Introduction to Technology

Section I

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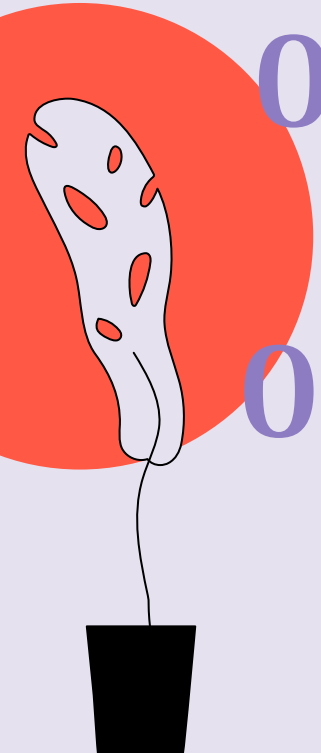

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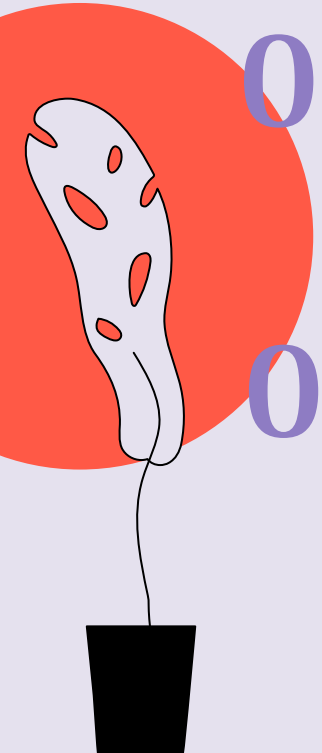


01

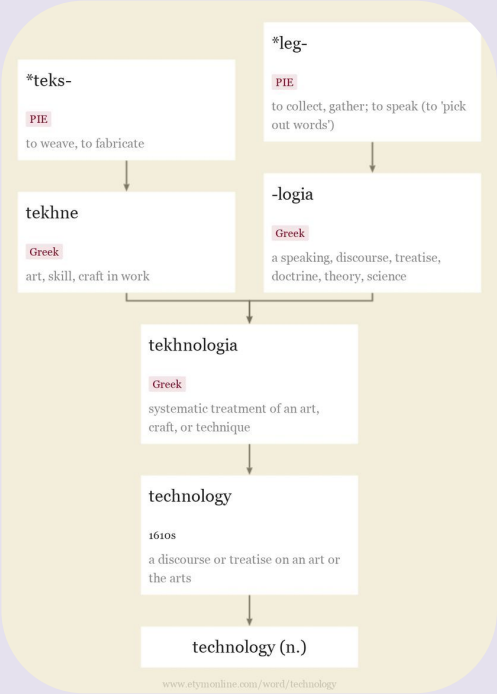
Brief History

of technology

What does technology mean?

A set of theories and techniques that allow the practical use of scientific knowledge. - RAE

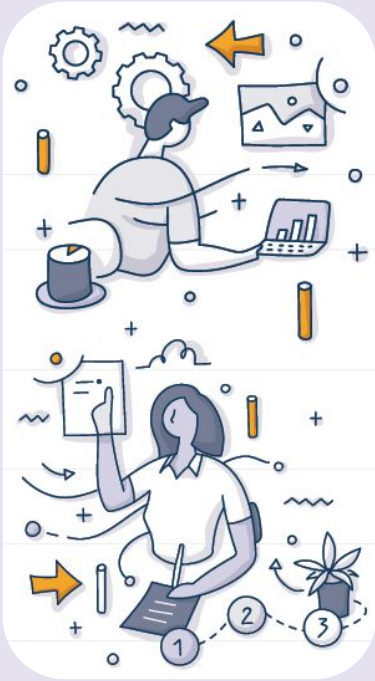
Technology is the set of knowledge and techniques that are applied in an orderly manner to achieve a certain objective or solve a problem. - economipedia



What does information technology mean?

Information Technology - IT

Any equipment or interconnected system or subsystem of equipment used in the **automatic acquisition, storage, manipulation, management, movement, control, display, switching, exchange, transmission, or reception of data or information** - CSRC

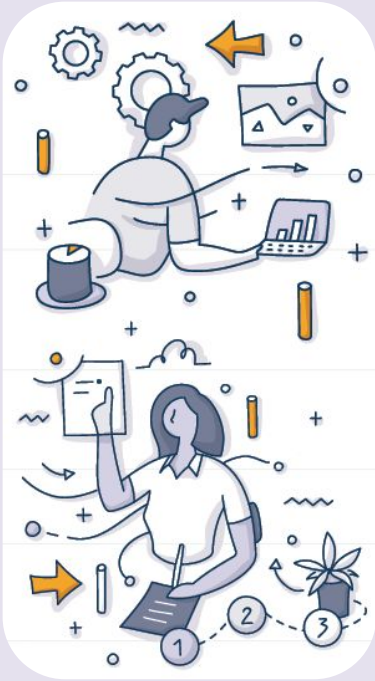


What does information technology mean?

Important points

- Obtained
- Storage
- Handling / Transformation
- Management / Administration
- Movement
- Control
- Visualization
- Switching
- Automatic exchange, transmission or reception

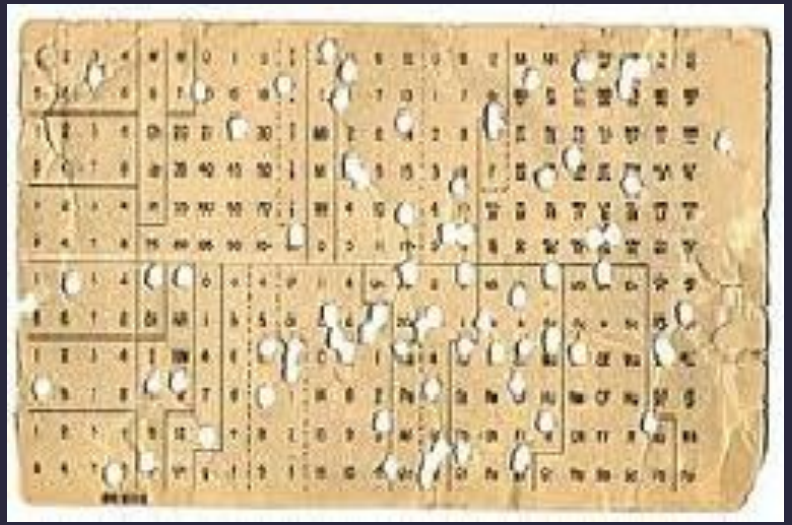
of **data or information**



HISTORY OF COMPUTING

(Timeline)

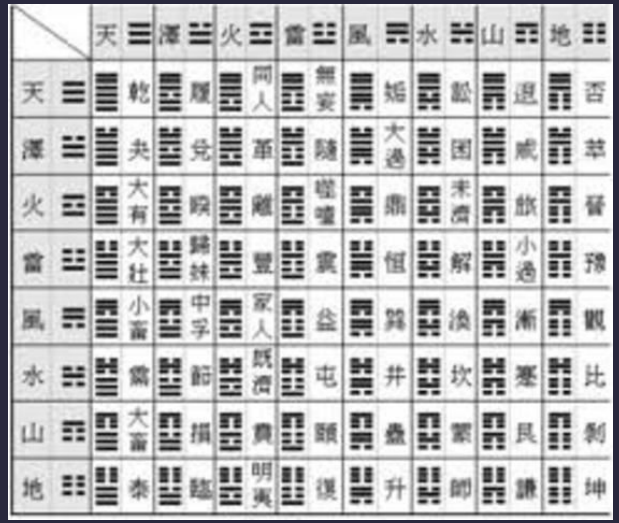
Abacus



The abacus appears, which was the first instrument used by mankind to perform calculus operations.

2,500 B.C.

Binary System



The book of mutations (I Ching) appears and in it we find the first formulation of the binary system.

2,000 B.C.

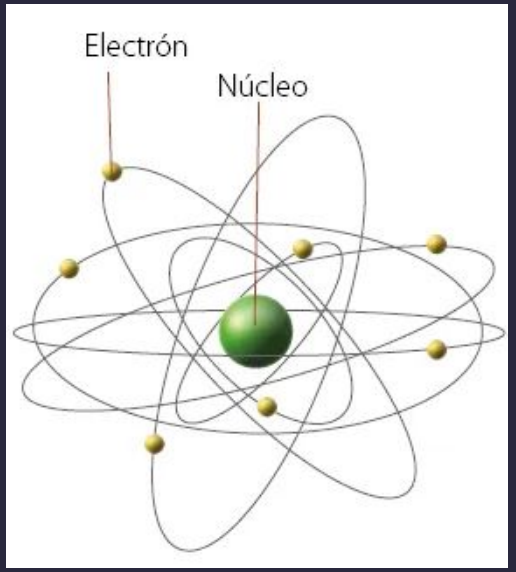
Alphabet

(Phenetius)

It was one of the most widely used writing systems as it spread throughout the Mediterranean world. It was assimilated by many other cultures adapting it to their respective languages.

1,500 B.C.

Electron

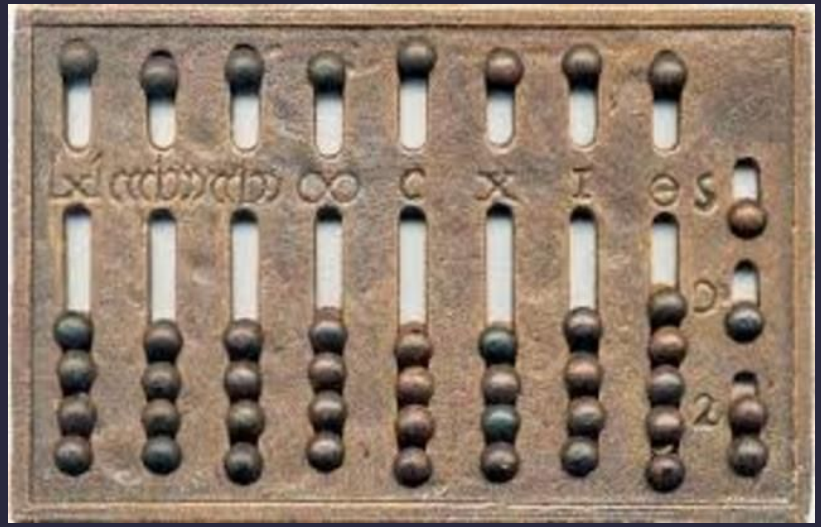


- Thales of Miletus describes static electricity and this is where the term electron comes from.

600 B.C.

Calculations

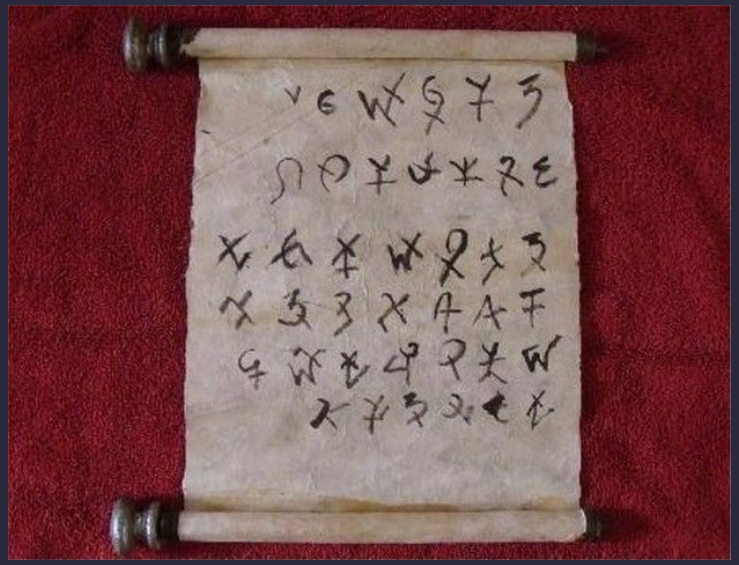
(Roman abacus)



The Romans use abacuses and for the balls they use stones which they call calculus.

500 B.C.

Scroll



In the city of Pergamon, parchment began to be used for writing.

170 B.C.

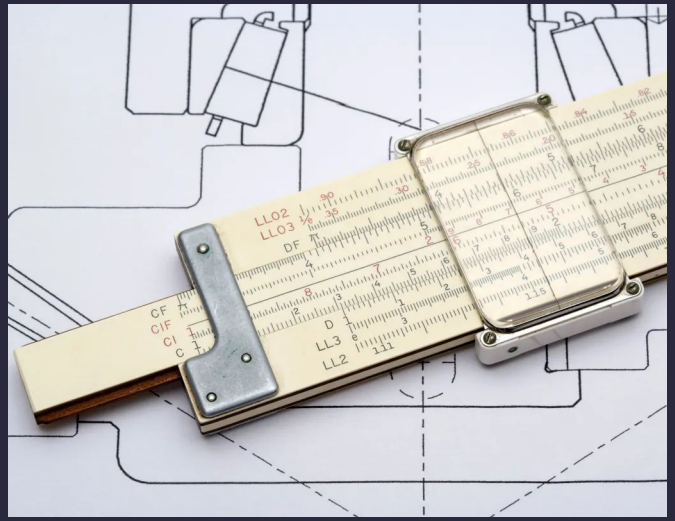
Paper

It is said that Ts'ai Lun first presented samples of paper to Emperor Han Ho Ti of China's Han dynasty.

105 B.C.

Rule of Calculation

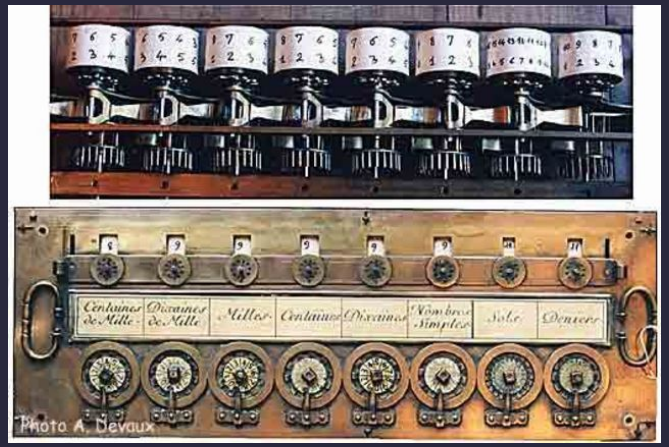
(William Oughtred)



- William Oughtred created a slide rule, which has been used by engineers until very recently.

1633

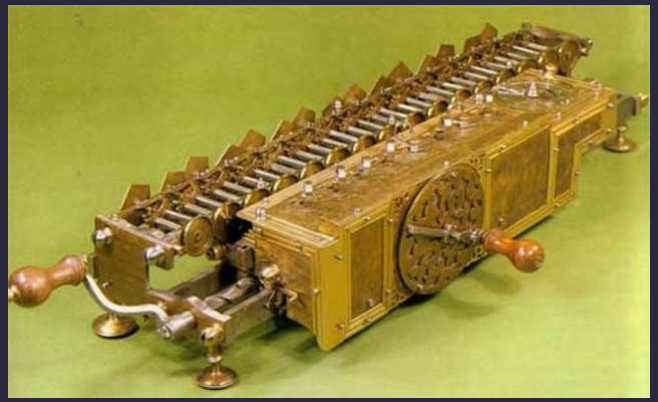
Mechanical calculator for addition and subtraction



Blaise Pascal built the first mechanical calculator that performed addition and subtraction.

1642

Multiplication calculator



Gottfried Leibnitz creates a machine capable of performing multiplications

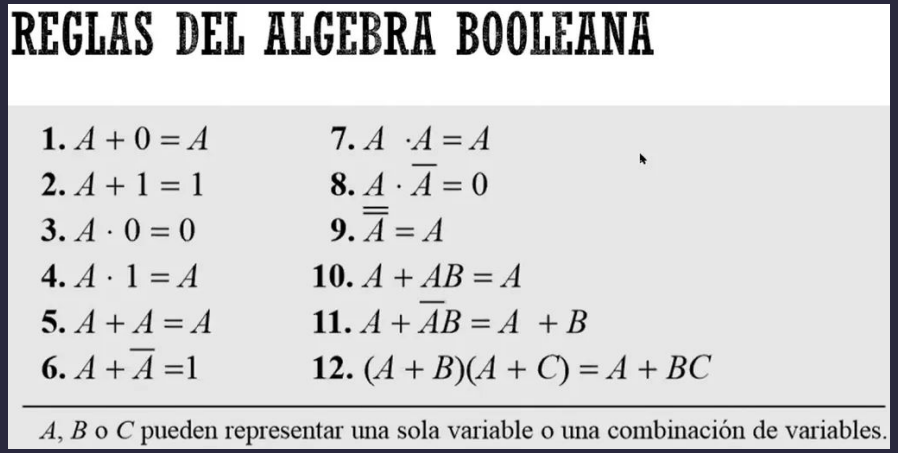
1671

Design of a machine capable of executing computer programs.

Charles Babbage designs but does not build a processing machine capable of executing computer programs.

1833

Boolean Algebra



REGLAS DEL ALGEBRA BOOLEANA

1. $A + 0 = A$	**7.** $A \cdot A = A$
2. $A + 1 = 1$	**8.** $A \cdot \overline{A} = 0$
3. $A \cdot 0 = 0$	**9.** $\overline{\overline{A}} = A$
4. $A \cdot 1 = A$	**10.** $A + AB = A$
5. $A + A = A$	**11.** $A + \overline{A}B = A + B$
6. $A + \overline{A} = 1$	**12.** $(A + B)(A + C) = A + BC$

A, B o C pueden representar una sola variable o una combinación de variables.

Boolean algebra is born by George Boole. The study of symbolic logic begins.

1847

Mechanical drilli machine

Hermann Hollerith used a mechanical punch as a way to represent letters and digits on paper cards. Later, in 1924, he would be the founder of IBM.

1890

First radio transmission

The first radio transmission was made on Christmas Eve 1906.

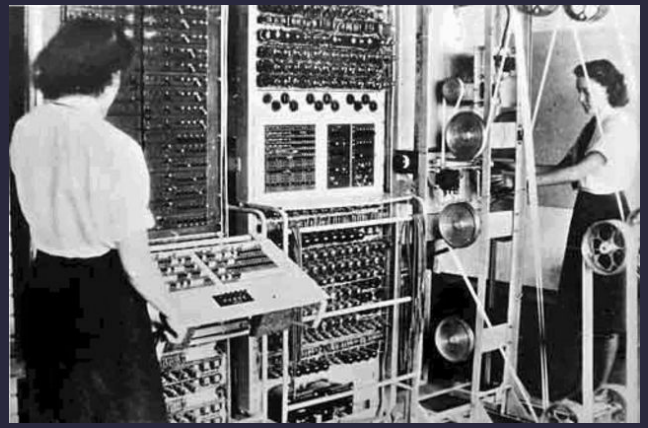
1906

First programmable electromagnetic computer

Konrad Suze presented the first programmable electromagnetic computer with a perforated tape. It had 2000 electromagnets, 64 words of 22 bits of memory, 1000 kilograms of weight and a power consumption of 4000 watts.

1941

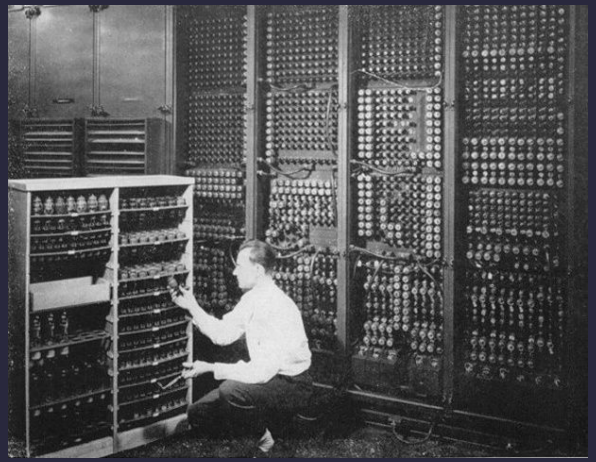
Colossus



Alan Turing builds the Colossus, a computer that allows deciphering in a few seconds the secret messages of the Nazis in World War II (Enigma Machine).

1944

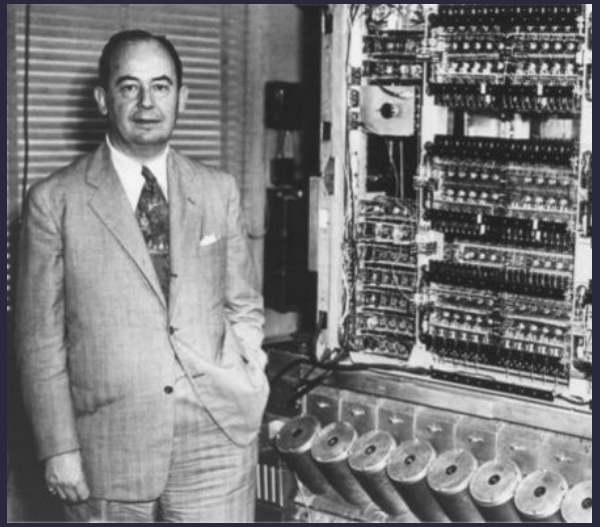
ENIAC



John Presper-Eckert and John W. Mauchly developed the ENIAC (Electronic Numerical Integrator And Calculator). It is considered to be the first computer, since it worked completely electronically.

1947

Arquitectura Von Neumman EDVAC



John Von Neumann created EDVAC. He had the idea of putting the instructions in the same memory as the data. He wrote them in binary code. This is known as the Von Neumann Architecture and is used today.

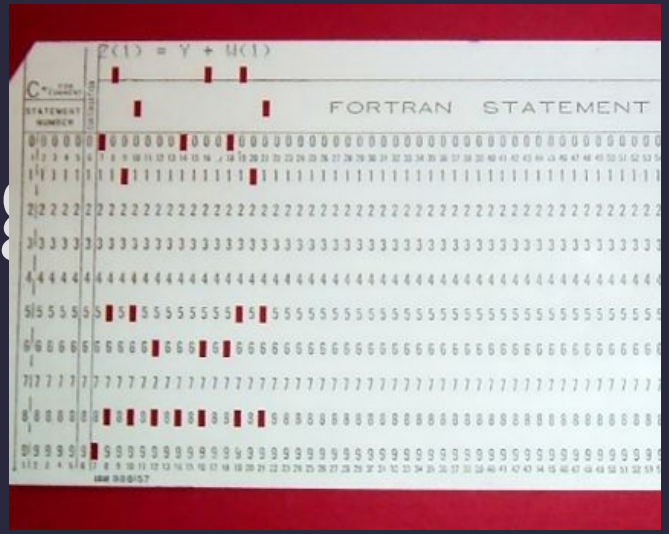
1949

UNIVAC 1 is born

The first commercial computer was born. It is the UNIVAC 1, which was developed by the Howard Aiken Sperry-Rand Corporation and purchased by the U.S. Census Bureau.

1951

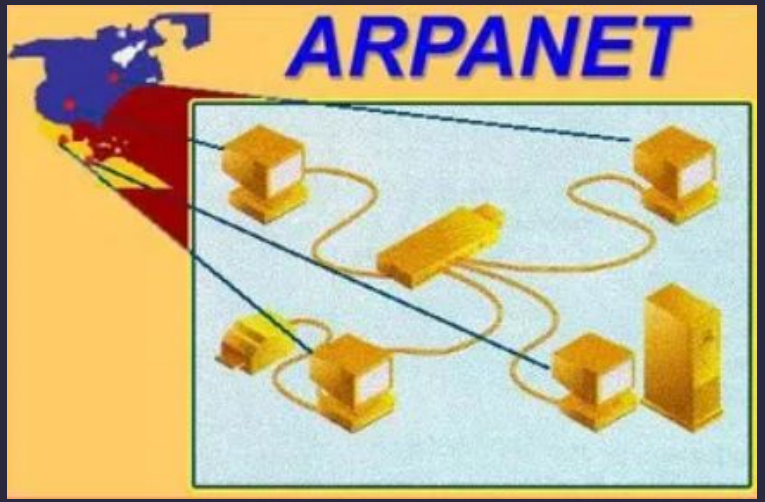
First programming language created



John Backus and his colleagues at IBM created the first Fortran, the first programming language.

1957

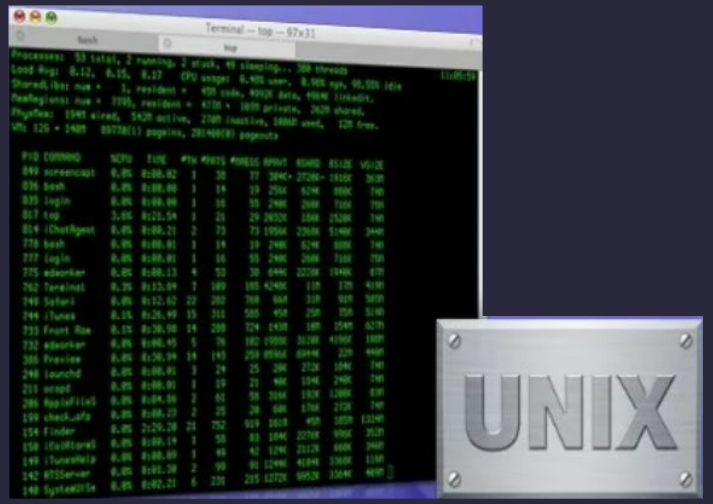
ARPA appears



ARPA is an agency of the U.S. Department of Defense. There J.C.R. Licklider successfully defends his ideas about a global computer network (Beginning of the Internet

1969

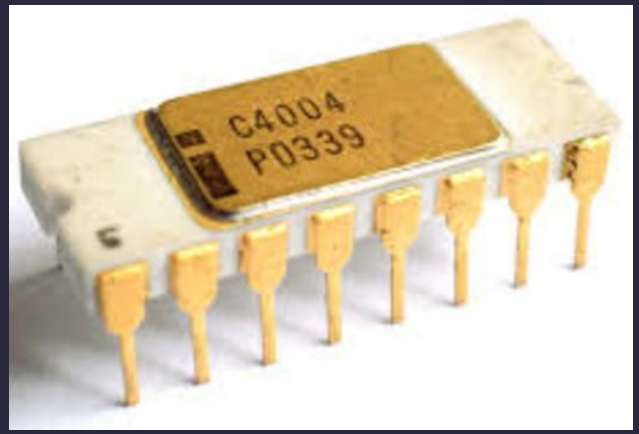
UNIX



- Creation of the UNIX operating system

1969

First silicon microprocessor



Intel manufactures and brings to market the first silicon microprocessor. It is the Intel 4004. It was created to perform Babbage's basic operations according to the Von Neumann architecture. It is the first CPU

1971

Apple's first computer

It is the beginning of what today is Apple. Steve Jobs and Steven Wozniak wanted to manufacture and market a computer for mass use.

1975

First Desktop Computer

- Commodore develops and markets the world's best-selling desktop computer

1978

First "Personal Computer" (PC) is born

The first of the “Personal Computer” is born. The first of the IBM PC compatible hardware platform. The IBM 5150. In addition, the TCP/IP protocol and the word Internet are defined.

1981

First Server and first DynaTAC 8000X cell phone created

The 1st site name server is created. Motorola introduces the first cell phone. The DynaTAC 8000X

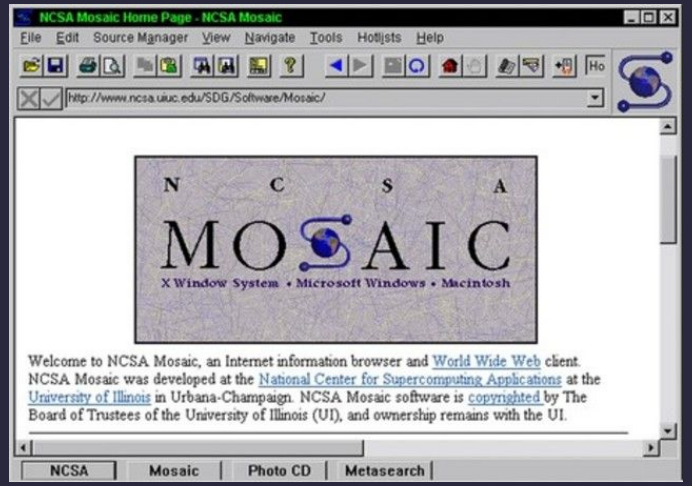
1983

A World Wide Web prototype is created

- 100,000 computers connected to the Internet and the World Wide Web is prototyped

1989

The Mosaic Internet browser appears



The Internet browser Mosaic, the first Internet search engine, appears, called Wandex. The IBM Simon becomes the first cell phone to integrate PDA functions.

1993

Internet search engines appear

In 1994 the Internet search engines WebCrawler, Lycos and Excite appeared. And in 1995 Internet AltaVista and Yahoo

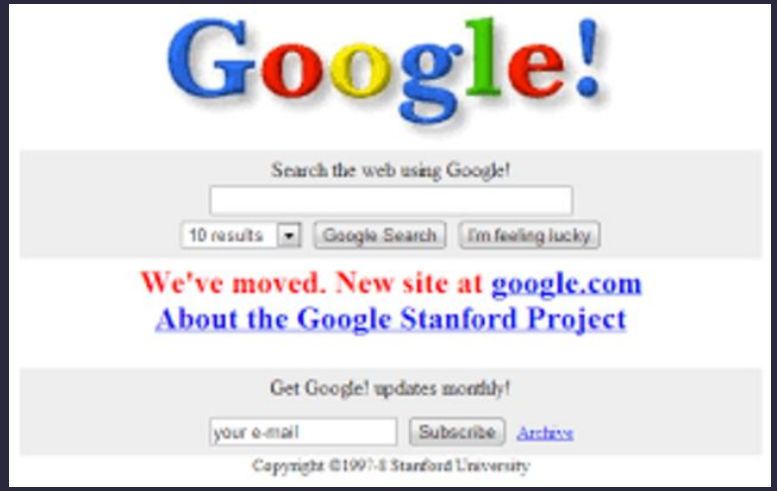
1994 y 1995

10,000,000 computers connected to the Internet

10,000,000 computers connected to the Internet. The Nokia 9000 Communicator becomes the smartphone and integrates an Intel 386 CPU.

1996

Google



- Google makes its appearance

1997

First Digital book

- The 1st digital book appears

1998

First social network LinkedIn

LinkedIn is launched as the first professional social network in history. This year also saw the appearance of MySpace and Hi

2003

Facebook and other social networks appear

Facebook, Flickr, Vimeo, Tagged and Google's first social network, Orkut, appear on the scene

2004

Youtube is born

- YouTube, DailyMotion and Reddit are created

2005

Iphone appears

- YouTube, DailyMotion and Reddit are created

2007

Whatsapp appears

- WhatsApp and Microsoft Bin Internet browser created

2009

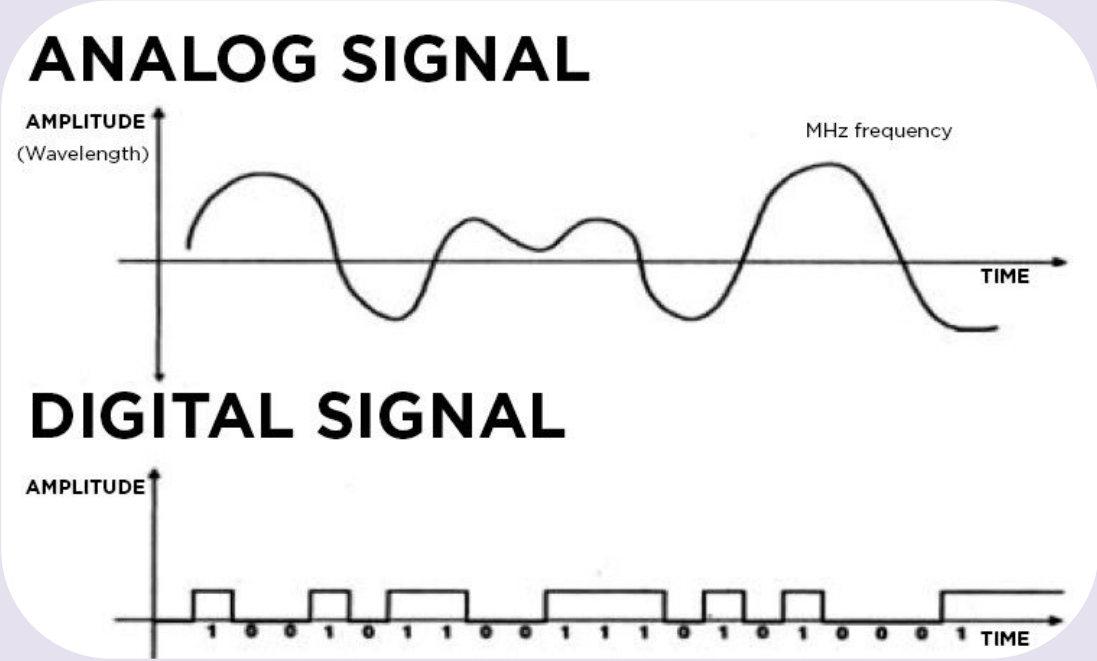
Timeline of Computer History

- https://www.computerhistory.org/timeline/

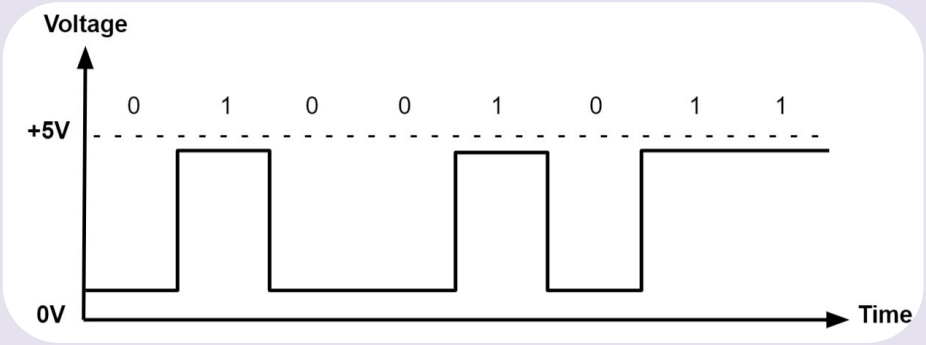
02
Principles

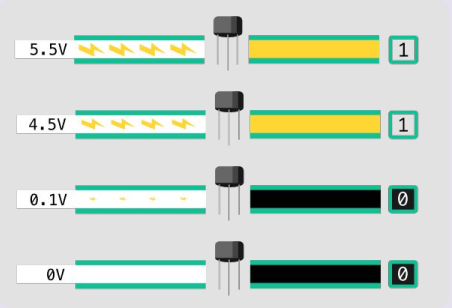
basics

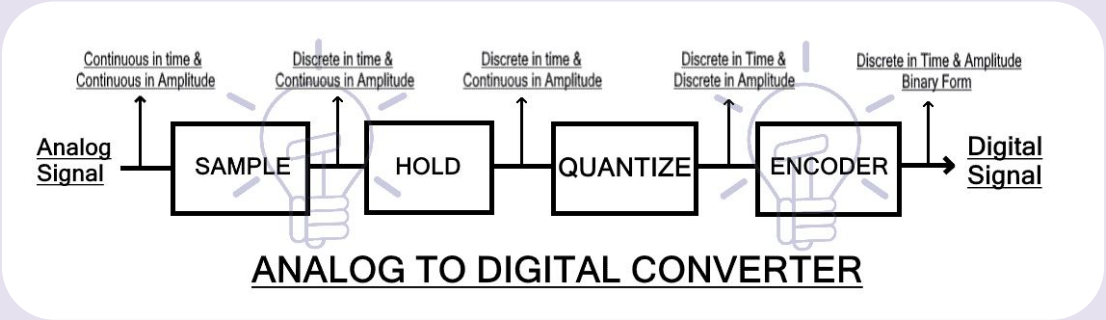
Analog vs Digital



Analog vs Digital







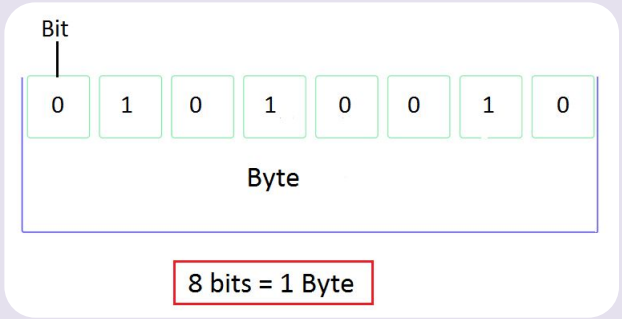
Bit vs Byte

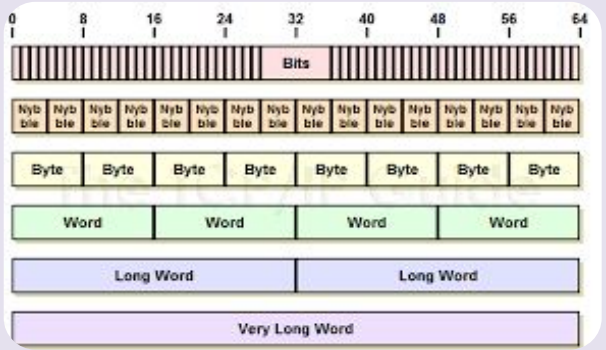
- 64 or 32 bits
- 1024 megabytes / 1024 megabits
- 1024 megabytes / 512 gigabytes

Bit vs Byte

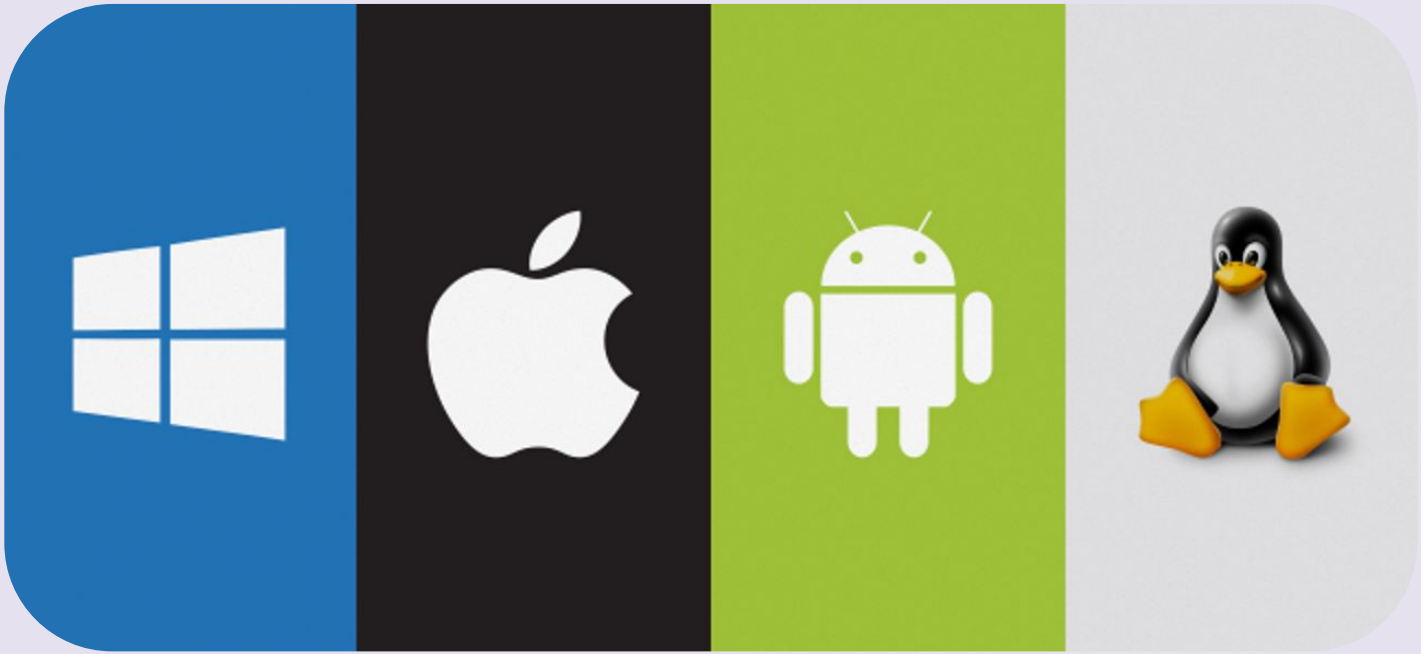
- The **bit (b)** is the **basic unit** in which information is measured in the computer environment.
- The **byte (B)** is a unit of measurement that is composed of **8 bits**, it is an **octadecimal base unit**.

In contrast to what happens with the other units that we usually handle, such as the meter, the gram, the liter whose base is decimal.





Operating Systems



Operating Systems

Operating Systems

There are 3 main operating systems for computers:

- Windows
- Mac
- Linux

Android and IOS are also based on unix. You can say that phone OS are variations of computer OS.

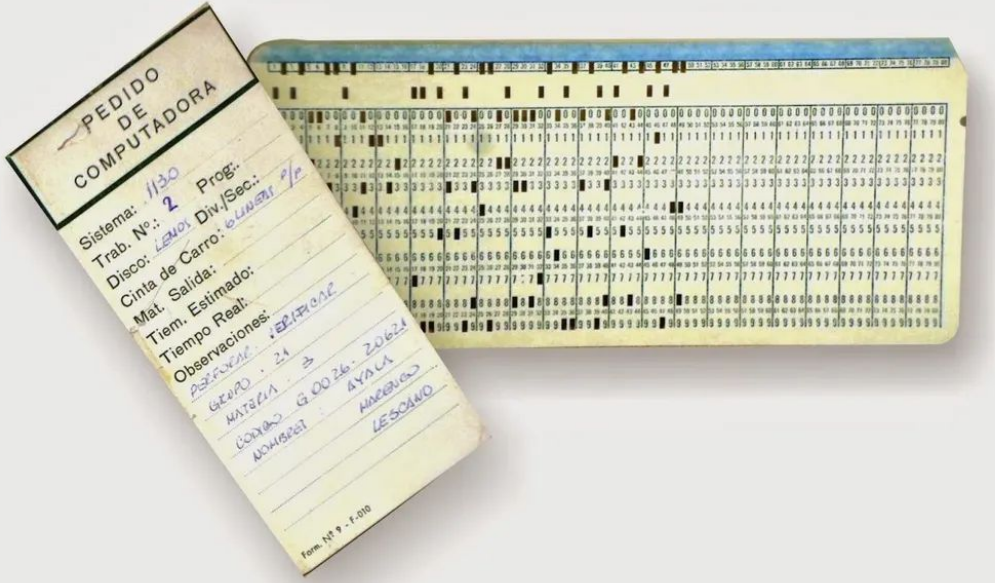
Curiosities

Are there viruses for MAC?

Does the MAC have antivirus?

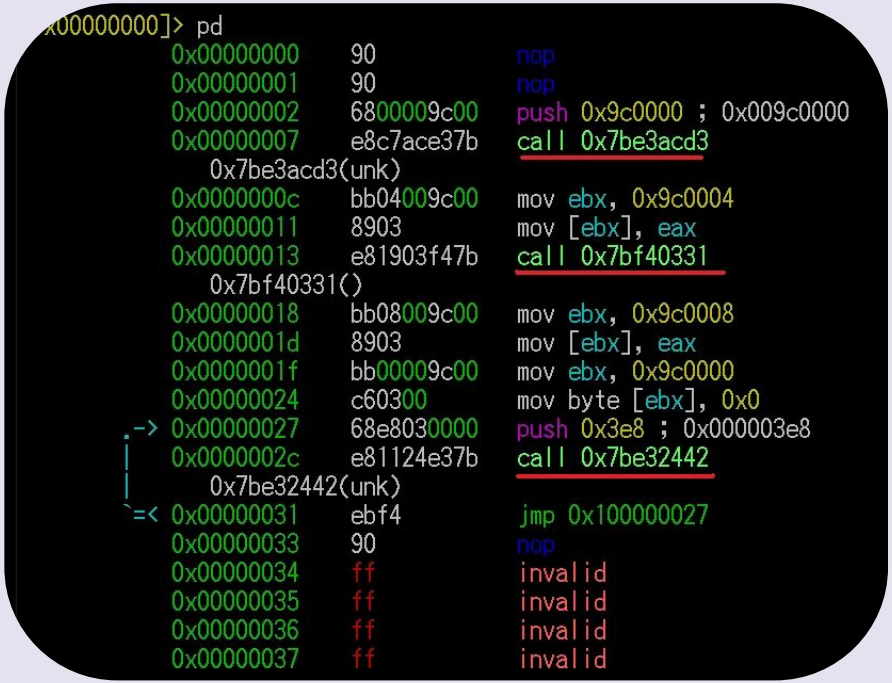
Are there viruses for an Iphone?

Older programs

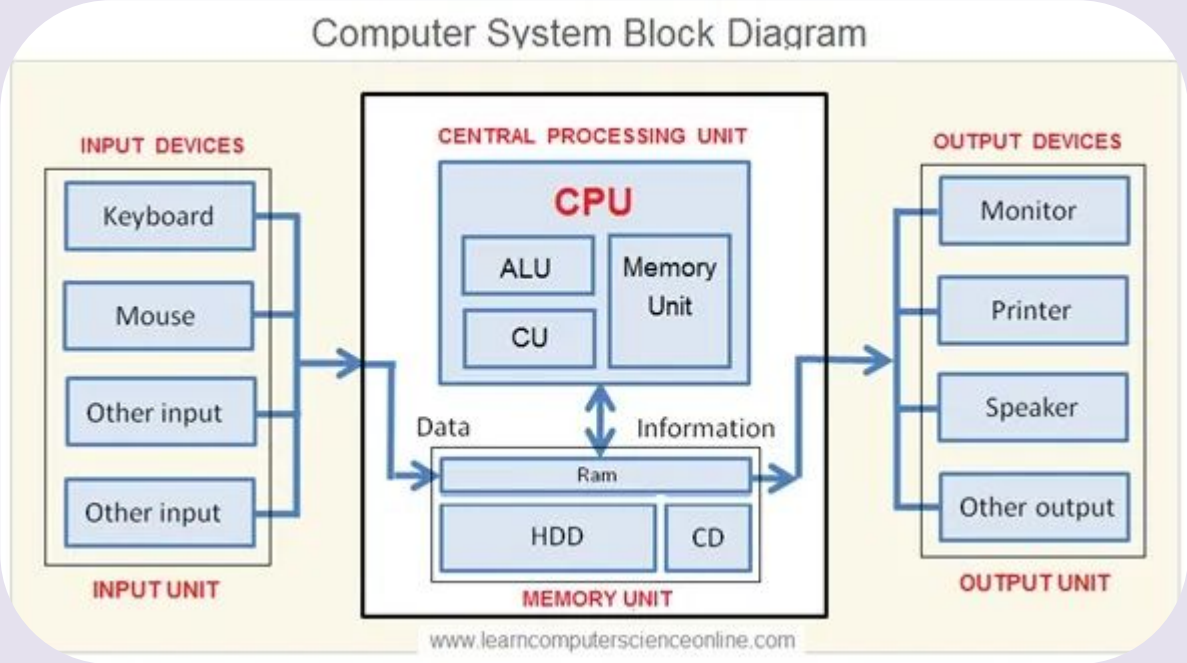


Old programs

Assembly language is the programming language used to write **low-level computer programs**, and is the **most direct representation of the machine code** specific to each **computer architecture** readable by a programmer.



Older programs



Programming Paradigms

A programming paradigm is a **way** or **style of programming software**. There are different ways of **designing a** programming **language** and various ways of working to obtain the results that programmers need. It is a set of **systematic methods applicable** at all levels of program design to solve computational problems.

Python or JavaScript, which are **multi-paradigms**

Programming Paradigms

It allows **separating the different components** of a program, thus simplifying its creation, debugging and subsequent improvements. Object-oriented programming **reduces errors** and **promotes code reuse**. It is a special way of programming, which is somewhat close to how we would express things in real life.

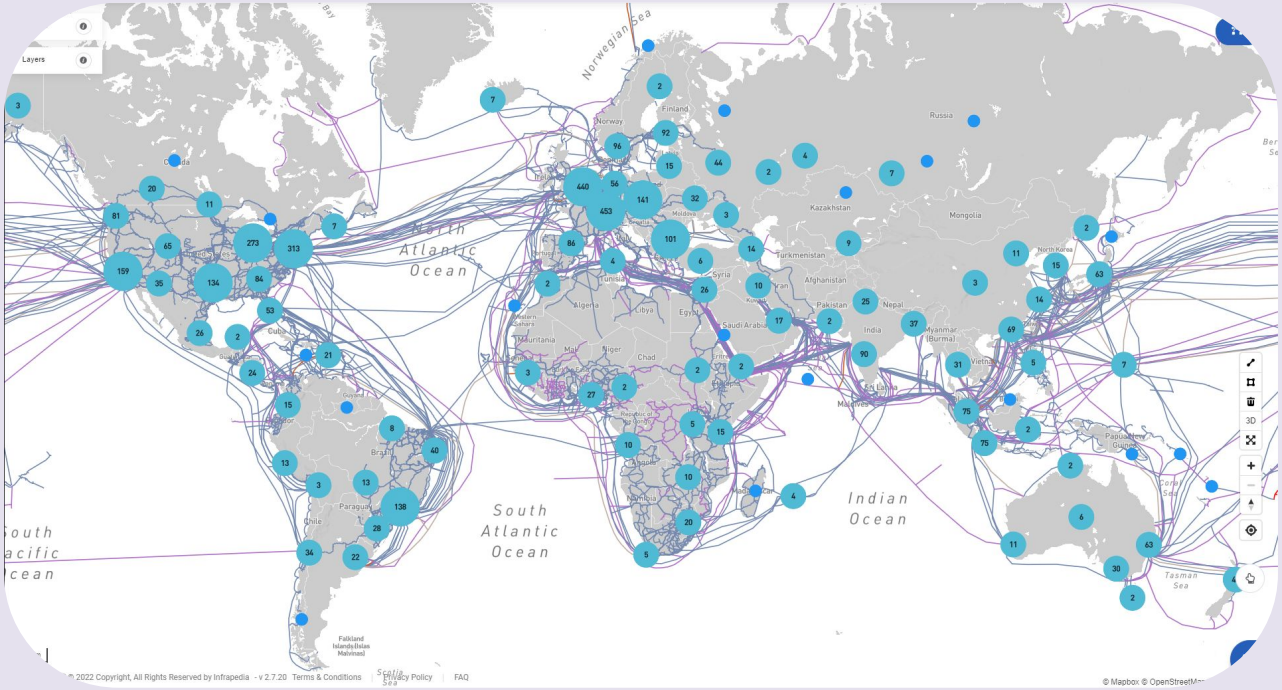
Examples of object-oriented programming languages would be Java, Python or C#.

Internet

Internet

Global, **decentralized** computer network, formed by the **direct connection between computers** by means of a special communication protocol. - RAE

Internet view



https://www.infrapedia.com/

Origin of the Internet

There are two versions:

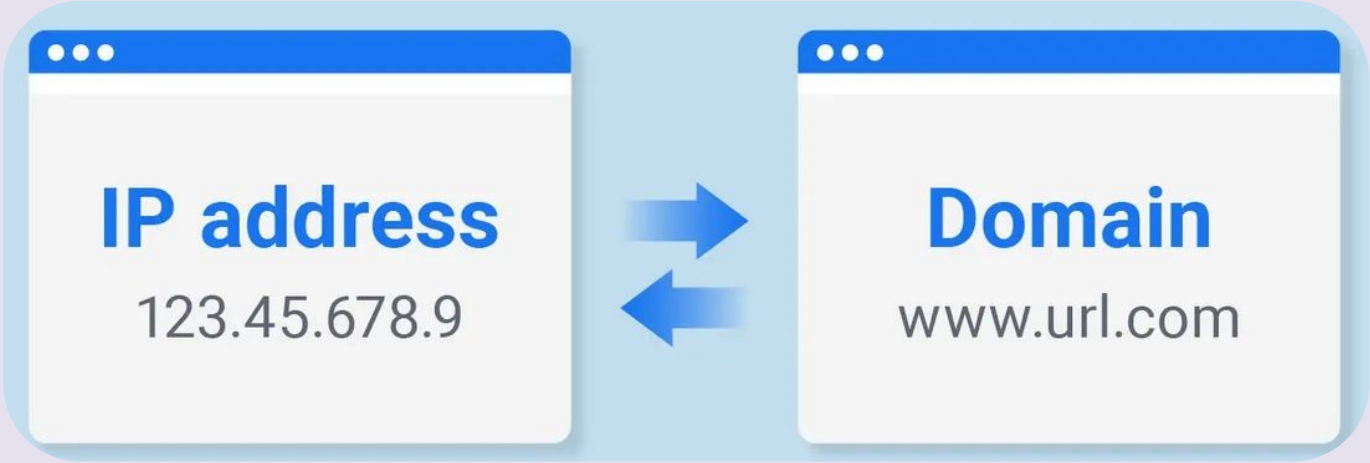
1. The most popular one points to its creation as a response from the US Department of Defense, who in the 1960s were looking for a way in which all the computers being used within the organization would work in a network, even if one of the computers suffered a failure due to an enemy attack.
2. The Information Processing Technologies Office (IPTO), a man named Robert Taylor (who was just becoming the director of the office) came up with the idea of creating a system that would allow researchers to share resources through the use of links.

Internet

In 1969 the U.S. Department of Defense began to look for communication alternatives in the event of an atomic war. Three years later, the first demonstration was carried out between 4 universities (3 in California and 1 in Utah) by establishing a connection known as ARPANET (Advanced Research Projects Agency Network).

IP - Internet Protocol

IP - Internet Protocol



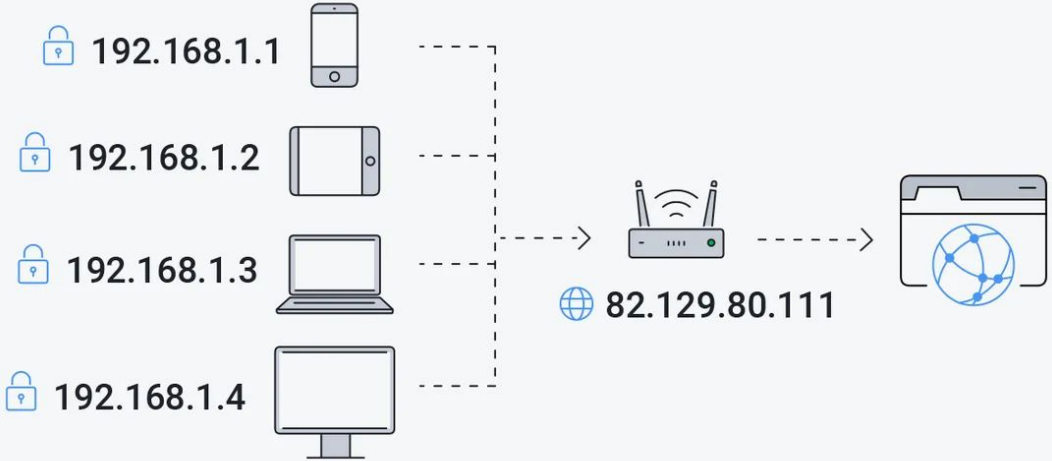

```
C:\Users\ANDREI>ping google.com

Pinging google.com [142.250.65.110] with 32 bytes of data:
Reply from 142.250.65.110: bytes=32 time=11ms TTL=118
```

142.250.65.110 = Google

IP - Internet Protocol

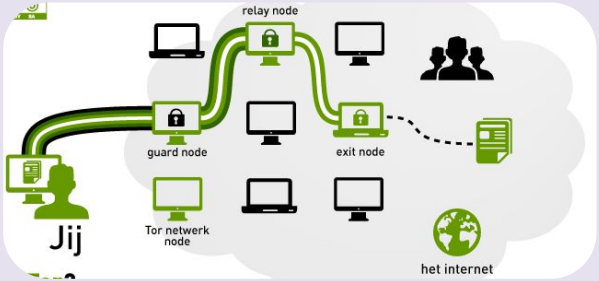
IP - Internet Protocol

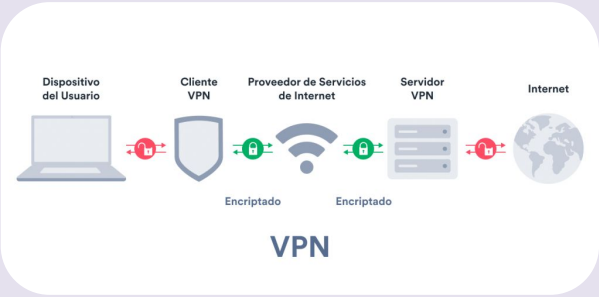


Public IP vs Private IP

Public IP	*Private IP*
Used over the Public Network ex. WAN	Used with in the private network ex. LAN
Recognized over the Internet	Not recognized over the Internet
Public IP are unique over the Globe.	Private IP are unique with in the network or LAN.
Public IP are paid.	Private IP are free of cost.
Assigned by Network Administrator.	Assigned by Internet Service Provider /IANA
Class A-- 10.0.0.0 to 10.255.255.255	RANGE-- Class A-- 1.0.0.0 to 9.255.255.255 11.0.0.0 to 126.255.255.255
Class B-- 172.16.0.0 to 172.31.255.255	Class B-- 128.0.0.0 to 172.15.255.255 172.32.0.0 to 191.255.255.255
Class C-- 192.168.0.0 to 192.168.255.255	Class C-- 192.0.0.0 to 192.167.255.355 192.169.0.0 to 223.255.255.255

Curiosity


relay node
guard node
exit node
Jij
Tor netwerk node
het internet

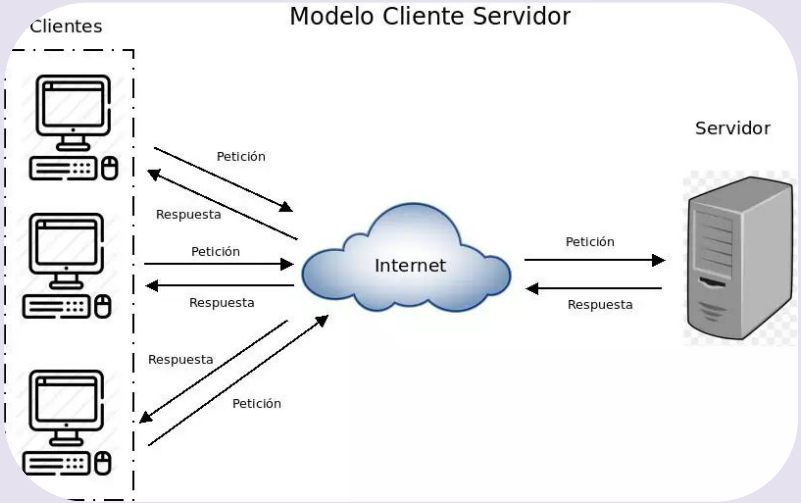

Dispositivo del Usuario
Cliente VPN
Proveedor de Servicios de Internet
Servidor VPN
Internet
Encriptado
Encriptado
VPN

Client Server

Client Server

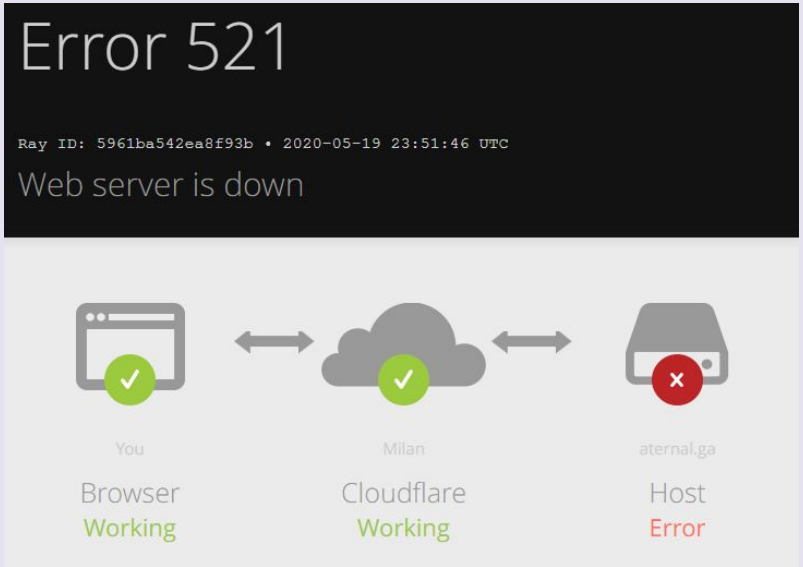
The client-server model is a distributed **application structure** that **divides tasks or workloads** between the **providers of a resource** or service, called servers, and the **service requesters**, called clients.

That is, the client **makes** service **requests** to the server, which is responsible for **fulfilling the requests**.

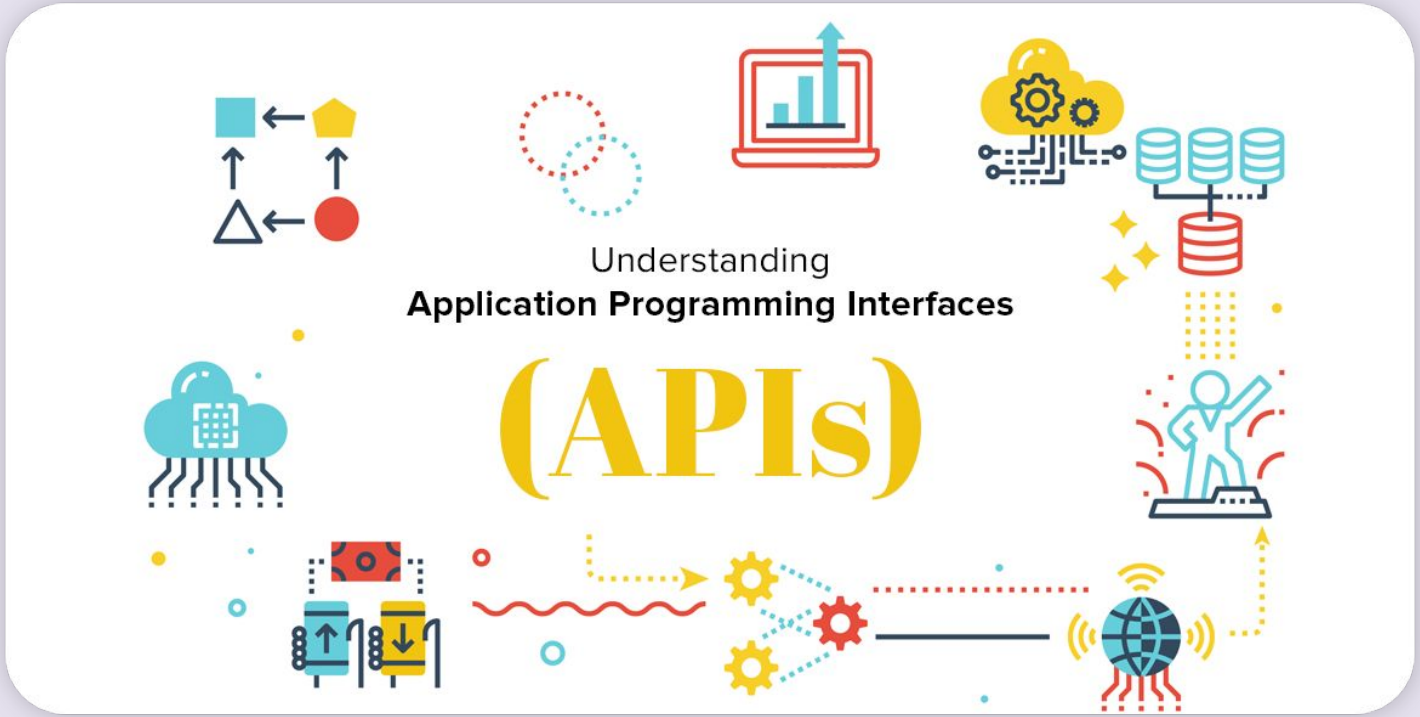


Curiosities

- What happens if the server goes down?
- How do I fix it?
- Is there anything else?



API - Application Program Interface



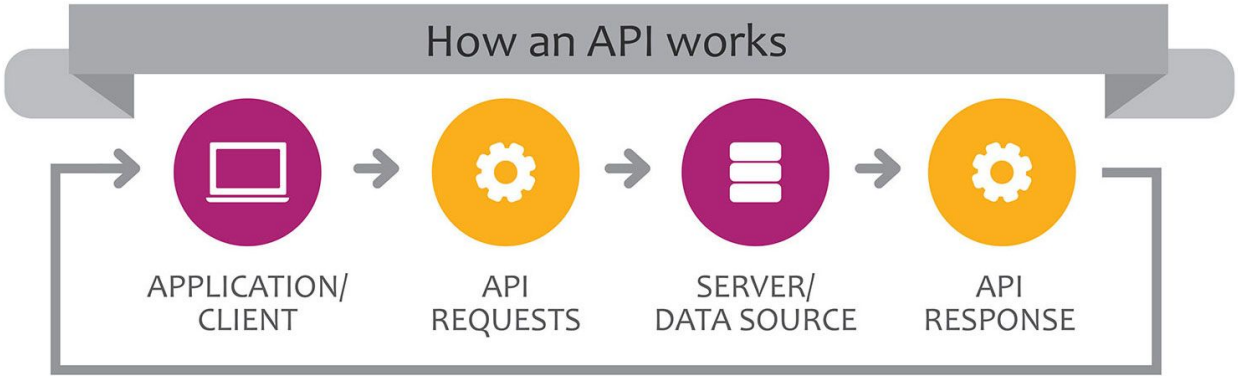
API - Application Program Interface

The API

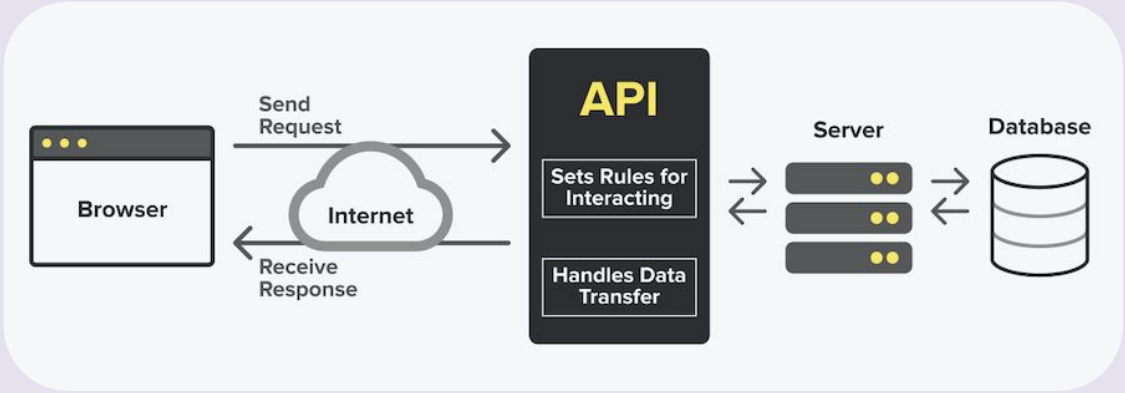
Application Programming Interface

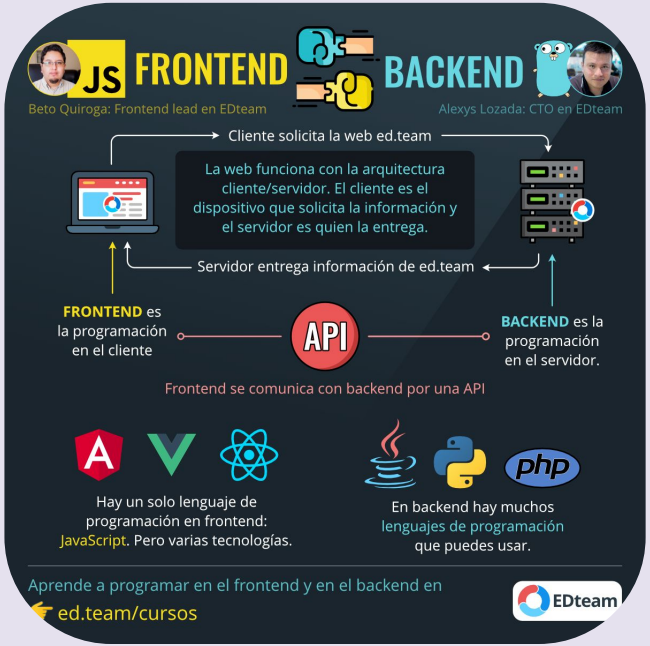
API Definition

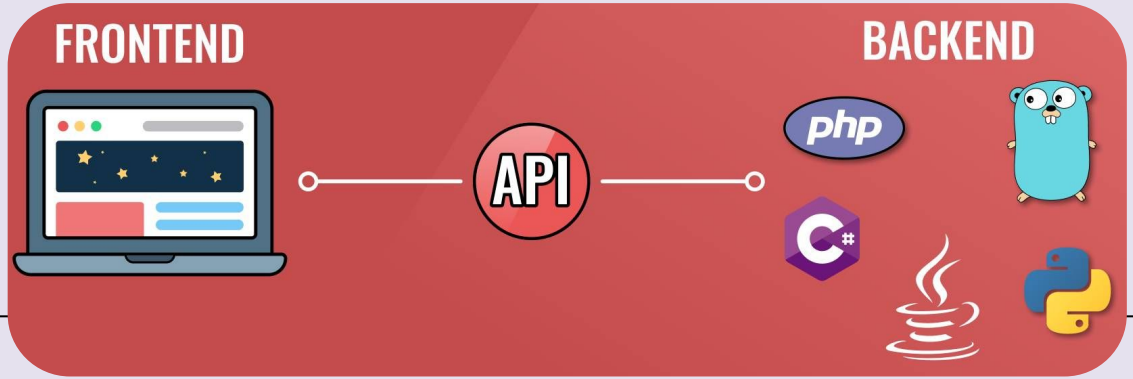
An application program interface that provides a developer with programmatic access to a proprietary software application. A software intermediary that makes it possible for application programs to interact with each other and share data.



API - Application Program Interface







Linux

Linux

It is a Unix-like **operating system** (or family of operating systems) composed of **free and open source software**. GNU/Linux arises from the contributions of several software projects, among which **GNU** (started by Richard Stallman in 1983) and the "Linux" **kernel** (started by Linus Torvalds in 1991) stand out.

Its capacity for **customization** and power to be truly **customizable** for unique software and application requirements is unparalleled. Its benefits include **stability, super-efficient management of memory resources, processors and storage**; its different types of **distributions** for each scenario make it a must-have for hosting the most demanding and peculiar applications or software platforms.

Linux VS Windows Server

	LINUX SERVER	WINDOWS SERVER
ARCHITECTURE	centered around the Linux kernel	based on the Windows NT architecture
COST	free, open-source software	owned by Microsoft, includes a licensing fee per user
SECURITY	highly secure against malware and cyber threats	more prone to hacking attempts and cyber threats
SUPPORT	large community supports that can answer commonly asked questions	community and long-term customer support, along with great documentation
MODE OF OPERATION	command line	graphical user interface
USER EXPERIENCE	requires an relatively experienced Linux administrator	more beginner-friendly
DATABASE SUPPORT	MySQL, PostgreSQL	Microsoft SQL, Microsoft Access
SCRIPT SUPPORT	Python, PHP, Perl, and other Unix languages	ASP and ASP.NET

Computer components

Computer components

CPU: Main processing unit
RAM: Random Access Memory
Hard disk
Power supply: Power supply
Motherboard: Motherboard
Cabinet
I.e.
CPU: Does all the processing
RAM: Keeps programs open
Hard Disk: Stores files
Power supply: Provides the electricity
Motherboard: Connects all components
Cabinet: Contains all components

Types of use

- Ophthalmic

Very basic use such as for offices, doctors' offices, etc. Only requires opening a few web pages and one or two programs.

- Students (Elementary - High School

Basic use such as running office, opening various web pages, performing tasks and opening various programs.

- Work

Moderate use such as opening multiple programs, saving many documents and using multiple platforms

- Gaming

Intensive use such as running video games that require general processing and graphics

- Compute intensive

Intensive use for performing Deep Learning, complex mathematical operations or requiring a lot of processing or video processing, similar to gaming

Types of use

Processors

- Intel
  - i3
  - i5
  - i7
  - I9
- AMD
  - Ryzen 3
  - Ryzen 5
  - Ryzen 7
  - Ryzen 9

RAM

- 2GB
- 4GB
- 8GB
- 16GB
- 32GB
- 64GB
- 128GB
- 256GB
- 512GB
- 1024GB - 1TB
- …

Storage

- 32GB
- 64GB
- 128GB
- 256GB
- 512GB
- 1024GB - 1TB
- 2TB
- …

Recommendations (2023)

- Ophthalmic

Intel i3 - Ryzen 3, 4GB a 8GB de RAM, 128GB

- Students (Elementary - High School)

Intel i3 a i5 - Ryzen 3 a Ryzen 5, 8GB a 16GB de RAM, 256GB a 512GB

- Work

Intel i5 a i7 - Ryzen 5 a Ryzen 7, 8GB a 32GB de RAM, 512GB a 1TB

- Videogames

Intel i5 a i9 - Ryzen 5 a Ryzen 9, 16GB a 64GB de RAM, 512GB a 2TB, Tarjeta de video

- Compute intensive

Intel i7 a i9 - Ryzen 7 a Ryzen 9, 16GB+ de RAM, 1TB+, Tarjeta de video (Opcional)

Curiosities

- Intel - Current: 13 Generations | Minimum purchase gen 10th
- AMD - Current: Serie 7000 | Minimum purchase series 5

Examples

- i7 13700K → iX = #Processor | XX = Generation| XXX - Processor grade
- R7 7800X → RX = #Processor | XX = Generation| XXX - Processor grade

NOTE:
Always the processor grade are 3 digits and ends with one or two letters.

03

Software Development

What is it?

What is it?

Software development refers to a set of IT activities dedicated to the **process of creating, designing, deploying and supporting software.**

There are three basic types:

- **System software** to provide basic functions such as operating systems, disk management, services, hardware management and other operational needs.
- **Programming software** to provide programmers with tools such as text editors, compilers, linkers, debuggers and other tools to create code.
- **Application software (applications or apps)** to help users perform tasks. Office productivity suites, data management software, media players and security programs are some examples. Applications also refers to web and mobile applications

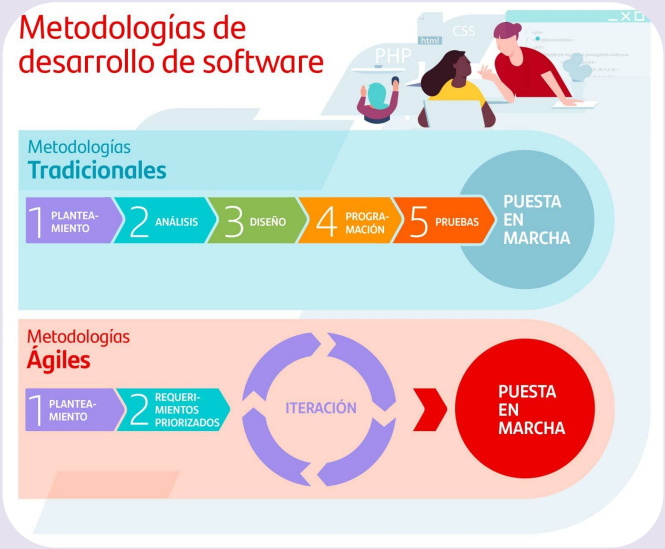
What is it?

- **Programmers, or coders**, write source code to program computers to perform specific tasks such as merging databases, processing online orders, routing communications, performing searches, or displaying text and graphics. Programmers typically **interpret instructions from software developers and engineers.**
- **Software engineers** apply **engineering** principles **to create software and systems to solve problems.** They use modeling language and other tools to devise solutions that can often be applied to problems in a general way, rather than simply solving only a specific instance or customer. Software engineering solutions adhere to the **scientific method** and must work in the real world. **Their responsibility has increased** as **products** have become increasingly **intelligent** with the addition of microprocessors, sensors and software.
- **Software developers** have a less formal role than engineers and may be closely involved in specific areas of the project, including writing code. At the same time, they **drive the overall software development lifecycle** by working in functional teams to **transform requirements into features, managing development teams and processes, and performing software testing and maintenance.**

Why does it arise?

IBM Vice President and blogger Dibbe Edwards notes, “Software has emerged as a **key differentiator in many products**, from automobiles to washing machines to thermostats, with a growing Internet of Things connecting them.”

Companies that use software development have **cleaner, faster and more effective processes** than companies that use entirely manual processes, since **response times, downtime and human error are eliminated.**



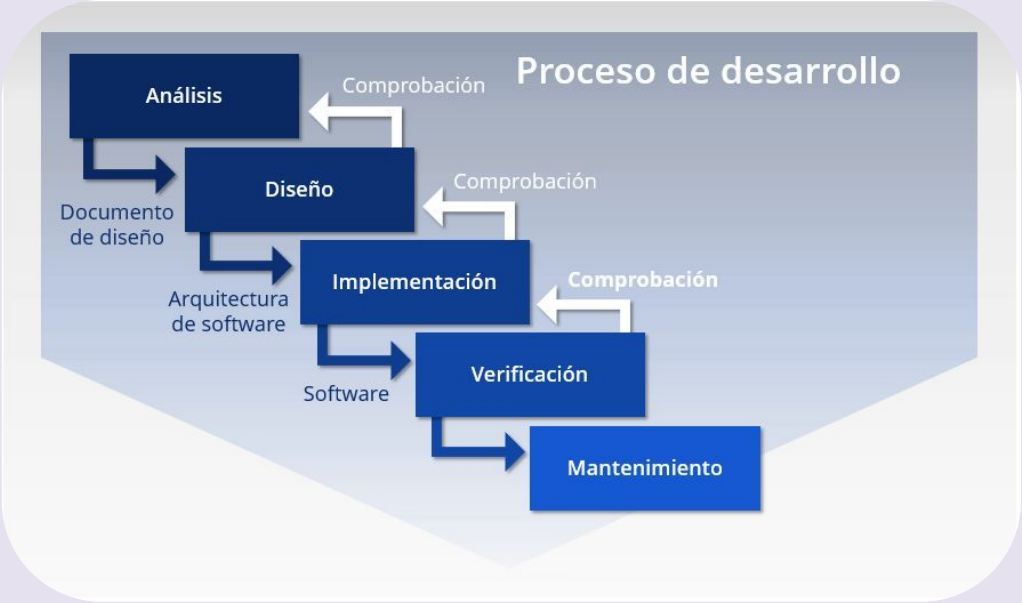
Steps in the software development process

1. Select a methodology
2. Gather requirements
3. Choose or create an architecture
4. Develop a design
5. Create a model
6. Create code
7. Perform testing
8. Manage configuration and defects
9. Deploy
10. Migrate data
11. Manage and measure the project

Summary of steps:

1. Requirements analysis and specification
2. Design and development
3. Testing
4. Deployment
5. Maintenance and support

Software development methodologies



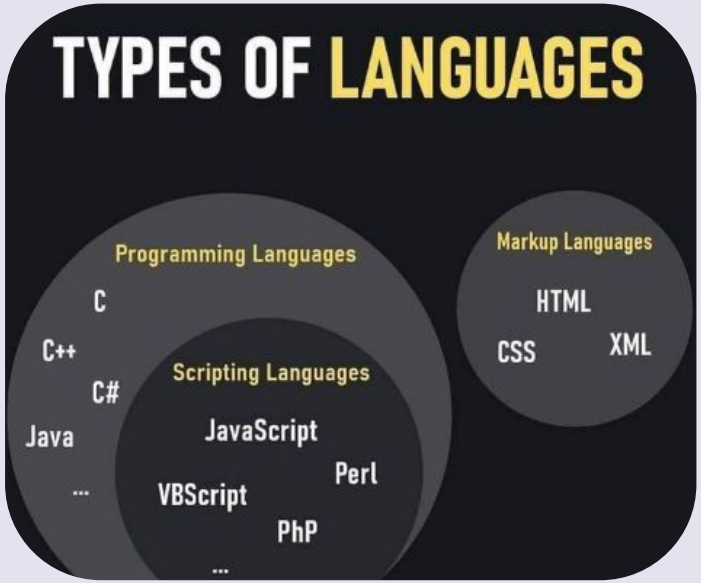
04

Applied technologies

Programming language

A programming language is a formal (or artificial, i.e., a **language with well-defined grammatical rules**) language that provides a person, in this case the programmer, with the **ability to write (or program)** a **series of instructions or sequences of commands in the form of algorithms** in order to control the**physical or logical behavior of a computer system**, so that various kinds of data can be obtained or certain tasks can be executed. This whole set of commands written in a programming language is called a computer program.

Programming language



Programming language

Programming language

Types of typing

A typed and untyped programming language

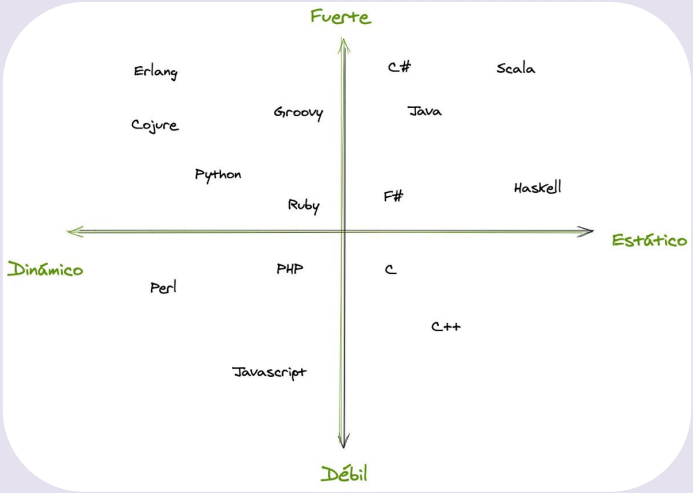
- The **typed languages** are those that **necessarily** have to **define the type of data or variable.** C#, C, C++ and Java are some examples.
- **Non-typed languages** are those that **do not need any definition** and take the type of the value assigned to them. JavaScript, Python and PHP are some examples

Typed = Static | Untyped = Dynamic

Typed = Strong | Untyped = Weak

Types of typing

- **Weak typing** allows you to work in **less time** and to check the results of the program in real time. For the **ideation phase** of the project, this option is ideal. It adapts very well to programs of smaller capacity.
- **Strong typing** allows you to perform operations with different types of variables. The direct consequence is that you **will not make as many mistakes** as with the language of the previous point. However, you need to **write more code**. This language is ideal for **larger projects** with a **larger number of specifications.**



Paradigms

A paradigm is like a map in which there are many paths to reach the same end. There are languages that adopt a specific paradigm and there are others that adopt more than one paradigm such as JavaScript, Python and PHP.

OOP - Object Oriented Programming

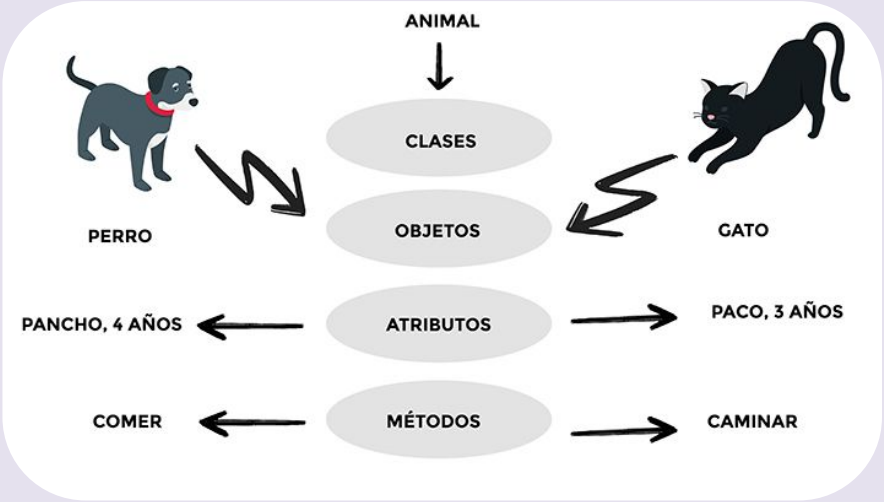
It allows **separating the different components** of a program, thus simplifying its creation, debugging and subsequent improvements. Object-oriented programming **reduces errors** and promotes **code reuse**. It is a special way of programming, which is somewhat close to how we would express things in real life.

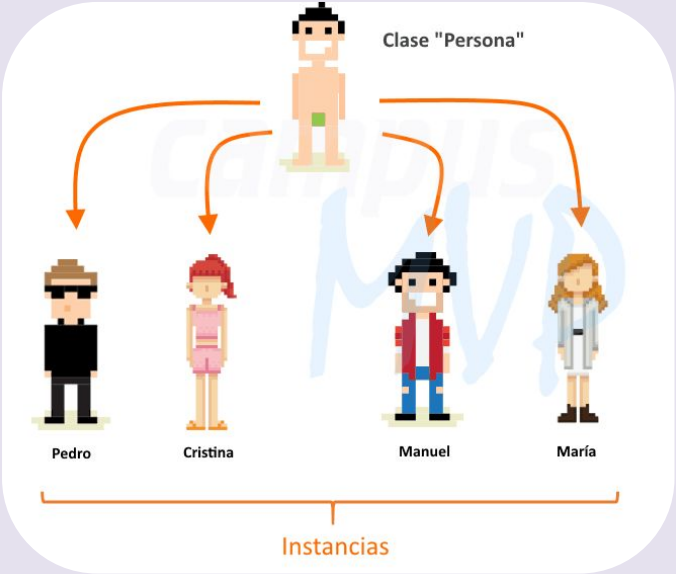
Examples of object-oriented programming languages would be Java, Python or C#.

OOP - Object Oriented Programming

OOP	Programación Estructurada
Más fácil de mantener	Difícil de mantener
No te repitas (DRY)	Código repetido en muchos lugares
Pequeños trozos de código reutilizados en muchos lugares	Una gran cantidad de código en pocos lugares
Enfoque por objetos	Enfoque de código de bloques
Más fácil de depurar	Más difícil de depurar
Gran curva de aprendizaje	Una curva de aprendizaje más sencilla
Utilizado en grandes proyectos	Optimizado para programas sencillos

OOP - Object Oriented Programming





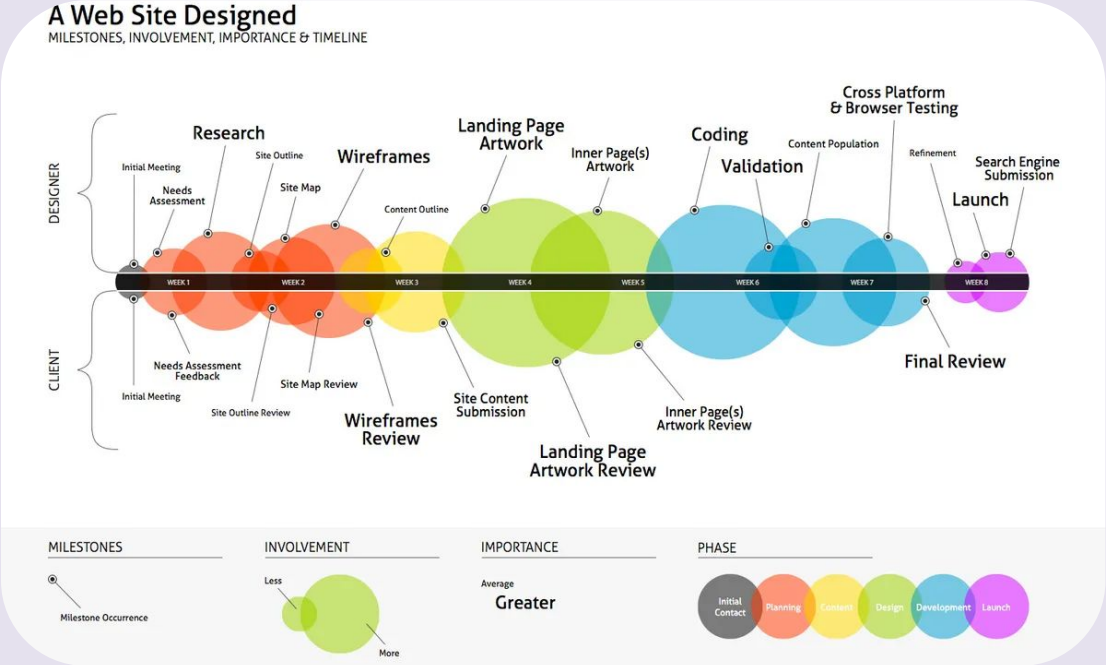
Development types

Web Development

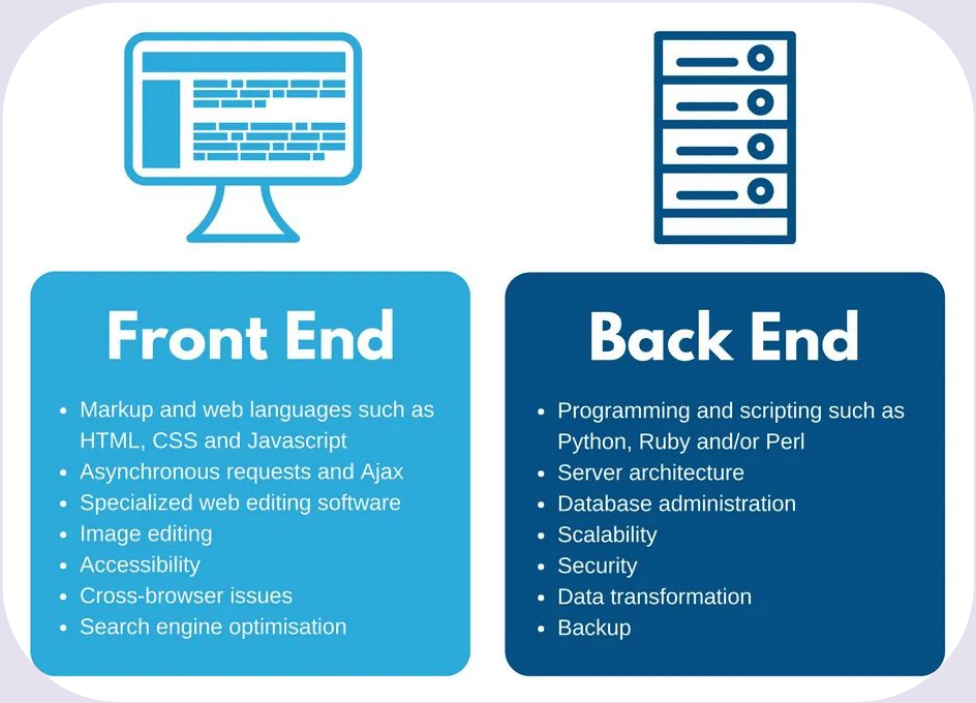
Web development is a term that defines the **creation of websites** for the **Internet or an intranet**. To achieve this, use is made of **server-side** and client-side software technologies that involve a combination of database processes with the use of a **web browser** in order to perform certain tasks or display information.

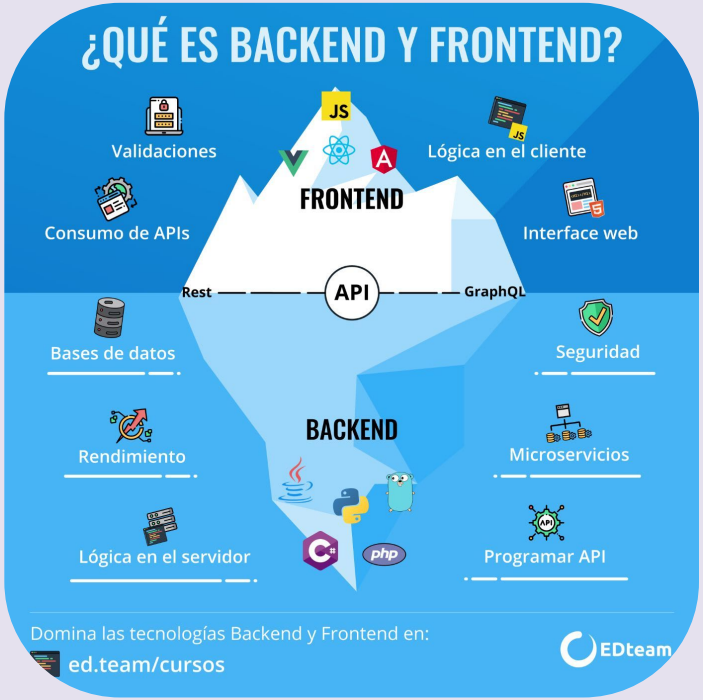
Functionally, the **web developer**, who is the one who performs this work, is usually only concerned with the **operation of the software**, it is the task of the web designer to worry about the final appearance (layout) of the page and the webmaster to integrate both parts.

Web Development



Web Development





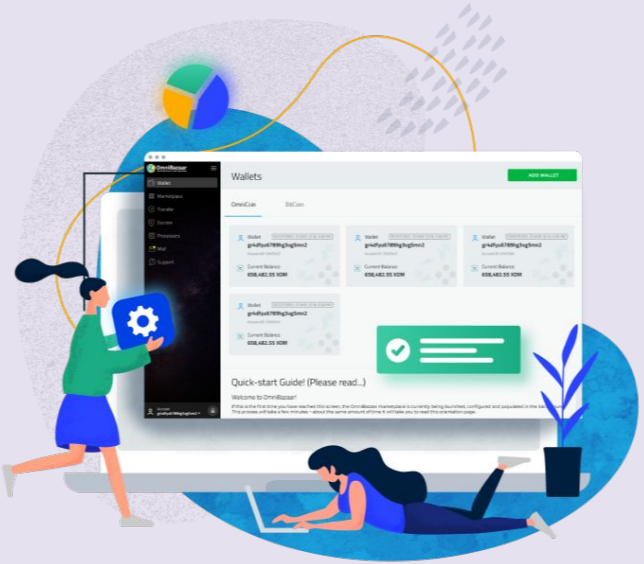
Web Development

Desktop Development

Desktop applications are the **set of programs or tools that we have installed on our** desktops or laptops and that **we can only use on those devices**. We cannot move them to a different device, which is why they have this limitation.

On the contrary, web applications, which have their presence in the cloud, do not have this portability problem.

Examples of desktop applications could be OpenOffice, Excel or Photoshop.



Desktop Development

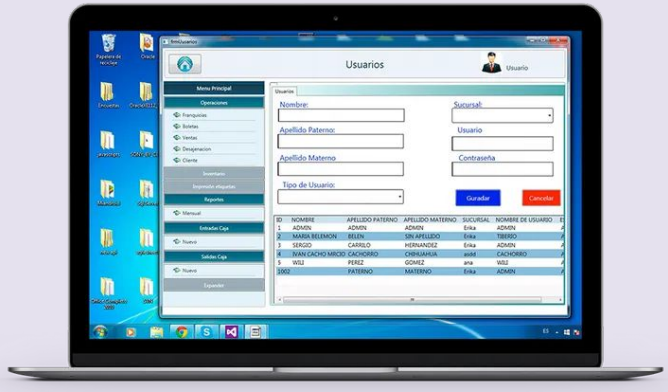
Among the most notable **advantages** of desktop applications are:

- Data is centralized.
- They are much more stable and robust programs.
- Data loading is faster.
- If the Internet is down, do not worry because you will still be able to use it.
- They are usually cheaper.
- Security is higher in these applications.
- You can make backup copies at any time.

Desktop Development

Starting with the **disadvantages** or defects that can be put to the desktop applications are:

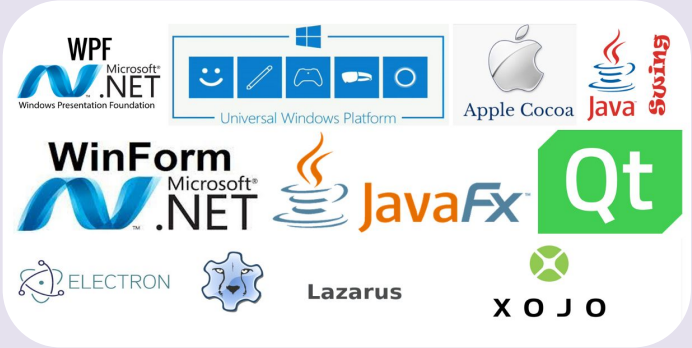
- They require installation on each client or device.
- After all, they are developed for a specific operating system. If you have a different system, you have to wait for them to develop the version for yours.
- An update is required on each device. You can't push an update to everyone with that application.



Desktop Development

The most known and used languages are Java and Python, but as we are going to see there are many more.

- In Windows we have Visual C++ and Visual Basic.
- C/C++ with Qt or GTK.
- Java with AWT or Swing.
- On Mac we have Objective-C/Swift with Cocoa.
- On Linux we have C/C++ with Qt or GTK.



Mobile development

Mobile application development is the set of processes and procedures involved in writing software for **small, wireless** computing devices, such as **smartphones** and other handheld devices.

Mobile applications **are often developed specifically to take advantage of the unique features of a particular mobile device**. For example, a gaming application might be written to take advantage of the iPhone's accelerometer, or a mobile health application might be written to take advantage of a smartwatch's temperature sensor.

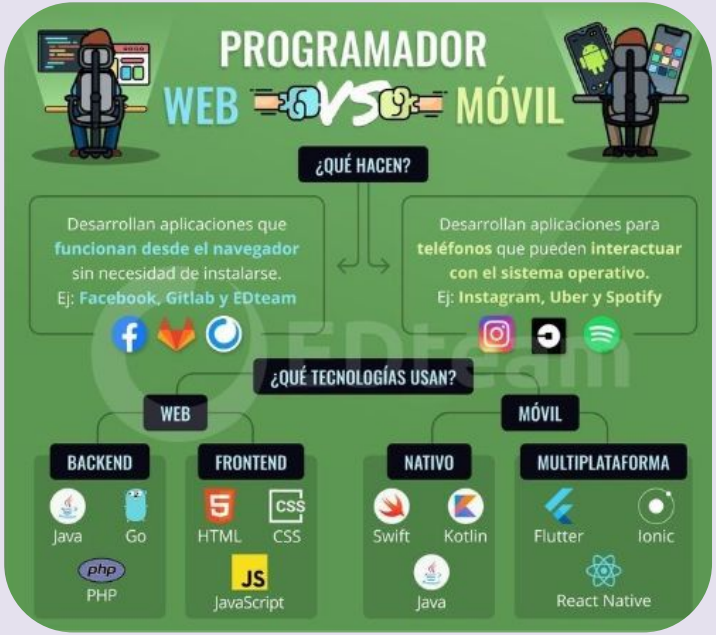
Mobile development

- **Native applications.** These applications are created using integrated development environments (IDE) and languages for mobile operating systems such as **Apple iOS or Google Android.** Native applications allow you to customize the necessary functions, but can be more expensive than other technologies.
- **Hybrid applications.** These are **web applications** that act like native applications. They are developed using technologies such as **HTML, JavaScript** and Cascading Style Sheets (**CSS**). Hybrid apps are **more cost-effective to develop than native apps** and can be **created faster,** but **they are not as feature-rich** as native apps and are not installed on the device.
- **Progressive Web Apps.** A PWA is a website that looks and **behaves as if it were a mobile app.** These apps are developed using web technologies such as React.
- **Encapsulated apps.** An encapsulated app runs inside a container app. Products such as the drag-and-drop app creation tool **Microsoft Power App** allow less experienced developers to **create a mobile app quickly.** But the lack of isolation from the core operating system, OS lock-in and relative novelty could pose problems.

Mobile development

A **mobile app** refers to a **native application**, created for certain smartphones, which can be downloaded from the corresponding store (each smartphone brand has its own), and **installed on the device's hard disk**.

A **mobile web** is a **web development designed to mimic a mobile app**, but accessed through a web browser. It is a **direct access to the web page** but the aspect it offers is adapted to our mobile device.



Mobile development

Cross-platform development

Cross-platform development consists in general in being able to program for multiple devices, it can be through a script, web application or an API in order to be compatible with multiple devices.

It is the most general way for a developer when he is not developing a program for a specific device.

05

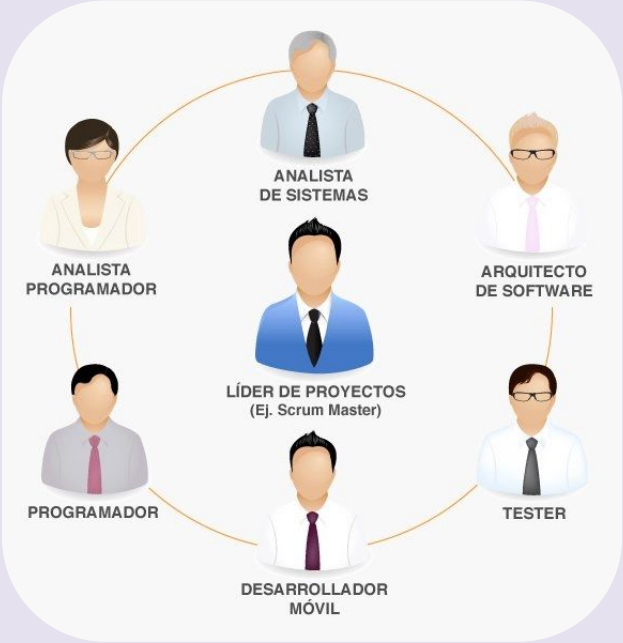
Roles

And its activities

Roles in Development

It takes more than developers and engineers to form an effective software development team. Many roles are needed in the software development lifecycle, and the ideal team consists of the following roles:

- Product owner
- Project manager
- UX and UI designers (UX/UI)
- Business analyst
- Software developers
- Programmers
- Team and technology leader (team lead or tech lead)
- Scrum master
- Full-stack developers
- Front-end developers
- Back-end developers



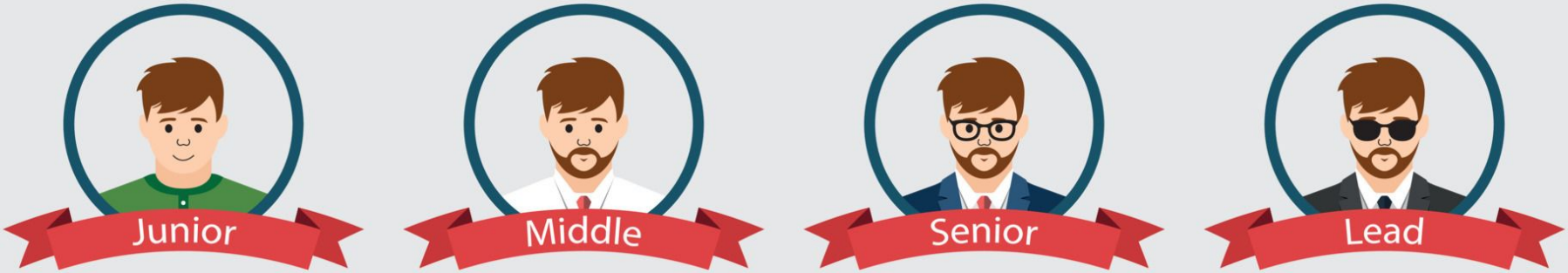
Roles in Development

How to choose a role?

The following should be considered when choosing a role:

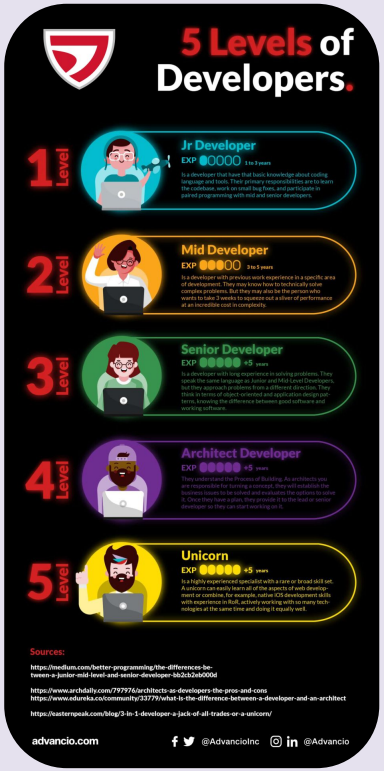
- Knowledge
- Tools
- Tastes
- Experience
- Skills

Role Ranks

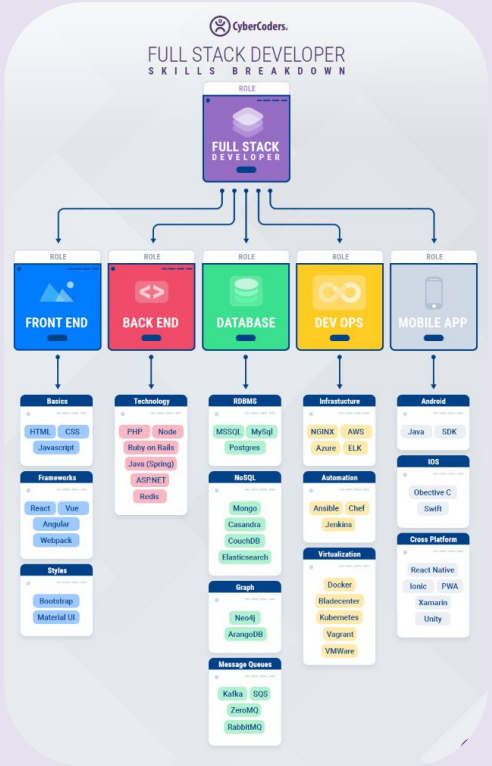


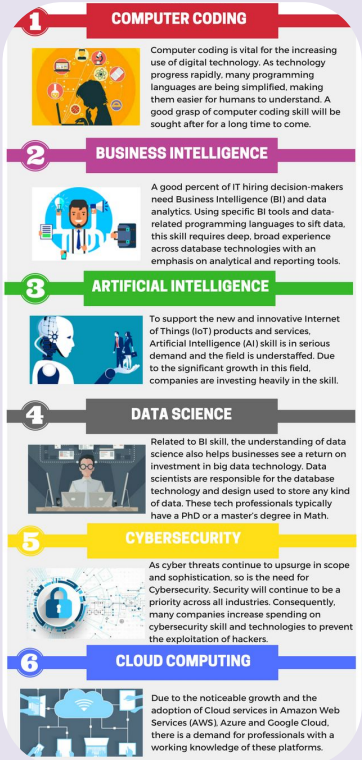
Role Ranks

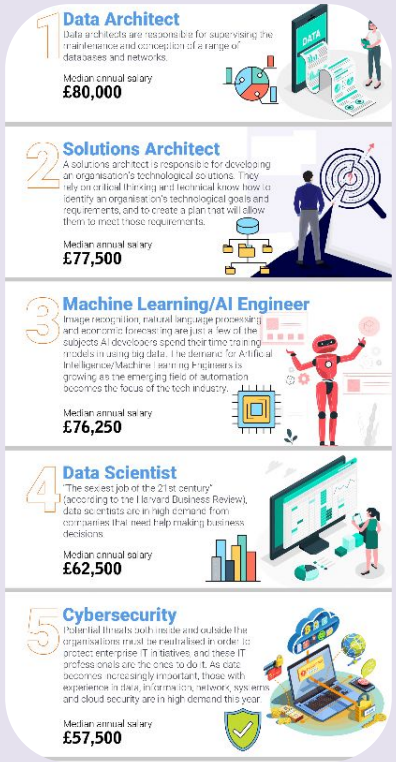

DEVELOPER LEVELS
JUNIOR
Necesita supervisión.
Conocimientos básicos sobre software y hardware.
Conoce al menos un lenguaje de programación.
Colabora en la planificación inicial del proyecto.
Trabaja en funciones y herramientas internas de software.
SEMI SENIOR
Capacidad técnica de realizar tareas con menos supervisión.
Conoce las etapas del desarrollo: análisis, desarrollo, prueba, implementación, documentación, etc.
Configura un ambiente de desarrollo por sí mismo.
Detecta errores de código y lo hace más eficiente.
Crea y escribe pruebas unitarias simples.
SENIOR
Es capaz de supervisar y dirigir equipos.
Comprende el alcance de un proyecto y plantea métodos para desarrollar, probar, implementar y mantener el proyecto.
Asesora a desarrolladores junior y semi senior.
Hace revisiones periódicas de código.
Mejora la calidad y estructura del código.

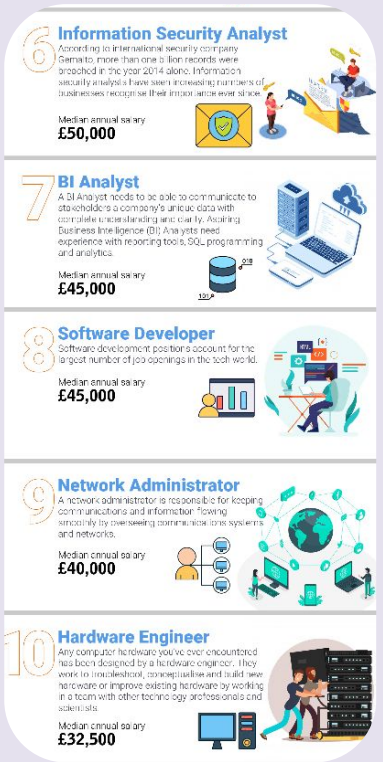

5 Levels of Developers.
1 Level
Jr Developer
2 Level
Mid Developer
3 Level
Senior Developer
4 Level
Architect Developer
5 Level
Unicorn
Sources:
advancio.com
@AdvancioInc
@Advancio

Roles in the industry









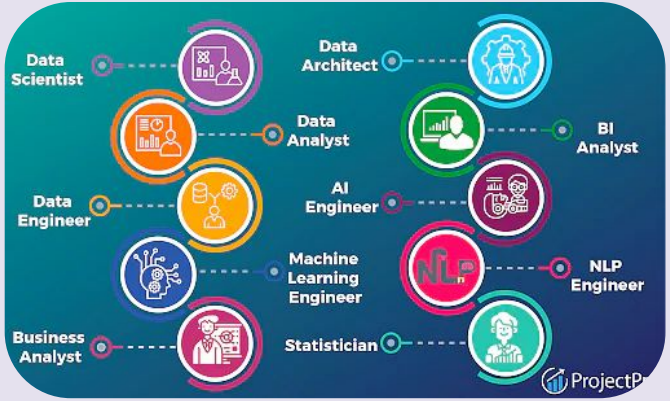
Developer

The main role is the creation and adaptation of software, although this is obviously a somewhat simplistic description. Its scope covers a range of applications, such as programs, processes, networks, version upgrades, patches, migrations, DevOps and testing.

- **Creation of specific code** and subsequent testing.
- Collaboration with customers on required **reports** and **oversight** of the process that turns them into reality.
- Use of a range of development tools to **facilitate the use of processes and systems.**
- Mapping the **design of a software application** and using **flow charts to highlight** each stage of the process.
- Organizing **upgrades and repairs** to **existing software** applications.
- Communicating progress with management through **reports, meetings and presentations.**

Data development

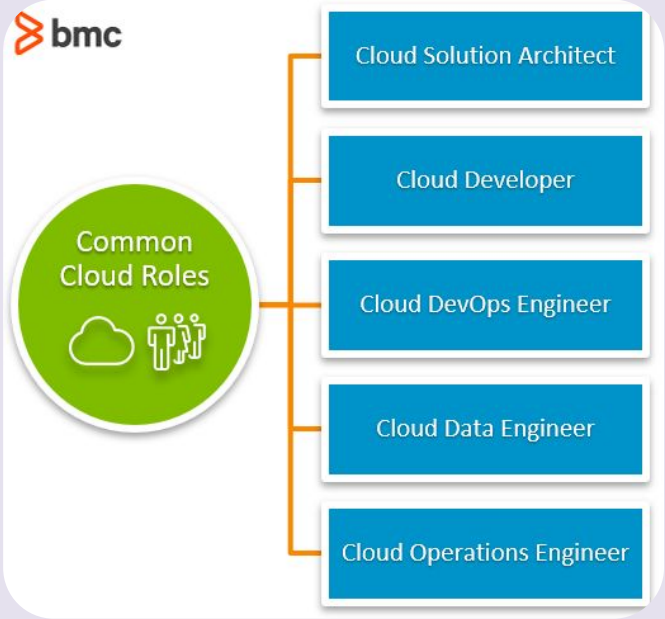
A **data analyst** needs to **process and interpret** data. A **data scientist** must be able to **create and develop** tools that process information. Let's take a look at each role in a little more depth. In addition, a **data engineer** needs to be able to **create programs or systems** that can t**ake data and turn it into meaningful information** that can be studied.



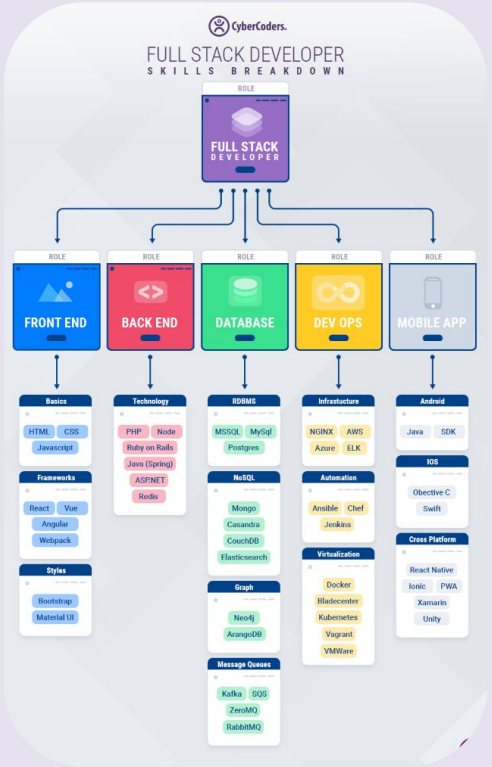
Cloud development

A **cloud developer** focuses on **developing cloud components and serverless functions** for organizations. The main role of a cloud developer is to develop scripts and business processes, always trying to leverage cloud functionalities to automate the configuration and deployment process.

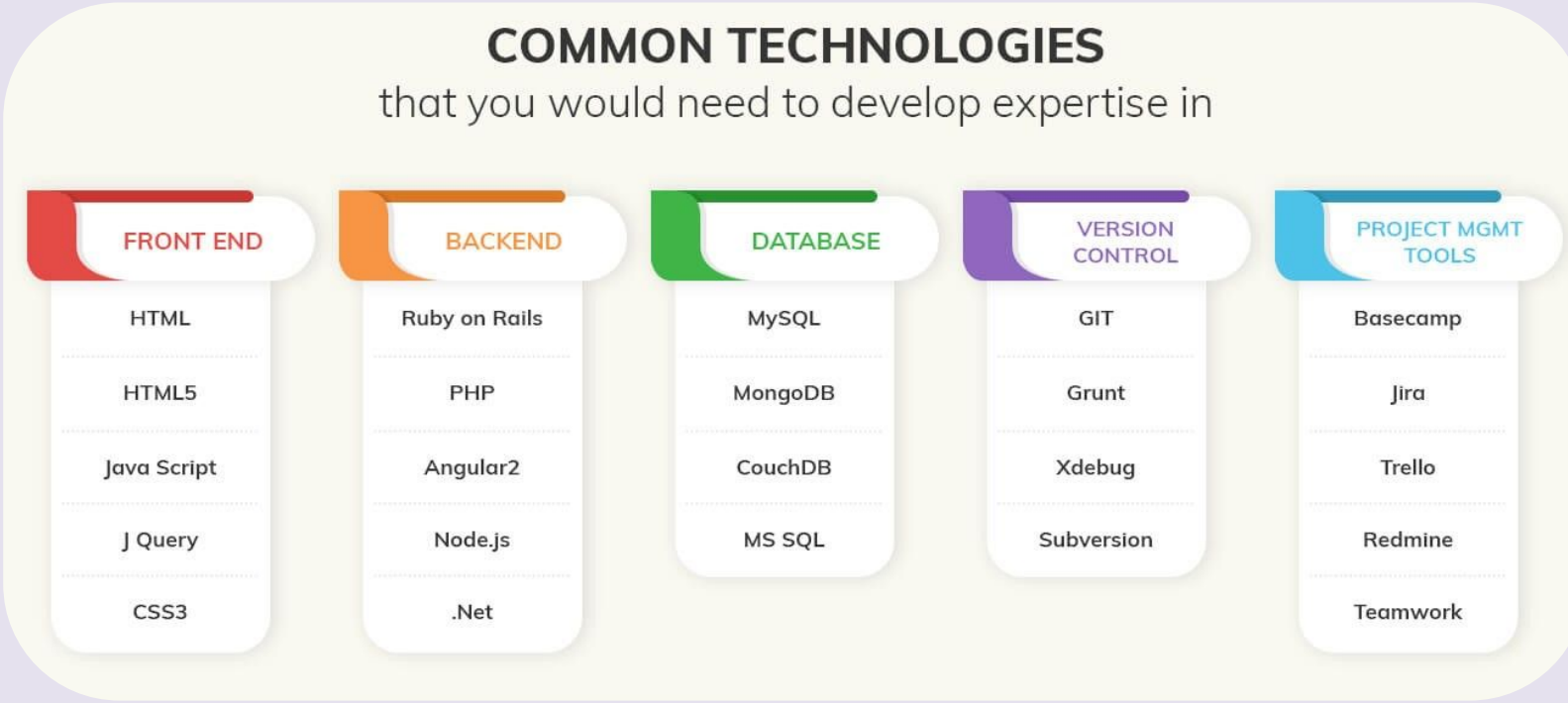
As a Cloud Developer, it is **crucial that you understand cloud capabilities**, as well as network and **connectivity** elements (e.g. firewalls, WAF, routing and security, and segmentation). The Cloud Developer is responsible for **monitoring processes and evaluating the resources consumed** in the process of **auto-scaling and deploying** dynamic components.



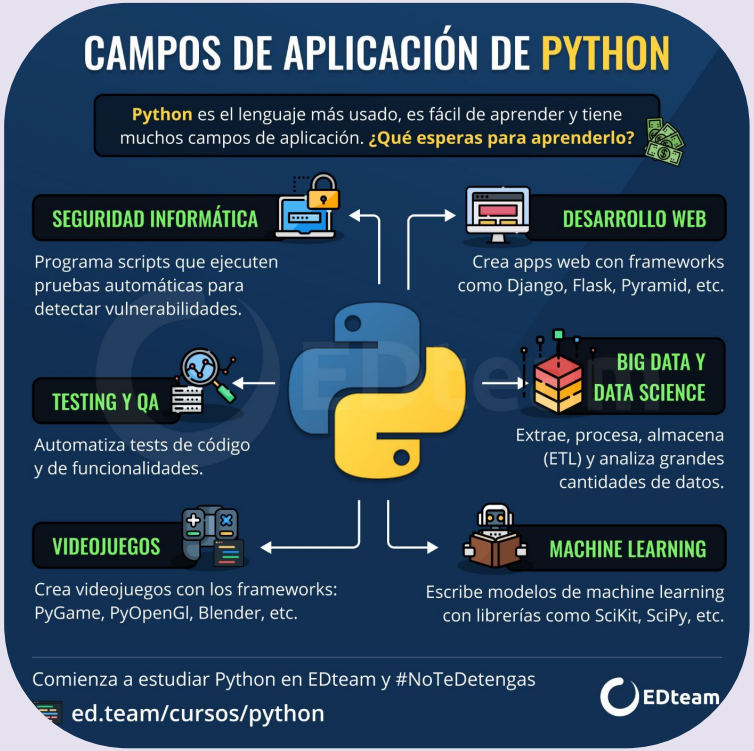
Technology used



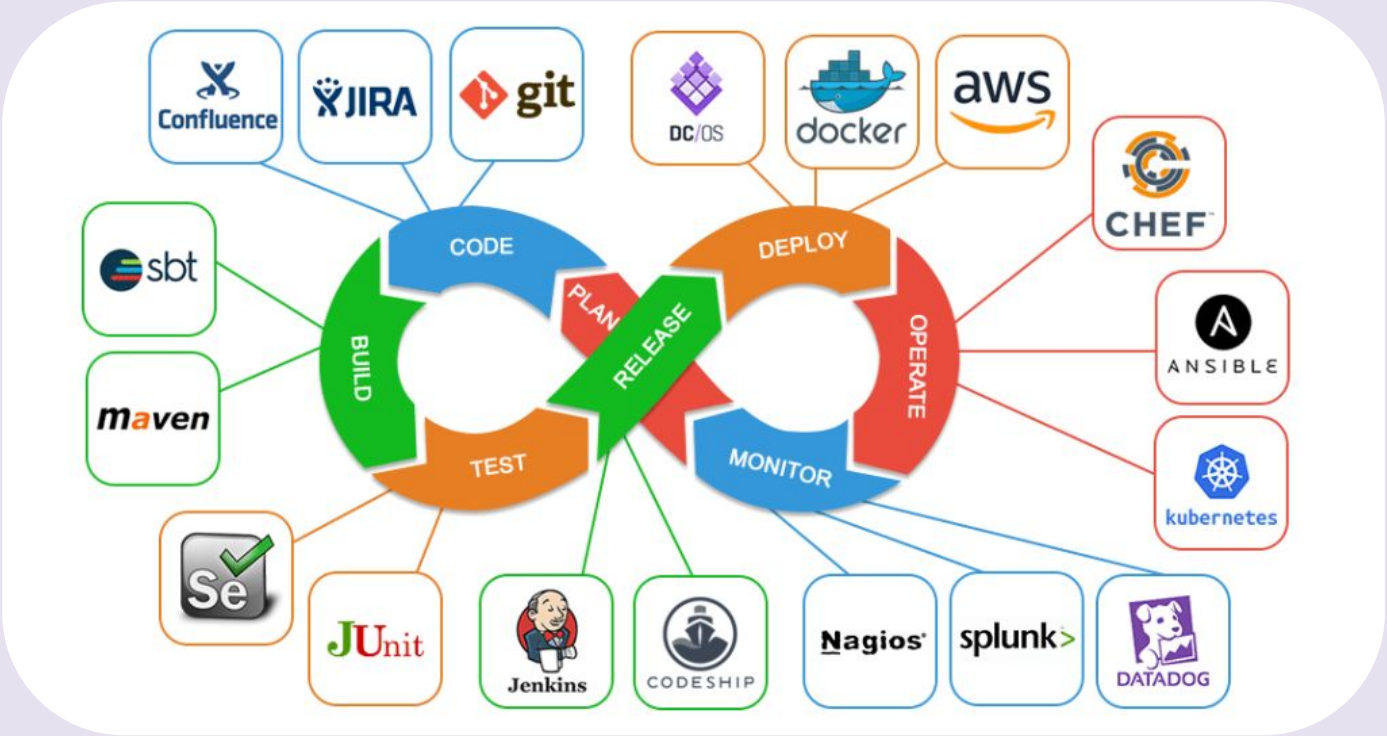
Technology used



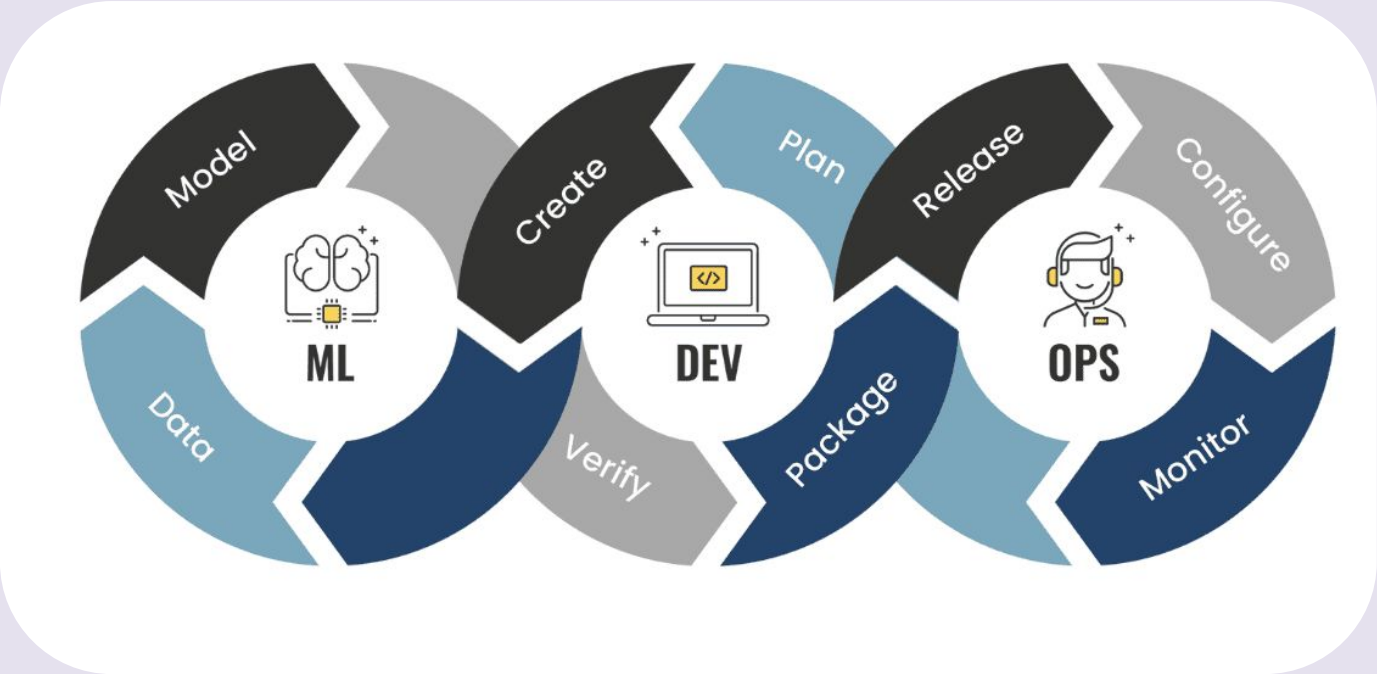
Technology used



Tasks to perform



Tasks to perform



Wages in Mexico (2021)

Rol	Promedio	Mediana	Máximo	Mínimo	Muestras	Desviación
Artificial Intelligence Developer	$34,133.33	$30,000.00	$80,000.00	$8,000.00	9	23751.00
Programador Salesforce	$29,555.56	$30,000.00	$59,000.00	$9,000.00	9	16583.96
Programador Back End	$26,784.86	$25,000.00	$76,000.00	$4,800.00	297	13499.27
Programador Full Stack	$24,534.83	$21,000.00	$100,000.00	$3,500.00	646	14075.20
Programador Móvil	$24,167.03	$20,000.00	$70,000.00	$5,000.00	88	14960.99
Programador Front End	$20,069.81	$17,500.00	$60,000.00	$4,000.00	167	11713.56
Programador de Aplicaciones de Escritorio	$18,985.68	$18,300.00	$35,000.00	$6,000.00	69	8745.40

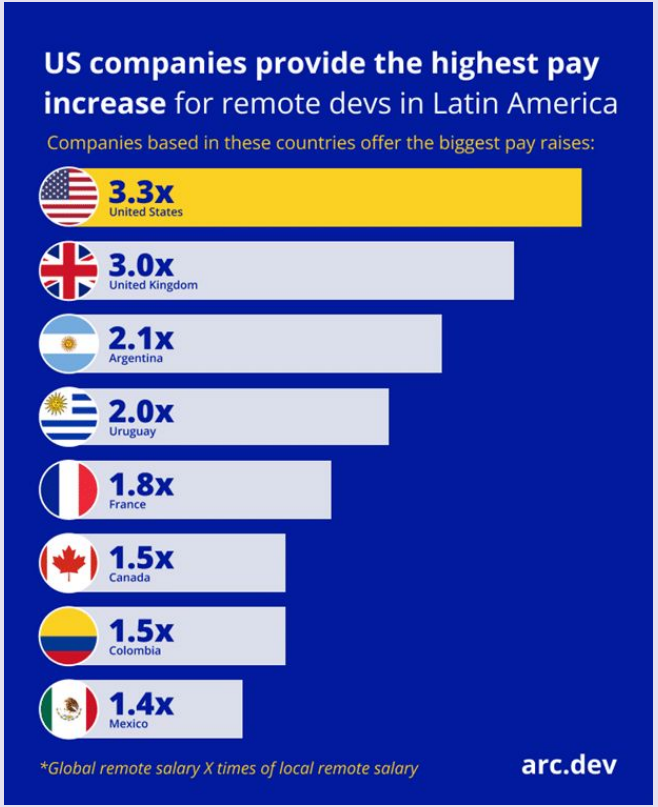
Años de experiencia	Promedio	Mediana	Maximo	Minimo	Muestras	Desviación
1 a 3 años	$15,965.00	$14,800.00	$70,000.00	$3,500.00	429	8855.57
4 a 5 años	$24,282.53	$21,800.00	$84,000.00	$5,000.00	271	12276.13
6 a 10 años	$30,240.39	$29,000.00	$93,400.00	$5,000.00	335	15180.71
11 a 15 años	$29,934.00	$30,000.00	$60,000.00	$5,000.00	120	12219.08
16 a 20 años	$31,358.32	$32,500.00	$60,000.00	$6,000.00	72	13051.38
21 a 25 años	$30,973.68	$28,000.00	$55,000.00	$16,900.00	19	10461.99
Más de 25 años	$29,941.44	$28,000.00	$100,000.00	$8,500.00	39	15932.78

Wages in Mexico (2021)

Lenguaje de programación	Promedio	Mediana	Max	Min	Muestras	Desviación
C++	$38,654.55	$45,000.00	$54,200.00	$15,000.00	11	16070.87
Swift	$33,721.71	$32,000.00	$70,000.00	$8,000.00	17	19167.46
Go	$33,666.67	$30,000.00	$55,000.00	$20,000.00	6	13002.56
Apex	$31,750.00	$30,000.00	$59,000.00	$9,000.00	8	16272.24
Ruby	$30,590.43	$29,000.00	$85,000.00	$10,000.00	14	18658.85
PL-SQL	$27,914.93	$28,300.00	$80,000.00	$6,600.00	28	13645.62
Kotlin	$27,838.10	$24,100.00	$57,000.00	$12,000.00	21	13257.43
Typescript	$26,583.33	$24,000.00	$70,000.00	$8,000.00	12	16940.85
Dart	$26,285.71	$22,000.00	$40,000.00	$7,000.00	7	12037.64
Java	$26,027.33	$25,000.00	$76,000.00	$4,000.00	283	12987.03
C#	$25,472.89	$24,000.00	$100,000.00	$3,500.00	268	13111.73
Python	$25,096.00	$20,000.00	$65,000.00	$6,000.00	75	15437.55
Cobol	$24,061.54	$22,000.00	$42,000.00	$10,000.00	13	10314.52
JavaScript	$23,401.52	$20,000.00	$93,400.00	$4,245.00	256	14708.45
Delphi	$23,285.71	$20,000.00	$34,000.00	$18,000.00	7	6264.03
PHP	$17,200.33	$15,000.00	$80,000.00	$4,000.00	173	10614.44
Visual Basic	$16,466.14	$15,250.00	$35,000.00	$6,000.00	28	6706.99
C	$13,120.00	$14,000.00	$20,000.00	$6,000.00	5	5046.98

Wages in Mexico (2021)

Framework	Promedio	Mediana	Máximo	Mínimo	Muestras	Desviación
Express	$35,117.47	$30,000.00	$84,000.00	$13,920.00	17	17973.41
Ruby on Rails	$32,365.18	$30,000.00	$85,000.00	$10,000.00	11	18998.30
.Net Core	$31,700.00	$30,500.00	$70,000.00	$6,500.00	30	14763.47
Nodejs	$30,246.88	$23,500.00	$92,000.00	$2,500.00	32	23958.95
Spring	$28,331.04	$27,000.00	$76,000.00	$6,000.00	187	12512.28
Flask	$28,173.33	$20,000.00	$54,000.00	$6,000.00	15	16600.42
React	$26,536.97	$22,000.00	$93,400.00	$4,500.00	117	16590.36
Django	$26,212.90	$20,000.00	$65,000.00	$9,000.00	31	16029.16
ASP	$25,782.11	$21,000.00	$55,000.00	$9,500.00	15	12795.19
MVC	$25,463.64	$28,000.00	$41,000.00	$9,500.00	11	8473.73
.NET	$24,891.08	$23,000.00	$100,000.00	$5,000.00	132	13101.77
Android	$24,404.71	$20,000.00	$57,000.00	$6,000.00	17	14505.24
Entity Framework	$23,477.27	$23,500.00	$40,000.00	$10,000.00	22	9073.53
Vue	$23,172.71	$19,000.00	$84,000.00	$7,300.00	48	13886.24
Angular	$23,143.12	$22,000.00	$93,400.00	$4,000.00	91	14077.26
Codeigniter	$17,133.33	$16,000.00	$28,000.00	$8,000.00	27	5449.77
Laravel	$16,279.02	$15,000.00	$50,000.00	$4,000.00	97	9468.76

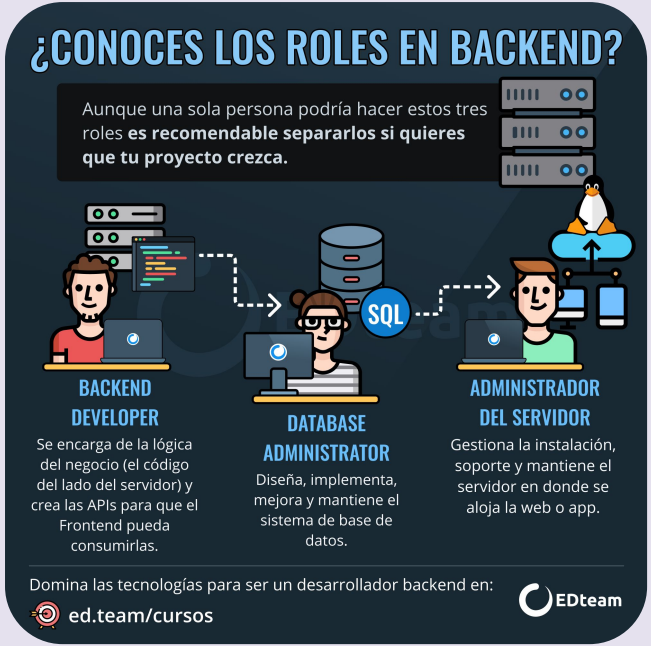


Back-End

The backend developer works with programming **languages and tools specific to his area**. Although it is **recommended** that he/she knows **the basics of frontend** to be able to communicate with that area, specialized profiles that can perform their work with higher quality are generally sought after.

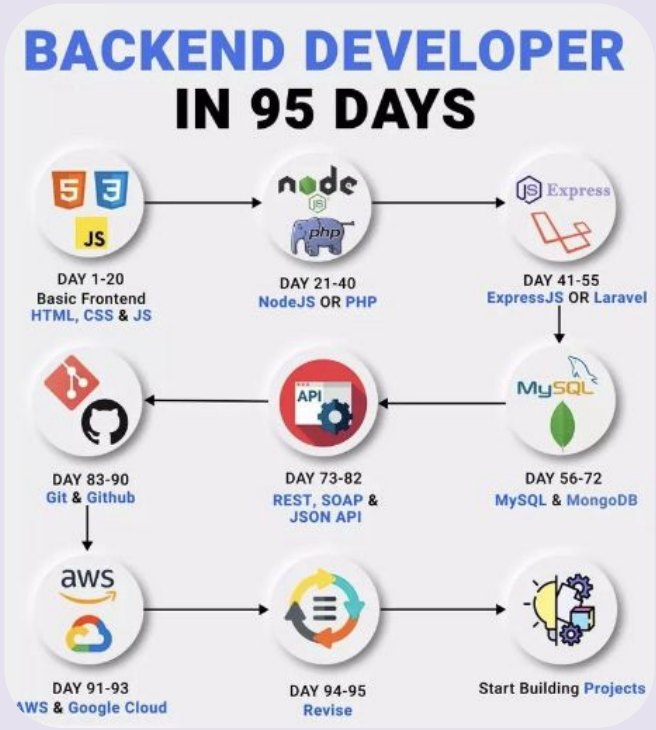
The work of a backend developer is **not visible to the user** who will use the application or website, since his job is to **support the site and its maintenance** in terms of servers and logic of the digital product.

The developer specialized in **backend is one of the most important when creating a digital product** because he will be **present from its construction to the end**, and even after to provide **maintenance and support to it.**



Back-End


Backend Technologies in the industry
Java
Airbnb
Uber
Pinterest
LinkedIn
eBay
PHP
Facebook
Viber
Hootsuite
Buffer
Yahoo
Wordpress
Wikipedia
JavaScript
Netflix
Candy Crush
Facebook
NodeJS
Airbnb
eBay
Square
Asana
Kotlin
Google
Amazon
Pinterest
Foursquare
Trello
Python
Google
Instagram
Spotify
Quora
Ruby
GitHub
Kickstarter
Basecamp
Scribd
C#
Twitch
GitHub
Telegram
MasterCard


BACKEND DEVELOPER
IN 95 DAYS
DAY 1-20
Basic Frontend
HTML, CSS & JS
DAY 21-40
NodeJS OR PHP
DAY 41-55
ExpressJS OR Laravel
DAY 56-72
MySQL & MongoDB
DAY 73-82
REST, SOAP & JSON API
DAY 83-90
Git & Github
DAY 91-93
AWS & Google Cloud
DAY 94-95
Revise
Start Building Projects

Front-End

The frontend developer is in **charge of creating the interface of a website or application through code.**

In the development process of a digital product, the **frontend developer receives the designs created by the UI designer**, and **translates them into programming languages.**

The frontend developer is one of the pillars that support the creation of a website or application. This **profile tends to be creative**, since before the UI designer profile became more common and necessary, it was the frontend developers who proposed the design of the interfaces.

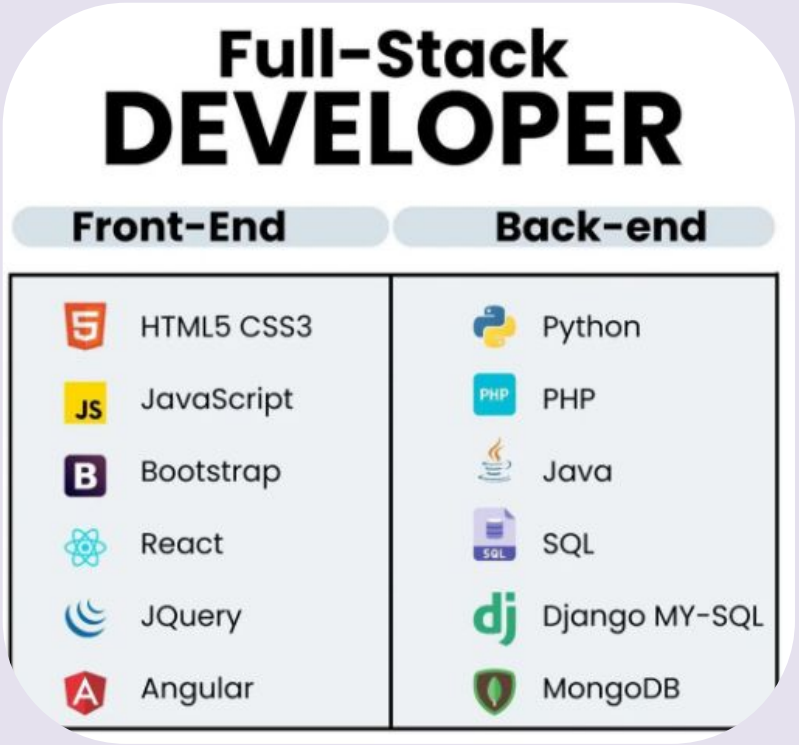
The development of the interface of **websites or applications is becoming more and more in demand** as, with the acceleration of the digital world, there are more and more products that solve **problems of people's daily lives.**

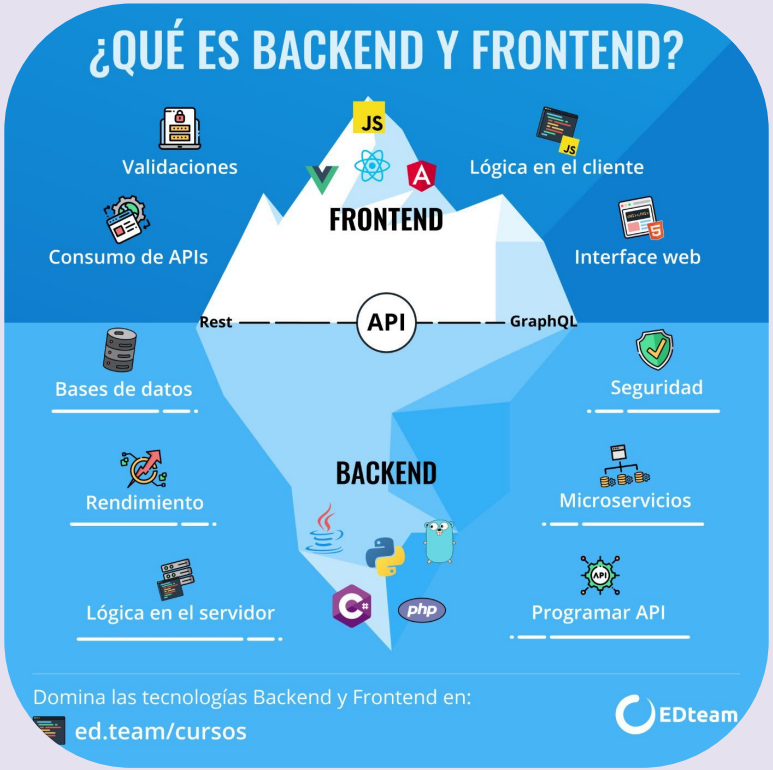
Front-End


DISEÑADOR WEB
VS
FRONTEND
Creativo, intuitivo y empático.
Define la guía de estilos de la web.
Diseña la experiencia de usuario.
Crea interfaces, wireframes, flujos de usuario, mockups, etc.
Maneja herramientas como Figma, Adobe Xd, Sketch, InVision, Zeplin.
Ambos pueden llevar el diseño a código
Es lógico, analítico y técnico.
Le da funcionalidad a la interfaz.
Puede conectarse a una API y consumir datos.
Muestra datos en pantalla y valida la información que se le mostrará al usuario.
Trabaja con JavaScript y puede usar librerías como Angular, React, Vue, etc.
ed.team/ui
EDteam
ed.team/frontend


DISEÑADOR UX
Investiga las necesidades del usuario para mejorar la usabilidad, los flujos de usuario y las conversiones.
Se preocupa por la arquitectura de la información y accesibilidad.
Hacen revisiones del producto y proponen mejoras en función al análisis de datos.
DISEÑADOR GRÁFICO
Define la identidad visual de una marca y le da coherencia a toda su presencia física y online.
Crea banners para redes sociales, posters para eventos, logotipos, infografías, etc.
Trabaja junto al equipo de marketing para crear gráficos y artes de campañas.
DISEÑADOR UI
Diseña las interfaces: mockups y prototipos, así como las pantallas e interacciones de una aplicación.
Aplica patrones de diseño para crear layouts, botones, formularios, etc.
Crea guías de estilo que se usan en toda la aplicación, asegurando consistencia y familiaridad para el usuario.
Conviértete en uno de estos profesionales estudiando en EDteam
ed.team/cursos
EDteam

FullStack


Full-Stack
DEVELOPER
Front-End
Back-end
HTML5 CSS3
JavaScript
Bootstrap
React
JQuery
Angular
Python
PHP
Java
SQL
Django MY-SQL
MongoDB


¿QUÉ ES BACKEND Y FRONTEND?
Validaciones
Lógica en el cliente
FRONTEND
Consumo de APIs
Interface web
Rest
API
GraphQL
Bases de datos
Seguridad
BACKEND
Rendimiento
Microservicios
Lógica en el servidor
Programar API
Domina las tecnologías Backend y Frontend en:
ed.team/cursos
EDteam

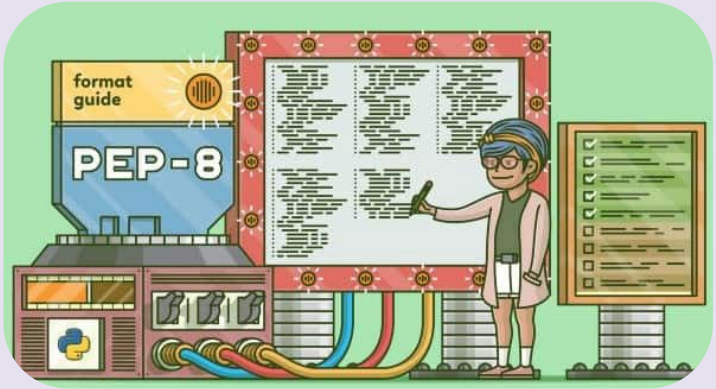
06

Basic knowledge

Standards

PEPs (Python Enhancement Proposals) that **govern** different aspects of **Python code production.** The PEPs cover everything from general design principles, such as Python Zen, to conventions for writing documentation, such as the Docstring Convention.

The **standard for JavaScript is ECMAScript (ECMA-262)** and the ECMAScript Internationalization API specification (ECMA-402). The documentation in MDN is based entirely on the latest draft versions of ECMA-262 and ECMA-402. And in some cases where proposals for new features for ECMAScript have already been implemented in browsers, the documentation and some MDN articles may make use of some of these features.



Links: Estándar Python | Estándar JS

Standards

What do the standards define or recommend? Some examples are:

- Variable declaration
  - Variable names
  - Variable values
  - Declaration of multiple variables
  - Collection type variables
- Declaration of functions
  - Function names
  - Keys and function spacing
  - Types of functions
  - Arguments of a function
- String construction
- Operations
  - Logical operations of equality and inequality

Functions

A function is a block of code that performs some operation. A function can **optionally define input parameters** that allow callers to pass arguments to the function. A function **can also return a value as output.** Functions are useful for **encapsulating common operations** in a single reusable block, ideally with a name that clearly describes what the function does.

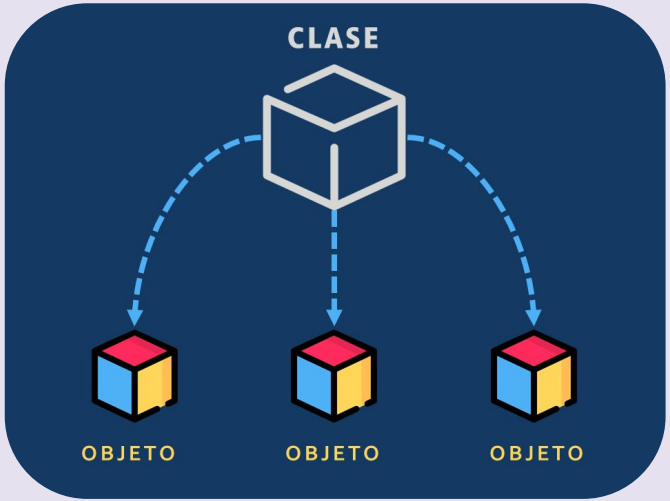
There is no practical limit to function length, but good design aims at functions that perform **a single well-defined task.** Complex algorithms should be broken down into simpler, easier-to-understand functions whenever possible.

```
function cuadrado(n){
        return n * n
}

let num = cuadrado(2);
```

Class

A **class** is an element of object-oriented programming that acts **as a template and will define the characteristics and behaviors of an entity.** The class is going to be like a mold from which we are going to be able to define entities. A class will define the characteristics and behaviors of an entity. If I define, for example, the class person, its characteristics or attributes could be gender, that is, if it is a man or a woman, age and name. The behaviors or methods that we would have in the case of the person class could be breathing, moving, walking, thinking, among others.



Decorators

A **decorator** is a **software pattern** that is used to **alter the operation of a given piece of code;** either a function, or a class, without the need to use other mechanisms such as inheritance.

Specifically, we refer to **functions** or objects with similar **behavior that allow us to alter how other entities work** without having to explicitly modify their code.

An example of the use of design patterns

Operations sync-async

Synchronous code is code where each instruction waits for the previous one to execute while asynchronous code **does not wait for deferred instructions and continues with its execution.** In general, asynchronous code allows for more responsive applications and reduces client waiting time.

Synchronous
Each instruction will be executed in sequence until completion.

Asynchronous
In the asynchronous case, some of the instructions will be executed out of time.

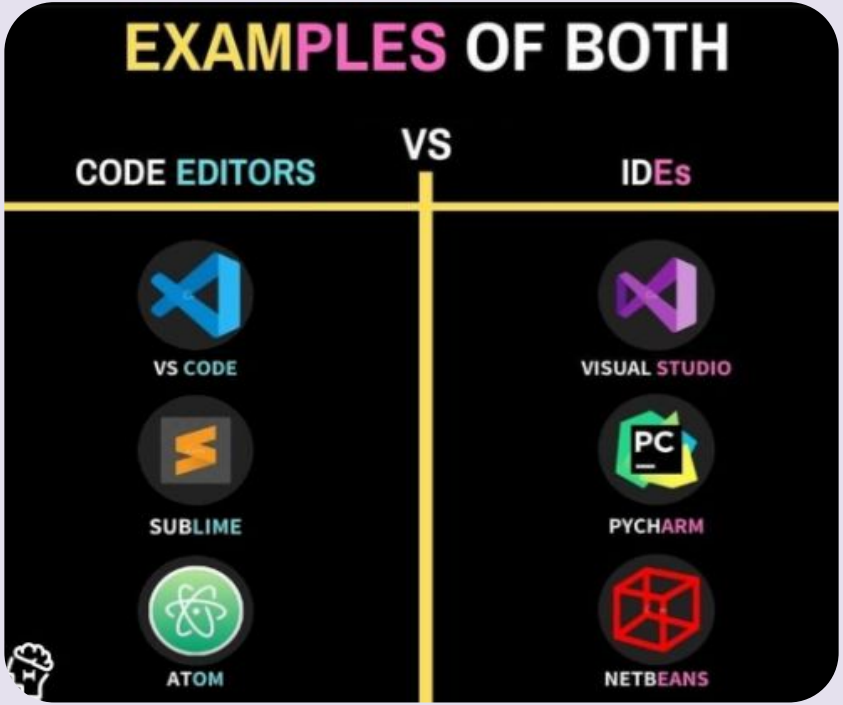
IDE vs Editors

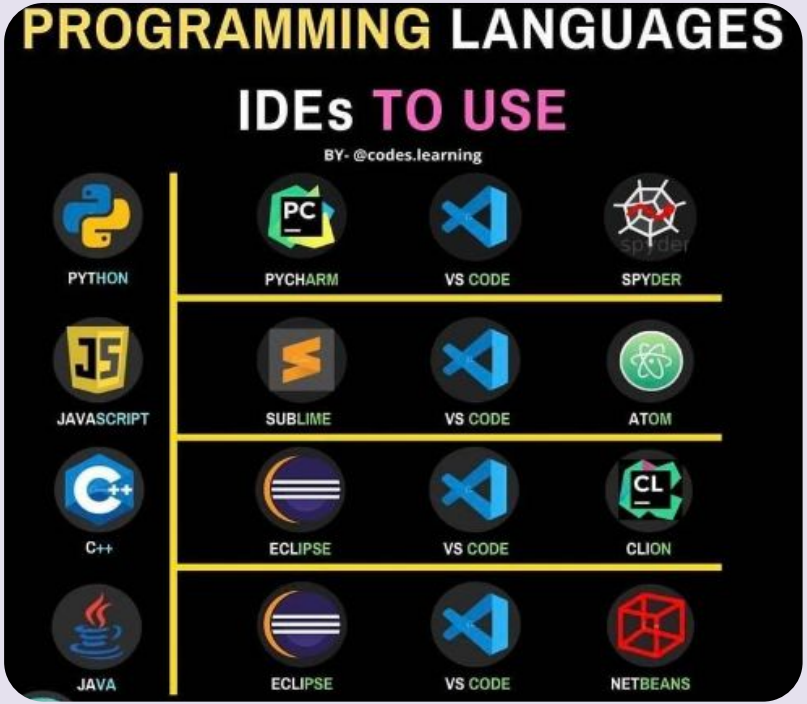
A code editor is a **lightweight program** that does not require much RAM or processor, where you can **open and create one file at a time and save it in a folder.** You can **add plugins to an editor to perform many more functions** (e.g. it can support multiple languages) and make it more powerful.

An **IDE** (**I**ntegrated **D**evelopment **E**nvironment), unlike an editor, is a heavier program that requires much more RAM memory and a more powerful processor, plus it is a **space to work on complete projects, not just files.** They contain **integrated tools**, that is to say, now you will no longer create folders on your own, they can have a **compiler** (for compiled languages), **an emulator, version control and terminals.**

Explicación detallada: Video

IDE vs Editors





Framework

A **framework** is an **environment or framework, a set of standardized** practices, concepts and criteria to follow. Following some rules, the framework forces us to use **good practices** for our code.

On the other hand, frameworks also **provide us with a set of pre-developed tools.** They are usually **common functions** in all projects. For example, if we have a web project we will surely have users and if we have users the most normal thing is that they have to "login". This functionality of logging in with an email and a password would already be done if we use a framework.

Scripts vs Programs

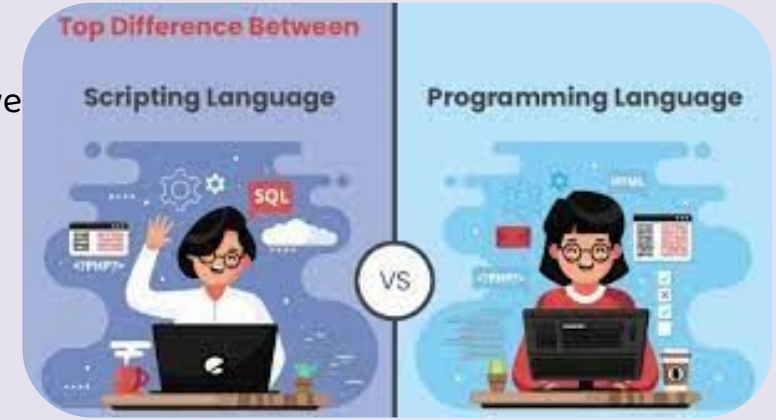
A script is a code file that can execute commands to perform a specific task. It is a single file.

A program, like a script, executes commands but it can have the difference of not being just a single file but a whole solution.

All scripts are programs but not all programs are scripts.

Examples of programs and scripts are the following:

- Script: Code that sends a message every day
- Program: Billing system



Version control

Version control, also known as “source code control,” is the practice of tracking and managing changes to software code. Version control systems are software tools that help software teams manage changes to source code over time.

Version control software keeps track of all code modifications in a special type of database. If a mistake is made, developers can go back in time and compare previous versions of the code to help resolve the error, while minimizing disruption to all team members.

Version control

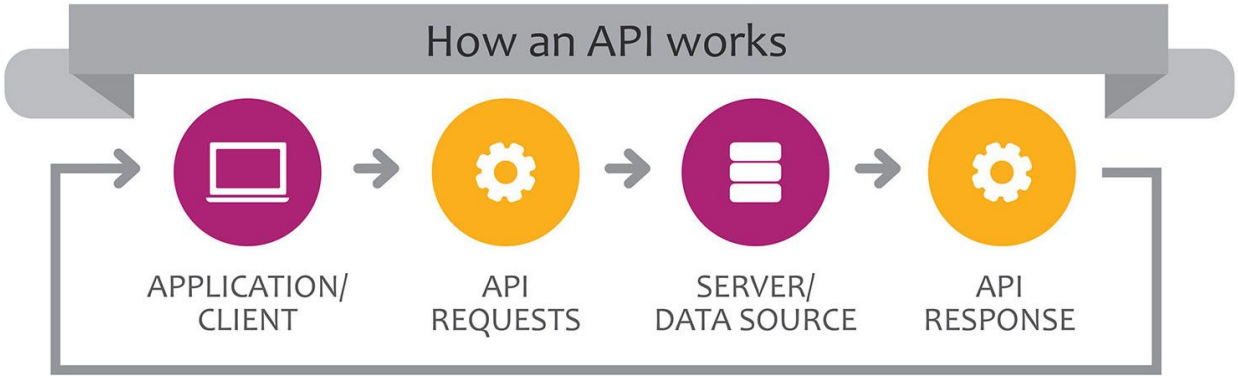
API

The API

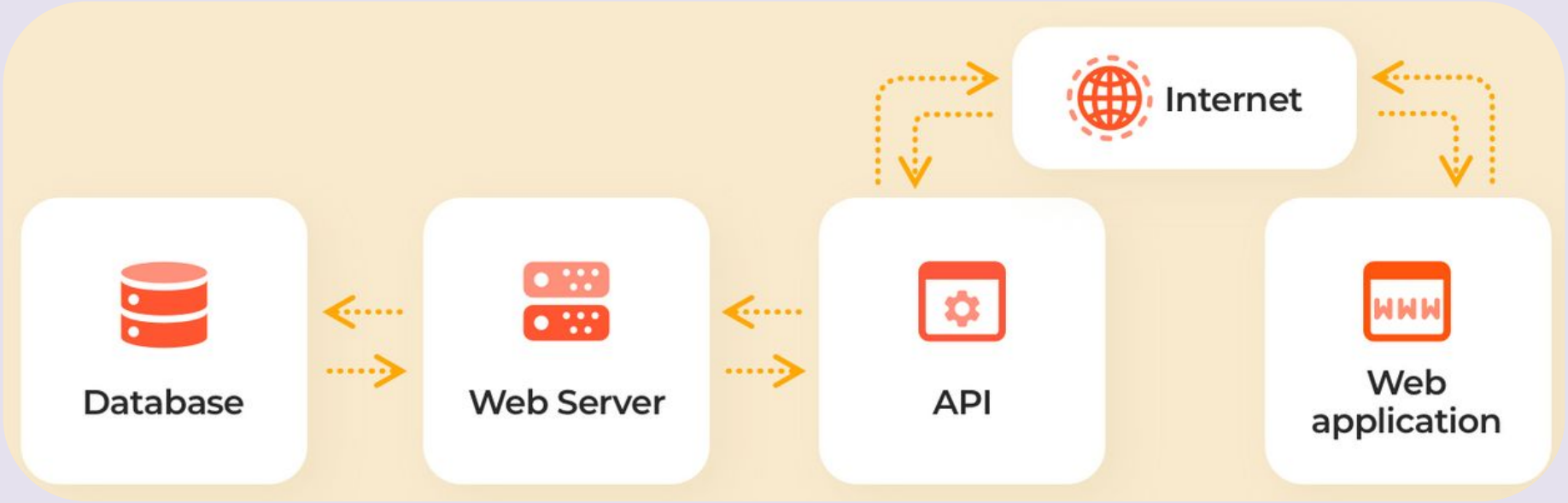
Application Programming Interface

API Definition

An application program interface that provides a developer with programmatic access to a proprietary software application. A software intermediary that makes it possible for application programs to interact with each other and share data.



API



swagger http://petstore.swagger.io/v2/swagger.json Explore

Swagger Petstore 1.0.0

[Base url: petstore.swagger.io/v2]
http://petstore.swagger.io/v2/swagger.json

This is a sample server Petstore server. You can find out more about Swagger at http://swagger.io or on irc.freenode.net, #swagger. For this sample, you can use the api key `special-key` to test the authorization filters.

Terms of service
Contact the developer
Apache 2.0
Find out more about Swagger

Schemes
HTTP

Authorize

pet Everything about your Pets

POST	/pet	Add a new pet to the store
PUT	/pet	Update an existing pet
GET	/pet/findByStatus	Finds Pets by status
~~GET~~	~~/pet/findByTags~~	Finds Pets by tags
GET	/pet/{petId}	Find pet by ID
POST	/pet/{petId}	Updates a pet in the store with form data
DELETE	/pet/{petId}	Deletes a pet

Design Patterns

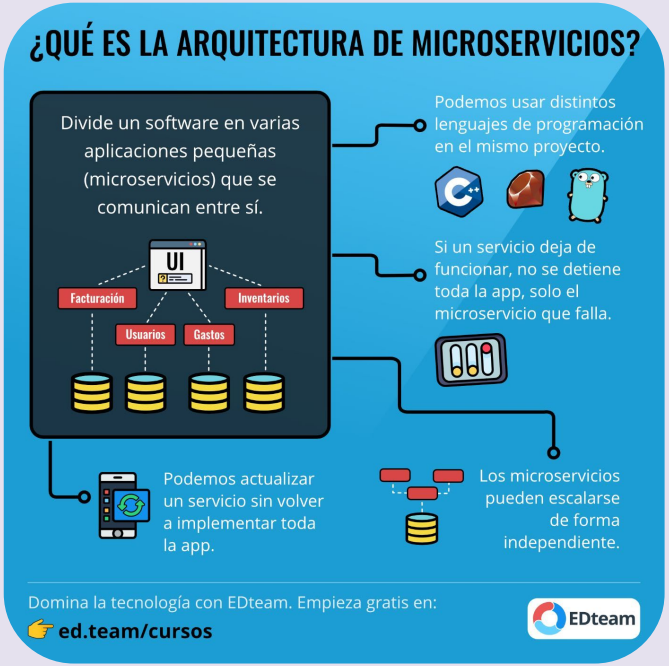
Design patterns are a general, reusable solution applicable to various software design problems. They are templates that identify issues in the system and provide appropriate solutions to common problems that developers have faced over a long time, through trial and error.

In essence, **design patterns** help you ensure the validity of your code, as they are solutions that work and have been tested by many developers, making them less prone to errors.

Microservices

Microservices are both an architectural style and a way of programming software. With **microservices**, applications are divided into their smallest, independent components.

Each of these components or processes is a **microservice**. This software development approach values granularity, simplicity, and the ability to share a similar process across multiple applications. It is a fundamental element of optimizing application development towards a **cloud-native model**.



Containers

Containers are, in essence, processes that run within the operating system and have characteristics that make them "special." They share the ecosystem along with "common" processes, and it is thanks to the Linux **KERNEL** that, through some of its features, provides these processes with remarkable capabilities.

A **container** is a process that runs isolated from other containers and even from other "common" processes. **Containers** are a form of operating system virtualization. A single **container** can be used to run anything from a **microservice** or software process to a larger application.

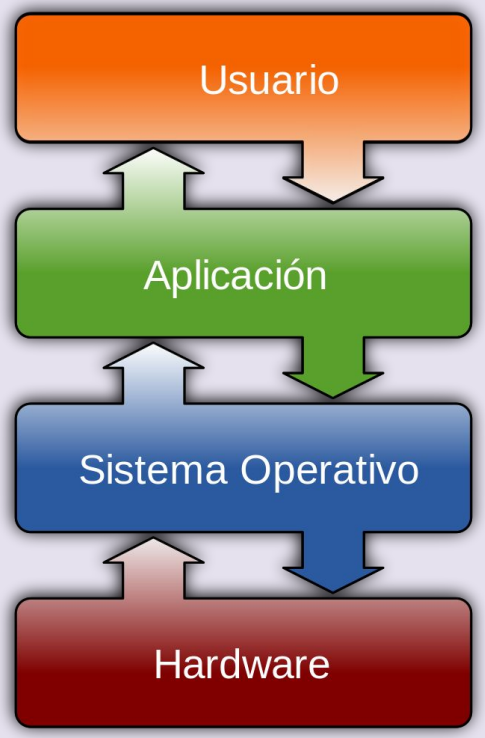
Cloud

The cloud is not a **physical entity** but an **enormous network of remote servers worldwide** that are connected to function as a **single ecosystem**. These servers are designed to **store and manage data**, **run applications**, or **deliver content or services**, such as **video streaming**, **webmail**, **office software**, or **social media**. Instead of accessing **files and data** from a **personal or local computer**, you access them **online** from any **device connected to the Internet**, meaning **information is available wherever you go and whenever you need it**.

Operative system and environment variables

Environment variables are **variables** available to your **program/application** dynamically at **runtime**. The value of these **variables** can come from various sources: **text files**, **third-party secret managers**, **calling scripts**, etc.

What's important here is that the value of these **environment variables** is **not hardcoded** into your program. They are truly **dynamic** and can change depending on the **environment** in which your program runs.



Architecture

Software architecture consists of **patterns** or **guidelines** that aid in the **construction of a program** (application). These **patterns** serve as a **guide** for **developers**, **analysts**, and all **related roles** to meet the **application's requirements**.

Defining **technologies** is one of the most **important aspects** of **software architecture**, but it doesn't mean that if a decision is made, it is something **final** that cannot be **changed in the future**.

One of the objectives of **software architecture** is to create an **application structure** that is **easily scalable** and **not heavily coupled**.

07

Latest developments

in technology

Latest developments

Virtual Reality

- Education
- Culture
- Events sector
- Customer experience

3D Printing

- Prosthesis
- Automotive industry
- Construction
- Food
- Space
- Etc

IOT

- Medicine
- Farms
- Schools
- Space
- Domotics
- Etc

Latest developments

Machine learning

Machine learning is a branch of artificial intelligence that allows machines to learn without being specifically programmed to do so.

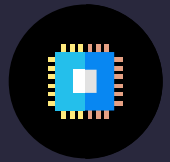
Big data

Big Data is a term that describes the sheer volume of data, both structured and unstructured, that floods businesses every day.

Criptomonedas

They use a complex code to create a single, verifiable currency that can be traded online and used to make purchases. They are decentralized.

Latest developments

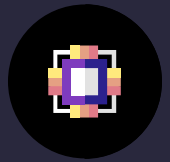


Quantum computing

It is based on the use of cubits, a special combination of ones and zeros. It is a computing paradigm different from that of classical computing.

5G

5G technology offers a theoretical maximum speed of 20 Gbps, while the maximum speed of 4G technology is only 1 Gbps.

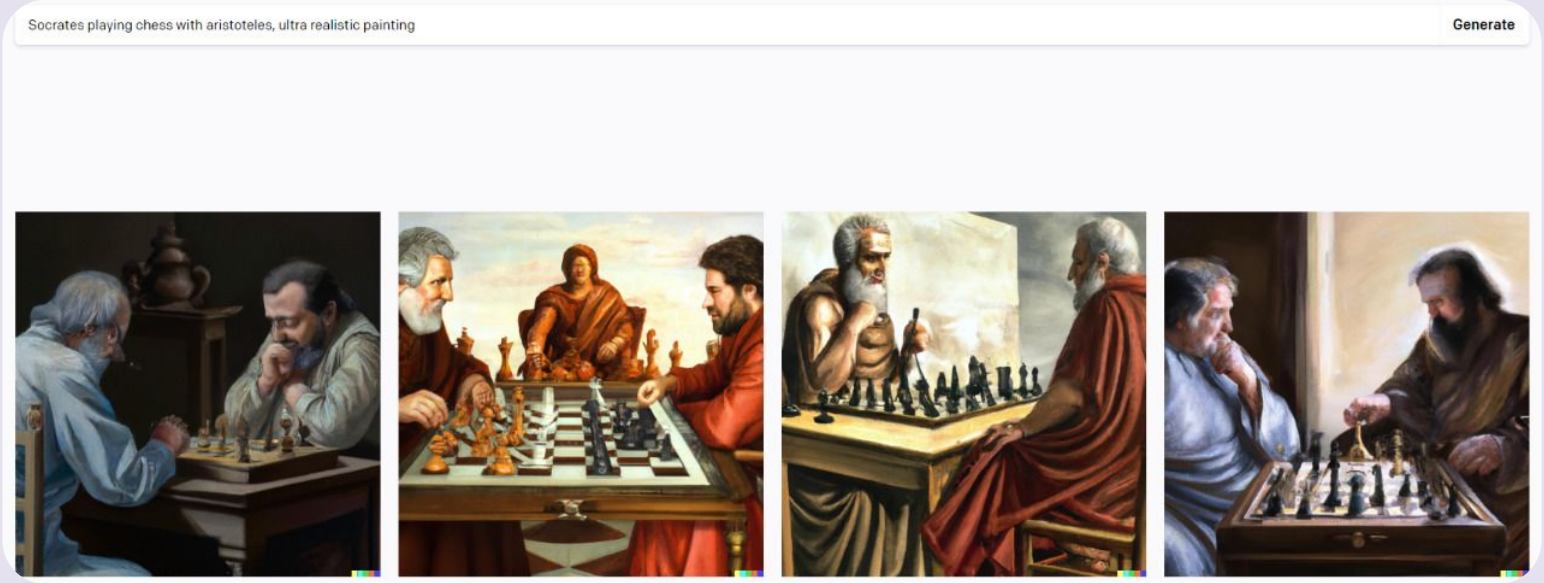


Neural networks

A set of neurons connected to each other and working together, without a specific task for each one.

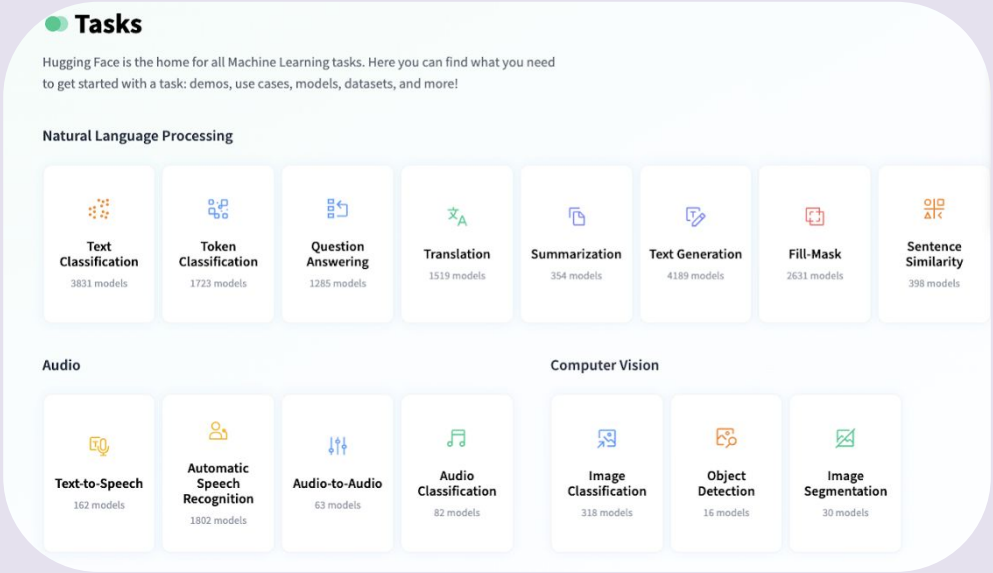
Main advances in AI

DALL-E 2



Main advances in Ai

Hugging Face



Start of 2023

We tried the AI-powered version of Microsoft Bing. Its huge, user-friendly search box and detailed responses make it so much better than Google.

Google vs. Microsoft: guerra abierta por la inteligencia artificial que va a cambiar tu vida

Microsoft desafía a Google: Bing es solo el principio