

# Implementing the Caesar Cipher

Creating and Manipulating Strings

# Strings: A Familiar Topic

- Strings: should be familiar

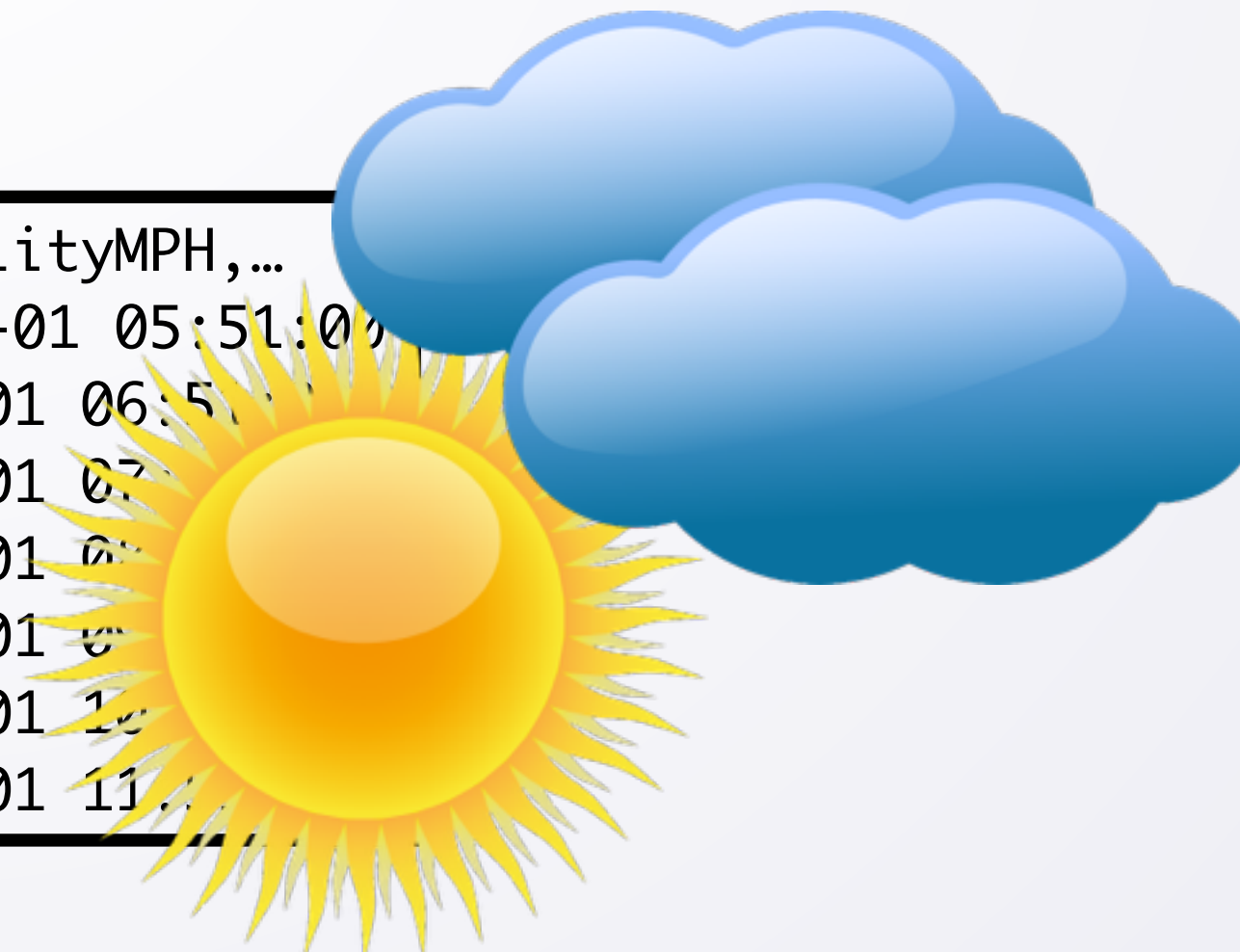
```
CGGACACACAAAAAGAAAAAGGTTTTTTAAGATTTTTTGTGTGCGAGTAACTATGAGGAAGATTAACAG
TTTTCTCAGTTTAAGGTATACACTGAAATTGAGATTGAGATTCTCCTCTTTGCTATTCTGTAACTTTCC
CTGGTTGTGACAATTGAATCAGTTTTATCTATTACCAATTACCATCAACATGGTATGTCTAGTGATCTTG
GGACTCTTCTTCATCTGGTTTTTCCTAGAGCTCTGAATCTATTTTGTGAGAAGTTCATCCAAACGACCCA
```



```
<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 05:51:00
1:51 AM, 30.9, 25.0, 79, 30.37, 10.0, Calm, Calm, -, N/A, , Overcast, 0, 2014-01-01 06:51:00
2:51 AM, 30.9, 26.1, 82, 30.38, 10.0, Calm, Calm, -, N/A, , Overcast, 0, 2014-01-01 07:51:00
3:51 AM, 30.0, 26.1, 85, 30.37, 10.0, Calm, Calm, -, N/A, , Overcast, 0, 2014-01-01 08:51:00
4:51 AM, 30.0, 27.0, 88, 30.37, 10.0, Calm, Calm, -, N/A, , Overcast, 0, 2014-01-01 09:51:00
5:51 AM, 30.9, 26.1, 82, 30.37, 10.0, Calm, Calm, -, N/A, , Overcast, 0, 2014-01-01 10:51:00
6:51 AM, 32.0, 25.0, 75, 30.38, 10.0, ESE, 4.6, -, N/A, , Overcast, 110, 2014-01-01 11:51:00
```



# 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" + "ABCDEFGHIJKLMNOPQRSTUVWXYZ"



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"XYZ" + "ABCDEFGHIJKLMNOPQRSTUVWXYZ"



"XYZABCDEFGHIJKLMNOPQRSTUVWXYZ"

# 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";
```





# Strings Are Immutable

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

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



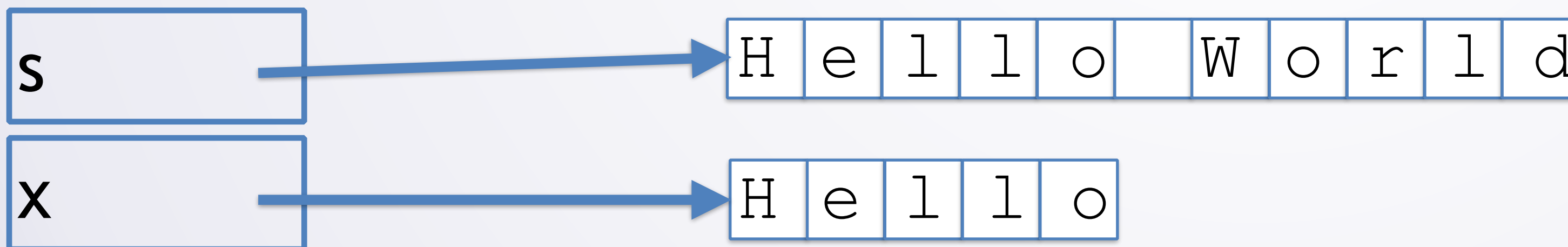
# Strings Are Immutable

- 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";
```



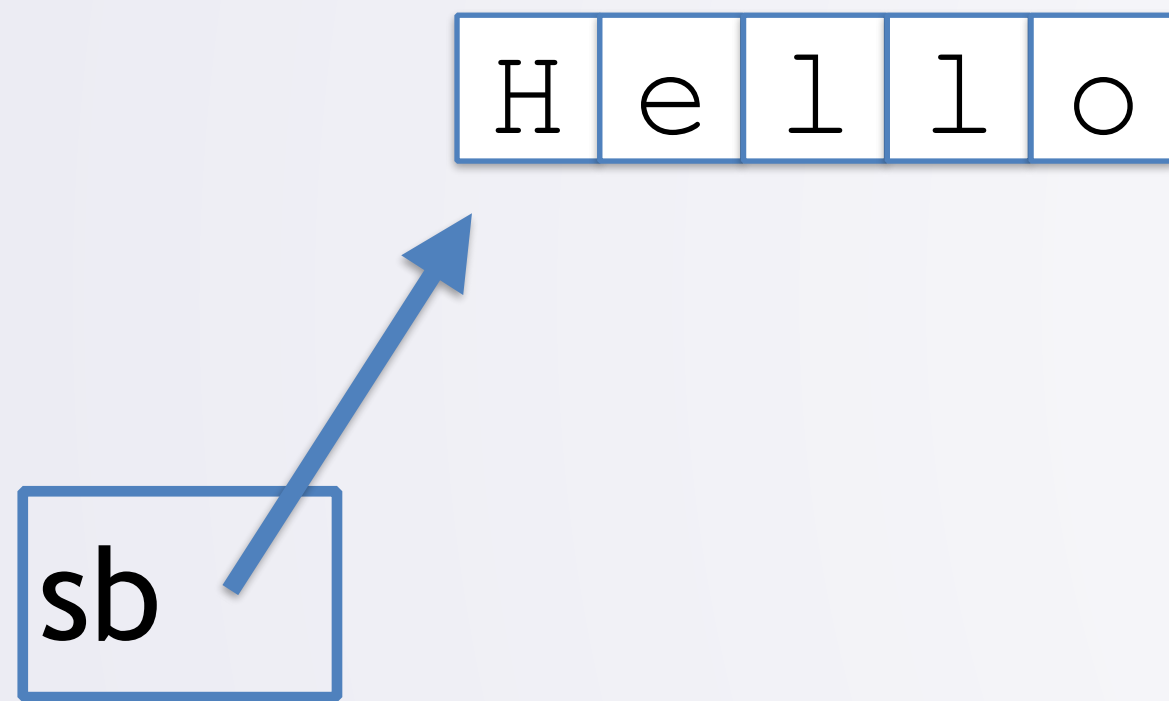
# StringBuilder

- Java has StringBuilder for exactly this purpose
  - Mutable sequence of characters
- `StringBuilder sb = new StringBuilder("Hello");`

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

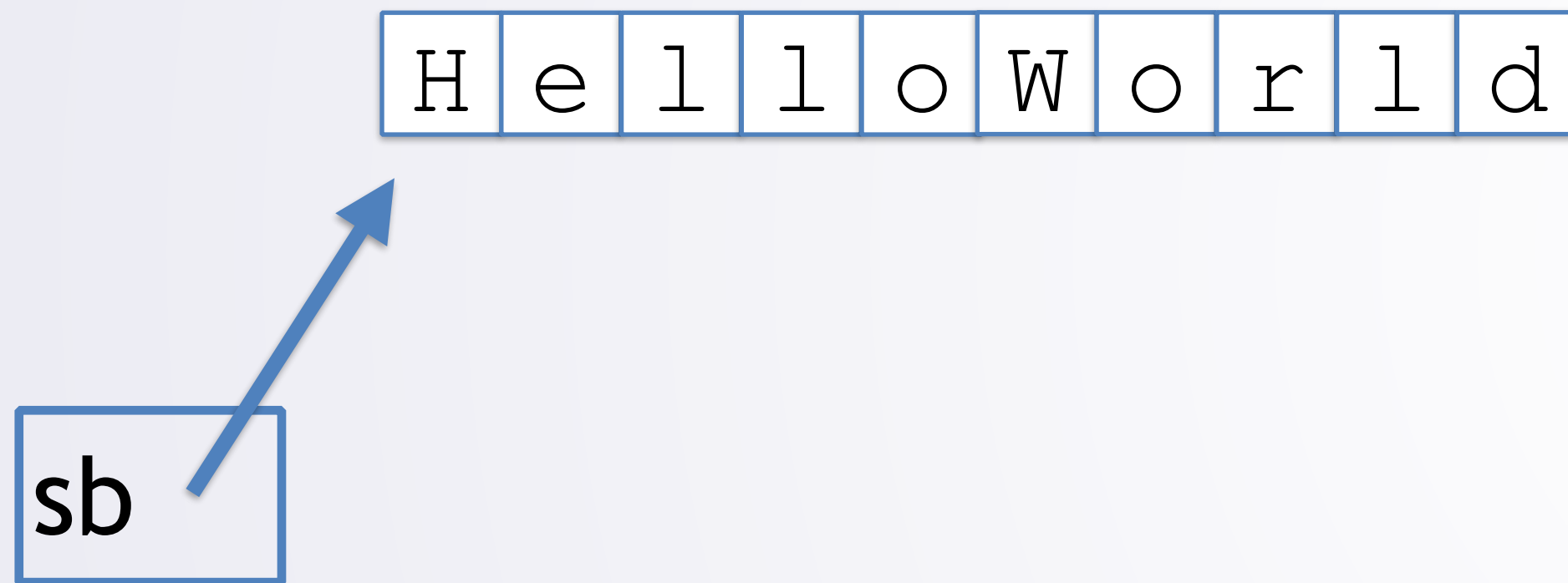
# StringBuilder Mechanics

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



# StringBuilder Mechanics

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



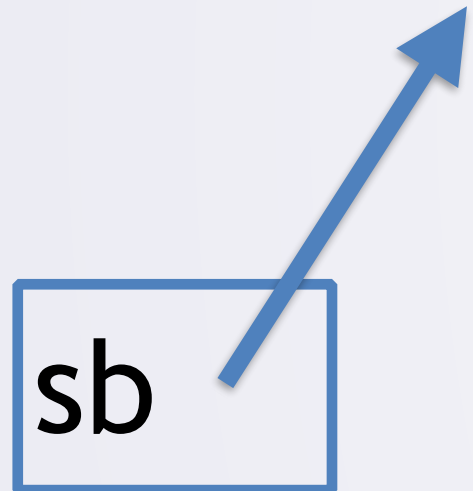


# StringBuilder Mechanics

```
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

A blue box containing the text 'sb' has a blue arrow pointing from its top-right corner to the first character 'H' of the character array above.