

# Lecture 02

## Introduction to Programming Languages

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# Outline

- **Programming Language**
- **Types of Languages**
- **Language Categories**
- **Language Levels**
- **Language Translators**
- **Programming Errors**

# 1. Programming Language

- A set of instructions given to computer to solve a specific problem is called ***Program***.
- ***Programming Language*** is Language that is used to write computer Programs.
- ***Programming languages*** can be used to create programs or software's that implement specific algorithms.

## 2. Types

- **High Level Languages (Near to Human)**
- **Low Level Languages (Near to Computer)**

# 3. Categories

- This is a list of notable **programming languages**, grouped by Category.
- Because there is no overarching classification scheme for programming languages, in many cases a language will be listed under multiple headings.

# 3.1 Array Programming Languages

- Array programming (also known as *vector* or *multidimensional*) languages generalize operations on scalars to apply transparently to vectors, matrices, and higher-dimensional arrays.
- A+, Fortran, APL, MATLAB, Freemat, Analytica etc

## 3.2 Authoring Languages

- An authoring language is a programming language used to create tutorials, websites, and other interactive computer programs.
- Bigwig , DITA, Lasso, PILOT, TUTOR

## 3.3 Constraint Programming Languages

- A constraint programming language is a declarative programming language where relationships between variables are expressed as constraints. Execution proceeds by attempting to find values for the variables which satisfy all declared constraints.
- Prolog, Eclipse, OZ, Claire, YAP etc



## 3.4 Command Line Interface Languages

- Command-line interface (CLI) languages are also called batch languages or job control languages.
- 4DOS, Bash, JCL etc

## 3.5 Compiled Languages

- These are languages typically processed by compilers. Compilers are basically language translators.
- C, C++, C#, ADA, ALGOL, COBOL, Cobra, Visual Basic, SWIFT, RPG, Python, Java, Simula etc

## 3.6 Concurrent Languages

- Message passing languages provide language constructs for concurrency and system (OS) programming.
- ADA, Alaf, Cury, Java, Julia, Pony, SR etc

## 3.7 Data Oriented Languages

- Data-oriented languages provide powerful ways of searching and manipulating the relations that have been described as entity relationship tables which map one set of things into other sets.
- SQL, SPARQL, WebQL, RDQL

## 3.8 Data Structured Languages

- Data-structured languages are those where logic is structured in ways similar to their data. Such languages are generally well suited to reflection and introspection.
- Array-based, List-based, Stack-based

## 3.9 Decision Table Languages

- Decision tables can be used as an aid to clarifying the logic before writing a program in any language, but in the 1960s a number of languages were developed where the main logic is expressed directly in the form of a decision table.
- Filetab

## 3.10 Decision Table Languages

- Declarative languages describe a problem rather than defining a solution. Declarative programming stands in contrast to imperative programming via imperative programming languages, where serial orders (imperatives) are given to a computer.
- Analytica, MetaPost, Wolfram etc

## 3.11 Embeddable Languages

- Source embeddable languages embed small pieces of executable code inside a piece of free-form text, often a web page.
- Client-side embedded languages aim to provide dynamism to web pages without the need to recontact the server. (JavaScript, VBScript, ActionScript)
- Server-side embedded languages are much more flexible and used to manipulate server.(PHP, Java, ASP.Net)



## 3.12 Extension Languages

- Extension programming languages are languages embedded into another program and used to harness its features in extension scripts.
- CAL, Guile, Lua, Perl, Ruby, Pike etc

## 3.13 Extension Languages

- Fourth-generation programming languages are high-level languages built around database systems. They are generally used in commercial environments.
- FOCUS, Link 4GL, Progress 4GL, SAS, xBase etc

## 3.14 Extension Languages

- In electronics, a Hardware description language or HDL is a specialized computer language used to describe the structure, design and operation of electronic circuits, and most commonly, digital logic circuits. The two most widely used and well-supported HDL varieties used in industry are **Verilog** and **VHDL**.
- Verilog-AMS, VHDL-AMS, VLLA, LAVA, SystemC

## 3.15 Interpreted Languages

- Interpreted languages are programming languages in which programs may be executed from source code form, by an interpreter.
- Basic, JavaScript, LISP, PHP, Ruby etc

## 3.16 Multiparadigm Languages

- Multiparadigm languages support more than one programming paradigm. They allow a program to use more than one programming style. The goal is to allow programmers to use the best tool for a job, admitting that no one paradigm solves all problems in the easiest or most efficient way.
- ADA, Beta, Delphi, F#, PHP, SWIFT etc

## 4. Language Code Levels

- Procedural Programming
- Object Oriented Programming
- MVC Programming

# 5. Language Translators

- Compilers
- Interpreters
- Assemblers

# 6. Programming Errors

- Syntax Errors
- Logical Errors
- Run Time Errors



# Summary

- **Programming Language**
- **Types of Languages**
- **Language Categories**
- **Language Levels**
- **Language Translators**
- **Programming Errors**

# References

- [https://en.wikipedia.org/wiki/Programming\\_language](https://en.wikipedia.org/wiki/Programming_language)
- [https://en.wikipedia.org/wiki/List\\_of\\_programming\\_languages\\_by\\_type](https://en.wikipedia.org/wiki/List_of_programming_languages_by_type)
- [https://en.wikipedia.org/wiki/Translator\\_\(computing\)](https://en.wikipedia.org/wiki/Translator_(computing))
- <https://www.inf.unibz.it/~calvanese/teaching/05-06-ip/lecture-notes/uni10/node2.html>