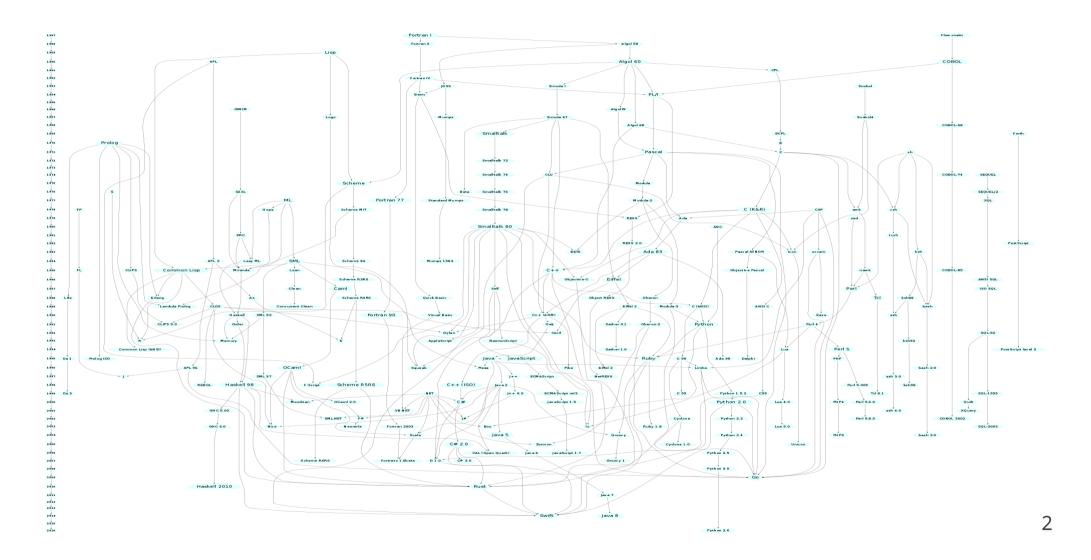
# Concepts of Programming Languages

Overview 5 October 2020

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## **Evolution of Programming Languages**

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



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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)

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#### **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

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#### **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

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#### 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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