Bags, Queues and Stacks
• **Problem**: Need to maintain an unordered collection of elements

• **Operations**:
  – Insert
  – Remove
  – Contains

• **Specific requirements**:  
  – E.g., Time of insertion into bag is important
Bag Interface

• Provide functions for operations

addBag (container, value)
testBag (container, value)
removeBag (container, value)
sizeBag (container, value)
• **Problem**: Maintain a collection of elements in First-In, First-Out format

• **Operations**:
  – Add an element to Queue
  – Remove an element from Queue
  – Read the front element of Queue
  – Contains
• **Problem:** Maintain a collection of elements in Last-In, First-Out format

• **Operations:**
  – Add an element to Stack
  – Remove an element from Stack
  – Read the top element of Stack
  – Contains
Difference between ADT and Implementation

• Stack ADT
  – Can be implemented using dynamic array
  – Linked list
  – ...

• Encapsulation idea
  – User don’t care what’s implemented
  – Just tell user how fast is each operation