Quiz 2: Stacks and queues

CS 14 - Data Structures

April 5, 2013

Questions:

1. Give three examples of stacks

   (a)

   (b)

   (c)

2. List the names of all stack operations, and their run times when implemented using vectors or lists.

3. Solve the RPN equations:

   (a) $1\ 2\ 3\ -\ +\ -1\ 4\ *\ *$

   (b) $1\ 2\ +\ 3\ 4\ 5\ -\ +\ *$

4. Give three examples of queues

   (a)

   (b)

   (c)

5. The Queue class below implements a queue data structure using two stacks.

   (a) Implement the enqueue and dequeue functions below. You may assume that stacks have member functions for push, pop, and size.

```
template <typename T> class Queue
{
public:
    Queue(void);
    ~Queue(void);

    void enqueue(const T& node);
    T dequeue();

private:
    Stack<T> stack1;
    Stack<T> stack2;
};

template<typename T> void Queue<T>::enqueue(const T& element) {









}

template<typename T> T Queue<T>::dequeue() {









}
```

   (b) What is the complexity of your functions in terms of the number of stack operations?

   (c) If we assume the stack was implemented with a vector, what is the overall time complexity? What about for a list?