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

```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?
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

  One item at a time from array

  type of item

  array name

  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

  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