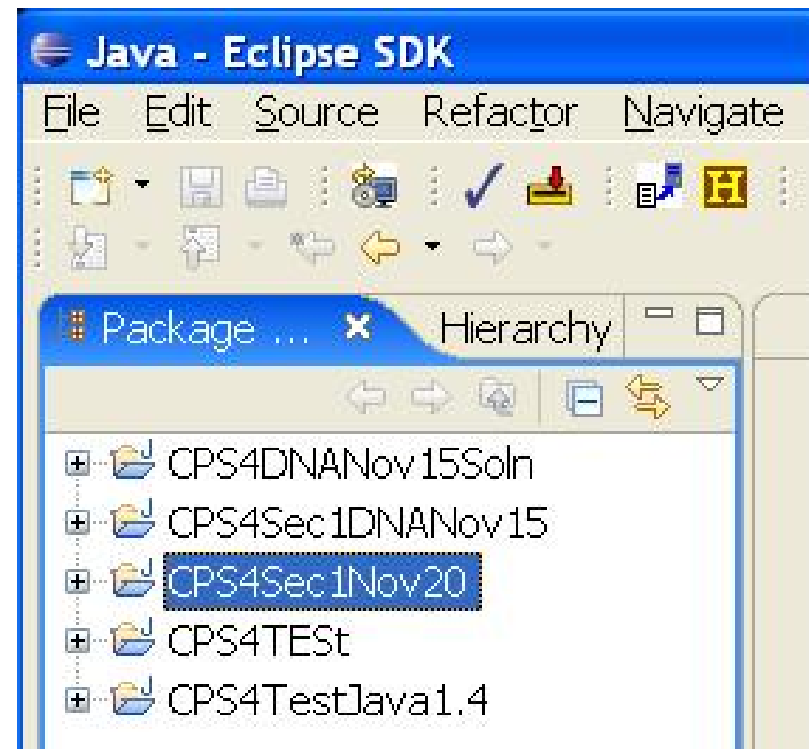# CompSci 4
Java (Part 2)
Nov 20, 2007

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Announcements

- Assignment 7
  - Storyboard due Nov 27
  - Alice world due Nov 29

- More APT's
  - String parts, Arrays

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

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

```java
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

```java
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;
}
```

Problem: DNA Max

- Given an array of DNA strands and a nucleotide (a, c, g, or t)

- Return the strand with the most occurences 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

```
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: 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