

CS210: Intermediate Computing/Data Structures (Java)

Lab #6

Purpose

This lab gives you experience developing a class that implements a queue using a circular array. In this lab, you will handle the possibility of needing to expand capacity. The test case code provided in this lab does test your code for its behavior in that situation.

Pre-Lab Assignment

Prior to the lab session, do the following to get started:

Download, save, and unzip the file [Lab6.zip](#) on your removable media (floppy disk, Zip disk, or memory stick) creating a directory named Lab6.

Copy your CircularArrayQueue class from Lab5 into this directory.

Open the Dr Java Application on your PC.

Create a new Dr Java project in the Lab6 directory by selecting the menu **Project -> New...** naming the project file **Lab6** and saving it in your new Lab6 directory. (Dr Java automatically opens an **Untitled** file in the editor window which you will ignore.)

Using the menu **File-> Open**, open the files: **CircularArrayQueue.java**, **EmptyCollectionException.java**, **QueueADT.java**, and **QueueTest.java**. Dr Java will automatically include this source file in the Project. Use the menu **Project -> Save** to save the updated project file.

Study the lecture notes about the expand capacity problem for the CircularArrayQueue class so that you understand what it needs to do.

Lab Activities

You need to design and add code to the methods of the CircularArrayQueue class in places as indicated by the comments:

1. In the enqueue method, you need to add a check for the need to expand capacity before updating the queue array and if needed, call the private expandCapacity method.
2. In the private expandCapacity method, you need to add the code to instantiate a new array twice the size of the existing array and copy all of the contents of the smaller array into the larger array so that the next element can be added.

Using the menu **Project -> Compile Project**, compile the program. Test your code by selecting the TestQueue.java file and using the DrJava **Tools -> Test Current Document** menu. This will run one different JUnitTestCase on your implementation of the CircularArrayQueue class to verify that your code now handles the expandCapacity situation correctly.

Show your code to the TA before leaving the lab. When you are through with the lab, close the Project using the menu **Project -> Close**. Be sure to remove your media and take it with you. If you have not finished the code, finish it by the next lab period. You will need to add to this code in the next lab to handle expand capacity.

Before you leave, have your TA check your code in progress. If you have not completed it, finish it before the next lab session to include a hard copy with your lab report.

Lab Report

Write a document that answers the following questions. Your lab must be printed (not handwritten).

Answer the following questions related to what you did in this week's lab.

Note: You should work alone on the lab report.

Note: The assignment is due at the BEGINNING of your next lab. No late assignments will be accepted. Emailed assignments will not be accepted. If you are not going to be in lab on the due date, you can turn the assignment ahead of time to the CS210 TA box in the CS department office.