

# Introduction to Python

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# Agenda

- Python Fundamentals Quiz
- Variables, Operators, and Data Structures
- Conditional Statements
- Looping Statements
- Functions

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**Let's begin the discussion by answering a few questions  
on the fundamentals of Python programming**

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# Python Fundamentals Quiz

Which of the following is true regarding variables in Python?

A

Values assigned to variables can be modified

B

Variables can store data structures such as arrays and dictionaries

C

Variables can only store integer and floats

D

Variables can store integer, floats, strings and booleans

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# Variables

Used to **store any type of data**

Single values (integer, float, string, boolean, etc.)

Data structures (arrays, lists, dictionaries, etc.)

Can be **created by assigning a value to it with the “=” operator** (assignment operator)

`num = 100` => creates a variable `num` and stores the value `100` in it

Can be **modified to store a different value**

`num = 3.14` => variable `num` gets modified, now stores `3.14` instead of `100`

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# Python Fundamentals Quiz

Which of the following combinations accurately matches mathematical symbols with their respective operations?

A

+ for addition, - for subtraction

B

\* for exponentiation, / for modulus

C

% for multiplication, \*\* for division

D

\*\* for multiplication, % for subtraction

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# Operators

Symbol	Operation	Example	Output
+, -	Addition, Subtraction	1 + 7 9 - 4	8 5
*, /, %	Multiplication, Division, Modulus	3 * 4 6 / 2 6 % 2	12 3.0 0
**	Exponentiation	2 ** 4	16
==, !=, >, >=, <, <=	Comparison	5 <= 4	False
in, not in	Membership	5 in [1, 2, 3, 4, 5]	True
()	Grouping	(1+2) * (2+3)	3 * 5 = 15

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# Python Fundamentals Quiz

Which of the following data structures in Python are mutable (can be modified later after being created)?  
List, Dictionary, Tuple

A

Only List

B

Tuple and Dictionary

C

List and Tuple

D

List and Dictionary

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# Data Structures

List	Tuple	Dictionaries
A collection of items of any data type	A collection of items of any data type	A collection of key-value pairs
Mutable (can be modified)	Immutable (cannot be modified)	Mutable (can be modified)
Syntax: <code>mylist = ["Element 1", "Element 2", "Element 3"]</code>	Syntax: <code>mytuple = ("Element 1", "Element 2", "Element 3")</code>	Syntax: <code>mydict = {1: 'Element 1', 2: 'Element 2', 3: 'Elements 3'}</code>
Example: <code>X=["a", 2, True, "b"]</code>	Example: <code>X=("a", 2, True, "b")</code>	Example: <code>X={1: 'Jan', 2: 'Feb', 3: 'Mar'}</code>

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# Python Fundamentals Quiz

Which of the following will retrieve the two middle elements from the list?

```
my_list = [1, "two", 3.5, "four", 5, 6.0, "seven", 8.2]
```

A

```
my_list[3:5]
```

B

```
my_list[4:6]
```

C

```
my_list[-5:-3]
```

D

```
my_list[-4:-6]
```

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# Lists - Slicing

To retrieve a specific **subset of elements from a list**, one can **slice the list by index**

The format for list slicing is as follows:

```
<list_name>[Start Index : End Index : Index-Jump]
```

Consider a list `my_list = ['a', 'b', 'c', 'd']`

Negative Index	-4	-3	-2	-1
Elements	a	b	c	d
Index	0	1	2	3

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# Python Fundamentals Quiz

Which statement accurately describes the behavior of the "elif" construct in Python?

A

"elif" is used to define a block of code to be executed if the preceding "if" or "elif" condition(s) evaluate to False.

B

"elif" is mandatory and must be included after every "if" statement.

C

"elif" is used only when there are multiple conditions and no "else" block is present.

D

"elif" is equivalent to "else if" and can be used interchangeably with the "else" statement.

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# Conditional Statements

Used to **make decisions based on specified rules**

A **single decision** can be made using **if-else construct**

```
if (test expression):  
    <Body of if> this is executed if the expression is True  
else:  
    <Body of else> this is executed if the expression is False
```

**More than one decision** can be made using the **if-elif-else construct**

```
if (test expression 1):  
    <Body of if> run this if test expression 1 is True  
elif (test expression 2):  
    <Body of elif> run this if test expression 2 is True  
else:  
    <Body of else> run this if none of the above expressions are True
```

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# Python Fundamentals Quiz

Which of the following statements is true regarding loops in Python?

A

The "for" loop requires a condition to be evaluated before execution

B

The "for" loop iterates through a sequence, executing on each element

C

The "while" loop requires a condition to be evaluated before execution

D

The "while" loop iterates through a sequence, executing on each element

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# Looping Statements

Used to **repeat a single statement or a set of statements**

Looping statement	Syntax	Example	Output
<b>for</b>	for iter var in seq: statements(s)	for i in range(1, 5): print(i)	Prints all integers from 1 till 5 (excluded)
<b>while</b>	while condition: statement(s)	i = 1 while i < 5: print(i) i += 1	Prints all integers from 1 till 5 (excluded)

# Python Fundamentals Quiz

What is the purpose of functions in Python?

A

To execute a specific task only once in a program

B

To combine multiple variables into a single variable

C

To break code into modular chunks for reusability and organization

D

To declare built-in variables that are predefined in Python

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# Functions

**Block of instructions that performs a specific task**

Break code into **modular chunks** which can be **reused later**

Makes the code more organized and manageable

There are two types of functions in Python

**Built-in Functions:** Pre-defined in Python (`print()`, `len()`, `sum()`, etc)

**User-defined Functions:** Defined by users to perform a specific task



# Python Fundamentals Quiz

Which of the following statements about the `return` statement in Python is/are true?

A

A function can have multiple return statements.

B

A function can return multiple values in a single return statement

C

It returns a value or an expression computed by the function.

D

A function must always include a return statement.

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# User-defined Functions

Syntax for a user defined function:

```
def function_name(parameters):  
    statement(s)  
    return statement
```

The **return statement is optional** and can be used when one or more values have to be returned by the function

**Example:** Create a function called `squared_sum` to add the square of two numbers

```
def squared_sum(num1, num2):  
    sq_sum = (num1*num1) + (num2*num2)  
    return sq_sum
```

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