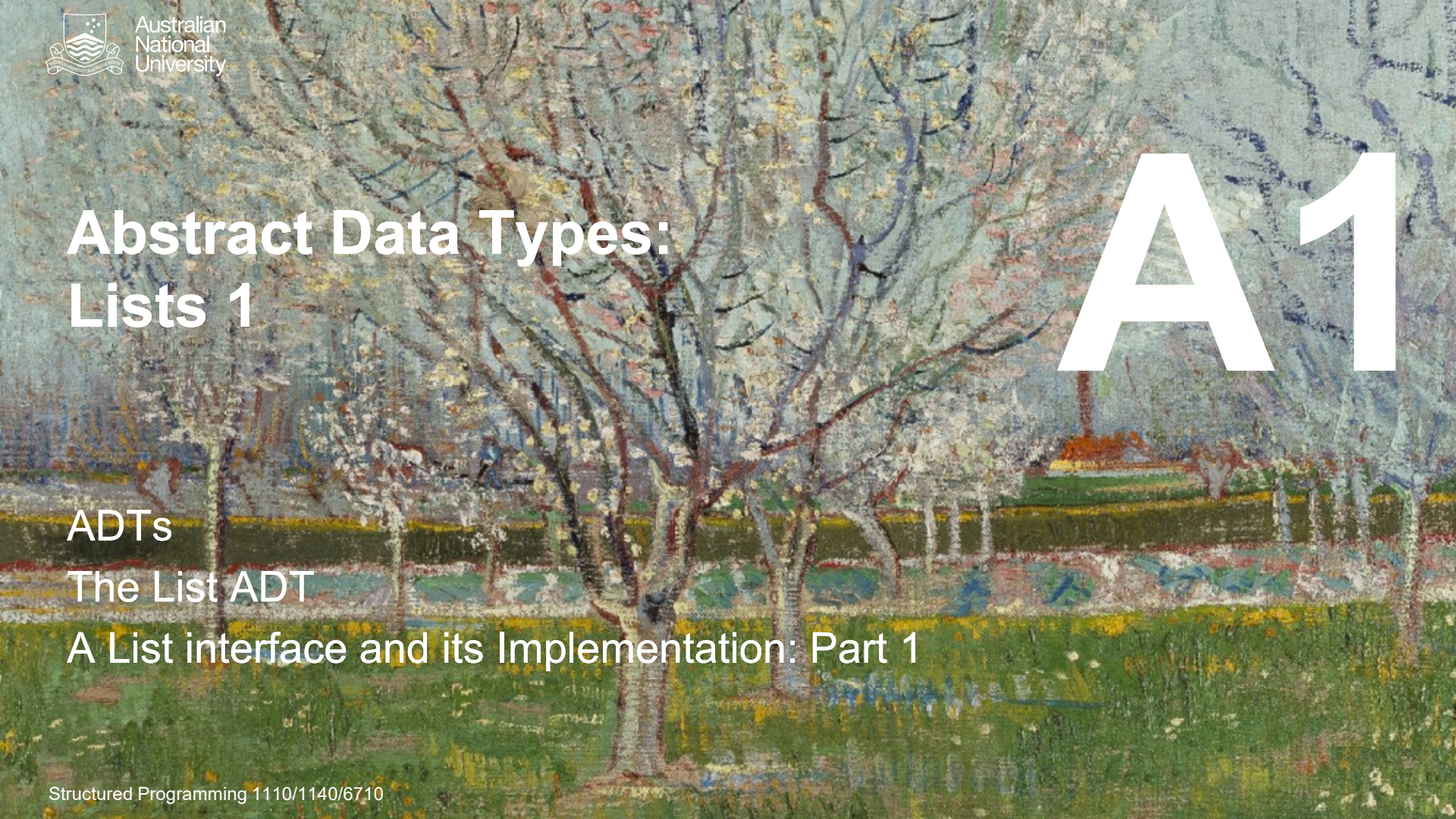


Abstract Data Types: Lists 1

A1

ADTs

The List ADT

A List interface and its Implementation: Part 1

Abstract Data Types (ADTs)

Abstract data types describe the behavior (semantics) of a data type without specifying its implementation. An ADT is thus abstract, not concrete.

A **container** is a very general ADT, serving as a holder of objects. A **list** is an example of a specific container ADT.

An ADT is described in terms of the semantics of the operations that may be performed over it.

The List ADT

The **list** ADT is a container known mathematically as a *finite sequence* of elements. A list has these fundamental properties:

- duplicates *are* allowed
- order is preserved

A list may support operations such as these:

- *create*: construct an empty list
- *add*: add an element to the list
- *is empty*: test whether the list is empty

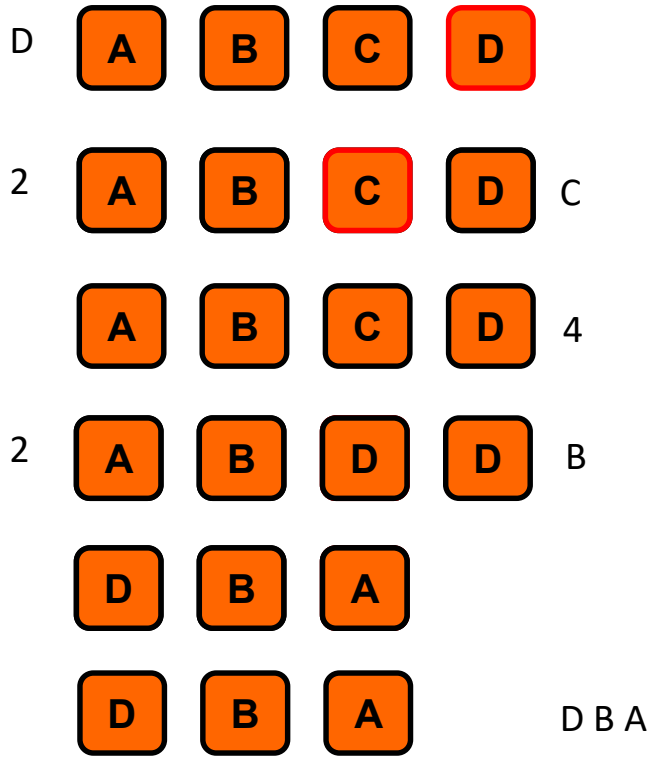
Our List Interface

We will explore lists using a simple interface:

```
public interface List<T> {
    void add(T value);
    T get(int index);
    int size();
    T remove(int index);
    void reverse();
}
```

Abstract Data Types: Lists A1

```
void add(T value);

T get(int index);

int size();

T remove(int index);

void reverse();

String toString();
```



List Implementation

- Arrays
  - Fast lookup of any element
  - A little messy to grow and contract
- Linked list
  - Logical fit to a list, easy to grow, contract
  - Need to traverse list to find arbitrary element