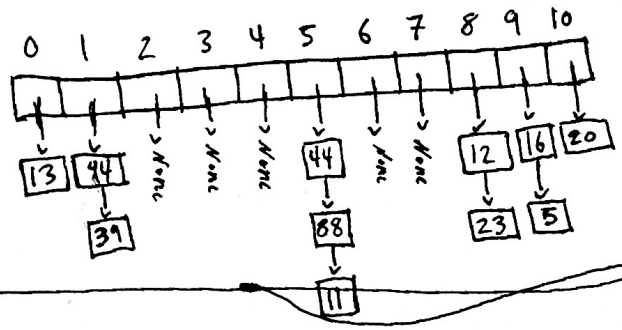
R-10.6) (open hashing)

Separate chaining collision-handling schemes can tolerate a load factor above 1 (although they shouldn't for efficiency), while open addressing schemes require that the load factor is never greater than 1, and cannot tolerate greater load factors.

R-10.9) {12, 44, 13, 88, 23, 94, 11, 39, 20, 16, 5} $h(i) = (3i+5) \bmod 11$

Collision Chaining method



R-10.10)

Linear probing method

0	1	2	3	4	5	6	7	8	9	10
13	94	39	16	5	44	88	11	12	23	20

R-10.12)

Double-hashing method

E1: $h(i) = (3i+5) \bmod 11$

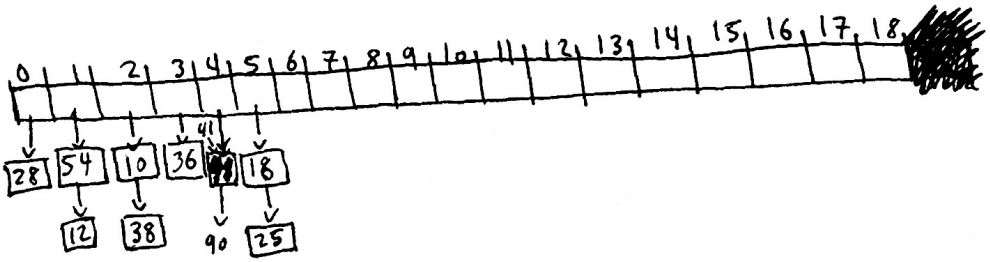
E2: $h'(K) = 7 - (K \bmod 7)$

0	1	2	3	4	5	6	7	8	9	10
13	94	23	88	39	44	11	[illegible]	12	16	20

R-10.14)

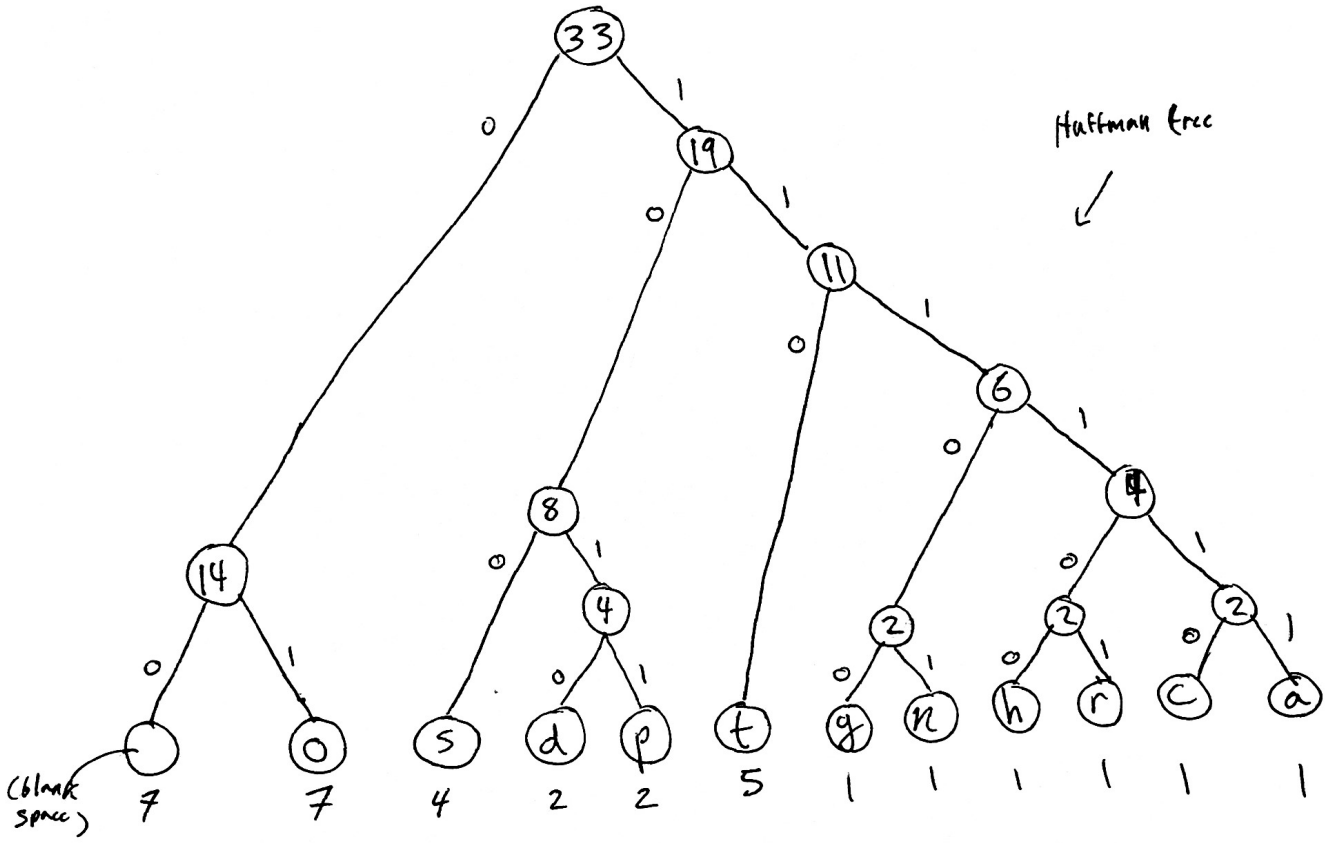
{54, 18, 10, 25, 28, 36, 38, 41, 12, 90}

$h(K) = 3K \bmod 7$

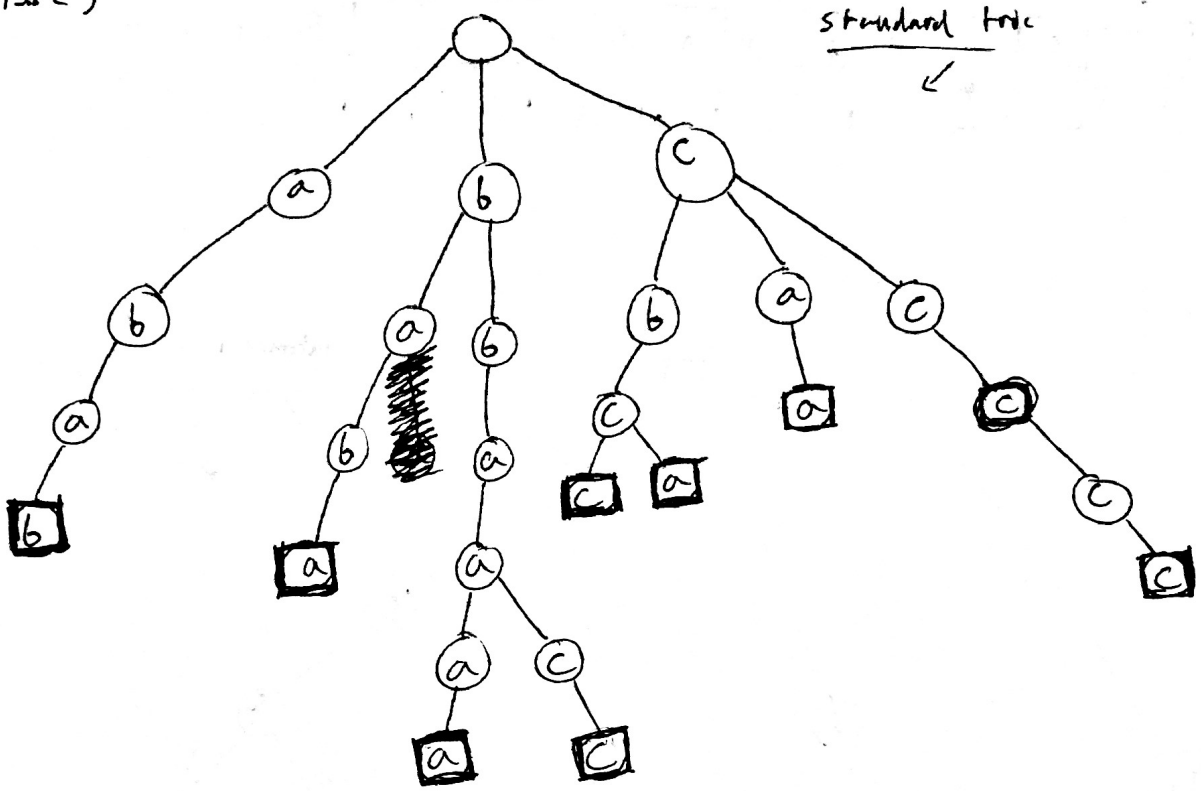


R.-13.11)

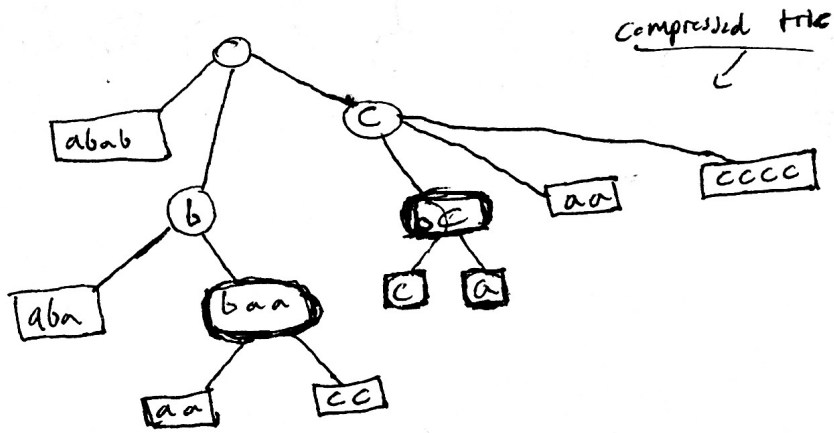
c	' '	o	s	d	p	t	g	n	h	r	c	a
f	7	7	4	2	2	5	1	1	1	1	1	1



R-13.12)



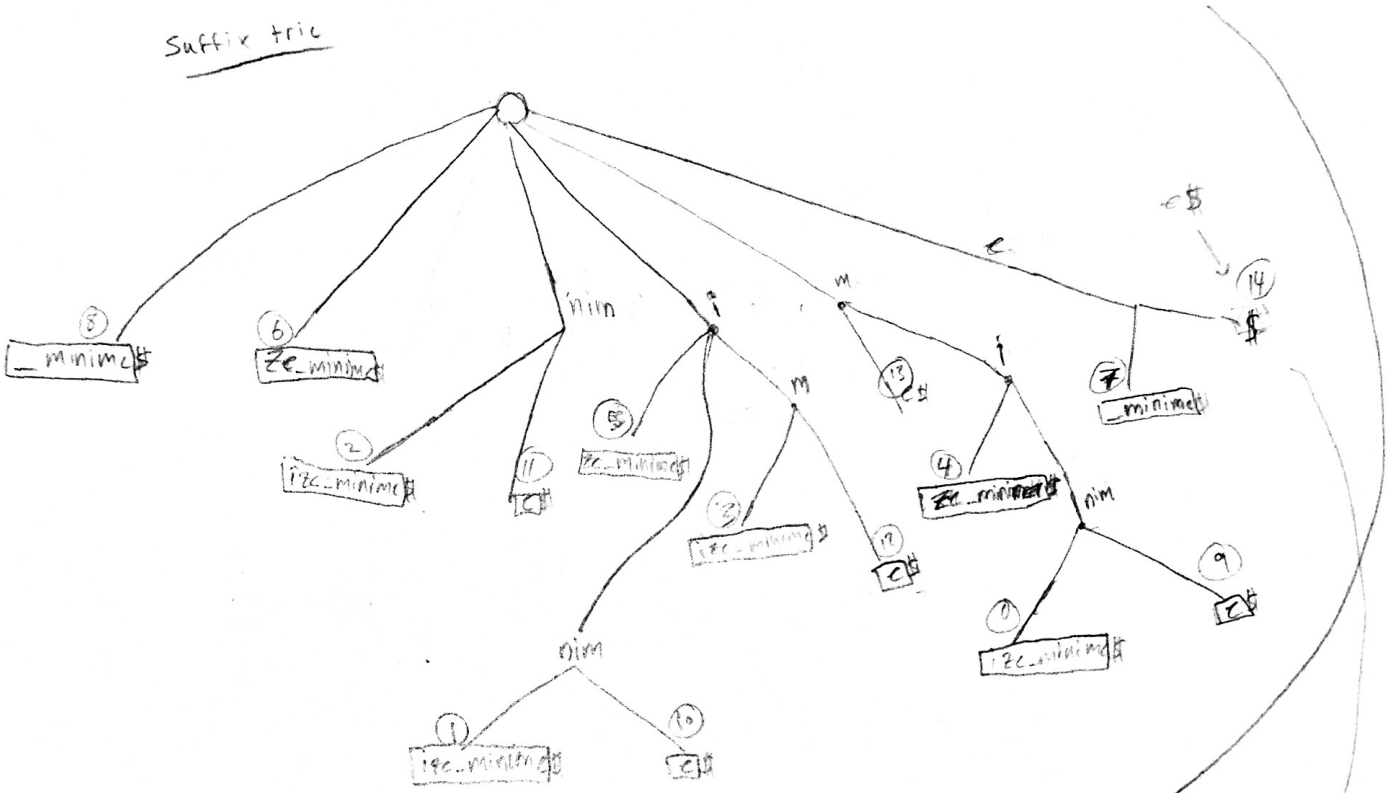
R-13.13)



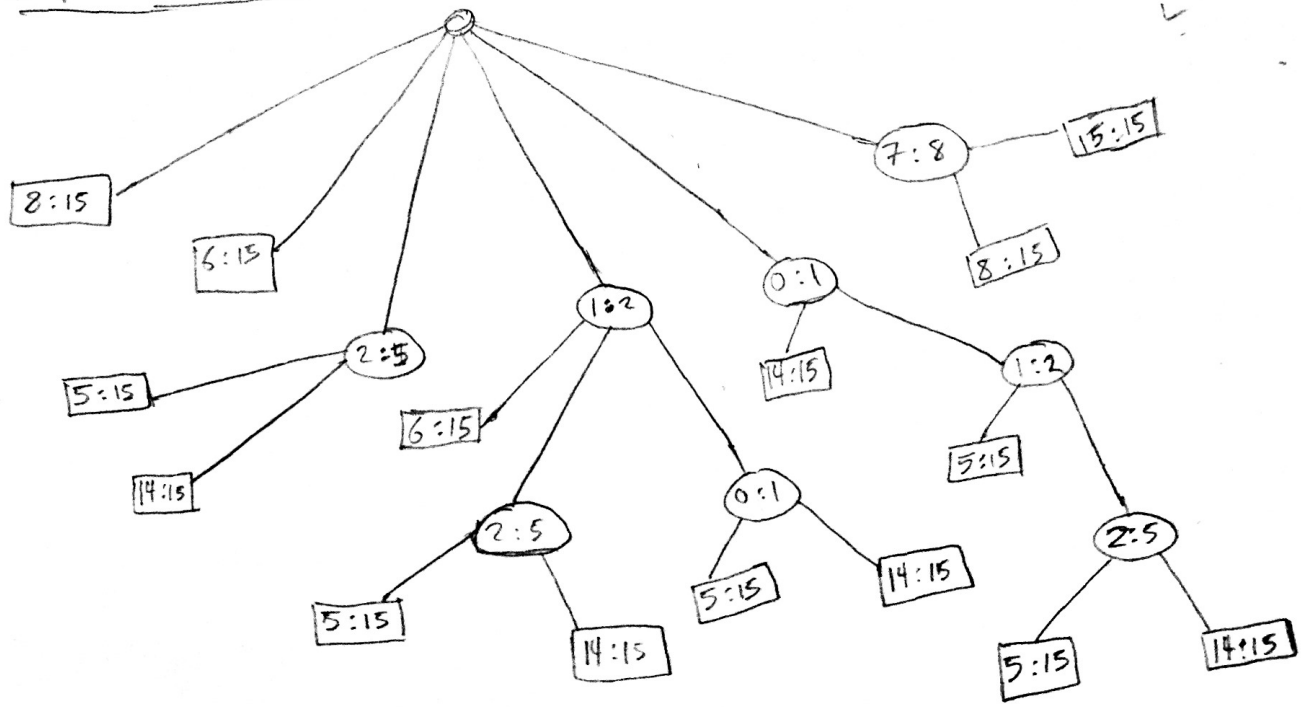
R.-(3.14)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
m	i	n	i	m	i	z	c	_	m	i	n	i	m	r	$

Suffix trie



Compressed Suffix trie



A. -13.5)

Given a standard trie T and a string s to delete from the trie, search the trie for the given string (traverse paths of the trie checking for char's in order of given string).

If the search was unsuccessful, return the original trie.

Else, let u be node where s was found.

- check if s is not equal to string ending at u, or has a child.
  - if so return trie; else:
  - set v = u's parent.
    - delete u from trie
  - if v has a child
    - set v's string to concatenation of v's and child strings
      (v.string += child.string)
    - then delete v's child node
- Return the new trie w/ string removed.

Time complexity: $O(n \cdot m)$, where n = alphabet size and m = depth of leaf representing the string to be removed.

R-15.4)

- Suppose T is a multiway tree in which each internal node has $5 \leq c \leq 8$ children.
- Each internal node other than root must have at least $d-1$ keys and contain at most $2d-1$ keys.

Thus, to guarantee a legal B-tree, need to guarantee that:

$d-1 \leq 5$ and $2d-1 \geq 8$,

So d can be $5 \leq d \leq 8$; $\{5, 6, 7, 8\}$.

R-15.8) order-7 B-tree

$\{4, 40, 23, 50, 11, 34, 62, 78, 66, 22, 90, 59, 25, 72, 64, 77, 39, 12\}$