Getting Started with Java

Recitation – 1/23/2009

CS 180

Department of Computer Science,

Purdue University

Project 1

- Now posted on the class webpage.
- Due Wed, Jan. 28 at 10 pm.
- Start early!
- All questions on the class newsgroup.
- Evening consulting hours from Monday to Wednesday during 7-10 p.m. in LWSN B146.

How to Solve This?

- Problem statement:
  - *Write a program that asks for the user's first, middle, and last names and replies with their initials.*
  - Example:
    - input: Andrew Lloyd Weber
    - output: ALW
- How do you understand this problem?
  - Input restraints or error tolerance?
  - Ask once or multiple times?
  - …

Overall Plan

- Identify the major tasks the program has to perform.
  - We need to know what to develop before we develop!
- Tasks:
  - Get the user's first, middle, and last names
  - Extract the initials and create the monogram
  - Output the monogram

Development Steps

- We will develop this program in two steps:
  - Start with the program template and add code to get input
  - Add code to compute and display the monogram
- Any more step in real life?
  - Do not forget to test every part of your program
  - Debug and improve your program

Step 1 Design

- The program specification states “get the user’s name” but doesn’t say how.
- How to get input?
  - Use **`JOptionPane`** (standard class)
  - Input Style Choice #1
    - Input first, middle, and last names separately
  - Input Style Choice #2
    - Input the full name at once
  - We choose Style #2 because it is easier and quicker for the user to enter the information

Why Use Standard Classes

- Don’t reinvent the wheel. When there are existing classes that satisfy our needs, use them.
- Learning how to use standard Java classes is the first step toward mastering OOP.
- Before we can learn how to define our own classes, we need to learn how to use existing classes.

JOptionPane for Output

- Using **`showMessageDialog`** of the **`JOptionPane`** class is a simple way to bring up a window with a message.

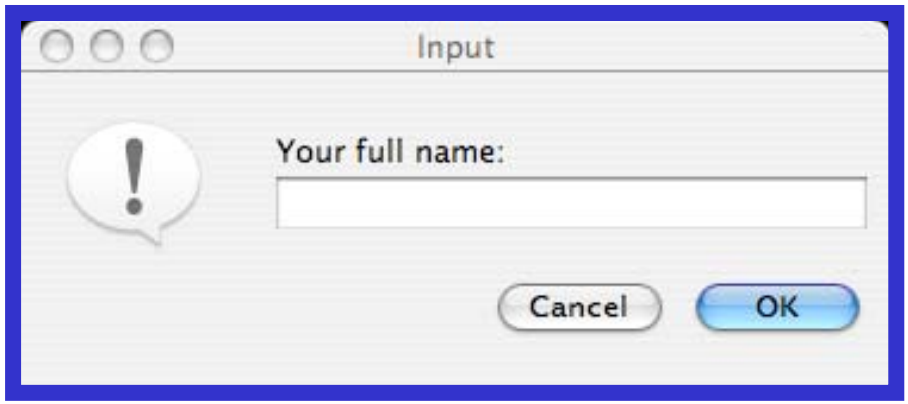
```
JOptionPane.showMessageDialog(null, “How
                                are you?”);
```

- How to show multiple lines of text?
  - Another line: **`“\n”`**

JOptionPane for Input

- Using **`showInputDialog`** of the **`JOptionPane`** class is another way to input a string.

```
JOptionPane.showInputDialog(null, "Your
                                    full name:");
```



String

- The textual values passed to the **`showMessageDialog`** method are instances of the **`String`** class.
- A sequence of characters separated by double quotes is a **`String`** constant.
- There are close to 50 methods defined in the **`String`** class. We will introduce three of them here: **`substring`**, **`length`**, and **`indexOf`**.
- We will also introduce a string operation called concatenation.

Usage of String Object

- Declaration

```
String name;
```

- Creation

```
name = new String("Jane Java");
```

- We can combine them together

```
String name = new String("Jane
                         Java");
```

- Indexing from 0 to length-1
  - Referring to the string **`name`**, which character's index is 3?

String Methods

- Assume **`str`** is a String object and properly initialized to **`"Purdue!"`**.
- Substring: **`str.substring(i, j)`**
  - What is **`str.substring(1, 3)`**?
- Length: **`str.length()`**
  - What is **`str.length()`**?
- Substring: **`str.indexOf(substr)`**
  - What is **`str.indexOf("ue")`**?
- Concatenation: **`str1 + str2`**
  - What is **`"Hi! " + str`**?
- Refer to Java API or lecture slides for more information

Step 1 Code

```
/*
   Chapter 2 Sample Program: Displays the Monogram
   File: Step1/Ch2Monogram.java
*/
import javax.swing.*;

class Ch2Monogram {
   public static void main (String[ ] args) {
      String name;
      name = JOptionPane.showInputDialog(null,
            "Enter your full name (first,
                              middle, last):");
      JOptionPane.showMessageDialog(null, name);
   }
}
```

Step 1 Test

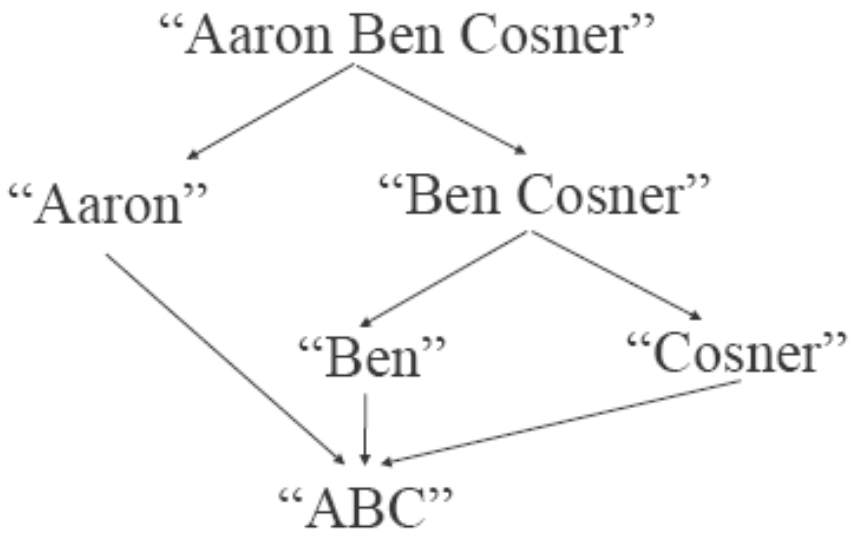
- In the testing phase, we run the program and verify that
  - we can enter the name
  - the name we enter is displayed correctly
- Why do we test before finishing the whole problem?
  - How to find a small bug in a large room?
  - What about finding a small bug on a small piece of paper?

Step 2 Design

- Our programming skills are limited, so we will make the following assumptions:
  - input string contains first, middle, and last names
  - first, middle, and last names are separated by single blank spaces
- Example
  - John Quincy Adams (okay)
  - John Kennedy (not okay)
  - Harrison, William Henry (not okay)

Step 2 Design

- Given the valid input, we can compute the monogram by
  - breaking the input name into first, middle, and last
  - extracting the first character from them
  - concatenating three first characters



Step 2 Code

```
/*
   Chapter 2 Sample Program: Displays the Monogram
   File: Step1/Ch2Monogram.java
*/
import javax.swing.*;

class Ch2Monogram {
   public static void main (String[ ] args) {
      String name, first, middle, last,
                          space, monogram;
      space = " " ;
      //Input the full name
      name = JOptionPane.showInputDialog(null,
               "Enter your full name (first,
                              middle, last):");
```

Step 2 Code

```
        //Extract first, middle, and last names
        first = name.substring(0, name.indexOf(space));
        name = name.substring(name.indexOf(space)+1,
                                        name.length());
        middle = name.substring(0, name.indexOf(space));
        last = name.substring(name.indexOf(space)+1,
                                        name.length());
        //Compute the monogram
        monogram = first.substring(0, 1) +
                        middle.substring(0, 1) +
                                last.substring(0,1);
        //Output the result
        JOptionPane.showMessageDialog(null,
                    "Your monogram is " + monogram);
    }
}
```

Step 2 Test

- In the testing phase, we run the program and verify that, for all valid input values, correct monograms are displayed.
- We run the program numerous times. Seeing one correct answer is not enough. We have to try out many different types of (valid) input values.

Program Review

- The work of a programmer is not done yet.
- Once the working program is developed, we perform a critical review and see if there are any missing features or possible improvements
- One suggestion
  - Improve the initial prompt so the user knows the valid input format requires single spaces between the first, middle, and last names
- Any other suggestion?

More Standard Classes

- Standard output: **`System.out.print(…)`**

```
System.out.print("Welcome to\nPurdue");
```

- Standard input: **`System.in`**
- Scanner

```
Scanner scanner = new Scanner(system.in);
```

- Date

```
Date today = new Date();
System.out.print(today.toString() + "\n");
```

  - SimpleDateFormat
- Refer to Java API or lecture slides for more information

Coding Style

- Take a careful look at the coding standards on the class website
- Develop or keep your own good coding style
- Good for readers, good for yourself

Quiz

- Write some code to print the following stuff:

  `Hey!`
  `Well done!`
  - Hint: **`System.out.print(…)`**
- Declare a String object **`school`** and let its value be **`“Purdue University”`**.