

# Background and historical perspectives

MODULE 1 / UNIT 1 / 1.1

MOISES M. MARTINEZ

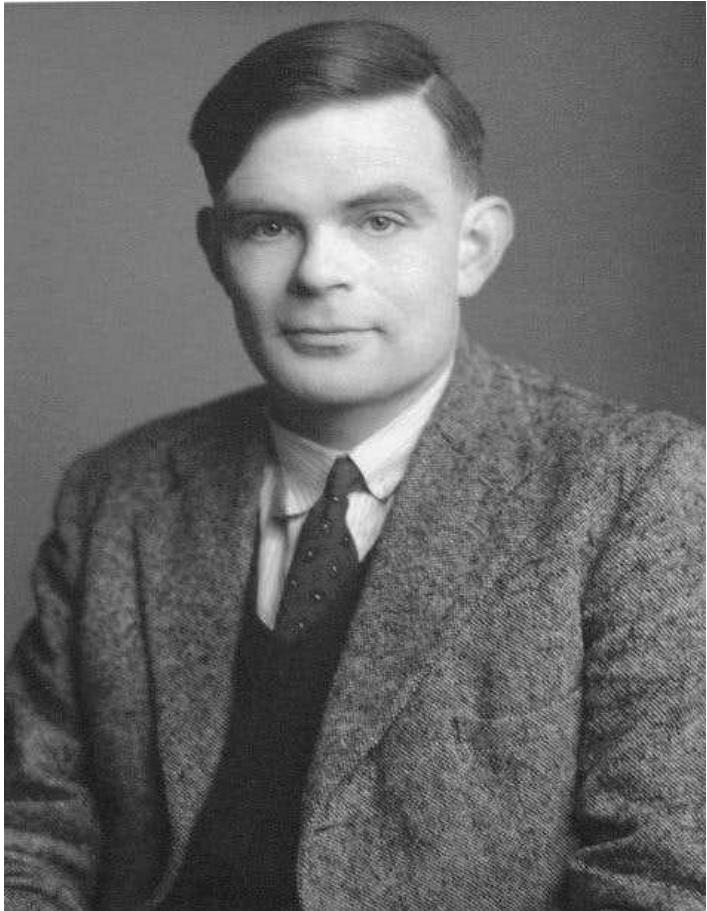
FUNDAMENTALS OF COMPUTER ENGINEERING

2025/2026

The beginning of  
Computer Science

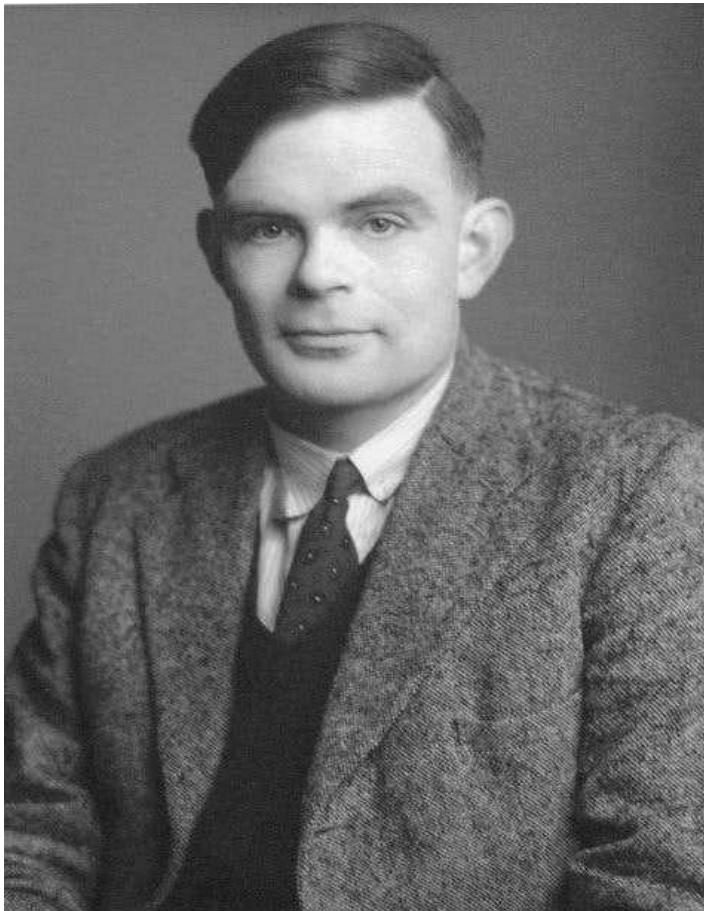
01

**The beginning of everything (Before 1940)**



**Who is this guy?**

## The beginning of everything (Before 1940)



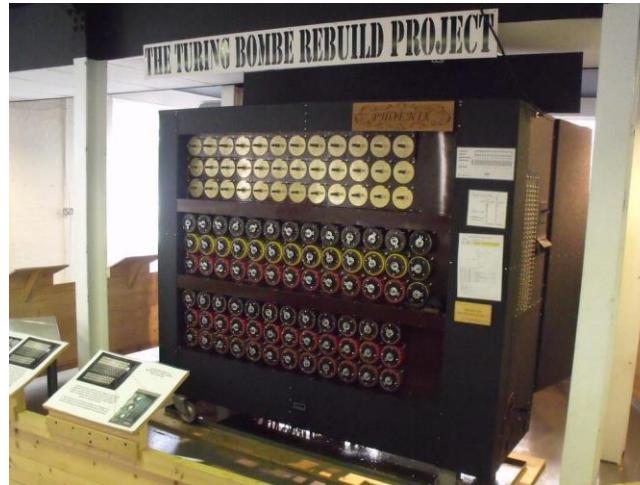
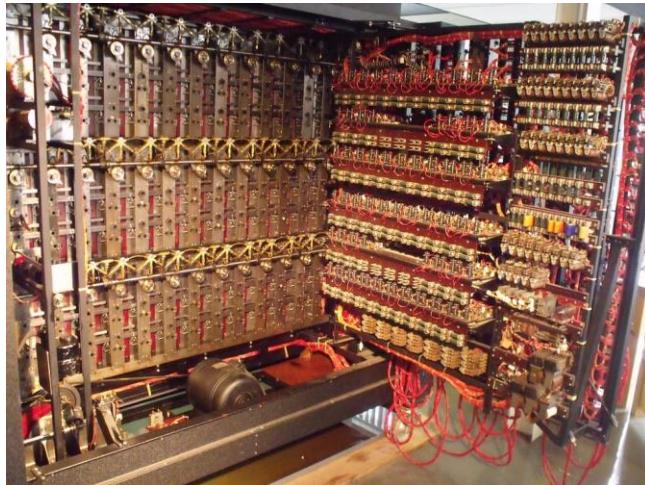
Alan Turing (1912-1954), a British mathematician, is widely regarded as one of the pioneers in the field of modern computing and Artificial Intelligence.

- He engineered the Phoenix, commonly known as the 'bomb,' a crucial apparatus instrumental in deciphering the codes generated by the Enigma machine.
- He formulated the Turing Test in 1950, a benchmark for assessing machine intelligence based on its ability to provide responses indistinguishable from those of a human.
- He conceptualized the Turing Machine, an automaton with the capacity to recognize any formal language.

# The beginning of Computer Sciences

## The beginning of everything (Before 1940)

The Bomba (1940), colloquially referred to as the Phoenix, represented a distinctive mechanical computing device designed for the purpose of ascertaining the rotor configuration of the Enigma machine. Its operation entailed the execution of a sequence of logical deductions for every conceivable combination.



The replication of the bomb device at Bletchley Park, located in England.

Enigma Machine

# First generation Programming using punched cards

# 02

## First generation (1940 - 1958)

The thermionic valve, also referred to as a **vacuum valve**, vacuum tube, or electron tube, serves as an electronic component employed for the amplification, switching, or manipulation of an electrical signal. This manipulation occurs through the control of electron flow within a near-vacuum or in the presence of specific gases, thereby operating within a confined space characterized by extremely low pressure.



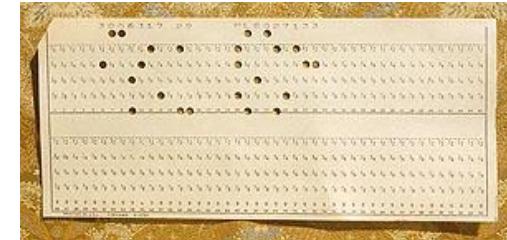
vacuum valve



Mercury tube



Magnetic drum

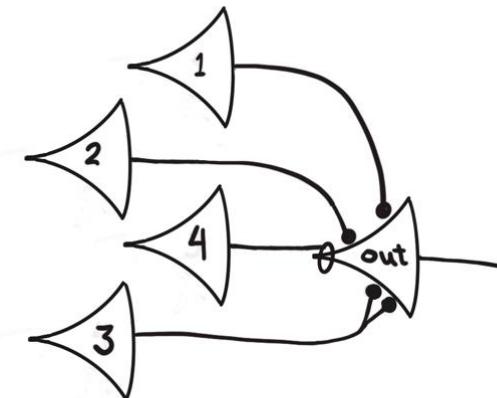
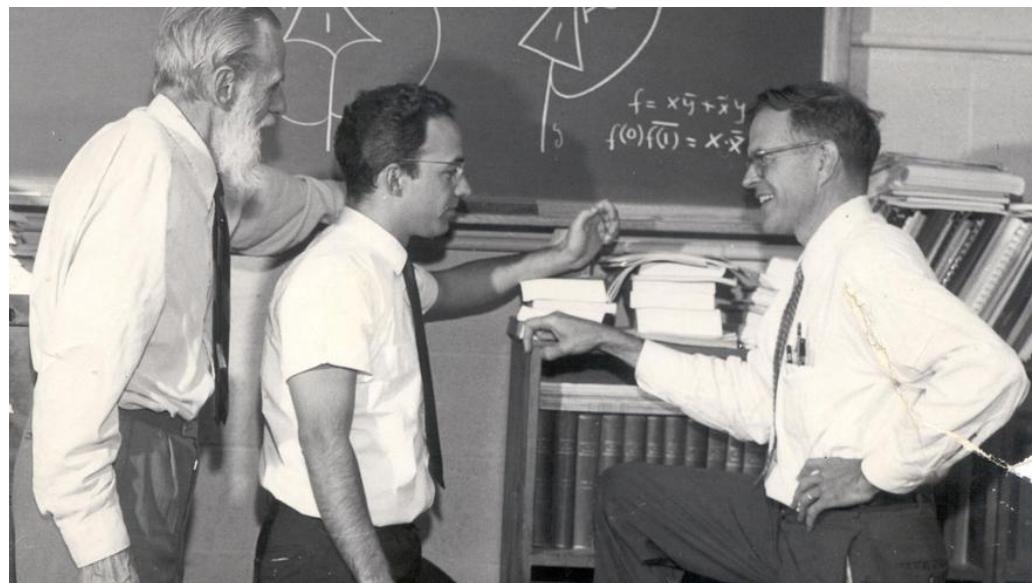


Punched Card

- Memory was constructed using liquid **mercury tubes** and **magnetic drums**.
- The internal storage system featured a high-speed rotating drum, where a read/write device inscribed magnetic markings.
- Programs were loaded into the system using **punched cards**.

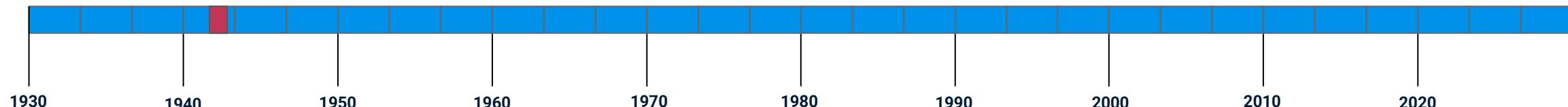
## First generation (1940 - 1958)

The first computational model of a neuron (MCP) was proposed by Warren McCulloch and Walter Pitts in 1943.



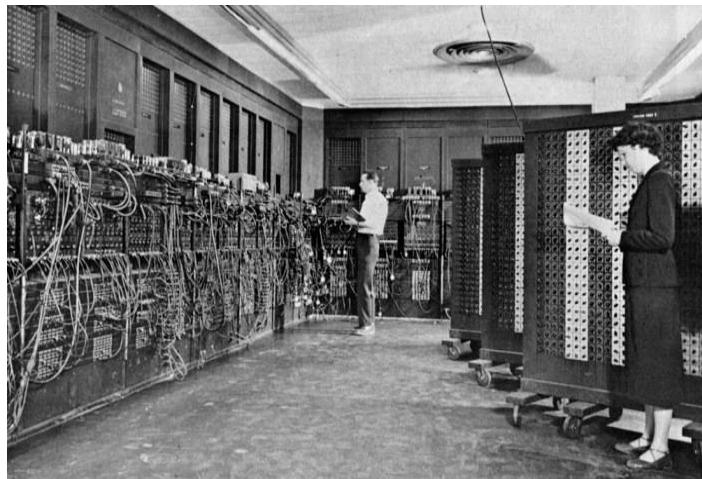
	1	2	3	4	out
F	F	F	F	F	F
T	F	F	F	F	F
F	T	F	F	F	F
T	T	F	F	F	T
F	F	T	F	F	T
T	F	T	F	F	T
F	T	T	F	F	T
T	T	T	F	F	T
X	X	X	T	F	

$$N_{out}(t+1) = ((N_1(t) \cdot N_2(t)) \vee N_3(t)) \cdot \sim N_4(t)$$



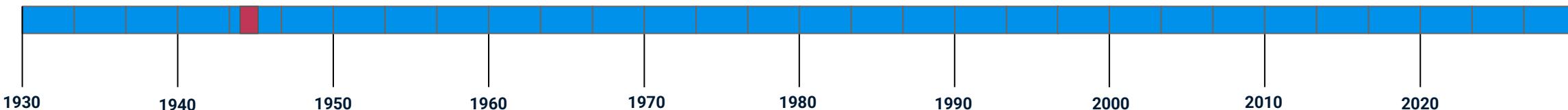
## First generation (1940 - 1958)

The ENIAC (Electronic Numerical Integrator And Computer) is recognized as one of the pioneering electromechanical computers with general-purpose capabilities. Its functionality was contingent upon the specific programming instructions it received, allowing it to execute diverse tasks as per the applied programming.



It was designed for the purpose of computing artillery firing tables for the United States Army and occupied a physical footprint of 167 square meters, with a total weight of approximately 27 tons.

- 5,000 add operations per second.
- 300 multiplication operations per second.

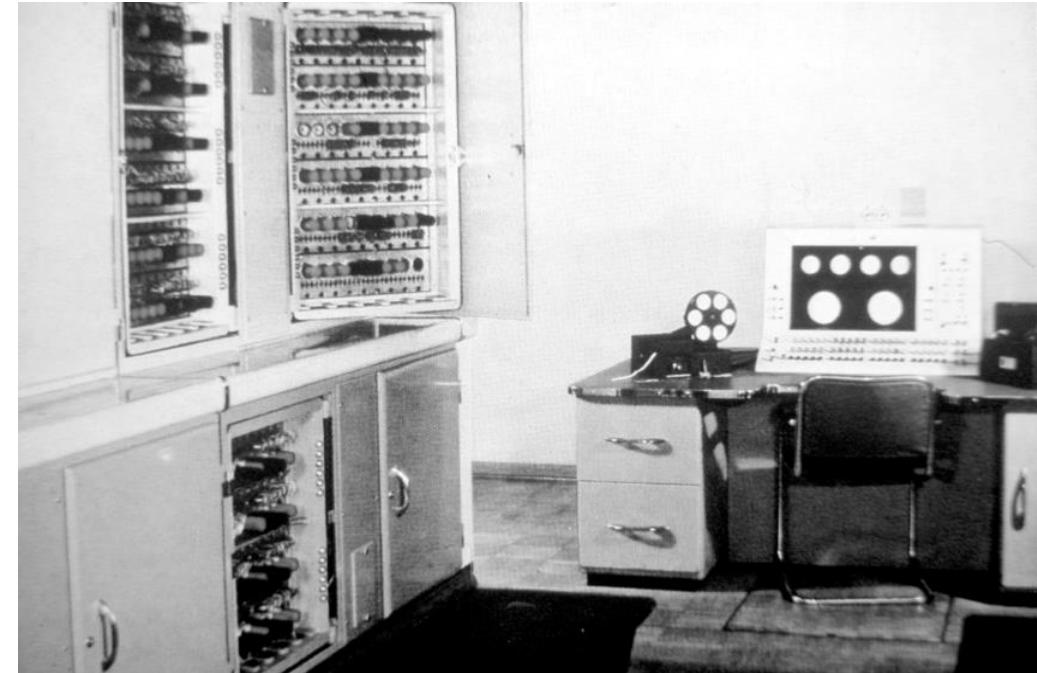


# Background and historical perspectives

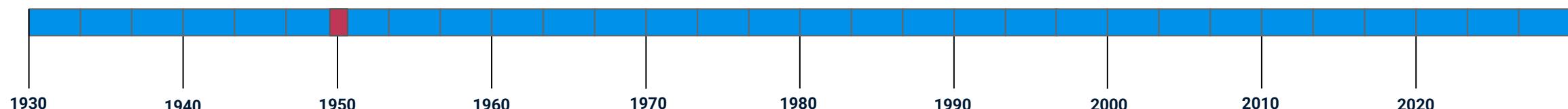
## First generation (1940 - 1958)



UNIVAC (UNIVersal Automatic Computer)

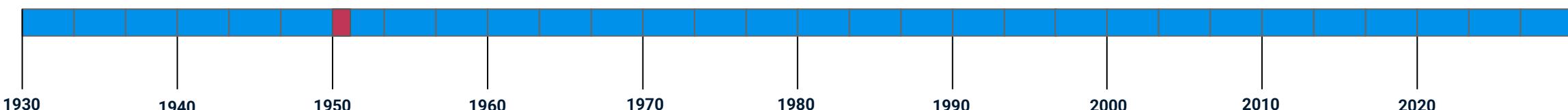
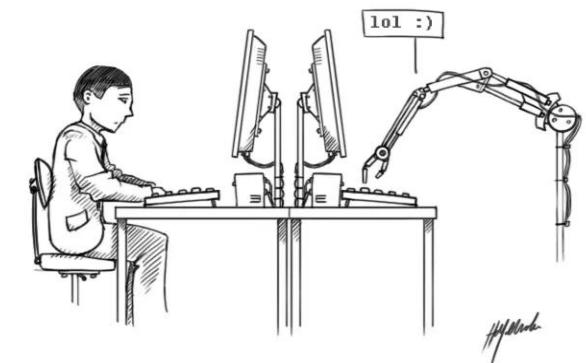


Ferranti Mark I



## First generation (1940 - 1958)

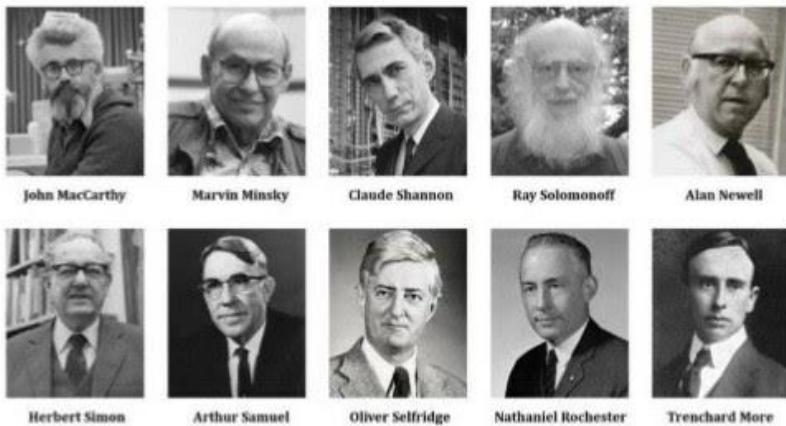
Alan Turing authored the publication 'Computing Machinery and Intelligence' in 1950, wherein he expounds upon the renowned concept of the Turing Test.



# Background and historical perspectives

## First generation (1940 - 1958)

The Dartmouth Summer Research Conference on Artificial Intelligence in 1956 marked a significant milestone in the emergence of Artificial Intelligence as a field dedicated to delineating applications that endeavoured to replicate the cognitive and behavioural paradigms of human reasoning.



### A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence

August 31, 1955

John McCarthy, Marvin L. Minsky,  
Nathaniel Rochester,  
and Claude E. Shannon

This Dartmouth summer research project in artificial intelligence was initiated by the Author, John McCarthy, in 1955. It is to be conducted by Marvin Minsky, Nathaniel Rochester, and Claude Shannon, and others. The project will consist of approximately 100 pages plus a title page. Copies of the report will be distributed to all interested parties. The report will be prepared in a form suitable for publication, and the remaining pages will specify how it is to be used. The report will be submitted to the Dartmouth College Library for permanent storage. The report will be available to anyone interested in the background of the project.

From discussions and consensus, some kinds of problems now exist for humans, which can be solved by machines. Some significant advance can be made in one or more of these areas. The purpose of this project is to bring together a number of scientists who can work together to solve some of the problems of the field.

1. Automatic Computation. This is an area where an automatic computer can be programmed to consider the problem of learning or problem solving. Present computers may be insufficient to handle such problems, but they are capable of much more capacity than our ability to write programs. In this area, we must determine what we know.

2. How Can Computers Think? This is an area where we must determine what we know about the way in which computers can think. It may be speculated that a large part of human knowledge is contained in the form of rules according to rules of reasoning and rules of inference. If this is true, then the problem of generalization consists of admitting a few

### The Dartmouth College Artificial Intelligence Conference: The Next Fifty Years

James Moor

Marvin Minsky, Claude Shannon, and others. McCarthy wanted, as he says, "to make sure that the Dartmouth project would be the most important thing in the world." McCarthy is credited for the first use of the term "artificial intelligence". The Dartmouth Conference is considered to be the first. It is interesting to speculate what would have happened if McCarthy had not been called to the meeting. He was invited by the Director of the Research Council of the University of Michigan, and the name probably derives from the Director's suggestion.

McCarthy gave some specifications. He said that the project should be a proposal for the organization of a summer research project at the Dartmouth College. The project did not come at the same time that McCarthy had intended. In fact, it came later. McCarthy emphasized that the project should be a summer research project, and that it should be organized by the Director of the Research Council of the University of Michigan, and the name probably derives from the Director's suggestion.

This project was called today as the Dartmouth Conference.

The project was to be organized on the basis of a proposal written by John McCarthy.

Marvin Minsky commented that the project was to be organized on the basis of a proposal written by John McCarthy.

John McCarthy was the first to propose to organize the Dartmouth Conference.

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1930

1940

1950

1960

1970

1980

1990

2000

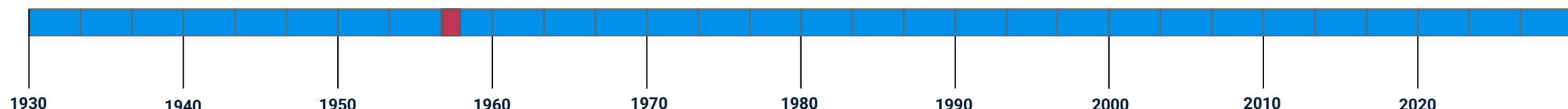
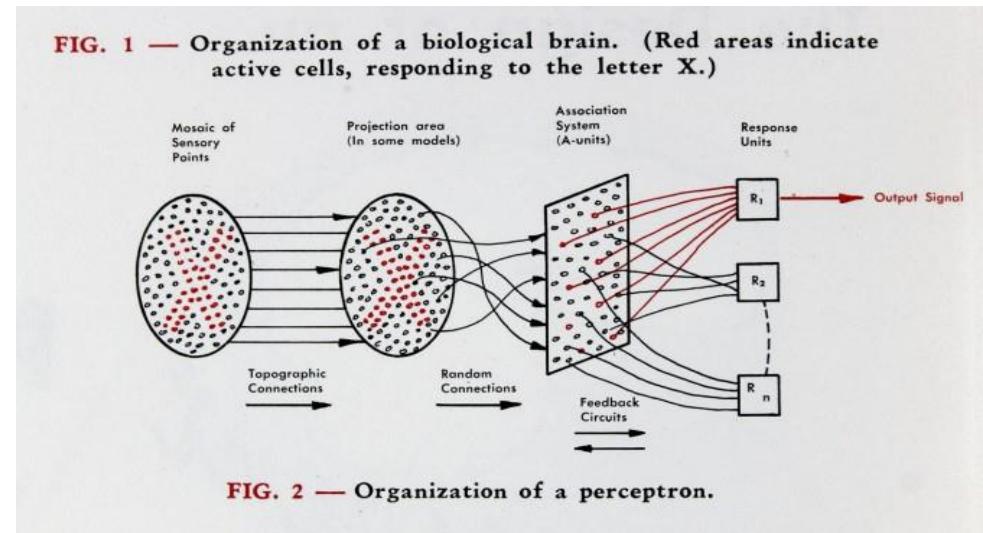
2010

2020

# Background and historical perspectives

## First generation (1940 - 1957)

Frank Rosenblatt combined the MCP neuron and the findings of Hebb's Rule creating the **first perceptron** introducing the concept of training (1957).



# Second generation

## The arrival of transistors

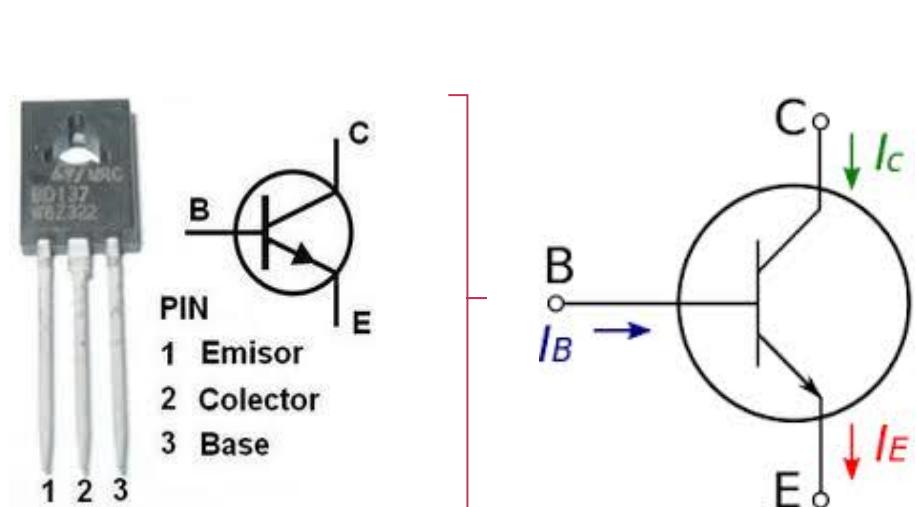
# 03

## Second generation (1957 - 1964)

The transistor is a semiconductor electronic device employed for the generation of an output signal in reaction to an input signal, with the capability for amplification, oscillation, switching, or rectification.



Replica first transistor

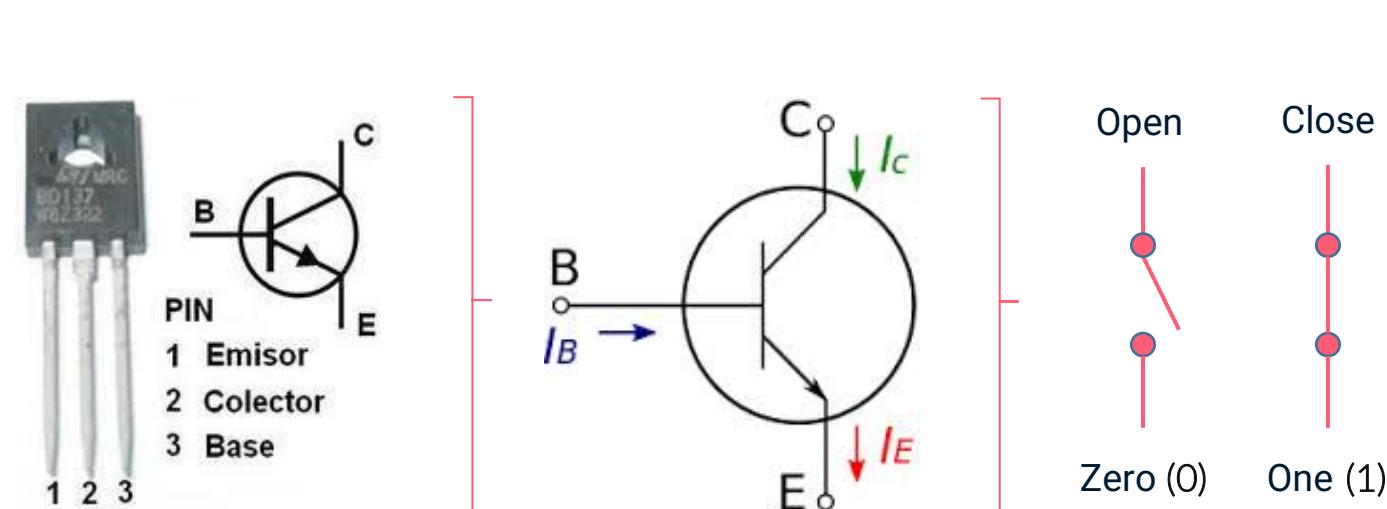


## Second generation (1957 - 1964)

The transistor is a semiconductor electronic device employed for the generation of an output signal in reaction to an input signal, with the capability for amplification, oscillation, switching, or rectification.



Replica first transistor



It serves as a switch in digital electronics, enabling the modulation of current conduction between the collector and the emitter by utilizing a low-intensity current through the base ( $I_B$ ) to either enable or disable the flow of current between the collector ( $I_C$ ) and emitter ( $I_E$ ).

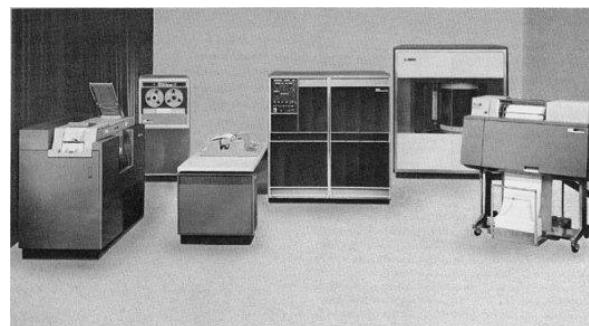
## Second generation (1957 - 1964)

Central computers, commonly known as **mainframes** or **iron**, are centralized electronic systems used by large organizations for critical functions, such as processing Big Data, enterprise resource planning, and managing substantial transaction volumes.

- They support time-sharing systems by centralizing resources and enabling user access through simple terminals.
- Their interfaces are less user-friendly, central computers provide the advantage of independent programming with high-level languages, regardless of the underlying hardware infrastructure.



PDP 1



IBM 1401



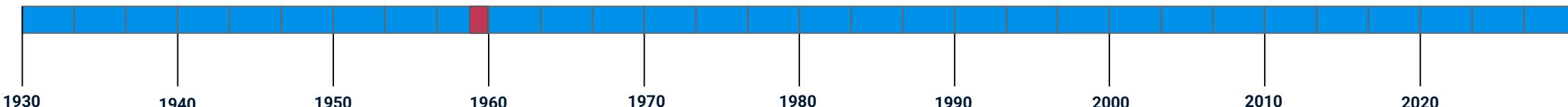
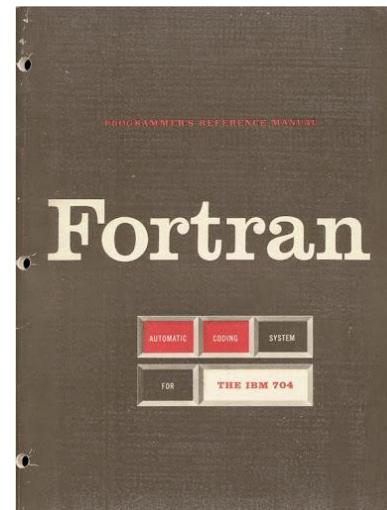
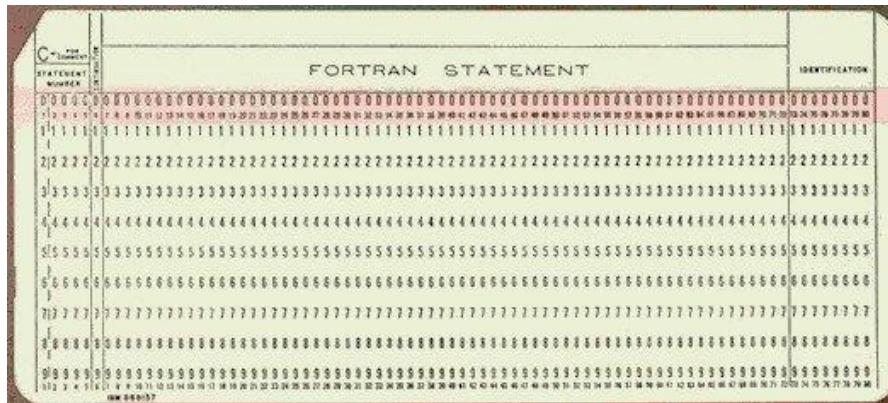
IBM 1621



IBM 360

## Second generation (1957 - 1964)

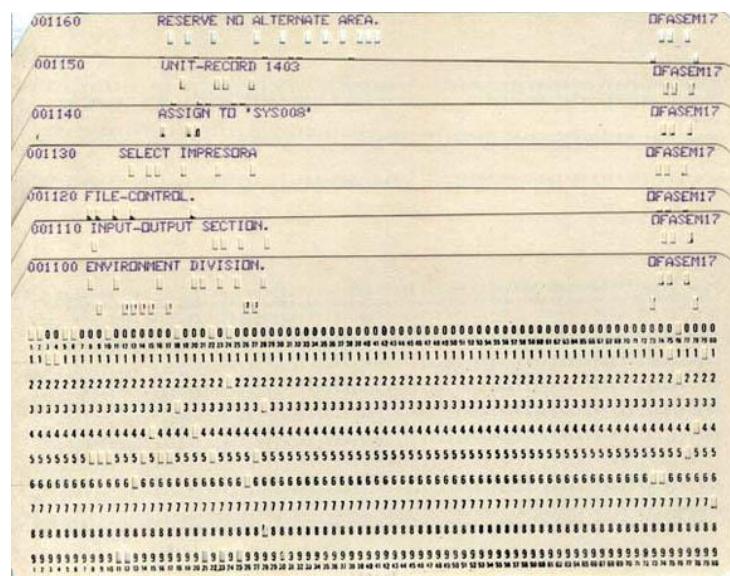
FORTRAN (**F**ormula **T**ranslation) emerged as a pioneering high-level programming language, widely used for scientific and engineering applications due to its efficiency in numerical and mathematical computations.



# Background and historical perspectives

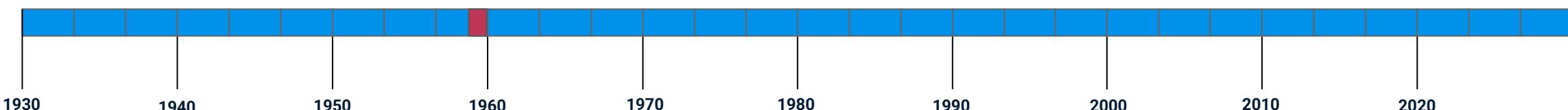
## Second generation (1957 - 1964)

COBOL, an acronym for 'C0mmon Business-Oriented Language,' was introduced in 1959. It was specifically designed to be executed on a wide range of computers using a compiler.



```
COMMAND → PROC-REG-ENTRADA. SCROLL → CSH
000924 MOVE CLI-TIPCTA-ENT TO CLI-TIPCTA-SAL.
000925 MOVE NUMCTA-ENT TO NUMCTA-SAL.
000926 MOVE NOMREP-ENT TO NOMREP-SAL.
000927 MOVE NOMCLIE-ENT TO NOMCLIE-SAL.
000928 MOVE DOMIC-CLI-ENT TO DOMIC-CLI-SAL.
000929 MOVE SALDOMAX-ENT TO SALDOMAX-SAL.
000930 MOVE EL-FECHA-ENT <IND-FECHA-ENT-FIN> TO FECHA-ENTRADA.
000931 IF NUM-MOUS-ENT GREATER SALDOMAX-ENT
000932 MOVE 0 TO IND-VALOR-1
000933 ELSE
000934 COMPUTE IND-VALOR-1 ROUNDED = 1
000935 <NUM-MOUS-ENT / SALDOMAX-ENT>.
000936 MOVE FEC-VALOR-ENT TO FEC-VALOR-SAL.
000937 MOVE FEC-OPER-ENT TO FEC-OPER-SAL.
000938 IF FEC-OPER-ENT =
000939 MOVE ZERO TO NUM-DIAS-BIF
000940 ELSE
000941 CALL 'DIFERDIA' USING FEC-VALOR-ENT.
```

Mathematician **Grace Hopper** was a leading advocate for the adoption of COBOL in both the private sector and the United States military.

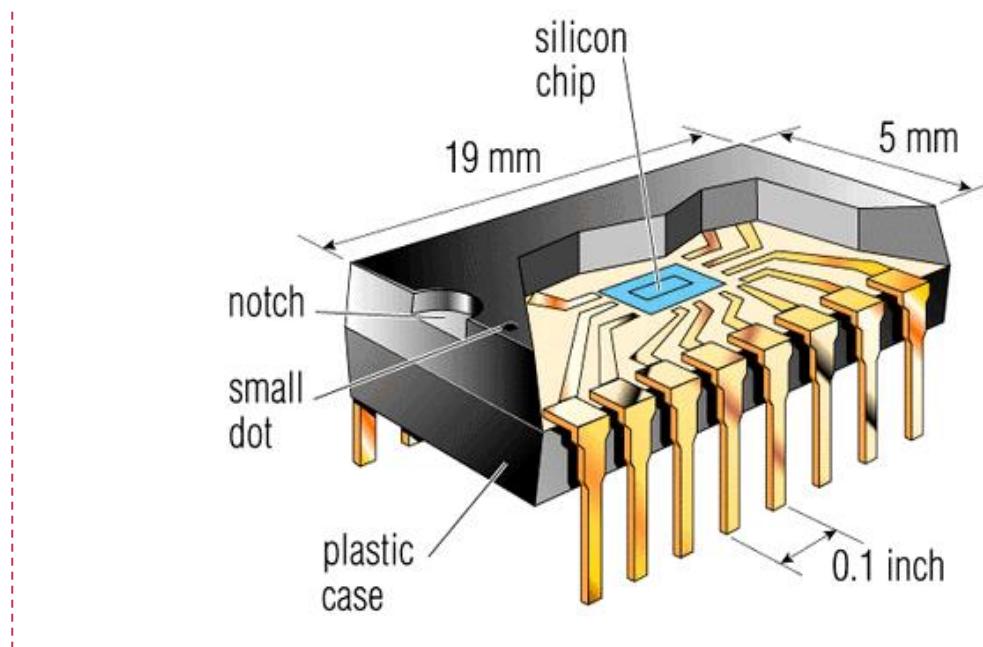
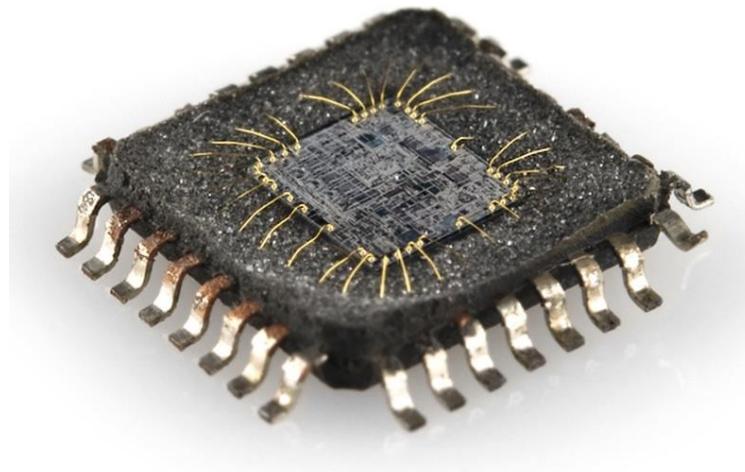


**Third generation**  
Combining transistors  
to form integrated circuits

04

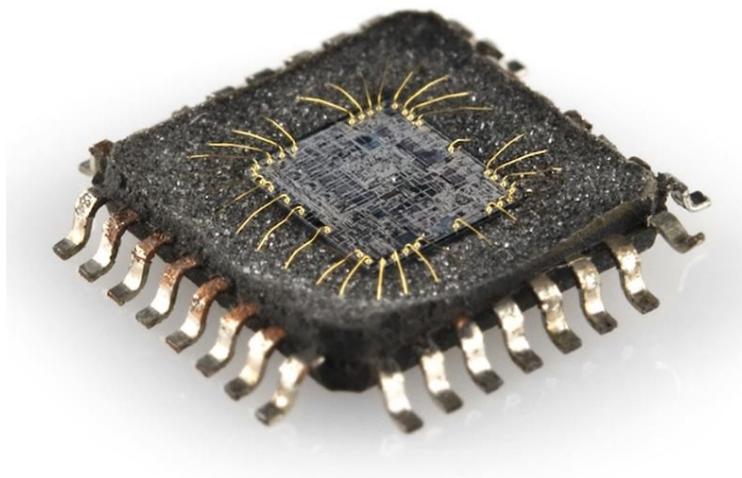
## Third generation (1965 - 1971)

The Integrated Circuit (1959), often referred to as a chip or microchip, represents an electronic device designed to execute particular functions, such as signal amplification. These circuits are constructed using semiconductor materials, notably Silicon, which exhibit characteristics reminiscent of those observed in vacuum tubes.



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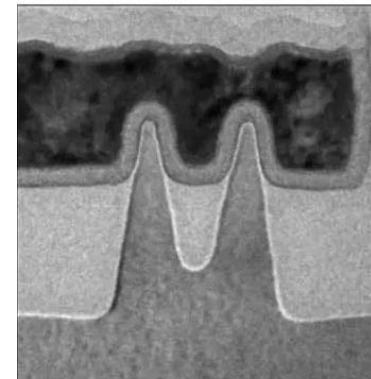
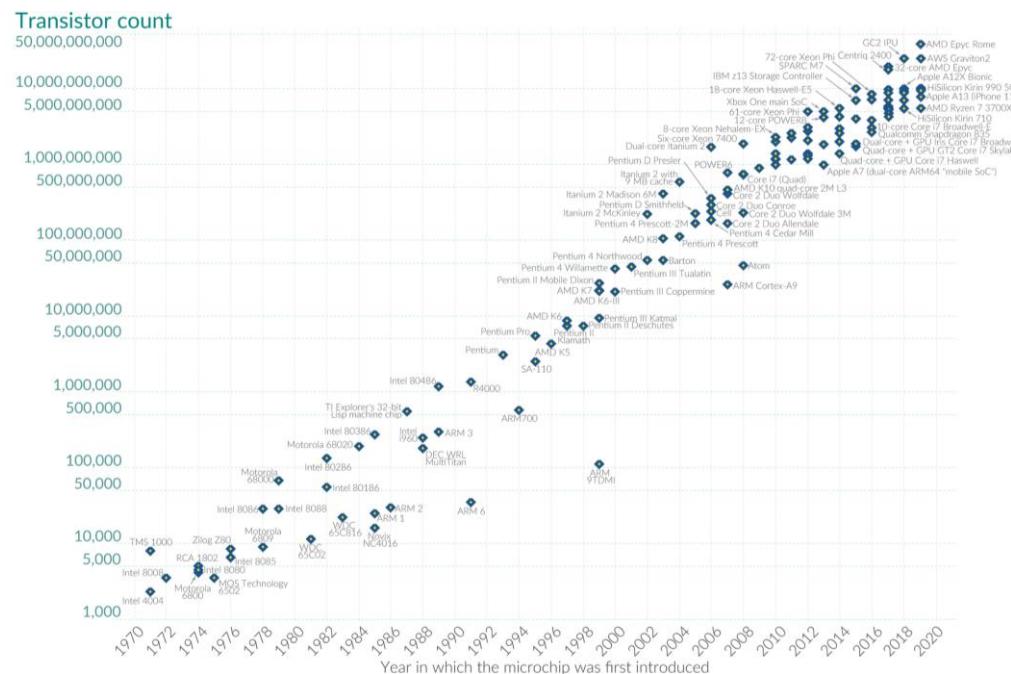


- Analog integrated circuits are constructed through the encapsulation of transistors, which collectively serve as amplifiers or signal oscillators.
- Digital integrated circuits are assembled using encapsulated transistors that operate as fundamental logic gates (And, Not, Or, Xor), designed to manipulate binary values.

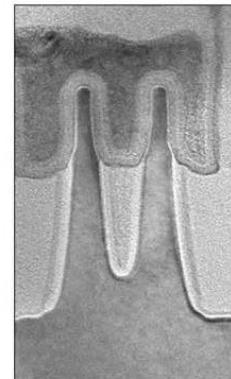
# Background and historical perspectives

## Third generation (1965 - 1971)

Moore's Law, introduced in 1971, is an empirical principle that posits that the quantity of transistors on an integrated circuit will roughly double approximately every two years. Initially, this law was articulated with the expectation of an annual doubling of transistor counts.



Transistor  
22 NM

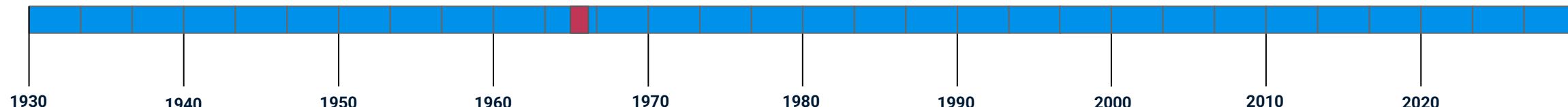
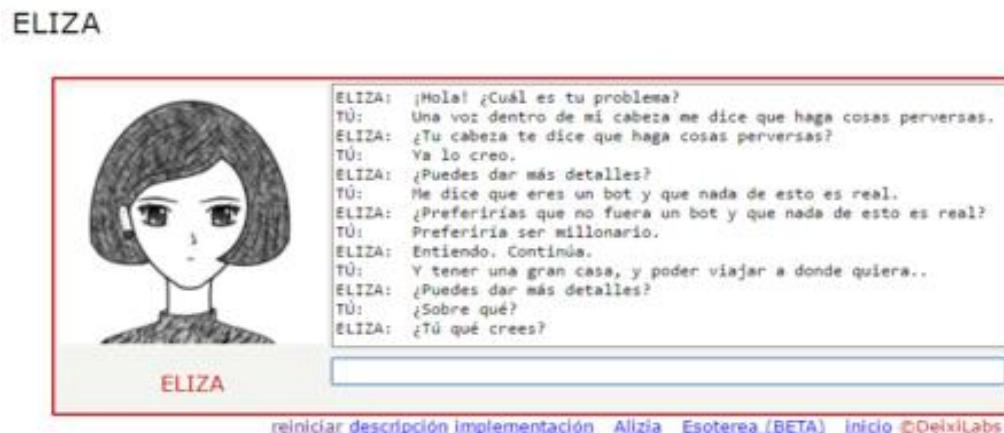
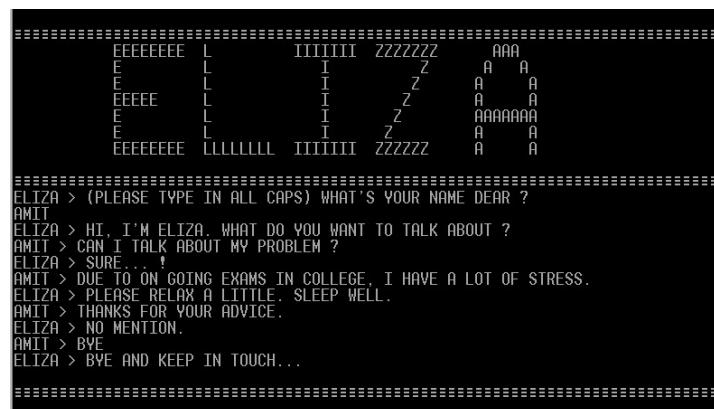


Transistor  
14 NM

A nanometer corresponds to  $10^{-7}$  centimeters, which is equivalent to 0.0000001 centimeters.

## Third generation (1965 - 1971)

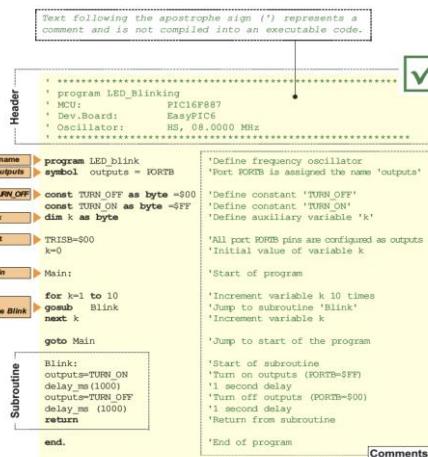
The inception of the first chatbot, named ELIZA, in 1965 marks a pivotal milestone as it is widely recognized as the inaugural conversational bot. ELIZA's functioning was predicated on the identification of keywords within input sentences, generating responses based on pre-registered model phrases within its database.



# Background and historical perspectives

## Third generation (1965 - 1971)

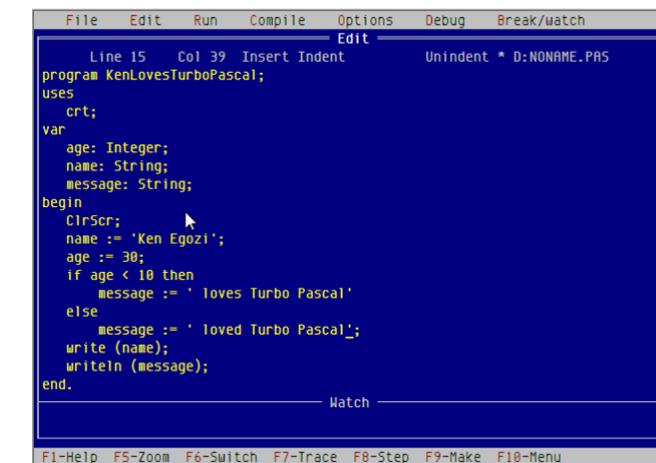
The emergence of imperative, pedagogically-oriented programming languages, exemplified by BASIC (Beginner's All-purpose Symbolic Instruction Code, 1964) and Pascal (1971), occurred with the specific intent of serving as educational tools for training prospective programmers.



The screenshot shows a BASIC code editor interface. The code is as follows:

```
*****  
* program LED_Blinking  
* PIC16F887  
* Dev.Board: Basic16  
* Oscillator: HS, 08.0000 MHz  
*****  
  
program LED_blink  
symbol outputs = IORTB  
  
Constant TURN_OFF const TURN_OFF as byte = $00  
const TURN_ON byte = $FF  
Variable k dim k as byte  
  
Statement TRISB=$00  
k=0  
  
Label Main:  
  
Jump to Subroutine Blink  
for k=1 to 10  
gosub Blink  
next k  
goto Main  
  
Subroutine Blink:  
outputs:=TURN_ON  
delay_ms(1000)  
outputs:=TURN_OFF  
delay_ms(1000)  
return  
  
end.  
  
Comments
```

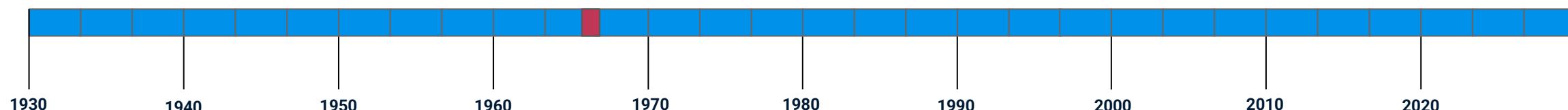
Source code example in BASIC



The screenshot shows a Pascal code editor interface. The code is as follows:

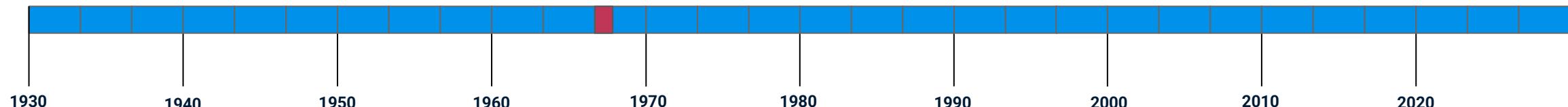
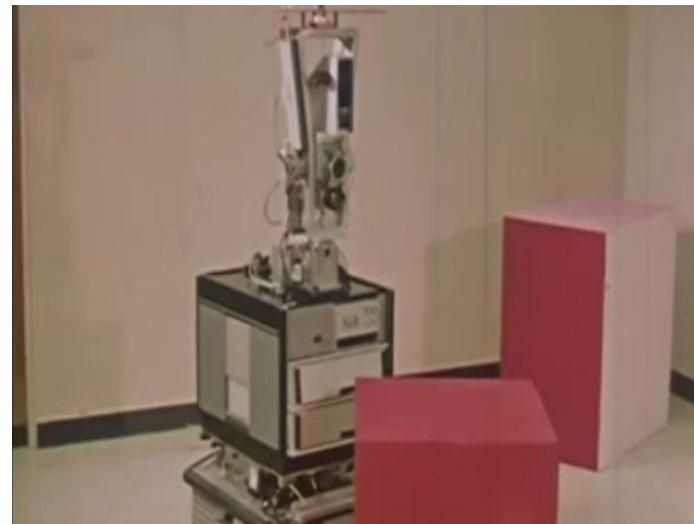
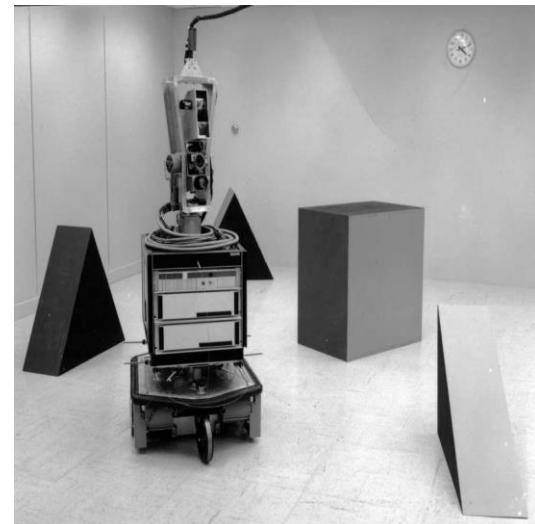
```
Line 15 Col 39 Insert Indent Unindent * D:NONAME.PAS  
program KenLovesTurboPascal;  
uses  
  crt;  
var  
  age: Integer;  
  name: String;  
  message: String;  
begin  
  ClrScr;  
  name := 'Ken Egozi';  
  age := 30;  
  if age < 10 then  
    message := ' loves Turbo Pascal'  
  else  
    message := ' loved Turbo Pascal';  
  write (name);  
  writeln (message);  
end.
```

Source code example in Pascal



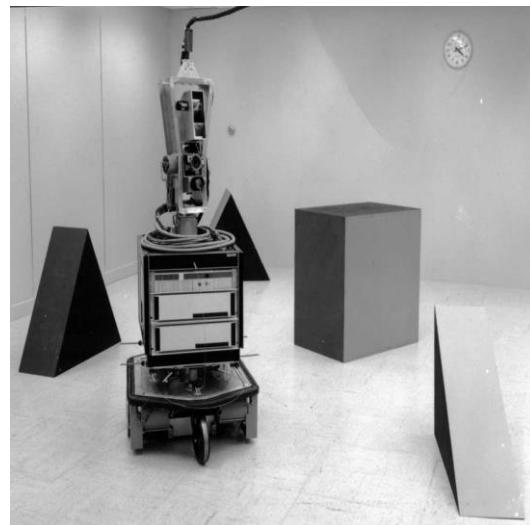
## Third generation (1965 - 1971)

The Shakey robot, developed in 1966, stands as a pioneering example of a robot with the ability to engage in deliberative reasoning regarding its actions. This capacity was facilitated through the application of the General Problem Solver (GPS) system and the implementation of Automated Planning.

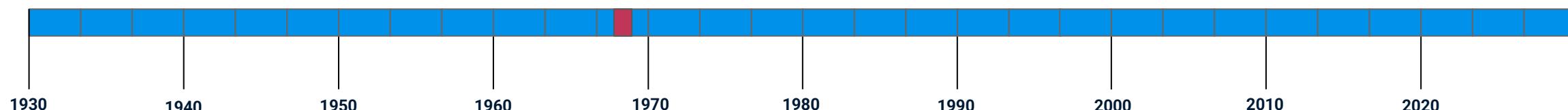
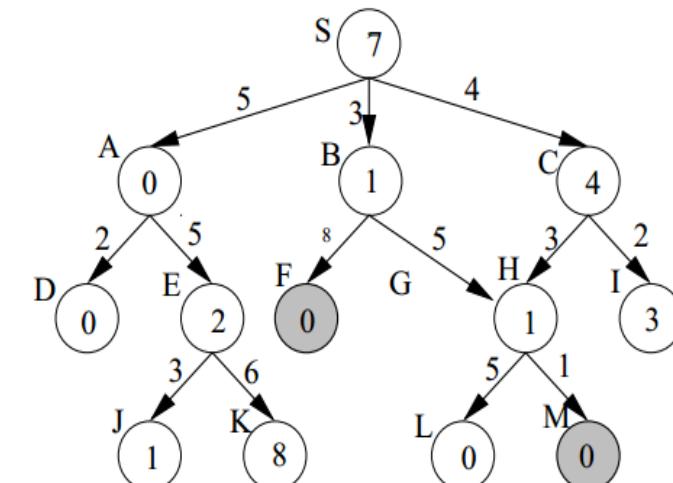


## Third generation (1965 - 1971)

The A\* algorithm, conceived in 1968, represents a seminal development that gave birth to the field of informed heuristic search. This algorithm has since been instrumental in addressing a wide array of challenges related to search, optimization, and reasoning problems.

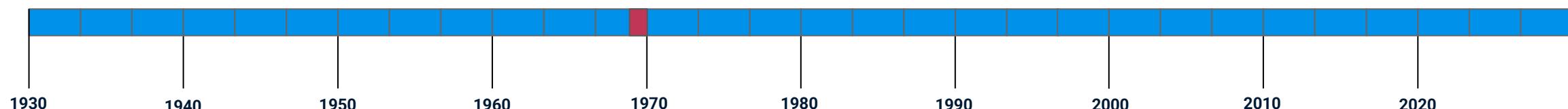
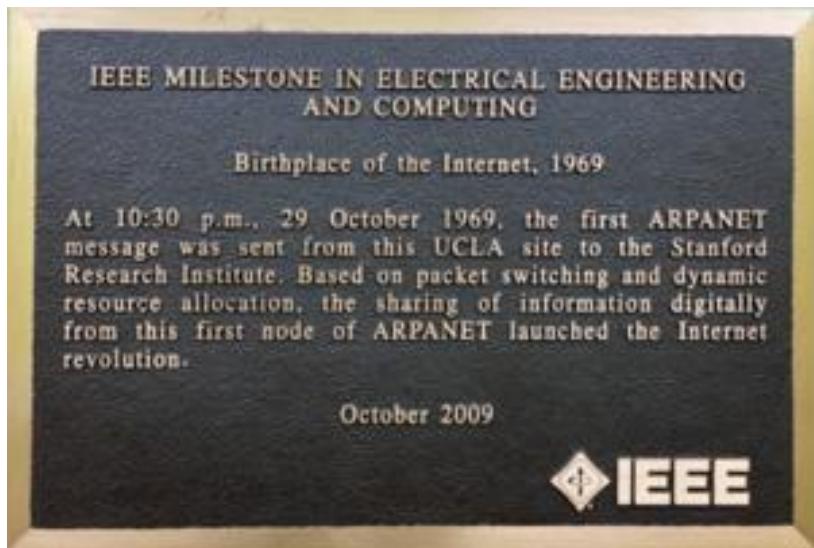
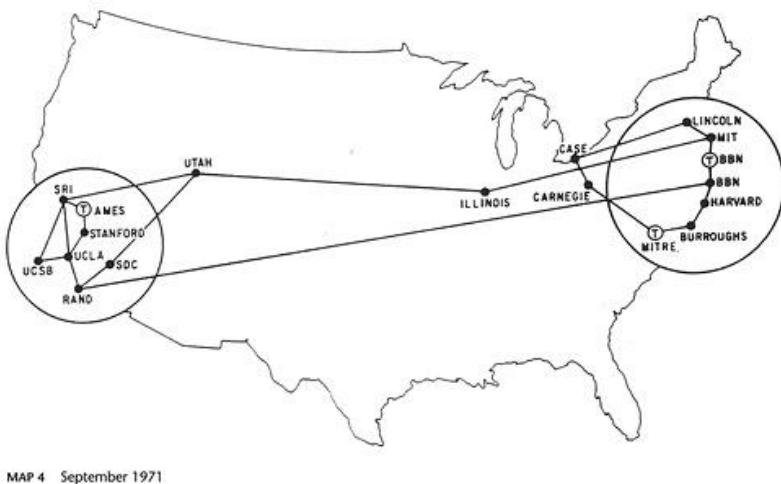


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4	3	2	3	4	5	6	7	8		16	17	18	19
3	2	1	2	3	4	5	6	7		15	16	17	18
2	1	0	1	2	3	4	5	6		14	15	16	17
3	2	1	2	3	4	5	6	7		13	14	15	16
4	3	2	3	4	5	6	7	8		12	13	14	15
5	4	3	4	5	6	7	8	9	10	11	12	13	14
6	5	4	5	6	7	8	9	10	11	12	13	14	15



## Third generation (1965 - 1971)

The U.S. Advanced Research Projects Agency Network (ARPANET), developed in 1969, was the first public packet-switched computer network between three universities in California, pioneering the fundamental technologies that would later form the backbone of the modern Internet.



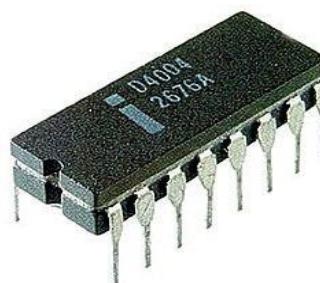
# Fourth generation Microprocessors and computer networks

# 05

## Fourth generation (1971 - 1981)

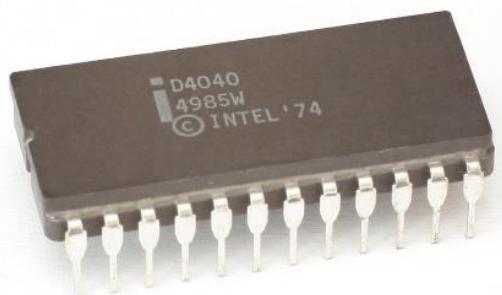
The Microprocessor, introduced in 1971, is an integrated circuit endowed with the capability to execute instructions encoded in binary language. It performs elementary arithmetic and logical operations, including addition, subtraction, multiplication, division, binary logic (such as 'and' and 'or' operations), and memory access functions. This pivotal component comprises at least two fundamental elements:

- Arithmetic Logic Unit (ALU): This digital circuit facilitates the execution of arithmetic and logical operations between values stored within the registers of the register bank.
- Register Bank: It comprises a collection of high-speed, small-capacity memory registers intended for the storage of operands and their corresponding results.

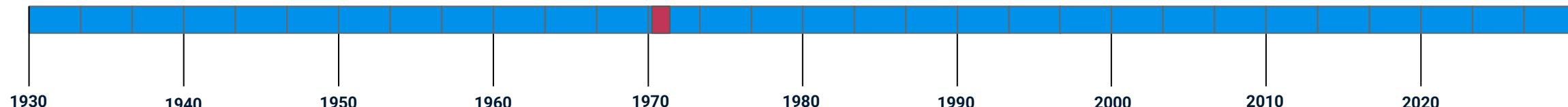
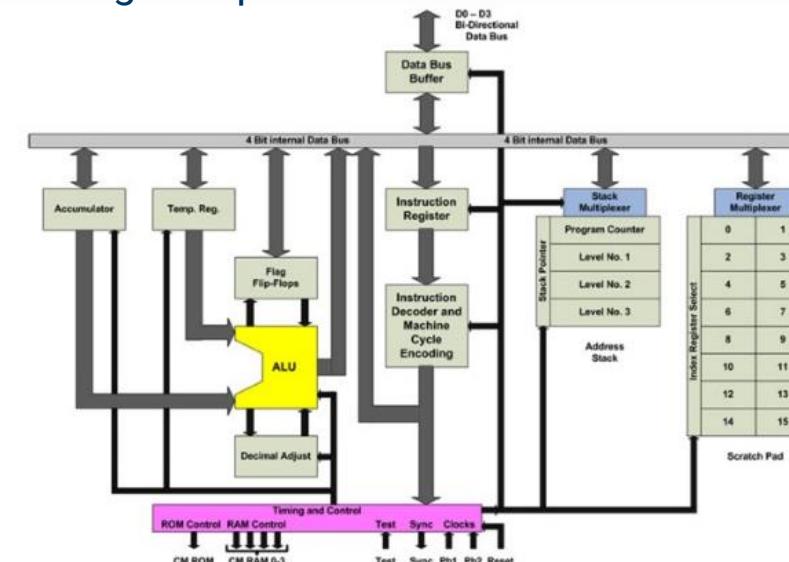


## Fourth generation (1971 - 1981)

In 1971, Intel developed the inaugural microprocessor, known as the **Intel 4040**, specifically designed for a calculator featuring a 4-bit Central Processing Unit (CPU). This pioneering microprocessor incorporated an Arithmetic Logic Unit (ALU), a register bank, and a 4-bit Bus, all integrated onto a single chip.



INTEL 4040



## Fourth generation (1971 - 1981)

High-speed computer networks serve as infrastructures facilitating data exchange and resource sharing among diverse systems. They enable the interconnection of numerous machines within a confined space, whether within a building, campus, or urban area, allowing the rapid transmission of small data packets between them in a matter of microseconds.

- Local Area Network (LAN): A LAN constitutes a wired network tailored for a limited number of systems, typically confined to a small geographical area.
- Metropolitan Area Network (MAN): MANs function as a 'metropolitan' network type, enabling the interconnection of LANs or WLANs at high-speed rates. MANs are typically deployed to link regions within the same city or smaller municipalities.
- Wide Area Network (WAN): WANs encompass expansive network architectures that interconnect LANs, WLANs, and MANs. Such networks are commonly established and managed by Internet Service Providers (ISPs).
- Wireless Local Area Network (WLAN): WLANs are wireless networks designed to facilitate access for a restricted number of systems through wireless access points.

## Fourth generation (1971 - 1981)

UNIX operative system, established in 1971, comprises a lineage of multitasking, multiuser computer operating systems. Unix systems are distinguished by their modular design, often referred to as the 'Unix philosophy,' which encompasses the following key components:

- A unified, inode-based filesystem known as the Unix filesystem.
- A primary mode of inter-process communication based on pipes.
- Shell scripting and command language, embodied in the Unix shell, are utilized to amalgamate various tools, enabling the execution of intricate workflows.

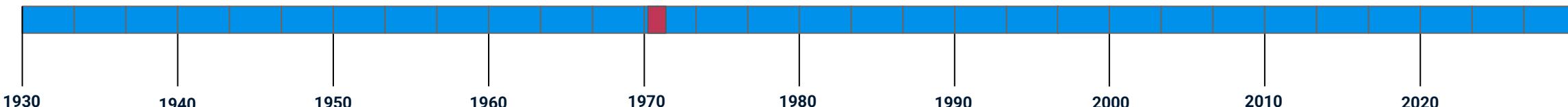


Dennis Ritchie (C) and Ken Thompson (UNIX).

```
$ simh-pdp11 boot.ini
PDP-11 simulator V3.10-0
Disabling XQ
#0=unix

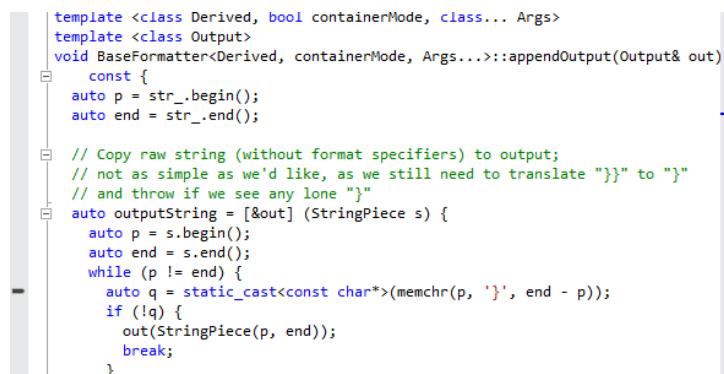
UNIX/3.0.1: unixhptm
real mem = 262144 bytes
avail mem = 195776 bytes
unix
single-user
# init 2
# process accounting started
crondemon started
cron started
multi-user
type ctrl-d

login: root
UNIX Release 3.0
# uname -a
unix unix 3.0.1 hptm
#
```



## Fourth generation (1971 - 1981)

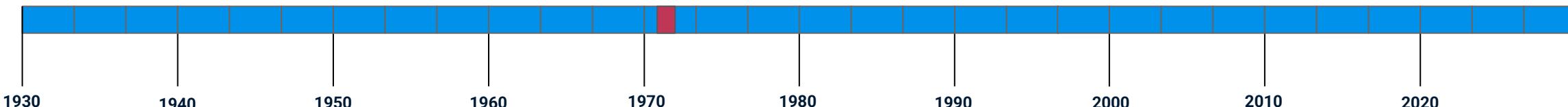
The C++ language, introduced in 1979, is an object-oriented, imperative-type general-purpose programming language that builds upon the foundation of C. Its creation aimed to augment the capabilities of the C programming language by introducing an object-oriented approach, thus rendering it a hybrid paradigm language.



```
template <class Derived, bool containerMode, class... Args>
template <class Output>
void BaseFormatter<Derived, containerMode, Args...>::appendOutput(Output& out)
{
    const {
        auto p = str_.begin();
        auto end = str_.end();
    }

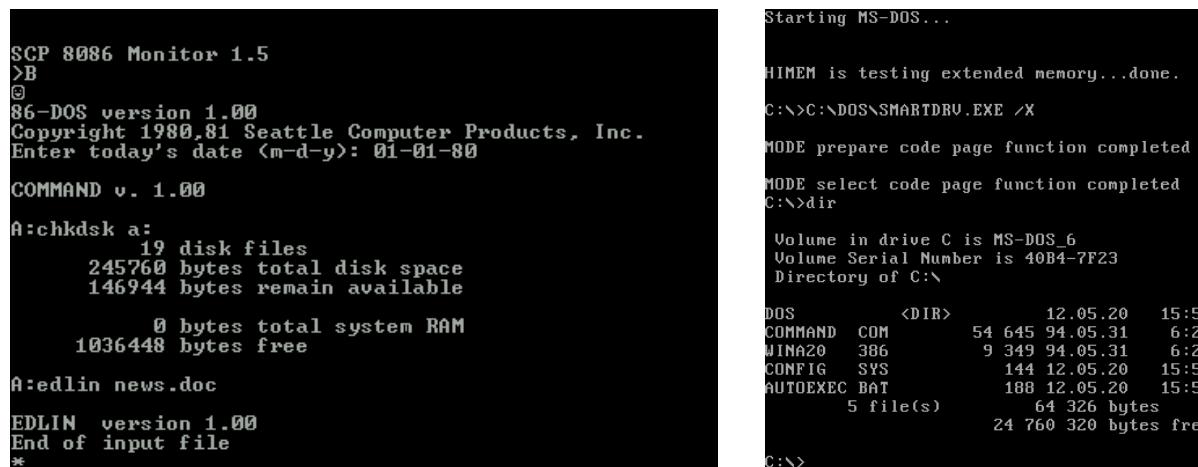
    // Copy raw string (without format specifiers) to output;
    // not as simple as we'd like, as we still need to translate "}" to ")"
    // and throw if we see any lone ")"
    auto outputString = [&out] (StringPiece s) {
        auto p = s.begin();
        auto end = s.end();
        while (p != end) {
            auto q = static_cast<const char*>(memchr(p, ')', end - p));
            if (!q) {
                out(StringPiece(p, end));
                break;
            }
        }
    };
}
```

The nomenclature “C++” derives from its syntax, signifying an increment over C, underscoring the fact that C++ serves as an extension of the C programming language.



## Fourth generation (1971 - 1981)

MS-DOS (Microsoft Disk Operating System) was created and first released in 1981, based on an operating system called QDOS (Quick and Dirty Operating System), which was developed by Seattle Computer Products. Microsoft acquired the rights to QDOS, refined it, and rebranded it as MS-DOS.



```
SCP 8086 Monitor 1.5
>B
@86-DOS version 1.00
Copyright 1980,81 Seattle Computer Products, Inc.
Enter today's date <m-d-y>: 01-01-80

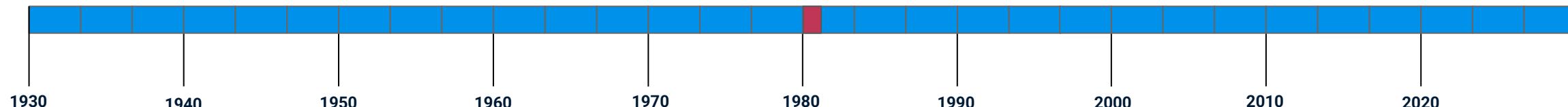
COMMAND v. 1.00

A:chkdsk a:
      19 disk files
    245760 bytes total disk space
   146944 bytes remain available

      0 bytes total system RAM
  1036448 bytes free

A:edlin news.doc
EDLIN version 1.00
End of input file
* Starting MS-DOS...
HIMEM is testing extended memory...done.
C:>C:\DOS\SMARTDRV.EXE /X
MODE prepare code page function completed
MODE select code page function completed
C:>dir
Volume in drive C is MS-DOS_6
Volume Serial Number is 40B4-7F23
Directory of C:\

DOS           <DIR>        12.05.20  15:57
COMMAND     COM            54 645 94.05.31  6:22
MINIMO      386             9 349 94.05.31  6:22
CONFIG      SYS            144 12.05.20  15:57
AUTOEXEC   BAT            188 12.05.20  15:57
                  5 file(s)       64 326 bytes
                           24 760 320 bytes free
C:>_
```



# Fifth generation The rise of Internet

# 06

## Fifth generation (1981 - 1995)

A personal computer (PC), short for Personal Computer, is a programmable digital apparatus that executes a sequence of instructions to process input data, resulting in the generation of information subsequently routed to output devices

- PCs are powered by microprocessors that integrated the CPU onto a single chip, enabling compact design and sufficient processing power for general tasks.
- PCs includes essential peripherals like a keyboard for input, a monitor for display, and often a printer or floppy disk drives for output and storage.
- PCs uses floppy disks for data storage and program loading, which were easy to use and portable.



Apple II

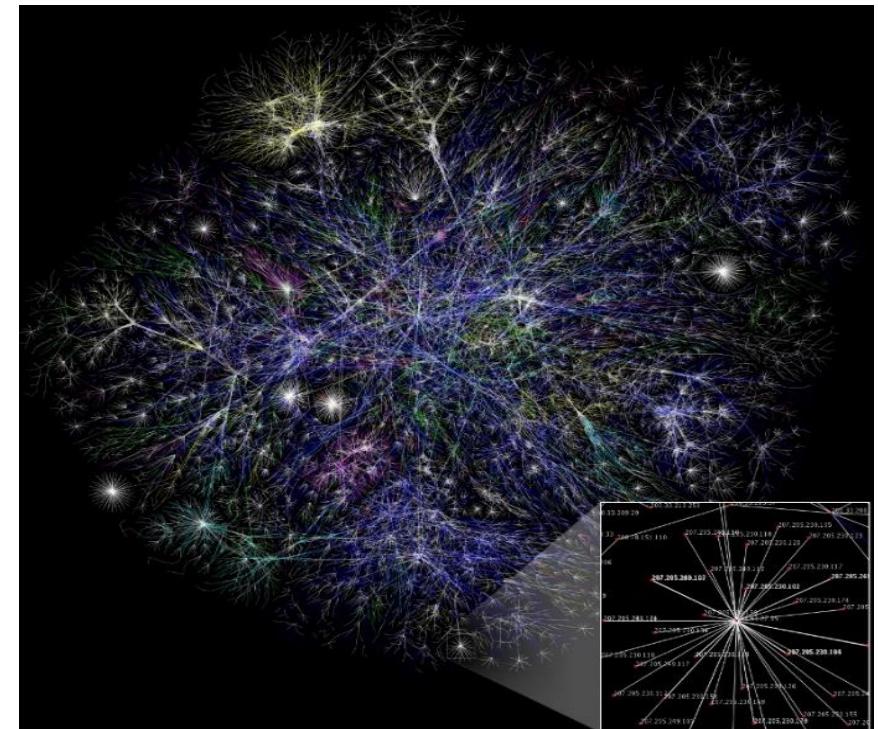


IBM Personal Computer

## Fifth generation (1981 - 1995)

The Internet is an intricate, decentralized assemblage of interconnected networks employing the TCP/IP family of protocols. This architecture ensures that the diverse physical networks comprising the Internet coalesce into a unified, globally-reaching logical network.

- Massive increase in Client/Server type applications.
- Widespread dissemination of applications and services following the advent of the initial web pages.
- Novel service categories rooted in distributed:
  - e-commerce
  - Email
  - Multimedia
  - Medical applications
  - Supercomputing on the Internet



## Fifth generation (1981 - 1995)

The backpropagation, or backward propagation of errors, algorithm was designed by Rumelhart, Hinton y Williams (1986) becoming in the standard training algorithm for ANN.

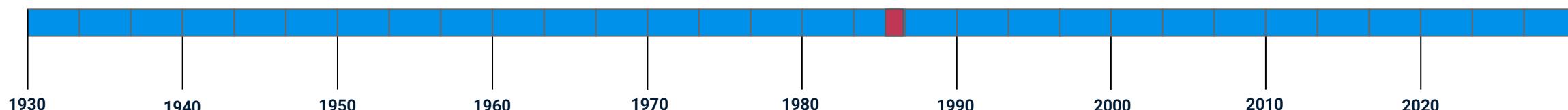
---

### Algorithm 1 Backpropagation Algorithm

---

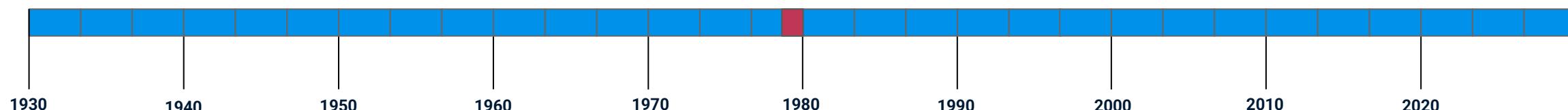
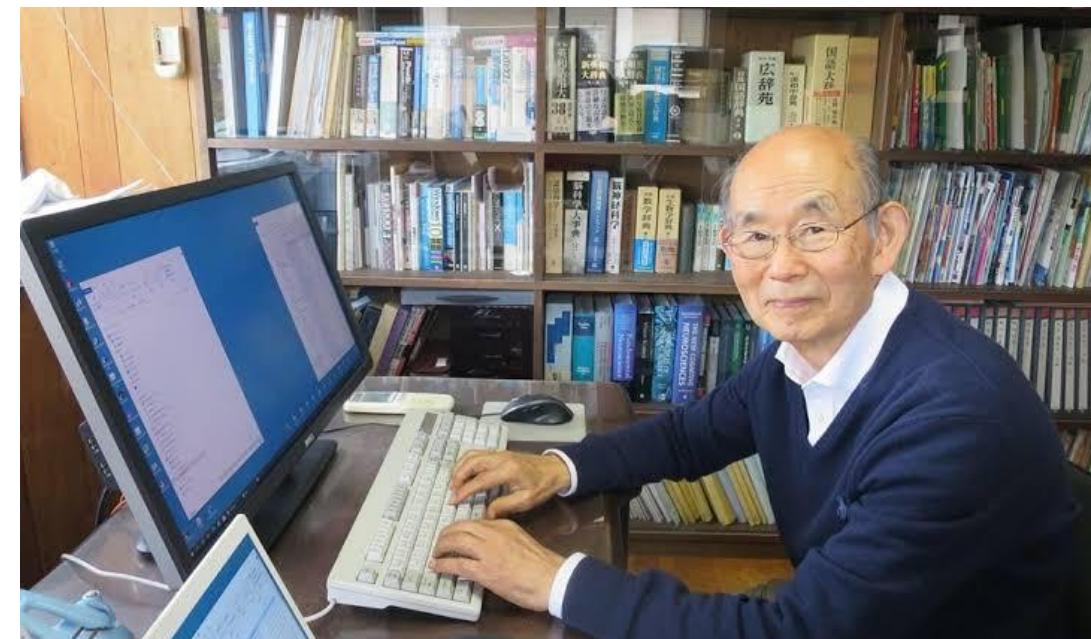
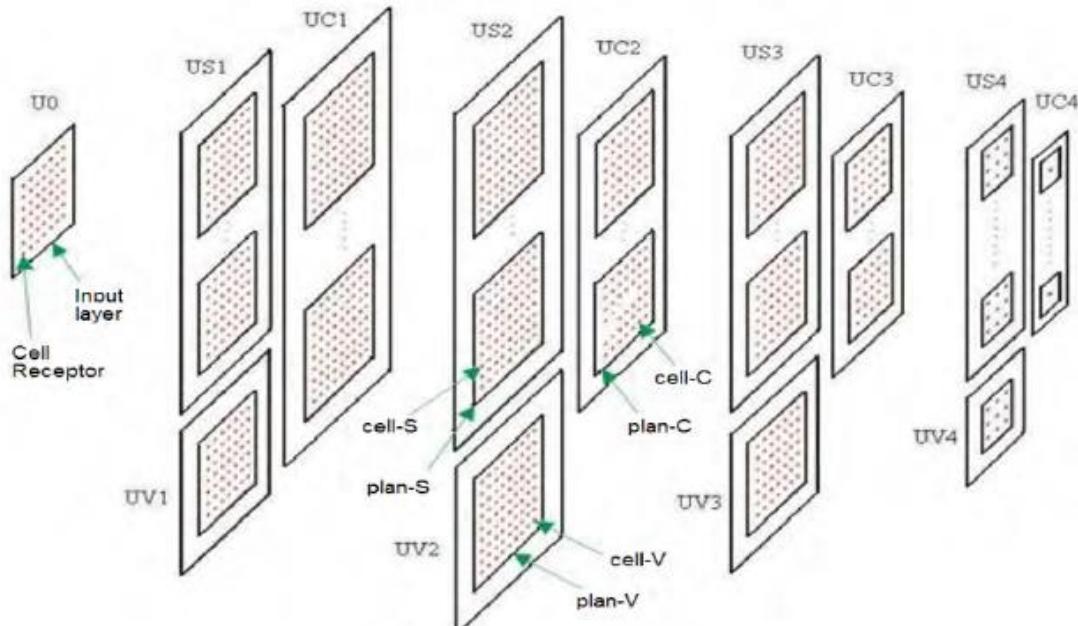
```
1: procedure TRAIN
2:    $X \leftarrow$  Training Data Set of size mxn
3:    $y \leftarrow$  Labels for records in X
4:    $w \leftarrow$  The weights for respective layers
5:    $l \leftarrow$  The number of layers in the neural network, 1...L
6:    $D_{ij}^{(l)} \leftarrow$  The error for all  $l,i,j$ 
7:    $t_{ij}^{(l)} \leftarrow 0$ . For all  $l,i,j$ 
8:   For  $i = 1$  to  $m$ 
9:      $a^l \leftarrow feedforward(x^{(i)}, w)$ 
10:     $d^l \leftarrow a(L) - y(i)$ 
11:     $t_{ij}^{(l)} \leftarrow t_{ij}^{(l)} + a_j^{(l)} \cdot t_i^{l+1}$ 
12:    if  $j \neq 0$  then
13:       $D_{ij}^{(l)} \leftarrow \frac{1}{m} t_{ij}^{(l)} + \lambda w_{ij}^{(l)}$ 
14:    else
15:       $D_{ij}^{(l)} \leftarrow \frac{1}{m} t_{ij}^{(l)}$ 
16:    where  $\frac{\partial}{\partial w_{ij}^{(l)}} J(w) = D_{ij}^{(l)}$ 
```

---



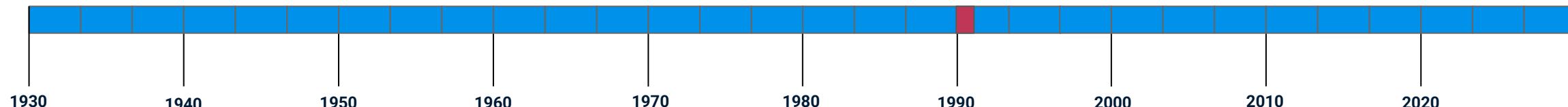
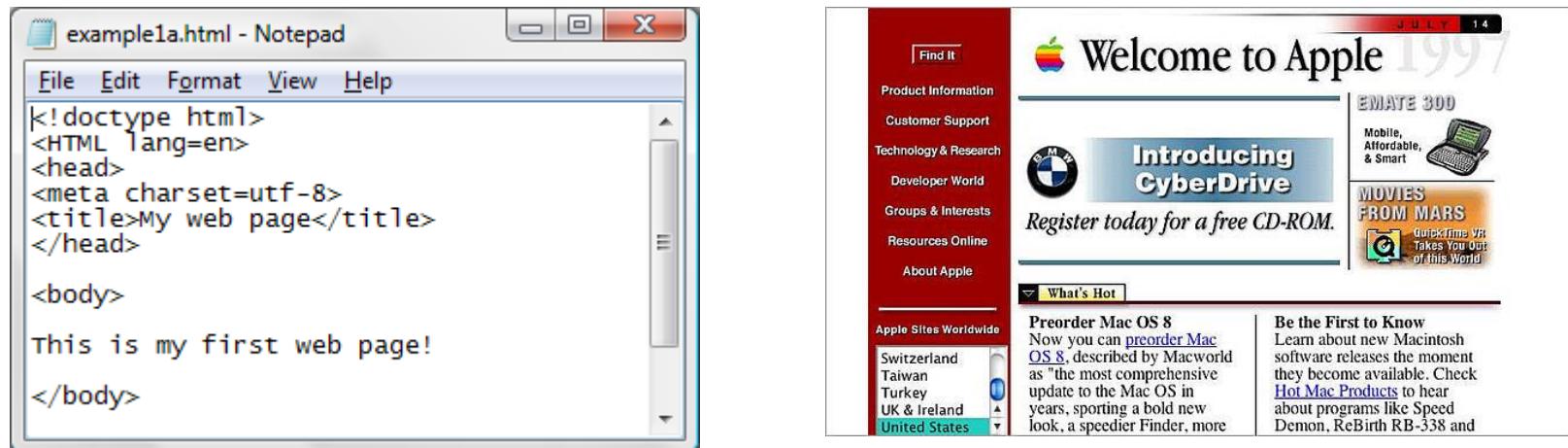
## Fifth generation (1981 - 1995)

First artificial Neural Network, called the neocognitron, for image recognition was proposed by Kunihiko Fukushima in 1979.



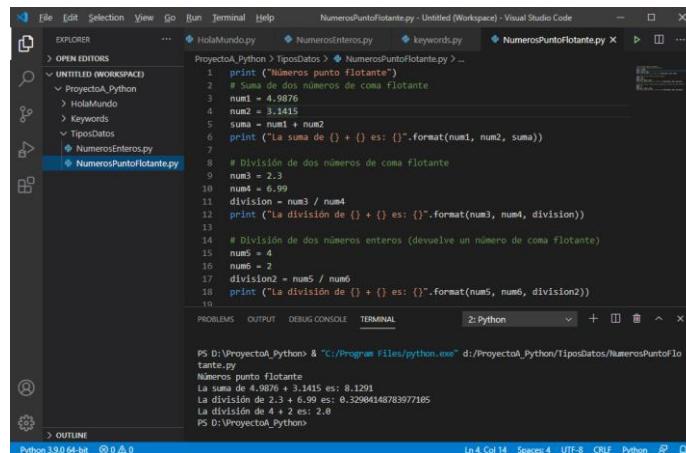
## Fifth generation (1981 - 1995)

HTML (HyperText Markup Language, 1991) is a comprehensive markup language employed for delineating the structural framework of web pages by means of tags (e.g., <head>) that specify the nature of the content they encapsulate. Presently, HTML stands as the prevailing standard language for constructing web applications.



## Fifth generation (1981 - 1995)

The Python language, introduced in 1991, represents a versatile general-purpose programming language that amalgamates elements of functional, object-oriented, and imperative paradigms. It was conceived with the primary objective of enhancing code readability, thereby facilitating its utilization by programmers.



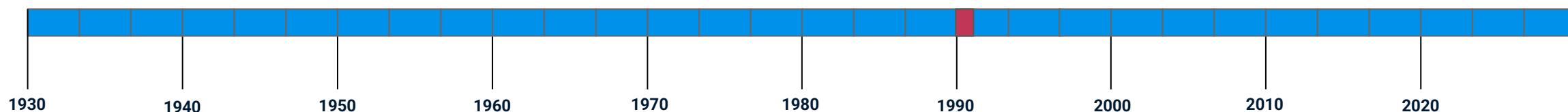
A screenshot of the Visual Studio Code interface. The left sidebar shows a file tree with several Python files: 'NumerosPuntoFlotante.py', 'NumerosEnteros.py', 'TiposDatos.py', 'Keywords.py', and 'HolaMundo.py'. The main editor area displays Python code for performing arithmetic operations on floating-point and integer numbers. The terminal at the bottom shows the execution of the code and its output.

```
1 print ("Números punto flotante")
2 # Suma de dos números de coma flotante
3 num1 = 4.9876
4 num2 = 3.1415
5 suma = num1 + num2
6 print ("La suma de {} + {} es: {}".format(num1, num2, suma))
7
8 # División de dos números de coma flotante
9 num3 = 2.3
10 num4 = 6.99
11 division = num3 / num4
12 print ("La división de {} + {} es: {}".format(num3, num4, division))
13
14 # División de dos números enteros (devuelve un número de coma flotante)
15 num5 = 4
16 num6 = 2
17 division2 = num5 // num6
18 print ("La división de {} + {} es: {}".format(num5, num6, division2))
```

```
PS D:\ProyectoA_Python> & "C:/Program Files/python.exe" d:/ProyectoA_Python/TiposDatos/NumerosPuntoFlotante.py
Números punto flotante
La suma de 4.9876 + 3.1415 es: 8.1291
La división de 2.3 + 6.99 es: 0.33294148783977185
La división de 4 + 2 es: 2.0
PS D:\ProyectoA_Python>
```

- Multi-paradigm: Object-oriented, imperative and functional.
- It operates as an interpreted language.
- Dynamic typing.
- Cross-platform compatibility.

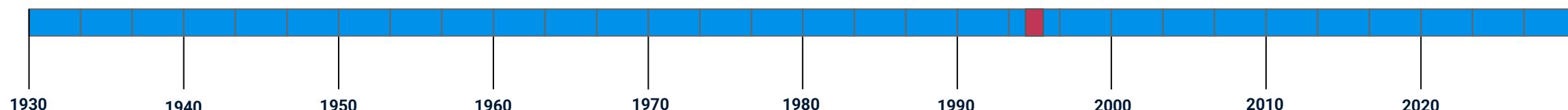
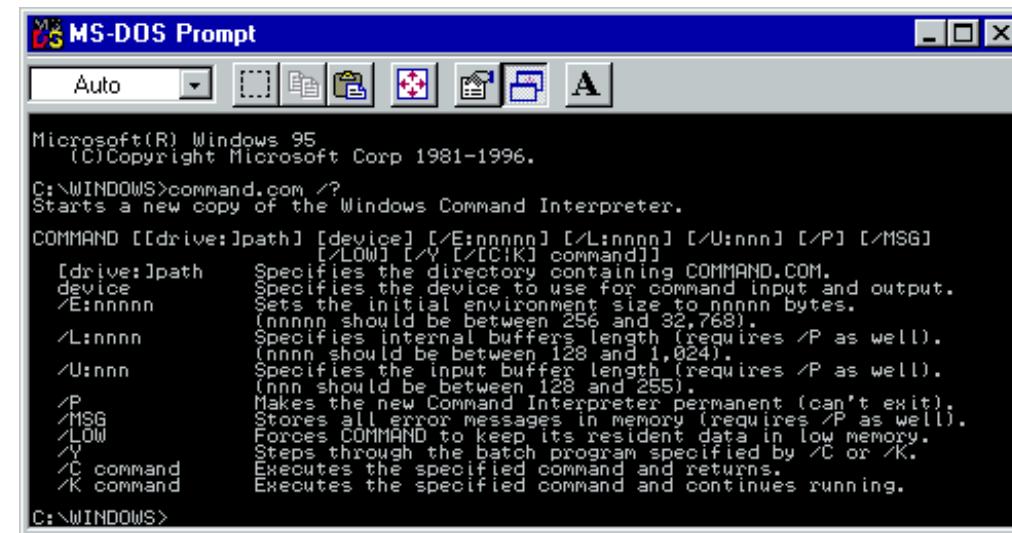
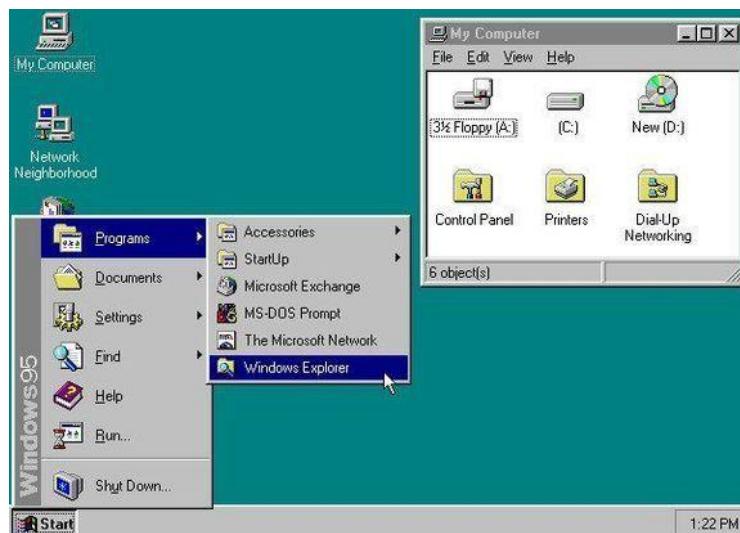
It is the most used language for building applications related to Big Data and Artificial Intelligence.



# Background and historical perspectives

## Fifth generation (1981 - 1995)

The Windows 95 operative system, launched in 1995, revolutionized personal computing with its user-friendly start menu and taskbar. Besides it introduced two important features: (1) plug-and-play hardware integration and (2) widespread Internet access; setting the standard for modern desktop operating systems.



# Sixth generation The modern world

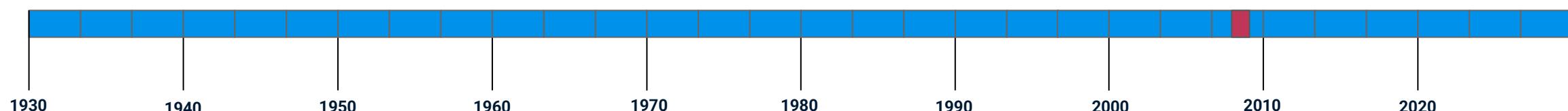
# 06

## Sixth generation (1995 - Now)

The first smartphone, introduced in 2009, marked the commencement of commercial availability, integrating the capabilities of both a mobile phone and a computer.

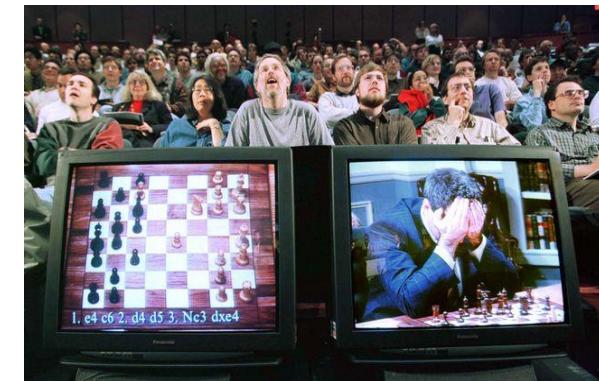


iPhone 3

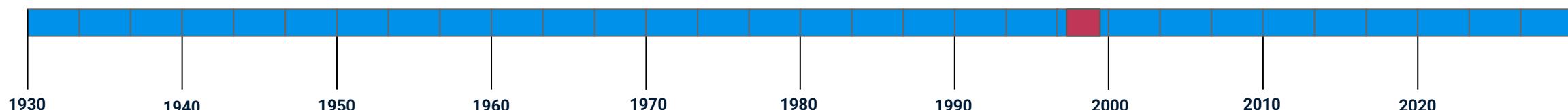


## Sixth generation (1995 - Now)

IBM unveiled Deep Blue in 1997, a supercomputer renowned for its parallel computing process. It engaged in two highly publicized chess matches against the reigning chess champion, Garry Kasparov.



Deepblue vs Kasparov en 1997: 4-2  
Deepblue vs Kasparov en 1998: 6-0

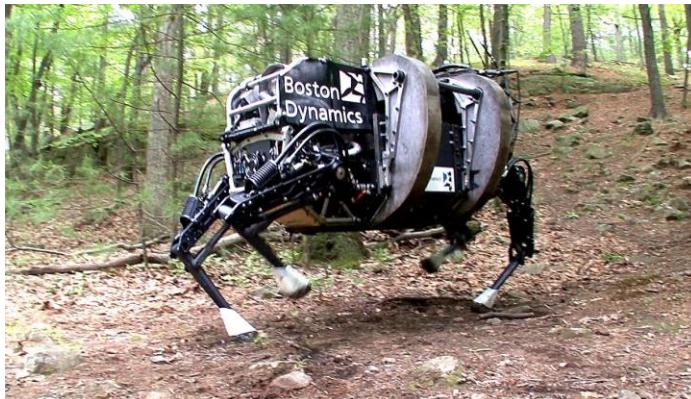


## Sixth generation (1995 - Now)

The era of assistant robots began with the introduction of AIBO, Roomba, and ASIMO, marking a significant milestone in the development of consumer and service robotics.



ASIMO - 2000



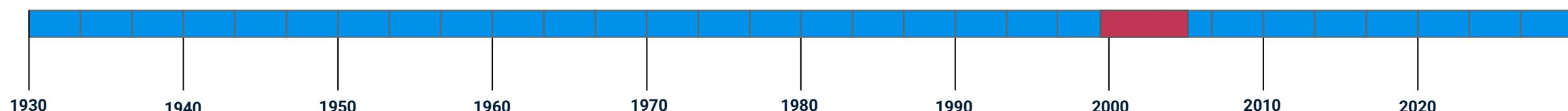
BigDog - 2005



First roomba 2002



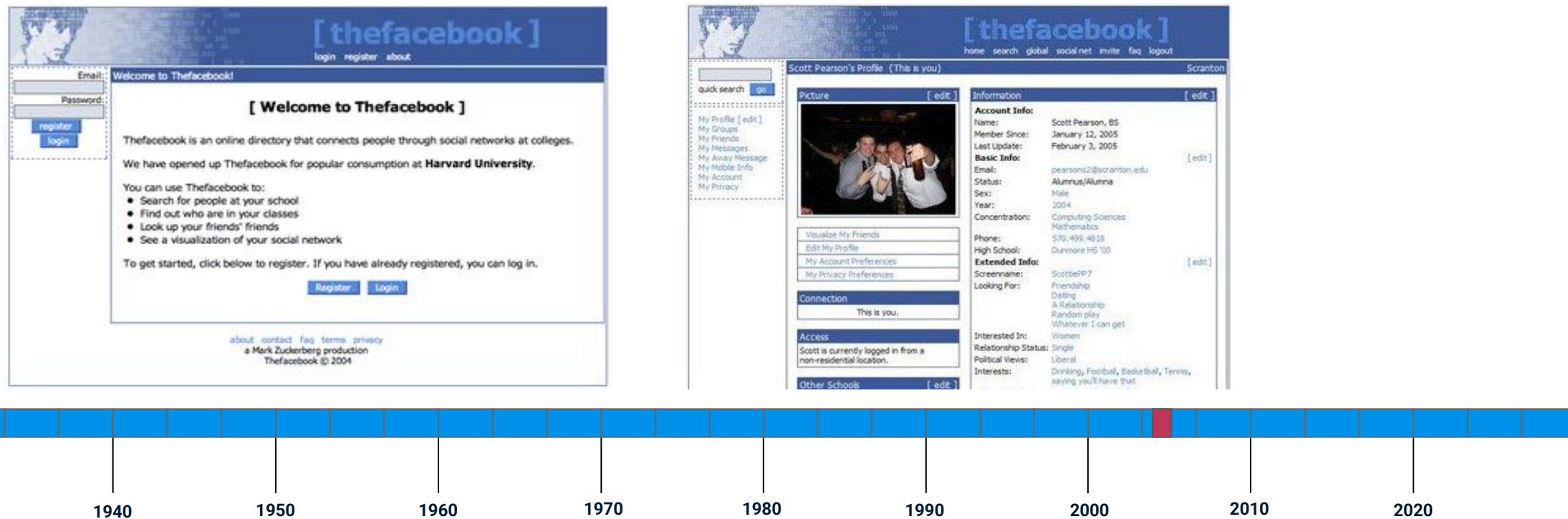
AIBO 1999



# Background and historical perspectives

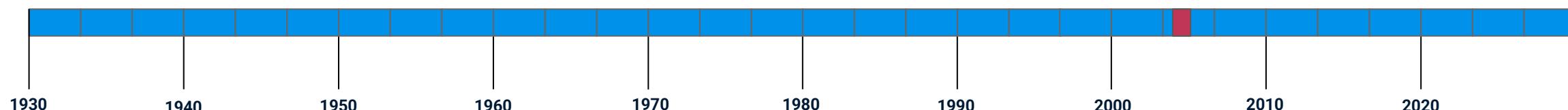
## Sixth generation (1995 - Now)

Facebook, founded in 2004, was the collaborative effort of Mark Zuckerberg, Eduardo Saverin, Andrew McCollum, Dustin Moskovitz, and Chris Hughes. The nomenclature of the platform was inspired by the 'face book' directories traditionally distributed among American university students.



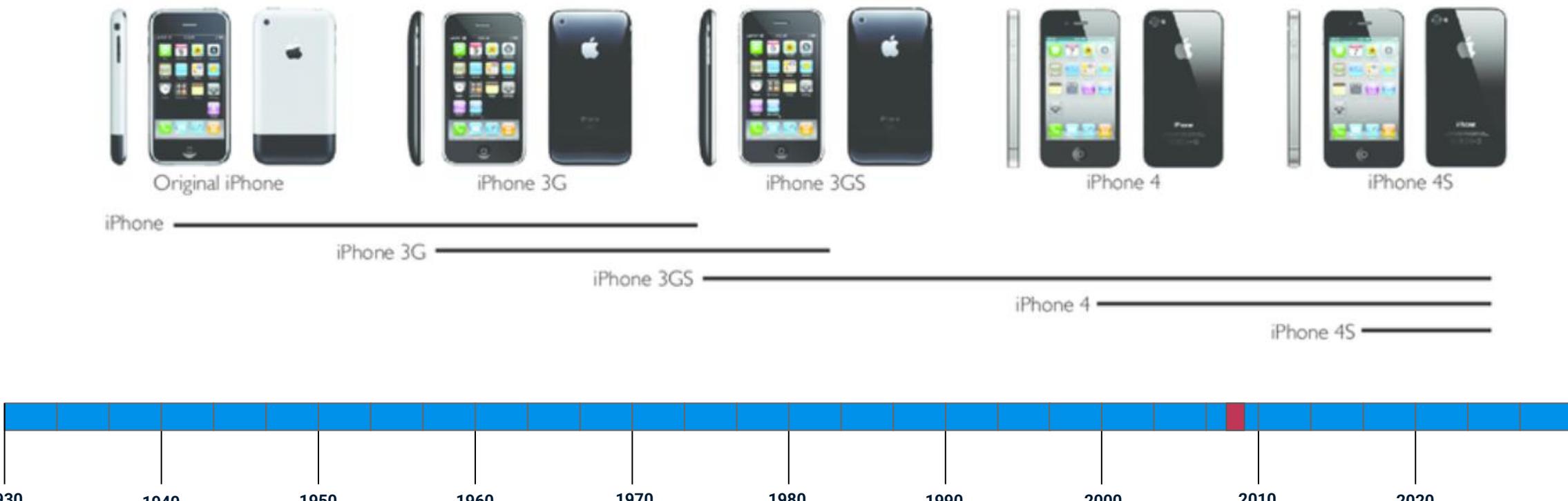
## Sixth generation (1995 - Now)

The establishment of the DARPA Challenge in 2004 marked the inception of a competition for autonomous vehicles, meticulously organized by the Defense Advanced Research Projects Agency (DARPA).



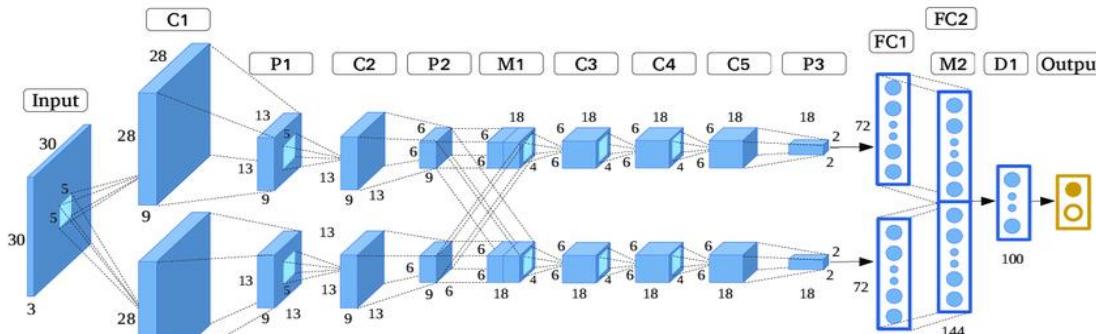
## Sixth generation (1995 - Now)

The first smartphone, introduced in 2008, marked the commencement of commercial availability, integrating the capabilities of both a mobile phone and a computer.

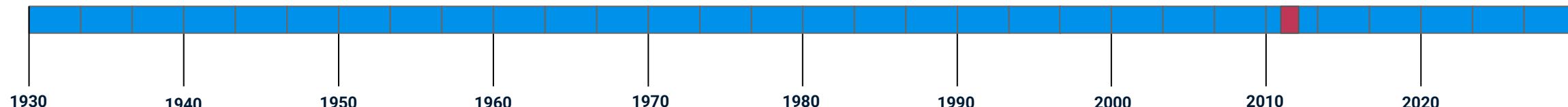


## Sixth generation (1995 - Now)

The AlexNet Neural Network created by Alex Krizhevsky in collaboration with Ilya Sutskever and Geoffrey Hinton won the ImageNet Large Scale Visual Recognition Challenge in 2012 showing the powerful of Deep CNN.

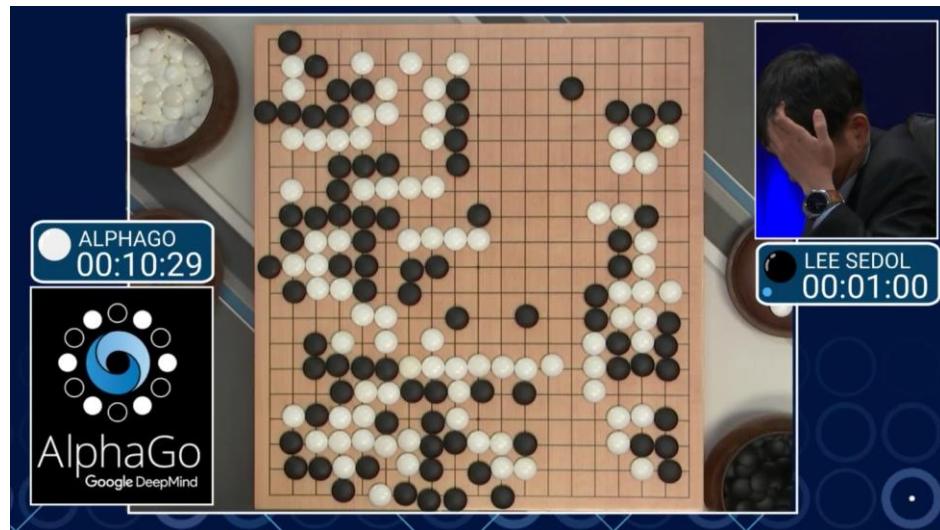


[https://proceedings.neurips.cc/paper\\_files/paper/2012/file/c399862d3b9d6b76c8436e924a68c45b-Paper.pdf](https://proceedings.neurips.cc/paper_files/paper/2012/file/c399862d3b9d6b76c8436e924a68c45b-Paper.pdf)

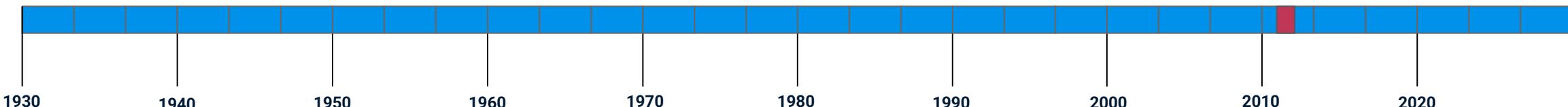


## Sixth generation (1995 - Now)

AlphaGo, introduced in 2016, represents a Go-playing system constructed using Deep Learning techniques. It achieved the remarkable feat of defeating the world's foremost Go player.



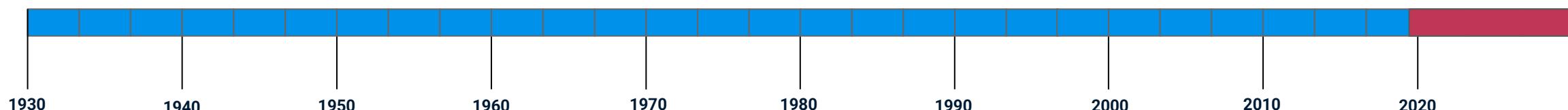
<https://www.youtube.com/watch?v=WXuK6gekU1Y>



# Background and historical perspectives

## Sixth generation (1995 - Now)

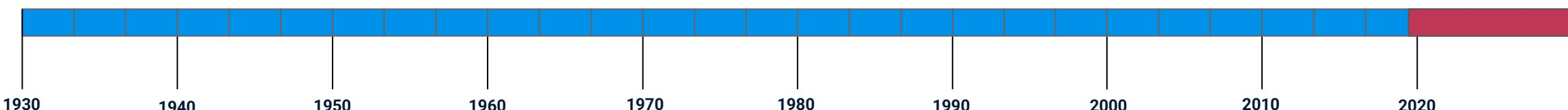
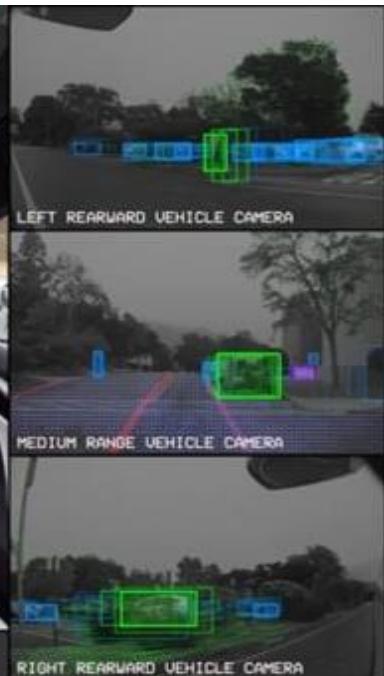
The development of applications has emerged as one of the pivotal sectors within the field of computer engineering.



# Background and historical perspectives

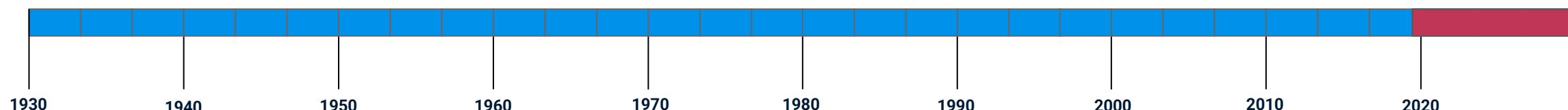
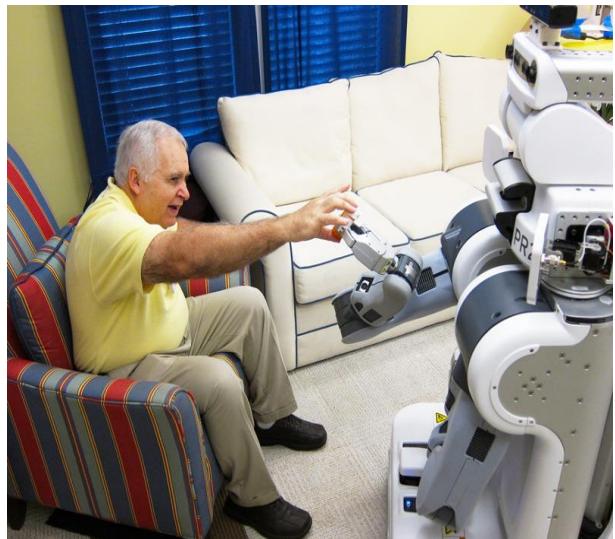
## Sixth generation (1995 - Now)

The first self-driving cars begin to make their appearance on our roadways.



## Sixth generation (1995 - Now)

The conceptualization and development of the inaugural robots equipped with advanced Artificial Intelligence methodologies, enabling them to interact with and engage in cognitive reasoning within their environment.

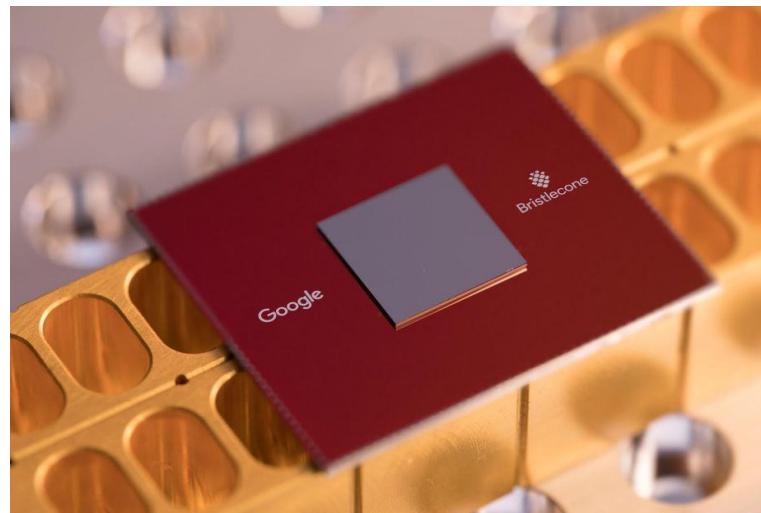


## Sixth generation (1995 - Now)

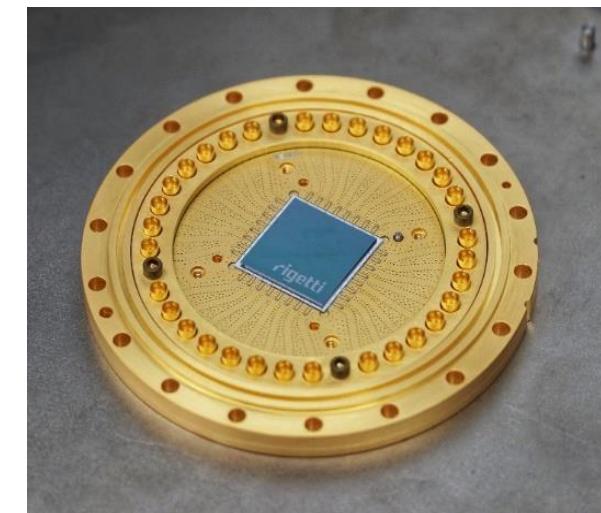
The initial quantum computers, which utilize Qubits instead of conventional bits, are constructed



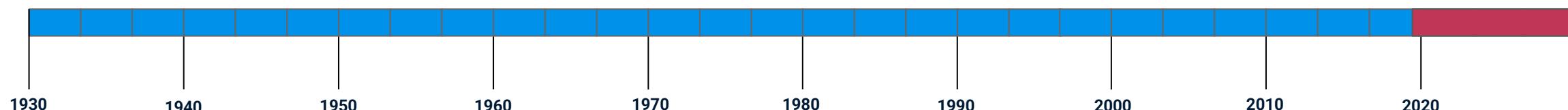
IBM – 127 Qubits



Google – 72 Qubits



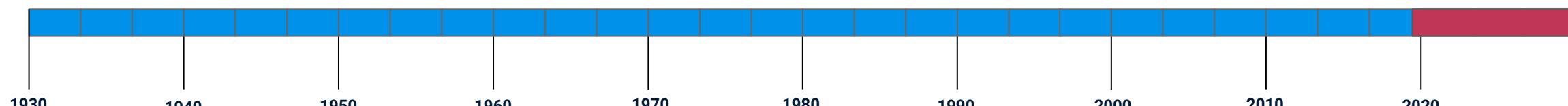
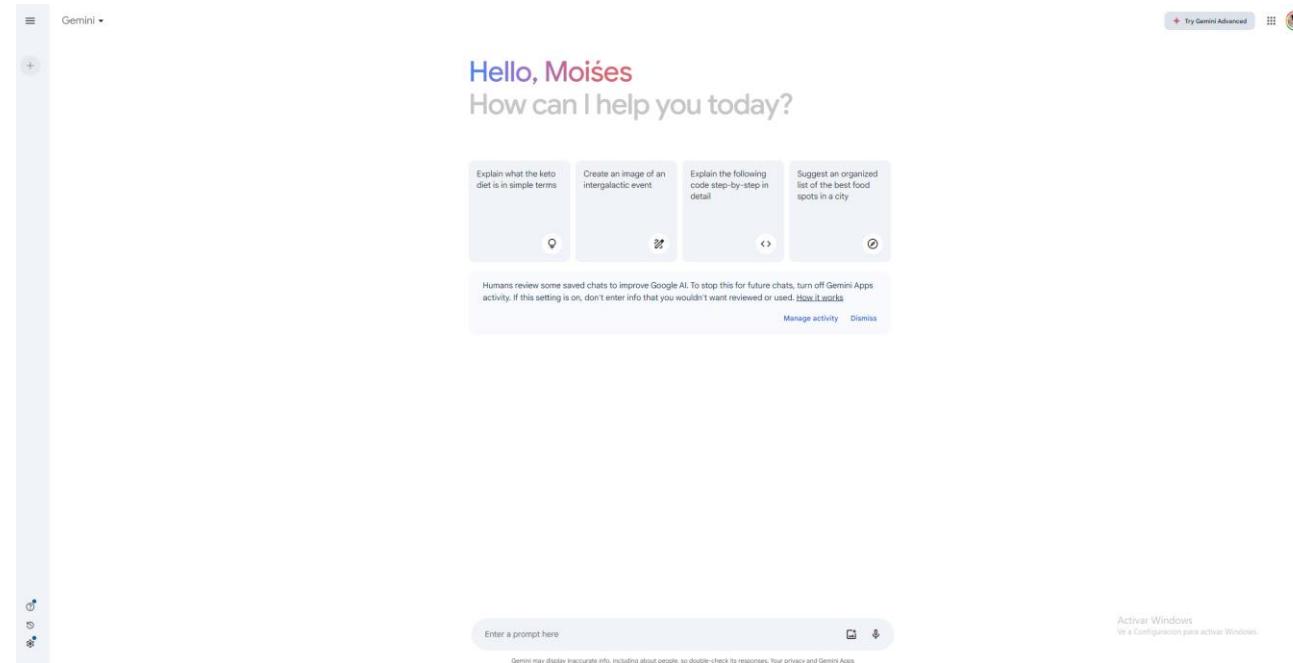
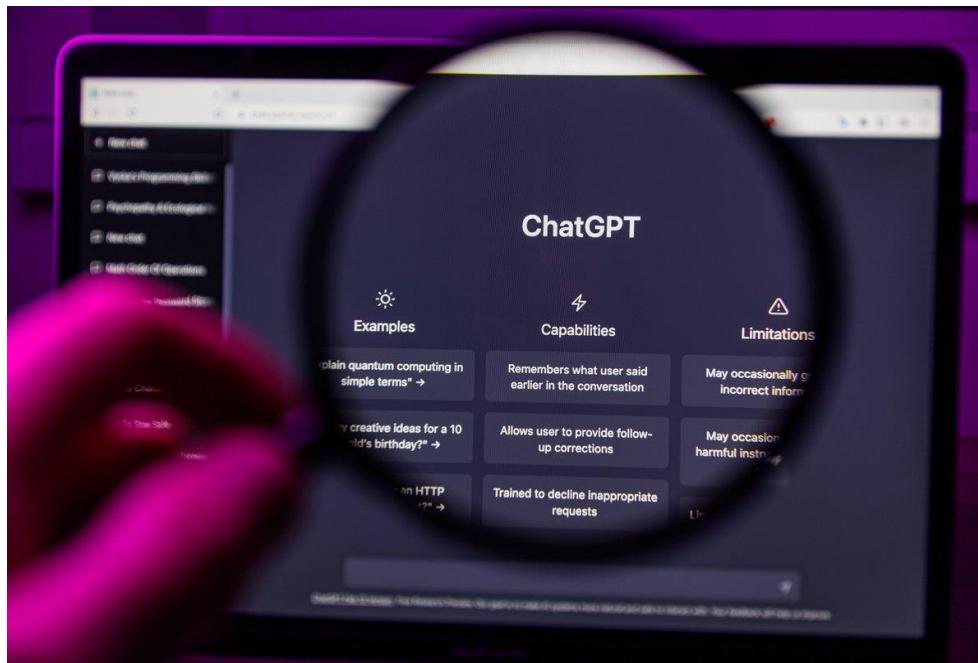
Rigetti – 20 Qubits



# Background and historical perspectives

## Sixth generation (1995 - Now)

If want to know more ask to Gemini and/or ChatGpt .....



# Background and historical perspectives

