PYTHON SEMINAR 2020

JENS HAHN

THEORETICAL BIOPHYSICS

PROGRAMMING - ROMAN NUMERALS

- Understand problem in general
- Convert problem to algorithmic problem
- Search online for possible solutions
- Test and debug code

TODAY

I Data types & flow control recap

II Functions

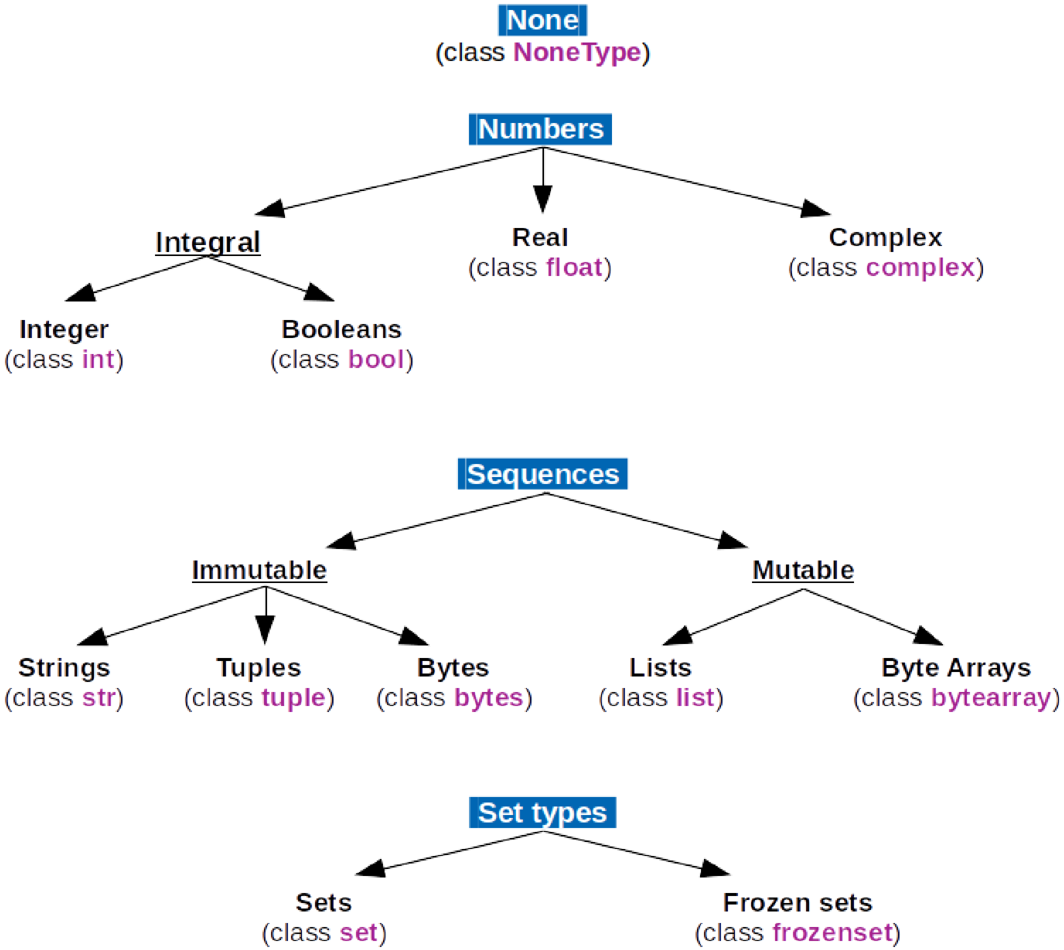
III Built-ins

I. ASSIGNMENT II - ROMAN NUMERALS

Tasks

- *Fetch* from *upstream* and *merge* - get course material
- Write script - work on assignment
- *Commit* file and *push* - save progress in repo

I. DATA TYPES RECAP



None
(class NoneType)

Numbers

Integral

Integer
(class int)

Booleans
(class bool)

Real
(class float)

Complex
(class complex)

Sequences

Immutable

Strings
(class str)

Tuples
(class tuple)

Bytes
(class bytes)

Mutable

Lists
(class list)

Byte Arrays
(class bytearray)

Set types

Sets
(class set)

Frozen sets
(class frozenset)

"Python 3. The standard type hierarchy.png" by Максим Пе is licensed under CC BY-SA 4.0

I. FLOW CONTROL RECAP

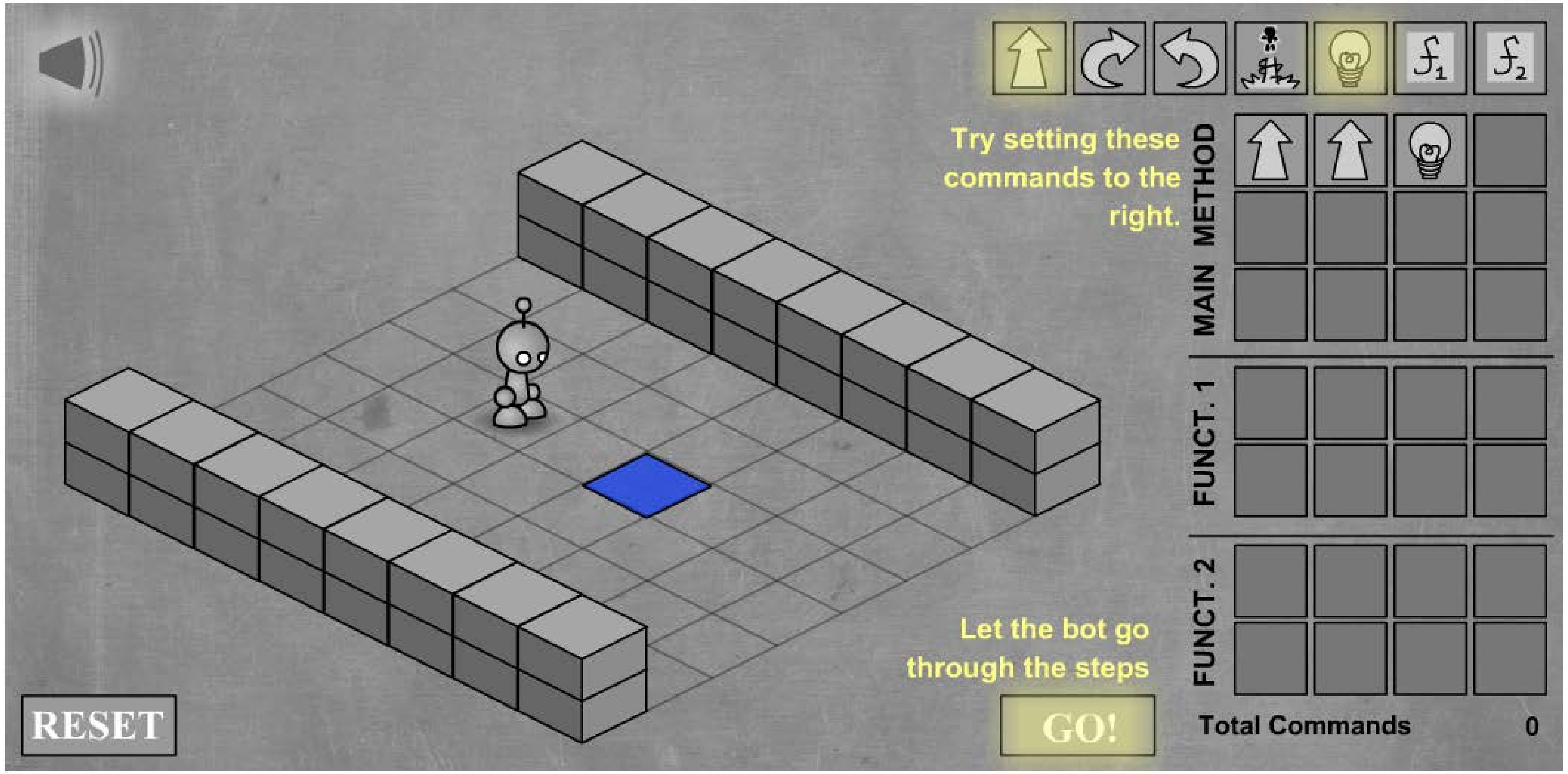
Loops

- *for* - loop variable is actual element of iterable object
- *while* - needs a break condition

Conditionals

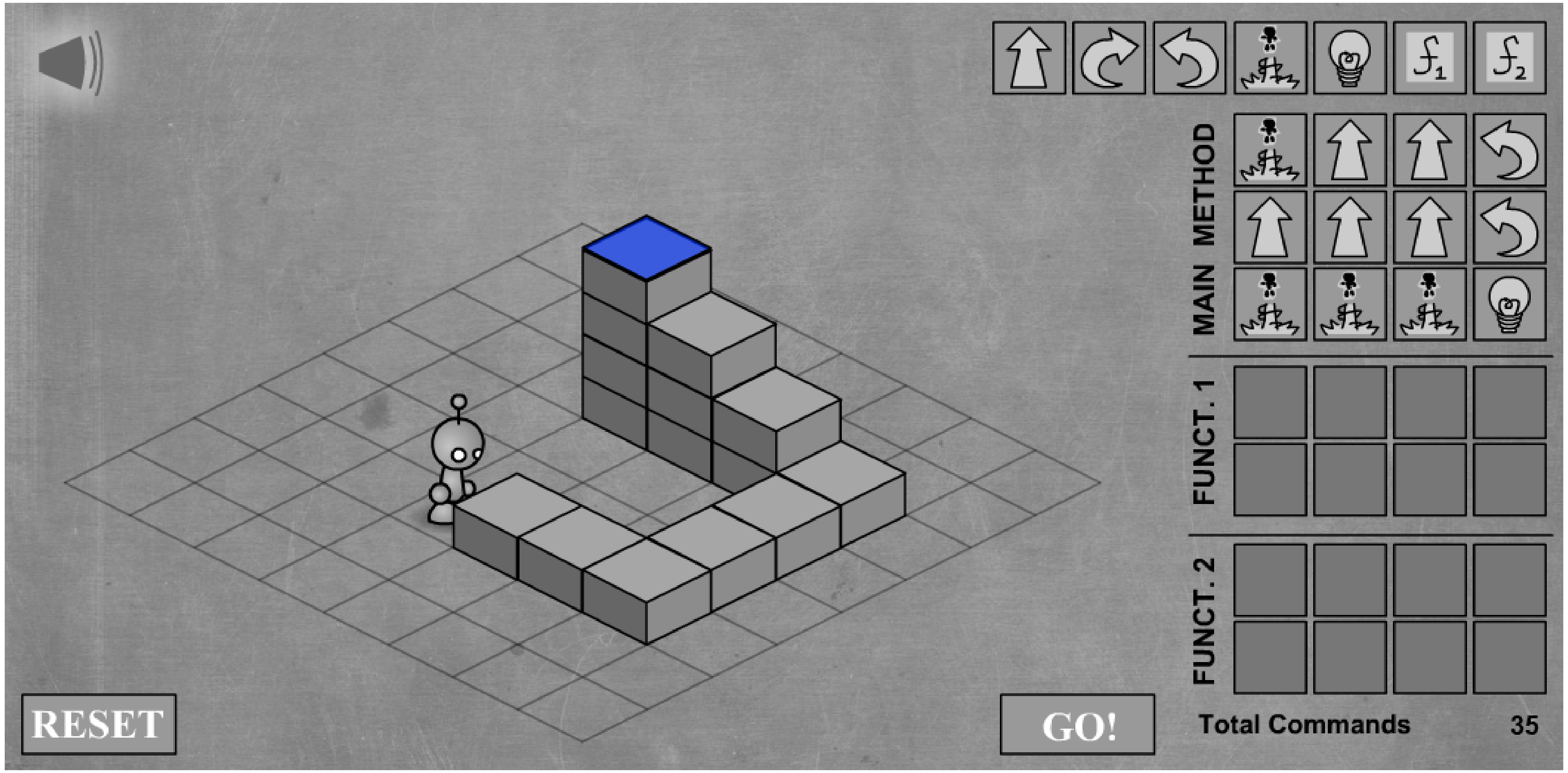
- *if* - first condition, always checked
- *elif* - checked only if previous condition is not met
- *else* - last statement, checked if no previous conditions are met

II. FUNCTIONS


Try setting these commands to the right.
MAIN METHOD
FUNCT. 1
FUNCT. 2
Let the bot go through the steps
RESET
GO!
Total Commands
0

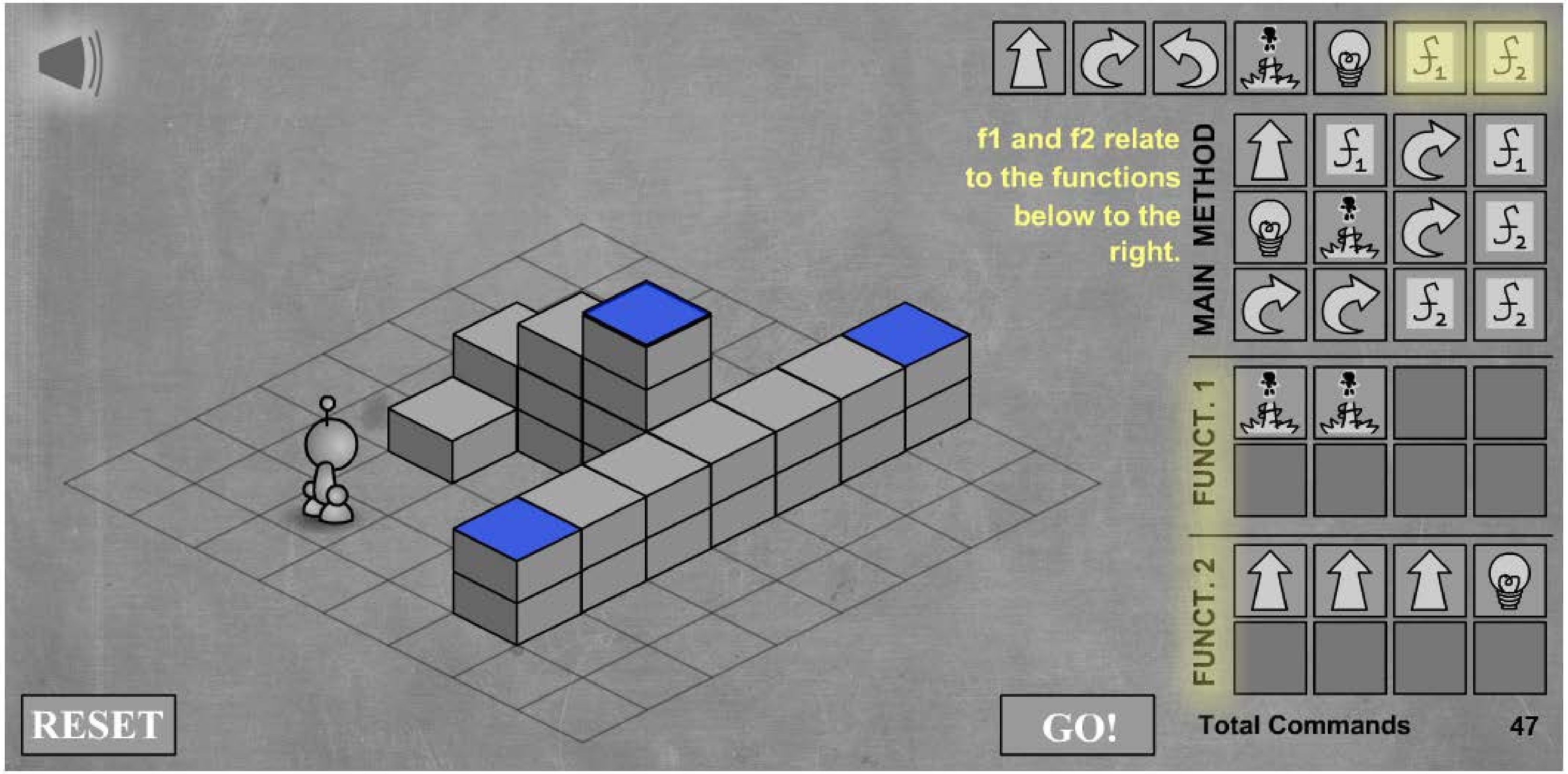
https://lightbot.com/

II. FUNCTIONS



https://lightbot.com/

II. FUNCTIONS



https://lightbot.com/

II. FUNCTIONS

Functions

- Only executed when called
- Small code entities (~100 lines) that can be reused
- One task per function
- Clear name (snake_case)

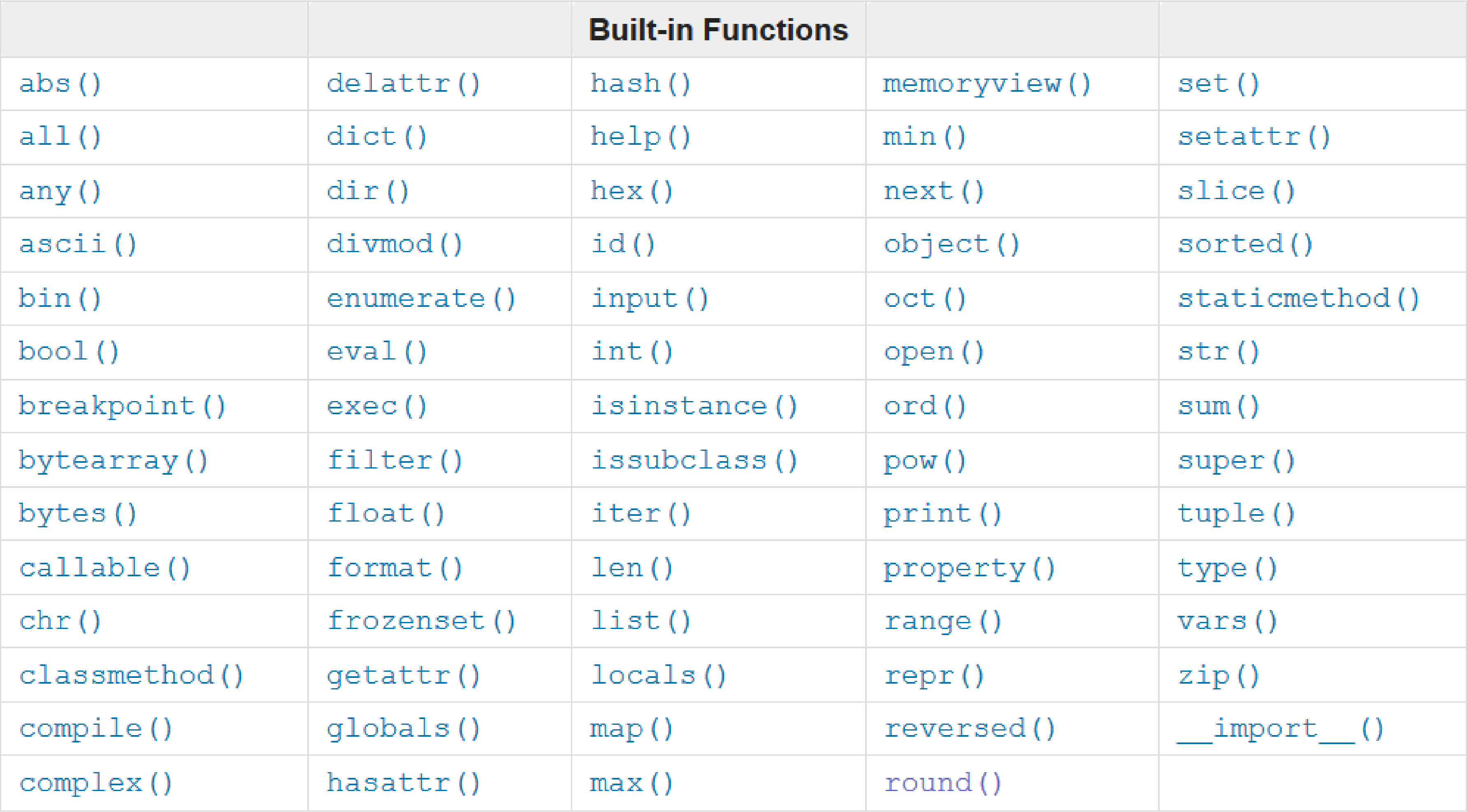
II. FUNCTIONS

argument

```
def get_length(iterable):
----length = 0
----for element in iterable:
--------length = length + 1
----return length
```

return value

III. BUILT-INS - OVERVIEW



		Built-in Functions		
abs()	delattr()	hash()	memoryview()	set()
all()	dict()	help()	min()	setattr()
any()	dir()	hex()	next()	slice()
ascii()	divmod()	id()	object()	sorted()
bin()	enumerate()	input()	oct()	staticmethod()
bool()	eval()	int()	open()	str()
breakpoint()	exec()	isinstance()	ord()	sum()
bytearray()	filter()	issubclass()	pow()	super()
bytes()	float()	iter()	print()	tuple()
callable()	format()	len()	property()	type()
chr()	frozenset()	list()	range()	vars()
classmethod()	getattr()	locals()	repr()	zip()
compile()	globals()	map()	reversed()	__import__()
complex()	hasattr()	max()	round()	

Python 3.7
documentation

III. BUILT-INS - IMPORTANT

- Converting functions: `int(), float(), list(), str(), …`
- Id of an object: `id()`
- Length of an iterable: `len()`
- Generate iterable (0-9): `range(10)`
- Ask for user input: `input(‘Type a number: ’)`
- Return type of object: `type()`

IV. ASSIGNMENT - FUNCTIONS, FUNCTIONS

Simple functions

- Function returns x^2
- Function sums up numbers in an iterable
- Function counts types of elements in an iterable

Games

- Guess a number
- Rock, Paper, Scissors
- Mastermind
- Battleship

IV. FURTHER READING

Python functions

- Programiz – Python Functions

  https://www.programiz.com/python-programming/function

- Python built-ins - documentation

  https://docs.python.org/3/library/functions.html

Python games

- Creating 2D games in Python

  https://opensource.com/article/18/4/easy-2d-game-creation-python-and-arcade

- Snake in 5 min

  https://youtu.be/rbasThWVb-c