Course plan

introduction ↔ insert

search

limits ↔ big-oh ↔ recursion

recursive eqns fibonacci

master → quicksort

merge

dijkstra

some theory → graphs ↔ adversarial

avl trees

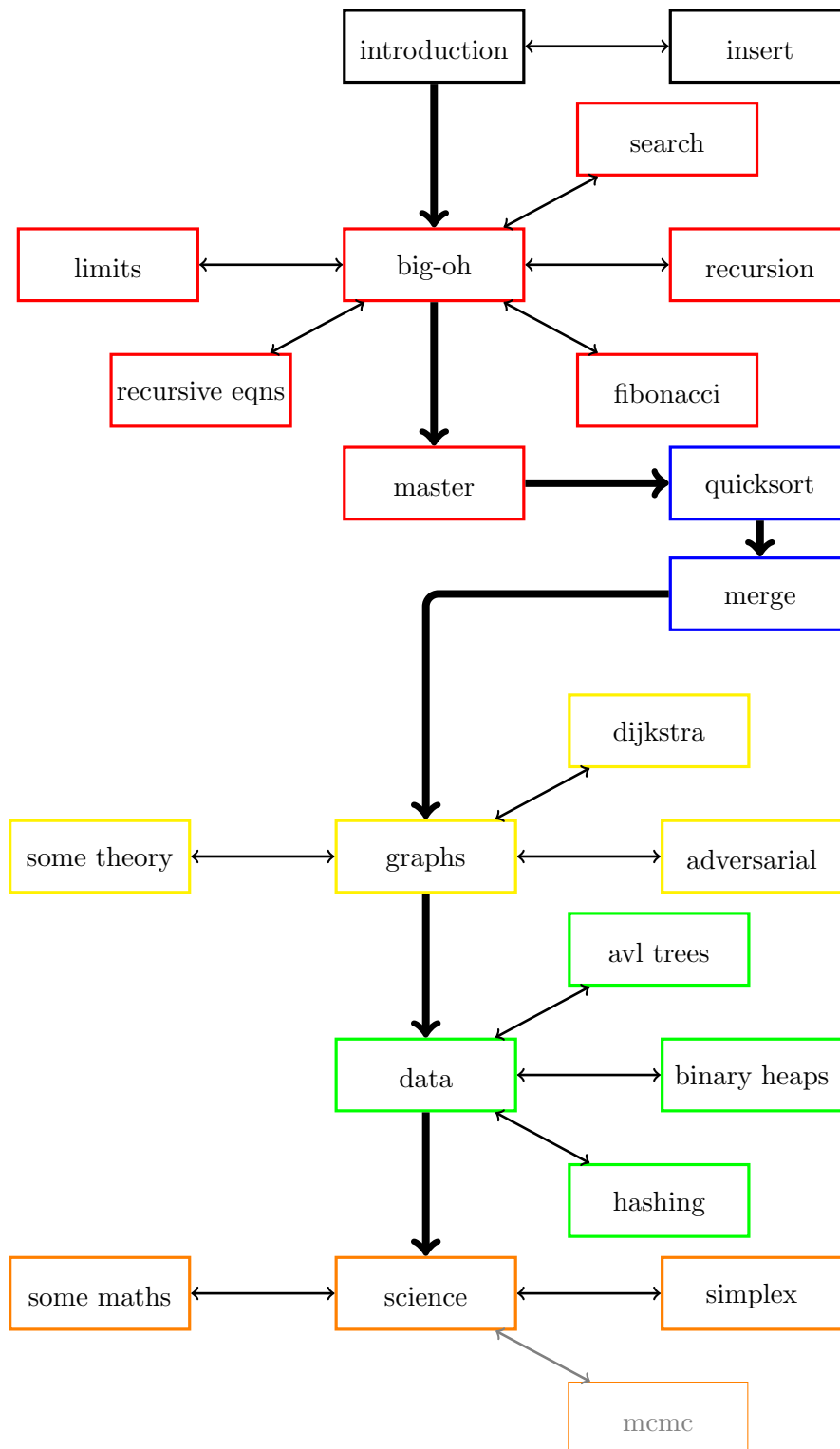data ↔ binary heaps

hashing

some maths ↔ science ↔ simplex

mcmc

Key to the plan

The nodes don't represent equal amounts of time, for example, the fibonacci sequence node represents about half a lecture, whereas the big-oh node might be two lectures.

Positions and colors

- CENTRE: main topics

- LEFT: background theory

- RIGHT: examples and applications

- RED: algorithmic complexity

- BLUE: sorting

- YELLOW: graph theory

- GREEN: data structures

- ORANGE: scientific computing

Nodes

(a) **introduction:** What is an algorithm.

(b) **insert:** Insert sort, an example algorithm.

(c) **big-oh** Algorithmic complexity.

(d) **limits** Limits in the mathematical sense.

(e) **recursive eqns** How to solve recursive equations

(f) **search:** Big-oh for binart and linear.

(g) **recursion:** Recursion and recursive algorithms.

(h) **fibonacci:** The interesting example of the fibonacci sequence.

(i) **master:** The master theorem.

(j) **quicksort:** Quicksort.

(k) **merge sort:** Merge sort.

(l) **graphs:** Introduction to graph theory.

(m) **some theory:** Some definitions and the Euler theorem.

(n) **dikstra:** Dijkskra's algorithm.

(o) **adversarial:** Adversarial search algorithms.

(p) **data:** Data structures, linked lists and binary trees.

(q) **avl trees:** Balanced trees and the AVL rotations.

(r) **binary heap:** Binary heaps.

(s) **hashing:** Hash functions and hashing data.

(t) **science:** Scientific computing.

(u) **some math:** Revising a bit of calculus.

(v) **simplex:** The Nelder Meade algorithm.

(w) **mcmc:** Markov chain Monte Carlo

The last section is aspirational, it is likely there will not be time to discuss it and it will not be examined.