Exercise 8. *Deadline: 11 May 2009.*

COURSE OF C++ PROGRAMMING LANGUAGE

STACK AND QUEUE

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Exercise

Define classes MyStack and MyQueue, which will represent respectively a stack (LIFO) and queue (FIFO) for real number (of type double). Use class deque<double> from STL as a base class.

```
class MyStack : protected deque<double>
{
    // ...
};

class MyQueue : public MyStack
{
    // ...
};
```

A stack is traditionally defined as any object that implements the following operations:

- push(x) — push a new element x onto the stack
- pop() — remove and return the topmost element from the stack
- top() — return (but do not remove) the topmost element in the stack
- size() — return number of elements in the collection
- empty() — return true if the collection is empty

A queue is similar to the stack and traditionally defined as any object that implements the following operations:

- push(x) — push a new element x on to the end of the queue
- pop() — remove and return the element at the front of the queue
- front() — return (but do not remove) the element at the front of the queue
- back() — return the element at the end of the queue
- size() — return number of elements in the collection
- empty() — return true if the collection is empty

You should define an operator << for these classes.

Finally write a short program, which will test your implementation of the stack (class MyStack) and the queue (class MyQueue). Test their copy constructors and copy assignments too.

Suggestion

Partition your code into the header and source files.

Hint

Some information about the class deque<> from STL (a double–ended queue) can be found on the webpage:

http://en.wikipedia.org/wiki/Deque

Some information about the stack and the queue data structure can be found on the webpages:

http://en.wikipedia.org/wiki/Stack_(data_structure)

http://en.wikipedia.org/wiki/Queue_(data_structure)