Model 1   Non-Static Methods

Method	Returns	Description
charAt(int)	char	Returns the char value at the specified index of this string.
indexOf(String)	int	Returns the index within this string of the first occurrence of the specified substring.
length()	int	Returns the length of this string.
substring(int, int)	String	Returns a new string that is a substring of this string (from beginIndex to endIndex - 1).
toUpperCase()	String	Returns a copy of this string with all the characters converted to upper case.

Each method listed above is non-static. That is, they have an *implicit parameter* named this that is passed automatically. (Note: There are many other String methods not listed above.)

Questions (15 min)   Start time:

1. If the variable str references the string "hello world", then what is the return value of the following method calls?

   a) str.charAt(8)   d) str.substring(4, 7)

   b) str.indexOf("wo")   e) str.toUpperCase()

   c) str.length()

2. Explain what precedes the dot operator (.) in the expressions above. What does it have to do with the keyword this in Model 1?

3. How many arguments does each method call in #1 have? (Hint: None of them have zero; don't forget to count the implicit argument.)

   a)   d)

   b)   e)

   c)

To call a `static` method, you write *ClassName.methodName*, for example: `Math.abs(-5)`

To call a non-`static` method, you write *objectName.methodName*, for example: `str.charAt(8)`

Methods can be designed either way. Most `String` methods are non-`static`, because that makes the code easier to read.

Static (`str` passed explicitly)	Non-Static (`str` passed implicitly)
`String.charAt(str, 8) // wrong`	`str.charAt(8)`

4. Label each method below as `static` or non-`static` (based on how it is called).

a) `color.indexOf("RED")`

b) `String.format("%3d", x)`

c) `title.substring(0, 10)`

d) `String.valueOf(3.14)`

e) `name.charAt(0)`

5. Consider the following statement and compiler error. Why is it impossible to call `charAt` this way? How would you correct the error?

```
char c = String.charAt(0);
```

Error: non-static method charAt(int) cannot be referenced from a static context

6. For each method in #4, what object is referenced by `this`? (Write N/A if `this` is not passed to the method.)

a)

b)

c)

d)

e)