

# Programming Language Concepts

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## Introduction

Wikipedia lists about 300 programming languages, while other sources list thousands. Joseph Marie Jacquard (18th century) was the first to make a programmable device (a loom).

## Why study programming languages?

- Language actually determines what we think, both natural and artificial languages.
- To study languages it to study how to design and implement languages.
- Different languages support different *idioms*.
- Learning different idioms gives you more design choices, even when not using a language with support for them.

What influences and individual or group to use a particular programming language?

- Organizational mandate
- Pre-existing components
- Developer skillset
- Design choices
- Implementations, shortcomings found, and dire emergencies

## Some Application Domains

- Natural sciences and engineering, number crunching: FORTRAN
- Business, financial calculations, report creation, databases: COBOL, RPG, Excel
- Intelligent systems: LISP, Prolog
- Systems/Embedded hardware: C
- Quick-and-dirty programs: shell, BASIC, Ruby, Python, PHP, JavaScript, visual languages
- Special purpose: PostScript, GPSS

## Computer Language Classes

Imperative:

- Machine/Assembly languages
- “Classic”: FORTRAN, Pascal, BASIC, C
- Object Oriented: Smalltalk, C++, Eiffel, Java, Python

Declarative:

- Functional: ML, Haskell
- Dataflow: spreadsheets
- Logic: constraint-based, Prolog

## From Source to Execution

What processes are involved to get a program’s source code to execute?

- Compilation
- Assembly
- Linking
- Loading
- Interpretation

## Shells vs Traditional Programming Languages

- Shells interpret source code.
- They tend to bind variables to names very late.
- Variable names and statements can be constructed at run time.

## Reminders

- Read Scott Text 1.1-1.5
- Brush up on Python
- Scheme, download Dr Racket. Read Scott text 11.3

You can find all my notes at <http://omgimanerd.tech/notes>. If you have any questions, comments, or concerns, please contact me at [alvin@omgimanerd.tech](mailto:alvin@omgimanerd.tech)