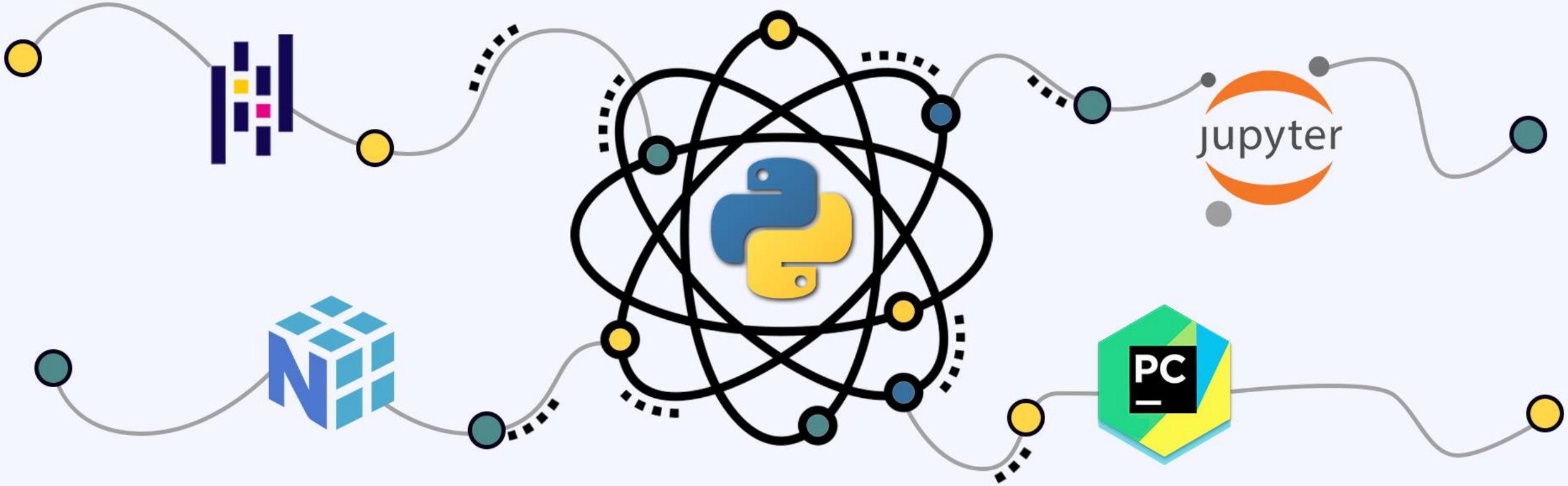
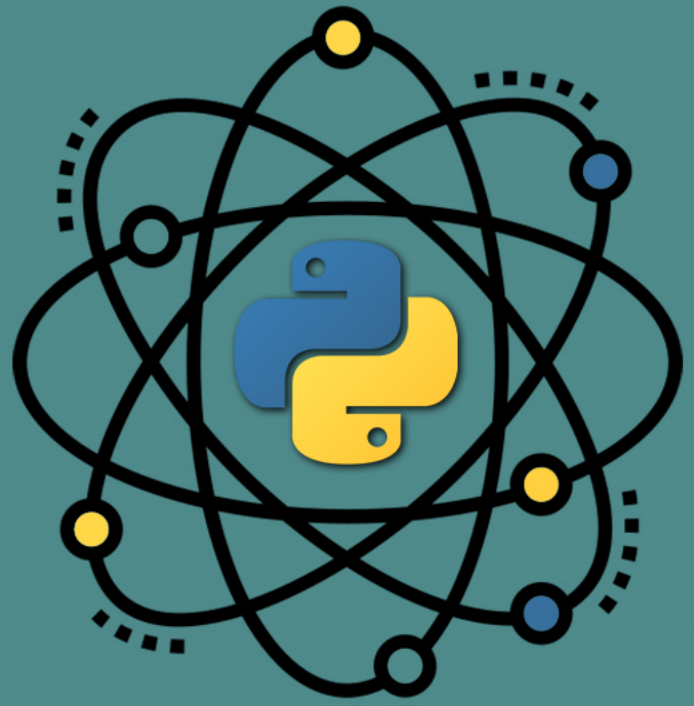


MOHAMMAD DEHGHANI PTYHON FOR DATA SCIENCE

زبان پایتون در علم داده

مدرس: محمد دهقانی



زبان پایتون در علم داده

مدرس:
محمد دهقانی

جلسه: نهم
موضوع: ساختمان داده

مواردی که در این جلسه بررسی می شوند:

1. معرفی و کار با list
2. معرفی و کار با set
3. معرفی و کار با dictionary
4. معرفی و کار با tuple
5. آموزش list comprehension

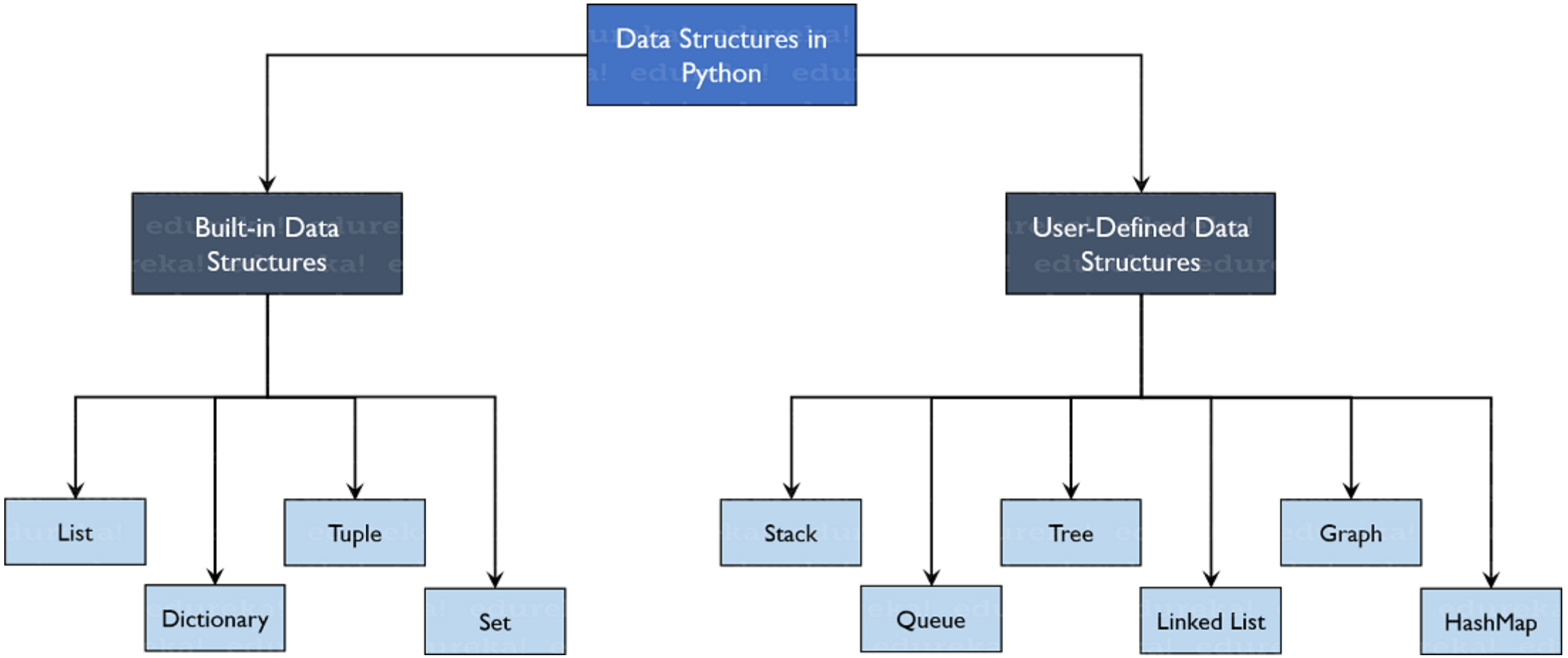
What is a Data Structure?

Organizing, managing and storing data is important as it enables easier access and efficient modifications.

Types of Data Structures in Python

Python has implicit support for Data Structures which enable you to store and access data.

- **List**
- **Dictionary**
- **Tuple**
- **Set**


Data Structures in Python
Built-in Data Structures
User-Defined Data Structures
List
Dictionary
Tuple
Set
Stack
Queue
Tree
Linked List
Graph
HashMap

Lists [square brackets]

To represent a sequence of items indexed by their integer position, one data structure you can use is a list. Lists contain zero or more elements and can contain elements of different types (even objects!). This makes lists powerful because they allow you to create deep and complex data structures.

Lists [square brackets]

Lists are mutable, meaning that you can add, delete, or change elements in a flexible manner. Another sequential data structure is a tuple; the difference between these two is that tuples are immutable.

Tuple (parenthesis)

Tuples are the same as lists are with the exception that the data once entered into the tuple cannot be changed no matter what. The only exception is when the data inside the tuple is mutable, only then the tuple data can be changed.

Tuple vs List

Advantages to tuples over lists:

- **Tuples use less space**
- **Immutability prevents changing tuple items by mistake**
- **Tuples can be used as dictionary keys**
- **Function arguments are passed as tuples**

Dictionary {flower braces}

Instead of using an offset, dictionaries use keys to associate with each value. This means that order is not tracked and should not matter if you plan to use a dictionary.

Dictionary keys are immutable and unique, however, dictionaries are mutable; the key-value elements can be added, deleted, or changed.

Sets {flower braces}

A set is like a dictionary with only the keys, not the values. This means that sets are unique and not sequential (stored unordered). Sets are also mutable. Sets contain zero or more elements and can contain elements of different, immutable types.

Sets {flower braces}

Essentially, sets are used when you want to know if something exists and nothing else about it. If it matters to track value order or store multiple of the same value, consider using a space-friendly tuple instead.

User-Defined Data Structures

Arrays vs. Lists

Arrays and lists are the same structure with one difference. Lists allow heterogeneous data element storage whereas Arrays allow only homogenous elements to be stored within them.

In summary

- If you need to keep track of sequencing, use a list or tuple
- If you only want to keep track of unique values and don't care about the order, use a Python set
- If you don't need to make changes once you define your object, use a tuple to save space and ensure that nothing can overwrite your data

source