

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

- DNReverse

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