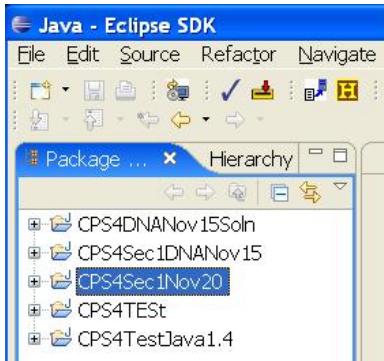


CompSci 4

Java (Part 2)

Nov 20, 2007

Prof. Susan Rodger



Review from last time

- What is Eclipse?
 - Environment to aid you in writing Java code
 - Create one project for each classwork
 - Put each new class in that same project
- What is an APT?
 - Tester for one method at a time
- Submit project (all classes for that day) with Ambient

Announcements

- Assignment 7
 - Storyboard due Nov 27
 - Alice world due Nov 29
- More APT's
 - String parts, Arrays

Review Strings

- `String word = "CompSci 4";`
- `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())
{
}
```

More on Strings

- `word.indexOf("Sci")`
 - Returns first position of “Sci” in word or -1 if not in word
- `word.substring(4, 6);`
 - Returns string that starts at position 4, goes up to but not including position 6 and is of length 2
- `word.substring(4)`
 - Returns string that starts at position 4 til the end of the string
- `word = word + " rocks";`
 - Build a string – append to the right end

Print out a value

- `System.out.println(string value);`
- Prints out on one line

Example

```
String course = "CompSci 4 Spring 2006";  
  
System.out.println(course);  
  
int pos = course.indexOf("Spring");  
String part1 = course.substring(0, pos);  
String part2 = course.substring(pos+6);  
course = part1 + "Fall" + part2;  
  
System.out.println(course);
```

if – else if - else

- Can have as many “else if” as you want
- else is optional
- First case that is true is executed
- See example on next page, what happens when num=3? num=6? num=10?

What is output for values of num?

```
if (num > 8)
{
    System.out.println(num);
}
else if (num > 5)
{
    System.out.println(num);
}
else
{
    System.out.println(num);
}
```

Arrays

- Parameter: double [] numbers
 - Means an array of doubles
 - Name of array is numbers
- Loop over items in an array – collections loop
 - for (double num: numbers)
 - {
 - // do something with num
 - // num is one item at a time from numbers
 - }

Arrays – (loop if Java 1.4)

- Parameter: double [] numbers
 - Means an array of doubles
 - Name of array is numbers
- Loop over items in an array

```
for (int k = 0; k< numbers.length; k++)
{
    // do something with numbers [k]
    // kth double in array numbers
}
```

- Note length applied to arrays – no parens

Array Example

- Find max number, assume at least one number in the array

```
public class MaxInArrayTest {
    public double MaxInArray (double [] numbers)
    {
        double max = numbers[0];
        for (double num: numbers)
        {
            if (num > max)
            {
                max = num;
            }
        }
        return max;
    }
}
```

Array Example (loop if Java 1.4)

- Find max number, assume at least one number in the array

```
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;
}
```

Example

- Given array
[“agt”, “aagt”, “taattt”, ccatg”]
- Given nucleotide “a”
- Returns “taattt”
- “a” appears 2 times max in a strand
- Longest such strand is “taattt”

Problem: DNA Max

- Given an array of DNA strands and a nucleotide (a, c, g, or t)
- Return the strand with the most occurrences of the nucleotide
- If there is more than one strand with the max number, return the longest such strand

Solve this problem in Eclipse

```
public class DNAMaxNucleotide
{
    public String max(String[] strands, String n)
    {
        // fill in code here
    }
}
```

- What steps do we do?
- What do we already know how to do?

Classwork today – More APTs

- Test java methods using APT
- Create one new Java project called CPS4Sec1Nov20 for all classwork
- Create three new classes based on APT problems
 - test with APT
 - Class and methods must be spelled exactly as shown
- Submit the project for grading under today's date

Classwork Problems see sheets on APT page for more detail

- Class: DNAComplement
 - Name of method: complement
 - Build and return a new string with complements
- Class: DNAReserve
 - Name of method: reverse
 - Build and return a new string that is the reverse
- Class: LongStrand
 - Name class: longest
 - Return string with most nucleotides