Working with Variables and Expressions in Python

Estimated time needed: **10** minutes

Objectives

After completing this lab you will be able to:

- Use expressions and variables to perform operations

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Expressions and Variables

Expressions

Expressions in Python can include operations among compatible types (e.g., integers and floats). For example, basic arithmetic operations like adding multiple numbers:

In [ ]:
```
# Addition operation expression

43 + 60 + 16 + 41
```

We can perform subtraction operations using the minus operator. In this case the result is a negative number:

In [ ]:
```
# Subtraction operation expression

50 - 60
```

We can do multiplication using an asterisk:

In [ ]:
```
# Multiplication operation expression

5 * 5
```

We can also perform division with the forward slash:

In [ ]:
```
# Division operation expression

25 / 5
```

In [ ]:
```
# Division operation expression

25 / 6
```

As seen in the quiz above, we can use the double slash for integer division, where the result is rounded down to the nearest integer:

In [ ]:
```
# Integer division operation expression

25 // 5
```

In [ ]:
```
# Integer division operation expression

25 // 6
```

Let's write an expression that calculates how many hours there are in 160 minutes:

In [ ]:
```
# Write your code below. Don't forget to press Shift+Enter to execute the cell
160//60
```

Python follows well accepted mathematical conventions when evaluating mathematical expressions. In the following example, Python adds 30 to the result of the multiplication (i.e., 120).

In [ ]:
```
# Mathematical expression

30 + 2 * 60
```

And just like mathematics, expressions enclosed in parentheses have priority. So the following multiplies 32 by 60.

In [ ]:
```
# Mathematical expression

(30 + 2) * 60
```

Variables

Just like with most programming languages, we can store values in *variables*, so we can use them later on. For example:

In [ ]:
```
# Store value into variable

x = 43 + 60 + 16 + 41
```

To see the value of `x` in a Notebook, we can simply place it on the last line of a cell:

In [ ]:
```
# Print out the value in variable

x
```

We can also perform operations on `x` and save the result to a new variable:

In [ ]:
```
# Use another variable to store the result of the operation between variable and va

y = x / 60
y
```

If we save a value to an existing variable, the new value will overwrite the previous value:

In [ ]:
```
# Overwrite variable with new value

x = x / 60
x
```

It's a good practice to use meaningful variable names, so you and others can read the code and understand it more easily:

In [ ]:
```
# Name the variables meaningfully

total_min = 43 + 42 + 57 # Total length of albums in minutes
total_min
```

In [ ]:
```
# Name the variables meaningfully

total_hours = total_min / 60 # Total length of albums in hours
total_hours
```

In the cells above we added the length of three albums in minutes and stored it in `total_min`. We then divided it by 60 to calculate total length `total_hours` in hours. You

can also do it all at once in a single expression, as long as you use parenthesis to add the albums length before you divide, as shown below.

In [ ]:
```
# Complicate expression

total_hours = (43 + 42 + 57) / 60  # Total hours in a single expression
total_hours
```

If you'd rather have total hours as an integer, you can of course replace the floating point division with integer division (i.e., `//`).

Exercise: Expressions in Python

Write an expression to add 30 and 20 and subtract 40

In [ ]:
```
# Write your code below. Don't forget to press Shift+Enter to execute the cell
```

▶ Click here for the solution

Write an expression to subtract 5 from 55 and divide the result by 10

In [ ]:
```
# Write your code below. Don't forget to press Shift+Enter to execute the cell
```

▶ Click here for the solution

Write an expression to multiply 6 with 10 and divide the result by 12

In [ ]:
```
# Write your code below. Don't forget to press Shift+Enter to execute the cell
```

▶ Click here for the solution

Exercise:Variables in Python

What is the value of `x` where `x = 3 + 2 * 2`

In [ ]:
```
# Write your code below. Don't forget to press Shift+Enter to execute the cell
```

▶ Click here for the solution

What is the value of `y` where `y = (3 + 2) * 2`?

In [ ]:
```
# Write your code below. Don't forget to press Shift+Enter to execute the cell
```

▶ Click here for the solution

What is the value of `z` where `z = x + y`?

In [ ]:
```
# Write your code below. Don't forget to press Shift+Enter to execute the cell
```

▶ Click here for the solution

Congratulations, you have completed your hands-on lab on Expressions and Variables in Python.

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