

# Concepts of Programming Languages

Overview

5 October 2020

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# Types of Programming Languages

- **Imperative:** Assembler as root (Operations and Control Structures)
- **Declarative:** Domain Specific Languages (HTML, XML, YAML, ...) => Limited in scope. Some are not Turing Complete.
- **Procedural** (Control Structures and Procedures): Fortran / Algol / Pascal / C
- **Object Oriented** (Classes and Objects): Smalltalk / Objective C / C++ / Eifel / **Java** / C#
- **Functional** (Lambdas + Closures): Haskell, Erlang, F#
- **Logic:** Prolog
- **Best of Breed:** Kotlin, Scala, Rust, JS, **Go**

**More Languages** ([https://en.wikipedia.org/wiki/List\\_of\\_programming\\_languages\\_by\\_type](https://en.wikipedia.org/wiki/List_of_programming_languages_by_type))

# Areas for Programming Languages

- Application Programming (small / large scale, web, central, cloud)
- Systems Programming
- Network Programming / Distributed Systems
- Realtime Systems
- User Interface Programming
- Embedded Systems

# Orthogonal Classifications

- Static vs. Dynamic Typed
- Compiled vs. Interpreted
- Sequential vs. Parallel
- Static Linked vs. Dynamic Linked
- Safe vs. Unsafe (Crash a process or even the system)
- Simple vs. Complex
- Platform Independent Bytecode vs. Platform Dependent Assemblercode
- Plattform Dependent Compiler vs. Cross Compiler

# Some Thoughts

- There are many solutions for a given problem
- The "best" language is nothing without a proper ecosystem (Libraries, Examples, Community)
- There are straight forward choices for a given platform (Mac: Swift + Objectiv-C, Linux: C + Python, Android: Java)
- Dont expect "Magic" from programming Languages
- Clean code and good programming is orthogonal to the language
- Learn more than one programming language at a professional level

# Thank you

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