

ADVANCED PROGRAMMING

Helia Nakhjavani

سرفصل مطالب

- مجموعه ها و کالکشن ها
- دیکشنری و کالکشن ها
- طراحی برنامه های تابعی
- اصول طراحی شی گرا
- مدیریت فایل ها و عملیات ها
- مازول های پایتون
- محاسبات علمی در پایتون
- مصور سازی داده
- پایتون با DB
- اولین گام به سوی پایتون
- متغیرهای ذخیره سازی
- دسته بندی انواع داده
- ایمپورت ها و قالب بندی IO
- محاسبات و انجام عملیات ها
- شرطی ها برای انجام تصمیم گیری
- اجرای تکراری با استفاده از حلقه ها
- لیست ها و کالکشن ها
- تاپل ها و کالکشن ها

اولین گام به سوی پایتون

ابزار های مورد نیاز:

- ❖ Jupyter Notebook
- ❖ Spyder
- ❖ Install anaconda

anaconda.com/products/distribution

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The world's most popular open-source Python distribution platform

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Python 3.9 • 64-Bit Graphical Installer • 688 MB

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 |  | 

 Open Source

Access the open-source software you need for projects in any field, from data visualization to robotics.

 User-friendly

With our intuitive platform, you can easily search and install packages and create, load, and switch between environments.

 Trusted

Our securely hosted packages and artifacts are methodically tested and regularly updated.

ANACPND

نصب



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All applications on base (root) Channels

DS DataSpell 3.4.4

DataSpell is an IDE for exploratory data analysis and prototyping machine learning models. It combines the interactivity of Jupyter notebooks with the intelligent Python and R coding assistance of PyCharm in one user-friendly environment.

Install Launch

lab JupyterLab 3.4.4

An extensible environment for interactive and reproducible computing, based on the Jupyter Notebook and Architecture.

Launch

jupyter Notebook 6.4.12

Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis.

Launch

IP[y]: Qt Console 5.3.2

PyQt GUI that supports inline figures, proper multiline editing with syntax highlighting, graphical calltips, and more.

Launch

Spyder 5.3.3

Scientific Python Development EnviRonment. Powerful Python IDE with advanced editing, interactive testing, debugging and introspection features

Launch

DL Datalore

Kick-start your data science projects in seconds in a pre-configured environment. Enjoy coding assistance for Python, SQL, and R in Jupyter notebooks and benefit from no-code automations. Use Datalore online for free.

Launch

Deepnote

Deepnote is a new kind of data notebook build for collaboration - Jupyter compatible, in the cloud and sharing is easy as sending a link

Launch

IBM Watson Studio Cloud

IBM Watson Studio Cloud provides you the tools to analyze and visualize data, to cleanse and shape data, to create and train machine learning models. Prepare data and build models, using open source data science tools or visual modeling.

Launch

ORACLE Cloud Infrastructure

Oracle Data Science Service

OCI Data Science offers a machine learning platform to build, train, manage, and deploy your machine learning models on the cloud with your favorite open-source tools

Launch

Glueviz 1.0.0

Multidimensional data visualization across files. Explore relationships within and among related datasets.

Install

Orange 3 3.32.0

Component based data mining framework. Data visualization and data analysis for novice and expert. Interactive workflows with a large toolbox.

PyCharm Professional

A full-fledged IDE by JetBrains for both Scientific and Web Python development. Supports HTML, JS, and SQL.

RStudio 1.1.456

A set of integrated tools designed to help you be more productive with R. Includes R essentials and notebooks.

JUPYTER NOTEBOOK

Home Page - Select or create a new notebook

localhost:8888/tree

jupyter

Files Running Clusters

Select items to perform actions on them.

Upload New ↘

	Name	Last Modified	File size
<input type="checkbox"/> 0	/		
<input type="checkbox"/>	Applications	a year ago	
<input type="checkbox"/>	Desktop	a minute ago	
<input type="checkbox"/>	Documents	2 years ago	
<input type="checkbox"/>	Downloads	4 minutes ago	
<input type="checkbox"/>	Dropbox	2 months ago	
<input type="checkbox"/>	GNS3	a year ago	
<input type="checkbox"/>	homebrew	a year ago	
<input type="checkbox"/>	Movies	4 months ago	
<input type="checkbox"/>	Music	a year ago	
<input type="checkbox"/>	opt	8 minutes ago	
<input type="checkbox"/>	Pictures	a year ago	
<input type="checkbox"/>	Public	2 years ago	
<input type="checkbox"/>	PycharmProjects	8 months ago	
<input type="checkbox"/>	Virtual Machines.localized	15 days ago	
<input type="checkbox"/>	VirtualBox VMs	8 months ago	
<input type="checkbox"/>	filimo-dm.db	a year ago	16.7 kB



JUPYTER NOTEBOOK

In [1]: `#First Python Program
print("Python is fun")`

Python is fun

In [2]: `10 + 10`

Out[2]: 20

Using Jupyter

Using Jupyter

Using Jupyter

JUPYTER NOTEBOOK

کلمات کلیدی و شناسه ها

False	def	class	if	not	while
None	as	continue	import	or	with
True	assert	Del	in	pass	yield
and	break	elif	is	raise	from
else	except	finally	for	return	
	Global	lambda	nonlocal	try	

Statements

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- دستورات قابل اجرا
- تک خطی و چند خطی



پایتون از indentation (فضای خالی) برای تعریف بلوک های کد استفاده می کند.

Indentation

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- توضیحات بخش های مختلف کد
- خوانا تر کردن کد برای فهم بیشتر
- تک خطی یا چند خطی

COMMENTS



The background features a dynamic, abstract design. On the left, a series of concentric, wavy lines in shades of pink, purple, and blue radiate from the bottom left towards the center. To the right of this, a large, semi-transparent circular shape in shades of blue and green overlaps the wavy lines. In the top right corner, there is a grid of small, white, circular dots.

متغیر های ذخیره سازی

- Container
- Store Data Types
- Named Location
 - Name = “Marcelo”
 - Number = 16.8

Variables

- Starts with a letter or _
- Can't start with a number
- Can contain A-z, 0-9 and _
- Case sensitive (name not equal to Name or NAME)

VARIABLE RULES

- Assigning values to variables
- Changing values

VARIABLE EXAMPLES

- Assigning multiple values to variables
- Some value for multiple variables

VARIABLE EXAMPLES

- Can't be changed in general
- Containers
- UPPERCASE letters
- Example: PI=3.14

Constants

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- Integer, Literals : Binary, Decimal, Octal, Hexadecimal
- Numeric Literals are unchangeable
- Int, Float and Complex

Numeric Literals

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- Sequence of characters
- Single Line and Multiple Line

String Literals

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True == 1

False == 0

BOOLEAN LITERALS

None

Define a null value

SPECIAL LITERALS

List

Tuple

Dictionary

Set

COLLECTION LITERALS

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DATA TYPES

1)Integers (int)

2)Floating Point Numbers(float)

3)Complex Numbers (complex)

Type(): to Know the Type of Data

Numbers

- Ordered Sequence and changeable
- Most Popular and Use
- Flexible
- Store many types of Data
- **Example :** [1,2,3,4]

Lists

- **Mutable**

You can change list items

LISTS

- Ordered Sequence
- Immutable/ Unchangeable
- Protect data
- Faster than lists
- **Example** : (1, "app", 2+5j)

TUPLE

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- Sequence of characters
 - Immutable
 - Single line string using '' or ""
 - **Example:** "Hello, World"
 - Multi-line string using """ """" or ''' ''''
- **Example :**
 ""Hello,
 World""

Strings

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- Unbordered (indexing has no meaning). #Error
- Eliminates duplicates
- **Example** : {1, 2, 3, 4, 5}
- Faster than lists

Set

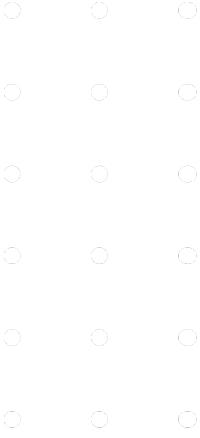
- Unbordered Collection, no duplicate
- {key1:value1, key2:value2}
- Retrieve data
- **Example :**
- {"name": "Fred" , "age":32 }

DICTIONARIES

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قالب بندی IMPORT IO



✓ Print()

➤ output data on screen

Inputs and Outputs

.format

Formatting The Output



Import

IMPORTING MODULES

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OPERATORS

Addition +
Subtraction -
Multiplication *
Division /
Modulus %
Floor Division //
Exponents **

Arithmetic Operators

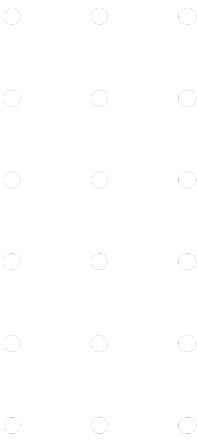
- Greater than >
- Less than <
- Equal to ==
- Not equal to !=
- Greater than or equal to >=
- Less than or equal to <=

COMPARISON OPERATORS

- **and**: True If both the operands are true
- **Or**: True of either of the operands is true
- **Not**: True if operand is false

Logical Operators

✓ =



✓ +=

✓ -=

✓ *=

✓ /=

ASSIGNMENT OPERATORS

✓ is

✓ is not

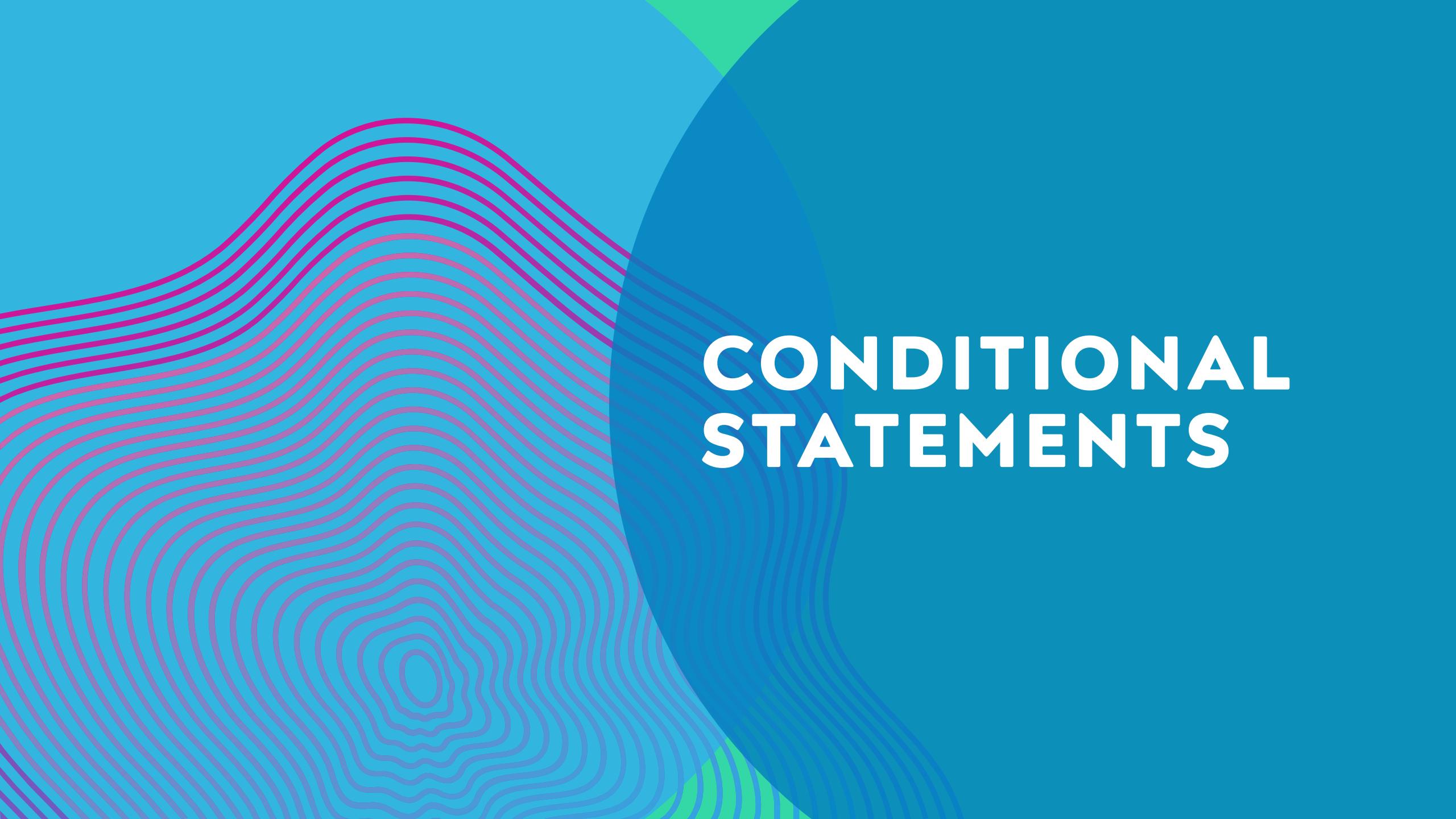
IDENTITY OPERATORS

✓ in

✓ not in

Membership Operators

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CONDITIONAL STATEMENTS

✓ Decision making

✓ **Syntax**

If test expression:
#statement

IF

- ✓ Decision making
- ✓ Is executed if the conditional if test expression is False
- ✓ **Syntax**

```
If test expression:  
    #statements  
else:  
    #statements
```

ELSE

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- ✓ Is executed if the conditional if test expression is False

- ✓ **Syntax**

If test expression:

#statements

else:

#statements

elif:

#statements

Elif

- ✓ Conditional Statements can be nested inside one another

Nested IF



WHILE

- ✓ Iterative over a block
- ✓ Iterative over a Sequence

- ✓ **Syntax**

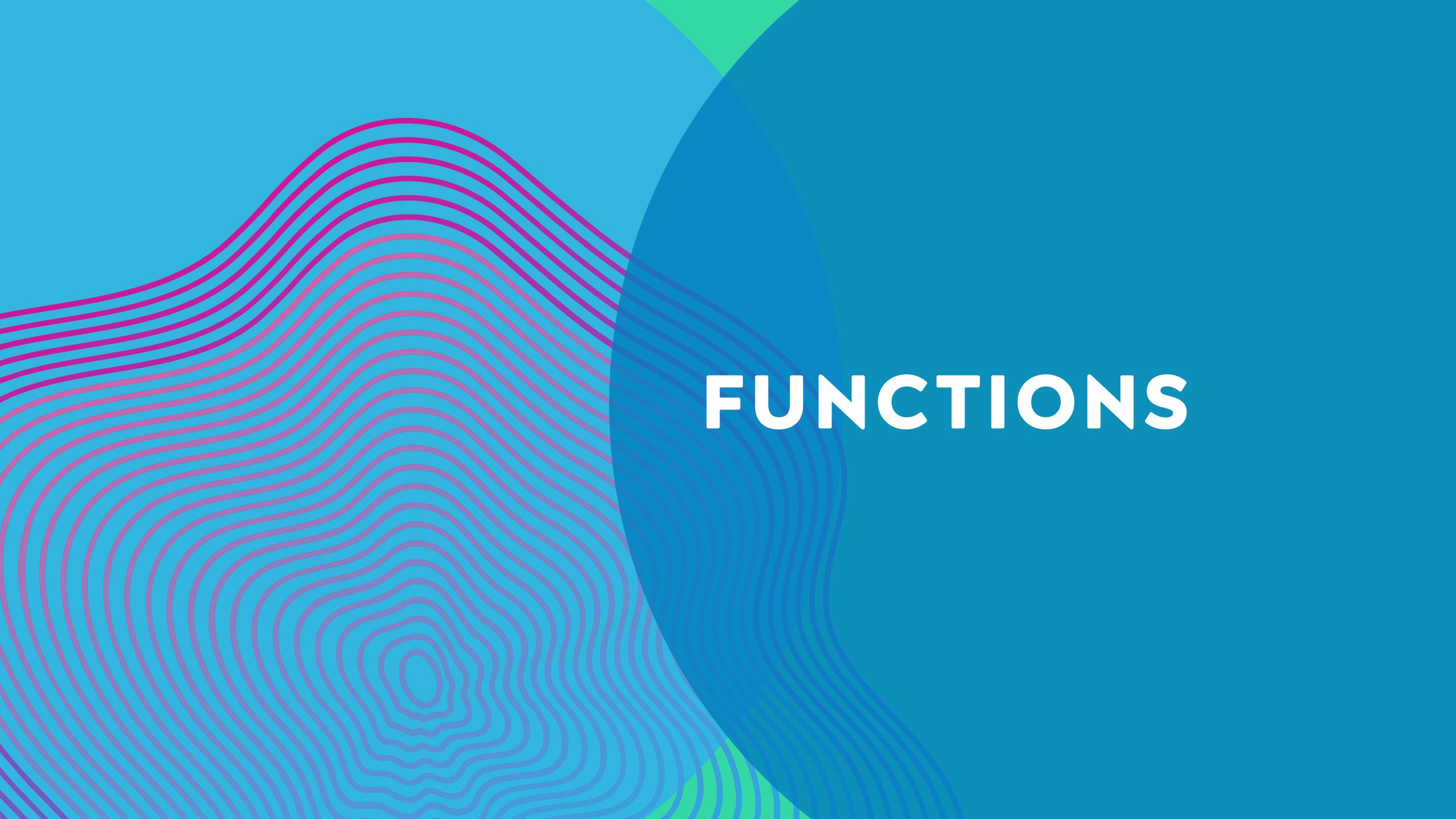
```
while test_expression:  
    Body of while
```

While

- ✓ Iterate over a block
- ✓ Iterate over a sequence

```
for val in sequence:  
    Body of for
```

For loops

The background features a dynamic, abstract design. On the left, a series of concentric, wavy lines in shades of pink, purple, and blue radiate from the bottom left towards the center. A large, solid blue circle is positioned in the upper right quadrant, partially overlapping the wavy lines. The overall composition is clean and modern, with a focus on color and form.

FUNCTIONS

- ✓ Block of code
- ✓ Group of related statements
- ✓ Pass arguments
- ✓ Syntax

```
def function_name()  
    #function body
```

Functions

- ✓ Pass data into functions
- ✓ Many arguments
- ✓ **Example**

```
def new_function(name)  
    print(name + "is the name")
```

```
new_function("Alen") #Alen is the name
```

Arguments

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- ✓ Inserting a list as an argument or a parameter into a function

- ✓ Return a value
- ✓ To exit a function, and go back to the place from where it was called
- ✓ **Syntax**

return [expression]

Return

✓ (key1 = value1, key2 = value2)

MULTIPLE ARGS

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- ✓ If you do not know how many keyword arguments that will be passed into your function, use an asterisk before the parameter name to denote this kind of argument

ARBITRARY ARGS

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- ✓ Solving problems
- ✓ A defined function can call itself

RECURSION

- ✓ Anonymous function
- ✓ Any number of arguments
- ✓ Only have one expression
- ✓ **Syntax:**

Lambda arguments: expression

LAMBDA

- ✓ Two arguments
- ✓ Three arguments

LAMBDA Examples

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- ✓ The power of lambda is better shown when you use them as an anonymous function inside another function

LAMBDA with Functions

CLASSES AND OBJECTS

- ✓ Python is an object-oriented language.
- ✓ Everything in python is an object
- ✓ Class is an object constructor

Classes And Objects

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FILES HANDLING

✓ Open("filename", "mode")

✓ Modes:

1. r

2. a

3. w

4. x

Files Handling