Ministry of Higher Education
Jami University Presidency
Academic Vice-Chancellor
Computer Science Faculty
Information system and Network Engineering department

Welcome to Jami University

2024

Introduction to java Programming

Welcome to this introduction to programming. We'll explore what programming is, different types of programming languages, and how they are used in today's world.

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Computer Science

Road Map for Today

01

Learn the Basics of Java Programming?

02

Introduction of programming languages

All about the contains •

03

Compiler assembler

Interpreter

04

Comparing Java, Python and C++

Course Contents

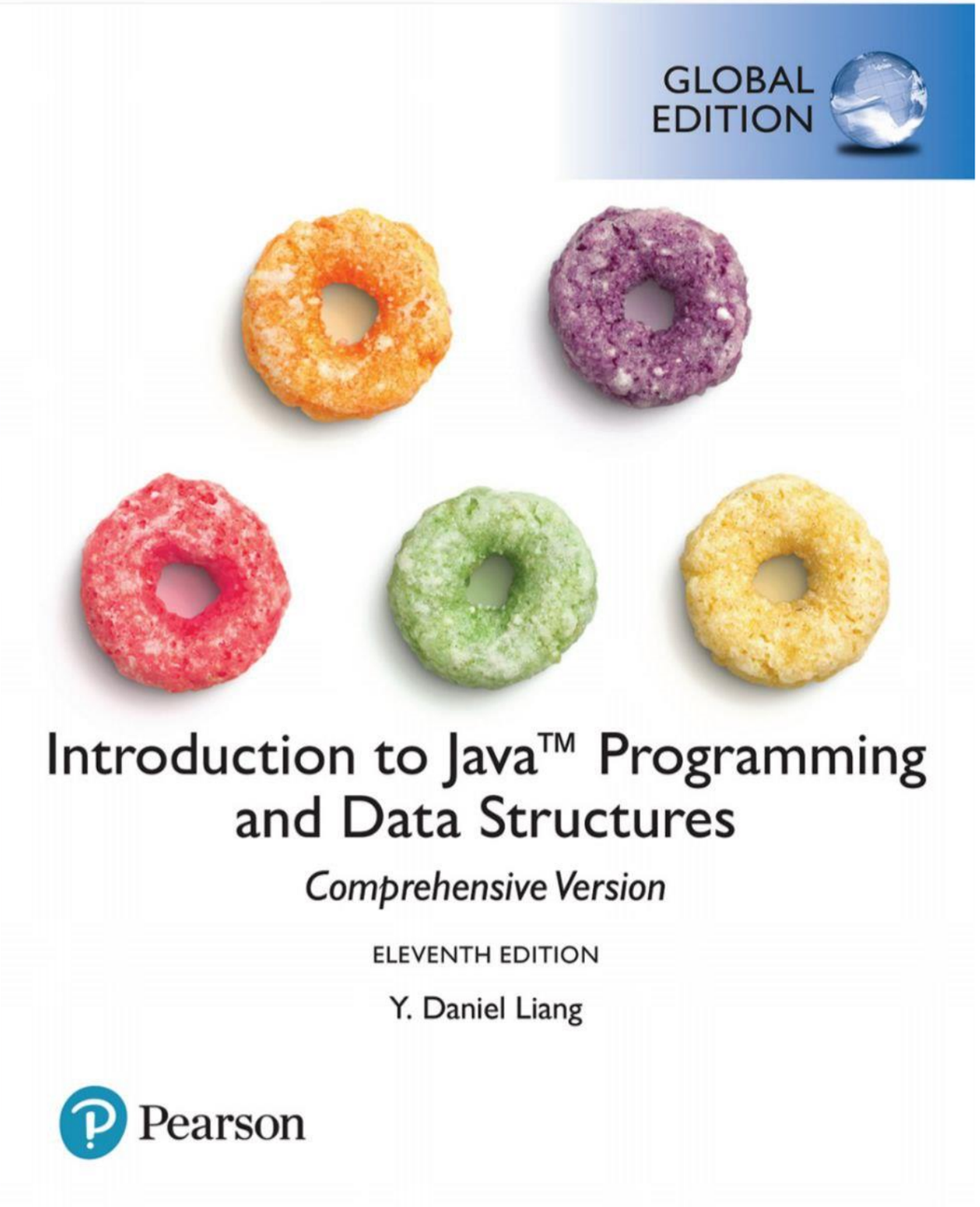
Course contents contains the following information:

1. **Course Syllabus and Resources**
2. **Lecture notes**
3. **Homework Assignments**
4. **Class Programs and activities**
5. **Sample Exams**

4

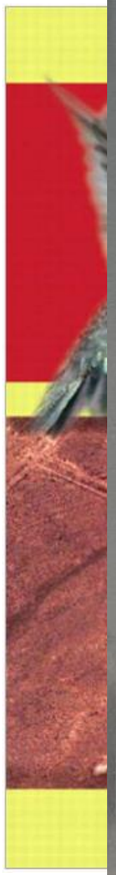
Course Text Book

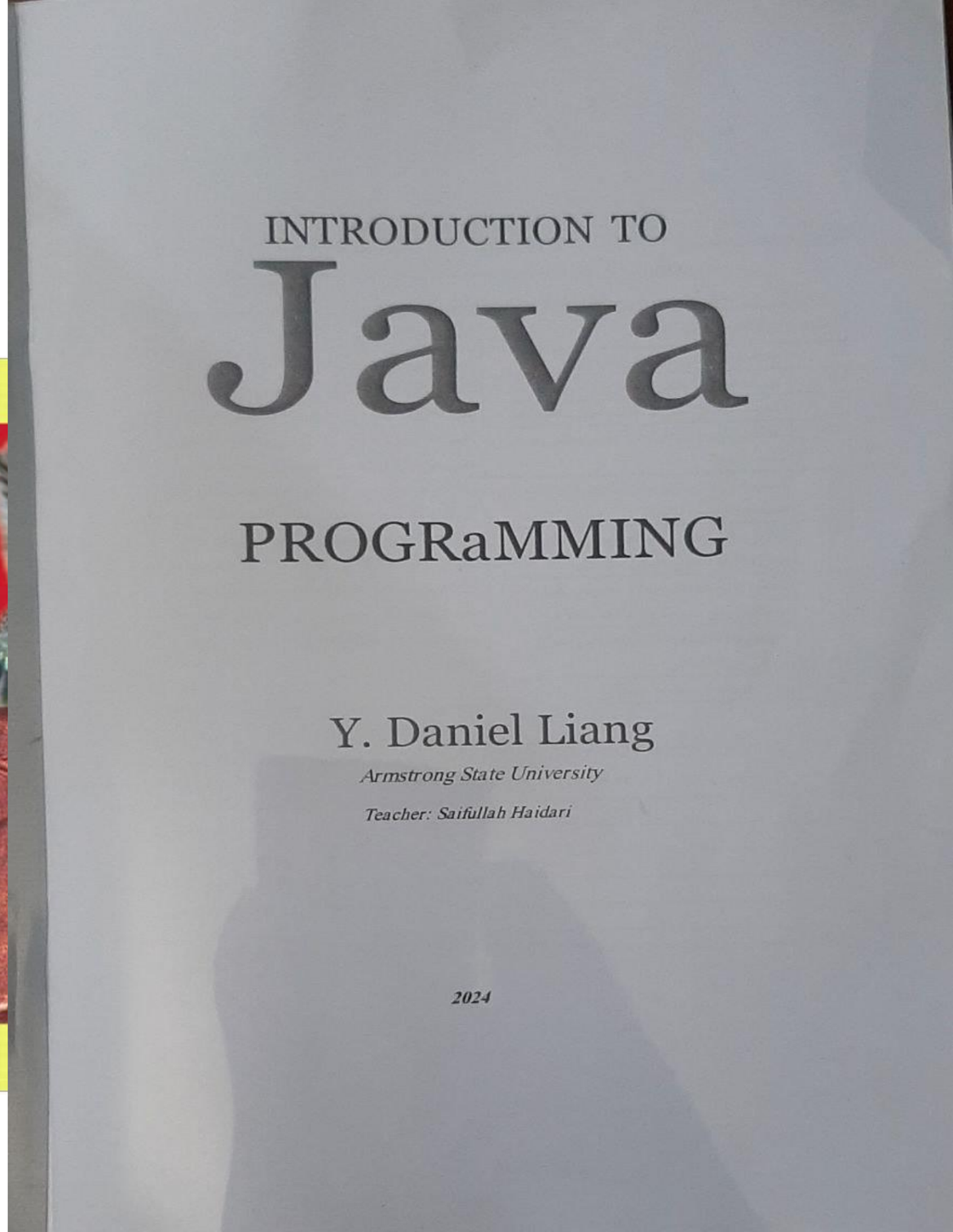
- **Introduction to Java Programming (11th Edition)**
- **Credit (4)**
- **Lecture notes will follow the book.**
- **Please keep up with the reading!**
- **Practical work**



Lecture note

- Introduction to Java Programming
- Lecture notes will follow the book.
- Please keep up with the reading!





Software

- For the course, you may use any IDE you are comfortable using. I will use one or more of the following in the classroom:
  - Eclipse
  - IntelliJ idea
  - NetBeans
- All these products can be downloaded from the web for free.
- The next presentations will include instructions on downloading and installing these programs.
- If you do not have your own computer, the computer labs on campus have the software.

Grading

Your grade will be determined as follows:

- **Midterm (20%)**
- **Attendance (10%)**
- **Homework (possible quizzes) (10%)**
- **Final Exam (60%)**

Class participation will help your grade!

Student Civility

In an effort to make this class enjoyable for everybody…

1. Please be on time to class!
2. Please do not talk to your friends and neighbors in class! It disturbs everyone.
3. Please turn your cell-phones off!

Expected result

- **The purpose of this course is to teach you about computing, but particularly, programming in Java (a powerful, widely-used programming language).**
- **Why care about computers and programming?**

1. **To Enabling technology use them in your country**
2. **Growing field with great opportunity make opportunities**
3. **Creative outlet**
4. **Participate in the world competitions (**ICPC北京总部 (pku.edu.cn)
   (The ICPC International Collegiate Programming Contest)

Review last lesson

Computer science

Computer science is the study of computer hardware and software. Those who study computer science, consequently, can specialize in a wide range of interrelated subfields, from artificial intelligence and cryptography to computer engineering and software development.

by Saifullah Haidari

Review last lesson

Database department

A database is a system that efficiently stores, organizes, and retrieves data.

Banking Systems

Used in banking systems to manage customer accounts and transactions.

Online Stores

Used in online stores to manage product information and customer orders.

Social Networks

Used in social networks to store user profiles and interactions.

by Saifullah Haidari

Software Engineering

Software engineering is the process of designing, developing, testing, and maintaining software.

1. **Requirements Gathering**

   Understanding the needs and goals of the software.

2. **Design**

   Creating the architecture and structure of the software.

3. **Development**

   Writing the code for the software.

4. **Testing**

   Ensuring the software meets the requirements and functions correctly.

5. **Deployment**

   Making the software available to users.

6. **Maintenance**

Review last lesson

Computer Networks

Computer networks are a collection of devices connected to each other through communication protocols.

1 Connecting Computers

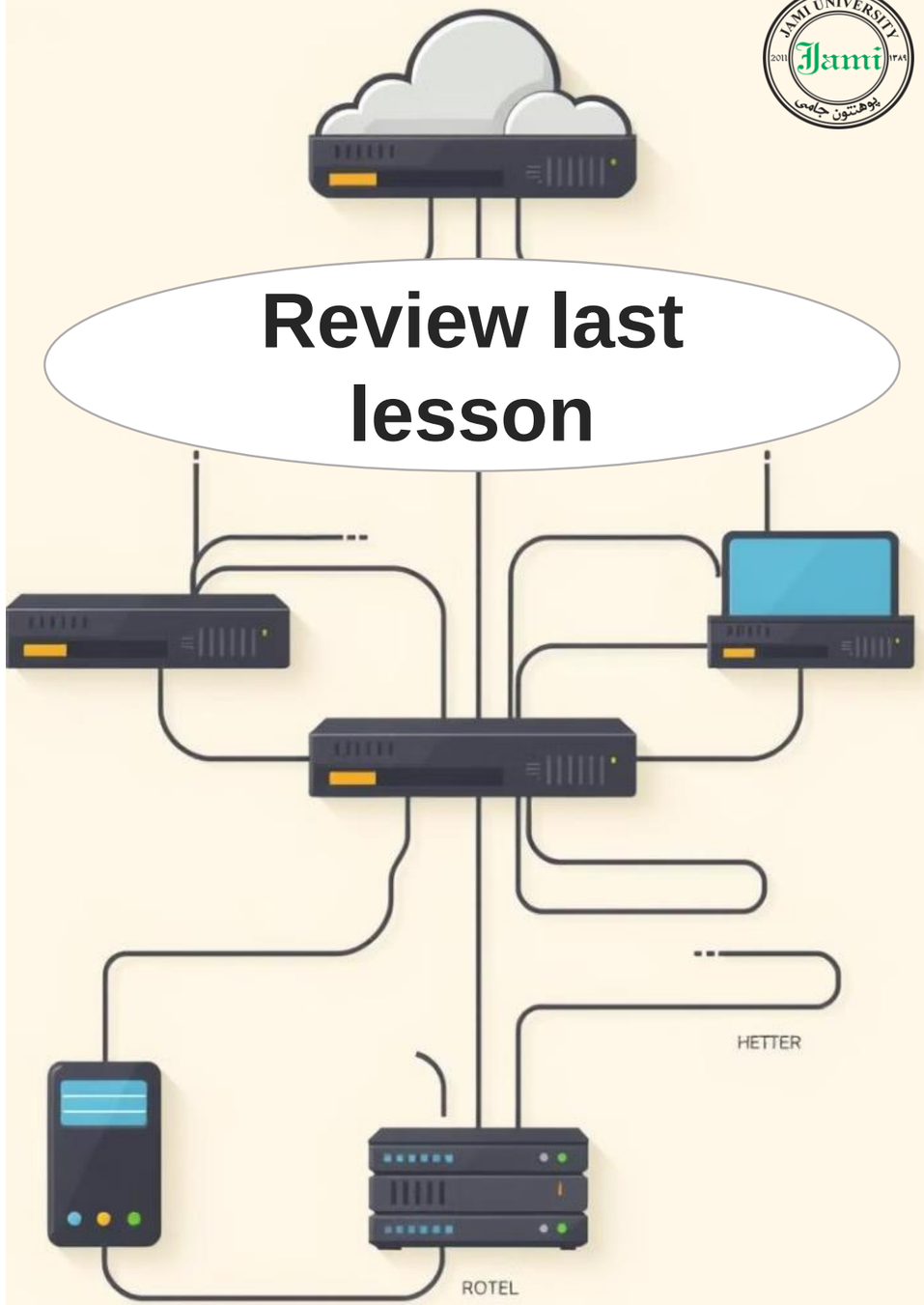
Allowing computers to share resources and communicate with each other.

2 Sharing Resources

Enabling access to shared files, printers, and other resources.

3 Internet Communication

Facilitating communication and data exchange over the internet.



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Review last lesson

Operating Systems

An operating system is a software that manages the hardware and software resources of a computer.

Resource Management

Manages the computer's memory, CPU, storage, and other resources.

User Interface

Provides a way for users to interact with the computer.

Security

Protects the computer from unauthorized access and malware.

Operating Systems

Review last lesson

EXAMPLE OF OPERATING SYSTEM

- Microsoft Windows
- Mac Os X
- Unix Operating System
- BSD
- Plan 9
- Linux and GNU
- Google Chrome OS

What is Programming?

1 Creating Instructions

Programming is the process of writing instructions that tell a computer how to perform tasks. These instructions are written in a specific language that the computer can understand.

2 Problem-Solving

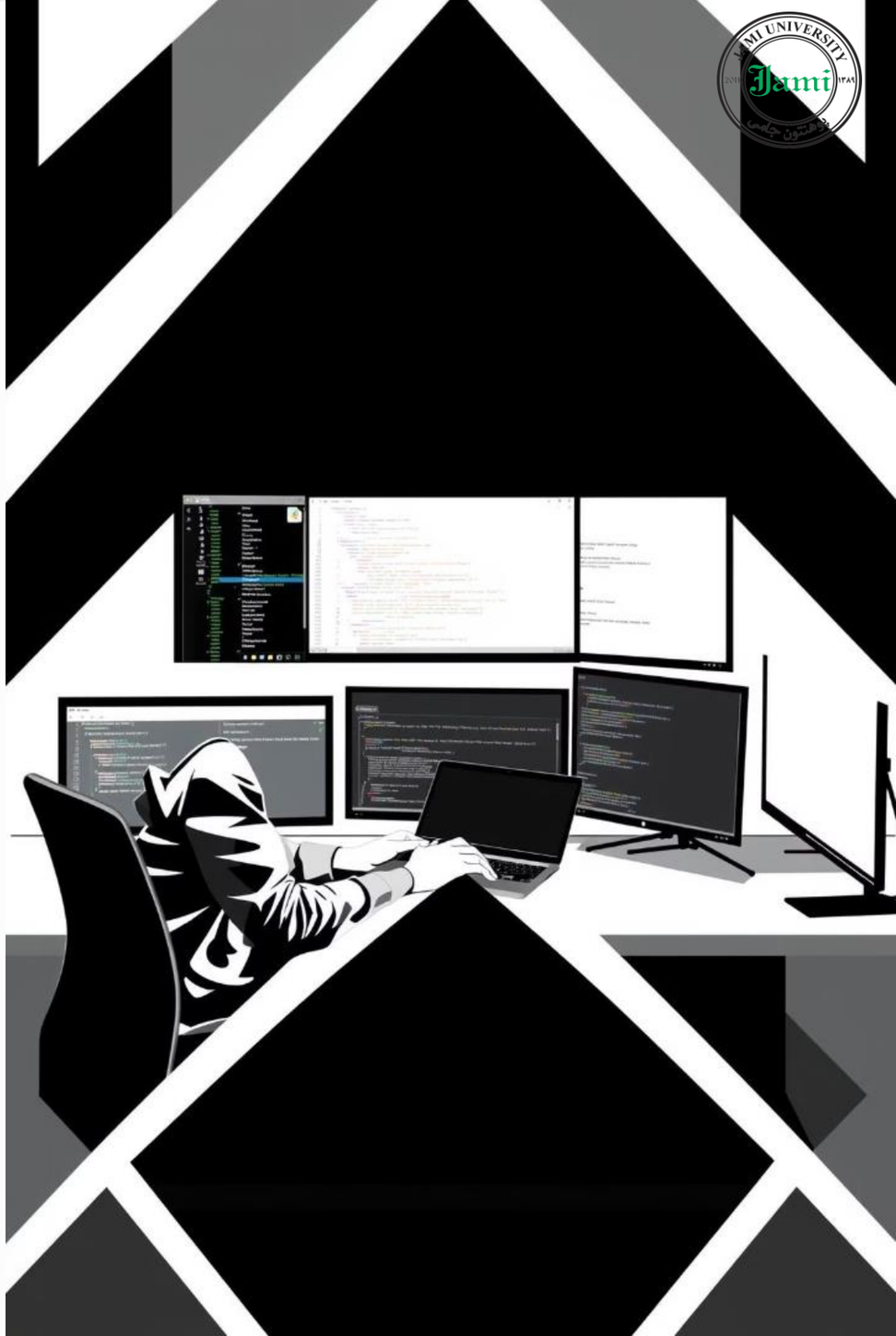
Programming involves identifying problems, breaking them down into smaller steps, and designing solutions that the computer can follow.

3 Logical Thinking

Programmers use logic and reasoning to create programs that work correctly and efficiently.

4 Implementation

Programmers translate their solutions into code, testing and refining it until it meets the desired requirements.



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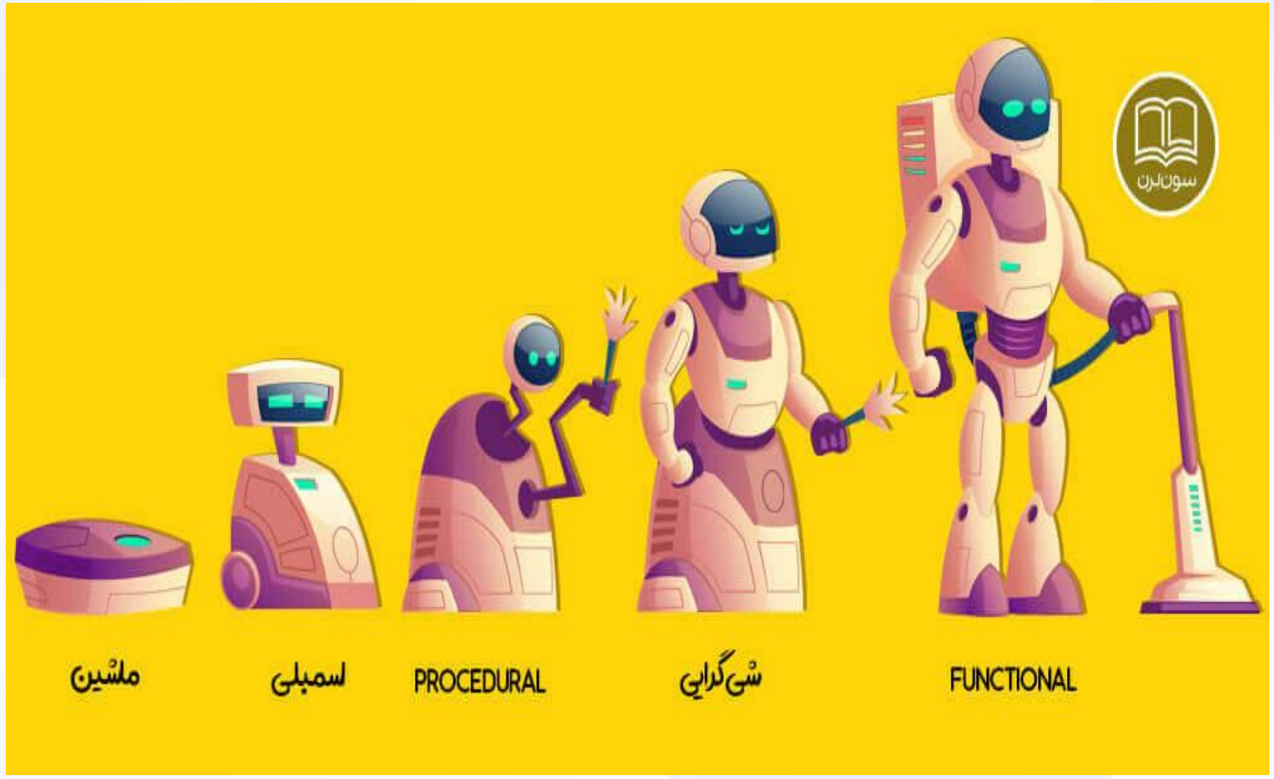
The development process of programming languages



Low level

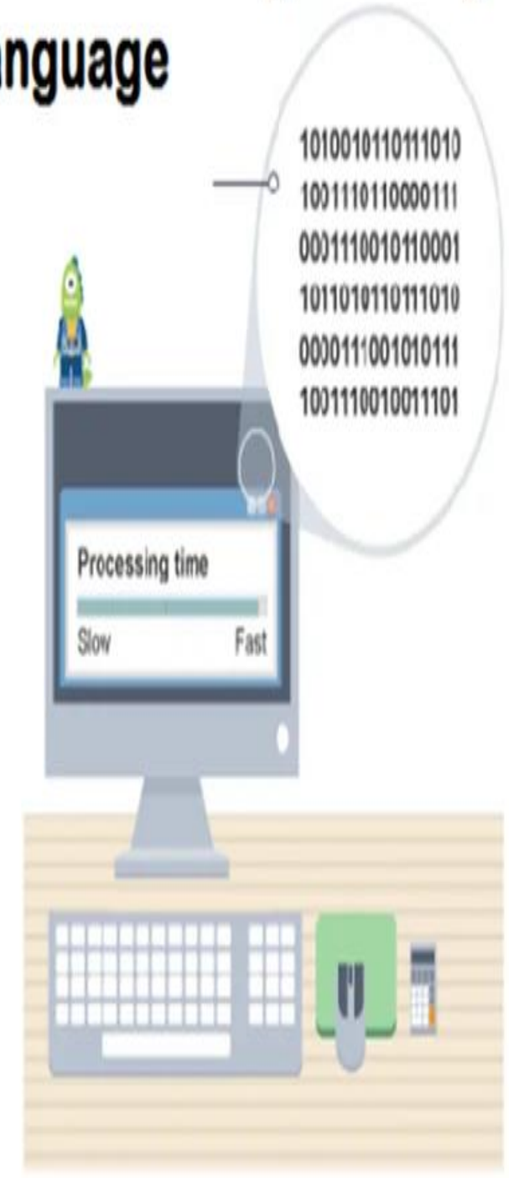
- machine)
- Assembly

High level

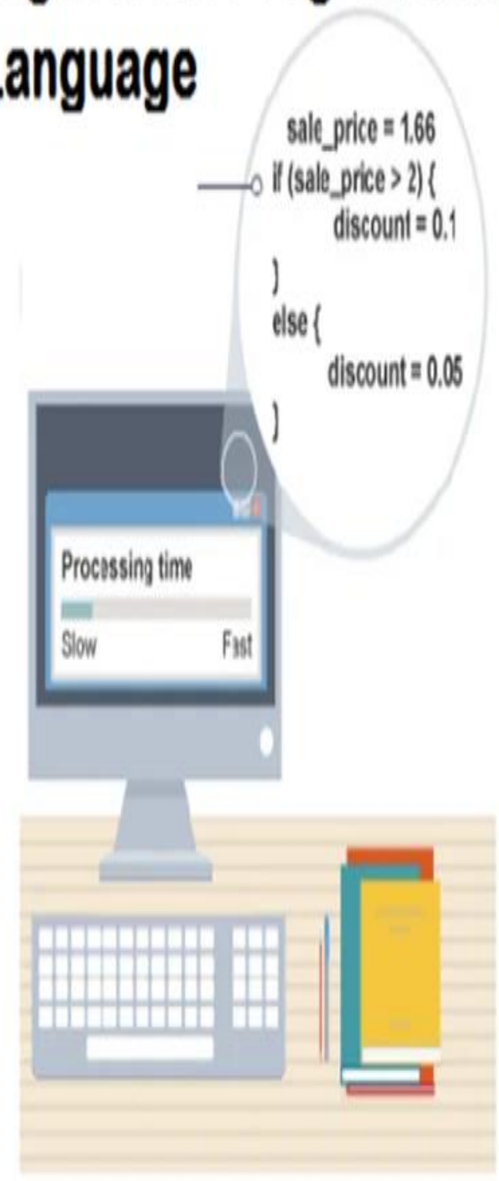
- Procedural
- oop
- Functional programming

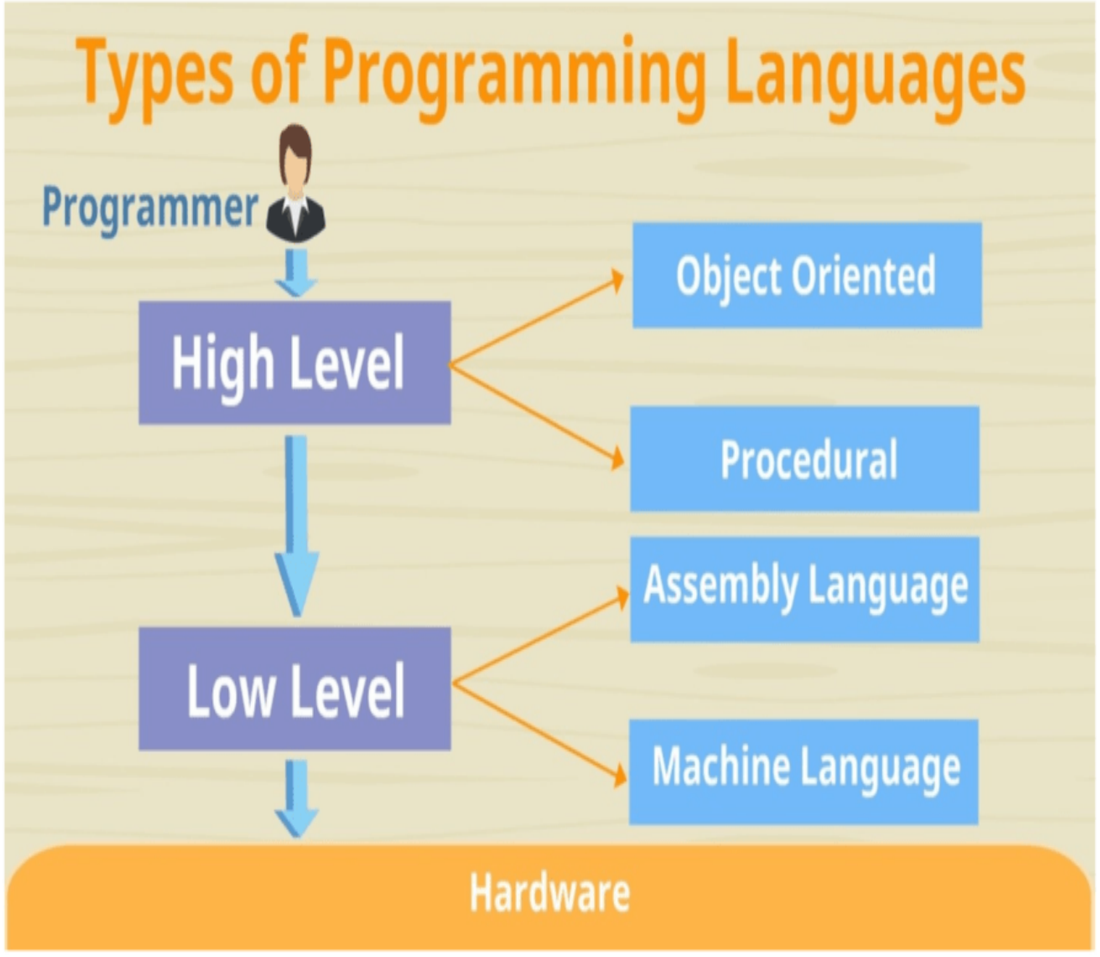
High-Level vs Low-Level

Low Level Programming Language



High Level Programming Language





inprogrammer

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Classification programming languages by usage

1. Desktop Programming Languages (Windows)
2. Web Programming Languages
3. Mobile Programming Languages
4. Multifunctional programming languages

Desktop Programming Languages (Windows)

The languages used to write programs under Windows and Desktop are called Desktop Programming Languages

1. Delphi
2. Python
3. Ruby
4. Golang
5. C Sharp
6. C
7. C-Plus (c++)
8. Java
9. Visual Basic

Web Programming Languages

In this section, we have two models of programming and coding: ***user-side and server-side***.

• Server-side languages

- **Server-side applications are installed on dedicated servers and used by users on the network. These applications typically require a network or server connection to run and are used to provide services to users. Examples of server-side applications include database management systems, web server, file server, and email server.**

• Client side languages

- **User-side applications are installed on the user's device and are used by the user to perform certain tasks. These applications usually do not require a network or server connection to run.**

Web Programming Languages

In this section, we have two models of programming and coding: client-side and server-side.

- **Server-side languages**
  - PHP
  - Ruby
  - Java
  - Python
- **Client side languages**
  - HTML
  - CSS
  - JavaScript
  - jQuery

Web Programming Languages

In this section, we have two models of programming and coding: ***user-side and server-side***.

- **Server-side languages**

- Examples of server-side applications include database management systems such as MySQL and Oracle, web servers such as Apache and PHP, file servers such as FTP and SFTP, and email servers such as Exchange and Postfix.

- **Client side languages**

- Examples of user-side apps include web browsers, office apps, graphics apps, gaming apps, and mobile apps and many other applications .

Mobile Programming Languages

The languages used to write mobile applications (Android and iOS) are called mobile programming languages.

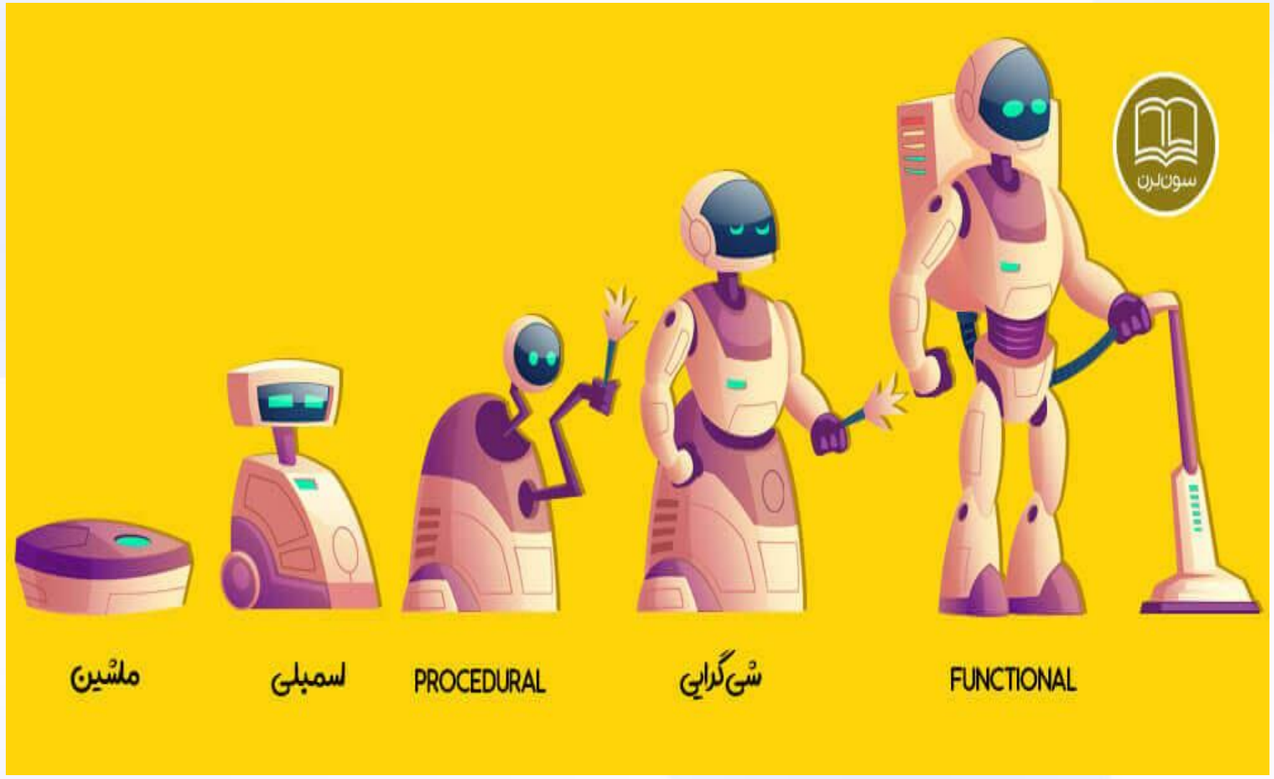
1. C Sharp
2. Python
3. Java
4. Swift
5. Ruby
6. Javascript
7. Objective c

Multifunctional programming languages

Programming languages that are used in several parts are called multi-purpose, for example, with the C programming language, it is possible to write both desktop applications and work on the web, as well as Android and iOS applications.

1. C Sharp
2. Python
3. Ruby
4. Java
5. Golang
6. C
7. C-Plus

The development process of programming languages



Low level

- machine)
- Assembly

High level

- Procedural
- oop
- Functional (Visual)

Machine Language

Machine language is the lowest-level programming language. It consists of binary code (0s and 1s), which is directly understood by the computer's central processing unit (CPU). While powerful, it is difficult for humans to read and write.

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Machine Language

Low-level programming languages deal directly with the system processor and can be used to execute basic programming commands.

It is difficult to understand the commands written in these languages.

1. Lowest level of programming
2. Consists of binary digits (0 and 1)
3. Difficult to use and understand
4. The only language that can be run directly by the processor(cpu)

Machine Code

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Assembly Language

Assembly language is a low-level programming language that uses symbolic instructions instead of binary code. This makes it easier to understand and write than machine language, but still requires an assembler to convert it into machine code.

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assembly Language

1. Writing in machine language has been a very grueling task and difficult
2. There is also a high probability of making mistakes.
3. The main purpose of talking to the CPU
4. In other words, in order to add two numbers together, a separate method must be defined for each of them.

Assembly & Machine Language

Machine Language	Assembly Language
1. 10100001 00000000 00000000	1. MOV AX, A
2. 00000101 00000100 00000000	2. ADD AX, 4
3. 10100011 00000000 00000000	3. MOV A, AX

1. Fetch/read *contents* from address A *(assembly language uses symbols to represent memory addresses, hence 0 is A)* and place it in register AX
2. Add 4 to AX
3. Update the address A with the new contents replacing the old contents

Compiler: Compilers are programs that translate High-level languages, like C++, Java, Actionscript, to Machine language

Assembler: Assemblers are programs that translate Assembly language to Machine instructions

emu8086 - assembler and microprocessor emulator 4.08

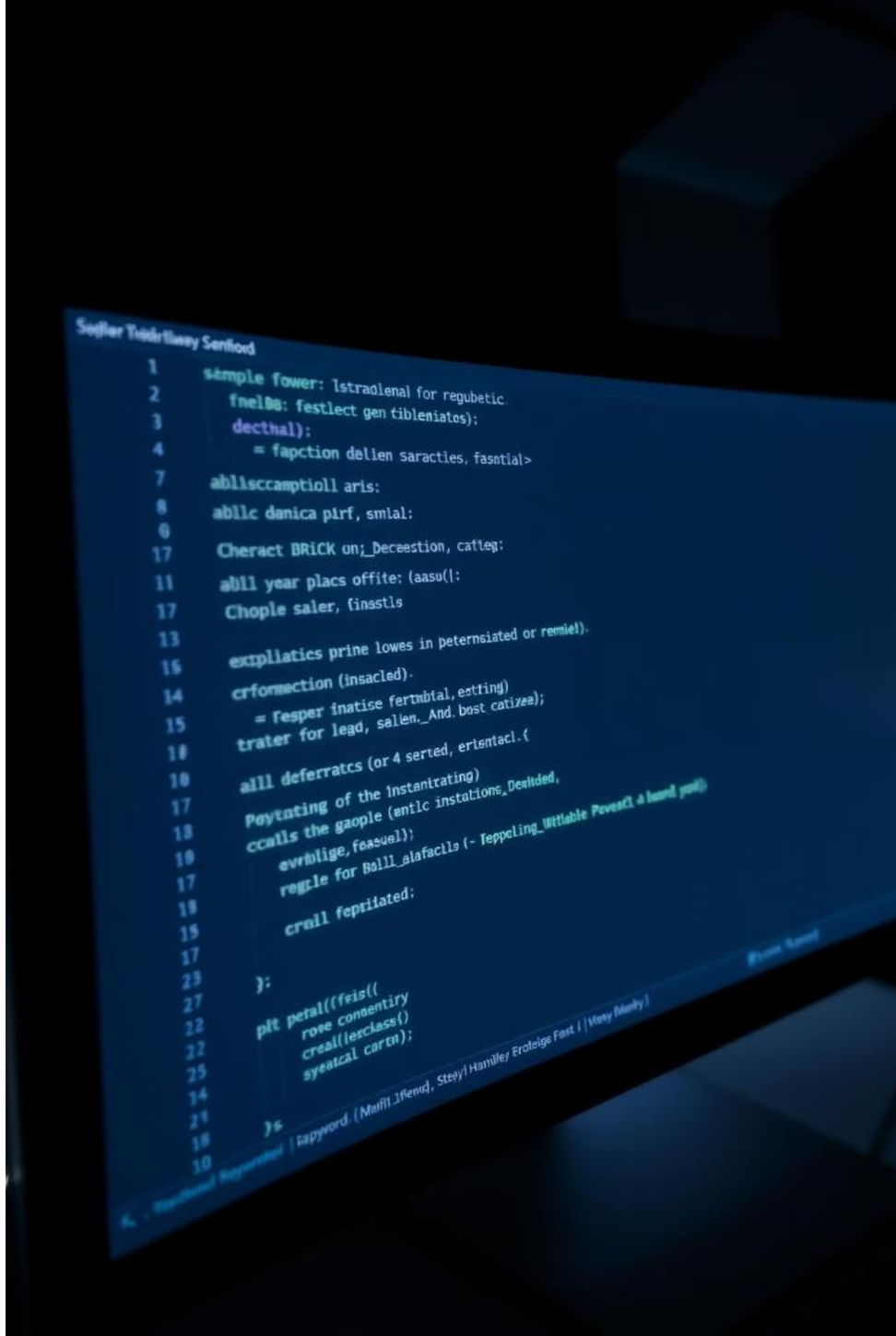
file edit bookmarks assembler emulator math ascii codes help

new open examples save compile emulate calculator convertor options help about

```
; multi-segment executable file template.

data segment
    ; add your data here!
    pkey db "press any key...$"
ends

stack segment
    dw   128  dup(0)
ends

code segment
start:
; set segment registers:
    mov ax, data
    mov ds, ax
    mov es, ax

    ; add your code here

    lea dx, pkey
    mov ah, 9
    int 21h        ; output string at ds:dx

    ; wait for any key....
    mov ah, 1
    int 21h

    mov ax, 4c00h ; exit to operating system.
    int 21h
ends

end start ; set entry point and stop the assembler
```

High-Level Programming Languages

High-level programming languages are designed to be more user-friendly and abstract away the complexities of machine code. They are more portable across different computer systems and easier for humans to read and write.



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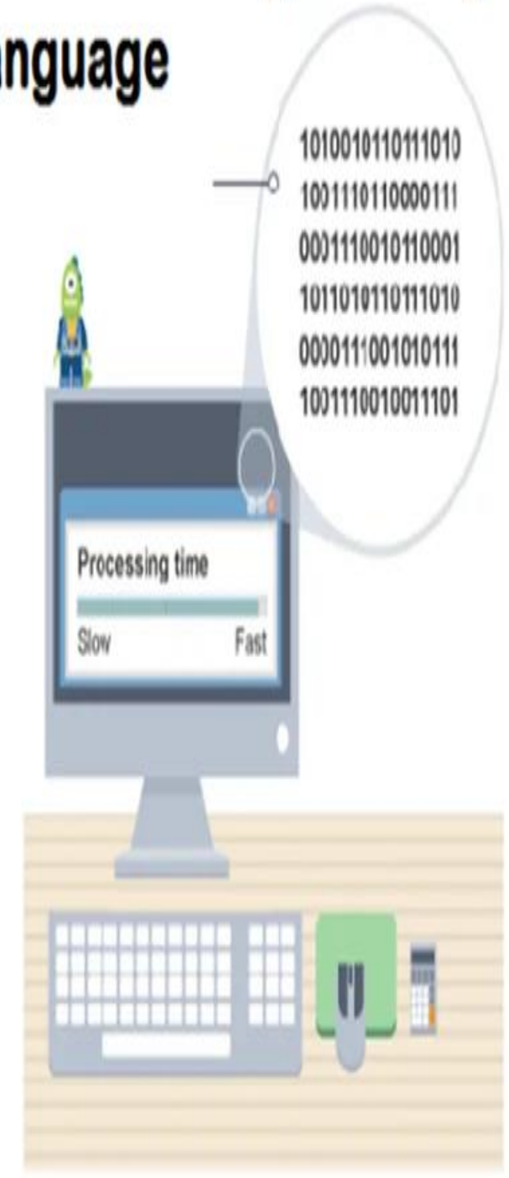
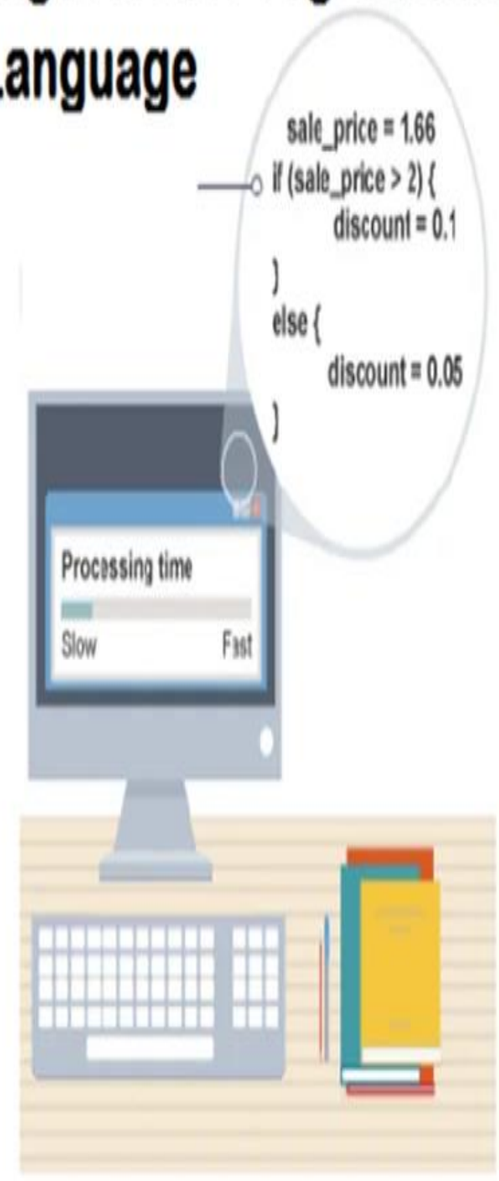
<!DOCTYPE html>
<html lang="en-us">
<head>
<title>pagename</title>
<meta name="Author" content="author">
<meta name="Description" content="description">
<meta name="Keywords" content="keywords">
<meta charset="utf-8">
<link rel="icon" type="image/icon" href="favicon.ico">
<link rel="stylesheet" type="text/css" href="style.css">
<style>
.reset
.clear
.cleared:after
.right
.left
a img
img
section, article, aside, footer
{ margin:0;
{ clear:both; }
{ float:right; }
{ float:left; }
{ border:0; }
{ max-width:
{ display:blo
{ margin:0;

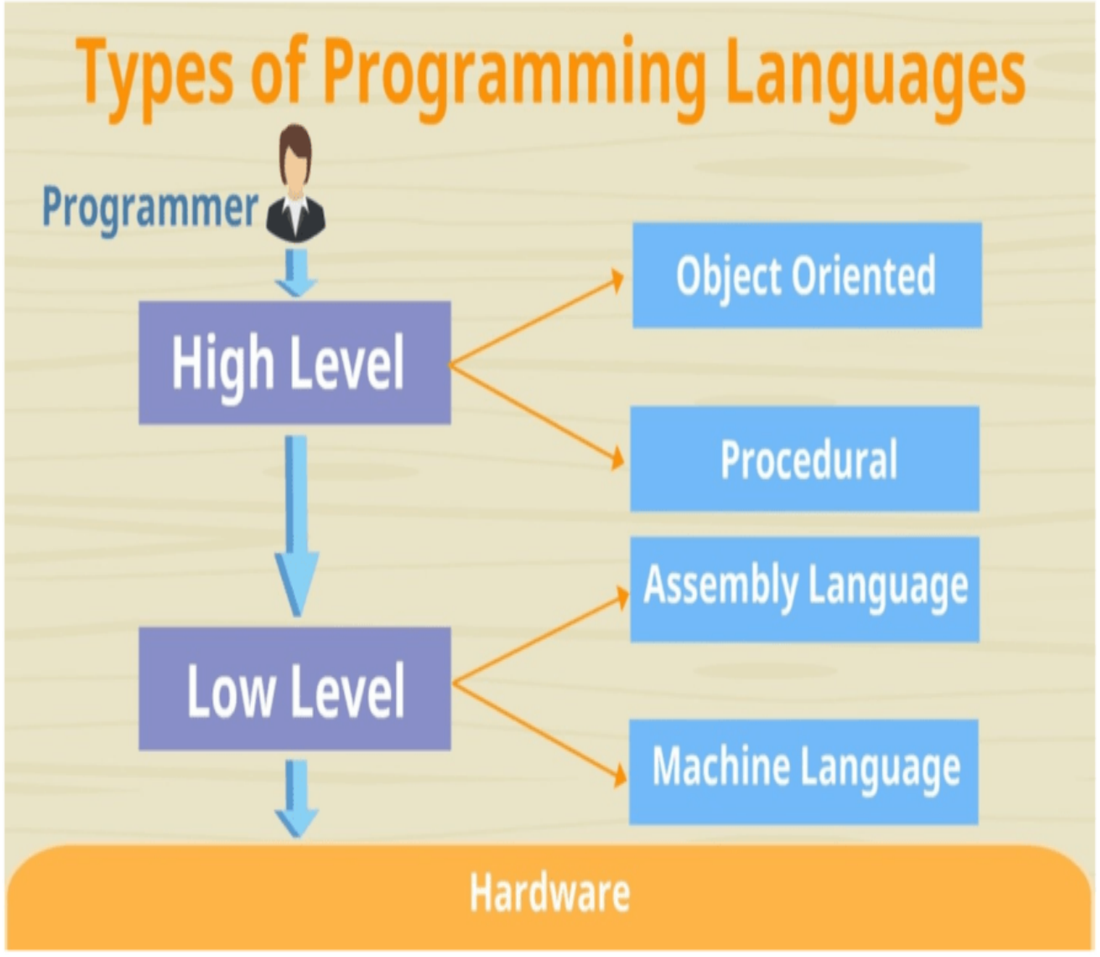
High-Level vs Low-Level

Low Level Programming Language



High Level Programming Language





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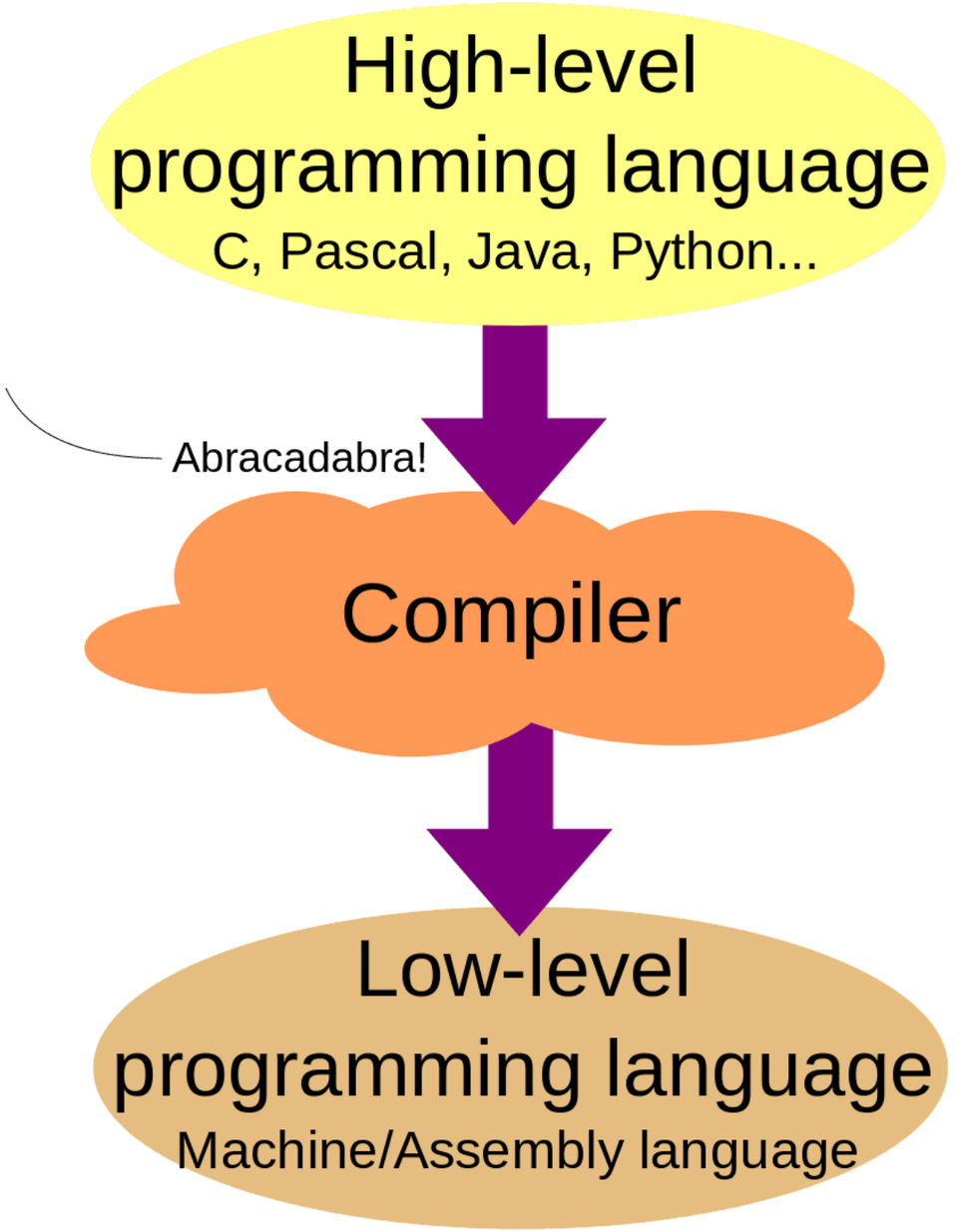
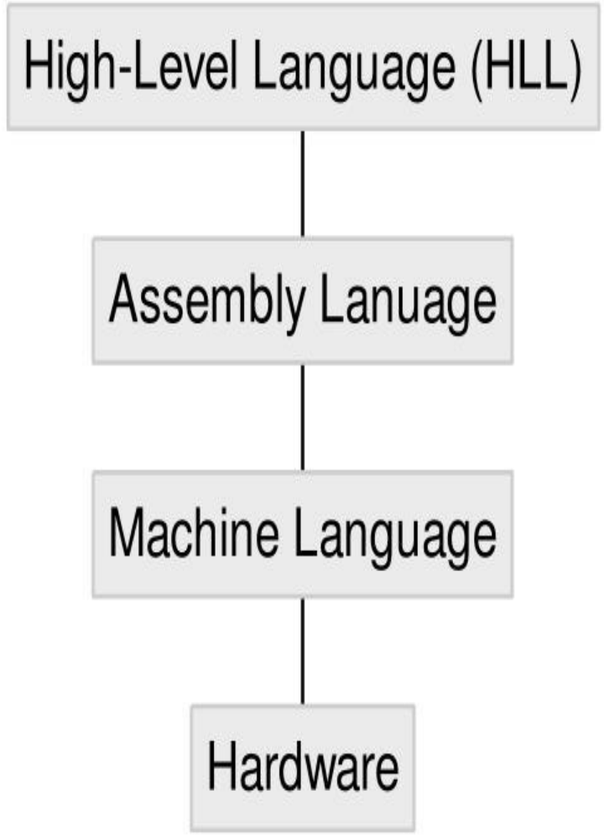
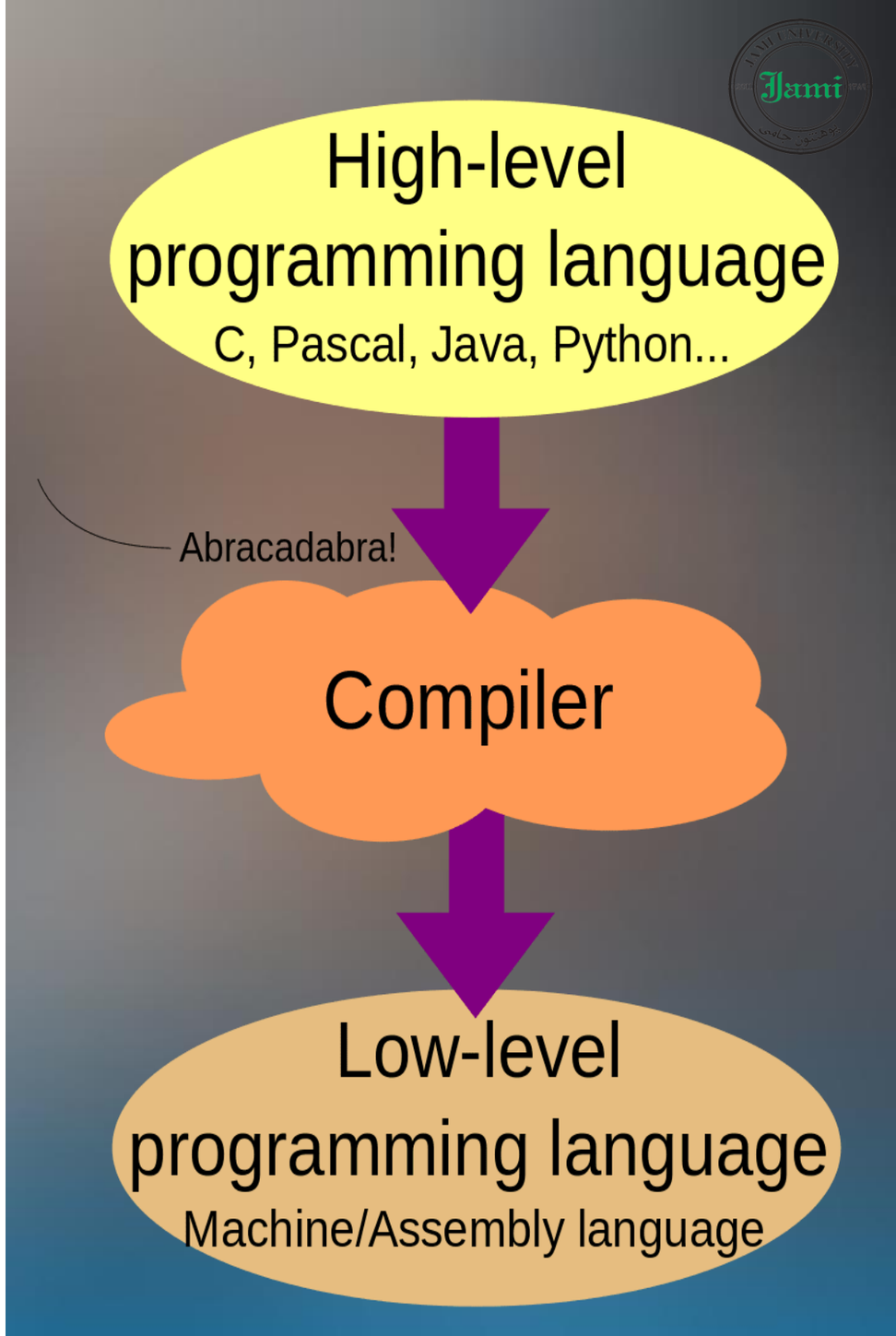
Programming Language Hierarchy





Compiler, Assembler, and Interpreter

Tool	Definition	Output
Compiler	Translates entire source code into machine code.	Executable file.
Assembler	Converts assembly code to machine code.	Object code.
Interpreter	Executes code line-by-line.	Immediate execution without intermediate file.



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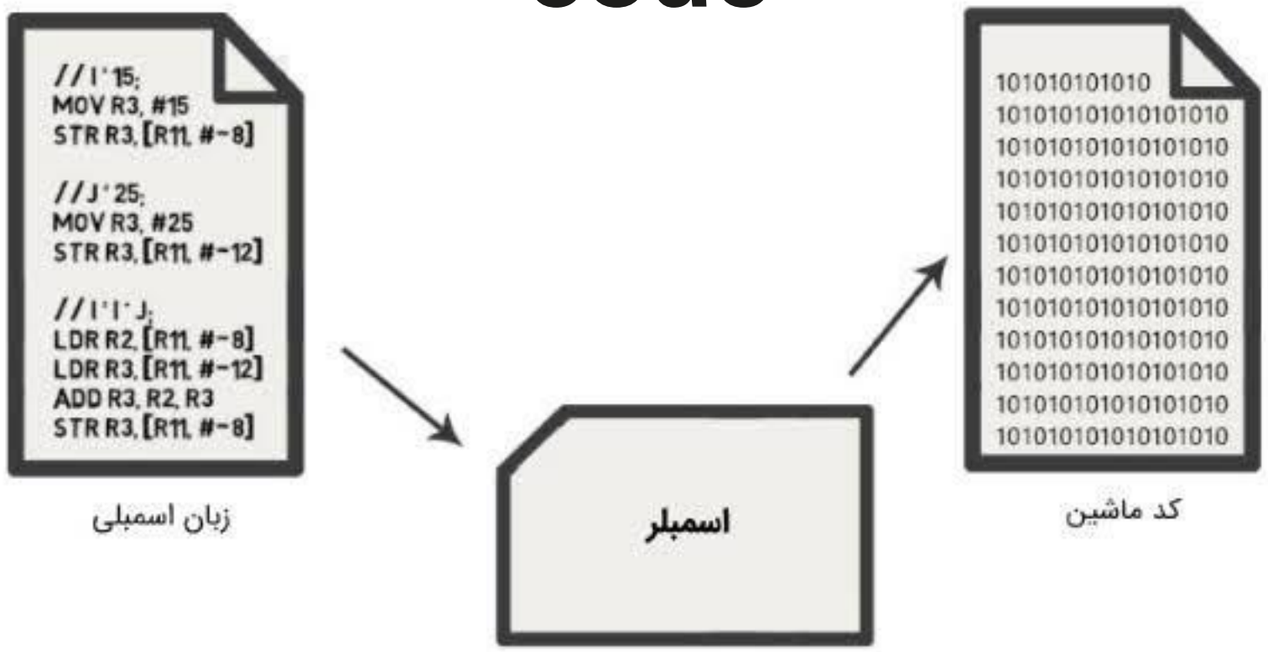
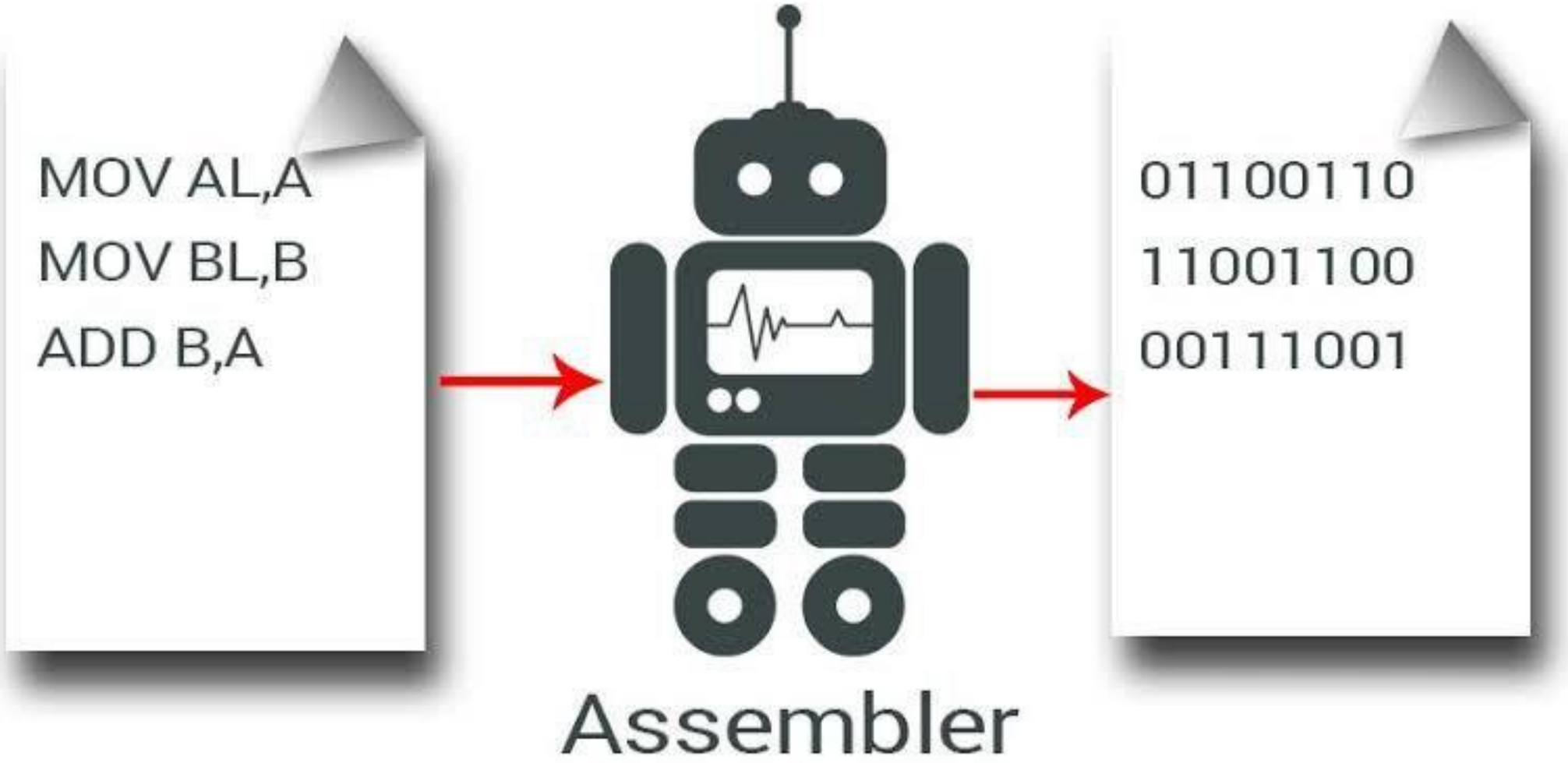
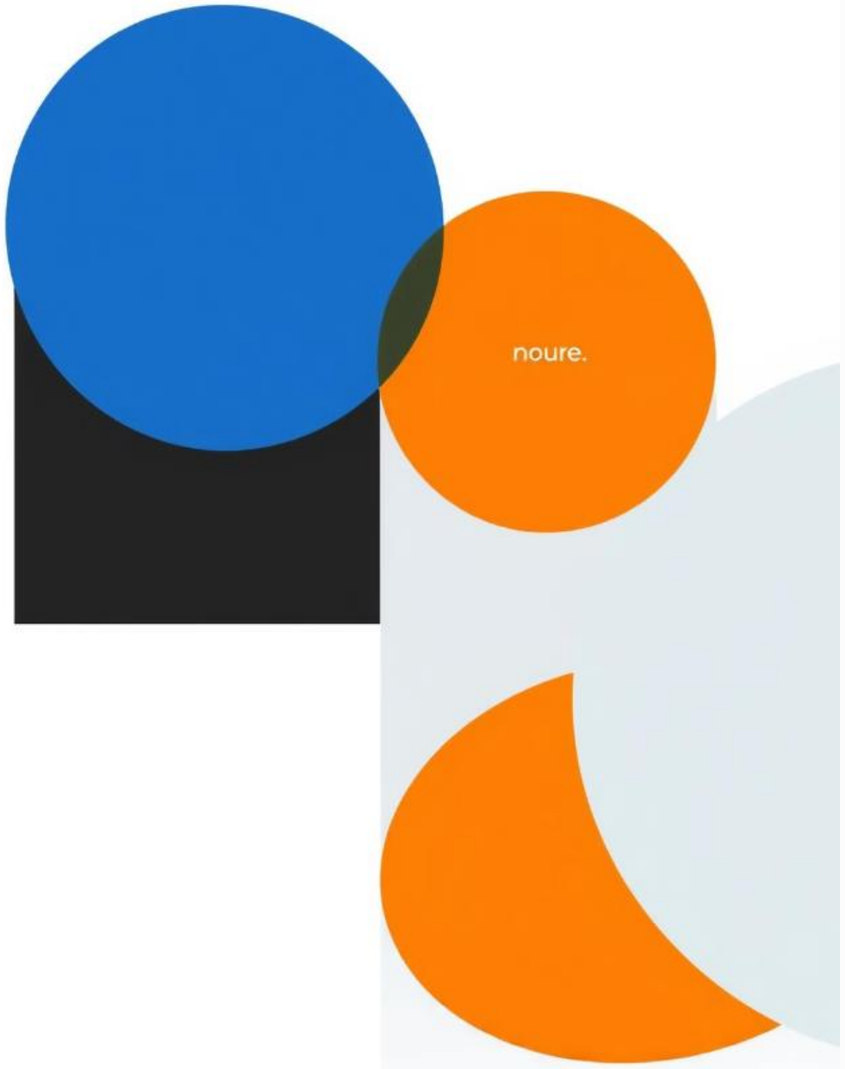
Assembly to machine code




MOV AL,A
MOV BL,B
ADD B,A
01100110
11001100
00111001
Assembler



Interpreted vs. Compiled Languages

1

Interpreted Languages

Interpreted languages are executed line-by-line by an interpreter. This makes them more flexible during development, as changes can be made and tested immediately.

2

Compiled Languages

Compiled languages are translated into machine code by a compiler before execution. This results in faster execution speeds, as the code is optimized for the target hardware.

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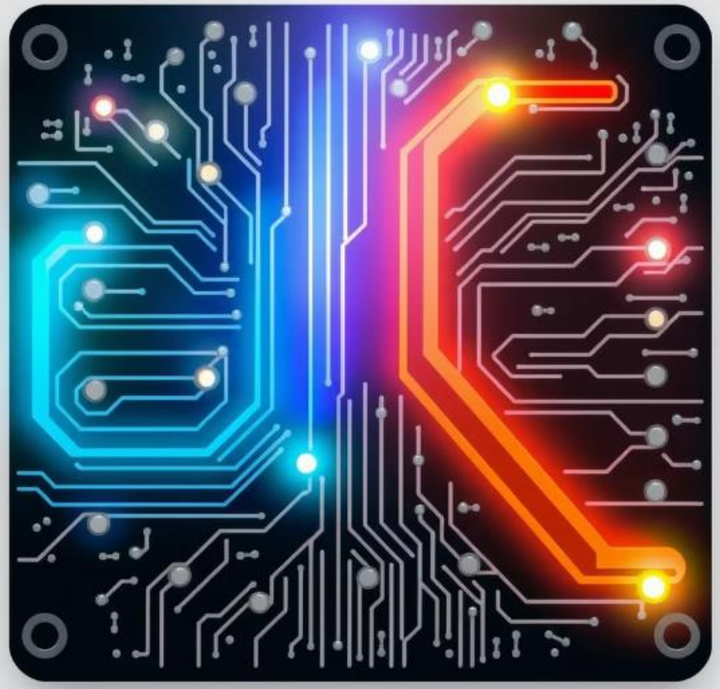

The Role of the Interpreter

Execution

Interpreters directly execute instructions written in a programming or scripting language without requiring them to be compiled into machine language. This allows for more flexibility and interactivity during development.

Debugging

Interpreters are often used for debugging, as they can stop execution at any point and allow the programmer to inspect the state of the program.

Dynamic Execution

Interpreted languages are often dynamic, meaning that code can be executed on the fly, making them suitable for interactive applications and scripting tasks.

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Procedural languages

If you write in procedural languages,

1. the codes We are similar to a list of tasks
2. The programming language engine runs it from top to bottom.
3. That is, the process of executing the code goes step by step.
4. But gradually, as software grew, this method created limitations for programmers.
5. They use repetition
6. Codes on a Frequent repeated
7. The messy and nested face would become a Spaghetti code.
8. The various functions and pieces of code are interdependent and disjointed, and
9. As a result, making a change in one part causes all the functions to be disrupted.

oop

1. OOP or Object Orient Programming sees as an object or object
2. It's close to the real world,
3. It will be easy for the programmer to understand.
4. In objectivism, as opposed to a variable procedure and functions, you work directly with objects.

5. Management
6. It makes it easier to maintain your codes,
7. The amount and time of coding will also be greatly reduced.
8. Use code you wrote once in other projects
9. Allows data and code to be organized in an orderly manner
10. They are more adaptable in larger projects.
11. Languages such as C++, C#, Python, PHP, Ruby, Perl, and Java are among the object-oriented programming languages.

Multi functional

1. Combining Functions and Calling
2. Use functions as values and send them as parameters for another function
3. Use them as the recursive value of a function.
4. The use of natural and everyday language is one of the characteristics of this language.
5. Using Neural Networks
6. and Artificial Intelligence
7. as well as the use of image processing
8. robotic
9. LISP, APL, IPL and #F languages are among the functional programming languages.

Programs and Types of Code

1

Source Code

Human-readable code written in a programming language we write in java c++ and ….

2

Object Code

Machine code produced by the compiler it is near to machine code not readable for human .

3

Executable Code

Final machine code that can be run on a computer or with operating systems
With extension of exe.

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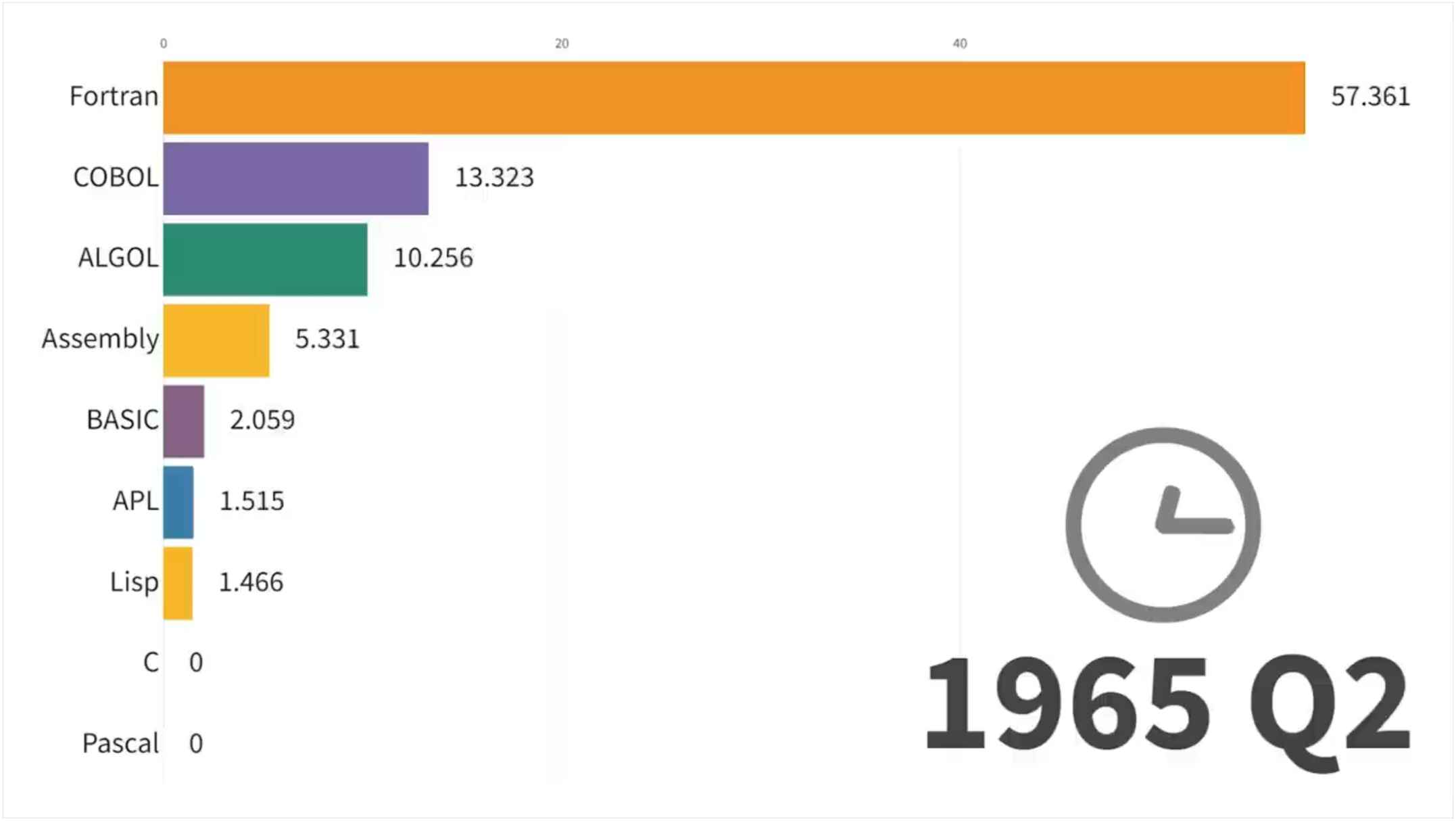
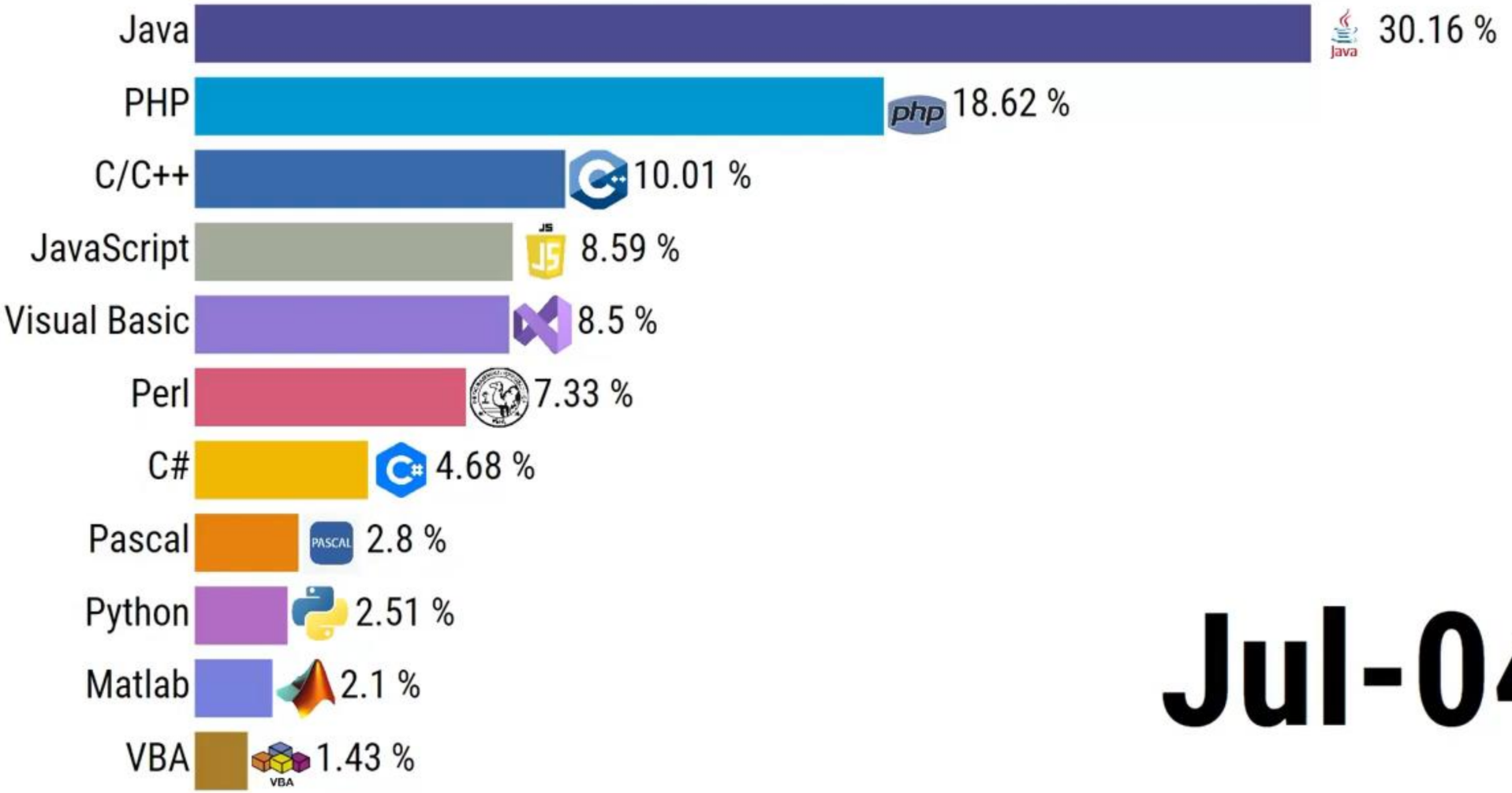

0
20
40
Fortran
57.361
COBOL
13.323
ALGOL
10.256
Assembly
5.331
BASIC
2.059
APL
1.515
Lisp
1.466
C
0
Pascal
0
1965 Q2

Popular Programming Languages



Jul-04

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Comparing Java, Python, and C++

This presentation provides a comparative analysis of Java, Python, and C++, exploring their key features, strengths, and use cases to help you understand which language best suits your needs.

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Python: Readability & Versatility

Code Readability

Python emphasizes code readability with its use of significant whitespace, making it easy to understand and maintain.

1. Print(“hellow world”)
2. Clear and concise syntax

Extensive Libraries

Python boasts a vast standard library with modules for various tasks, simplifying development and reducing coding effort.

1. Data science and machine learning
2. Web development and automation ai
3. Artificial intelligent

by Saifullah Haidari

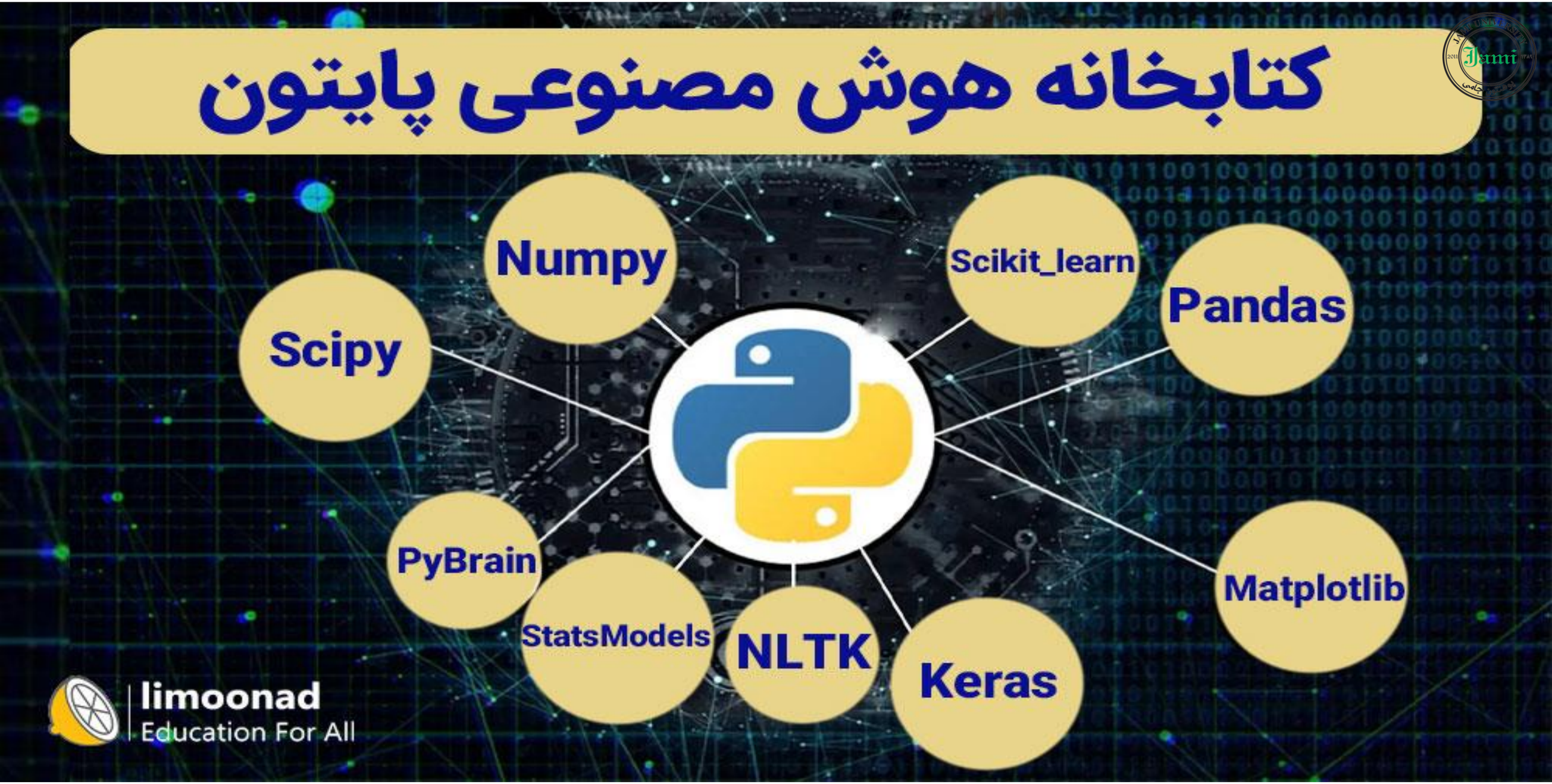
Advantage

1. Easy to Learn, Easy to Use:
2. Interpreted language
3. Portable
4. Huge Libraries:
5. Open Source
6. Easy integration with other programming languages
7. IoT opportunities:
8. object-oriented

Disadvantage

1. Low Speed
2. Inefficient memory consumption
3. It performs very poorly in programming for mobile devices:
4. The Python language is mostly used in programming servers
5. Runtime errors:
6. Simplicity of the Python language

کتابخانه هوش مصنوعی پایتون




Java

java

1. Java was first designed in 1994 by James Gosling at Sun Microsystems then purchased by oracle.
2. Most Popular Programming Languages
3. Because about 90% of existing companies use it extensively.
4. "Write Once, Run Everywhere"

Java: A Look Under the Hood

1 Object-Oriented

Java is a pure object-oriented programming language, meaning everything in Java is an object. This promotes code reusability and modularity, making it suitable for large projects and 90% of world’s company are using java

2 Security

Java utilizes a strong type system, requiring explicit type declarations, enhancing code reliability and catching errors early.

3 Automatic Memory Management

Java's garbage collection automatically handles memory management, simplifying development and reducing the risk of memory leaks.

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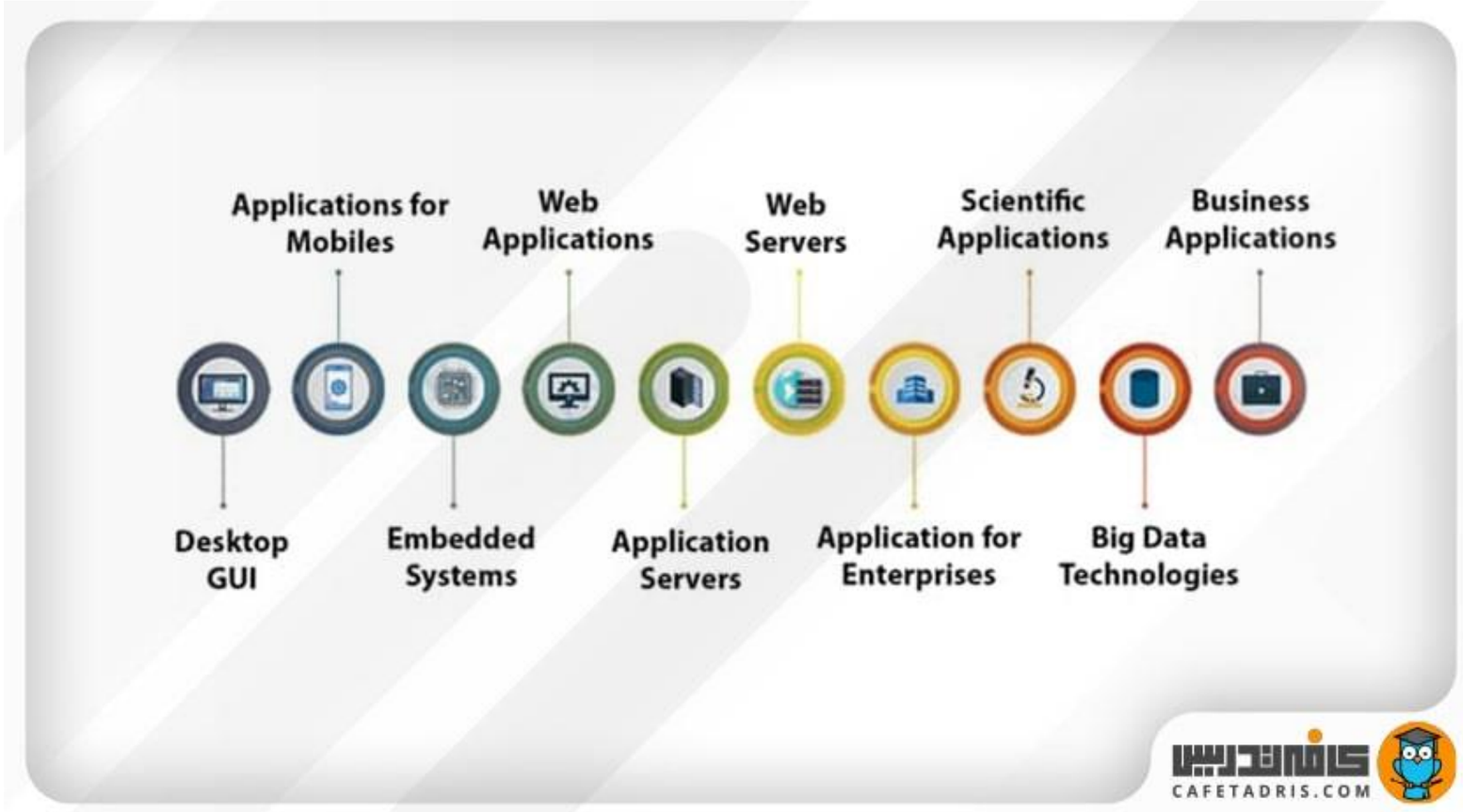
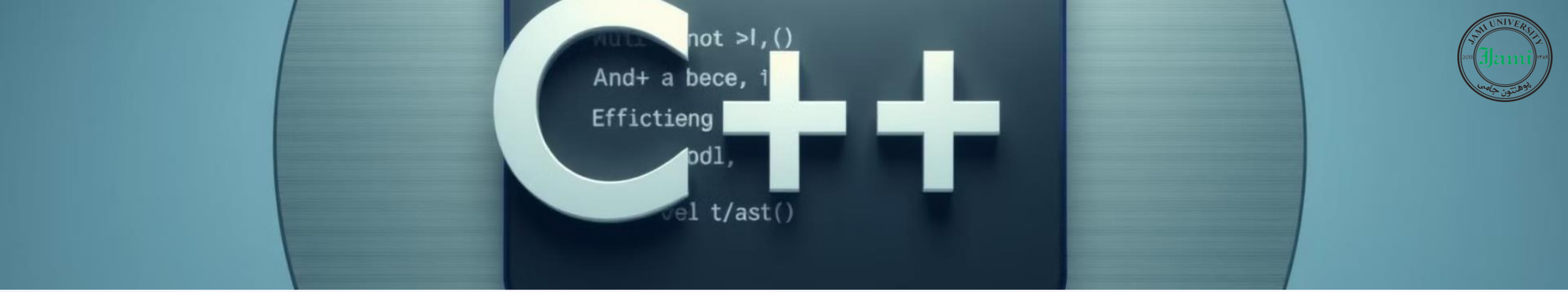
Advantage

1. More than 20 years of experience
2. Java code can be executed on any type of hardware.
3. Java
4. Java has become popular for the Android operating system.
5. Web applications are used.
6. The Apache Hadoop Windows system is written in Java and is used by Amazon Web Services.
7. Because of its clarity and versatility, it is one of the first languages used to teach beginners. They have commercial applications.
8. (JVM)

Java applications



```java
class HelloWorld
{
    public static void main(String args[])
    {
        System.out.println("Hello World");
    }
}
```



C++: Performance & Control

Direct Memory Management

C++ allows for direct memory management, giving developers fine-grained control over memory allocation and deallocation.

Object-Oriented Programming

C++ supports object-oriented programming principles, allowing for code reusability and modularity, enhancing code organization and maintainability.

Rich Standard Library

C++ provides a comprehensive standard library with functionalities for various tasks, simplifying development and offering efficient building blocks.

by Saifullah Haidari

C++

C-++ in 1986
As an alternative to the C programming language
And it immediately gained great popularity.

Microsoft Windows and Google Chrome are two of the most popular projects written in C Plus.
Of course, most of Adobe's products and most of Amazon's website services are also written in this language.

C-Plus is a powerful tool that can be used in various parts of programming such as.

1. Financial
2. Banking
3. Game Development
4. Telecommunication
5. Banking
6. Electronic
7. Retail Stores
8. And many other things.

Use Cases & Applications

1

Java

Enterprise applications, Android development, web services.

2

Python

Data science, machine learning, web development, scripting.

3

C++

Game engines, systems software, real-time simulations, embedded systems, operating systems,iot,

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Learning Resources

Books & Tutorials

A variety of books, online courses, and tutorials are available for each language, catering to different learning styles and levels.

Online Courses & Platforms

Online learning platforms provide structured courses, interactive exercises, and community support for learning these languages.

Online Communities & Forums

Engaging with online communities and forums allows you to ask questions, share knowledge, and connect with other developers.

Practice Projects & Coding Challenges

Hands-on experience is essential. Start with small projects and gradually tackle more complex challenges to solidify your understanding.

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Conclusion: Choosing the Right Language

Ultimately, the best language depends on your project requirements, personal preferences, and desired outcomes. Analyze your needs, explore the strengths of each language, and make an informed decision.

by Saifullah Haidari

As a conclusion of this lesson

Learn the Basics of Java Programming?	Introduction of programming languages
Compiler assembler Interpreter	Comparing Java, Python and C++
Types of codes	examples

منابع

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Thanks!

Do you have any questions?
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Please keep this slide for your future