

## Objectives

- More Strings!
- Exam review

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## Review

- How do you put a tab in a string?
- What is the general name for characters like tab?
  - What are other examples?
- How do you “get” a certain character in a string?
- How do you iterate through a string?
- Can you modify the contents of a string?

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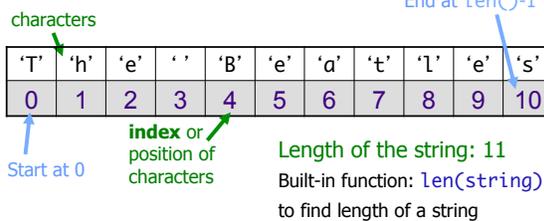
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## Review: Strings

- Actually a *sequence* of characters

➢ Example:

band = “The Beatles”



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## Review: Iterating Through a String

- For each character in the string

string of length 1

```
for char in string:  
    print(char)
```

'T'	'h'	'e'	' '	'B'	'e'	'a'	't'	'l'	'e'	's'
0	1	2	3	4	5	6	7	8	9	10

An integer

```
for pos in range(len(string)):  
    print(string[pos])
```

- For each position in the string

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## Review: Substrings Operator []

- Look at a particular character in the string
  - Syntax: `mystr[<integer expression>]`
  - [Positive value]: index of character
  - [Negative value]: count backwards from end
- Look at a sequence of characters in the string
  - Syntax: `mystr[<start>:<end>]`

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## Review: Testing for Substrings

- Using the `in` operator
  - Used `in` before in `for` loops
- Syntax:

```
substring in mystring:
```

  - Evaluates to True or False
- Example:

```
if "Jr." in name:  
    print name, "contains 'Jr.'"
```

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## Format Specifiers

[ ] mean optional

- General format: `%[flags][width][.precision]code`
  - flags:
    - 0: zero fills
    - +: adds a + sign before positive values
    - -: left-justification (default is right-justification)
  - width:
    - *Minimum* number of character spaces reserved to display the entire value
    - Includes decimal point, digits before and after the decimal point and the sign

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## Format Specifiers

- General format: `%[flags][width][.precision]code`
  - precision:
    - Number of digits after the decimal point for **floating point** values
  - code:
    - Indicates the value's **type**/how to format

Code	Type
s	string
d or i	integer
f	float
e	floating point with exponent

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## Example using Format Operator

```
print("Your item that cost ($%.2f)" % value)
print("costs $%.2f with tax" % tax)
```

Alternative:

```
print("Your item that cost ($%.2f) costs $%.2f with tax" % (value, tax))
```

Diagram labels: Formatting operator, Format specifier, Replacement values

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## Formatting Practice

- `x = 10`
- `y = 3.5`
- `z = "apple"`
- `"%6.2f" % x`
- `"%6.2d" % x`
- `"%06.2f" % y`
- `"%+6.2f" % y`
- `"%-10s" % z`
- `"%5d %-7.3f" % (x,y)`

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## Example: Printing Out Tables

- A table of temperature conversions

```
Temp F      Temp C      Temp K
-----
-459.7      -273.1        0.0
  0.0        -17.8        255.2
 32.0         0.0         273.1
```

- If we want to print data in rows, what is the template for what a row looks like?
  - How do we make the column labels line up?

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`temp_table.py` 17

## USING THE STR API

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## Review

- What is an API?
- How do we call methods on an object?

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## str Methods

- **str** is a *class* or a *type*
- **Methods**: available operations to perform on **str** objects
  - Provide common functionality
- To see all methods available for **str** class
  - `help(str)`

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## str Methods

- Example method: **find(substring)**
  - Finds the index where substring is in string
  - Returns -1 if substring isn't found
- To call a method:
  - `<str_obj>.methodname([arguments])`
  - Example: `filename.find(".py")`

Executed on this string

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## Common str Methods

Method	Operation
<code>center(width)</code>	Returns a copy of string centered within the given number of columns
<code>count(sub[, start [, end]])</code>	Return # of non-overlapping occurrences of substring <code>sub</code> in the string.
<code>endswith(sub), startswith(sub)</code>	Return <code>True</code> iff string ends with/begins with <code>sub</code>
<code>find(sub[, start [, end]])</code>	Return first index where substring <code>sub</code> is found
<code>isalpha(), isdigit(), isspace()</code>	Returns <code>True</code> iff string contains letters/digits/whitespace only
<code>lower(), upper()</code>	Return a copy of string converted to lowercase/lowercase

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`string_methods.py`

## Common str Methods

Method	Operation
<code>replace(old, new[, count])</code>	Returns a copy of string with all occurrences of substring <code>old</code> replaced by substring <code>new</code> . If <code>count</code> given, only replaces first <code>count</code> instances.
<code>split([sep])</code>	Return a list of the words in the string, using <code>sep</code> as the delimiter string. If <code>sep</code> is not specified or is <code>None</code> , any whitespace string is a separator.
<code>strip()</code>	Return a copy of the string with the leading and trailing whitespace removed
<code>join(&lt;sequence&gt;)</code>	Return a string which is the concatenation of the strings in the sequence with the string this is called on as the separator
<code>swapcase()</code>	Return a copy of the string with uppercase characters converted to lowercase and vice versa.

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## String Methods vs. Functions

### Functions

- All "input" as arguments/parameters
- Example: `len` is a built-in function
  - Called as `len(strobj)`

### Methods

- "Input" are argument/parameters *and* the string the method was called on
- Example:
  - `strobj.upper()`

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## Are You Smarter Than a 5th Grader?

- Problem in spelling from the show: How many a's are in abracadabra?
  - Solve using `str` methods

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## Verifying User Input

- How can we verify that the user entered the lottery number in the correct format?
  - Review: What was the correct format?

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## Looking Ahead

- Lab tomorrow
  - Strings
- Exam Wednesday

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