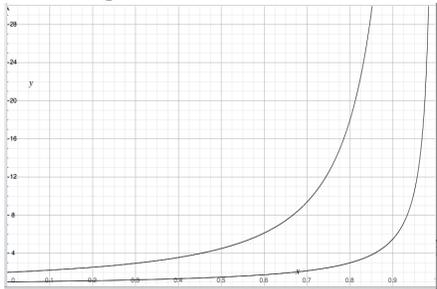


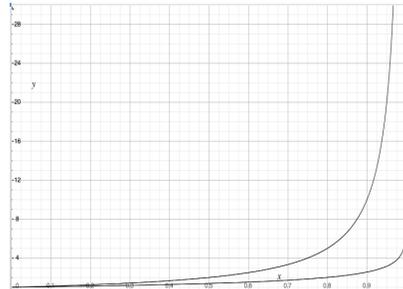
Running Time Observations:



Linear Probing:

Successful: $\frac{1}{2}(1 + \frac{1}{(1-\alpha)})$

Unsuccessful: $\frac{1}{2}(1 + \frac{1}{(1-\alpha)^2})$



Double Hashing:

Successful: $\frac{1}{\alpha} * \ln(\frac{1}{(1-\alpha)})$

Unsuccessful: $\frac{1}{(1-\alpha)}$

ReHashing:

What happens when the array fills?

...or a better question:

Algorithm:

Which collision resolution strategy is better?

- Big Records:
- Structure Speed:

What structure do hash tables replace?

What constraint exists on hashing that doesn't exist with BSTs?

Why talk about BSTs at all?

Analysis of Dictionary-based Data Structures

	Hash Table		AVL	List
	SUHA	Worst Case		
Find				
Insert				
Storage Space				

Data Structures in std library:

- std::map
- std::unordered_map

A Secret, Mystery Data Structure:

ADT:

insert

remove

isEmpty

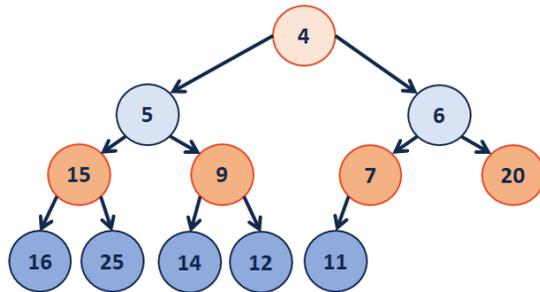
Implementation of _____

insert	removeMin	Implementation
$O(n)$	$O(n)$	Unsorted Array
$O(1)$	$O(n)$	Unsorted List
$O(\lg(n))$	$O(1)$	Sorted Array
$O(\lg(n))$	$O(1)$	Sorted List

Q1: What errors exist in this table? (Fix them!)

Q2: Which algorithm would we use?

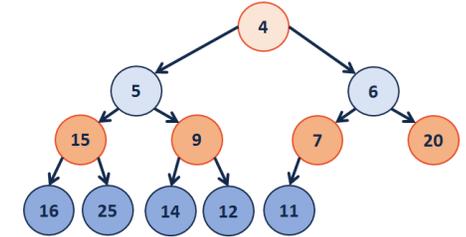
A New Tree-like Structure:



A complete binary tree T is a min-heap if:

-
-

Implementing a (min)Heap as an Array



4	5	6	15	9	7	20	16	25	14	12	11			
---	---	---	----	---	---	----	----	----	----	----	----	--	--	--

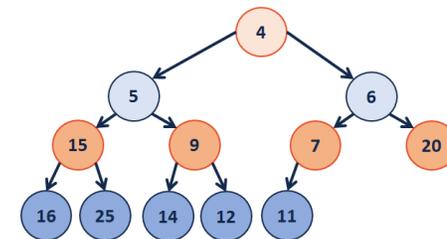
Operations:

leftChild(index) :=

rightChild(index) :=

parent(index) :=

Insert:



-	4	5	6	15	9	7	20	16	25	14	12	11		
---	---	---	---	----	---	---	----	----	----	----	----	----	--	--

CS 225 – Things To Be Doing:

1. Theory Exam 3 starts next week (Thursday, April 9th)
2. MP5 EC+7 deadline is today – earn the extra credit!
3. lab_hash released Wednesday
4. Daily POTDs are ongoing!