Python Programming Guide

Python Overview

Python is a high-level, interpreted programming language known for its simplicity and readability. Created by Guido van Rossum and first released in 1991, Python emphasizes code readability with its notable use of significant whitespace. Its design philosophy emphasizes code readability and allows programmers to express concepts in fewer lines of code than would be possible in languages such as C++ or Java.

Python Data Types

Python supports various built-in data types. Numeric types include integers, floating-point numbers, and complex numbers. Sequence types include lists (mutable ordered collections), tuples (immutable ordered collections), and strings (immutable sequences of characters). Python also provides dictionaries for key-value mappings and sets for unique element collections. The dynamic typing system means variables don't need explicit type declarations.

Control Flow Structures

Python provides standard control flow statements including if-elif-else conditionals, for loops for iteration, and while loops for conditional repetition. The language also supports list comprehensions, which provide a concise way to create lists. Exception handling is accomplished through try-except blocks, allowing graceful error management.

Functions and Modules

Functions in Python are defined using the def keyword and can accept positional arguments, keyword arguments, and default parameter values. Python supports first-class functions, meaning functions can be passed as arguments, returned from other functions, and assigned to variables. The module system allows code organization and reuse through import statements. Python's extensive standard library provides modules for file I/O, system operations, networking, and much more.