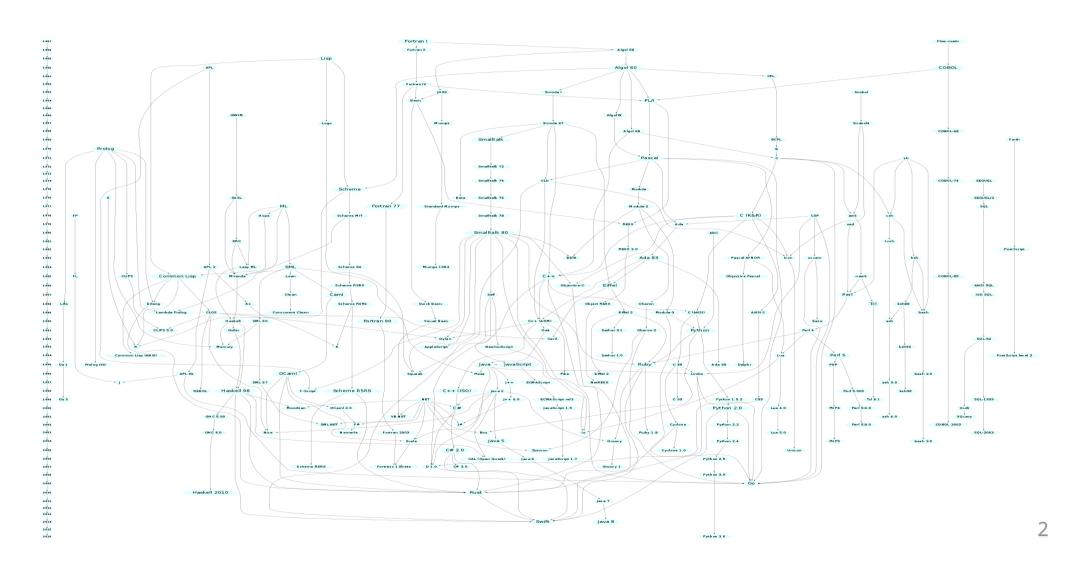# Concepts of Programming Languages

Overview
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Evolution of Programming Languages

img/01-Languages.png(img/01-Languages.png)

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)

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

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Thank you

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