Lecture 31: Essential Python Modules

Importing and utilizing standard library modules.
math, random, and statistics.

Agenda

What is a Module?
Importing Modules
The math Module
The random Module
Generating Random Data
The statistics Module
Summary

What is a Module?

A module is a file containing Python definitions and statements.
Modules allow you to organize code logically.
The Python Standard Library comes with dozens of useful modules.

Importing Modules

Use the ‘import‘ keyword to bring a module into your script.
You can import specific functions using ‘from ... import ...‘.

The math Module

Provides access to mathematical functions defined by the C standard.
Constants: ‘math.pi‘, ‘math.e‘.
Functions: ‘math.sqrt()‘, ‘math.ceil()‘, ‘math.floor()‘, trigonometry.

The random Module

Implements pseudo-random number generators for various distributions.
Warning: Not suitable for cryptographic purposes (use ‘secrets‘ module instead).

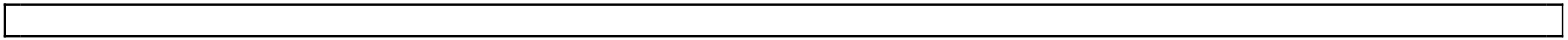
Common random Functions

‘randint(a, b)‘: Random integer N such that a ¡= N ¡= b.
‘choice(seq)‘: Random element from a non-empty sequence.
‘shuffle(seq)‘: Shuffle sequence in place.

The statistics Module

Provides functions for calculating mathematical statistics of numeric data.
Introduced in Python 3.4.
Functions include mean, median, mode, variance, and standard deviation.

Using statistics



Advanced statistics

‘stdev()‘ computes the sample standard deviation.
‘variance()‘ computes the sample variance.

Summary

Modules extend Python's core functionality.
'math' for complex math, 'random' for unpredictable output, 'statistics' for data analysis.

Next Unit

This concludes Unit 4 on Functions. In Unit 5, we will explore Strings and Data Structures.