

กำหนดการคอมพิวเตอร์และข้อมูล

บทนำกำหนดการคอมพิวเตอร์ (ไพธอน)

สัปดาห์ที่ ๑

วิรัชธร จิตศิริวิทย์

ฉบับที่ ๑.๐ (ปลายปี ๒๕๖๕)

Programming, Computer and Data

Introduction to Computer Programming (Python)

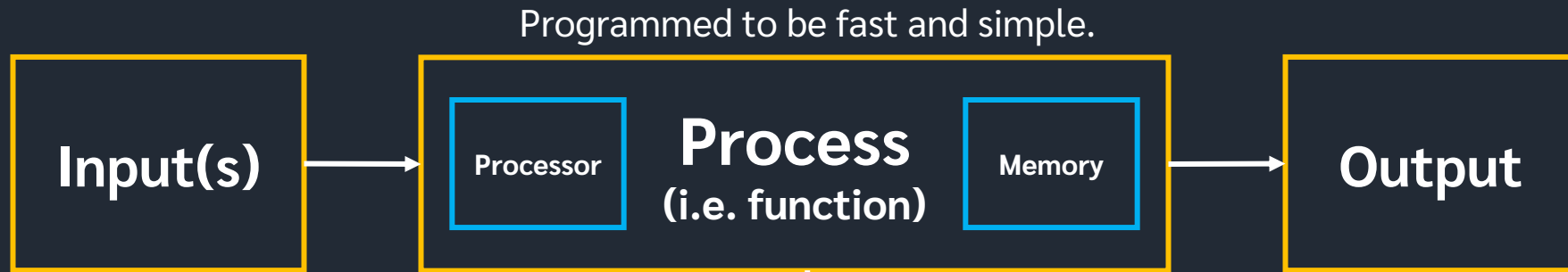
Week 1

Vivatsathorn Thitasirivit

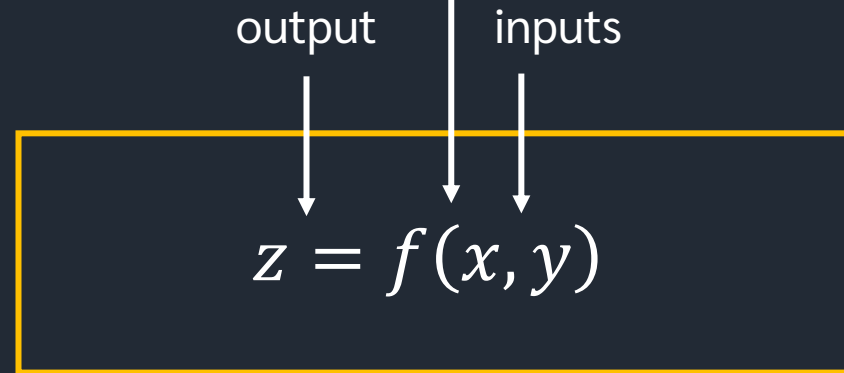
Rev. 1.0 (Course Fall 2022)

What is Computer Programming?

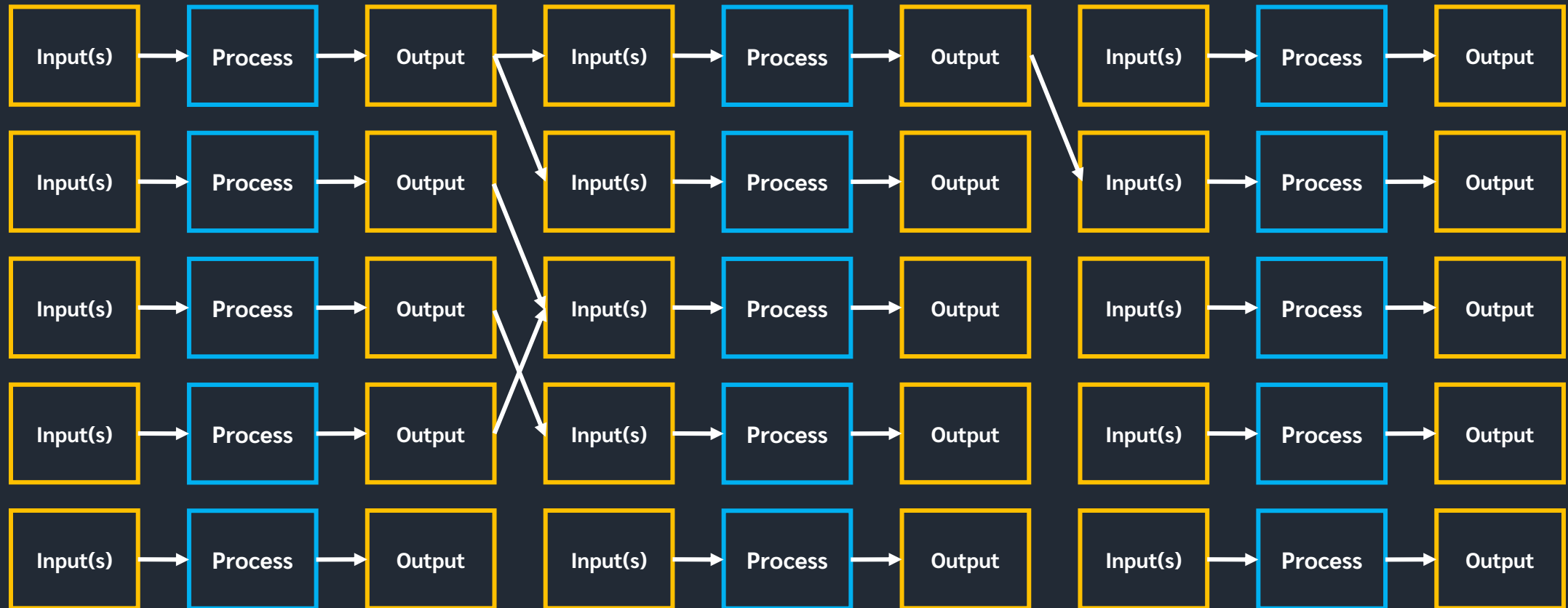
Simple (Linear) Process



Mathematical Equivalence

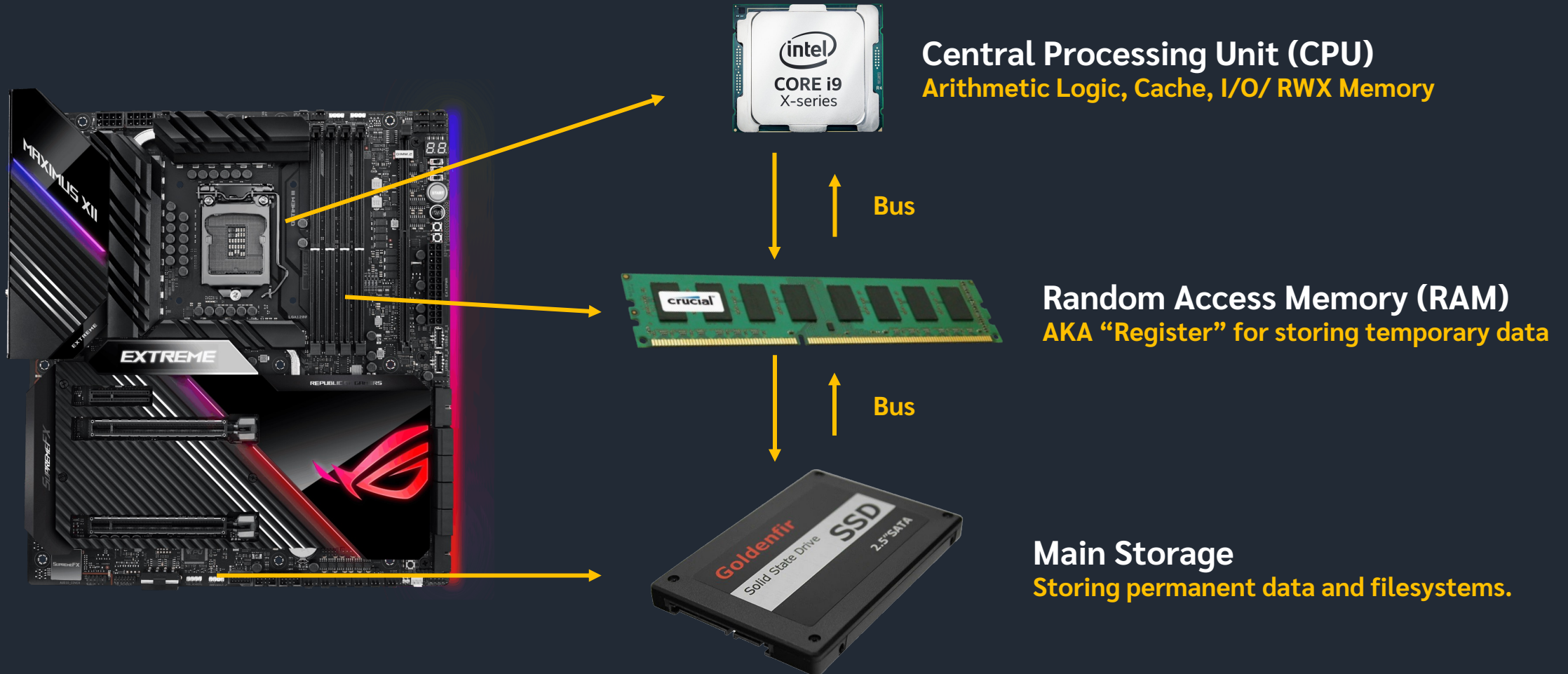


What is Computer Programming?



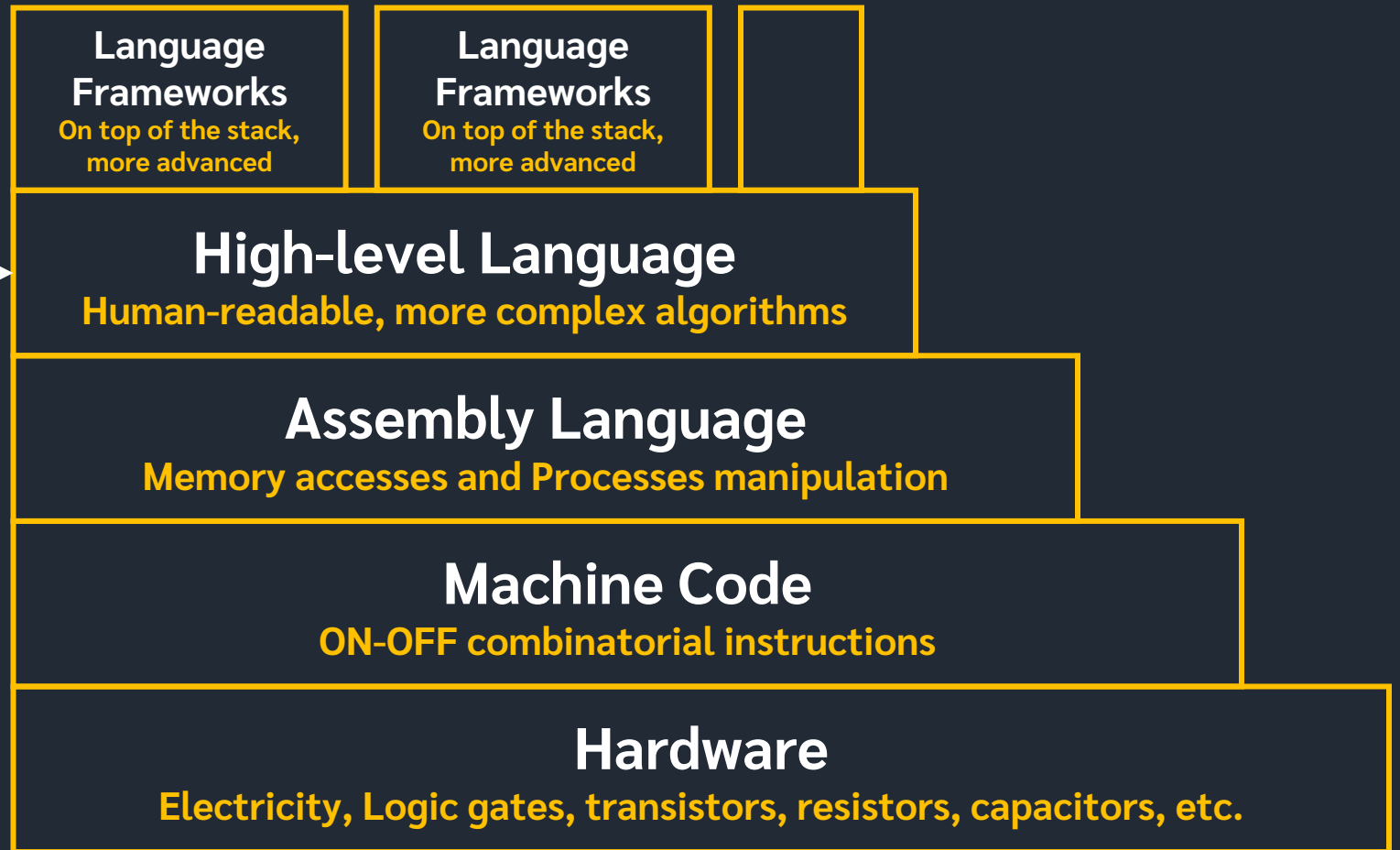
A computer may contain a lot of these individuals and chains of processes.

Components of a computer (Simplified)



Layers of Computer Programming Languages

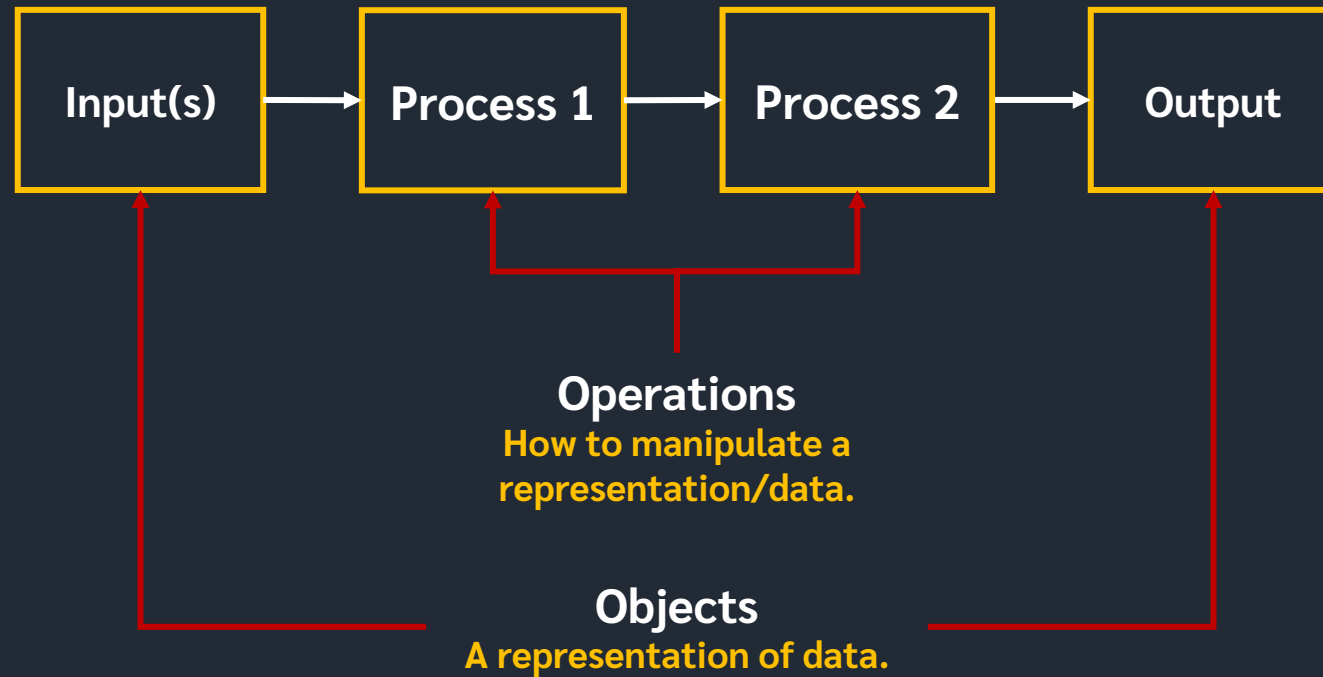
We will be focusing here... →



```
MOV EAX, [EBX]  
MOV [ESI+EAX], CL  
MOV DS, DX
```

```
1001 0010 0111 1000 1110 0110 0101 1010 0001 1001 1100 ...
```

A Program



A Program

Example Program: Course Registration

Objects

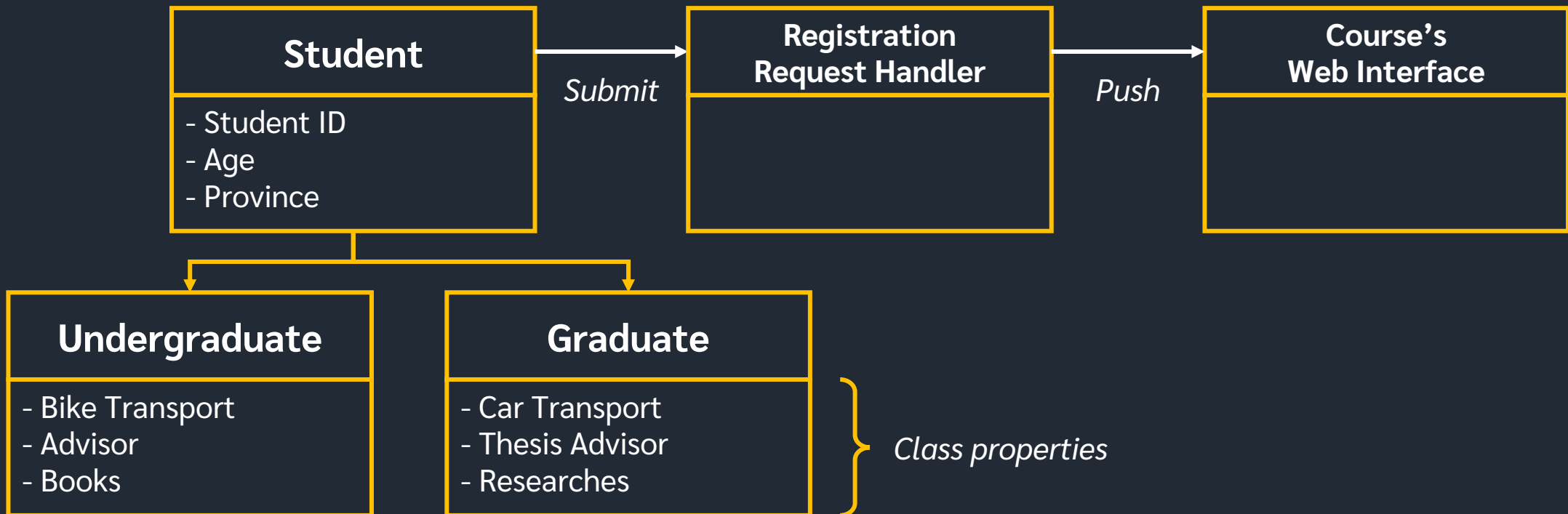
- **Student**
 - Undergraduates
 - Graduates
- **Registration Handler**
- **Course's Web Interface**

Operations

- Request Submission from Student to the system (handler).
- Show courses' details on user's web interfaces.

Class Diagram (Simplified)

Example Program: Course Registration



Algorithm

Definition

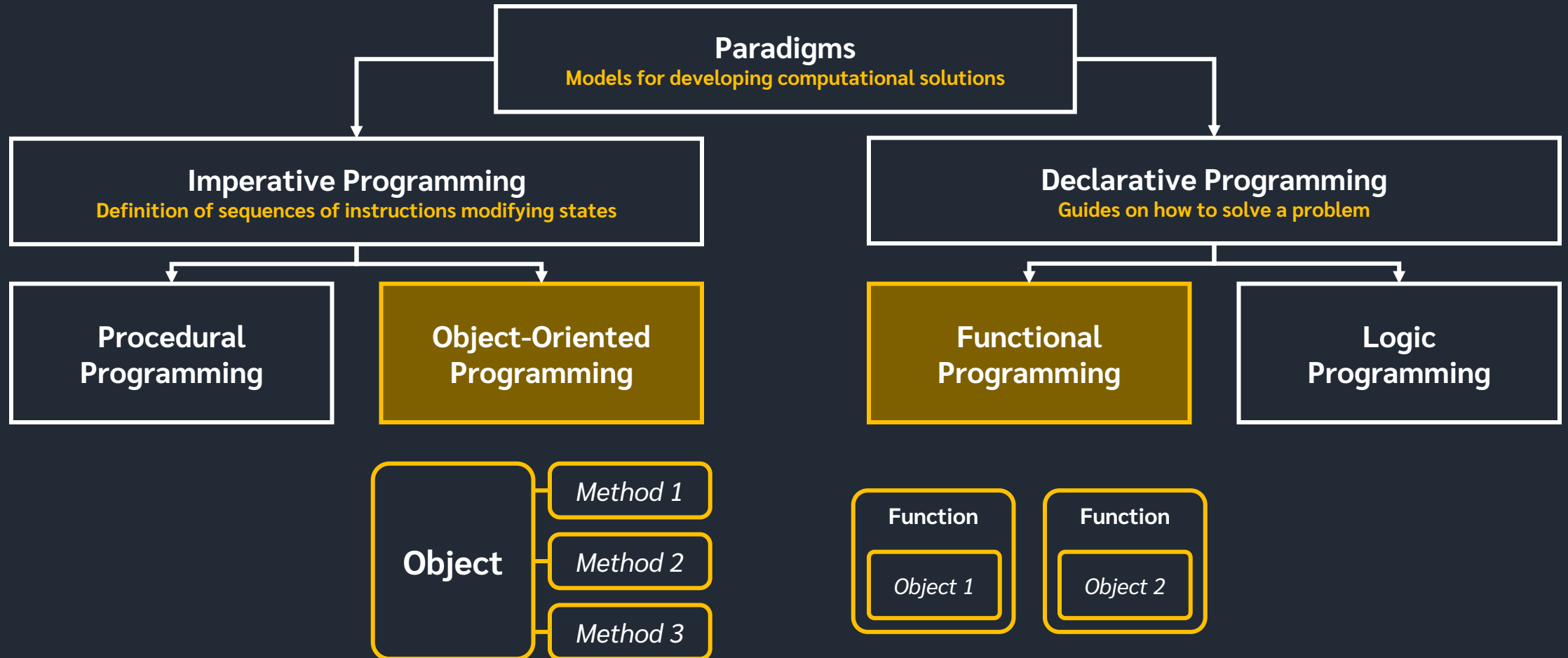
A set or sequences of processes and/or operations to solve a specific **problem**.

“Procedure through which we obtain the solution of a problem.”

Characteristics of an algorithm

- 1. Non-ambiguity** Unique interpretation for each input (Deterministic mapping).
- 2. Executability** Must be possible to execute each statement in a finite amount of space and time.
- 3. Finiteness** After executed, must terminate within a finite amount of time.

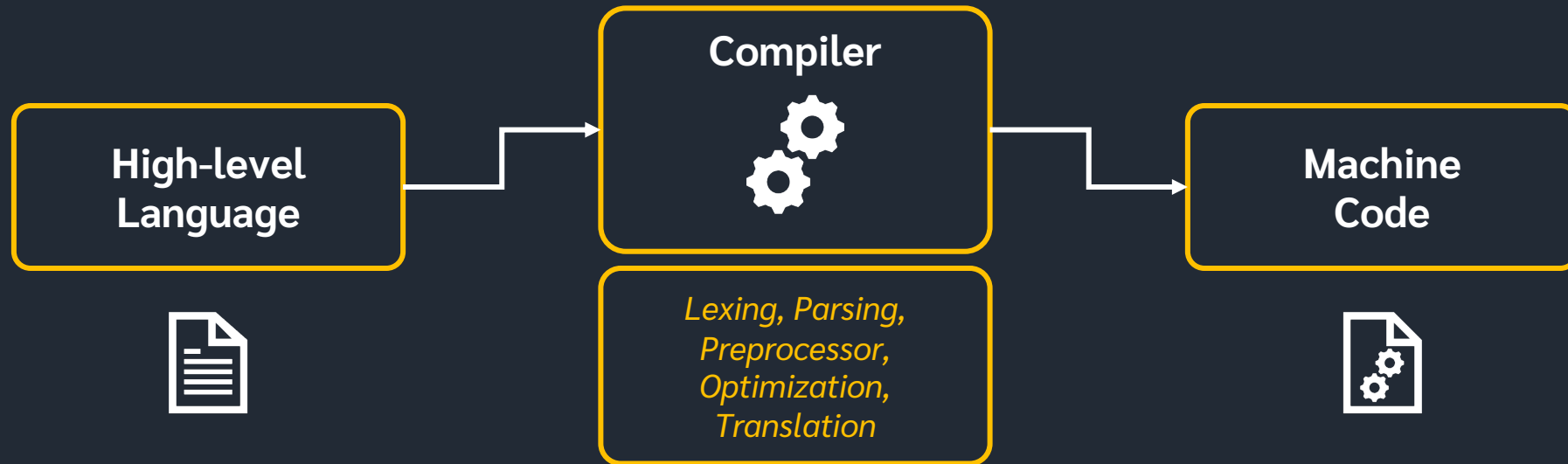
Programming Paradigms



How to translate *High-Level Language* to *Low-Level Language*

1. Compiler

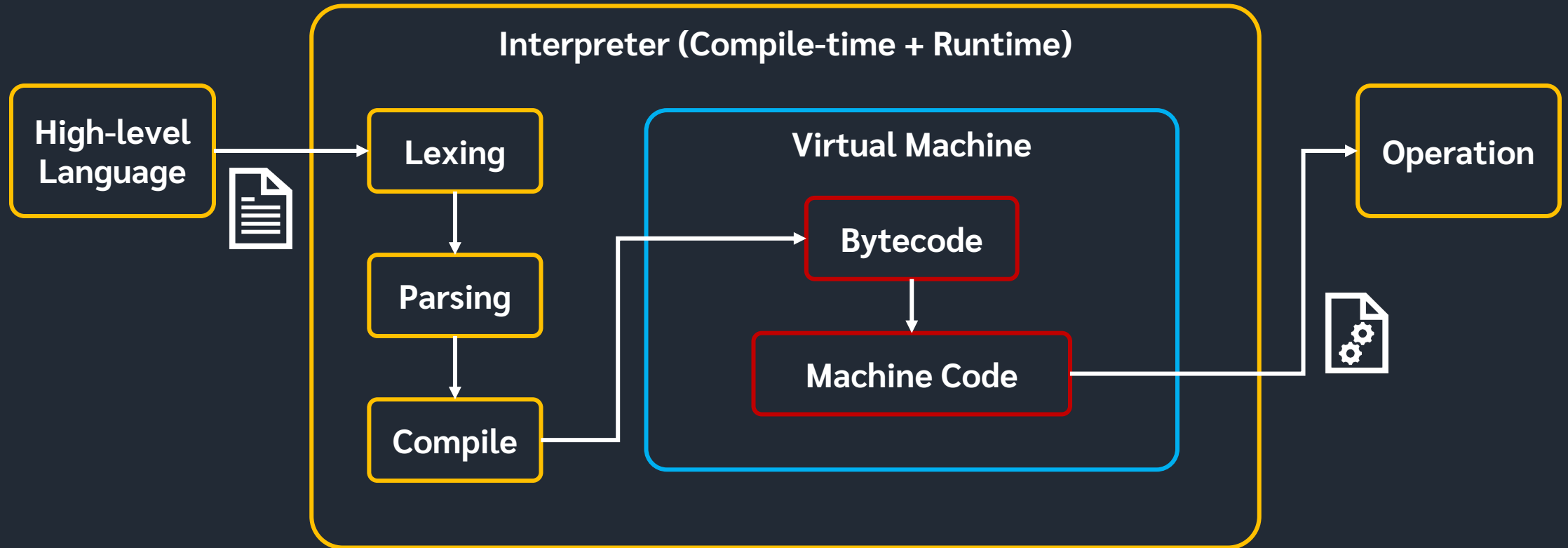
Example: C, C++



How to translate *High-Level Language* to *Low-Level Language*

2. Interpreter

Example: *Python, Java*



Memory Representation:

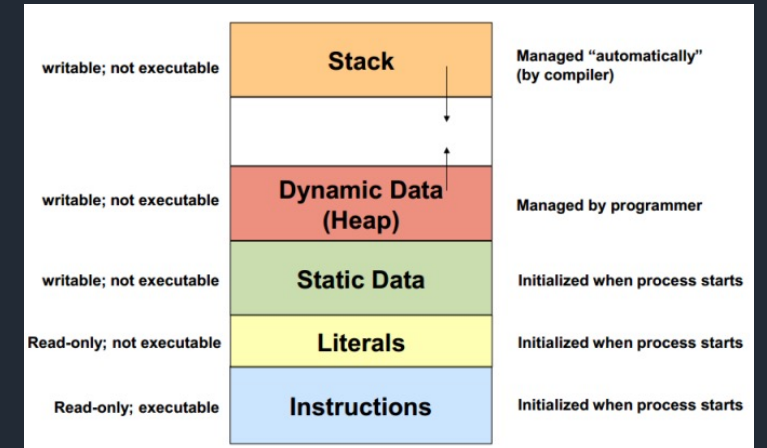
Memory Rows

Row 0	1	0	0	1	1	1	0	0	<i>Value</i>
	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	<i>Address</i>
Row 1									<i>Value</i>
	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F	<i>Address</i>
Row 2									<i>Value</i>
	0x10	0x11	0x12	0x13	0x14	0x15	0x16	0x17	<i>Address</i>
Row 3									<i>Value</i>
	0x18	0x19	0x1A	0x1B	0x1C	0x1D	0x1E	0x1F	<i>Address</i>

Memory Representation:

Memory Stack

Address (Binary)	Address (Hex)	Value
0000	0x00	1
0001	0x01	0
0010	0x02	0
0011	0x03	1
0100	0x04	1
0101	0x05	1
0110	0x06	0
0111	0x07	0
1000	0x08	0
1001	0x09	0



Working Environment

Programming IDE (Integrated Development Environment)



Notepad

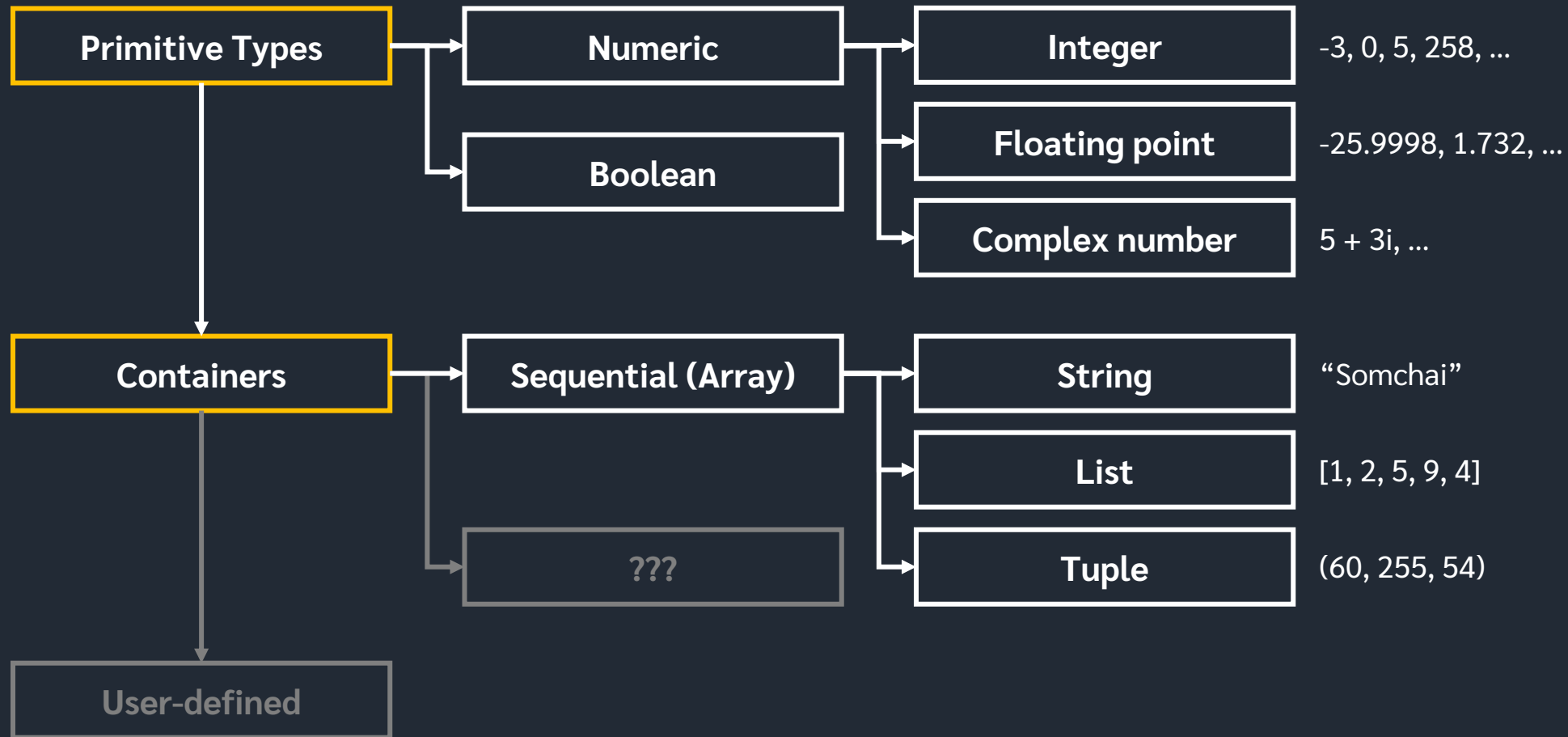


PyCharm Community Edition



Visual Studio Code

General Data Types in Python Programming



Printing texts on the screen

Variables Declaration & Operations

Printing variables on the screen

References

<https://www.inf.unibz.it/~calvanese/teaching/06-07-ip/lecture-notes/uni01.pdf>