

# 05 B: Midterm 1 and Puzzlers

CS1102S: Data Structures and Algorithms

Martin Henz

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- 1 Puzzlers
  - Solution Puzzler “Generic Drugs”

# Last Puzzler: Generic Drugs

```
public class LinkedList<E> {
    private Node<E> head = null;
    private class Node<E> {
        E value;
        Node<E> next;
        // constructor links the node as new head
        Node(E value) {
            this.value = value;
            this.next = head;
            head = this;
        }
    }
}
```

## Last Puzzler: Generic Drugs

```
public void add(E e) {
    new Node<E>(e); // Link node as new head
}
public void dump() {
    for (Node<E> n = head; n != null; n = n.next)
        System.out.print(n.value + " ");
}
public static void main(String[] args) {
    LinkedList<String> list
    = new LinkedList<String>();
    list.add("world");
    list.add("Hello");
    list.dump();
} }
```

# The Problem

```
public class LinkedList<E> {  
    private Node<E> head = null;  
    private class Node<E> {  
        ...  
    }  
    ...  
}
```

The problem is that the two lines

```
LinkedList<E>  
Node<E>
```

declare different type variables E!

# The Problem

---

The problem is that the two lines

```
LinkedList<E>  
    Node<E>
```

declare different type variables E!

Resulting error

```
Cannot convert from LinkedList<E>.Node<E> to  
LinkedList<E>.Node<E>
```

## Example in Java

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```
public class Test {  
    public int myVar = 3;  
    public void f(int myVar) {  
        return myVar + 7;  
    }  
}
```

There are two declarations of `myVar`. The declaration that applies to `return myVar + 7` is the *closest surrounding declaration*.

# A Simple Fix

```
public class LinkedList<E> {
    private Node head = null;
    private class Node {
        E value;
        Node next;
        // constructor links the node as new head
        Node(E value) {
            this.value = value;
            this.next = head;
            head = this;
        }
    } ...
}
```



# A Simple Fix

---

```
...
public void add(E e) {
    new Node(e); // Link node as new head
}
public void dump() {
    for (Node n = head; n != null; n = n.next)
        System.out.print(n.value + " ");
} }
```

## New Puzzler: Shades of Gray

What does the following program print?

```
public class ShadesOfGray {
    public static void main(String[] args) {
        System.out.println(X.Y.Z);
    }
}
class X {
    static class Y {
        static String Z = "Black";
    }
    static C Y = new C();
}
class C {
    String Z = "White";
}
```

# Next Week

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- Monday Lab: Lab tasks (attendance taken; bonus marks)
- Wednesday: Hashing
- Thursday: Tutorial on midterm solutions
- Friday: Hashing and Priority Queues