CompSci 100e
Program Design and Analysis II

Program running: standard output below

Test Results Follow (scroll to see all)

# of correct: 10 out of 10

1	pass
2	pass
3	pass
4	pass
5	pass
6	pass
7	pass
8	pass
9	pass
10	pass

January 18, 2011

Prof. Rodger

Announcements

- Lab 0 was to get Eclipse/Ambient running
- Lab 1 (Jan 21/24) – APTs
- APT Assignment out (do 7 APTs)
  - 2 done in class, 2 in lab, 3 on your own
  - Submit all 7 together one Java Project by Jan 25
- Consulting hours starting soon…..

Visualizing Text

- Text Cloud aka Tag Cloud?
  - Number of occurrences/emphasis indicated by size of word
  - Great visual/statistic: http://chir.ag/phernalia/preztags/

  - http://www.nytimes.com/gst/mostsearched.html?period=30&format=tagcloud
    - What information is stored in the URL of the NYTimes site above?

Lab 0: Text Clouds

- Point – To install Eclipse, Ambient, Java
- Text clouds: A simple yet powerful idea
  - Visualization of most frequently occurring words within some body of text
  - Color or font size indicates word frequency

- What is involved with generating text clouds?
  - Steps? Issues?
  - See `SimpleWordCount.java` and `SimpleCloudMaker.java`

Problem Solving and Programming

- How many words are in a file?
  - What's a word?
  - What's a file?
  - How do we solve this: simply, quickly, …?
    - What's the best we can do? Constraints?
- How many different/unique words are in a file?
  - How is this related to previous task?
- How many words do two files have in common?
  - Spell-checking, stemming, Did you mean ..?
- How many codons does DNA have in common?

Java - for loop

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

    System.out.print(post);
    for (int k = 1; k < numberPosts; k++) {
        System.out.print(rail);
        System.out.print(post);
    }
    System.out.println(" ");
}
```

Array

- Declare and initialize an array of integers

```
int[] values = new int[12];
```

- Set it to these values:

```
8 3 4 3 8 2 4 4 6 2 8 4
```

- Access item in slot 6 in the array

```
values[6]
```

- Array is fixed size. The size is:

```
values.length
```

Example

```
for (int k=0; k<values.length; k++)
{
    values[k] = values[k] + values[k-1];
}
```

- What does this do?
- Is it correct?

Classwork

- SimpleWordCount.java

Reading from Files

- import java.io.File;
- Declare a file

```
File fileOfCats = new
File("cats.txt");
```

- Use file – pass it as an argument to a Scanner

```
  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

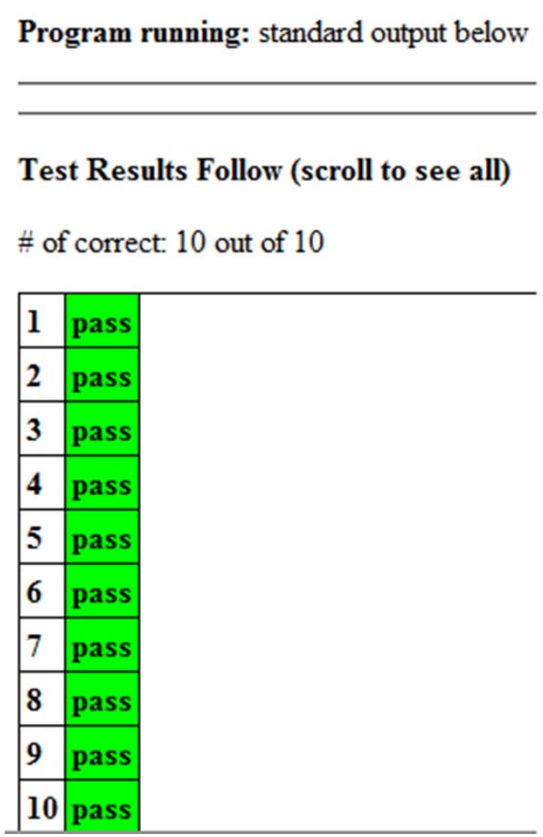
```
String word = in.nextInt();
```

What will we use Eclipse for in CompSci 100e?

- Use to write complete java programs
  - Access libraries
- Use as an editor to write text files
  - README – gives info about the program
- Use to write simple methods, then test with APT

APT – Algorithmic Program Testing

- Not a complete java program
  - No main method
- Focus on and solve one small problem
- Rich set of data for testing
- Use Eclipse editor for APT, but cannot run program! Why?
- Goal: all green



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Solve APT

- DNAreverse

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: `""`

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"
```

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?

Strings

- `String word = “CompSci 100e”;`
- `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())
  {
  }
```

Solve APT

- ClassScores