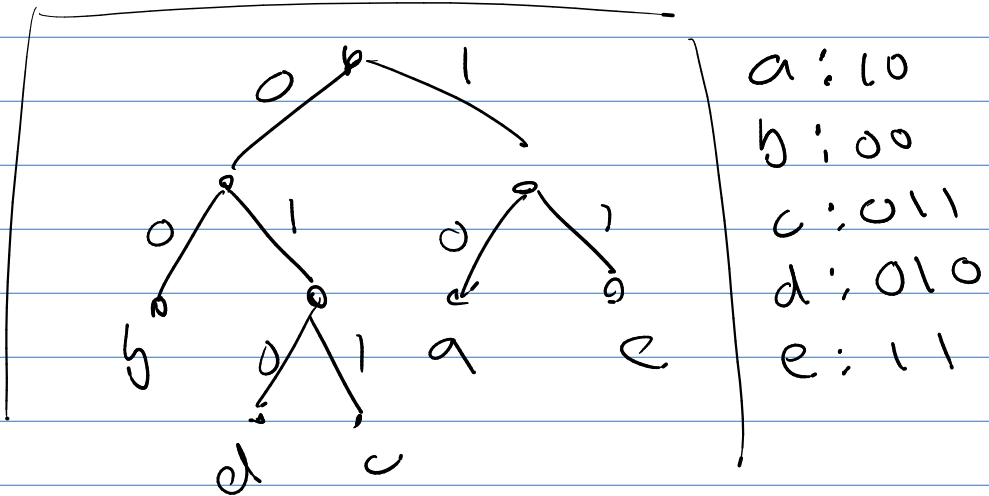
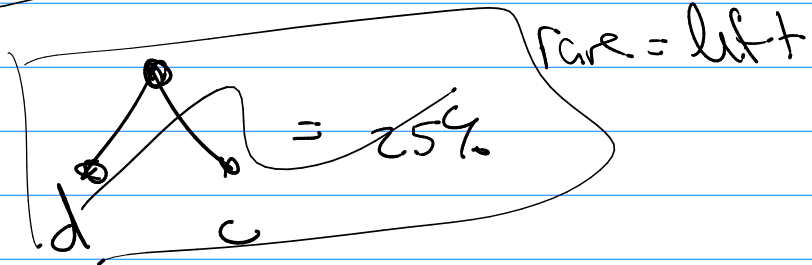
k: 10111

Prefix code

ged: 1111 | 000 | 011
 g e d

Huffman is how to make the tree very short.

ex: a = 25%, b = 20%, c = 15%, d = 10%, e = 30%

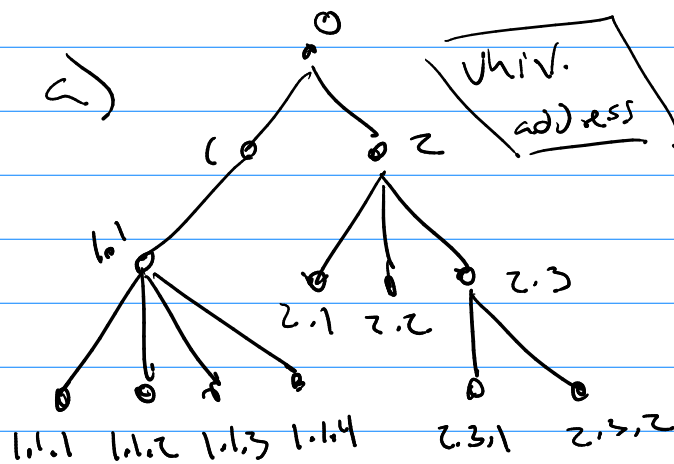
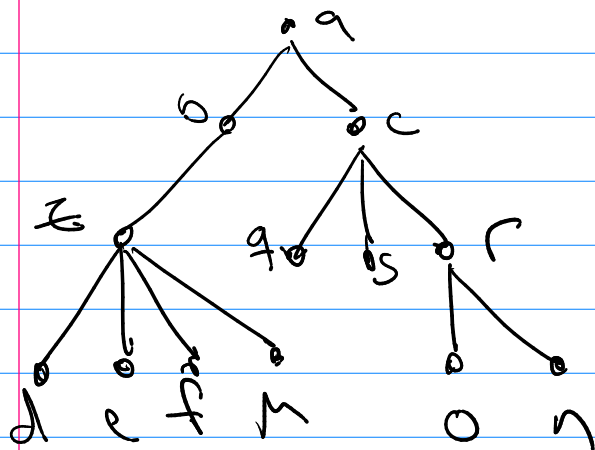


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dad : 01010010

11.3 Traversals

- a) universal address system
- b) lexicographic sort of addresses



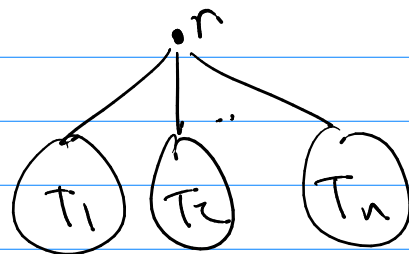
- b) $0 < 1 < 1.1 < 1.1.1 < 1.1.2 < 1.1.3 < 1.1.4 < 2 < 2.1 < 2.2 < 2.3 < 2.3.1 < 2.3.2$

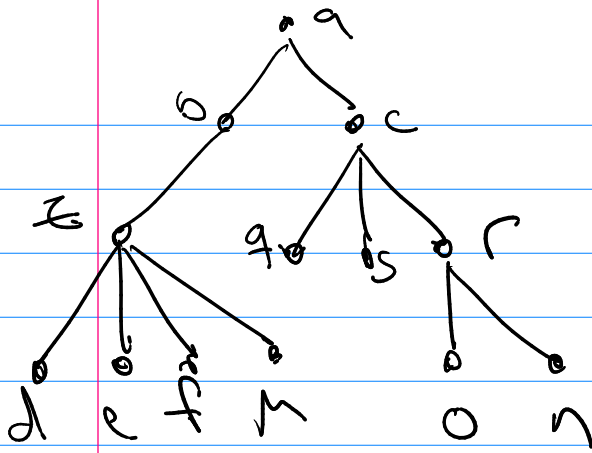
c) a, b, z, d, e, f, m, c, g, s, r, o, n

Traversals

① Pre-Order Traversal

- s₁) visit r
- s₂) visit T₁ in pre-order
- s₃) visit T₂ in pre-order
- ⋮
- s_n) visit T_n in pre-order





pre-order: a, b, z, d, e, f, m, c
q, s, r, o, n

in-order: d, z, e, f, m, b, a, q, c, s, o, r, n

post: d, e, f, m, z, b, q, s, o, n, r, c, a

In-order Traversal

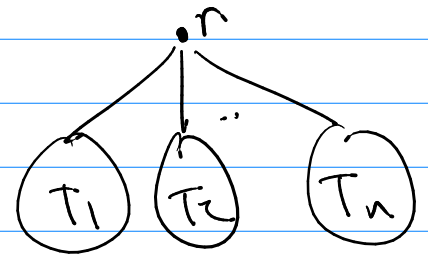
S₁) visit T₁ in in-order

S₂) visit r

S₃) visit T₂ in in-order

⋮

S_n) visit T_n in in-order



Post-order Traversal

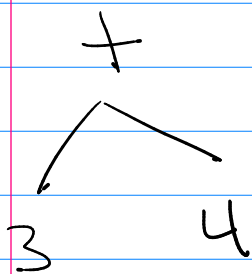
S₁) visit T₁ in post-order

S₂) visit T₂ in post-order

⋮

S_n) visit T_n in post-order

S_{n+1}) visit r



pre-order: +, 3, 4

in-order: 3, +, 4

post-order: 3, 4, +