Implementing the Caesar Cipher

Creating and Manipulating Strings

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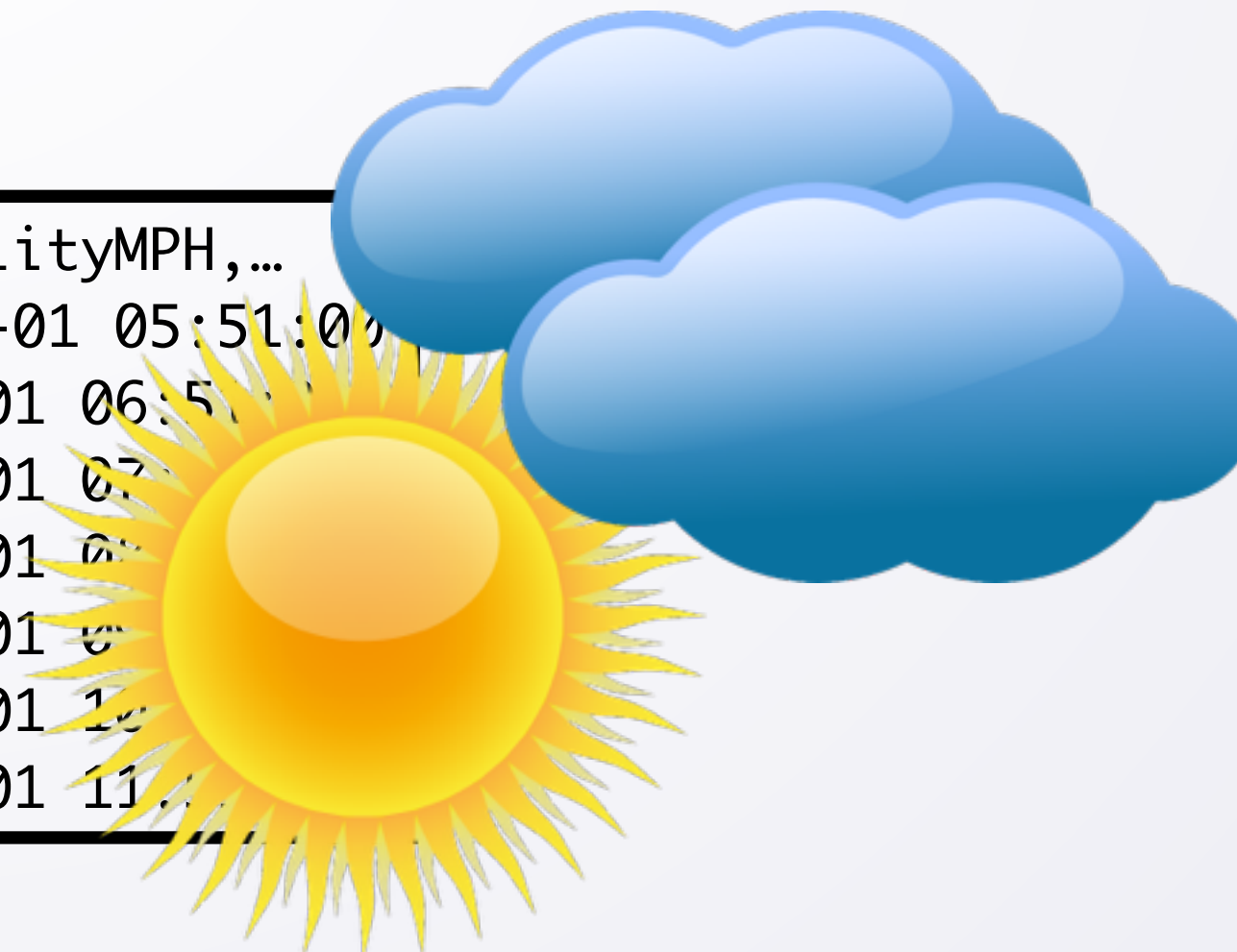# Strings: A Familiar Topic

- Strings: should be familiar

```
CGGACACACAAAAAGAAAAAAGGTTTTTTAAGATTTTTTGTGTGCGAGTAACTATGAGGAAGATTAACAG
TTTTCCTCAGTTTAAGGTATACACTGAAATTGAGATTGAGATTCTCCTCTTTGCTATTCTGTAACTTTCC
CTGGTTGTGACAATTGAATCAGTTTTATCTATTACCAATTACCATCAACATGGTATGTCTAGTGATCTTG
GGACTCTTCTTCATCTGGTTTTTCCTAGAGCTCTGAATCTATTTTGTGAGAAGTTCATCCAAACGACCCA
```

DNA

HTML
5

```
<div class="split-3-layout layout theme-base">
<h2 class="section-heading">
</h2>
<div class="column">
    <article class="story theme-summary
```

```
TimeEST,TemperatureF,Dew PointF,Humidity,Sea Level,PressureIn,VisibilityMPH,…
12:51 AM,30.9,25.0,79,30.36,10.0,Calm,Calm,-,N/A,,Overcast,0,2014-01-01 05:51:0
1:51 AM,30.9,25.0,79,30.37,10.0,Calm,Calm,-,N/A,,Overcast,0,2014-01-01 06:5
2:51 AM,30.9,26.1,82,30.38,10.0,Calm,Calm,-,N/A,,Overcast,0,2014-01-01 0
3:51 AM,30.0,26.1,85,30.37,10.0,Calm,Calm,-,N/A,,Overcast,0,2014-01-01
4:51 AM,30.0,27.0,88,30.37,10.0,Calm,Calm,-,N/A,,Overcast,0,2014-01-01
5:51 AM,30.9,26.1,82,30.37,10.0,Calm,Calm,-,N/A,,Overcast,0,2014-01-01
6:51 AM,32.0,25.0,75,30.38,10.0,ESE,4.6,-,N/A,,Overcast,110,2014-01-01 1
```

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Creating Strings

- Different from before: making Strings

  - Previously, pieces of existing Strings

  ```
  FIRST LEGION ATTACK EAST FLANK

  CFOPQ IBDFLK XQQXZH BXPQ CIXKH
  ```

Concatenation

- Concatenation

    - Fancy word for "stick together"

    - Use + operator with a String operand

```
"XYZ" + "ABCDEFGHIJKLMNOPQRSTUVW"
```

Concatenation

- Concatenation
  - Fancy word for "stick together"
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```
"XYZ" + "ABCDEFGHIJKLMNOPQRSTUVW"
```

```
"XYZABCDEFGHIJKLMNOPQRSTUVW"
```

Useful for Caesar Cipher

- Make a "rearranged" alphabet
  - Take two pieces (substring)
  - Concatenate them together

alphabet: ABCDEFGHIJKLMNOPQRSTUVWXYZ
encr: XYZ

String encr = alphabet.substring(23);

Useful for Caesar Cipher

- Make a "rearranged" alphabet
  - Take two pieces (substring)
  - Concatenate them together

```
alphabet: ABCDEFGHIJKLMNOPQRSTUVWXYZ
    encr: XYZABCDEFGHIJKLMNOPQRSTUVW
```

```
String encr = alphabet.substring(23);
encr = encr + alphabet.substring(0,23);
```

Strings Are Immutable

- Strings are immutable
  - Cannot change them
  - Can only make new ones

```
String s = "Hello";
```

```
s
```

```
H e l l o
```

Strings Are Immutable

- Strings are immutable

    - Cannot change them

    - Can only make new ones

```
String s = "Hello";
String x = s;
```

s
x

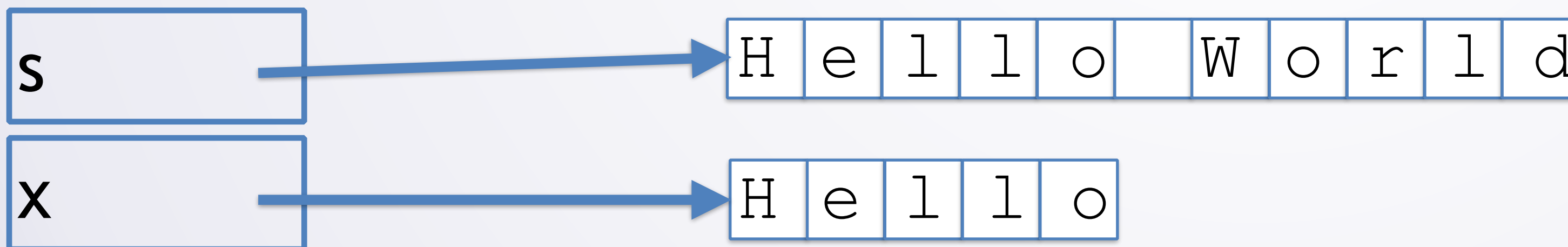| H	e	l	l	o

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Strings Are Immutable

- Strings are immutable
    - Cannot change them
    - Can only make new ones

- Many times with large String: slow

```
String s = "Hello";
String x = s;
s = s + " World";
```

| s | → | H | e | l | l | o | | W | o | r | l | d |

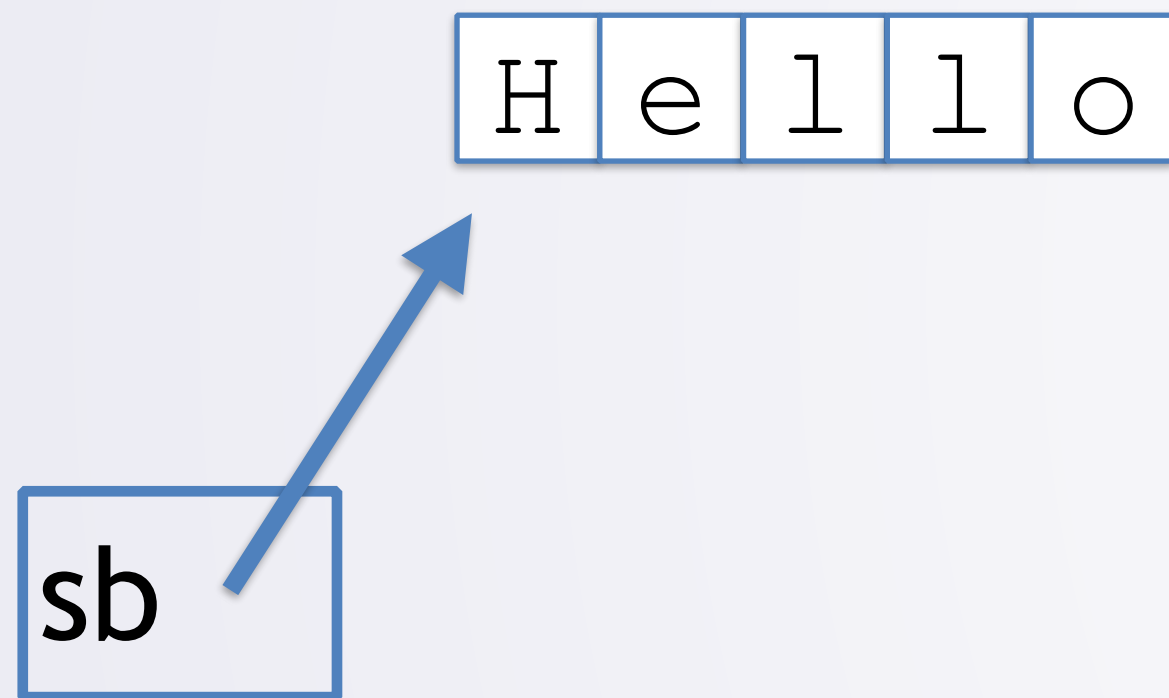| x | → | H | e | l | l | o |

StringBuilder

- Java has StringBuilder for exactly this purpose

  - Mutable sequence of characters

- StringBuilder sb = new StringBuilder("Hello");

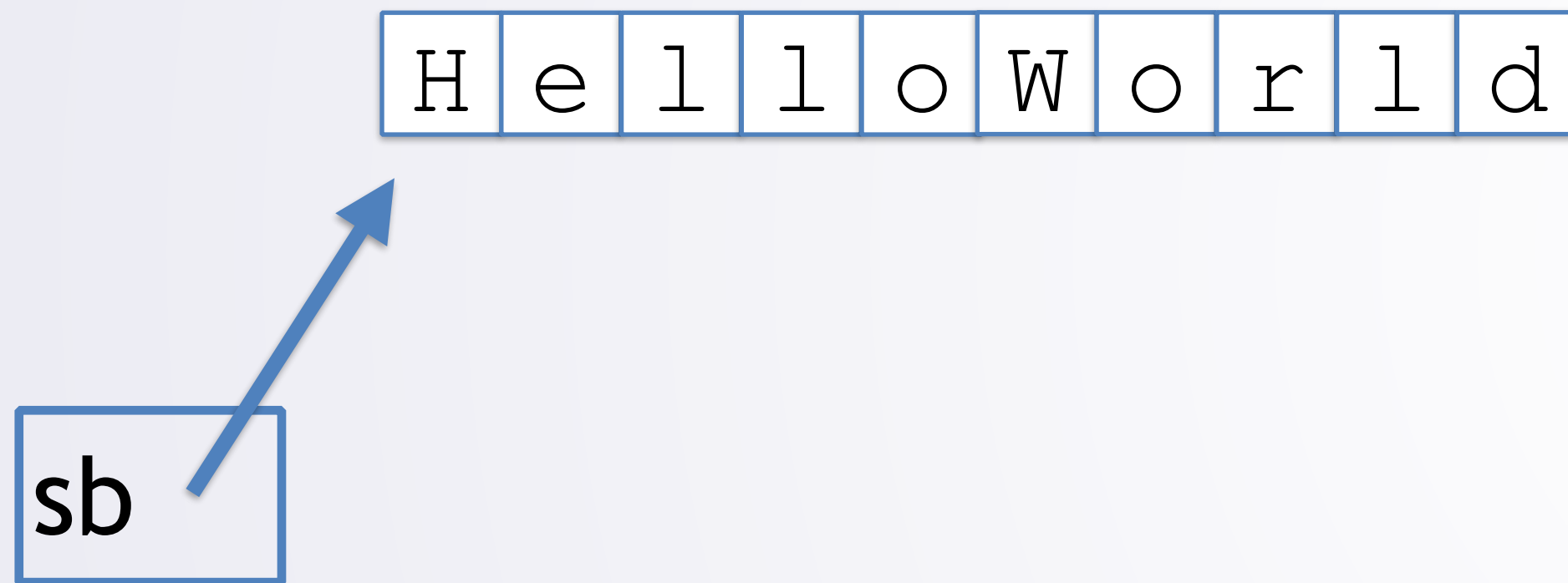| Method Name	Functionality
append	Put String, int, char, etc.. on end
insert	Insert String, int, char, etc... into middle
charAt	Gets character at specified index
setCharAt	Changes the character at specified index
toString	Get back String that you made

StringBuilder Mechanics

`StringBuilder sb = new StringBuilder("Hello");`

StringBuilder Mechanics

```
StringBuilder sb = new StringBuilder("Hello");
sb.append("World");
```

H	e	l	l	o	W	o	r	l	d

sb

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StringBuilder Mechanics

```
StringBuilder sb = new StringBuilder("Hello");
sb.append("World");
sb.insert(5, " Around The ");
```

H	e	l	l	o		A	r	o	u	n	d		T	h	e		W	o	r	l	d

sb