Collections

Goldsmiths Computing

Motivation

We have seen a number of data structures for storing data by now.
Is there a unifying concept behind storing data items?

Definition

collection a grouping of some variable number of data items.
aka: "container" (C++)

linear collection a collection with an underlying linear order

collection	linear?
linked list	✓
dynamic array	✓
binary tree	?
set	✗
multiset	✗
stack	✓
queue	✓
priority queue	✓
deque	✓

Operations

Generic collection

size	how many elements does the collection contain?
insert[o]	add o to the collection
find[o]	is the object o in the collection?
remove[o]	return a collection with all instances of o removed
count[o]	how many times is o stored in the collection?
sum	what is the sum of the objects in the collection?
iterate[f]	visit all items of the collection, calling f on each item

Linear collection

position[o]	what index is o at, if any?
get[i]	get the object at index i

Work

1. Reading
   - Drozdek [C++], section 1.7.1 (Containers), 3.7 (Lists in the STL), 4.4-4.7 (Stacks, Queues, Priority Queues, Deques in the STL)
   - Drozdek [Java], section 1.5 (Vectors in `java.util`), 3.7 (Lists in `java.util`), 4.1.1 (Stacks in `java.util`)