CompSci 6
Programming Design and Analysis

February 9, 2010
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A JFileChooser Dialog Box
Announcements/Review

• Assignment 4 due in a week
• Reading: Ch. 2.11-2.13, 8.1-8.8
  – Classes & OOP
• Reading Quiz next time
• Review: types of loops:
  – while, for, collection loop
• Review: Arrays:
  – array – built-in
  – ArrayList – Collection in Java
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

• Appears at top of program

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

- **String**
  - a sequence of characters
  - *objects* of the String class

- **String constants:**
  "Hello, World!"

- All Strings are constants don’t use “new” w/ String

- **String variables:**
  String message = "Hello, World!";

- **String length:**
  int n = message.length();

- **Empty string:** ""

- **Concatenating Strings**
  - Use the + operator:
    String name = "Dave";
    String message = "Hello, " + name;

- **Automatic type conversion**
  String a = "Agent00";
  int n = 7;
  String bond = a + n;
  // bond is "Agent007"
Strings (cont)

• How do you build a new string?
  – Initialize a string as empty
  – Use + (concatenation) to put strings together
  – Example:

        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())
  {
  }
  }
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
```
Comparing Strings and Objects

String one = "computer";
String two = "com" + one.substring(3,8);
String three = two;
String four = "science";

System.out.println(two);
if (one == two) // don’t do
    System.out.println("A");
if (two == three) // don’t do
    System.out.println("B");
Comparing Strings (cont)

if (one.equals(two))
    System.out.println("C");
if (two.equals(three))
    System.out.println("D");
if (one.compareTo(four) < 0)
    System.out.println("E");
Reading from Files

- import java.io.File;
- Declare a file
  ```java
  File fileOfCats = new File("cats.txt");
  ```
- Use file – pass it as an argument to a Scanner
  ```java
  Scanner in = new Scanner(fileOfCats);
  ```
Using Scanner class to read

• Import java.util.Scanner;
• Declare Scanner and bind it to a file (last slide)
• Make sure there is input still to read
  while (in.hasNext())
• Read next line
  String line = in.nextLine();
• Read next word/token
  String word = in.next();
• Read next integer
  String word = in.nextInt();
LineNumberer

• Reads all lines of a file and sends them to the output file, preceded by line numbers

• Sample input file:
Mary had a little lamb
Whose fleece was white as snow.
And everywhere that Mary went,
The lamb was sure to go!

• Program produces the output file:
/* 1 */ Mary had a little lamb
/* 2 */ Whose fleece was white as snow.
/* 3 */ And everywhere that Mary went,
/* 4 */ The lamb was sure to go!
import java.io.FileReader;
import java.io.FileNotFoundException;
import java.io.PrintWriter;
import java.util.Scanner;

public class LineNumberer {
    public static void main(String[] args) throws FileNotFoundException {
        Scanner console = new Scanner(System.in);
        System.out.print("Input file: ");
        String inputFileName = console.next();
        System.out.print("Output file: ");
        String outputFileName = console.next();

        FileReader reader = new FileReader(inputFileName);
        Scanner in = new Scanner(reader);
        PrintWriter out = new PrintWriter(outputFileName);
        int lineNumber = 1;
    }
}

Continued
while (in.hasNextLine())
{
    String line = in.nextLine();
    out.println("/* "+ lineNumber + " */ "+ line);
    lineNumber++;
}
out.close();
Classwork

• Write a method to print contents of file, one word at a time
• Write a method to calculate the mode of an array of integers
• Write a method to calculate the mode of a file of integers