CompSci 6
Programming Design and Analysis

February 6, 2007
Prof. Rodger

"Hello"

Announcements

• Read for next time Chap. 13.1-4, 16.1-2
• Assignment 5 is due Thursday
• Classwork Jan 30 due today
• Classwork Feb 1, Feb 6 due Friday
• Reading Quiz for next time
• Exam 1 is Thursday, Feb 15!

Review

• Types of loops
  – while
  – for
  – Collections for

• Group of data of the same type
  – Array
  – ArrayList – Collection in Java

Review - while

```java
public void printFencePost(int numberPosts) {
    String rail = "===";
    String post = "I";

    int num = 1;
    System.out.print(post);
    while (num < numberPosts) {
        System.out.print(post);
        System.out.print(rail);
        System.out.print(post);
        num++;
    }
    System.out.println(" ");
}
```
Review – Array/For loop Example

- Find max number, assume at least one number in the array

```java
public double MaxInArray(double [] numbers) {
    double max = numbers[0];
    for (int k = 1; k < numbers.length; k++) {
        if (numbers[k] > max)
            max = numbers[k];
    }
    return max;
}
```

How do you use an ArrayList?
What does this code do?

```java
// create an ArrayList
ArrayList<Integer> numbers =
    new ArrayList<Integer>();
numbers.add(78);
numbers.add(83);
numbers.add(43);
numbers.set(0, 94);
Collections.sort(numbers);
System.out.println(numbers.size());
System.out.println(numbers.get(0));
```

To use other Classes

- Sometimes need to add an import

```java
import java.util.Collections;
```

- Appears at top of program

```java
import java.util.ArrayList;
import java.util.Collections;
```

Same Problem from before - Find Max - Use an ArrayList

```java
public double MaxInArray(double [] numbers) {
    // convert to ArrayList first
    ArrayList<Double> numbersAL =
        new ArrayList<Double>();
    for (int k = 0; k < numbers.length; k++) {
        numbersAL.add(numbers[k]);
    }
```
(cont)

```java
// solve using Collections loop
double max = numbersAL.get(0);
for (double temp: numbersAL)
{
  if (temp > max)
    max = temp;
}
```

Alternative (cont)

```java
// or Alternatively use for loop and get
max = numbersAL.get(0);
for (int k=0; k< numbersAL.size(); k++)
{
  if (numbersAL.get(k) > max)
    max = numbersAL.get(k);
}

return max;
```

Strings

- A String is a class
- String constant
  - “The NC State Fair starts Friday!”
- All strings are constants! You cannot change them!
- Do not need “new” when creating a String

Strings (cont)

- How do you build a new string?
  - Initialize a string as empty
  - Use + (concatenation) to put strings together
  - Example::
    ```java
    String dayFairStarts = "";
    String month = "Oct";
    dayFairStarts = "Friday";
    dayFairStarts += ", " + month + " " + 14 + ", " + 2005;
    ```
  - Has the string been modified?
What can you do with strings?

- Look at API
  - int length()
    - Returns length of string
- String substring(int beginIndex)
  - Returns substring from beginIndex to end of string
- String substring(int beginIndex, int endIndex)
  - Returns substring from beginIndex to endIndex - 1

Example

```
String one = "ferriswheel";
String two = one.substring(5);
String three =
    one.substring(4,6);
```

What are two and three?

Finding substrings in strings

- int indexOf(String str)
  - Returns first position of str in the string
  - First position in a string is 0
- int indexOf(String str, int fromIndex)
  - Returns first position of str starting at fromIndex

Example

```
String one = "Cotton Candy";
String two =
    one.substring(indexOf("Can"),
                  indexOf("Can")+4);
```

What is two?
Review Strings

- String word = “CompSci 4”;  
- word.length() – returns length of string  
- word.toCharArray() – returns string as an array of characters  
- word.charAt(5) – returns character at position 5  
- Loop over characters in a string  
  for (char ch: word.toCharArray)
  {
  }

Write Reverse a String, Palindrome

- String Reverse(String s)  
  - Returns the string in reverse  
  - Hint: Build a new string that is the reverse

- Boolean Palindrome(String s)  
  - Returns true if s is a palindrome  
  - Hint: Use Reverse

Classwork Birthday

- Convert a String that represents a number to an int  
  Example (hint):
  
  String numString = “87”;  
  int num =  
  Integer.parseInt(numString);  
  // num has int value 87

Classwork – Class Scores

- Find the mode of (44, 77, 88, 77, 35, 44)  
- How?