



---

# ΧΩΡΙΚΕΣ ΒΑΣΕΙΣ ΔΕΔΟΜΕΝΩΝ

## Διάλεξη: POSTGRESQL και Python

---

### Διδάσκοντες:

N. Μήτρου, Καθ. ΣΗΜΜΥ ΕΜΠ

A. Ζαφειρόπουλος, Δρ. Μηχ. ΣΗΜΜΥ ΕΜΠ



# Python Programming Language

---

- Python is easy to use
  - Types are associated with objects, not variables.
  - Python typically operates at a much higher level of abstraction.
  - Syntax rules are very simple.
- Python is expressive
  - a single line of Python code can do more than a single line of code in most other languages
- Python is readable
  - blocks of code have to be indented
- Python is cross-platform and free
- Python is not the fastest language
- Python doesn't have the most libraries
- Python doesn't check variable types at compile time



# Εγκατάσταση Python και εκπαιδευτικό υλικό

---

- Download and install Spyder IDE
  - <https://www.spyder-ide.org/>
- Download it as part of the Anaconda distribution
  - <https://www.anaconda.com/products/individual>
- Alternatively:
  - <https://docs.spyder-ide.org/installation.html>
- Python Tutorial
  - <https://www.python.org/about/gettingstarted/>
  - <https://www.w3schools.com/python/default.asp>
  - <https://docs.python.org/3/tutorial/>



# Τύποι δεδομένων σε Python

---

- **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



# Python Collections

---

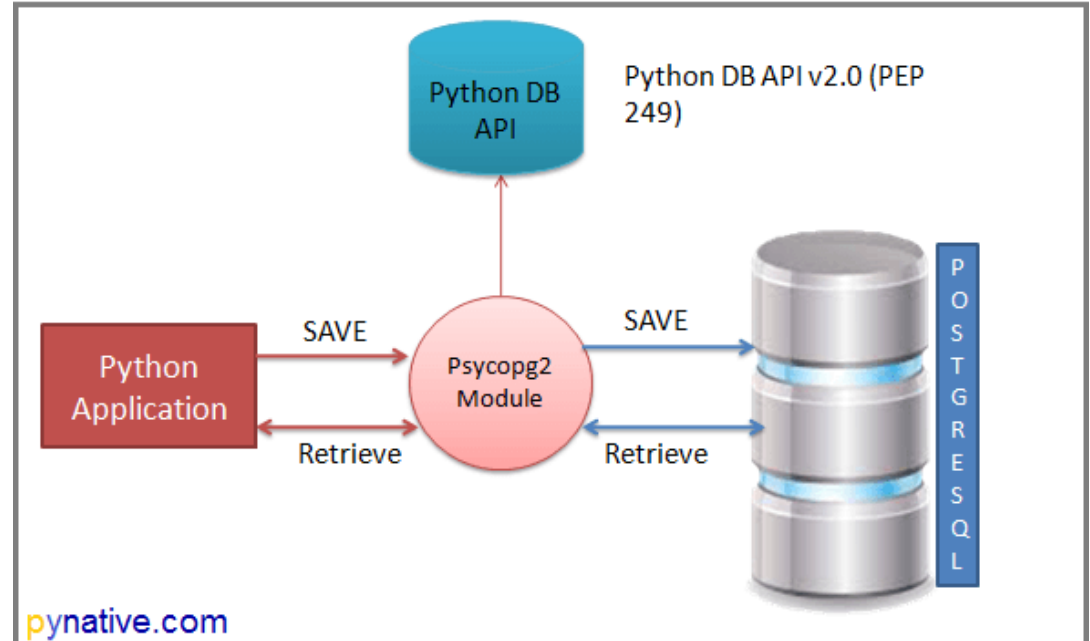
- There are four collection data types in the Python programming language:
  - **List** is a collection which is ordered and changeable. Allows duplicate members (similar to Array).
  - **Tuple** is a collection which is ordered and unchangeable. Allows duplicate members. One-element tuples need a comma.
  - **Set** is a collection which is unordered and unindexed. No duplicate members.
  - **Dictionary** is a collection which is unordered, changeable and indexed. No duplicate members.

[https://www.w3schools.com/python/python\\_lists.asp](https://www.w3schools.com/python/python_lists.asp)



# Python Drivers για PostgreSQL

- **Psycopg** is the most popular PostgreSQL adapter for the Python programming language. Its core is a complete implementation of the Python DB API 2.0 specifications. Several extensions allow access to many of the features offered by PostgreSQL.
- The specification calls for the use of a **connection** object to manage the connection to the database and for the use of **cursor** objects to manage the interaction with the database, for fetching data from the database and updating its contents.
- <https://www.psycopg.org/>





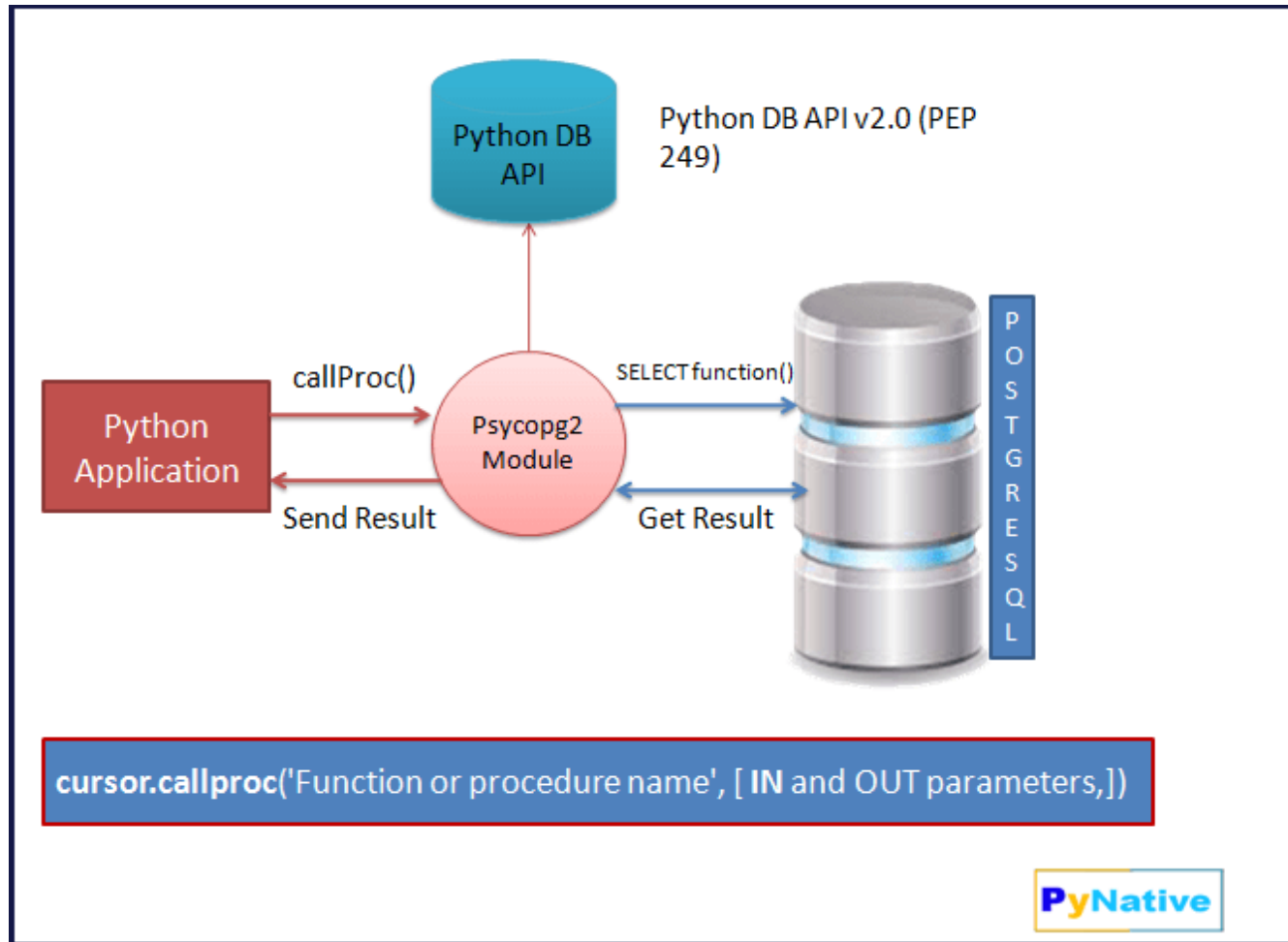
# Εγκατάσταση Psycorg package και εκπαιδευτικό υλικό

---

- Installation of Psycorg
  - pip install psycorg2 (within the Spyder environment)
- Python PostGIS packages
  - psycorg-postgis - <https://pypi.org/project/psycorg-postgis/0.1.3/>
  - postgis: PostGIS helpers for psycorg2 - <https://pypi.org/project/postgis/>
  - plpygis is a Python converter to and from the PostGIS geometry type, WKB, EWKB, GeoJSON and Shapely geometries - <https://plpygis.readthedocs.io/en/latest/index.html#>
- Tutorials:
  - <https://pynative.com/python-postgresql-tutorial/>
  - <https://www.postgresqltutorial.com/postgresql-python/>
  - <https://www.psycorg.org/docs/>



# Κλήση PostgreSQL Stored Procedure μέσω Python







# PL/Python

---

- The PL/Python procedural language allows PostgreSQL functions to be written in the Python language.
- `CREATE EXTENSION plpythonu;`

```
CREATE OR REPLACE FUNCTION make_point(x FLOAT, y FLOAT)
  RETURNS geometry
AS $$
  from pypgis import Point
  p = Point(x, y)
  return p
$$ LANGUAGE plpythonu;
```