Программа обучения JAVA-программированию

Учебный план программы «JAVA-программирования»

Activity

- Theory lectures
- Practice
- Final Project

Java / Python

Topic
Types, variables, operators
Data structures
Conditional statements
Loops and arrays
Object Oriented Programming: Objects and classes
Design, debugging, interfaces
Inheritance, exceptions, file I/O

Design Patterns
Concurrency / Parallelism: Multithreading, Multiprocessing, Async
Comm protocols: UDP, TCP/IP, http, sockets
Data Structures for Data Scientists (NumPy, Pandas)
Final Projects: Java, Python

Detailed Description

Types, variables, operators

- What are data types?
- Primitive Data Types & Declarations
- Variables & Types
- Numeric & Character Literals
- String formatting and Parsing
- String Literals
- Arrays, Non-Primitive Data Types
- Casting & Type Casting

Data Structures

- Arrays
- Lists
- Stack
- Queue
- Map

Conditional statements

- Conditional (**if**) statements
- Java: **else if**; Python: **elif**
- Conditional (**switch**) statements

Loops

- **for** loops
- **while** loop
- **break**
- **continue**

Object Oriented Programming: Objects and classes

- Concept & Syntax Of Class
- Concept & Syntax Of Methods
- Fields and Methods
- Constructors & Destructors
- Encapsulation
- Access Specifiers
- Access Control
- Inheritance
- Method Overloading
- Polymorphism
- Method Overriding

Design, debugging, testing

- Design Concepts
- Troubleshooting Concepts
- Slowness
- Crashing
- Managing Resources
- Unit Testing
- TDD

Inheritance, exceptions, file I/O

- Reading and Writing to Files
- Input and Output Stream
- Manipulating input data
- Reading Lines
- Opening & Closing Streams
- Predefined Streams
- File handling Classes & Methods
- Using Reader & Writer classes
- Exceptions Overview
- Exception Keywords
- Catching Exceptions
- The finally Block
- Exception Methods
- Declaring Exceptions
- Defining and Throwing Exceptions
- Errors and Runtime Exceptions
- Assertions

Design Patterns

- Singleton
- Object pool
- Adapter
- Facade
- Strategy
- Observer or Publish/subscribe

Concurrency / Parallelism: Multithreading, Multiprocessing, Async

- Concurrency vs. Parallelism
- Process vs Thread
- Java: Thread vs. Runnable class
- Java: Thread-safe data structures
- Python: Eliminating impact of global interpreter lock (GIL)
- Python: Multithreading vs Async (Python: asyncio library)

Comm protocols

- UDP
- TCP/IP
- http
- sockets

Data Structures for Data Scientists (NumPy, Pandas)

- Indexing and Slicing
- Appending and resizing
- Concatenation
- Statistics
- Search and sort
- Linear Algebra

- Read / Write CSV & Excel Files
- Series
- Data Frames
- Aggregation
- Missing Data
- Merging / Joining
- Visualization (Matplotlib)