

CS367 Lecture 3

Wednesday 18 June 2014

Reminders:

- Register on Piazza
- HW0 due today
- HW1 and P1 assigned.
- Email ansari@cs.wisc.edu about VISA, any conflicts, etc.

Last class:

- Generics
- Lists

Today:

- Iterators
- Primitives vs. References
- Java Visibility Modifiers

Iterators

What are they?

Conceptual Picture

`Iterator<E>` interface in `java.util` specifies what iterators must do:

- `boolean hasNext()`
- `E next()`
- `void remove() // optional`

Every class implementing the `Iterable` interface must have an `iterator()` method.

Using iterators: Examples

Suppose L is an `ArrayList<String>` containing Strings. Write a code fragment that uses iterators to print each item in L.

Complete the method using iterators to determine if the list contains duplicates.

```
public boolean hasDups(ArrayList<String> list)
```

What happens here?

```
for (Iterator<String> it = alist.iterator(); it.hasNext(); ) {  
    System.out.println(alist.get(i++));  
}
```

Providing iterators (implementer's hat)

Direct vs. indirect access

```
public class ArrayGSack<E> implements GSackADT<E>, Iterable<E> {  
    ...  
    public Iterator<E> iterator() {  
  
    }  
}
```

Adding iterators to GSack

```
public class ArrayGSackIterator<E> implements Iterator<E> {

    public ArrayGSackIterator(                ) {

    }

    public boolean hasNext() {

    }

    public E next() {

    }

    public void remove() {
        throw new UnsupportedOperationException();
    }
}
```

Primitives vs. References: Assignment

Primitives:

```
int x, y, z;  
x = 7;  
y = x;  
z = x;  
y = 10;  
z = 8;
```

References:

```
ArrayList<String> x, y, z;  
x = new ArrayList<String>();  
y = x;  
z = x;  
y = new ArrayList<String>();  
z.add("Madison");
```

Primitives vs. References: Parameter Passing

Primitives

Suppose:

```
void mod1(int x) {  
    x = 7;  
}
```

and in main():

```
int x = 1;  
int[] y = {1, 2, 3};  
mod1(x); mod1(y[2]);
```

References:

Suppose:

```
void mod2(int[] x) {  
    x[0] = 7;  
}  
  
void mod3(int[] x) {  
    x = new int[x.length]  
    x[0] = 14;  
}
```

and in main():

```
int[] a = {1, 2, 3};  
mod2(a);  
mod3(a);
```

Java Visibility Modifiers

public

private

protected
