SI 506 Lecture 04

Topics

1. Statements and expressions
2. Object behaviors (a gentle intro)
3. string formatting: f-string; `\n` newline escape sequence
4. In-class coding challenges

Vocabulary

- **Expression**. An accumulation of values, operators, and/or function calls that return a value. `len(< some_list >)` is considered an expression.
- **f-string**. Formatted string literal prefixed with `f` or `F`.
- **Method**. A function defined by and bound to an object. For example the `str` type is provisioned with a number of methods including `str.lower()` and `str.strip()`.
- **Statement**. An instruction that the Python Interpreter can execute. For example, assigning a variable to a value such as `name = 'arwhyte'` is considered a statement.

1.0 Statements and expressions

A Python *statement* is an instruction that performs some action. For example, a variable assignment is considered a statement. Actions that evaluate one or more conditions (`if-else-if`) or involve iteration over a sequence or a dictionary (`for`, `while`) are also considered statements.

A Python *expression* is a combination of values, pointers (i.e., variables), operators, and/or function or method calls that return a value.

 A statement can include one or more expressions (the reverse is not true).

```
schools = [
    'Gerald R. Ford School of Public Policy',
    'School of Information',
    'School of Public Health',
    'Stamps School of Art & Design'
    ] # a statement

named_schools = [] # statement
for school in schools: # statement
    if ' school' in school.lower(): # statement that includes an
expression (school.lower())
        named_schools.append(school) # expression (mutates the list)

print(f"\n1.0 named schools = {named_schools}") # expression
```

2.0 Object behaviors (a gentle intro)

The string (`str`) type or object can be said to exhibit behaviors that are expressed in the form of *methods* that you can call. For example, we can call `str.lower()` to convert a string to all lower case characters:

```
umich = 'University of Michigan'
umich_lowercase = umich.lower()

print(f"\nUMich lowercase = {umich_lowercase}")
```

Another `str` method that you will use frequently is the `str.split()` method. This method allows you to return a list of character "chunks" after splitting the string on a specified delimiter (the default delimiter is a space).

```
umich_twitter = '@UMich @UMichiganNews @UMichResearch @UMSI'
umich_twitter_handles = umich_twitter.split()

print(f"\nTWITTER 01 = {umich_twitter_handles}")
```

When you split `umich_twitter` on a space the return value is a list:

```
['@UMich', '@UMichiganNews', '@UMichResearch', '@UMSI']
```

Note that you can pass a specified delimiter to the `str.split()` method, as in the following example:

```
umich_twitter = '@UMich,@UMichiganNews,@UMichResearch,@UMSI'
umich_twitter_handles = umich_twitter.split(',')

print(f"\nTWITTER 02 = {umich_twitter_handles}")
```

❗ Consider carefully your choice of delimiter when splitting a string. In the following example, specifing a comma as the sole delimiter upon which to split the string will lead to unexpected results:

```
umich_twitter = '@UMich, @UMichiganNews, @UMichResearch, @UMSI'
umich_twitter_handles = umich_twitter.split(',') # wrong delimiter

print(f"\nTWITTER 03 = {umich_twitter_handles}")
```

The list returned by the split operation will contain string elements with a leading space--usually not the desired outcome.

```
['@UMich', ' @UMichiganNews', ' @UMichResearch', ' @UMSI']
```

💡 Instead specify a delimiter that also includes a trailing space (`', '`).

Over the course of the semester you will learn to use a number of `str` methods. For a complete listing see w3schools' "Python String Methods"

Other types such as lists, tuples, and dictionaries also include methods you can call. We will explore those types and their methods in the coming weeks.

3.0 String formatting

The lectures, lab exercises, and problem sets will often include a number of pre-positioned `print()` statements in which a *formatted string literal* (a.k.a f-string) is passed in as an argument.

The f-string syntax `f"some_string {some variable}"` is less verbose and easier to construct than earlier string formatting approaches. You will learn how to write f-strings as well as format string using the older approaches in the very near future.

```
course = 'SI 506'
print(f"\nCourse = {course}")
```

💡 `\n` represents an escape sequence, specifically an ASCII linefeed (LF). Think of `\n` as "newline". Passing `\n` in a string will insert a new line at the position of the escape sequence.

4.0 Challenges

Meme stocks: an emerging equities category in which company popularity and stock performance is driven in large part by social sentiment rather than traditional economic or corporate indicators.

GameStop Corp.'s (GME) share price rose dramatically during 2021. Between 4 January 2021 ($17.25) and 27 January 2021 ($347.51) the stock price increased an astounding 1914.55 percent. The stock price ended the year at $148.39 and the decline in the stock price has continued into early 2022 with the stock price closing at $116.65 on Friday, 14 January 2022.

During 2021 the stock price was driven in large part by otherwise small-scale "retail" investors using social media platforms to coordinate activities and force the more traditional private equity firms, hedge funds and wealthy investors—who had bet against the stock price increase via short-selling—to cover their losses by repurchasing GME shares that they had previously borrowed in order to return them and exit their trades, a response further contributing to the rise in the share price.

We'll use the 2021 GameStop share price surge as the "theme" for today's set of challenges.

Challenge 01

Uncomment the variable name that is both syntatically *and* stylistically correct from the list below:

```
# !ticker_symbol = 'GME'
# ticker-symbol = 'GME'
# ticker_symbol = 'GME'
# @ticker_symbol = 'GME'
# TickerSymbol = 'GME'
```

Challenge 02

Return the type and length of the "ticker symbol" object using the appropriate built-in functions and assign the return values to the appropriate variable.

```
obj_type = None
obj_length = None
```

Challenge 03

GameStop was not the only company that saw a jump in its share price due, in part, to coordinated retail investor activity. AMC Entertainment Holdings Inc. (NYSE: AMC), BlackBerry Ltd (NYSE; BB), and Macy's Inc. also experienced share price surges during January 2021.

Use the `str.split()` method to split the variable named `string` into a `list`. Assign the return value to the variable `companies`.

❗ The presence of a single quote in the string requires the use of double quotes to denote the `str` object.

```
string = "GameStop AMC BlackBerry Macy's"
companies = None
```

Challenge 04

Again, use the `str.split()` method to split the variable named `string` into a `list`. Assign the return value to the variable `companies`.

💡 this challenge requires that you pass to `string.split(< argument >)` the appropriate *delimiter* argument.

```
string = "GameStop, AMC, BlackBerry, Macy's"
companies = None
```

Challenge 05

GameStop's 2021 YTD (Year to date) price change was an astounding 760.23 percent. Write an equation that returns this value and assign it to the variable `percent_change`.

```
jan_04_open_price = 17.25 # 4 Jan 2021
dec_31_close_price = 148.39 # 31 Dec 2021
percent_change = None
```

Challenge 06

Let's say you decided to speculate in GameStop shares prior to the start of the 2022 Winter semester. You purchased five (5) shares at the opening price on Friday, 31 Dec 2021 ($153.62 per share) commission-free. You then sold all five (5) shares on Friday, 14 Jan 2022 ($148.39 per share), incurring a transaction fee of one percent (.01) on the sell price. Use Python to answer the following questions.

1. How much did it cost you to purchase the five shares?
2. What was the sell price of the five shares?
3. What was the percent change in price between 4 August and 8 September?
4. What was the return on investment (ROI) on your speculation in GME stocks?

💡 ROI is calculated by *subtracting* the initial value of the investment from the final value of the investment (less any fees), then *dividing* this new number (the net return) by the total cost of the investment, and finally, *multiplying* the quotient by 100.

```
dec_31_open_price = 153.62
jan_14_close_price = 148.39
gamestop_shares = 5

purchase_price = None
sell_price = None
percent_change = None
fee = None
roi = None
```

Challenge 07

The coordinated trading activity of "retail" investors rattled the market during the early part of the year. The Security and Exchange Commission (SEC) issued a statement on Wednesday, 27 January 2021, noting that it was "actively monitoring" the current volitility in the options and equities markets. The NY Times reported that "[n]o one knows how this ends."

First, return a count of the characters in the following multi-line string and assign to the variable `char_count`.

Then split the string into a list of character "chunks" using the blank spaces in the string as the delimiter. Then calculate the average chunk size and assign the value to the variable `avg_chunk_size`.

```
ny_times = """
No one knows how this ends. Some analysts say the intense activity could
eventually prompt a wider
sell-off in the market by forcing hedge funds on the losing side of these
trades to sell parts of
their portfolios to raise cash to cover their losses. While this
speculative frenzy played out on
the market's sidelines, the S&P 500 fell more than 2.5 percent on
Wednesday, its worst day since
```

```
late October, as the Federal Reserve gave a glum assessment of the economy
and before a number of
big tech companies announced their earnings.
"""

char_count = None

chunks = None
chunk_count = None

avg_chunk_size = None
```

Sources

- New York Times, "'Dumb Money' Is on GameStop, and It's Beating Wall Street at Its Own Game", 27 January 2021.
- GamesStop Inc., "Historical Price Lookup"
- finbox.com, "1 Year Stock Price Total Return for GameStop Corp."
- TheStreet, "Will GameStop Stock Repeat its Historic January 2021 Performance?"
- Yahoo Finance, GME 2021 share prices