CIS 412 L Artificial Intelligence Lab
Topic - 01
Introduction to Python for Machine Learning

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What is Python?

Python is a popular programming language. It was created by Guido van Rossum, and released in 1991.

It is used for:

- web development (server-side),
- software development,
- mathematics,
- system scripting.

What can Python do?

- Python can be used on a server to create web applications.
- Python can be used alongside software to create workflows.
- Python can connect to database systems. It can also read and modify files.
- Python can be used to handle big data and perform complex mathematics.
- Python can be used for rapid prototyping, or for production-ready software development.

Why Python?

- Python works on different platforms (Windows, Mac, Linux, Raspberry Pi, etc).
- Python has a simple syntax similar to the English language.
- Python has syntax that allows developers to write programs with fewer lines than some other programming languages.
- Python runs on an interpreter system, meaning that code can be executed as soon as it is written. This means that prototyping can be very quick.
- Python can be treated in a procedural way, an object-oriented way or a functional way.

Python Indentation

Indentation refers to the spaces at the beginning of a code line. Where in other programming languages the indentation in code is for readability only, the indentation in Python is very important. Python uses indentation to indicate a block of code.

- Example:

```
if 5 > 2:
  print("Five is greater than two!")
```

Python Indentation (Continue)

- The number of spaces is up to you as a programmer, but it has to be at least one.
- Example:

```
if 5 > 2:
   print("Five is greater than two!")
     if 5 > 2:
    print("Five is greater than two!")
```

- You have to use the same number of spaces in the same block of code, otherwise Python will give you an error:

Comments

- Single line comments:

  Comments starts with a #, and Python will ignore them

- Multi Line comments:

  Python does not really have a syntax for multi line comments. To add a multiline comment you could insert a # for each line Or you can add a multiline string (triple quotes) in your code, and place your comment inside it.

Variables

Rules for Python variables:

- A variable name must start with a letter or the underscore character
- A variable name cannot start with a number
- A variable name can only contain alpha-numeric characters and underscores (A-z, 0-9, and _)
- Variable names are case-sensitive (age, Age and AGE are three different variables)

Multi Words Variable Names

- **Camel Case:**

  Each word, except the first, starts with a capital letter

  Eg: `myVariableName = "John"`
- **Pascal Case**

  Each word starts with a capital letter

  Eg: `MyVariableName = "John"`
- **Snake Case**

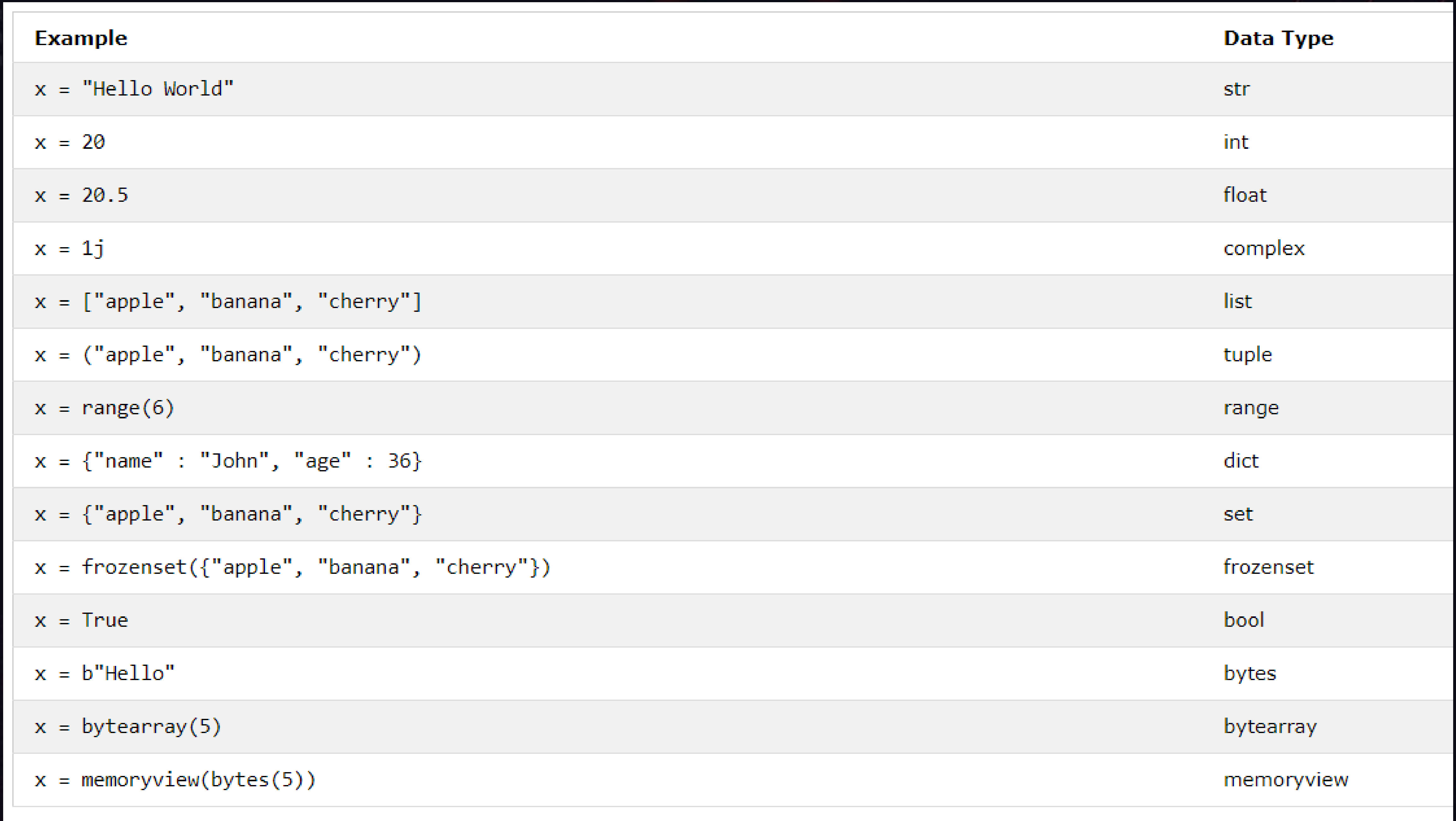
  Each word is separated by an underscore character

Eg: `my_variable_name = "John"`

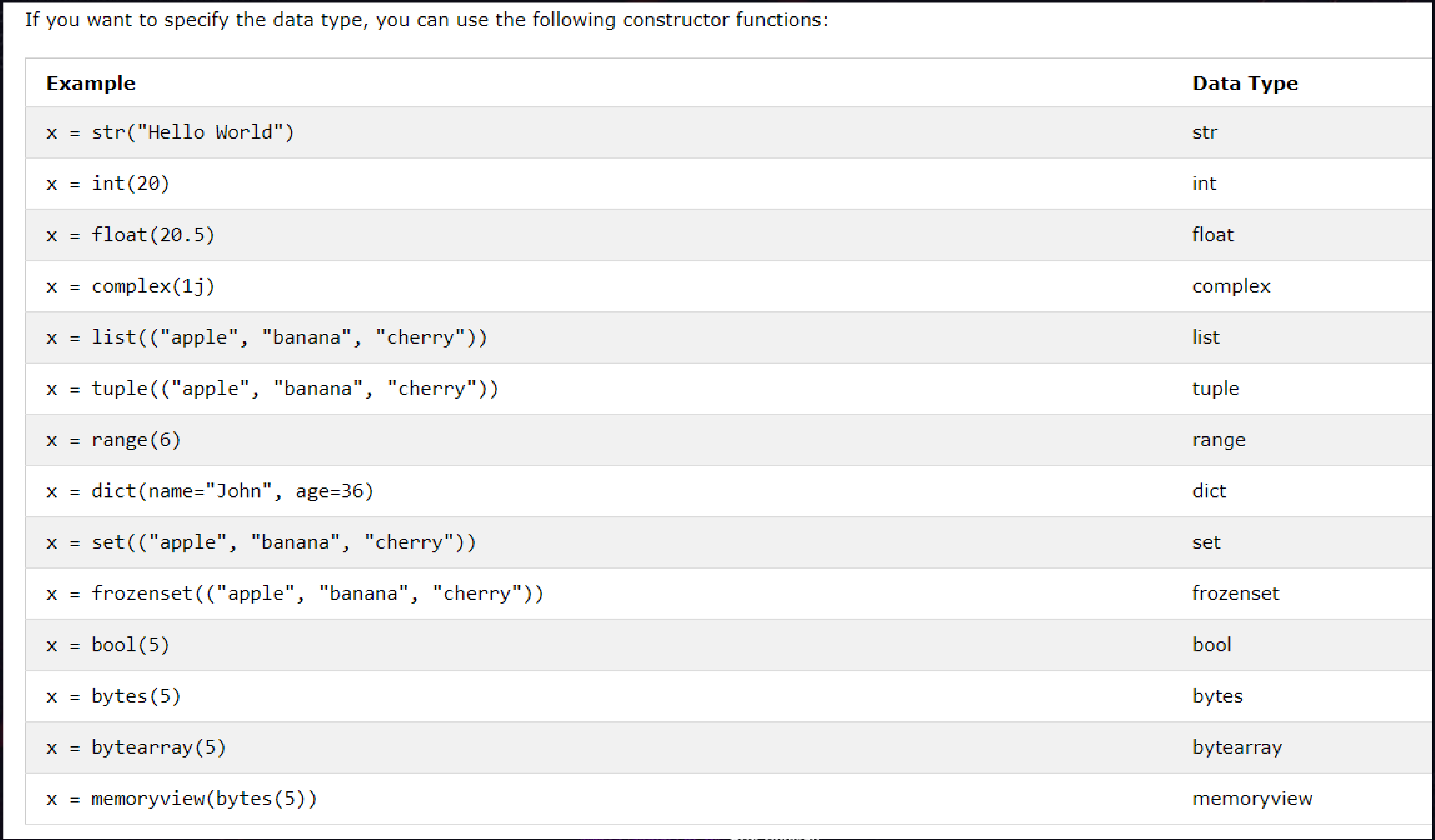
Python Data Types

Python has the following data types built-in by default, in these categories:

- Text Type: str
- Numeric Types: int, float, complex
- Sequence Types: list, tuple, range
- Mapping Type: dict
- Set Types: set, frozenset
- Boolean Type: bool
- Binary Types: bytes, bytearray, memoryview



Example	Data Type
x = "Hello World"	str
x = 20	int
x = 20.5	float
x = 1j	complex
x = ["apple", "banana", "cherry"]	list
x = ("apple", "banana", "cherry")	tuple
x = range(6)	range
x = {"name" : "John", "age" : 36}	dict
x = {"apple", "banana", "cherry"}	set
x = frozenset({"apple", "banana", "cherry"})	frozenset
x = True	bool
x = b"Hello"	bytes
x = bytearray(5)	bytearray
x = memoryview(bytes(5))	memoryview



If you want to specify the data type, you can use the following constructor functions:

Example	Data Type
`x = str("Hello World")`	str
`x = int(20)`	int
`x = float(20.5)`	float
`x = complex(1j)`	complex
`x = list(("apple", "banana", "cherry"))`	list
`x = tuple(("apple", "banana", "cherry"))`	tuple
`x = range(6)`	range
`x = dict(name="John", age=36)`	dict
`x = set(("apple", "banana", "cherry"))`	set
`x = frozenset(("apple", "banana", "cherry"))`	frozenset
`x = bool(5)`	bool
`x = bytes(5)`	bytes
`x = bytearray(5)`	bytearray
`x = memoryview(bytes(5))`	memoryview