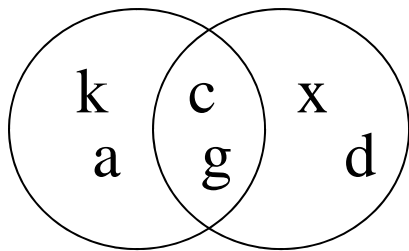


# CompSci 6

## Programming Design and Analysis



March 25, 2010

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# Announcements

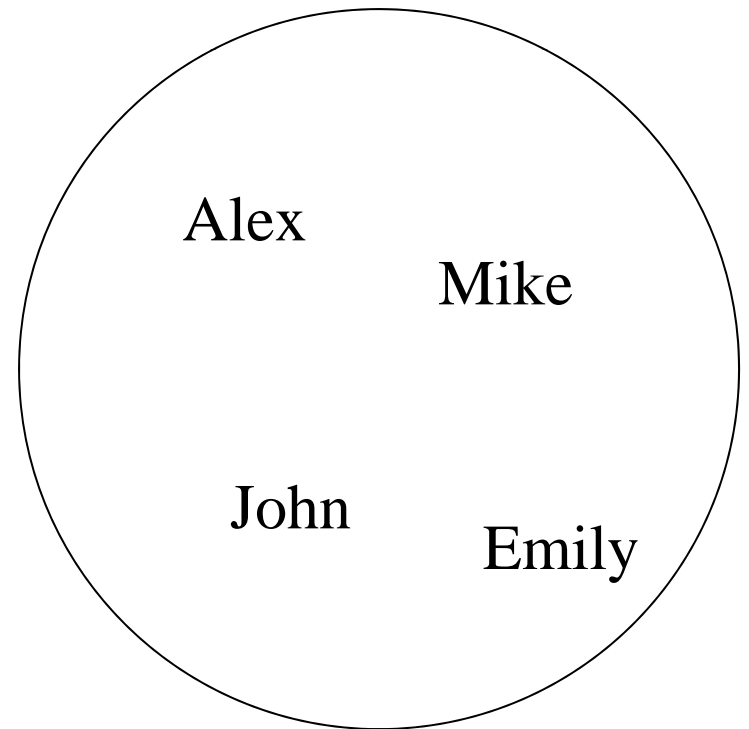
- Next time – more on sets
- No Reading Quiz for next time
- Assignment 8 out – APT on sets

# 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 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