

FoCS 2 – Revision Checklist

1. Lists, Stacks, Queues
 - primitive operators
 - uses and algorithms
2. Complexity
 - space v. time
 - average case v. worst case
 - Big Oh notation
 - computation – exact and approximate
3. Trees –general, binary and quad trees
 - inductive definitions
 - primitive operators
 - uses and algorithms
4. Binary Search Trees
 - definition
 - building, modifying and searching
 - tree rotations (what, how, why?)
5. Heap trees and Priority queues
 - definitions
 - inserting, deleting, building
 - Bubbling Up and Bubbling Down
6. Sorting
 - general definitions and theoretical limits
 - $O(n^2)$ algorithms – bubble, selection, insertion
 - Tree based algorithms – Treesort and Heapsort
 - Divide and conquer algorithms – Quicksort and Mergesort
 - Non-comparison algorithms – Radix sort
 - Comparisons – Average/worst speed, Stability, Only first $m \ll n, \dots$
7. Hash Tables
 - general definitions
 - load factors, efficiency, computational costs
 - collision avoidance – buckets, direct chaining, open addressing
 - linear probing, secondary/double hashing
 - choosing good hash functions
8. Graphs
 - general definitions and implementations
 - planarity – definitions and theorems
 - traversals – depth first and breadth first
 - shortest paths – Dijkstra's and Floyd's algorithms
 - minimal spanning trees – Prim's and Kruskal's algorithm