

Intro to Data Structures

Lecture #16 – Stacks & Queues
October 26, 2014

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Outline for Today

- Review Quiz 4
 - avg == median == 85
 - high was 104 (also a 99)!
- Stacks
- Queues
- Problem Solving with Stacks and Queues
- Questions about HW5

Stacks and Queues (restricted lists)

- Stacks and queues constrain where items can be added/removed
- Stacks
 - everything happens "at the top"
 - Last-In-First-Out (LIFO)
- Queues
 - remove from front, add at back
 - First-In-First-Out (FIFO)
- Interfaces...

Stack Interface

```
public interface Stack<AnyType>
{
    boolean isEmpty();
    void push(AnyType value);
    AnyType pop();
    AnyType peek();
}
```

Queue Interface

```
public interface Queue<AnyType>
{
    boolean isEmpty();
    void enqueue(AnyType value);
    AnyType dequeue();
    AnyType peek();
}
```

Stacks and Queues (problem solving)

- Where have you seen stack-like (LIFO) behavior?
 - lunch trays
 - "undo"
 - the run-time stack (method call activation records)
 - parenthesis balancing
 - some old-school calculators (dc)

Stacks and Queues (problem solving)

- Where have you seen queue-like (FIFO) behavior?
 - lunch lines
 - roundabout throughput (well...)
 - stocking food (milk/veggies in the refrigerator)

Stacks and Queues (implementation)

- Constant-time behavior for all operations
- Implies what?