Introduction to Python Programming

Coding in General

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Created by Daniel Benninger

What is Programming?

- **Programming** is the process of creating a set of instructions that tell a computer how to perform a task.

- Programming can be done using a variety of computer "languages," such as SQL, Java, Python, and C++.

https://www.khanacademy.org/computing/computer-_programming/programming/intro-to-programming/v/programming-_intro

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What is Programming?

- **Coding** is the method of giving instructions to a computer to perform a specific task.

- You may have also heard it referred to as “software programming” or “computer programming.”
- These instructions are communicated using a “computer language” that computers can understand. These languages include visual blocks, Java, Python, and C, C++

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What is Programming?

- **What is Coding?**

Communication

Coding is a language used to communicate instructions to a computer.

Problem Solving

Coding involves breaking down large problems into smaller, manageable steps.

Creation

Coding enables the creation of software, websites, games, apps, and much more.

What is Programming?

- **Learning to code** expands problem solving and critical thinking skills, making it a great opportunity for younger people to build those skills while young

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What is Python?

- Object oriented language
- Interpreted language
- Supports dynamic data type
- Independent from platforms
- Focused on development time
- Simple and easy grammar
- High-level internal object data types
- Automatic memory management
- It’s free (open source)!

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What is Python?

Python is an **interpretive language.**

- This means that your code is not directly run by the hardware.
- It is instead passed to a *virtual machine*, which is just another programme that reads and interprets your code.
- If your code used the '+' operation, this would be recognised by the interpreter at run time, which would then call its own internal function 'add(a,b)', which would then execute the machine code 'ADD'.
- This is in contrast to compiled languages, where your code is translated into native machine instructions, which are then directly executed by the hardware. Here, the '+' in your code would be translated directly in the 'ADD' machine code.

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What is Python?

Some Language Properties

- Everything is an object
- Modules, classes, functions
- Exception handling
- Dynamic typing, polymorphism
- Static scoping
- Operator overloading
- Indentation for block structure

Why Learn Python?

- Fun-to-use "Scripting language"
- Object-oriented
  - Highly educational
- Very easy to learn
- Powerful, scalable, easy to maintain
  - High productivity
  - Lots of libraries

Where to Use Python?

- Internet programming
- Database (DB) programming
- Text data processing
- Numerical operations
- Graphics
- Graphic User Interface (GUI)
- Distributed processing

And …

- Machine Learning
- Data Science
- Artificial Intelligence
- …

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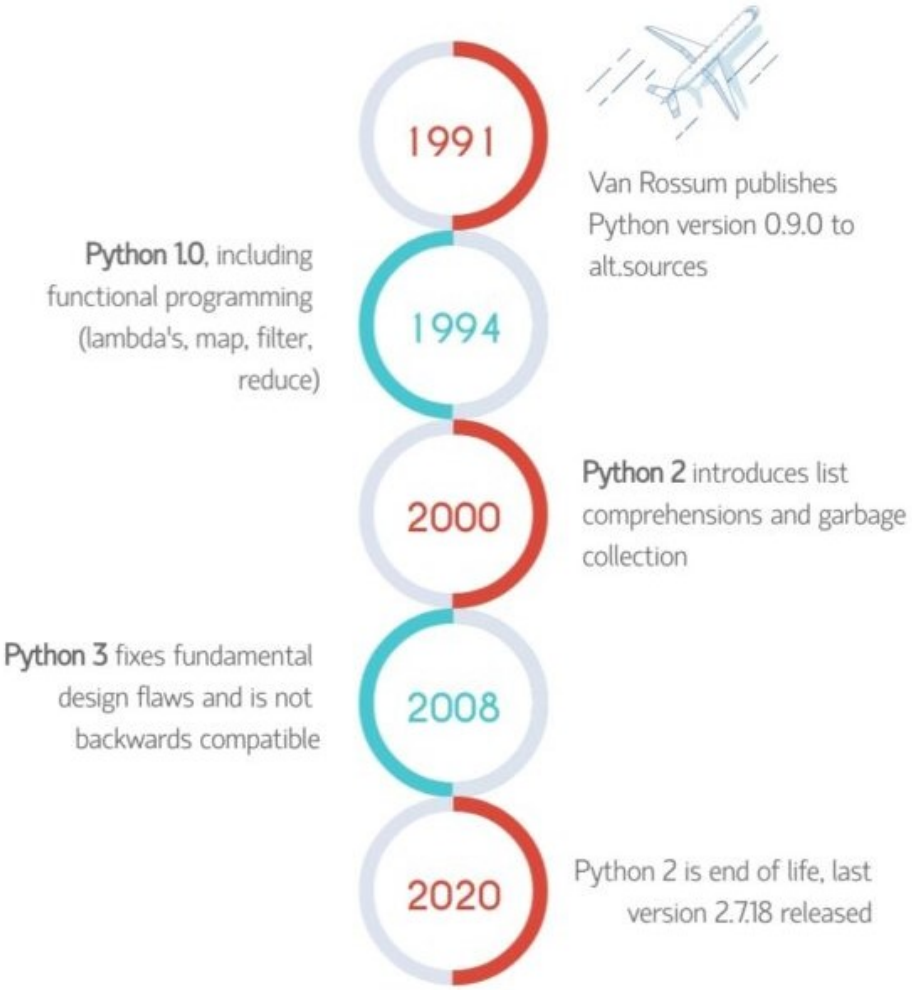
Timeline



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Elements of the Python Language

What is Character Set?

- **Character Set** is a bunch of identifying elements in the programming language.

Elements of the Python Language

What is Character Set?

- Letters: A-Z, a-z
- Digits: 0 to 9
- Special Symbols: space + - / ( ) [ ] = ! = < > , ‘ “ $ # ; : ? &
- White Spaces: Blank Space , Horizontal Tab, Vertical tab, Carriage Return.
- Other Characters: Python can process all 256 ASCII and Unicode Characters.

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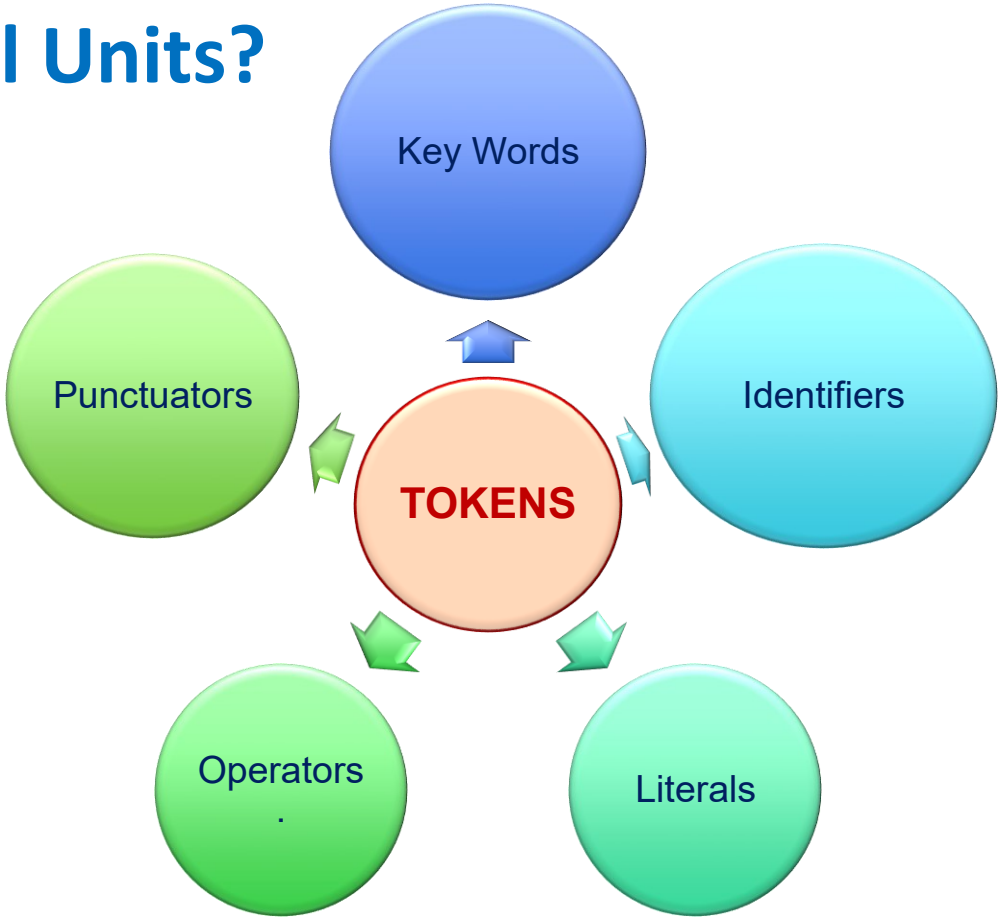
Elements of the Python Language

What are Tokens or Lexical Units?

- Individual elements that are identified by programming language are called **tokens** or **lexical units**.

Elements of the Python Language

What are Tokens or Lexical Units?



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Elements of the Python Language

What are Key Words?

- **Keywords** are also called as reserved words these are having special meaning in python language.
- The words are defined in the python interpreter hence these can’t be used as programming identifiers.

Elements of the Python Language

Some Python Key Words

and	or
break	class
continue	def
del	elif
else	except
exec	finally
for	from

global	if
import	is
not	with
pass	print
raise	return
try	while

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Elements of the Python Language

What is an Identifier?

- A Python **Identifier** is a name given to a function, class, variable, module, or other objects that you'll be using in your Python program.
- In short, it's a name appeared in the program.

For Example: x,y,z, i,j,k, nr, firstname, last_name are valid identifiers

Python Naming Conventions

1. An identifier can be a combination of uppercase letters, lowercase letters, underscores (_), and digits (0-9)
   Hence, the following are valid identifiers: myClass, my_variable, var_1, and print_hello_world
2. The first character must be letter
3. Special characters such as %, @ and $ are not allowed within identifiers
4. An identifier should not begin with a number
   Hence, 2variable is not valid, but variable2 is acceptable

Python Naming Conventions (cont.)

5. Python is a case-sensitive language and this behaviour extends to identifiers.
   Thus, Labour and labour are two distinct identifiers in Python
6. You cannot use Python keywords as identifiers
7. You can use underscores (_) to separate multiple words in your identifier
   Hence, my_local_data_file is a valid identifier

Python Naming Conventions (cont.)

Some valid identifiers

Myfile1 DATE9_7_8 y3m9d3 _xs MYFILE _FXd

Some invalid identifiers

MY-REC 28dre break elif false del @home

References

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- Python Documentation
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