05 B: Midterm 1 and Puzzlers

CS1102S: Data Structures and Algorithms

Martin Henz

February 12, 2010

Generated on Tuesday 23$^{\text{rd}}$ February, 2010, 11:19

Last Puzzler: Generic Drugs

```java
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

```java
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

```java
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

```java
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

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