

CS 61b – Summer 2005
Homework #3 – Due July 13th at 5:00pm

This homework is to be done individually. You may, of course, ask your fellow classmates for help if you have trouble editing files, compiling programs, or using the submit program. Do not share code or specific parts of answers. Please see the syllabus for guidelines on appropriate interaction with your fellow classmates.

When you are finished with the homework, you will submit it electronically. First put all of the files you want to submit into their own directory. Change to that directory, and then type “submit hw3”

If you can't complete the entire homework, and it complains about you not having certain files, then just edit a blank file with that name, and then save it. This will submit an empty file, but the submit program should then work.

Homework setup

Copy the files for homework 3 into your directory:

```
> mkdir hw3  
> cd hw3  
> cp -R $master/hw/hw3/* .
```

Note the -R after cp. This will copy directories as well as normal files.

Problem 1

In this homework, you are going to implement your own Doubly Linked list class (patterned on Weiss, Ch 17).

In the \$master/hw/hw3/weiss/nonstandard directory, there are three Java files:

```
ListNode.java  
LinkedList.java  
LinkedListIterator.java
```

For problem 1, you are going to create a class called **DLinkedList**. This class will make use of a doubly-linked list (see Weiss, pages 574–577 for updated code on how to insert new nodes into a doubly-linked list.

You will also need to create a class called **DListNode** which is just like **ListNode**, but with a `prev` pointer.

Lastly, create a new class called **DLinkedListIterator**, patterned on **LinkedListIterator**. Your **DLinkedListIterator** class should have a new method called **retreat()** which sets the iterator to the item pointed to by the `prev` pointer.

Homework setup

Because these `LinkedList` classes are in the `weiss.nonstandard` package, we must compile them in a slightly different way than before.

Assuming that `ListNode.java`, `LinkedList.java`, `LinkedListIterator.java`, `DListNode.java`, `DLinkedList.java`, and `DLinkedListIterator.java` are all in the

```
~/hw/hw3/weiss/nonstandard
```

directory, then we must compile the Java files from the

```
~/hw/hw3/
```

directory. This is because the compiler, when trying to compile `DLinkedList.java`, will see references to the `weiss.nonstandard.DLinkedListNode` class. In order to find it, it will look in the “`weiss/nonstandard/`” directory.

Thus, to compile the files you are editing, you should do:

```
> cd ~/hw/hw3
> javac -g weiss/nonstandard/DLinkedListNode.java
> javac -g weiss/nonstandard/DLinkedListIterator.java
> javac -g weiss/nonstandard/DLinkedList.java
```

Grading

1) (10 points) Modify the `main()` method given in `LinkedList.java` so that it builds and refers to your new **DLinkedList** class. You will have to change references from **LinkedListIterator** to **DLinkedListIterator**. Make sure that the output is correct.

2) (17 points) Next, modify `main()` so that you build a **DLinkedList** with 10 different Integers in it. Print out the first five numbers in order (with the `advance()` method of **DLinkedListIterator**). Then, print out the first five numbers in reverse order by calling `retreat()`.