

## Lists and More About Strings

CS303E: Elements of Computers  
and Programming  
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## Functions vs. Methods

- We've been looking at string *functions*
  - take the string as an argument:  
string.<functionName>(<string>, <other args>)
- Now, we are going to look at *methods*
- Methods are called on objects:  
    <objectName>.<methodName>(<args>)
- So a string method...

## String Methods

- Strings methods are called on a string:  
    s="hello"  
    s.isalnum() #isalnum() is a method

## Sample String Methods

Method	Description
s.isalnum()	Returns True if s contains only letters and digits
s.isdigit()	Returns True if s contains only digits
s.isalpha()	Returns True if s contains only letters
s.isspace()	Returns True if s contains only whitespace
s.islower()	Returns True if all letters in s are lowercase
s.isupper()	Returns True if all letters in s are uppercase
s.endswith(<suf>)	Returns True if s ends with <suf>
s.startswith(<pre>)	Returns True if s ends with <pre>
s.count(<x>)	Returns number of times <x> appears in s
s.strip()	Returns a <i>new string</i> with leading and trailing whitespace characters removed
s.rstrip()	Returns a <i>new string</i> with trailing whitespace characters removed
s.lstrip()	Returns a <i>new string</i> with leading whitespace characters removed

	<b>iClicker Question</b>
	<p>What is the difference between a method and a function?</p> <p>A. Methods are called on objects; functions are not</p> <p>B. Functions perform a set of tasks</p> <p>C. Methods are for the madness</p>

	<b>Example: String Methods</b>
	<p>Write a segment of code that prints "all lower case letters" if a string, <code>s</code>, consists of only letters and all are lower case, "all upper case letters" if <code>s</code> consists of only letters and all letters are uppercase, and prints "whitespace" if <code>s</code> is all whitespace.</p>

	<b>Lists as Parameters</b>
	<ul style="list-style-type: none"> <li>■ When a list is a parameter to a function, that function has the ability to change its value in the calling function</li> <li>■ Let's see why...</li> </ul>

	<b>Lists as Parameters: Summary</b>
	<ul style="list-style-type: none"> <li>■ Lists are not passed into the function in the typical way</li> <li>■ Instead, a pointer to the list is passed</li> <li>■ As a result, the function has access to the same list</li> </ul>

### iClicker Question

If lists, files, and strings are all objects, and objects can be modified in functions, why can't strings be modified in functions?

- A. Strings aren't objects
- B. Functions are irrelevant, strings are immutable
- C. They can be!

### Memory Management

- Variables and their values take up space in memory
- Memory space is limited
- To save memory, a program should clean up any values it has finished using
  - Many languages the programmer must do this explicitly using delete or free

### Garbage Collection

- Other languages manage the memory for you
- *Garbage collectors* collect any values no longer being used
  - Python, Java

### Group Exercise

Write a function that takes a list and sorts it in ascending order. Do not use the Python `sort()` method.