**Compilation vs. interpretation - advantages and disadvantages**

|  | **COMPILATION** | **INTERPRETATION** |
| --- | --- | --- |
| **ADVANTAGES** | * the execution of the translated code is usually faster; * only the user has to have the compiler - the end-user may use the code without it; * the translated code is stored using machine language - as it is very hard to understand it, your own inventions and programming tricks are likely to remain your secret. | * you can run the code as soon as you complete it - there are no additional phases of translation; * the code is stored using programming language, not machine language - this means that it can be run on computers using different machine languages; you don't compile your code separately for each different architecture. |
| **DISADVANTAGES** | * the compilation itself may be a very time-consuming process - you may not be able to run your code immediately after making an amendment; * you have to have as many compilers as hardware platforms you want your code to be run on. | * don't expect interpretation to ramp up your code to high speed - your code will share the computer's power with the interpreter, so it can't be really fast; * both you and the end user have to have the interpreter to run your code. |

**What does this all mean for you?**

* Python is an **interpreted language**. This means that it inherits all the described advantages and disadvantages. Of course, it adds some of its unique features to both sets.
* If you want to program in Python, you'll need the **Python interpreter**. You won't be able to run your code without it. Fortunately, **Python is free**. This is one of its most important advantages.

Due to historical reasons, languages designed to be utilized in the interpretation manner are often called **scripting languages**, while the source programs encoded using them are called **scripts**

**What is Python?**

Python is a widely-used, interpreted, object-oriented, and high-level programming language with dynamic semantics, used for general-purpose programming.

And while you may know the python as a large snake, the name of the Python programming language comes from an old BBC television comedy sketch series called **Monty Python's Flying Circus**.

At the height of its success, the Monty Python team were performing their sketches to live audiences across the world, including at the Hollywood Bowl.

Since Monty Python is considered one of the two fundamental nutrients to a programmer (the other being pizza), Python's creator named the language in honor of the TV show.

**Who created Python?**

One of the amazing features of Python is the fact that it is actually one person's work. Usually, new programming languages are developed and published by large companies employing lots of professionals, and due to copyright rules, it is very hard to name any of the people involved in the project. Python is an exception.

There are not many languages whose authors are known by name. Python was created by [**Guido van Rossum**](https://en.wikipedia.org/wiki/Guido_van_Rossum), born in 1956 in Haarlem, the Netherlands. Of course, Guido van Rossum did not develop and evolve all the Python components himself.

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The speed with which Python has spread around the world is a result of the continuous work of thousands (very often anonymous) programmers, testers, users (many of them aren't IT specialists) and enthusiasts, but it must be said that the very first idea (the seed from which Python sprouted) came to one head - Guido's.

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* First, Python checks if the name specified is **legal** (it browses its internal data in order to find an existing function of the name; if this search fails, Python aborts the code);
* second, Python checks if the function's requirements for the number of arguments **allows you to invoke** the function in this way (e.g., if a specific function demands exactly two arguments, any invocation delivering only one argument will be considered erroneous, and will abort the code's execution);
* third, Python **leaves your code for a moment** and jumps into the function you want to invoke; of course, it takes your argument(s) too and passes it/them to the function;
* fourth, the function **executes its code**, causes the desired effect (if any), evaluates the desired result(s) (if any) and finishes its task;
* finally, Python **returns to your code** (to the place just after the invocation) and resumes its execution.

|  |  |  |
| --- | --- | --- |
| **Priority** | **Operator** |  |
| 1 | \*\* |  |
| 2 | +, - (note: unary operators located next to the right of the power operator bind more strongly) | unary |
| 3 | \*, /, //, % |  |
| 4 | +, - | binary |

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x = 10

if x > 5: # True

print("x > 5")

if x > 8: # True

print("x > 8")

if x > 10: # False

print("x > 10")

else:

print("else will be executed")

Each if is tested separately. The body of else is executed if the last if is False.

**The while loop and the else branch**

Both loops, while and for, have one interesting (and rarely used) feature.

We'll show you how it works - try to judge for yourself if it's usable and whether you can live without it or not.

In other words, try to convince yourself if the feature is valuable and useful, or is just syntactic sugar.

Take a look at the snippet in the editor. There's something strange at the end - the else keyword.

As you may have suspected, **loops may have the**else**branch too, like**if**s**.

The loop's else branch is **always executed once, regardless of whether the loop has entered its body or not**.

Can you guess the output? Run the program to check if you were right.

Modify the snippet a bit so that the loop has no chance to execute its body even once:

i = 5

while i < 5:

print(i)

i += 1

else:

print("else:", i)

The while's condition is False at the beginning - can you see it?

Run and test the program, and check whether the else branch has been executed or not.

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* 
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MODULE (86%)

SECTION (47%)

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**Some useful exceptions**

Let’s discuss in more detail some useful (or rather, the most common) exceptions you may experience.

**ZeroDivisionError**

This appears when you try to force Python to perform any operation which provokes division in which the divider is zero, or is indistinguishable from zero. Note that there is more than one Python operator which may cause this exception to raise. Can you guess them all?

Yes, they are: /, //, and %.

**ValueError**

Expect this exception when you're dealing with values which may be inappropriately used in some context. In general, this exception is raised when a function (like int() or float()) receives an argument of a proper type, but its value is unacceptable.

**TypeError**

This exception shows up when you try to apply a data whose type cannot be accepted in the current context. Look at the example:

short\_list = [1]

one\_value = short\_list[0.5]

You're not allowed to use a float value as a list index (the same rule applies to tuples, too). TypeError is an adequate name to describe the problem, and an adequate exception to raise.

**AttributeError**

This exception arrives – among other occasions – when you try to activate a method which doesn't exist in an item you're dealing with. For example:

short\_list = [1]

short\_list.append(2)

short\_list.depend(3)

The third line of our example attempts to make use of a method which isn’t contained in the lists. This is the place where AttributeError is raised.

**SyntaxError**

This exception is raised when the control reaches a line of code which violates Python's grammar. It may sound strange, but some errors of this kind cannot be identified without first running the code. This kind of behavior is typical of interpreted languages – the interpreter always works in a hurry and has no time to scan the whole source code. It is content with checking the code which is currently being run. An example of such a category of issues will be presented very soon.

It's a bad idea to handle this exception in your programs. You should produce code that is free of syntax errors, instead of masking the faults you’ve caused.

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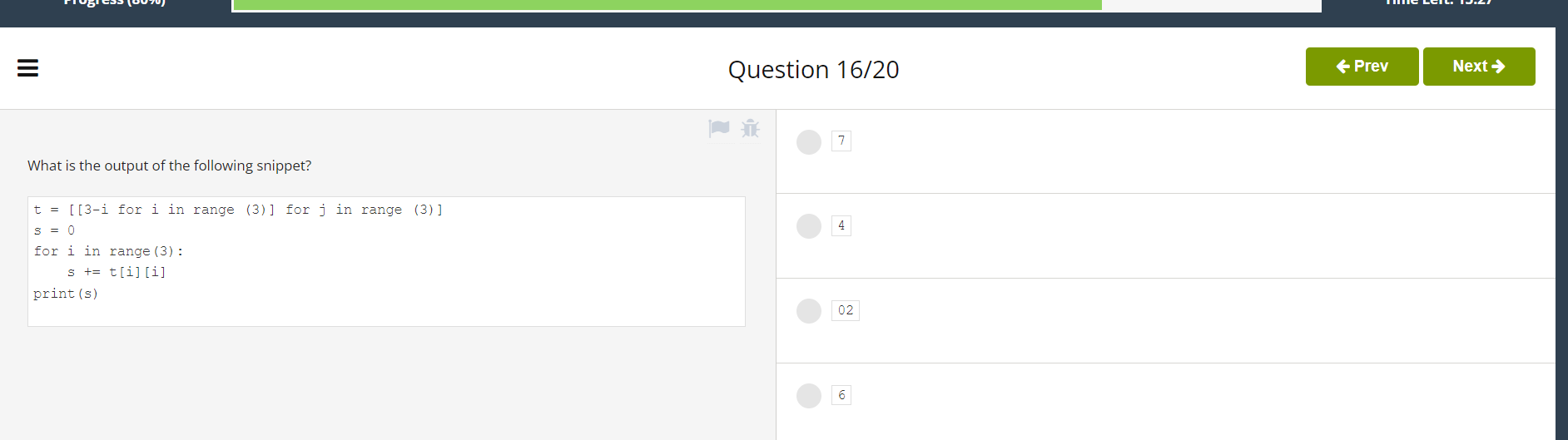
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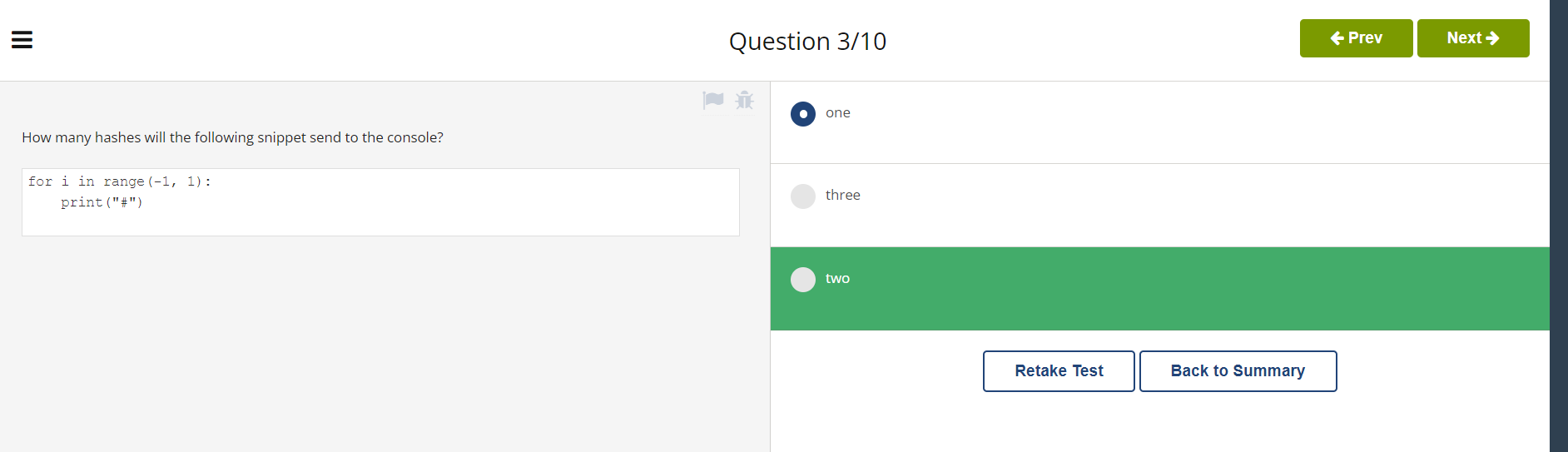
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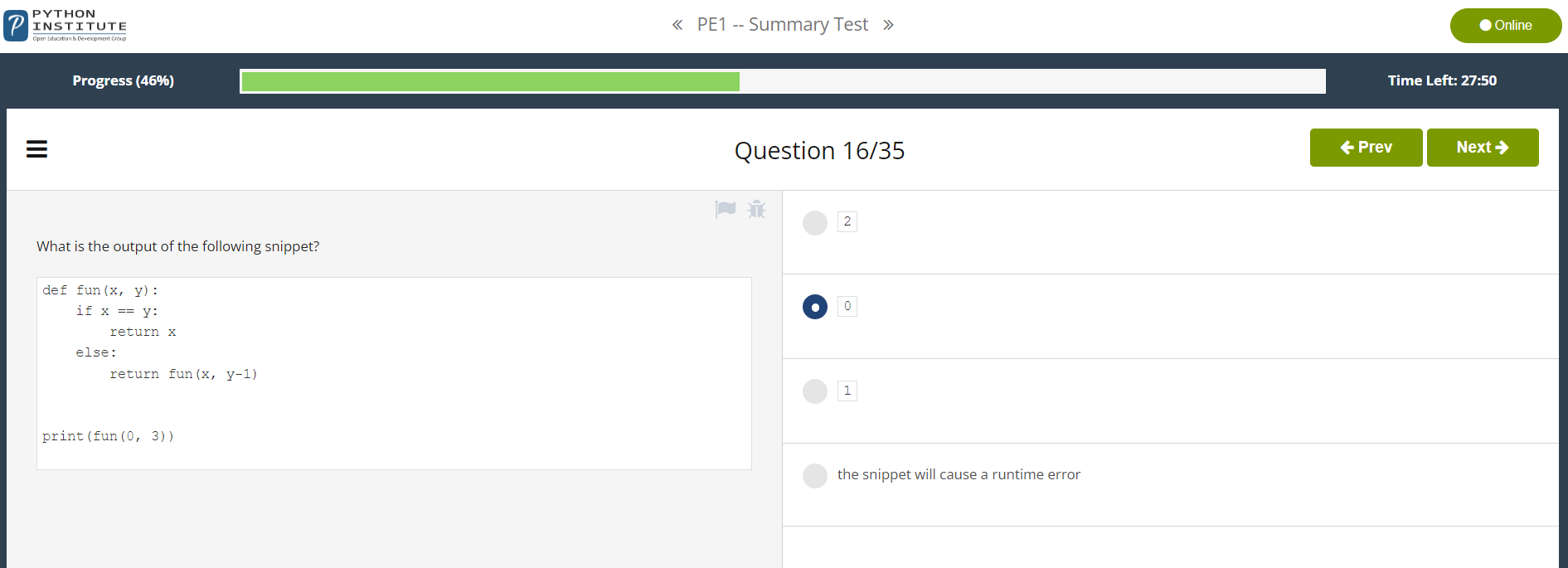
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