CSE 100 Lecture 21

Tries
Two searches in PA4

Board

S T N G
E I A E
D R L S
S E P O

Dictionary

race
radiant
rain
ran
rat
rats
...

race
radiant
rain
ran
rat
rats
...
Two searches in PA4

Parallel search allows you to minimize time by ruling out unneeded paths. But how to represent the tree.
Tries: Efficient way to store/find keys that are sequences of digits

Create the code trie for the following code:

A: 00001
S: 10011
E: 00101
R: 10010
C: 0001
H: 101
Does the structure of the trie depend on the order in which keys are inserted?

A. Yes  B. No
Multi-way tries: Efficient finding of keys by their sequence

Build the trie which holds the following number keys:

Assuming your trie could potentially hold *any* decimal number,
How many children does each node (potentially) have?
A. 2    B. 8    C. 10    D. Other
Multi-way tries: Efficient finding of keys by their sequence

Build the trie to store the following numbers:

8
1234
59
123
8775
80

Which node in the trie represents 1234?
A. Red
B. Purple
C. Blue
D. Green
E. Other
Multi-way tries: Efficient finding of keys by their sequence

Build the trie to store the following numbers:

Is there a way to find whether *all* keys contained in a sequence of digits are present in the trie?

A. Yes  
B. No
Properties of tries

Build the trie to store the following numbers:

Is there a “strong ordering” property in a trie? That is, are smaller keys always to the left of larger keys?

A. Yes  B. No
Suppose your keys are a sequence of at most D digits, and N is the maximum number of keys you will store. What is the worst case height of this trie (i.e., for large N)?

A. D  B. \lg(D)  C. N  D. D \times N  E. Other
Properties of tries

Build the trie to store the following numbers:

If you stored the same N D-digit keys in a Binary Search Tree, what would be the worst case height of the tree?

A. N  
B. \( \lg(10^D) \)  
C. \( \lg(N) \)  
D. \( \lg(D) \)  
E. Other
Properties of tries

Build the trie to store the following numbers:

Consider storing the full $10^D$ keys. We know that on average the height of a BST will be $\lg(10^D)$. Which is smaller: $D$ or $\lg(10^D)$?

A. $D$  
B. $\lg(10^D)$  
C. They are the same
Properties of tries

Build the trie to store the following numbers:

So what is the main drawback of tries?
A. They are difficult to implement
B. They (usually) waste a lot of space
C. They are slow
D. There is no drawback of tries