Announcements/Review

• Assignment 7
  – Storyboard due Nov 25, Alice world Dec 2

• 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 2008 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(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
  One item at a time from array

  ```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 CPS4Sec1Nov20 (or Sec2) 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