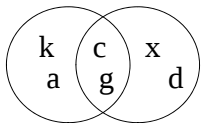


CompSci 6

Programming Design and Analysis



March 25, 2010

Prof. Rodger

Announcements

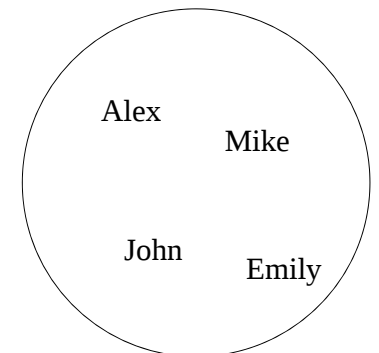
- Next time – more on sets
- No Reading Quiz for next time
- Assignment 8 out – APT on sets

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
 - A TreeSet just happens to store the items in order
- 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?

```
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
- In general don't know the order of the elements, however TreeSet implementation does give the elements in order.
- 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!

```
// 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

Output for Code shown (Set only printed once)

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 ($A - B$)
 - 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