Python Programming Basic

Python Advanced

Foreword

In this course, we are going to learn advanced Python programming.

Objectives

Upon finishing the course, you will be able to :

- Know Regular expressions and its usage
- Know how Python handles files
- Know Python common Errors and Exceptions
- Know Python Generator and Decorator
- Know Python Common Standard Library
- Know Data Structure about Linked List and Binary Tree

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1. **Regular Expressions**
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   - **How to use Regular expressions**
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What are Regular Expressions?

Regular expressions (called REs, or regexes, or regex patterns) are a sequence of characters that define a search pattern.

Specify the pattern for the set of possible strings that we want to match

- Is there a match for the pattern anywhere in this string?
- Does this string match the pattern

Modify a string or to split it apart in various ways.

How to use Regular Expressions in Python?

In Python, regular expressions are essentially a tiny programming language embedded inside Python through the RE module.

The RE module provides an interface to the regular expression engine, allowing you to compile REs into objects and then perform matches with them.

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File I/O

Files are named locations on disk to store data. They are used to permanently store data in a non-volatile memory (e.g. hard disk).

In Python, a file operation takes place in the following order:

- Open a file
- Read or write
- Close the file

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Errors and Exceptions

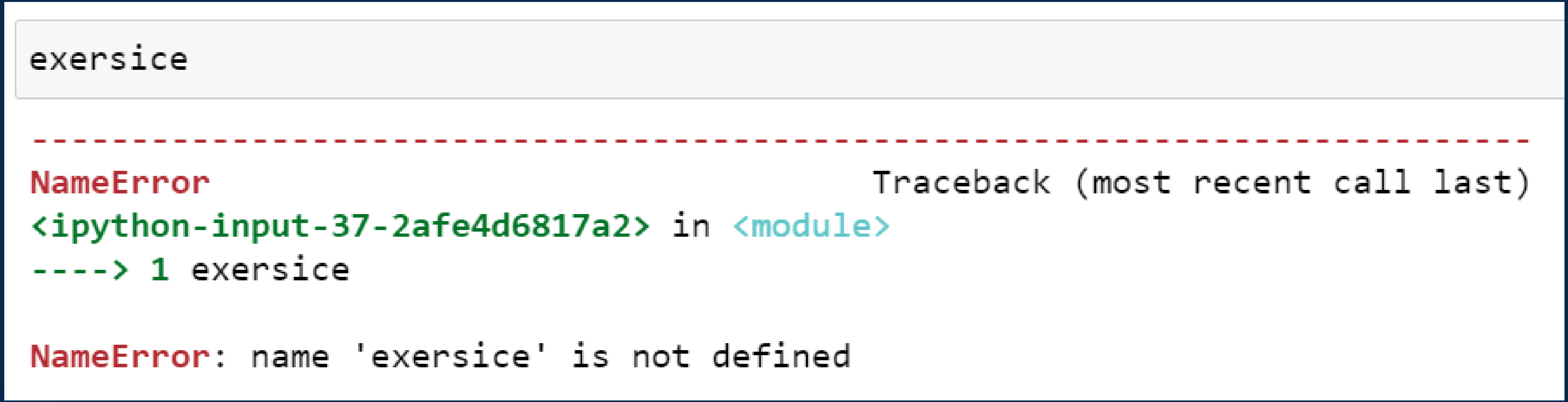
Errors are the problems in a program due to which the program will stop the execution. On the other hand, exceptions are raised when the some internal events occur which changes the normal flow of the program.

There are two kinds of errors in Python:

- Syntax errors
- Exceptions

Syntax Errors

Syntax errors, also known as parsing errors. When the proper syntax of the language is not followed then syntax error is thrown.



```
exersice
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
<ipython-input-37-2afe4d6817a2> in <module>
----> 1 exersice

NameError: name 'exersice' is not defined
```

Exceptions

Even if a statement or expression is syntactically correct, it may cause an error when an attempt is made to execute it. Errors detected during execution are called exceptions.

We can catch an exception by try-catch statement.

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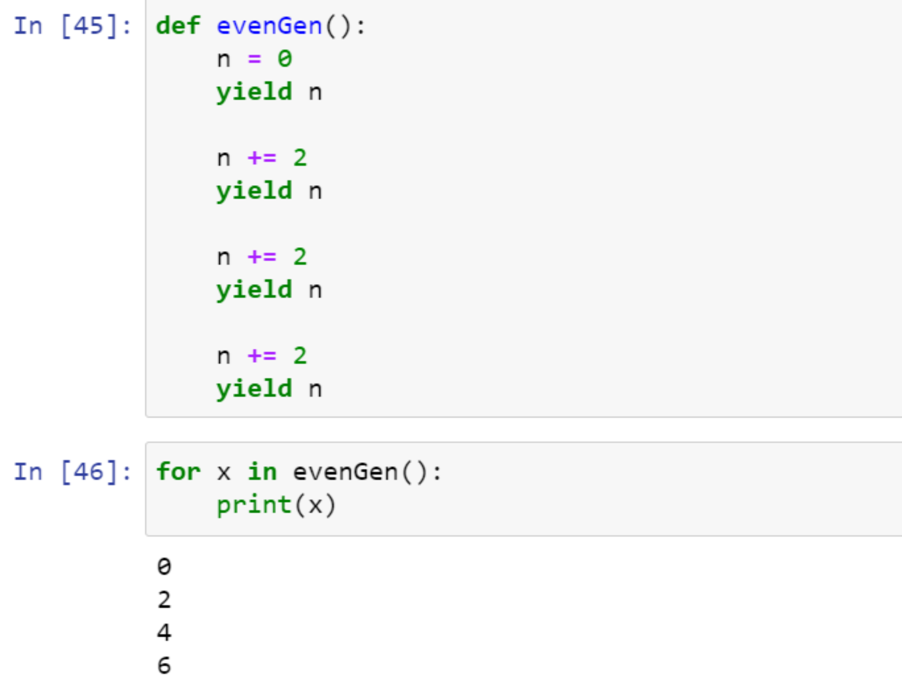
Generator

Generator functions are a special kind of function that return a lazy iterator. These are objects that you can loop over like a list. However, unlike lists, lazy iterators do not store their contents in memory.



```
In [45]: def evenGen():
             n = 0
             yield n

             n += 2
             yield n

             n += 2
             yield n

             n += 2
             yield n
```

```
In [46]: for x in evenGen():
             print(x)
```

```
0
2
4
6
```

Decorator

Decorators can add functionality to an existing code without modifying its structure. This is also called metaprogramming because a part of the program tries to modify another part of the program at compile time.

Any object which implements the special __call__() method is callable. A decorator is a callable that returns a callable.

Basically, a decorator takes in a function, adds some functionality and returns it.

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   - **sys module**
   - **os module**

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Standard Library

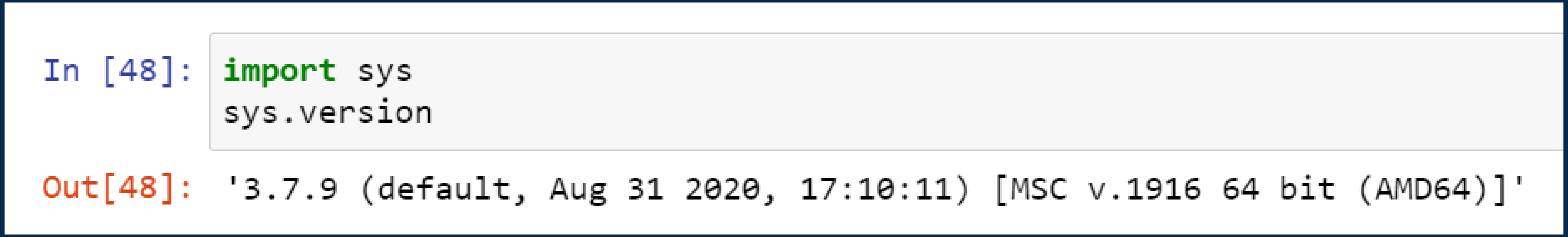
The Python Standard Library is a collection of modules accessible to a Python program to simplify the programming process and removing the need to rewrite commonly used commands.

A list of the Standard Library modules can be found at:

- https://docs.python.org/3/library/

Sys Module

The sys module provides information about constants, functions and methods of the Python interpreter.



```
In [48]: import sys
         sys.version

Out[48]: '3.7.9 (default, Aug 31 2020, 17:10:11) [MSC v.1916 64 bit (AMD64)]'
```

Os and Time Modules

Os and time modules belongs to Generic Operating System Services. The modules of Generic Operating System Services provide interfaces to operating system features that are available on (almost) all operating systems.

Two examples of Generic Operating System Services modules:

- os module — Portable access to operating system specific features
- time module — Functions for manipulating clock time

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   - **Doubly Linked Lists**
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Singly Linked Lists

A singly linked list is a type of linked list that is unidirectional, which means, it can be traversed in only one direction from head to the tail.

Doubly Linked Lists

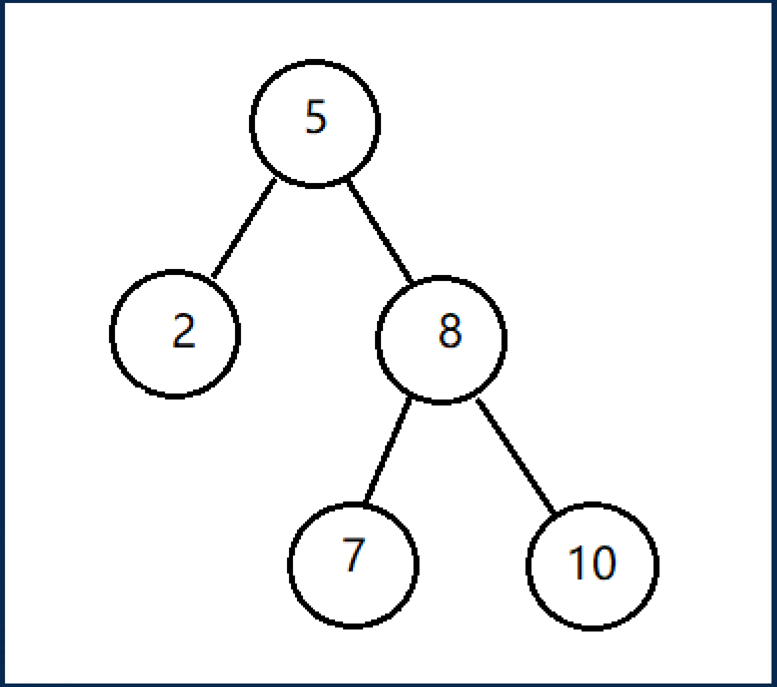
Doubly linked list is a type of linked list in which each node apart from storing its data has two links.

- The first link points to the previous node in the list.
- The second link points to the next node in the list.

The first node of the list has its previous link pointing to NULL, and the last node of the list has its next node pointing to NULL.

Binary Tree

A binary tree is a tree data structure in which each node has at most two children, which are referred to as the left child and the right child.



Summary

This chapter introduces Python regular expressions and its usage, file I/O processing, common errors and exceptions, generator and decorator, Python standard library and data structure.

More Information

Online learning website

- https://e.huawei.com/en/talent/#/home

Huawei Knowledge Base

- https://support.huawei.com/enterprise/en/knowledge?lang=en

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