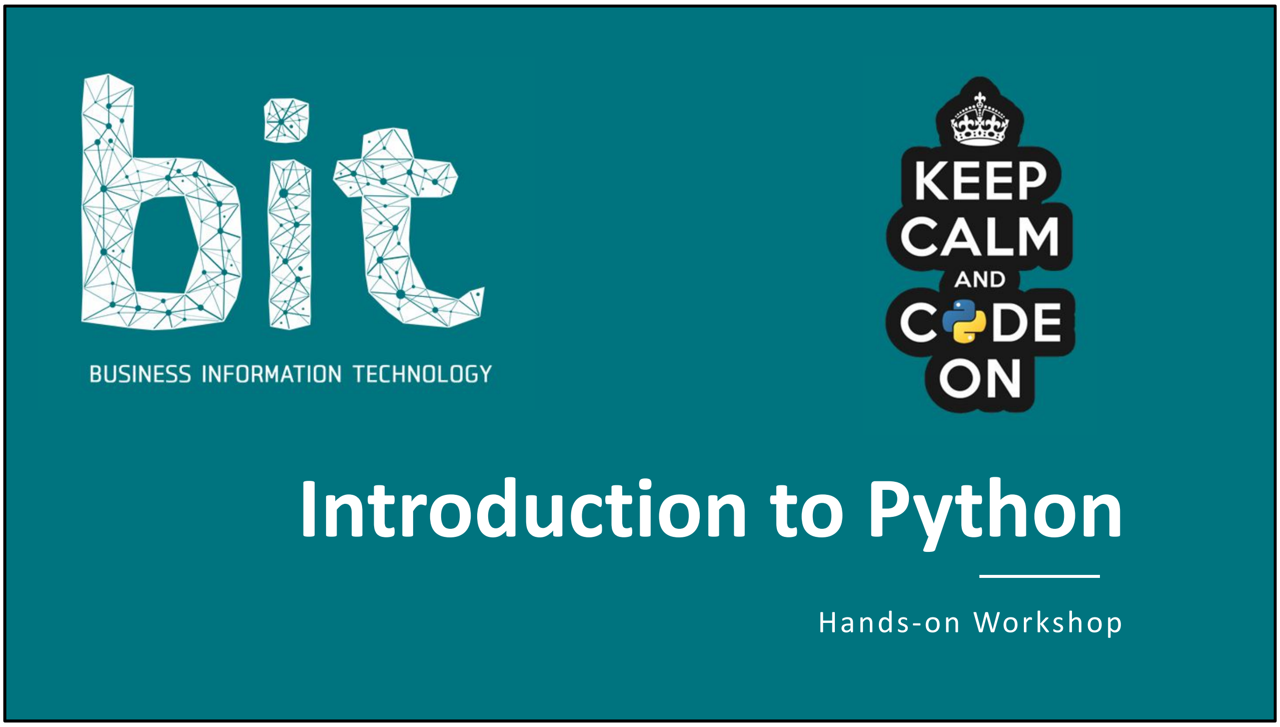

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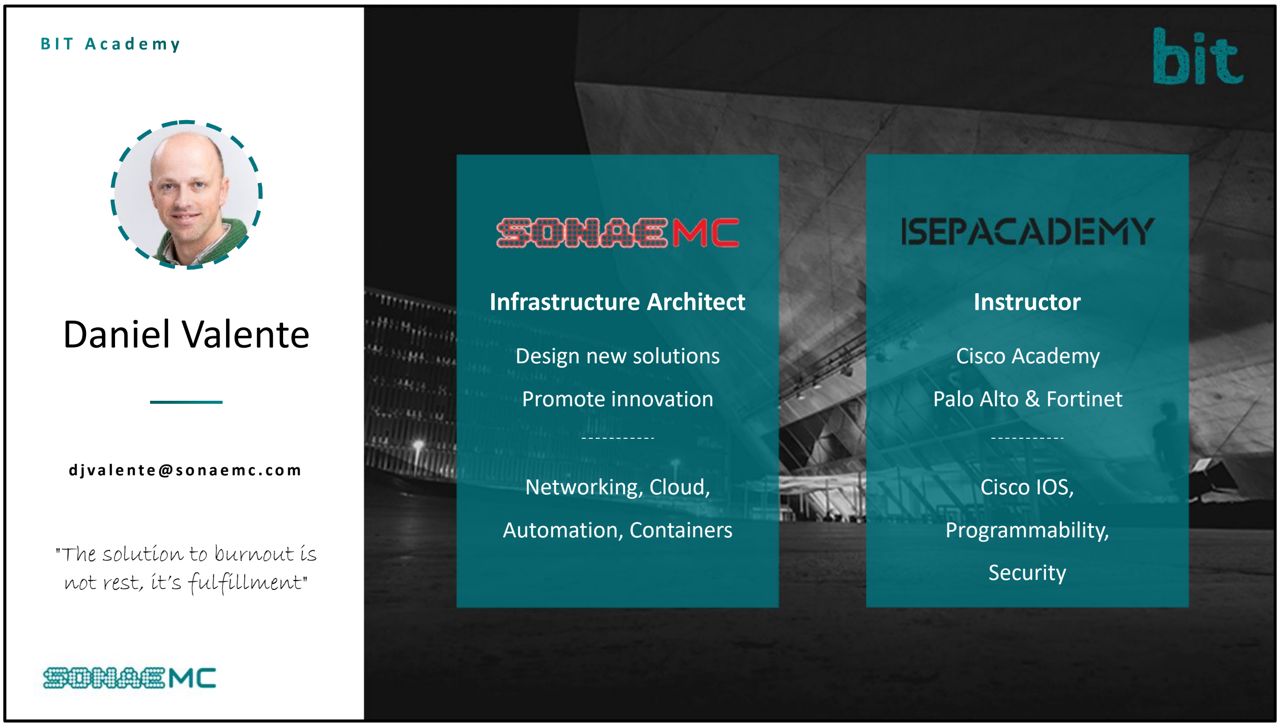
BUSINESS INFORMATION TECHNOLOGY

KEEP CALM AND CODE ON

Introduction to Python

Hands-on Workshop



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Daniel Valente

djvalente@sonaemc.com

"The solution to burnout is not rest, it's fulfillment"

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Infrastructure Architect

Design new solutions

Promote innovation

Networking, Cloud,

Automation, Containers

ISEPACADEMY

Instructor

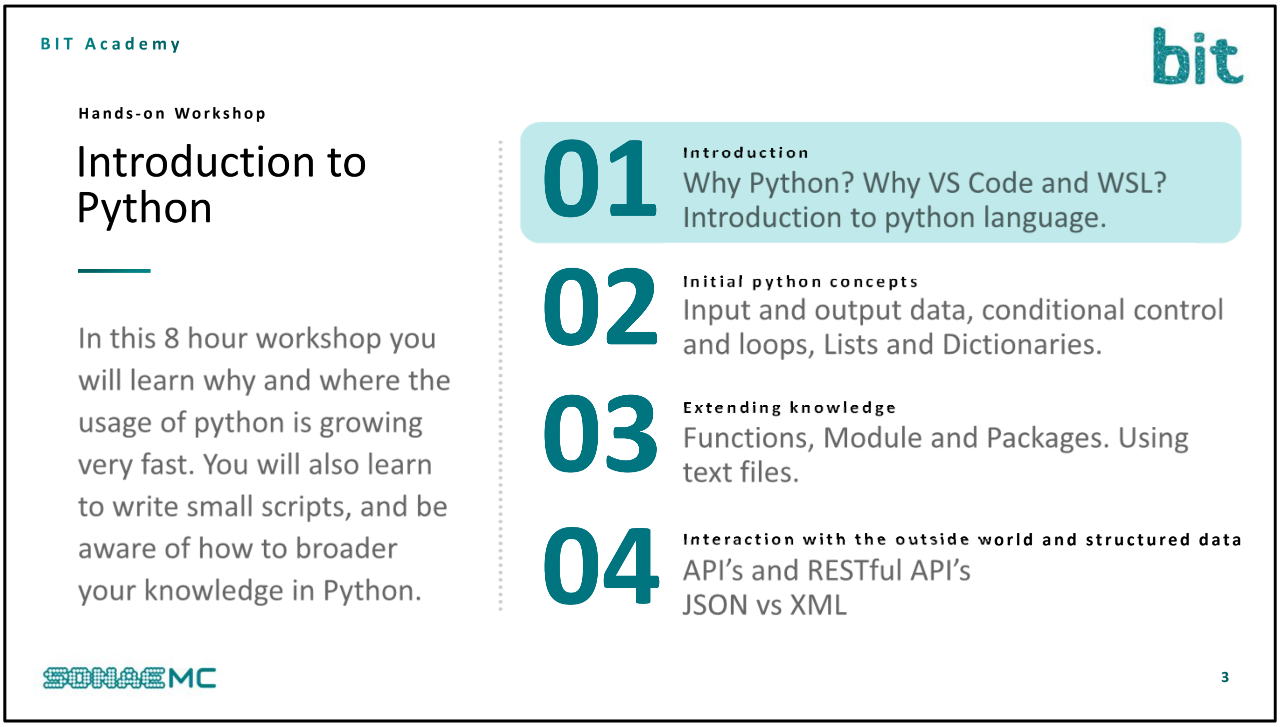
Cisco Academy

Palo Alto & Fortinet

Cisco IOS,

Programmability,

Security



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Hands-on Workshop

Introduction to Python

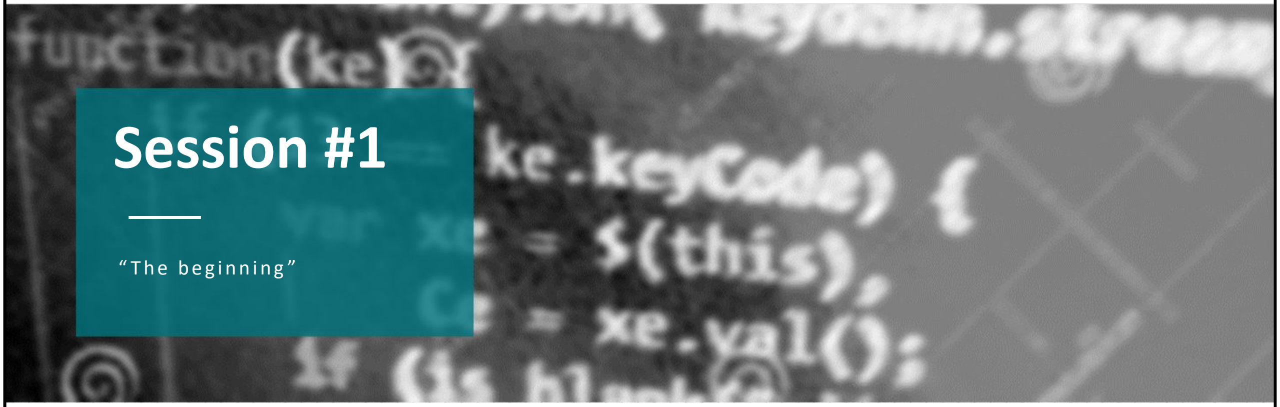
In this 8 hour workshop you will learn why and where the usage of python is growing very fast. You will also learn to write small scripts, and be aware of how to broader your knowledge in Python.

01 Introduction
Why Python? Why VS Code and WSL?
Introduction to python language.

02 Initial python concepts
Input and output data, conditional control and loops, Lists and Dictionaries.

03 Extending knowledge
Functions, Module and Packages. Using text files.

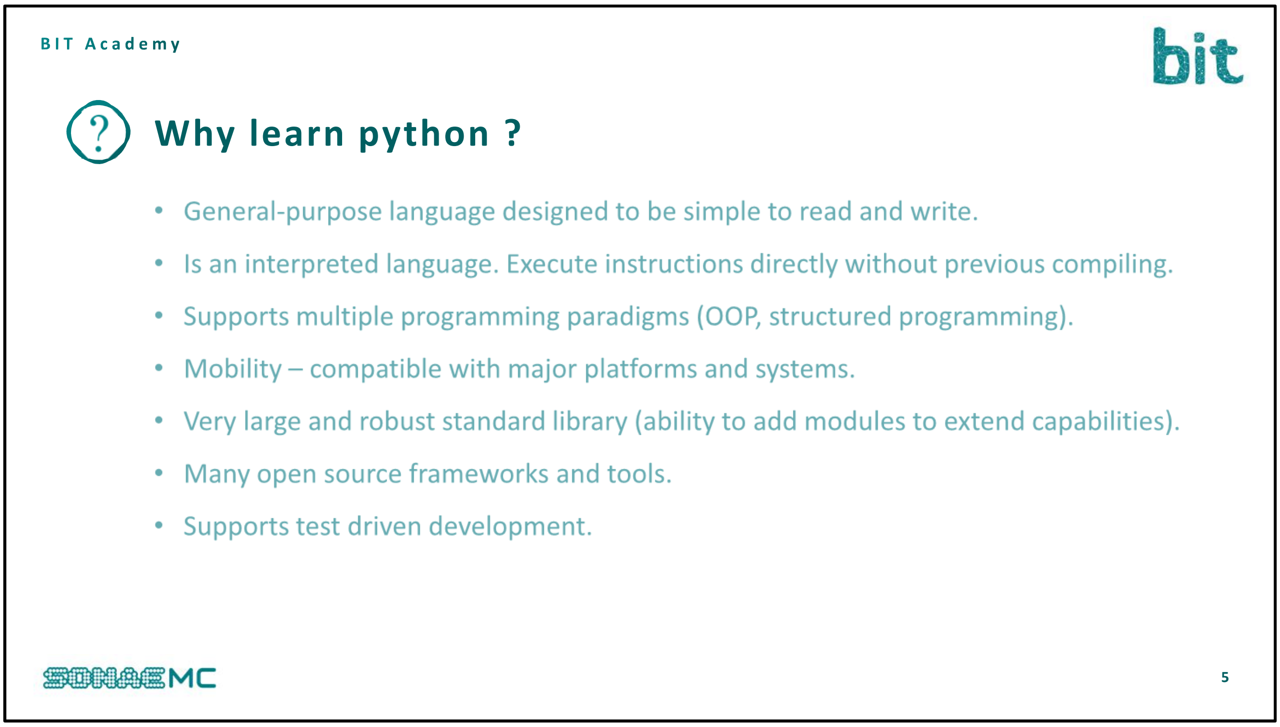
04 Interaction with the outside world and structured data
API's and RESTful API's
JSON vs XML



Session #1

"The beginning"

Why python? Why VS Code and WSL? Python virtual environments. Python initial concepts.



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Why learn python ?

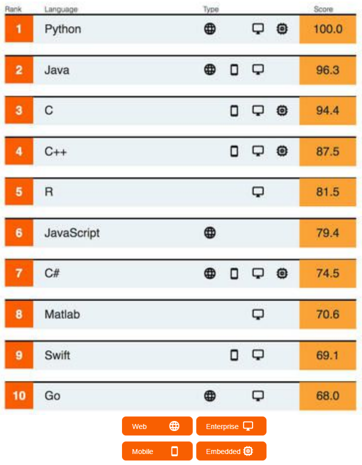
- General-purpose language designed to be simple to read and write.
- Is an interpreted language. Execute instructions directly without previous compiling.
- Supports multiple programming paradigms (OOP, structured programming).
- Mobility – compatible with major platforms and systems.
- Very large and robust standard library (ability to add modules to extend capabilities).
- Many open source frameworks and tools.
- Supports test driven development.

https://medium.com/@mindfiresolutions.usa/python-7-important-reasons-why-you-should-use-python-5801a98a0d0b
https://medium.com/@mindfiresolutions.usa/advantages-and-disadvantages-of-python-programming-language-fd0b394f2121
https://www.techrepublic.com/article/why-python-is-considered-the-top-programming-language-ahead-of-javascript-and-c/

Why learn python ?

- #1 on “The top programming languages of 2019”

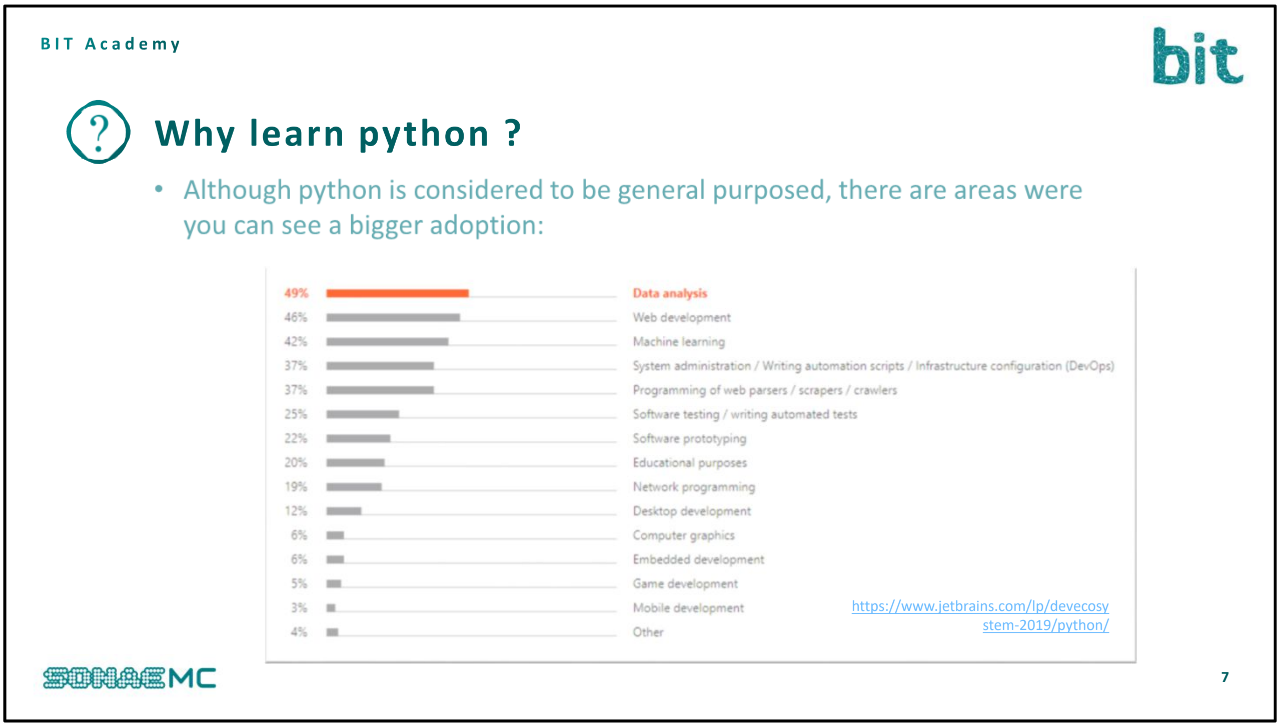
“IEEE Spectrum attributes Python's success to its explosion of new users in recent years, driven largely by the popularity of the language in the fast-growing field of machine learning, which in turn has been driven by easy-to-use yet capable Python libraries like NumPy, Pandas, and Keras”



Rank	Language	Type	Score
1	Python	🌐 🖥 ⚙	100.0
2	Java	🌐 📱 🖥	96.3
3	C	📱 🖥 ⚙	94.4
4	C++	📱 🖥 ⚙	87.5
5	R	🖥	81.5
6	JavaScript	🌐	79.4
7	C#	🌐 📱 🖥 ⚙	74.5
8	Matlab	🖥	70.6
9	Swift	📱 🖥	69.1
10	Go	🌐 🖥	68.0

Web 🌐 Enterprise 🖥
Mobile 📱 Embedded ⚙

https://www.techrepublic.com/article/the-top-programming-languages-of-2019-python-is-number-one-say-engineers/



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Why learn python ?

- Although python is considered to be general purposed, there are areas were you can see a bigger adoption:

https://www.jetbrains.com/lp/devecosystem-2019/python/

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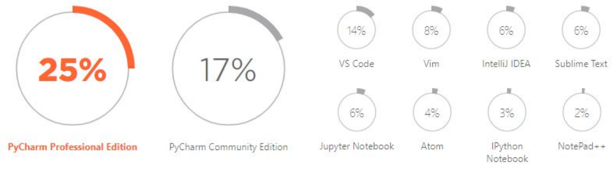
Python vs R – for data science
https://medium.com/@data_driven/python-vs-r-for-data-science-and-the-winner-is-3ebb1a968197

https://sebastianraschka.com/Articles/2014_python_2_3_key_diff.html

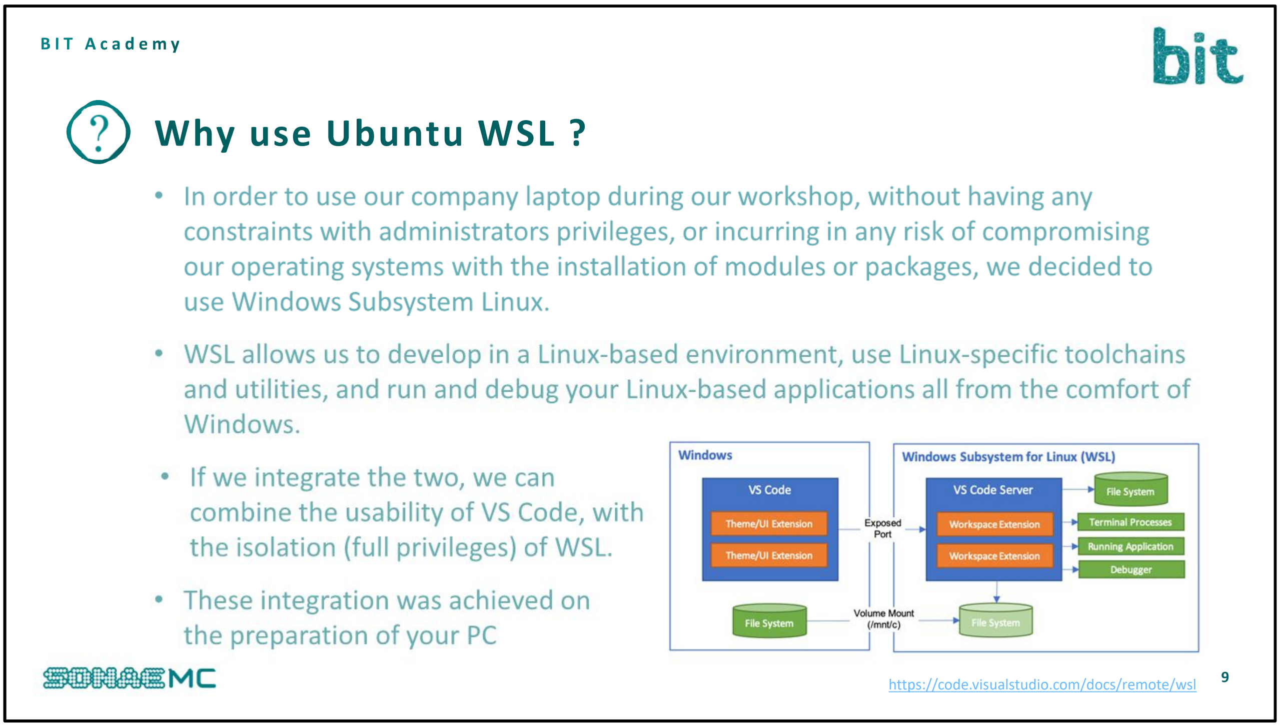
What is an IDE ? Why VS Code ?

- IDE stands for Integrated Development Environment



- VS Code is #2 in the IDE ranking for python developers (open source).
- PyCharm is only used with python, so we decided to adopt a more broader tool.
- The cleaner integration with WSL, also helped us to choose VS Code for our workshop.

https://www.jetbrains.com/lp/devecosystem-2019/python/



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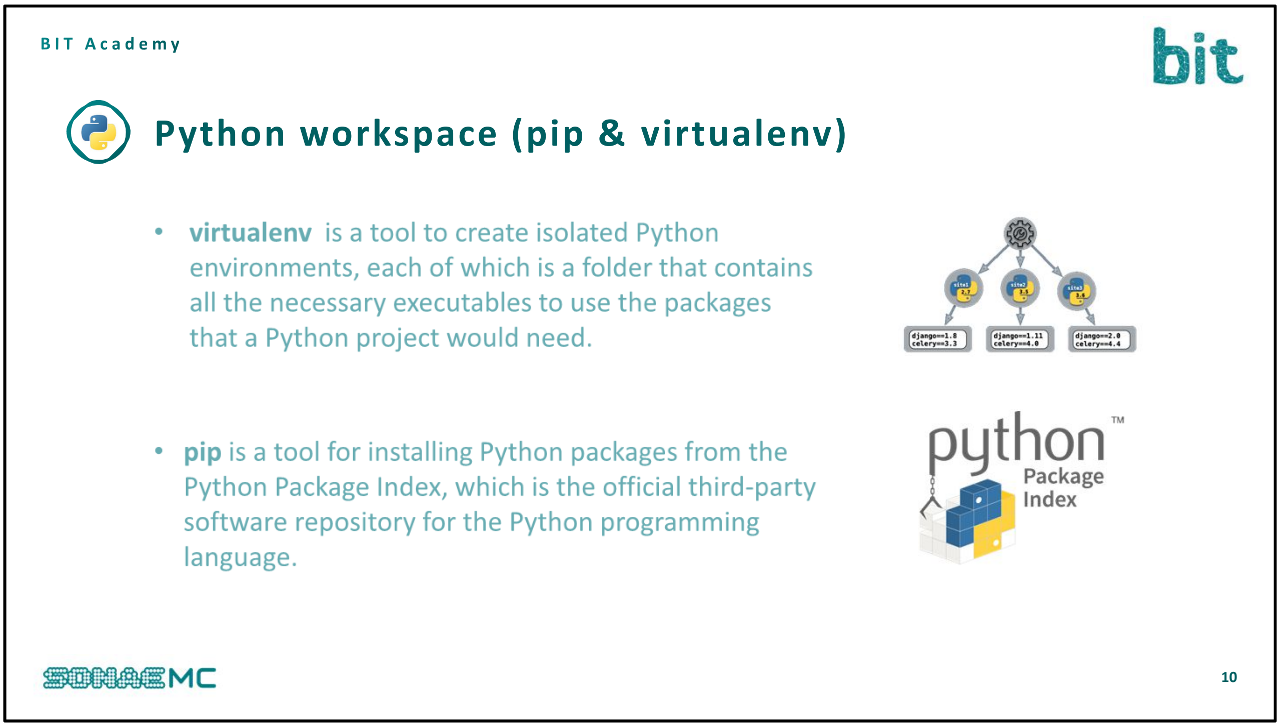
Why use Ubuntu WSL ?

- In order to use our company laptop during our workshop, without having any constraints with administrators privileges, or incurring in any risk of compromising our operating systems with the installation of modules or packages, we decided to use Windows Subsystem Linux.
- WSL allows us to develop in a Linux-based environment, use Linux-specific toolchains and utilities, and run and debug your Linux-based applications all from the comfort of Windows.
- If we integrate the two, we can combine the usability of VS Code, with the isolation (full privileges) of WSL.
- These integration was achieved on the preparation of your PC

https://code.visualstudio.com/docs/remote/wsl

Aceder aos ficheiros WSL pelo Windows
\\wsl$
\\wsl$\Ubuntu-18.04\home\djvalente\sonae

Aceder aos ficheiros Windows a partit do WSL
/mnt/c



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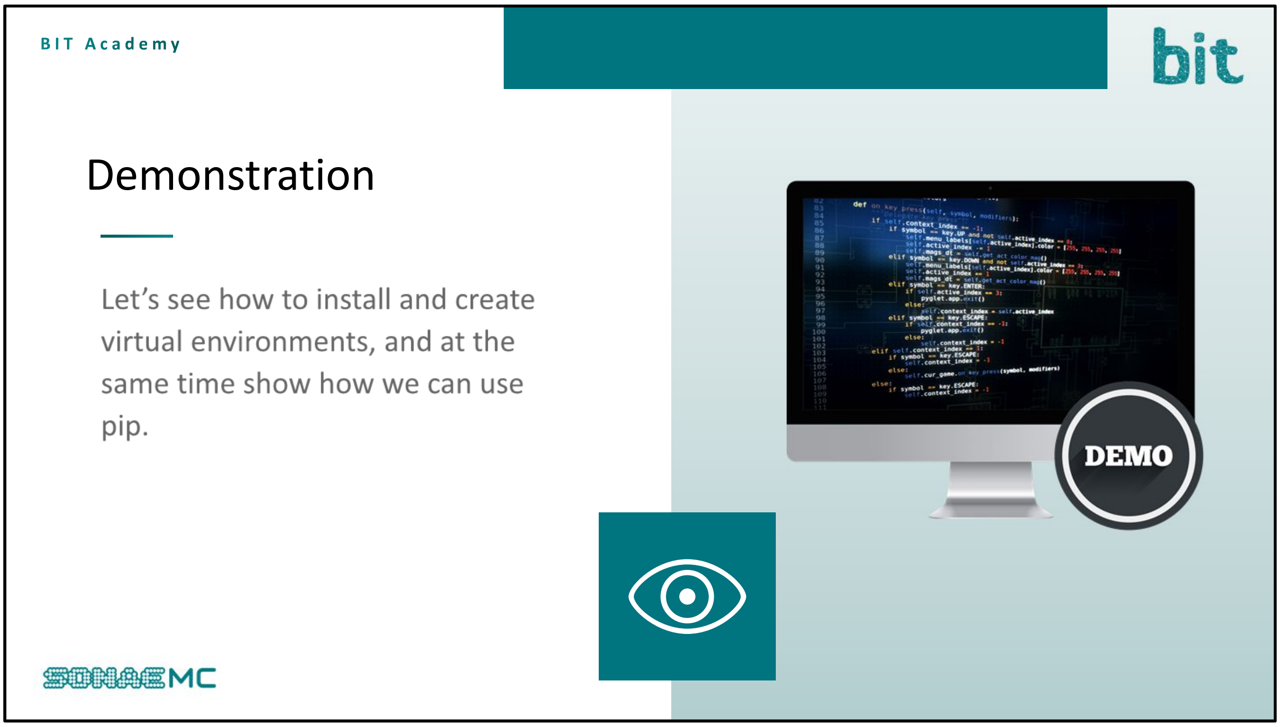
Python workspace (pip & virtualenv)

- **virtualenv** is a tool to create isolated Python environments, each of which is a folder that contains all the necessary executables to use the packages that a Python project would need.
- **pip** is a tool for installing Python packages from the Python Package Index, which is the official third-party software repository for the Python programming language.

https://lazzyprogrammer.wordpress.com/2015/09/04/pip-vs-easy-install/



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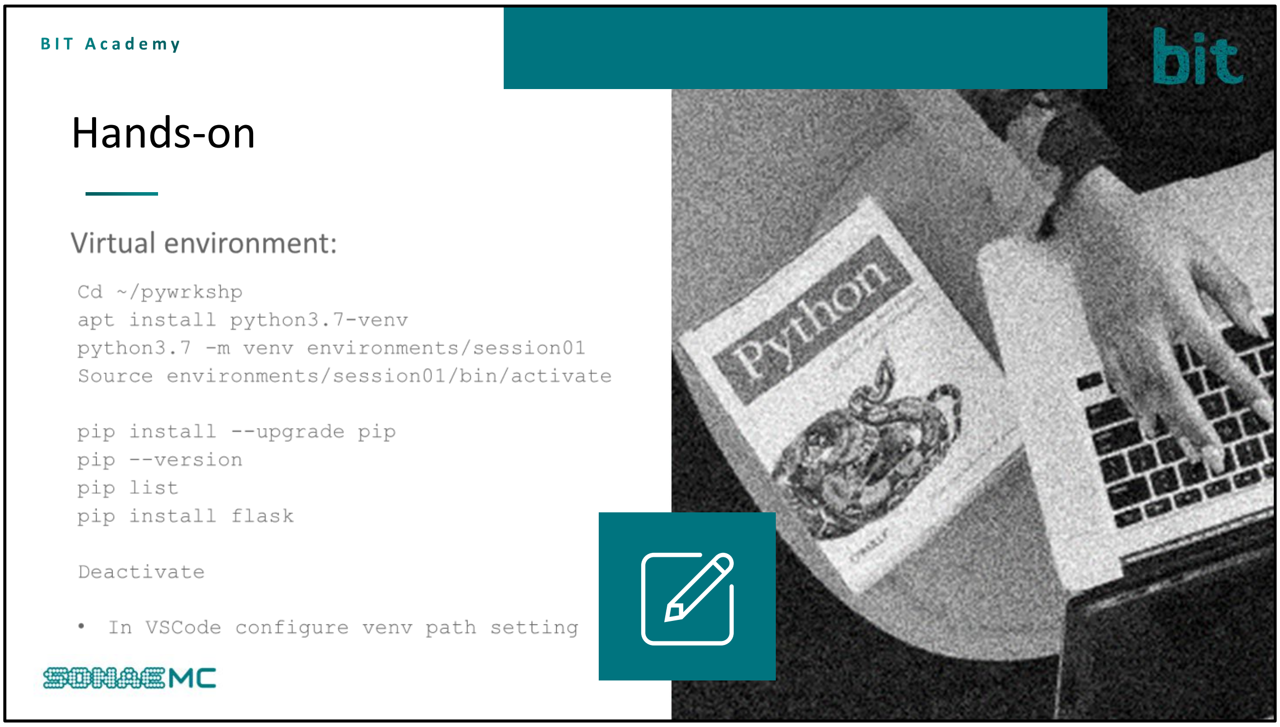
Demonstration

Let’s see how to install and create virtual environments, and at the same time show how we can use pip.

```
apt install python3.7-venv

python3.7 -m venv environments/session01
Source environments/session01/bin/activate

apt install python-pip
pip install --upgrade pip
pip --version
pip list

Deactivate

----

Version 2:
sudo apt install virtualenv
virtualenv py2
```

```
source py2/bin/activate
```

```
print("3/2=", 3/2)
```



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Hands-on

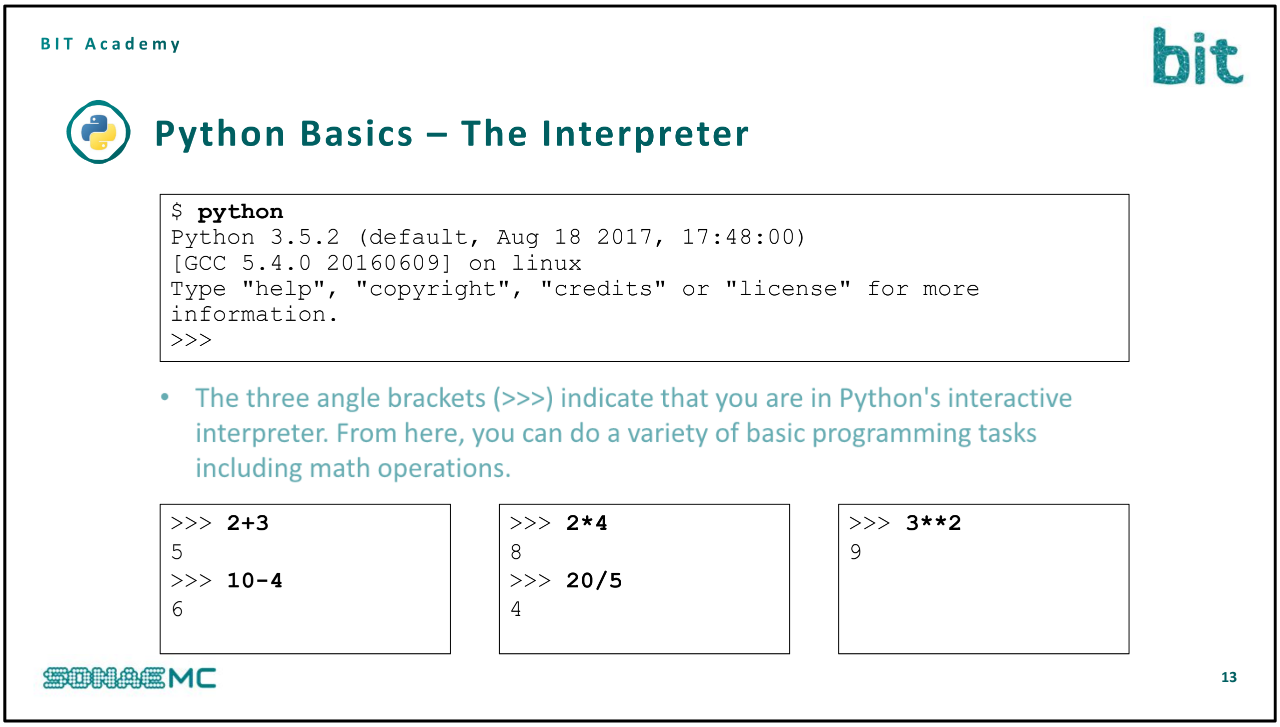
Virtual environment:

```
Cd ~/pywrkshp
apt install python3.7-venv
python3.7 -m venv environments/session01
Source environments/session01/bin/activate

pip install --upgrade pip
pip --version
pip list
pip install flask

Deactivate
```

- In VSCode configure venv path setting



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Python Basics – The Interpreter

```
$ python
Python 3.5.2 (default, Aug 18 2017, 17:48:00)
[GCC 5.4.0 20160609] on linux
Type "help", "copyright", "credits" or "license" for more
information.
>>>
```

- The three angle brackets (>>>) indicate that you are in Python's interactive interpreter. From here, you can do a variety of basic programming tasks including math operations.

```
>>> 2+3
5
>>> 10-4
6
```

```
>>> 2*4
8
>>> 20/5
4
```

```
>>> 3**2
9
```

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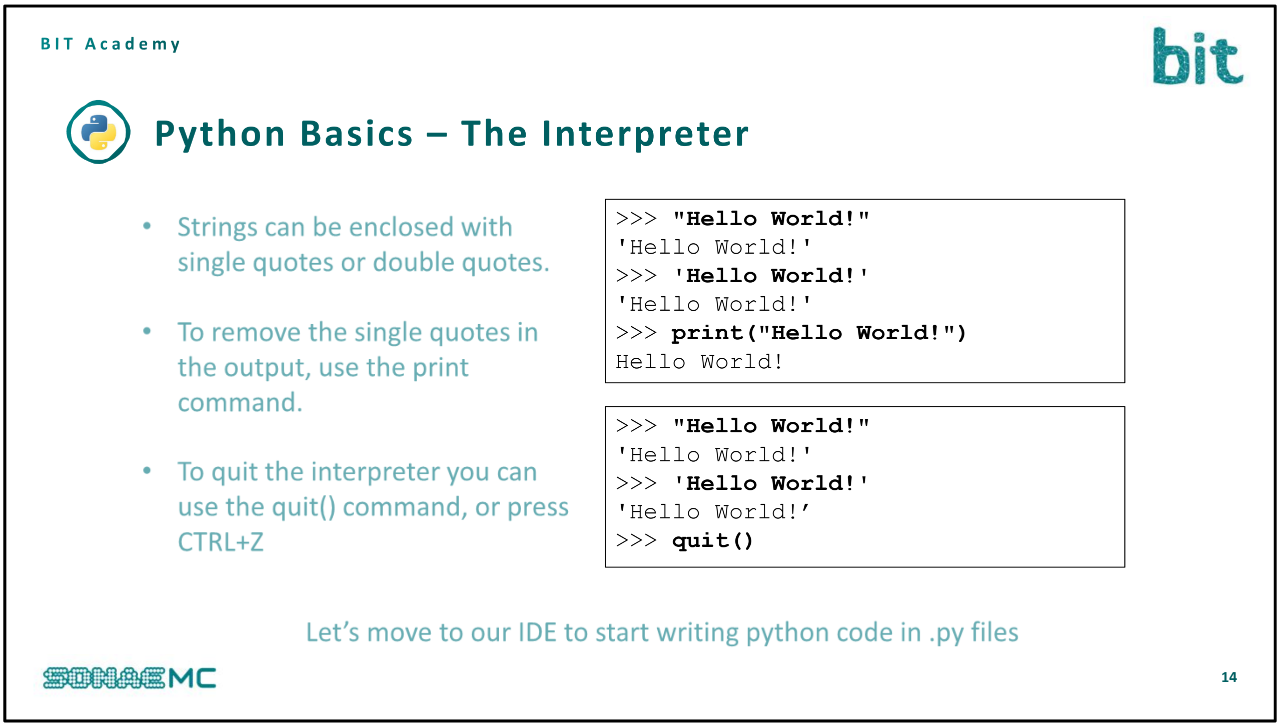
Python uses the standard order of operations commonly known as **PEMDAS**.
Mathematical expressions are evaluated in the following order.
Parentheses
Exponents
Multiplication and **D**ivision
Addition and **S**ubtraction



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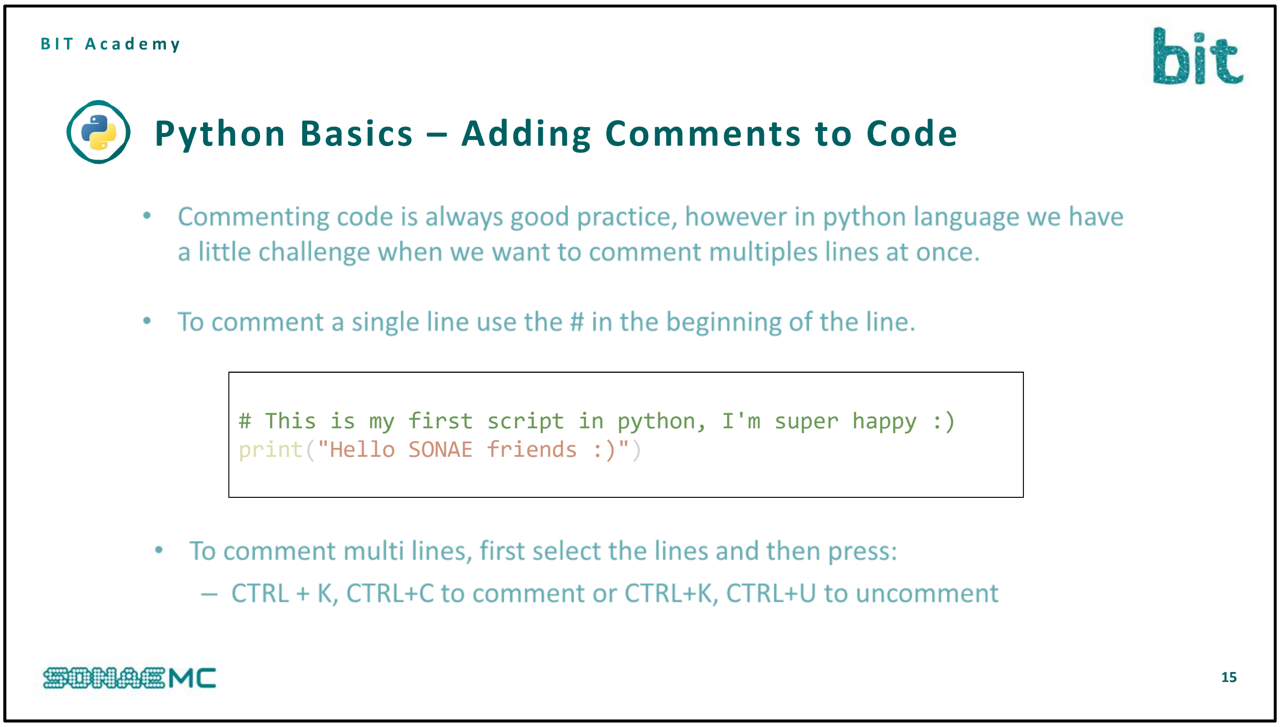
Python Basics – The Interpreter

- Strings can be enclosed with single quotes or double quotes.
- To remove the single quotes in the output, use the print command.
- To quit the interpreter you can use the quit() command, or press CTRL+Z

```
>>> "Hello World!"
'Hello World!'
>>> 'Hello World!'
'Hello World!'
>>> print("Hello World!")
Hello World!
```

```
>>> "Hello World!"
'Hello World!'
>>> 'Hello World!'
'Hello World!’
>>> quit()
```

Let’s move to our IDE to start writing python code in .py files



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Python Basics – Adding Comments to Code

- Commenting code is always good practice, however in python language we have a little challenge when we want to comment multiples lines at once.
- To comment a single line use the # in the beginning of the line.

```
# This is my first script in python, I'm super happy :)
print("Hello SONAE friends :)")
```

- To comment multi lines, first select the lines and then press:
  - CTRL + K, CTRL+C to comment or CTRL+K, CTRL+U to uncomment

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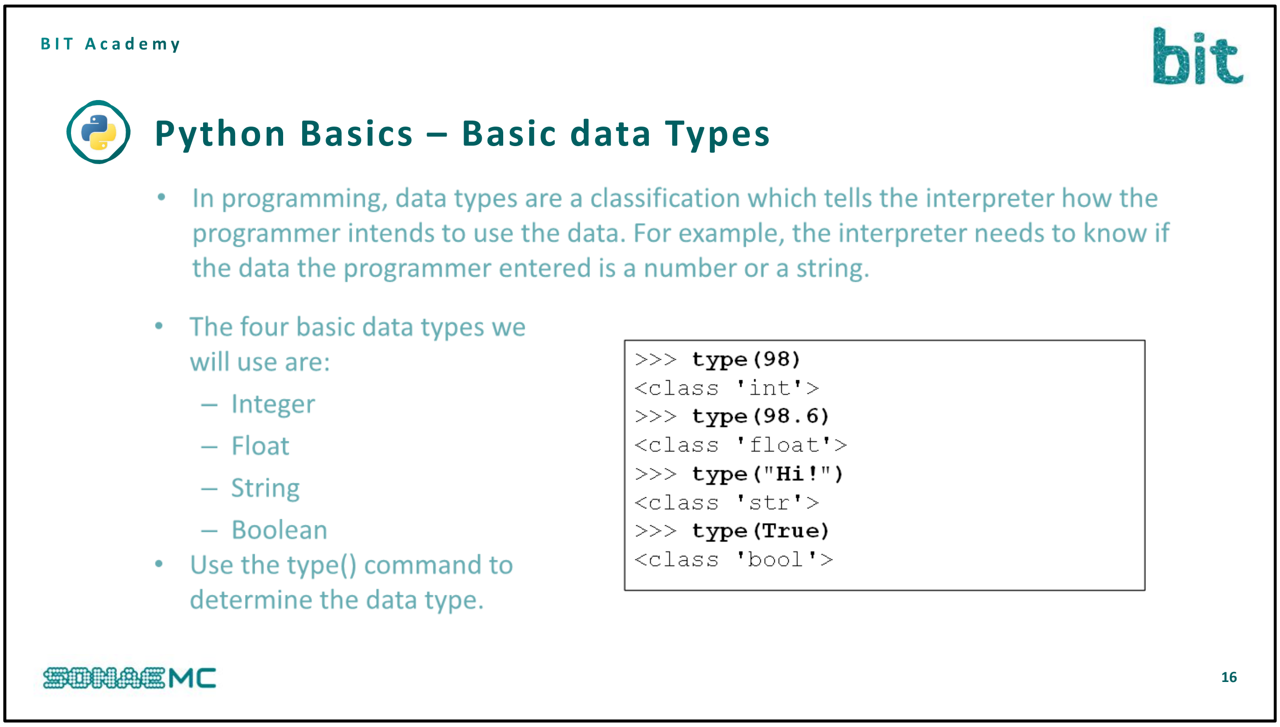

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Python Basics – Basic data Types

- In programming, data types are a classification which tells the interpreter how the programmer intends to use the data. For example, the interpreter needs to know if the data the programmer entered is a number or a string.
- The four basic data types we will use are:
  - Integer
  - Float
  - String
  - Boolean
- Use the type() command to determine the data type.

```
>>> type(98)
<class 'int'>
>>> type(98.6)
<class 'float'>
>>> type("Hi!")
<class 'str'>
>>> type(True)
<class 'bool'>
```

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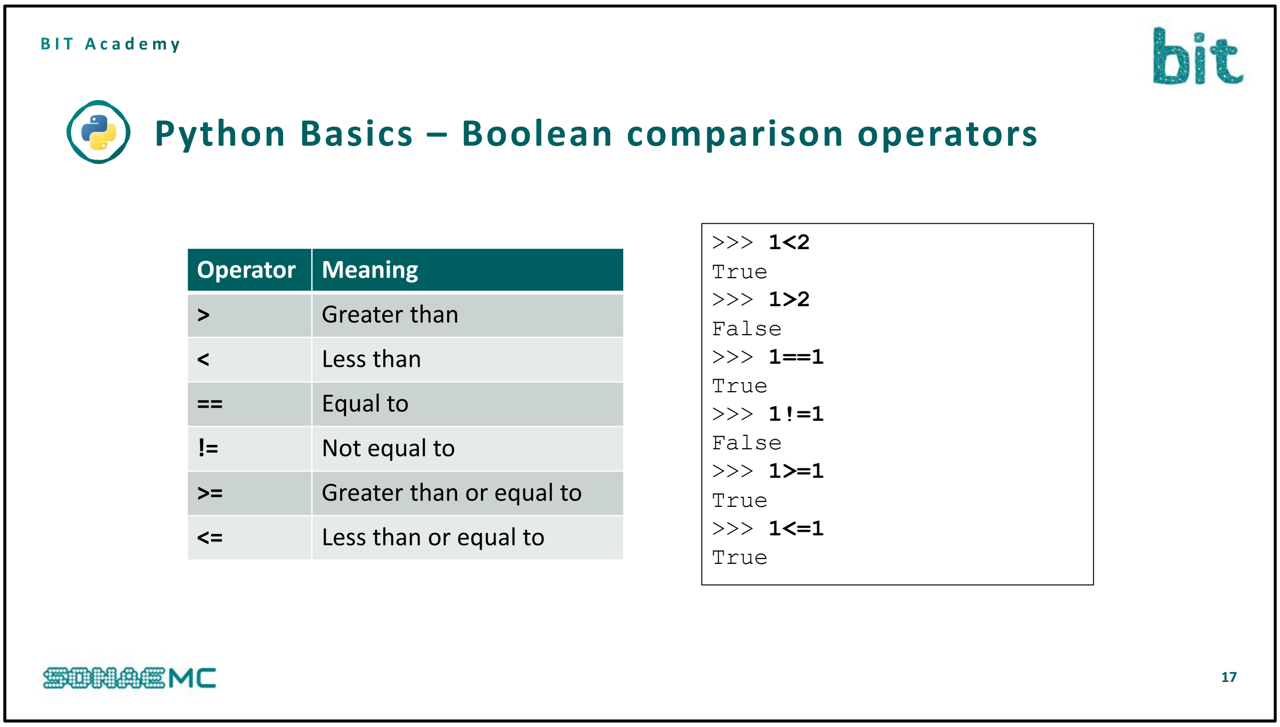
Integer - used to specify whole numbers (no decimals), such as 1, 2, 3, and so on. If an integer is entered with a decimal, the interpreter ignores the decimal. For example, 3.75 is interpreted as 3.

Float - used to specify numbers that need a decimal value, such as 3.14159.

String - any sequence of characters such as letters, numbers, symbols, or punctuation marks.

Boolean - any data type that has a value of either True or False.



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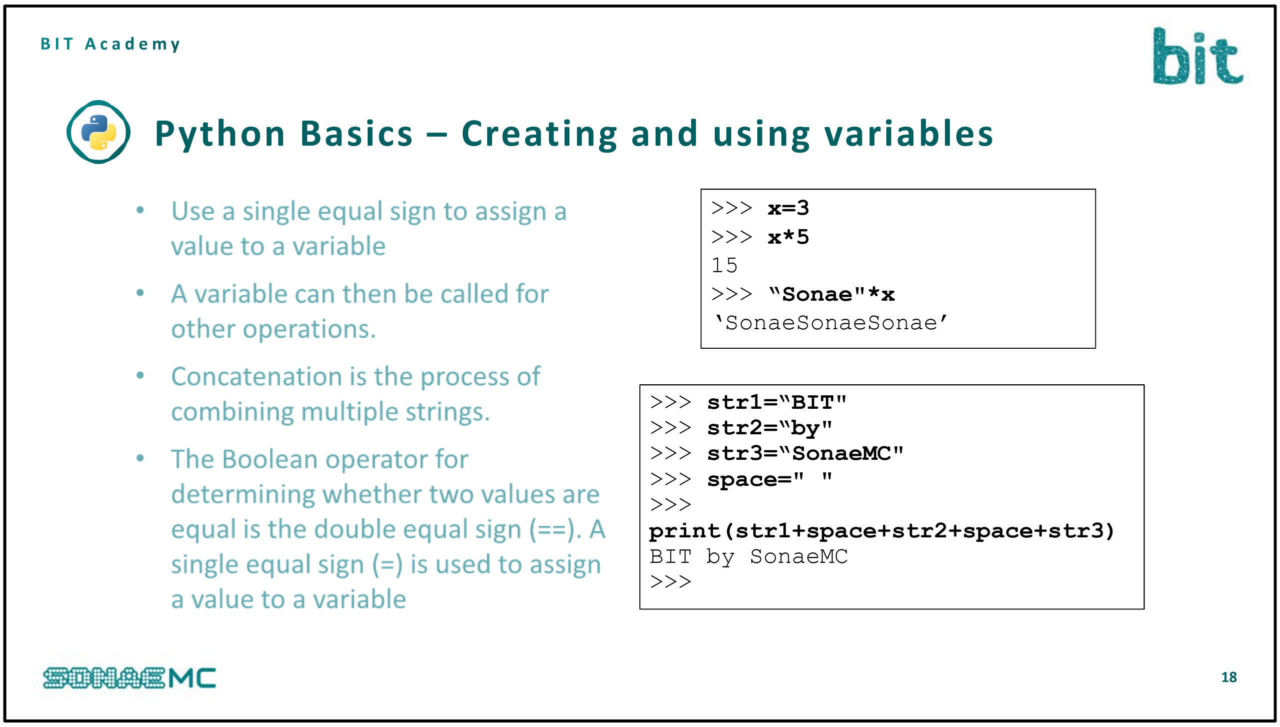
Python Basics – Boolean comparison operators

Operator	Meaning
>	Greater than
<	Less than
==	Equal to
!=	Not equal to
>=	Greater than or equal to
<=	Less than or equal to

```
>>> 1<2
True
>>> 1>2
False
>>> 1==1
True
>>> 1!=1
False
>>> 1>=1
True
>>> 1<=1
True
```

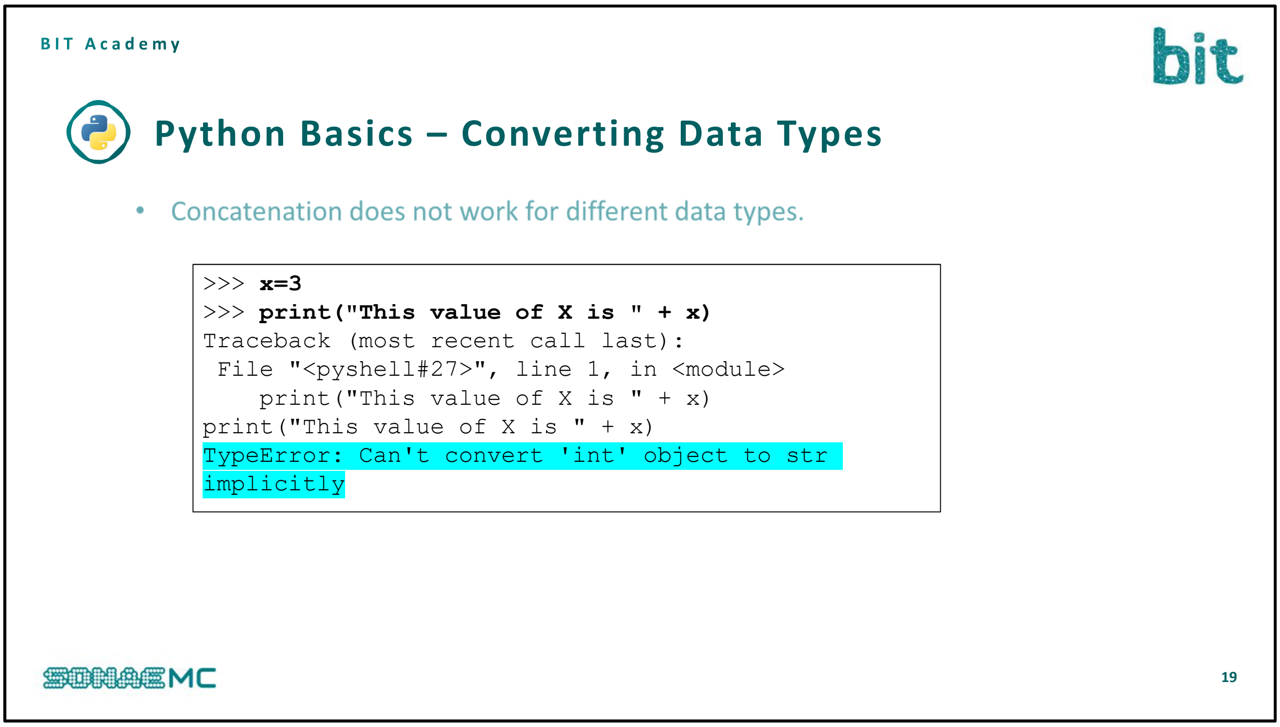


Python Basics – Creating and using variables

- Use a single equal sign to assign a value to a variable
- A variable can then be called for other operations.
- Concatenation is the process of combining multiple strings.
- The Boolean operator for determining whether two values are equal is the double equal sign (==). A single equal sign (=) is used to assign a value to a variable

```
>>> x=3
>>> x*5
15
>>> “Sonae"*x
‘SonaeSonaeSonae’
```

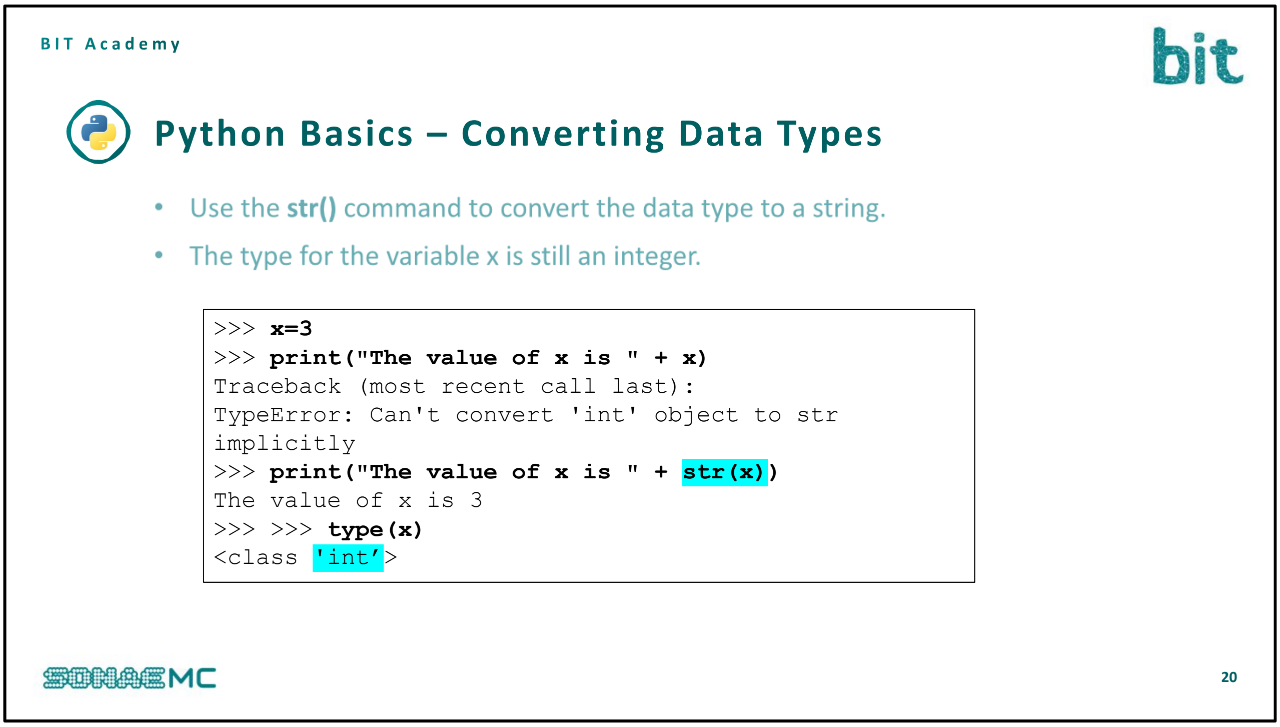
```
>>> str1=“BIT"
>>> str2=“by"
>>> str3=“SonaeMC"
>>> space=" "
>>>
print(str1+space+str2+space+str3)
BIT by SonaeMC
>>>
```



Python Basics – Converting Data Types

- Concatenation does not work for different data types.

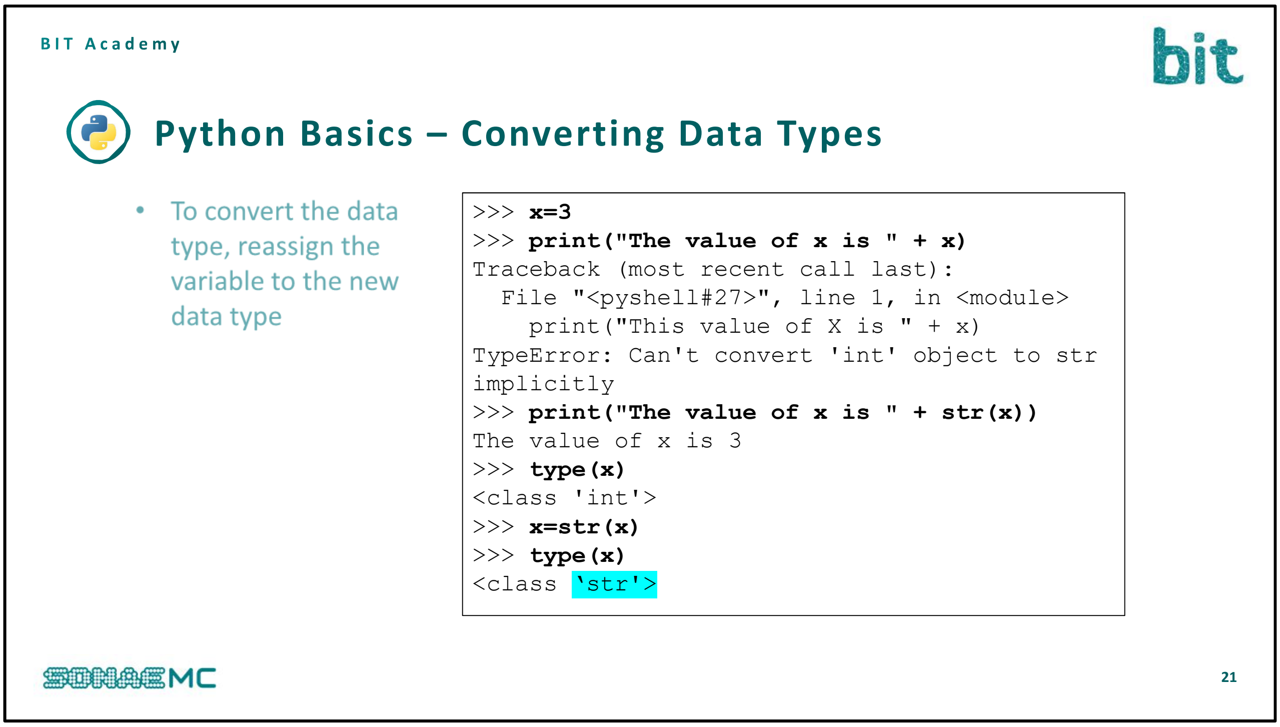
```
>>> x=3
>>> print("This value of X is " + x)
Traceback (most recent call last):
 File "<pyshell#27>", line 1, in <module>
    print("This value of X is " + x)
print("This value of X is " + x)
TypeError: Can't convert 'int' object to str
implicitly
```



Python Basics – Converting Data Types

- Use the **str()** command to convert the data type to a string.
- The type for the variable x is still an integer.

```
>>> x=3
>>> print("The value of x is " + x)
Traceback (most recent call last):
TypeError: Can't convert 'int' object to str
implicitly
>>> print("The value of x is " + str(x))
The value of x is 3
>>> >>> type(x)
<class 'int’>
```



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Python Basics – Converting Data Types

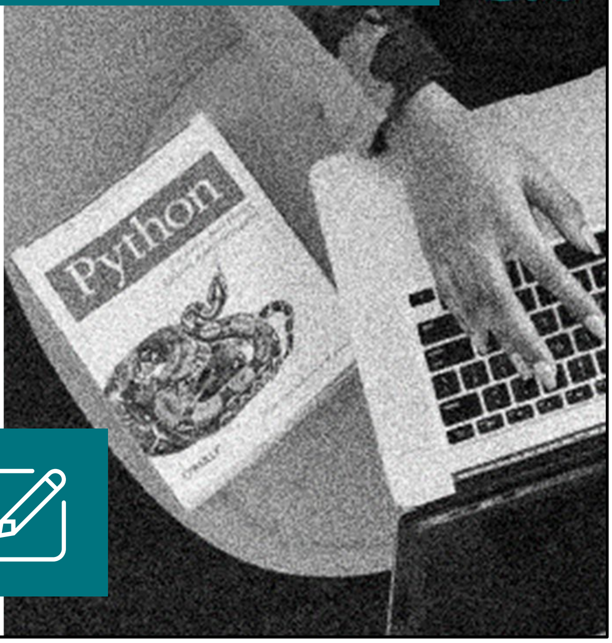
- To convert the data type, reassign the variable to the new data type

```
>>> x=3
>>> print("The value of x is " + x)
Traceback (most recent call last):
  File "<pyshell#27>", line 1, in <module>
    print("This value of X is " + x)
TypeError: Can't convert 'int' object to str
implicitly
>>> print("The value of x is " + str(x))
The value of x is 3
>>> type(x)
<class 'int'>
>>> x=str(x)
>>> type(x)
<class 'str'>
```

Hands-on

Python Basics

- Try entering an expression with a complex order of operations in the interactive interpreter.
- In the interpreter, try out different Boolean operators
- Print the sum of two variables



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