CompSci 4
Java (Part 2)
Apr 7, 2009

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Announcements/Review
• Assignment 7
  – Storyboard was due Apr 2, Alice world Apr 9
• What is Eclipse?
  – Environment to aid you in writing Java code
  – Create ONLY one project for each classwork, think of it as one Alice world with several
    classes in it
  – Put each new class in that same project
• What is an APT?
  – Web-based tester for one method at a time
• Today – More APTs
  – String – More APTs
  – 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)
   { 
    // do something to ch
   }

More on Strings
• word.indexOf(“Sci”)
  – Returns first position of “Sci” in “word” or –1 if not in word
• word.substring(4, 6)
  – Returns part of string in “word” that starts at position 4, goes up to but not including position
    6 and is of length 2
• word.substring(4)
  – Returns part of string in “word” 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:
  ```java
  System.out.println("word is ");
  System.out.println(word);
  ```

  What is printed?

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Example

```java
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);
```

How could you change 2006 to 2009 in course?

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if – else if - else

- Alternative to nesting ifs
- 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?

```java
if (num > 8) {
    System.out.println("A");
}
else if (num > 5) {
    System.out.println("B");
}
else {
    System.out.println("C");
}
```
Arrays

- Parameter: double [] numbers
  - Means an array of doubles, name of array is numbers
- Loop over items in an array – collections loop
  
  
  ```java
  for (double item: numbers)
  {
      // do something with item here
      // item is one_item_at_a_time
  }
  ```

To refer to one item in Array

- Name of array[position number]
- Be careful, position number must exist!

- Example:
  numbers is an array of doubles
  ```java
  System.out.println(numbers[3]);
  ```

Array Example

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

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

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
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”

Solve this problem in Eclipse

```java
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 CPS4Apr7 for all classwork
- Create three new classes based on APT problems – test with APT
  - Class and methods must be spelled exactly as shown
- Get checked off

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