Overview

Lecturer: Ken Brown
Website: www.cs.ucc.ie/~kb11/teaching/CS2515/Home/
Username: cs1
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Labs

Should be Tuesday and Thursday, 15:00–17:00, with each student allocated to one timeslot.

Assessment

- End-of-semester exam, (80%)
- In-class tests and assignments (20%)

Outline

- Motivation and OOP crash course
- Basics of algorithm analysis
- Arrays and LinkedLists
- Lists, Stacks, Queues, Sets and Dictionaries
- Applications
- Recursion
- Binary trees and balanced trees
- Search and traversal algorithms for trees
- Hashing

Textbooks

There is no required textbook but the following would be good to have or consult:

1. Data Structures and Algorithms in Python
2. [missed this]
3. [missed this]

Note

No lecture this Friday.

Intro

Algorithms process information mantained in data structures, and produce actions and results.

We'll be looking at algorithms and particularly the data structures that underlie them.

Data Structures

Data structures are the frameworks we use to maintain the data that are processed by the algorithms.

Inside data structures we use algorithms to determine how to store the data efficiently.

Abstract Data Types

Abstract data types are higher level patterns for organising data structures – patterns for reading data from the structure, for removing data, for and adding new data.

E.g. an abstract data tyep would be a graph, and then there'd be a 2D matrix representing that graph.

Three Questions for an Algorithm

1. Does it do what it is supposed to do?
2. How long will it take?
3. How much space does it need to run?

Why is Efficiency Important?

1. As processors get faster, users expect to solve bigger problems.
2. Some problems have known limits on their efficiency (will never be solved efficiently).