

DSA – Revision Checklist

1. Basic Data Structures
 - arrays, loops and invariants
 - lists, stacks, queues, sets and recursion
 - 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
 - searching in general
 - definition of binary search trees
 - building, modifying and searching
 - tree rotations – why, what, how?
5. Heap trees and Priority queues
 - definition of heaps and priority queues
 - binary heap trees – insertions, deletions, building
 - bubbling up and bubbling down
 - Binomial trees and heaps
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 $m \ll n$, ...
7. Hash Tables
 - general definitions and implementations
 - load factors, efficiency, computational costs
 - dealing with collisions – 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