CompSci 4
Java (Part 2)
Nov 17, 2009

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Announcements/Review

• Assignment 7
  – Storyboard was due already, Alice world Nov 19
• 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 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:
  System.out.println("word is ");
  System.out.println(word);

What is printed?

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);

How could you change 2006 to 2009 in course?

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?

What is output for values of num?

```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:
  
  ```java
  numbers is an array of doubles
  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 CPS4Nov17 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