CS 225

#23: AVL Applications

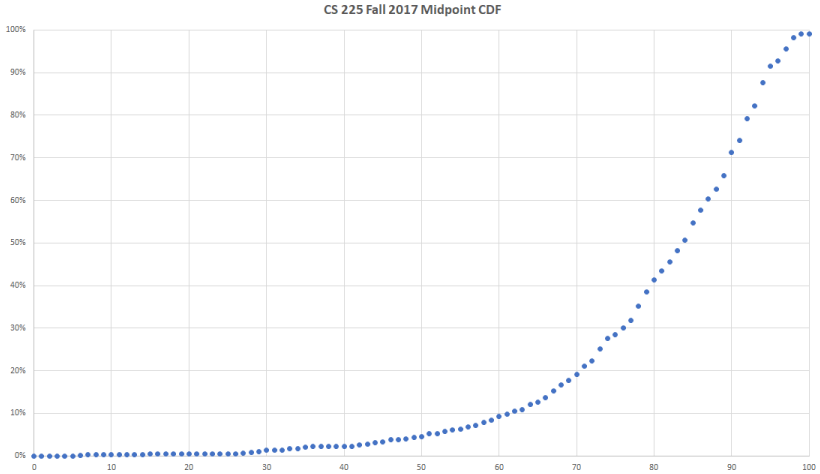
October 20, 2017

Running Time of Every Data Structure So Far:

	Unsorted Array	Sorted Array	Unsorted List	Sorted List
Find				
Insert				
Remove				
Traverse				

	Binary Tree	BST	AVL
Find			
Insert			
Remove			
Traverse			

CS 225 Mid-Point Grades (CDF):

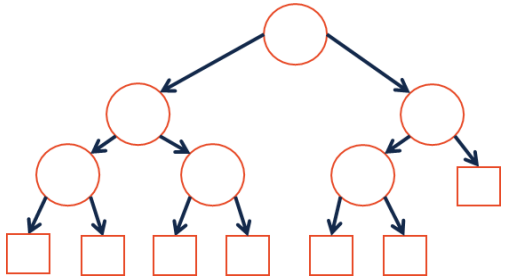


Range-based Searches:

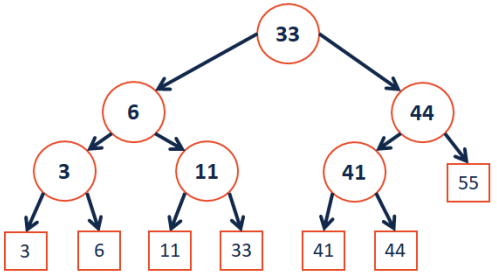
Q: Consider points in 1D: $p = \{p_1, p_2, \ldots, p_n\}$.

...what points fall in [11, 42]?

Tree Construction:



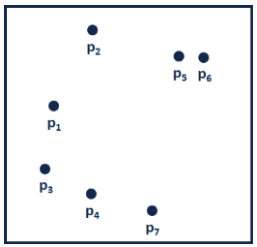
Range-based Searches:



Running Time:

Extending to k-dimensions:

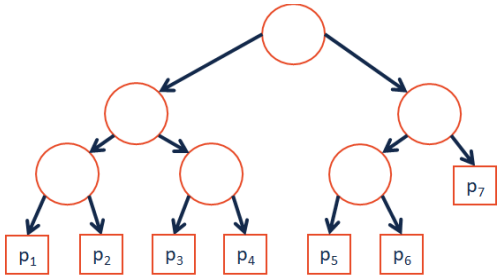
Consider points in 2D: $\mathbf{p = \{p_1, p_2, \ldots, p_n\}}$.

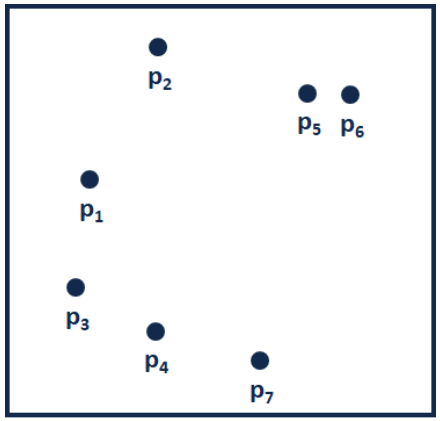


...what points are inside a range (rectangle)?

...what is the nearest point to a query point **q**?

Tree Construction:





Why iterators?

FloodFillImage.cpp (partial)

```
ImageTraversal & traversal = /* ... */;
for (const Point & p : traversal) {

}
```

CS 225 – Things To Be Doing:

1. Exam #7 starts Monday; review session @7pm, 1404 SC
2. MP4 due on Monday
3. lab_avl due on Sunday
4. Daily POTDs