CompSci 6
Programming Design and Analysis

March 22, 2007
Prof. Rodger
Announcements

• No reading for next class. – More on sets.
• Assignment 6 due March 29!
  – There is extra credit on this assignment
• No Reading Quiz for next time
Sets

• Set is an unordered list of items
  – Items are unique! Only one copy of each item in set!

• In Java we will use TreeSet to manipulate a set
  – A TreeSet is a particular implementation of a Set

• Operations:
  – Create a set
  – Add an item to a set
  – Check if item is in a set
  – Is set empty?
  – Remove item from set
Example – Create and add to Set

TreeSet<String> firstnames = new TreeSet<String>();
firstnames.add("John");
firstnames.add("Emily");
firstnames.add("Alex");
firstnames.add("Mike");
firstnames.add("John");
firstnames.add("Mike");
Example – Is object in set?

```java
if (firstnames.contains("Zed"))
    System.out.println("Zed is in the set.");
else
    System.out.println("Zed is not in the set.");
if (firstnames.contains("Mike"))
    System.out.println("Mike is in the set.");
else
    System.out.println("Mike is not in the set.");
```
Iterator – Look at each element in a Set

• Can create an iterator to look at each element in the set
• Don’t know the order of the elements
• Guaranteed to give you all the elements in the set – one at a time
  – What is this similar to that we have done before?
Iterate over elements in Set firstnames

With collections loop, iterator is automatically created for you!

```java
// Print elements in set
for (String name : firstnames) {
    System.out.println(name);
}
```
Alternative way to use Iterator

// you must create iterator for set
Iterator<String> iter2 =
    firstnames.iterator();
// use iterator to print elements in set

while (iter2.hasNext())
{
    System.out.println(iter2.next());
}
Example – Other Operations on Sets

• size() – returns size of set
  – System.out.println("Size of set is " + firstnames.size());

• remove(object) – remove object from set if there

• isEmpty() – return true if set is empty

• See “Sets” and “Iterator” on Java API page
Zed is not in the set.
Mike is in the set.
Alex
Emily
John
Mike
Size of set is 4
Set Operations

• **Union** of two sets
  – all the elements from both sets

• **Intersection** of two sets
  – the elements that are in both sets

• **Difference** of two sets \((A \setminus B)\)
  – the elements in A that are not in B
Classwork Today

• Implement set operations for two sets
  – Union, intersection, difference

• Implement set operations for array of sets
  – Union, intersection