

INTRODUCTION

Programming Languages

- Instruct the computer
- Hardware (... , etc)
- Assembly code
- “Low level languages” → C, FORTRAN...
- “High level languages” → C++, Java, JavaScript
- Yet still higher-level languages? λ -calculus, π -calculus, process algebra

What is the difference?

- Expressively equal
- Differences in efficiency
- Offer different abstractions

Classifications

- 1) Imperative → tell the computer exactly what to do
 - a. Procedural: C, ADA, FORTRAN, COBOL. “Von Neumann languages”.
Fetch → Decode → Execute → Fetch...
 - b. Object-oriented: Java, C++, Smalltalk. Fundamental idea: objects.
 - c. Scripting languages: PHP, Python, and JS... Shell scripts. Putting things together.
- 2) Declarative languages → tell the computer what we want done
 - a. Logic languages: spreadsheets
 - b. Dataflow languages: circuit
 - c. Functional: LISP, Scheme, Haskell, and Clojure.
 - d. Concurrent?