CompSci 6
Programming Design and Analysis

February 5, 2008
Prof. Rodger

"Hello"
Announcements

• Read for next time Chap. 10.1-4, 11.1
• Assignment 5 is due Thursday
• Classwork Jan 29 due today
• Classwork Jan 31, Feb 5 due Friday
• Reading Quiz for next time
• Exam 1 is Thursday, Feb 14!
Review

• Types of loops
  – while
  – for
  – Collections for

• Group of data of the same type
  – Array
  – ArrayList – Collection in Java
public void printFencePost(int numberPosts) {
    String rail = "====";
    String post = "I";

    int num = 1;
    System.out.println(post);
    while (num < numberPosts) {
        System.out.println(rail);
        System.out.println(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
numbers.set(0, 94);
Collections.sort(numbers);

// Import 'Collections' (java.util)
Create class 'Collections'
Create constant 'Collections'

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

• Appears at top of program
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]);
    }
```
// solve using Collections loop

double max = numbersAL.get(0);
for (double temp : numbersAL)
{
    if (temp > max)
        max = temp;
}

Alternative (cont)

// 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 6”;
- `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):

```java
String numString = "87";
    int num = Integer.parseInt(numString);
    // num has int value 87
```