Search

Radix search trie (RST)

R-way trie (RT)

De la Briandias trie (DLB)

Binary search tree (BST)

- Left branch is less than
- Right branch is larger than
- Create a tree with 0, 1, 2, 3 (in order)

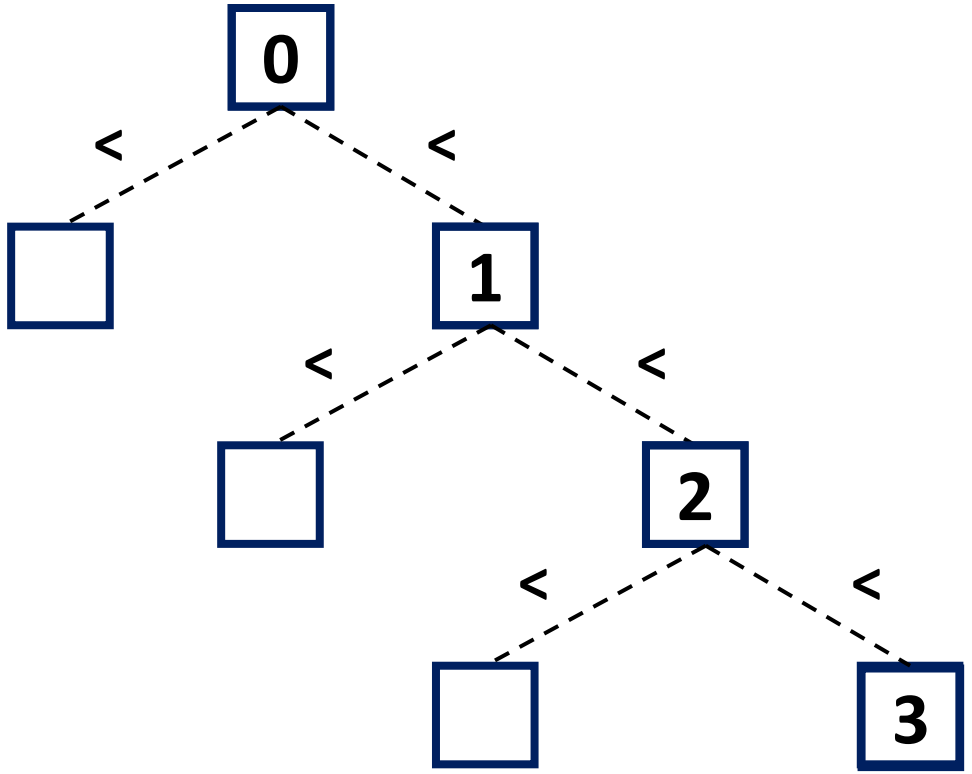
Create BST

0

1

2

3



Can we do better?

Radix search trie

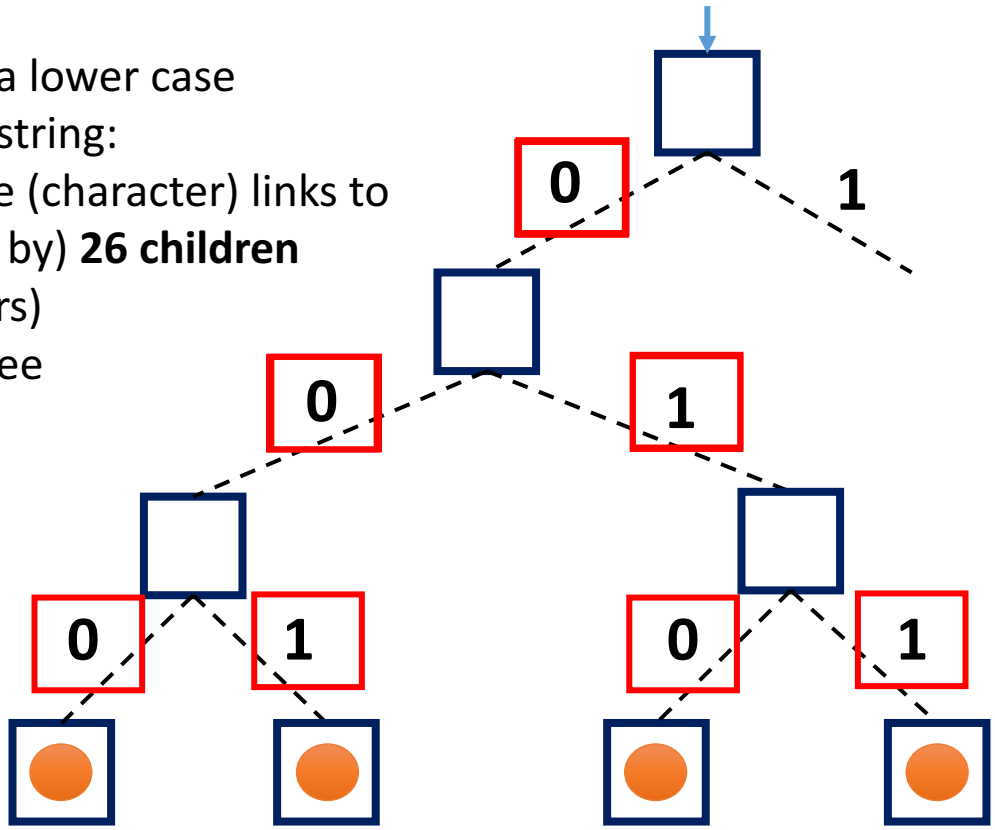
- Using a pair <Key,Value> instead of only Value (BST)
- Key is parsed along the tree edges
- Value is stored at a node
- Assume each Value is linked with only one Key
- Create a tree with 0, 1, 2, 3 (in order)

Create RST

Key	Value
000	0
001	1
010	2
011	3

Binary representation

Consider a lower case alphabet string:
each node (character) links to (followed by) **26 children** (characters)
26-way tree



Worst case bounds by binary representation length (log n), not by n as in BST

Can we apply to string?

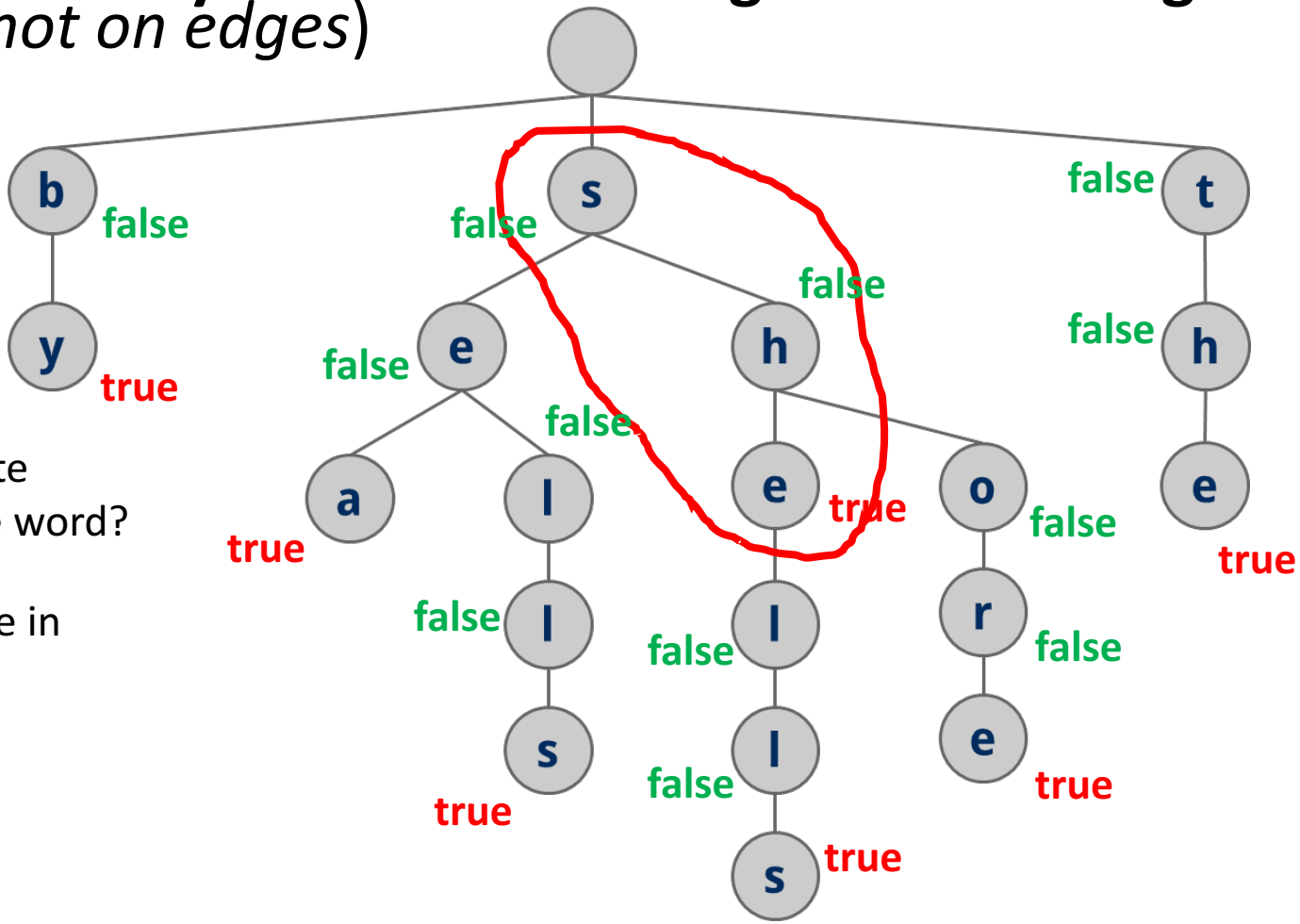
R-way trie (lecture example)

- she, sells, sea, shells, by, the, sea, shore (*Keys are on nodes, not on edges*)

Worst case bounds by the character length of the string

How can we indicate "she" is a complete word?

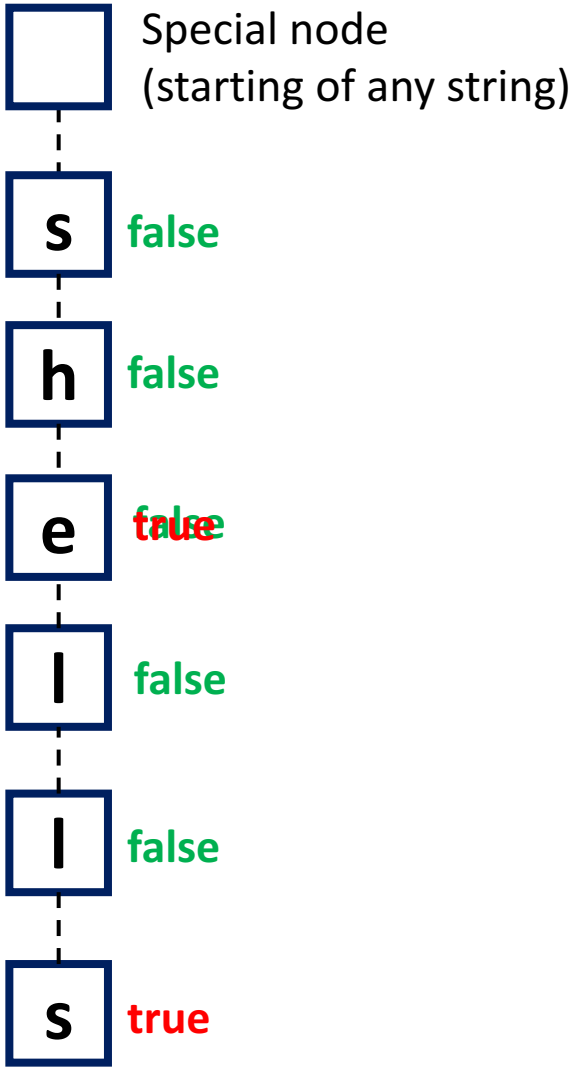
Using a flag variable in each node?



Create R-way trie

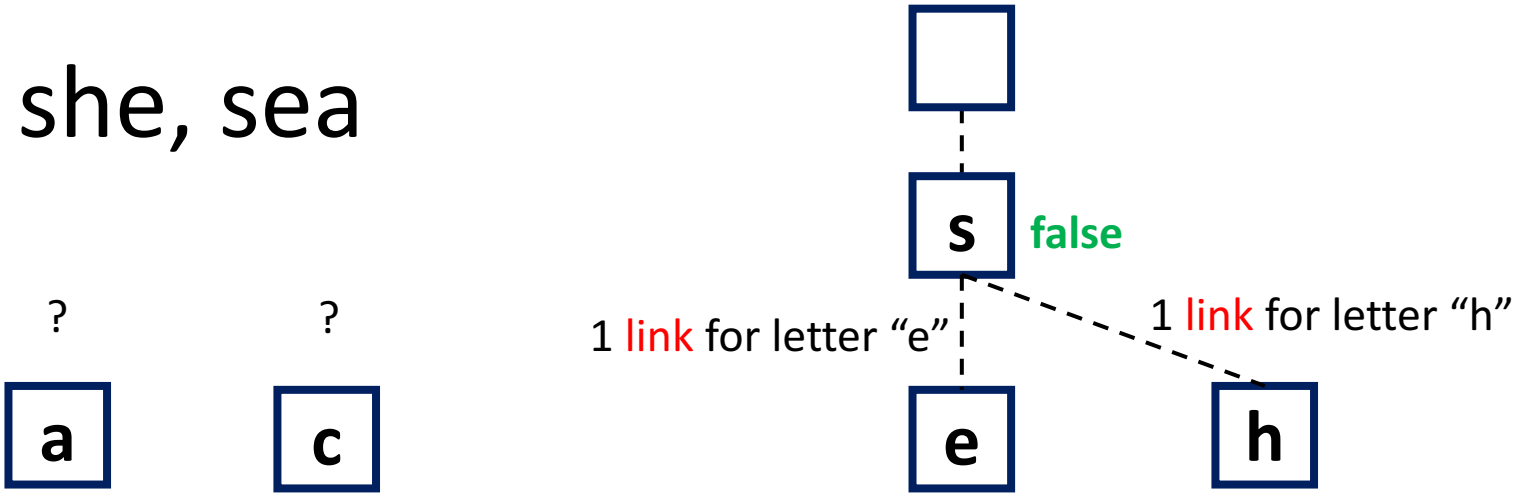
- shells, she

s h e l l s



The ugly truth

she, sea



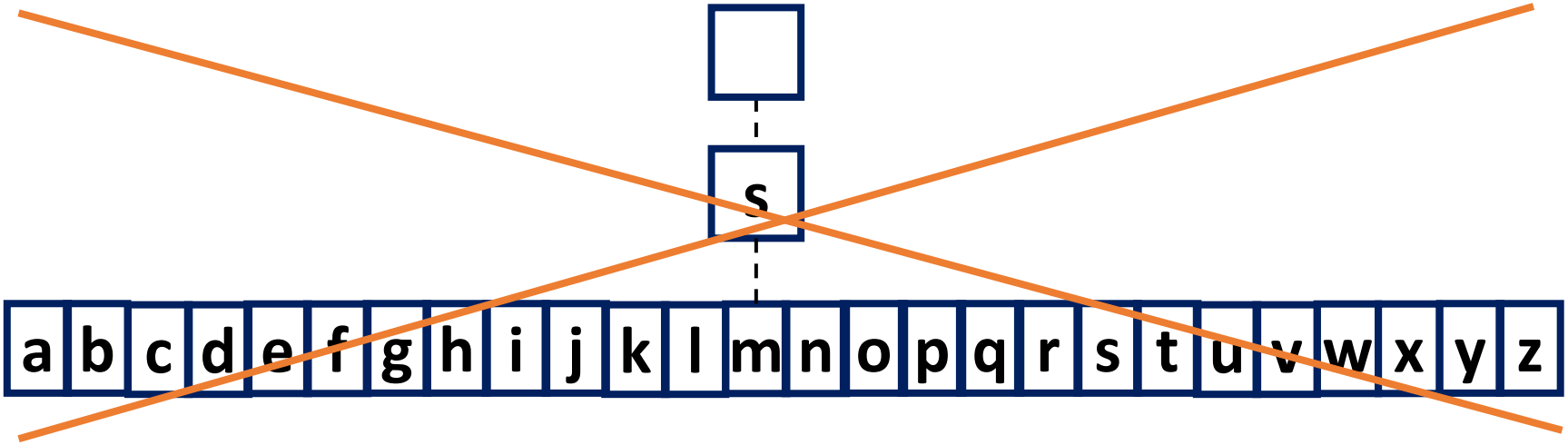
1 node = 26 links + 1 flag variable

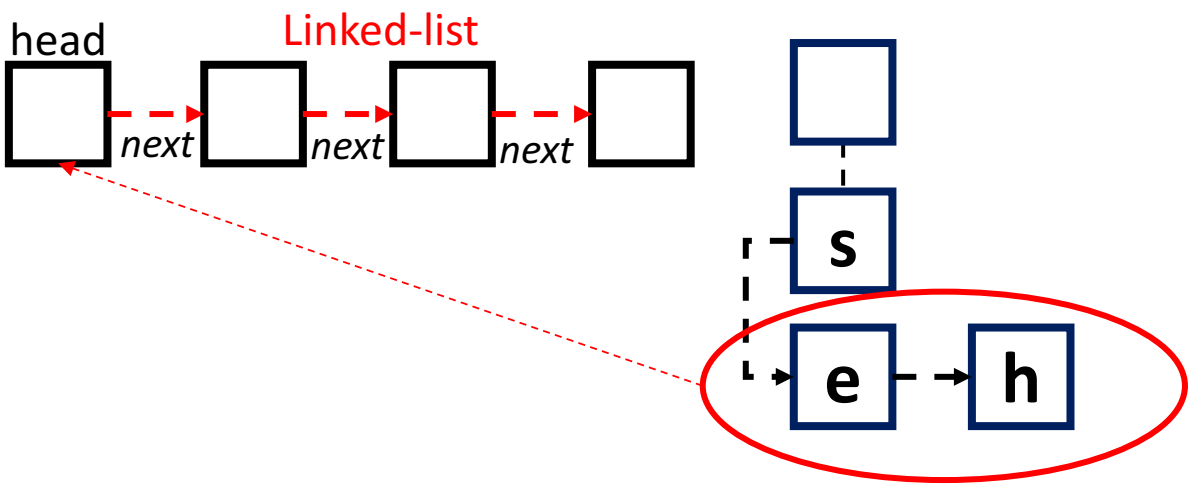
The same prefix? Impossible combinations?

Can we do it better?

De la Briandais (DLB)

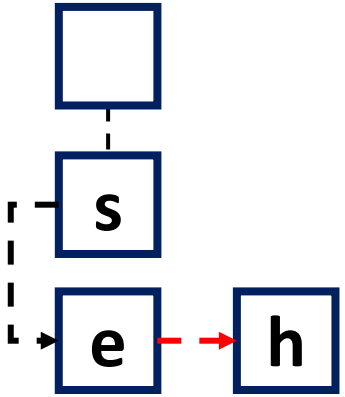
- Replace the fixed link array by a flexible linked list





Trade off

- Save a lot of space, especially when the real case has sparse strings
- Increase searching time. Why?
  - R-way trie: Directly go to a child in the **array**
  - DLB: linearly go the child in the linked list

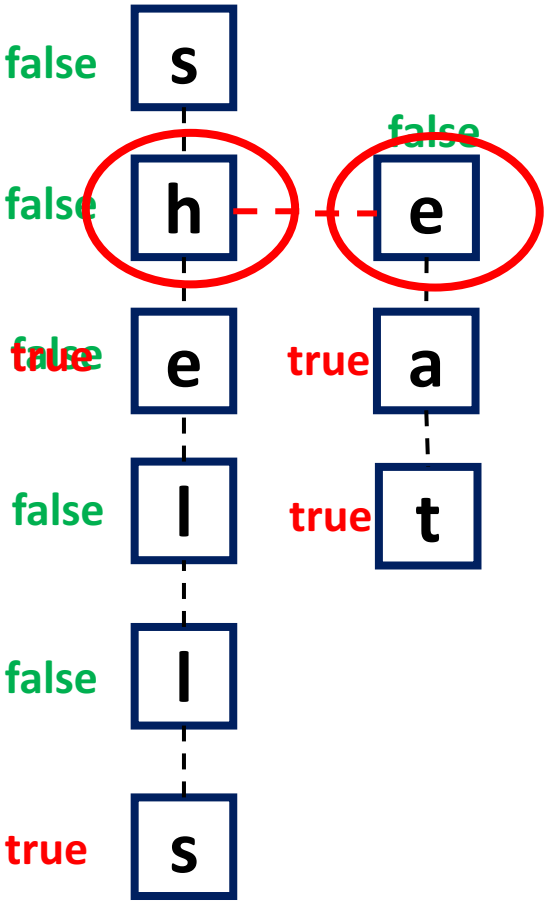


Create a DLB

- shells, she, sea, seat

s h e l l s

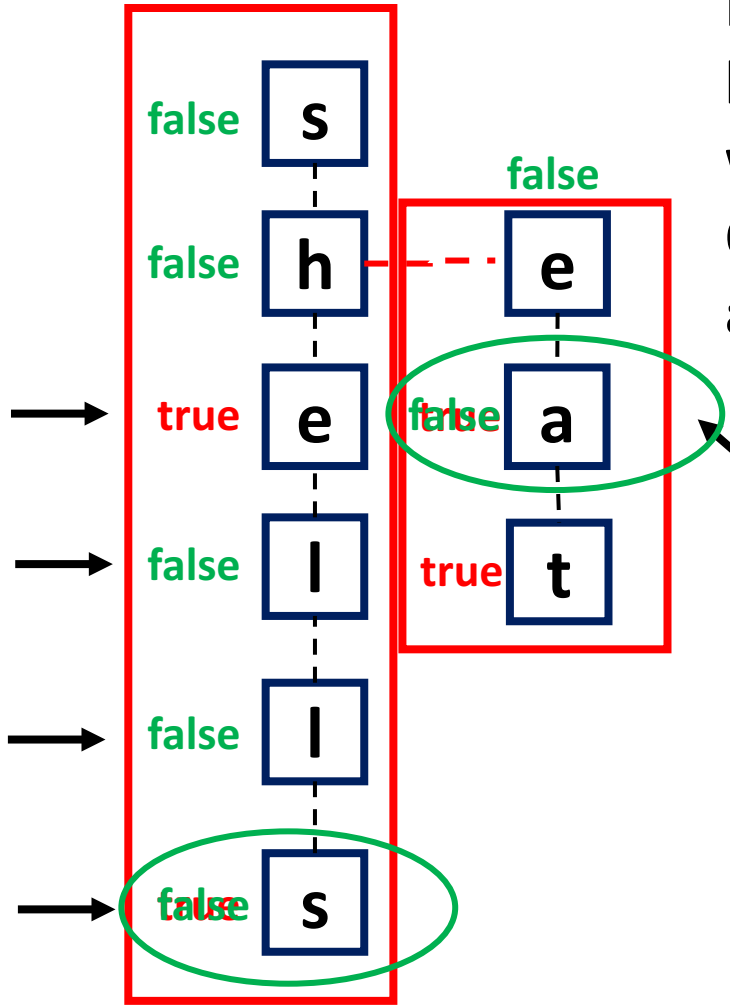
s e a t



Delete a word in DLB

shells

sea



If the path does not belong to other words, remove. Otherwise, leave it alone.

A true node
stop

False, no children
delete

False, no children
delete

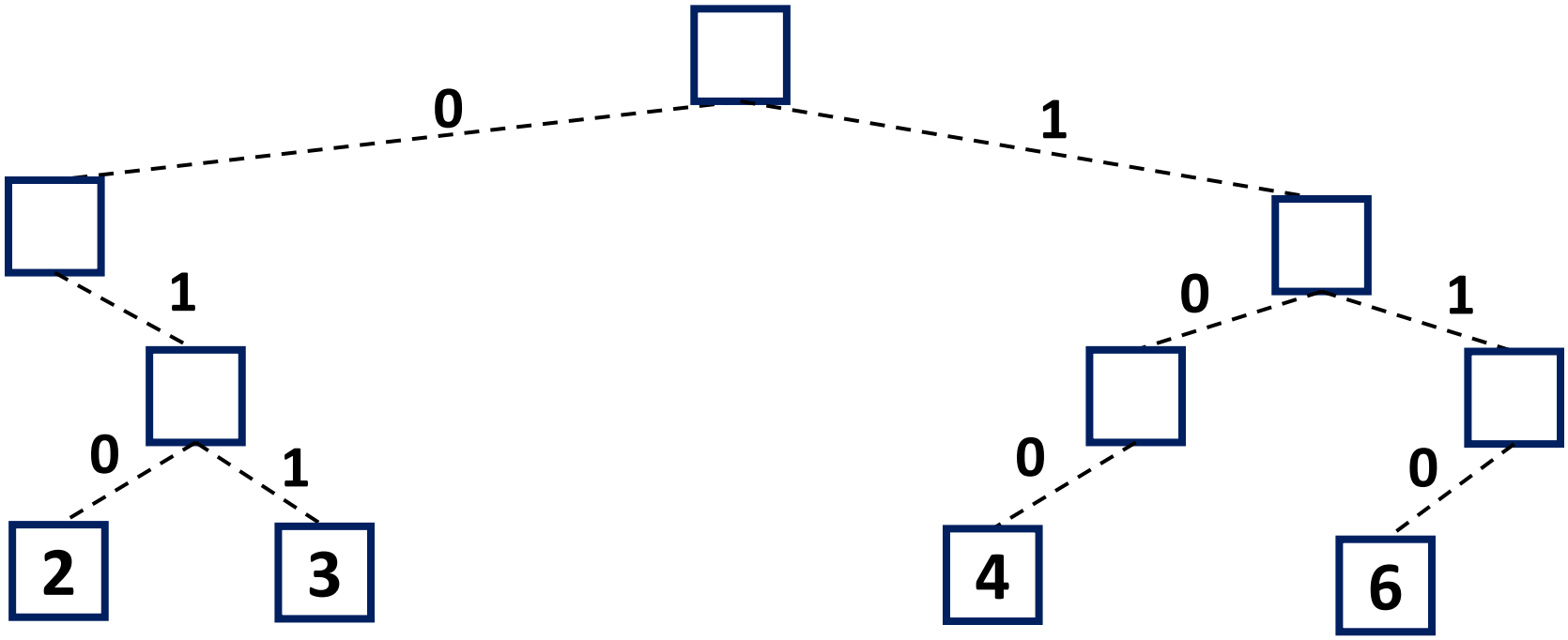
Change to false
no children: *delete*

Change to false, has a child
stop

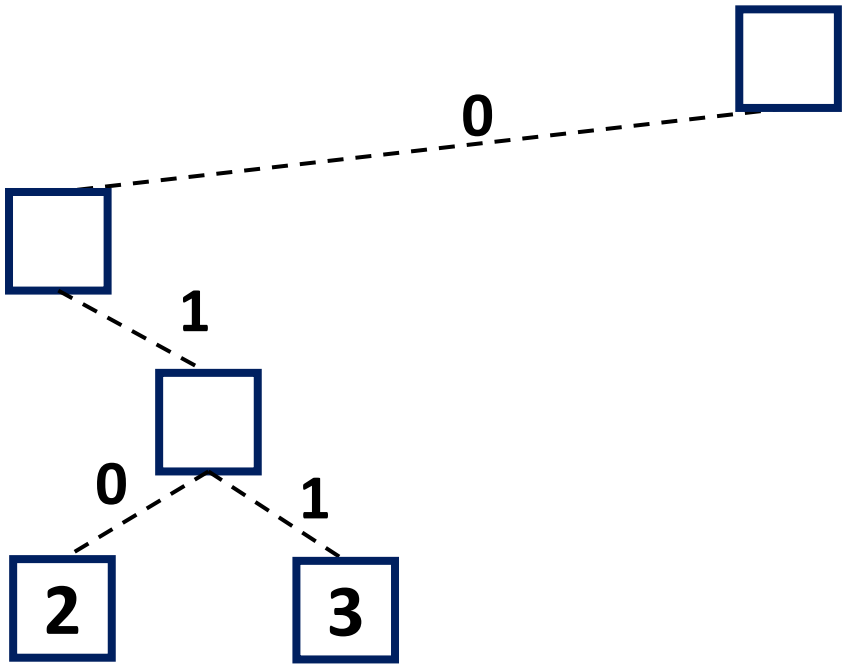
Exercises (on paper)

- RST:
  - Create a tree for: 2, 3, 4, 6
  - Delete values: 4, 6
- DLB:
  - Create a tree for: baby, bad, bank, box, dad, dance
  - Delete words: bad, bank, dance

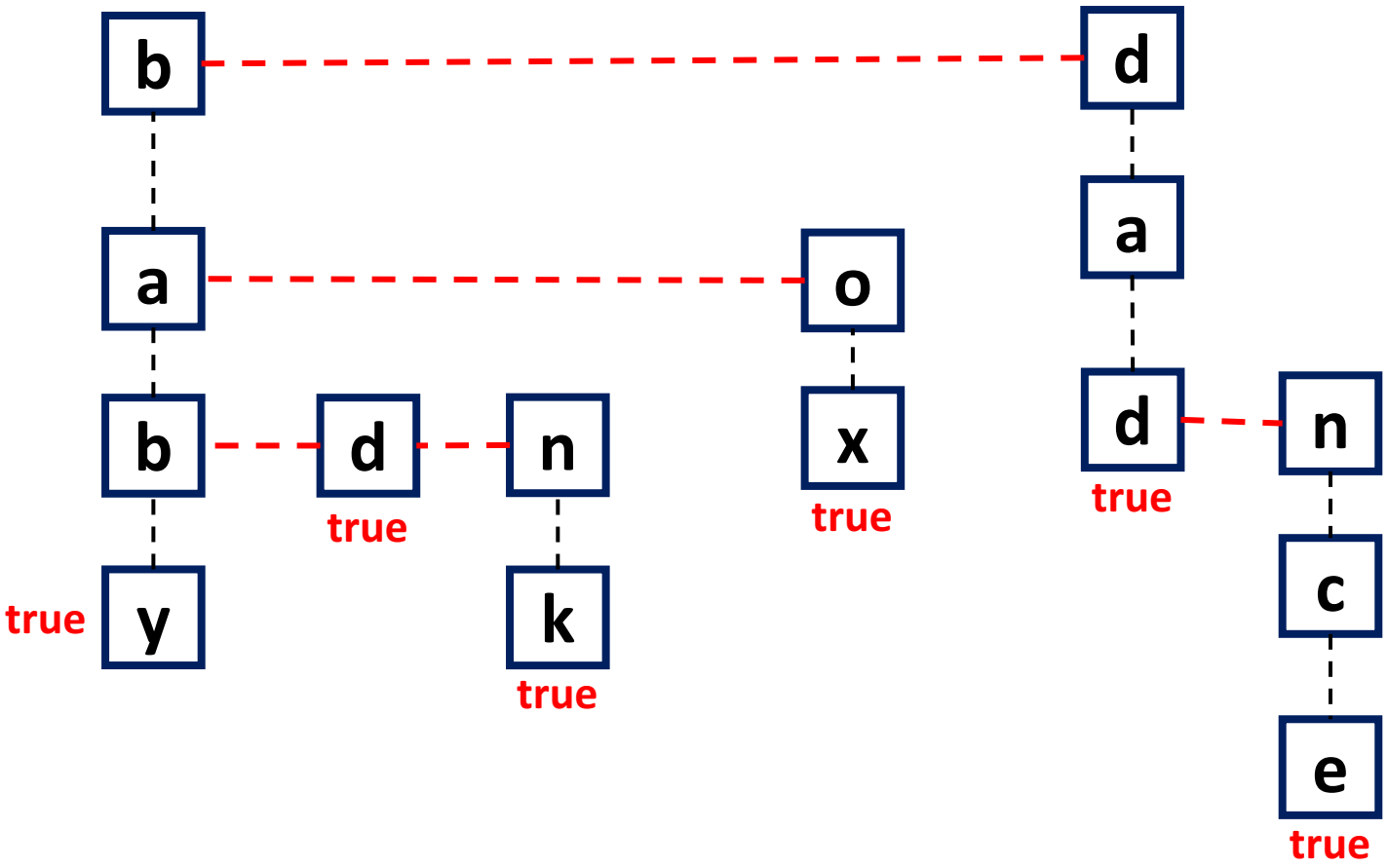
Exercises RST (creation)



Exercises RST (deletion)



Exercise DLB (creation)



Exercise DLB (deletion)