

CSC 172– Data Structures and Algorithms

Lecture #26

Spring 2018

Please put away all electronic devices



Announcements

- Final:
 - On May 01
 - Same time (3:25 pm to 4:40 pm)
 - Same location: Hubbell Auditorium
- Sorting Dance Videos:
 - We will post on the course website
 - You can vote for the best dance



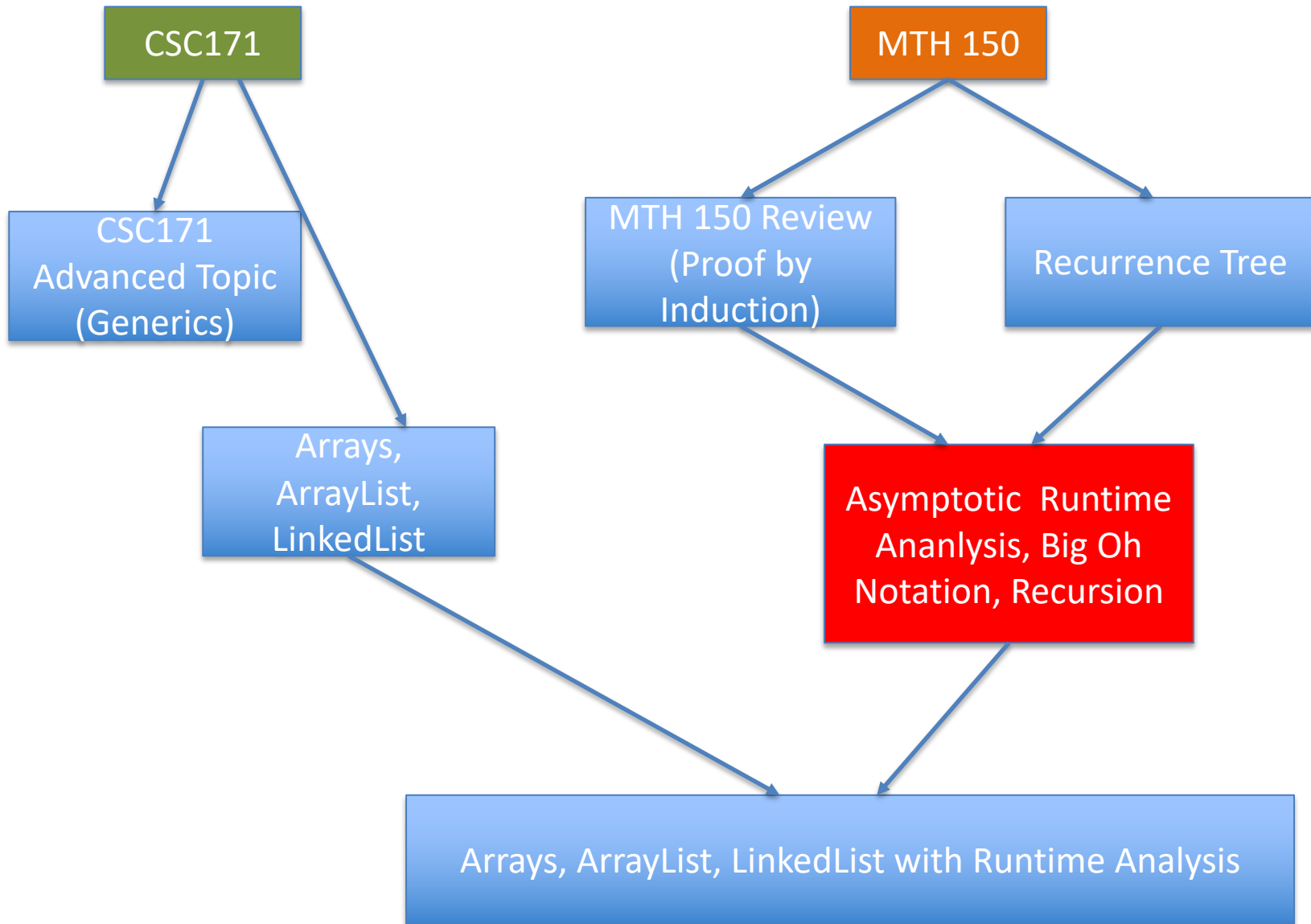
FINAL REVIEW

What did we learn?

Directed Acyclic Graph (DAG) representation

WHAT DID WE LEARN?

DAG



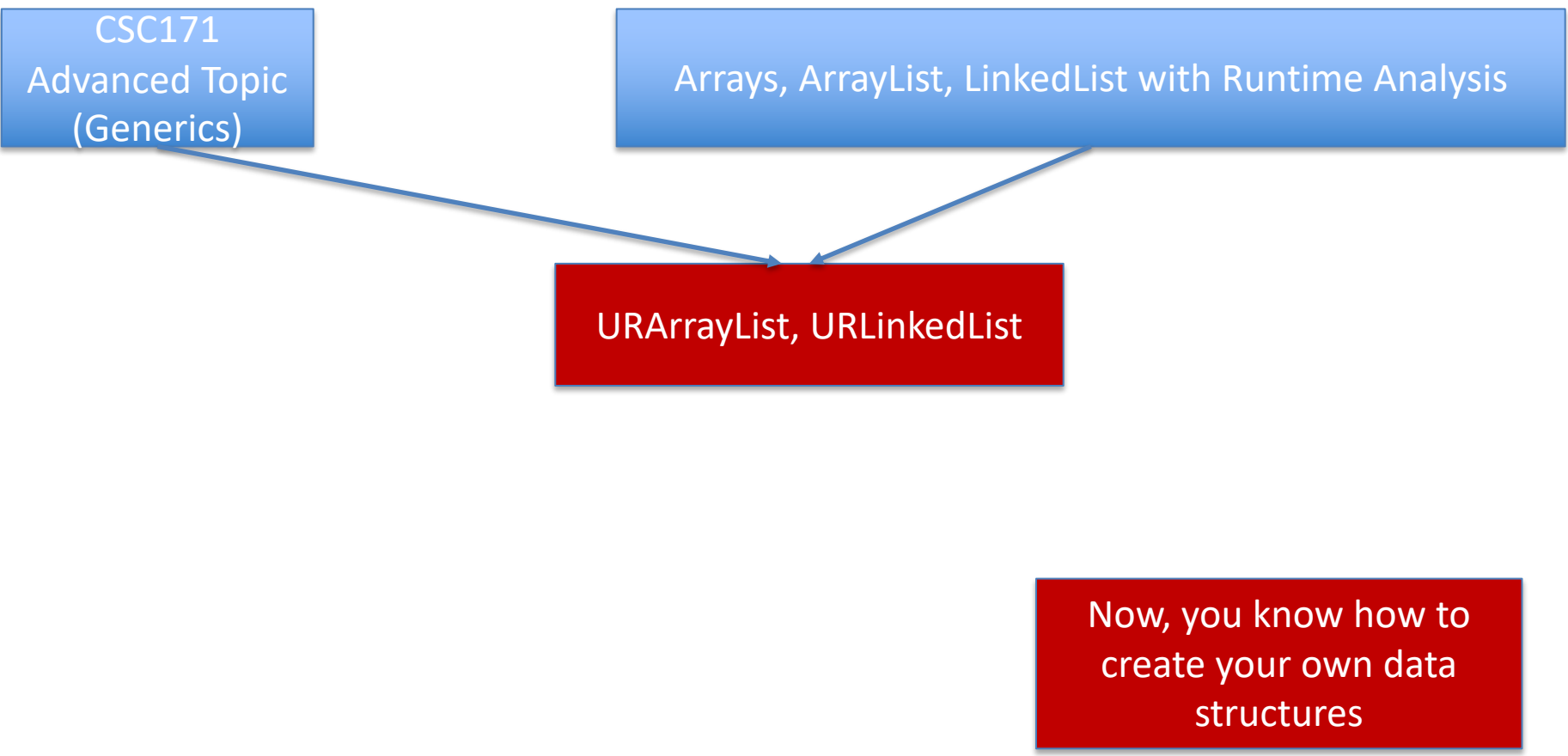
DAG (Continued)

CSC171
Advanced Topic
(Generics)

Arrays, ArrayList, LinkedList with Runtime Analysis

URArrayList, URLinkedList

Now, you know how to
create your own data
structures



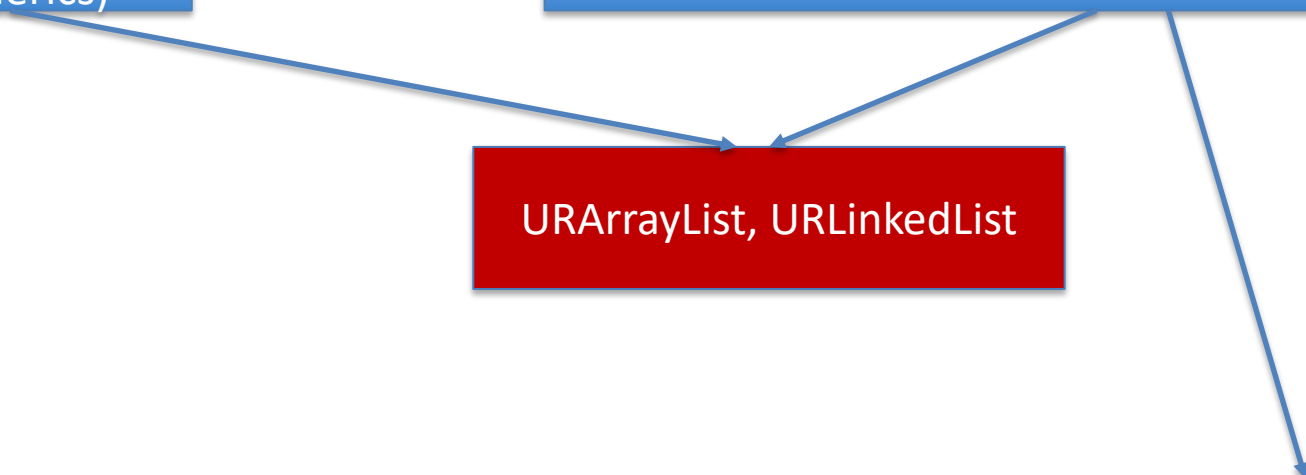
DAG (Continued)

CSC171
Advanced Topic
(Generics)

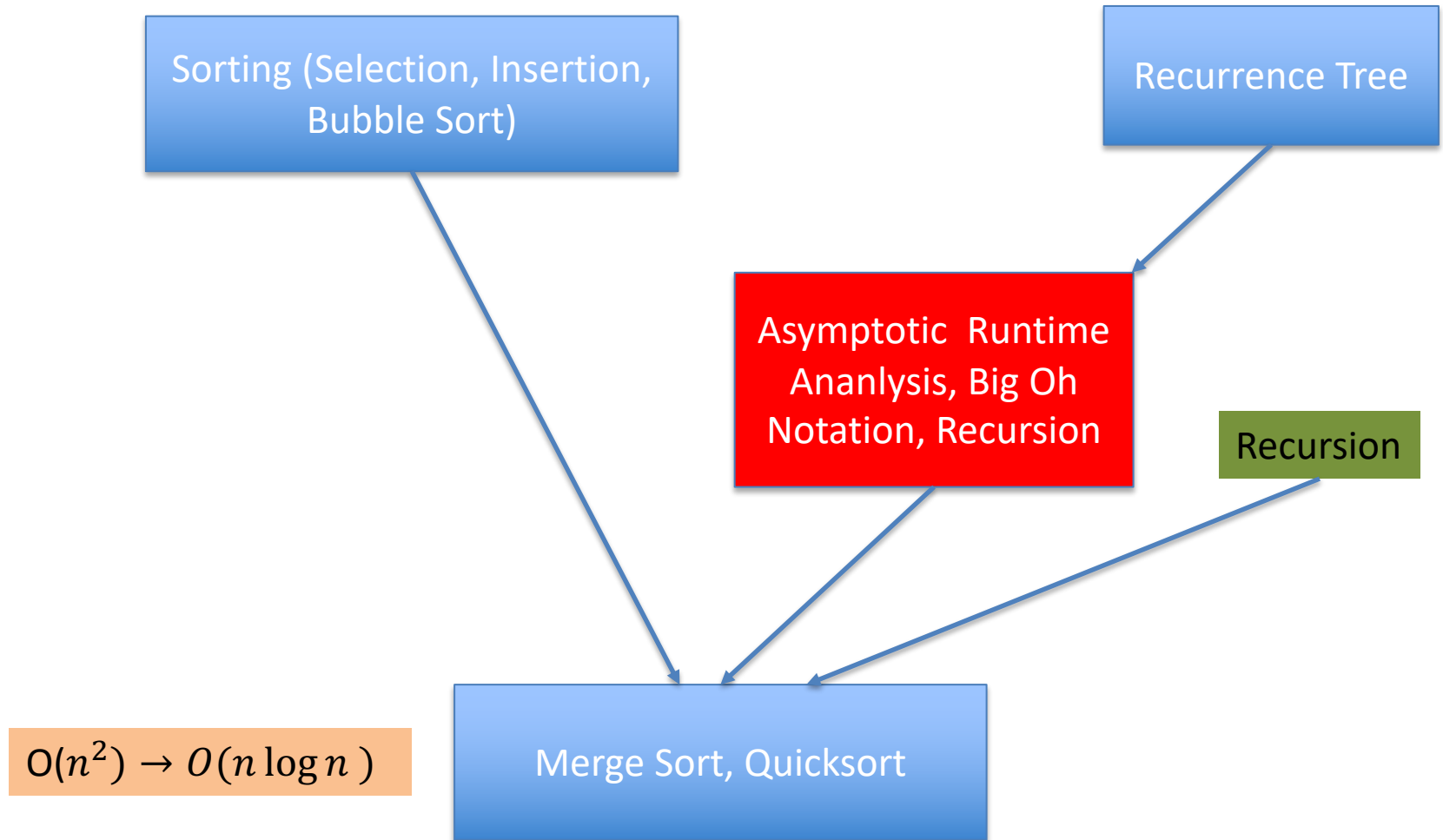
Arrays, ArrayList, LinkedList with Runtime Analysis

URArrayList, URLinkedList

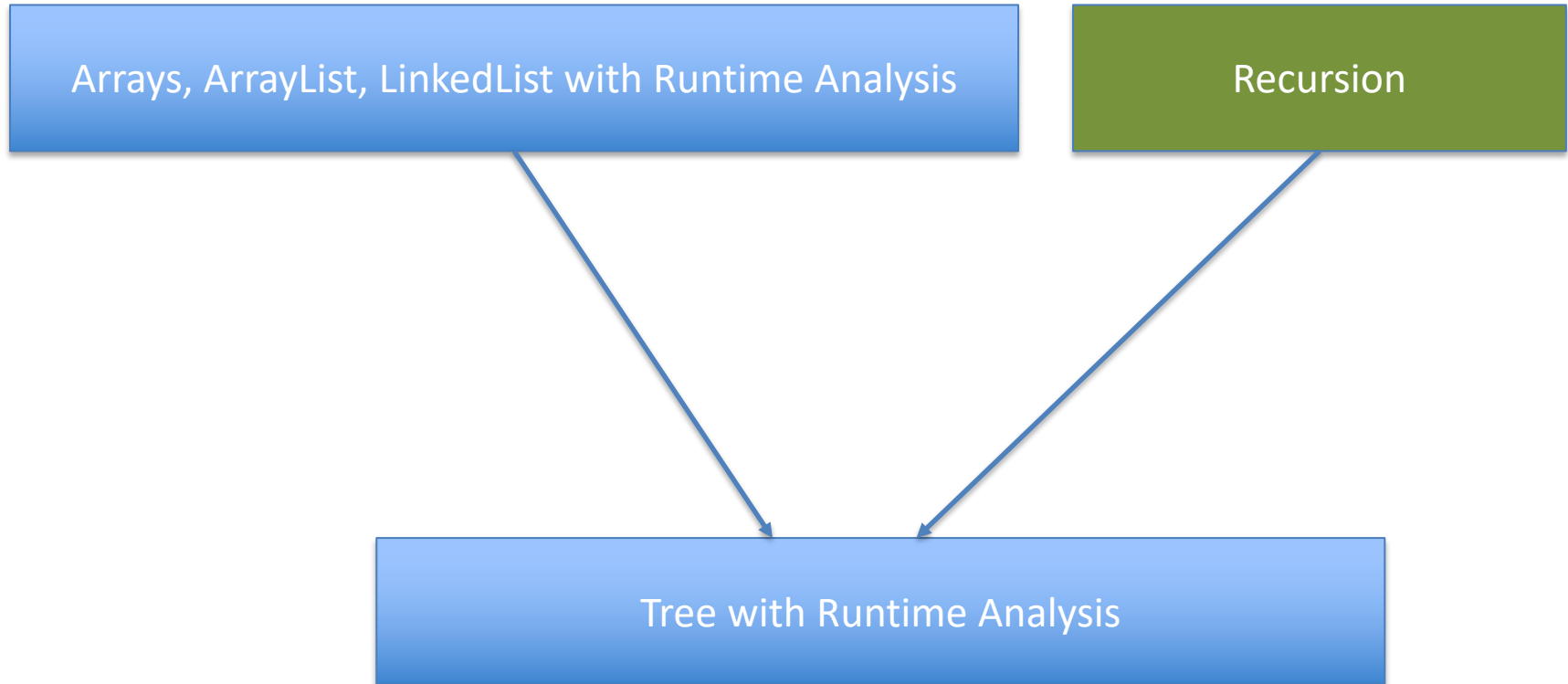
Stack, Queue



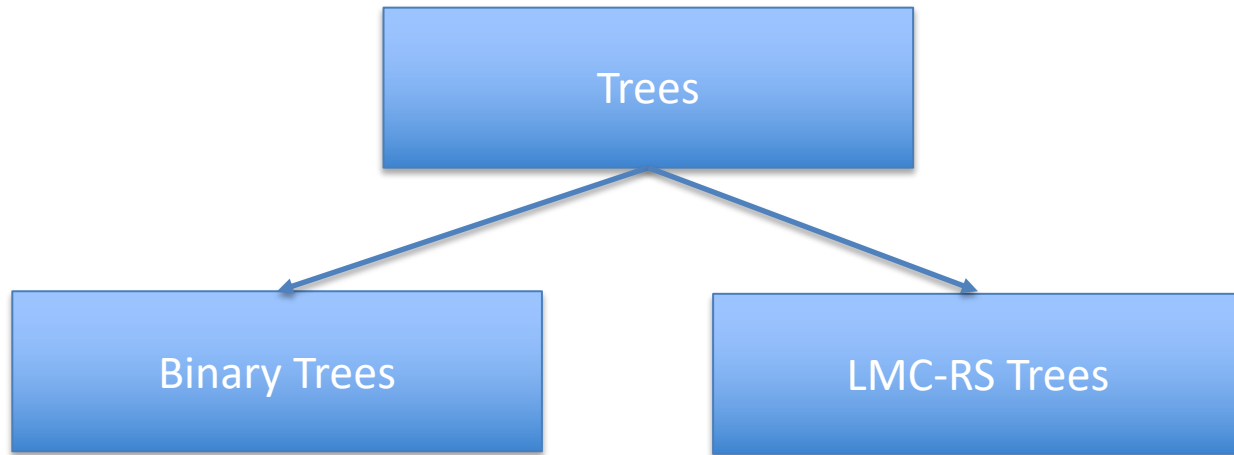
Sorting



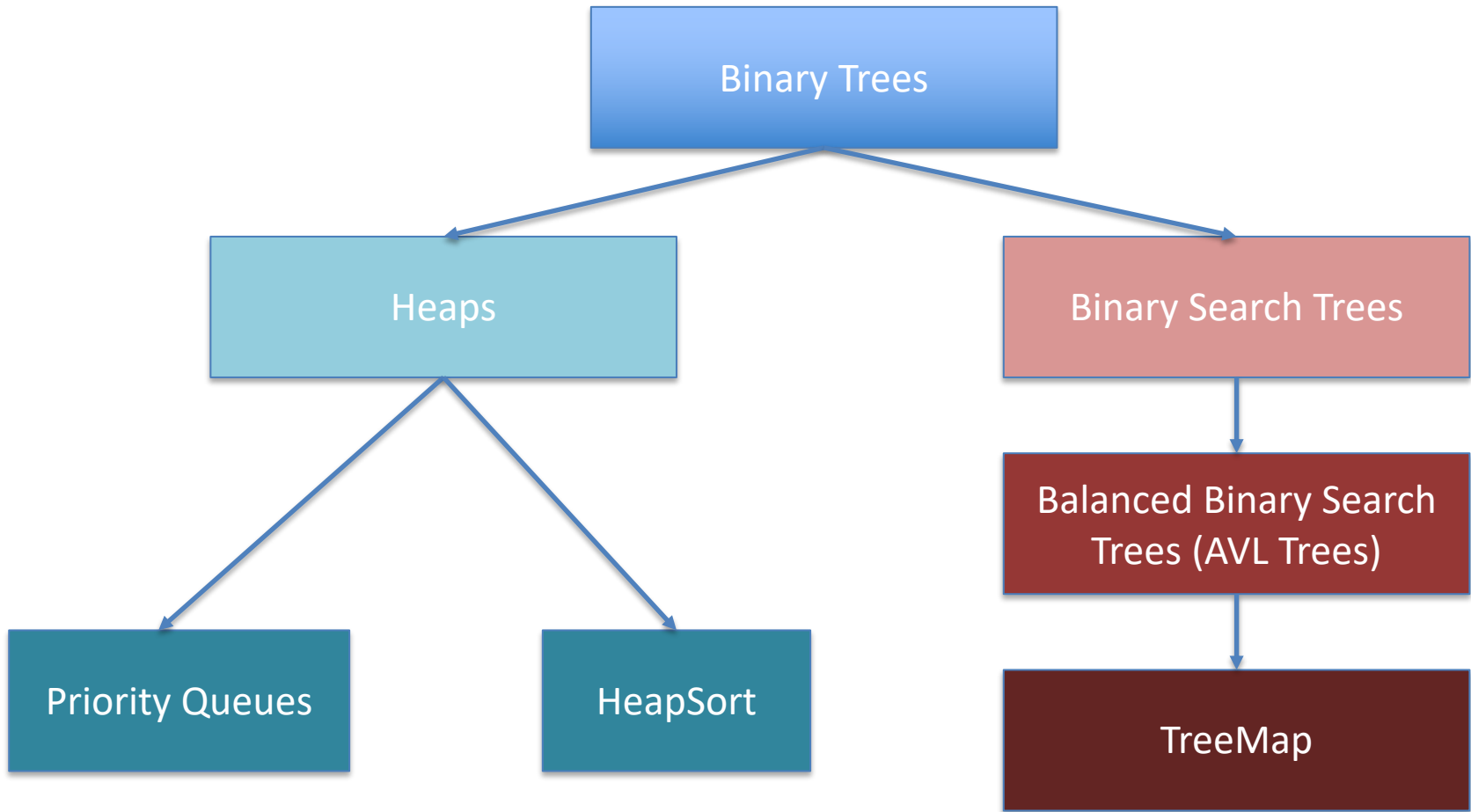
Linear to Non-linear



Tree Variations



Binary Trees

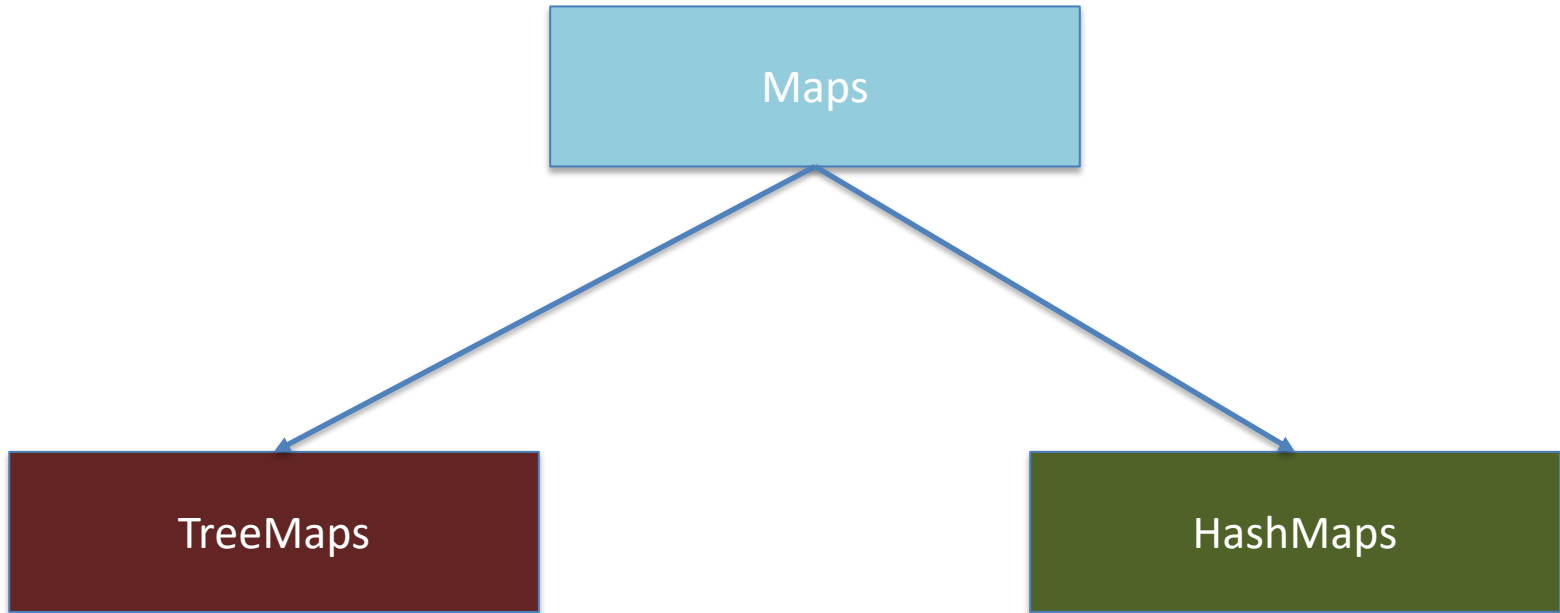


Last Two Data Structures

Graphs

HashMap

Maps



DATA STRUCTURES COVERED

Linear Data Structures Covered

- Arrays
- ArrayLists
- LinkedLists
- Stacks
- Queues

Other Data Structures

- Trees
 - LMC-RS Trees
 - Binary Trees
 - Binary Search Trees
 - Balanced Binary Search Trees (AVL trees)
 - » TreeMap (Map implementation using Balanced Binary Search Tree) •
 - Heaps (and Priority Queues)
- Graphs
- HashMaps

ALGORITHMS

Algorithms

- Linear search vs Binary search
- Finding well-formed expression
- Shunting yard algorithm
- Recursion (and backtracking)
- Sorting: (insertion sort, selection sort, bubble sort vs. merge sort, quicksort, heapsort)

Algorithms

- Various tree traversal techniques
- Heapify algorithm
- Huffman coding
- Tree rotations
- Graph algorithms
 - BFS
 - DFS
 - Topological sorting
 - Shortest path for unweighted Graphs
 - Dijkstra's algorithm
 - Prim's algorithm
- Hashcode

Runtime

ArrayLists

LinkedLists

Arrays

Stacks

Insert, Delete, Search, Traverse,
and Others...

Graph

Trees

HashMap

Priority
Queues

Iterative vs.
Recursive

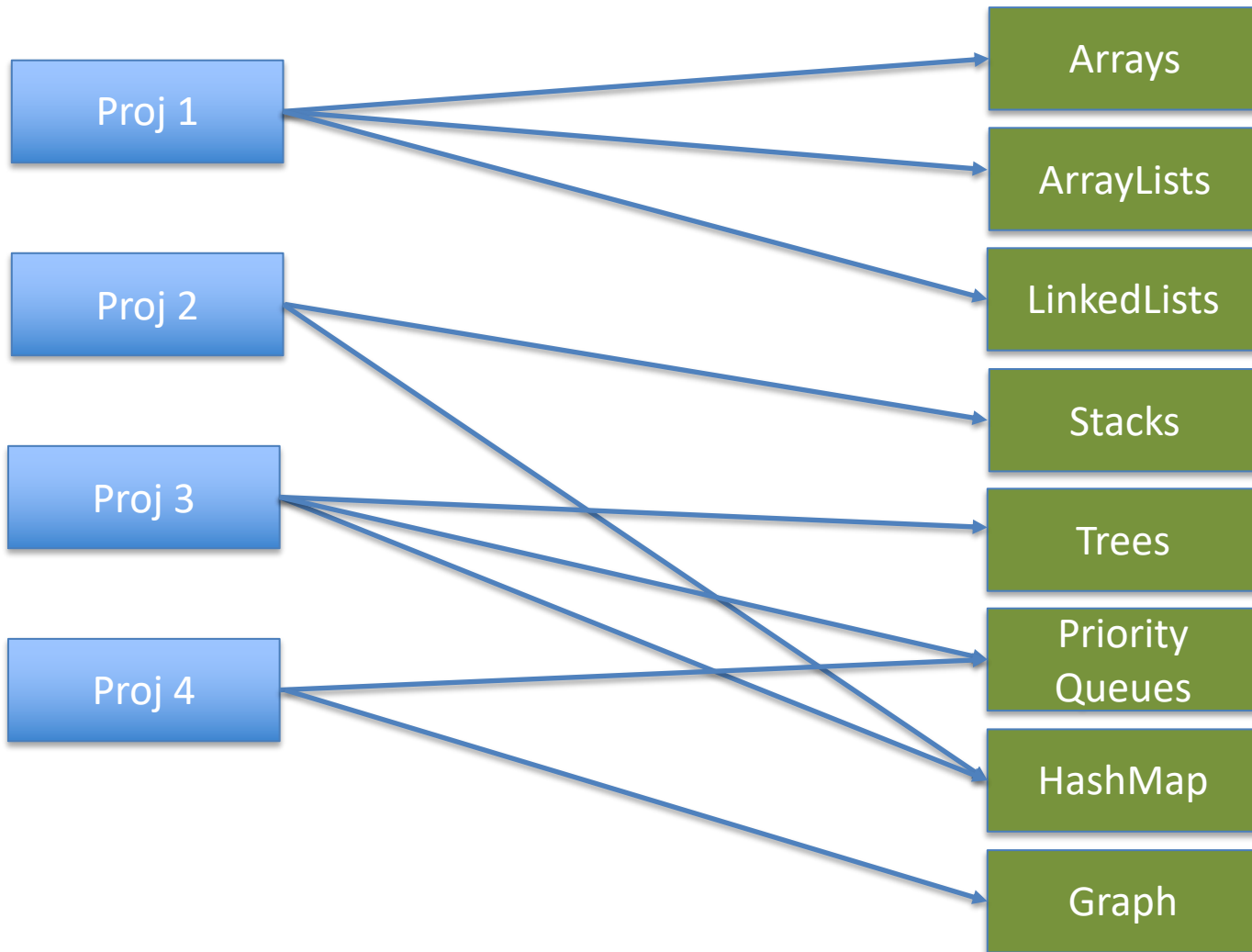
Runtime and Space

Sorting

Iterative vs. Recursive

PROJECTS

Projects and Data Structures



Optional Project

ArrayLists

LinkedLists

Arrays

Stacks

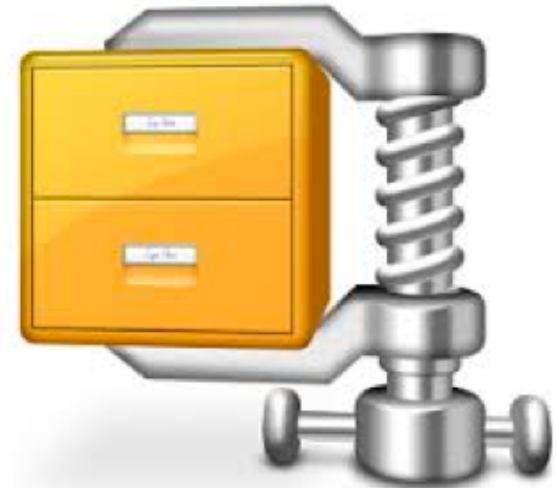
Graph

Trees

HashMap

Priority
Queues

Real Life Examples



EXAM STRUCTURE

Exam Structure

Total: 100 pts

You have finished 20 pts already

Other 80 pts:

Time: 75 minutes

Average: 1 minute per point

Coverage: Mostly after MT

- Short Questions:
 - One sentence answers
 - Short questions
 - Short functions
 - Short questions on Graph (Especially runtimes are important)
- Other Questions:
 - Questions will have parts
 - Coding, Drawing, Theory,
 - No Long questions on Graph (except **Topological Sorting**)
 - Also, there will be extra credit problems

Not included:

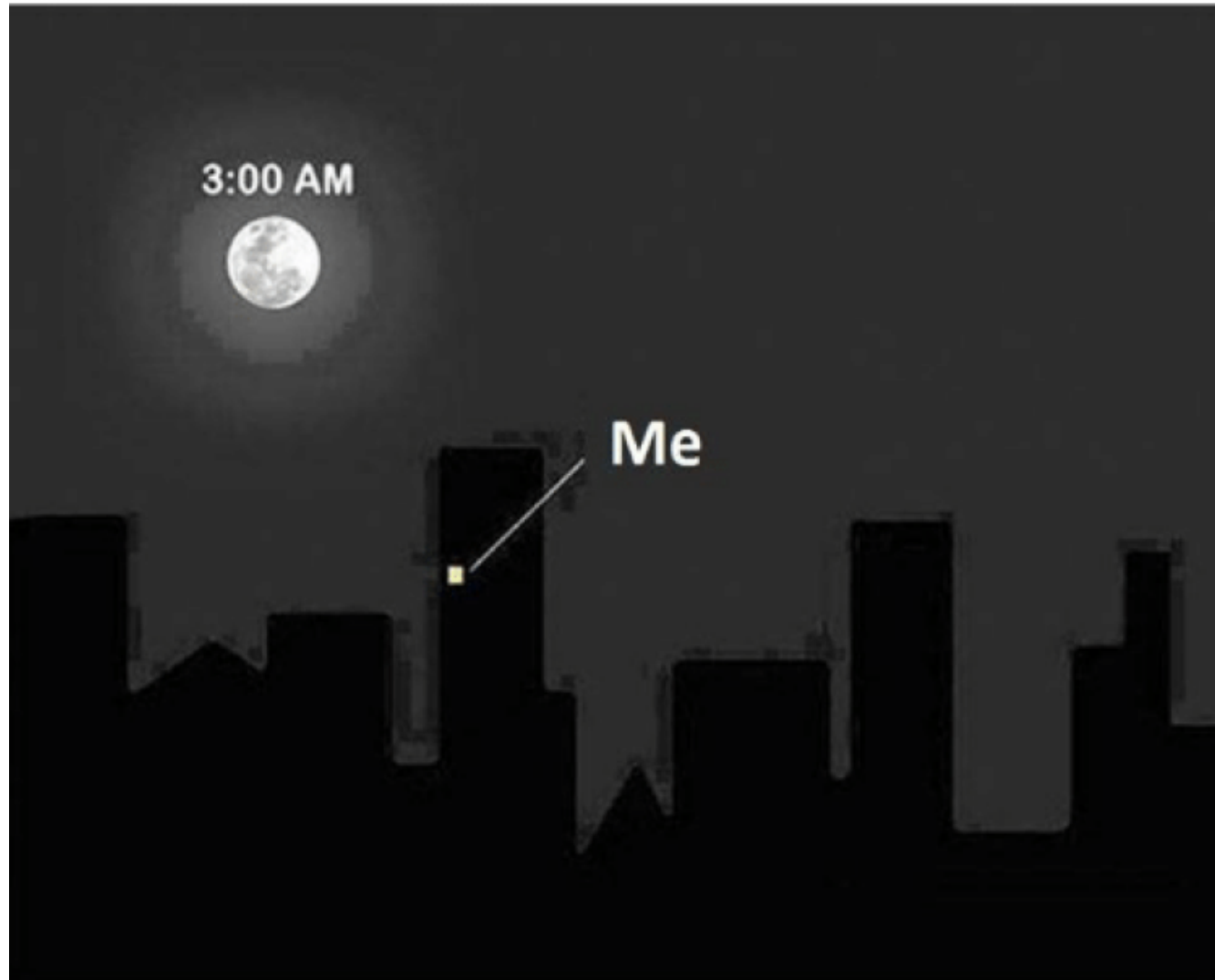
Proof by Induction
Recurrence Tree related problems
Wildcards

How to prepare for the exam

- Go through workshop materials, labs, quizzes and above all, lecture slides
- Read the textbook to strengthen your understanding
 - Bonus: plenty of animations

THINGS TO AVOID

The Night before exam



**Whole
Year**



**Night
Before
Exam**

Sarcasm101.com

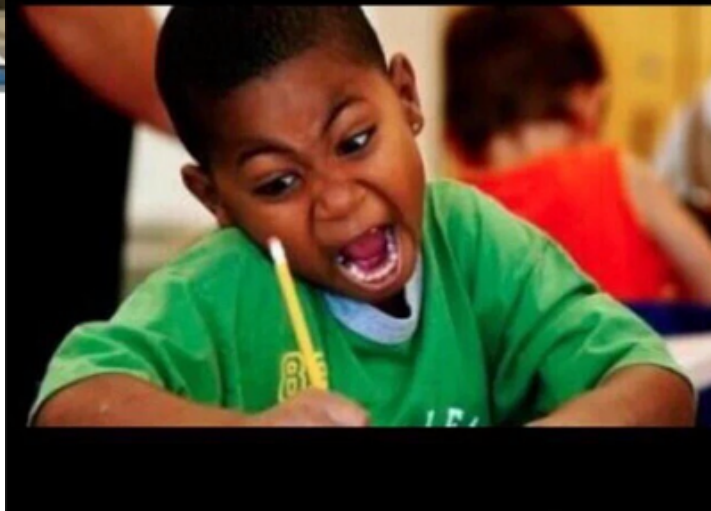
**During
Exam**



During the exam



THE LAST 5 MINUTES OF EXAM



That's all!





GOOD LUCK
FOR YOUR

EXAM A
N
D

DO THE BEST

