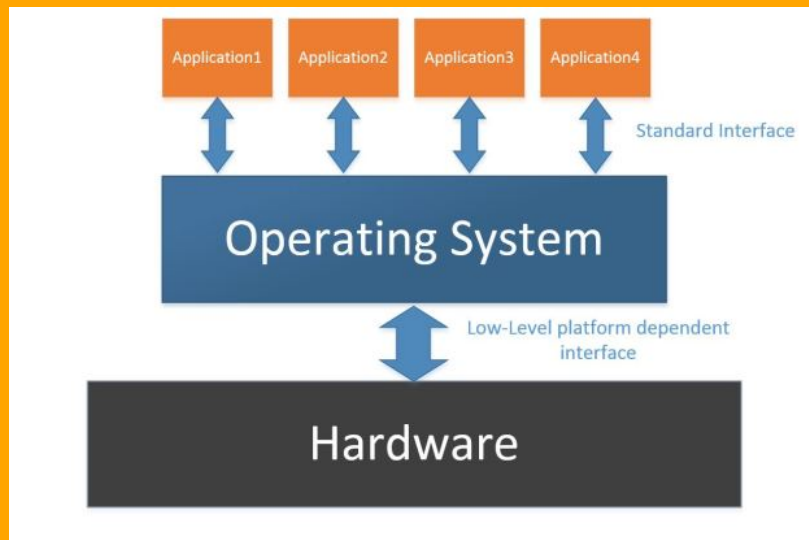


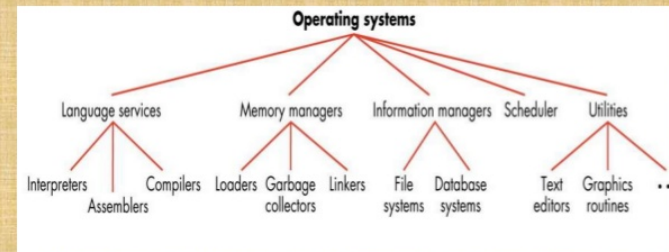
INTRO TO OPERATING SYSTEMS

ABSTRACTION/CONTROL/MIN/MAX/WHY/WHAT IF



System Control Programs-OS

An operating system is an integrated set of specialized programs that are used to manage overall resources of and operations of the computer.



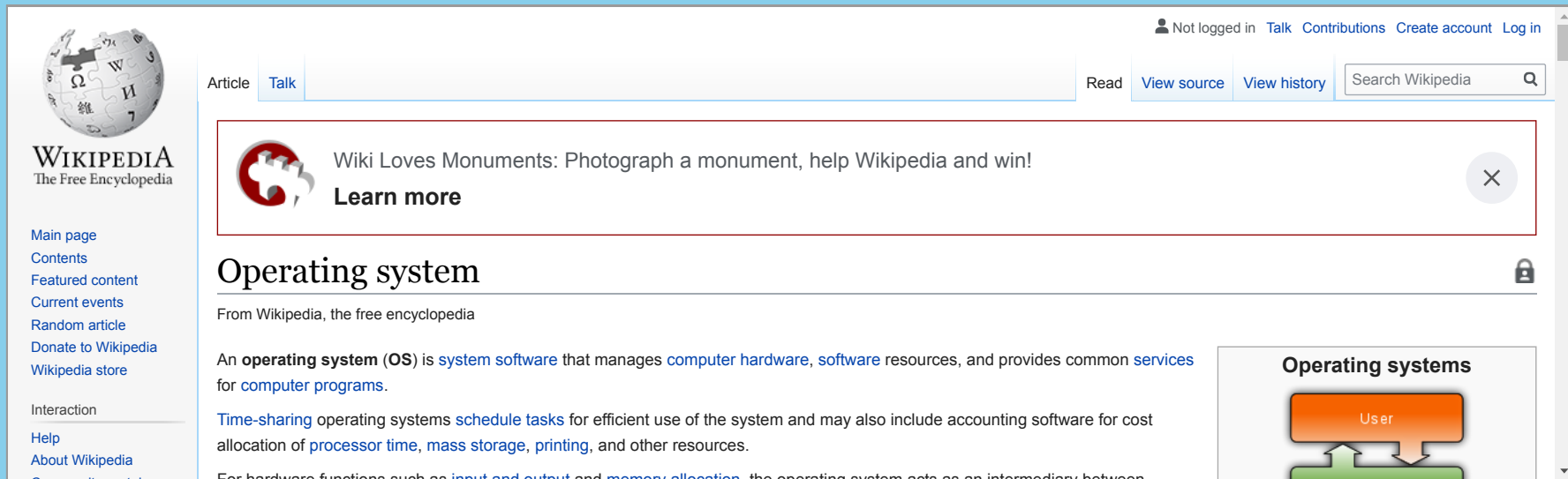
<https://www.itread01.com/content/1542568646.html> <https://www.slideshare.net/HarshaSachdeva/system-software-16044424>

TODAY'S 75min 4p-5:51p

- ◆ What is an OS? (20m)
 - ◆ Some OS's (25m)
 - ◆ Some Hardware w/o OS? (10m)
 - ◆ Whys and What Ifs (20m)
-

◆ What is an OS? (20m)

An operating system (OS) is system software that manages computer hardware and software resources and provides common services for computer programs.



The screenshot shows the Wikipedia page for 'Operating system'. At the top, there's a navigation bar with links like 'Not logged in', 'Talk', 'Contributions', 'Create account', and 'Log in'. Below this is a search bar and a 'View source' link. A banner for 'Wiki Loves Monuments' is visible. The article title 'Operating system' is prominently displayed, followed by a brief introduction: 'From Wikipedia, the free encyclopedia'. The main text defines an operating system (OS) as system software that manages computer hardware, software resources, and provides common services for computer programs. It also mentions time-sharing operating systems and their role in scheduling tasks. A diagram on the right, titled 'Operating systems', illustrates the interaction between a 'User' and the system.

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Operating system

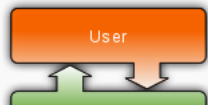
From Wikipedia, the free encyclopedia

An **operating system** (OS) is [system software](#) that manages [computer hardware](#), [software](#) resources, and provides common [services](#) for [computer programs](#).

[Time-sharing](#) operating systems [schedule tasks](#) for efficient use of the system and may also include accounting software for cost allocation of [processor time](#), [mass storage](#), [printing](#), and other resources.

For hardware functions such as [input and output](#) and [memory allocation](#), the operating system acts as an intermediary between

Operating systems



```
graph TD
    User[User] --> OS[Operating System]
    OS --> User
```

◆ What is an OS? (20m)

An operating system is something like Windows, Linux (Ubuntu/Fedora-RedHat/Debian/GenToo/SUSE-Slackware), BSD, Android, iPhoneOS/MacOSX



<https://www.thedailyprogrammer.com/2015/01/operating-systems-introduction.html>

Have we forgotten Blackberry OS/Solaris/Pick/Pr1mOS/Xerox Pilot/Dartmouth TSS/Tenex/TOPS20/VMS/RT-11/DOS/Apple Pascal OS/OS2/Classic Mac?

Silberschatz et al.

An operating system acts as an intermediary between the user of a computer and the computer hardware. The purpose of an operating system is to provide an environment in which a user can execute programs in a convenient and efficient manner.

An operating system is software that manages the computer hardware. The hardware must provide appropriate mechanisms to ensure the correct operation of the computer system and to prevent user programs from interfering with the proper operation of the system.

Silberschatz et al.

An operating system MAKES the computer hardware USABLE WITHOUT HAVING TO KNOW DETAILS. User programs WILL BE convenient and efficient TO SOME EXTENT, AS THE DESIGN ALLOWS.

An operating system is software that manages the computer hardware. The hardware has CLEVER RULES THAT KEEP THE USER FROM SHOOTING SELF IN FOOT, AND BTW, HELL IS OTHER PEOPLE.

Silberschatz et al.

An operating system GETS IN THE WAY OF THE USER SEEING the computer hardware. ALL THAT MATTERS IS user programs being convenient and efficient.

An operating system is software that manages the computer hardware. The hardware must ENFORCE RULES THAT KEEP THE USER FROM INTERFERING WITH THE SYSTEM.

How-To-Geek

An operating system is the primary software that manages all the hardware and other software on a computer.

<https://www.howtogeek.com/361572/what-is-an-operating-system/>

Techopedia

An operating system (OS), in its most general sense, is software that allows a user to run other applications on a computing device.

<https://www.techopedia.com/definition/3515/operating-system-os>

Who?

There was no display and no command line. The human was the operating system: a control console allowed *The Operator* to start and stop programs and so on.

My View

An operating system is a control system for programmable devices
(1) to support programming (2) to control system resources.

Some operating systems also have users, and their user-experience is relevant.

For some operating systems, physical and cyber environments are relevant.

An operating system is software-hardware co-design rising to the systems level.

◆ Some OS's (25m)

IBM System 360 OS (1964)

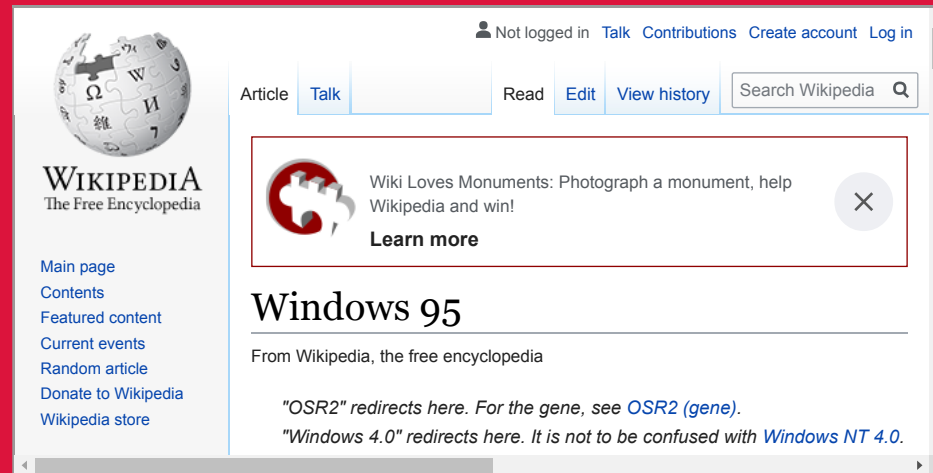


<https://www.ibm.com/ibm/history/ibm100/us/en/icons/system360/impacts/>



◆ Some OS's (25m)

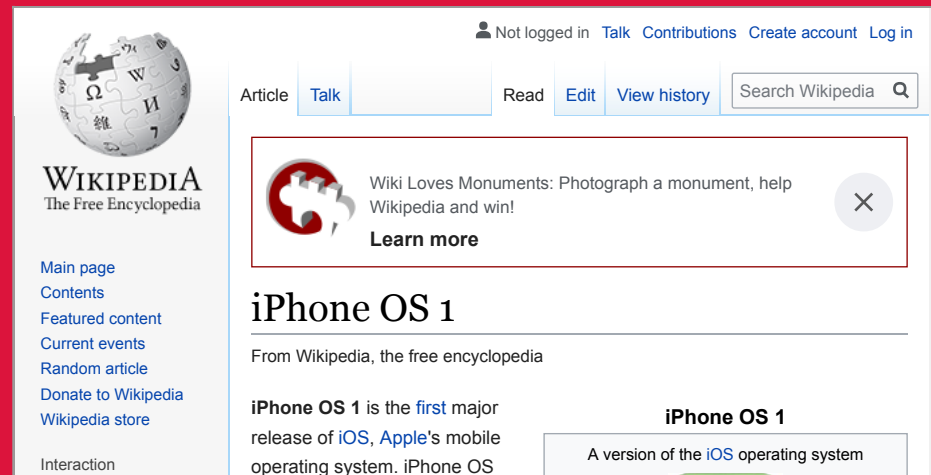
Windows 95 (1995)



<https://www.extremetech.com/computing/294907-why-moving-the-mouse-in-windows-95-made-the-os-faster>

◆ Some OS's (25m)

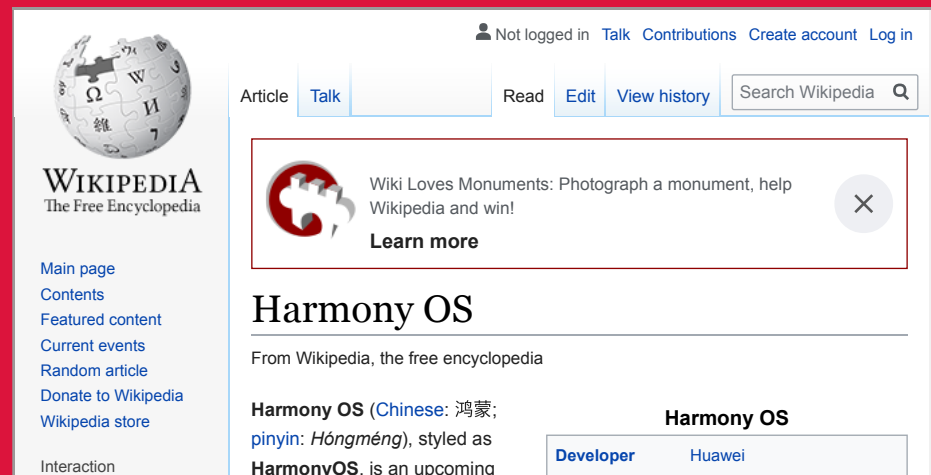
iPhone OS 1 (2007)



<https://www.mid-day.com/articles/tech-rewind-iphone-iphone-tenth-anniversary-technology-steve-jobs-apple-iphone/15890153>

◆ Some OS's (25m)

Huawei Harmony OS (2019?)



<https://www.telecomlead.com/smart-phone/huawei-unveils-harmony-os-but-not-to-harm-android-91703>

♦ Some OS's (25m)

Your Turn

- ♣ What's the smallest OS?
 - ♣ What's the largest OS?
 - ♣ What's the OS for the largest system?
 - ♣ What's the OS for the smallest system?
-

♦ Some OS's (25m)

Your Turn

- ♣ What's the oldest consumer OS?
 - ♣ What was the most innovative OS?
 - ♣ What's the most secure?
 - ♣ What's the most convenient?
-

♦ Some OS's (25m)

Your Turn

- ♣ What's the lowest-level OS?
 - ♣ What's the highest-level OS?
 - ♣ What are the worst OS's ever?
 - ♣ What are the best OS's ever?
-

My World at Your Age

HP 9100A (1968) HP 2100A (1971)

Microdata 3200 (1974) ADDS Mentor (1980) Prime 750 (1979)

Vax 11/780 (1977) Xerox Alto (1973)

HP Computer Museum

[Home](#) In April 2016, HP's first ever computer was restored and functional, [click here!](#) |

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Technical Desktops



9100A

Early Calc and Computers Selection:

Name: 9100

Product Number: 9100

Introduced: 1968

Division: [Loveland](#)

Ad: [Click to see](#), [Click to see](#), [Click to see](#), [Click to see](#)

Original Price: \$4900

Catalog Reference: 1969, P. 130

Donated by: John Geremin, Megatronics Australia.

Description:

The 9100A was the first technical desktop computer introduced by Hewlett Packard. The 9100 could also be considered a calculator. It did not have an alphanumeric keyboard, and most functions were effectively "programmed under" individual keys on the keyboard, similar to a modern-day non-programmable trigonometric calculator.

The 9100A used a keystroke sequence known as Reverse Polish Notation (RPN). The 9100 had a three-line CRT display and built in mass storage (magnetic card drive). Optional peripherals included the 9120A thermal printer and ~~9125A~~ single-pen plotter. The 9101A provided additional external storage for the 9100. The 9100B was introduced in 1969. It had 3840 bits of core memory, compared to 2208 bits in the 9100A.

[Click here](#) for a detailed look at the origins of the 9100.



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2100A

Early 2000 Selection:

Name: 2100A
Product Number: 2100A
Introduced: 1971
Division: [Supermin](#)
Ad: [Click to see](#), [Click to see](#)
Original Price: Unknown
Catalog Reference: 1972, page 399
Donated by: Paul Schroeter, HP Australia.

Description:

The 2100A replaced the [2110](#), [2115](#) and [2114](#) in 1971. The 2100A was compatible with the earlier computers and used the same I/O boards. It was the industry's first microprogrammable minicomputer.

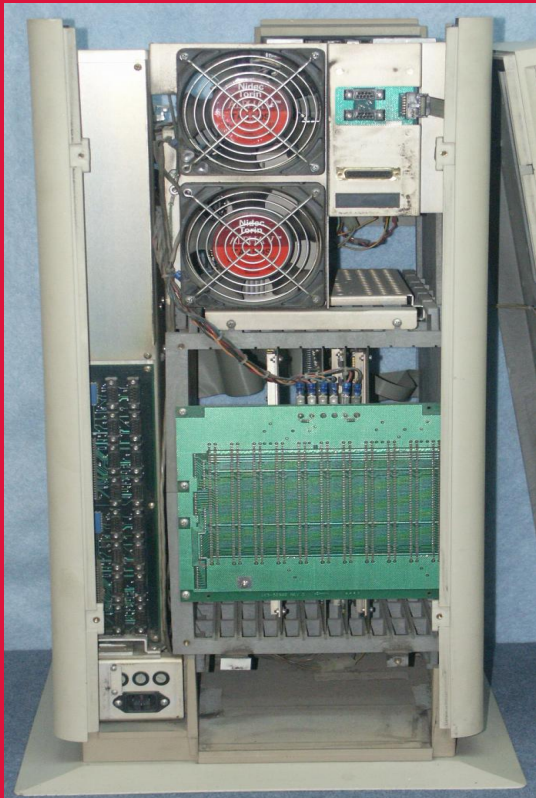
The 2100A included an integrated power supply and came with 14 I/O channels within the mainframe (externally expandable to 45 channels). The power supply was auto-switching between 115V and 230V (the first in a minicomputer).

Like the 211X computers that it superceded, the 2100A used magnetic core memory. It came standard with 4K words of memory, upgradable within the mainframe to 32K words. Other new features introduced by the 2100A included: memory protect, dual channel DMA and an optional hardware floating point processor.

Main boards for the 2100A:

A1: 02100-60014





Prime 750

PRIME Product Bulletin: Prime 750 System

DESCRIPTION

The Prime 750 is the most powerful member of Prime's new family of hardware- and software-compatible systems. With many features that fully exploit its 32-bit architecture, the 750 offers speed, low overhead, and flexibility in a wide range of computational timesharing and interactive data processing applications.

Key contributors to the Prime 750's speed and low overhead are a 16K-byte cache memory, instruction prefetch unit, high-bandwidth burst mode I/O, and interleaved main memory. In addition, a high-performance floating-point unit provides instruction execution speeds that rival systems costing much more. This feature, along with a 32 million-byte virtual address space for programs, makes the 750 a fast and powerful tool in scientific and engineering applications.

For commercial applications, the Prime 750 offers COBOL program execution speed exceeded by no system short of a mainframe. Especially in environments requiring the flexibility to use other languages, and add users and applications, the 750 outperforms any system in its price range.

Programs written for any Prime system run without modification on the 750. And since it is compatible with all Prime peripherals, controllers, and I/O interfaces, any Prime system can be upgraded to a 750 at a fraction of the total system cost and with minimal conversion effort.

FEATURES

- Embedded operating system, PRIMOS, for fast access to all system resources, timesharing for up to 63 users, batch, and multi-tasking.
- 32 million-byte virtual address space per user.
- 16K-byte, 80 nanosecond cache memory.
- Instruction prefetch and decoding.



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VAX-11

From Wikipedia, the free encyclopedia

The **VAX-11** is a discontinued family of [minicomputers](#) developed and manufactured by [Digital Equipment Corporation](#) (DEC) using processors implementing the [VAX instruction set architecture](#) (ISA), succeeding the [PDP-11](#). The VAX-11/780 is the first VAX computer.

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 - [VAX-11/782](#)
 - [VAX-11/785](#)
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Xerox Alto

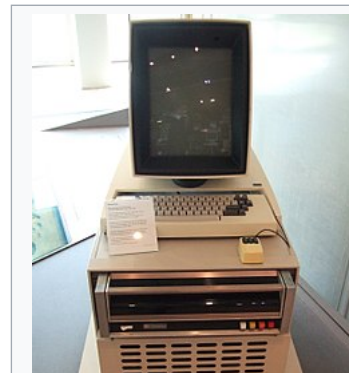
From Wikipedia, the free encyclopedia

The **Xerox Alto** is the first computer designed from its inception to support an [operating system](#) based on a [graphical user interface](#) (GUI), later using the [desktop metaphor](#).^{[7][8]} The first machines were introduced on 1 March 1973,^[9] a decade before mass-market GUI machines became available.

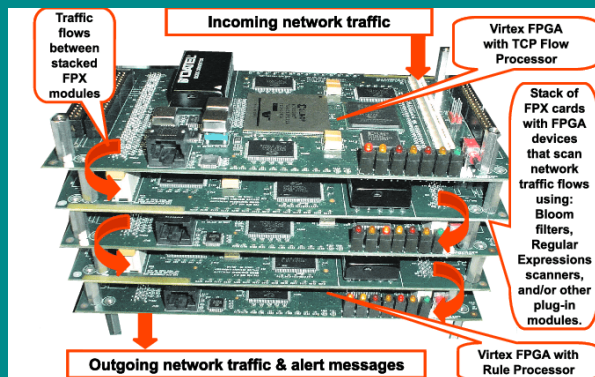
The Alto is contained in a relatively small cabinet and uses a custom [central processing unit](#) (CPU) built from multiple [SSI and MSI integrated circuits](#). Each machine cost tens of thousands of dollars despite its status as a [personal computer](#). Only small numbers were built initially, but by the late 1970s, about 1,000 were in use at various Xerox laboratories, and about another 500 in several universities. Total production was about 2,000 systems.

The Alto became well known in [Silicon Valley](#) and its GUI was increasingly seen as the future of computing. In 1979, [Steve Jobs](#) arranged a visit to Xerox PARC, in which [Apple Computer](#) personnel would receive a demonstration of the technology from Xerox in exchange for Xerox being able to purchase stock [options](#) in Apple.^[10] After two visits to see the Alto, Apple

Xerox Alto

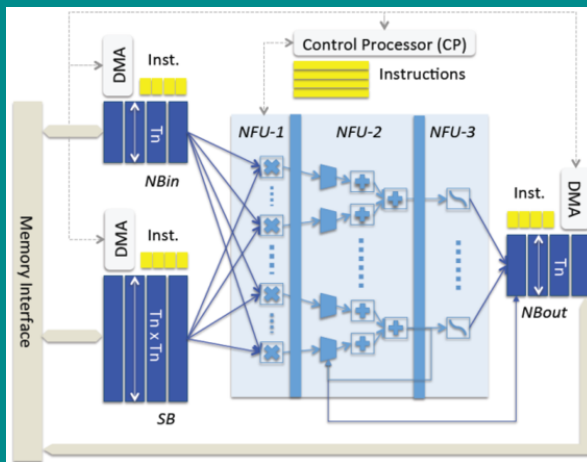


◆ Some Programmable Hardware w/o OS? (10m)



https://www.researchgate.net/figure/The-FPX-platform-in-a-stacked-configuration-allows-network-processing-to-occur-across_fig5_4174985 <https://www.pcmag.com/review/317750/irobot-roomba-880>
<https://www.zeebiz.com/india/news-proud-day-for-india-brahmos-supersonic-cruise-missile-test-successful-with-indigenous-seeker-40105>

◆ Some Programmable Hardware w/o OS? (10m)



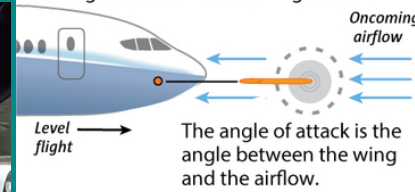
<http://prog3.com/article/2015-09-14/2825698> <https://www.pcworld.com/article/3204149/amd-nvidia-coin-mining-graphics-cards-appear-as-gaming-gpu-shortage-intensifies.html>
https://www.renesas.com/jp/ja/doc/products/memory/r10cp0001eu0100_tcam.pdf

◆ Other Programmable Hardware w/ OS? (10m)

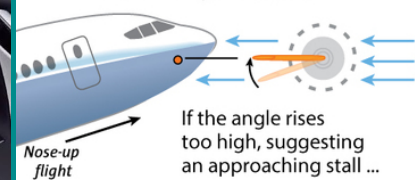


How the MCAS (Maneuvering Characteristics Augmentation System) works on the 737 MAX

1. The angle-of-attack sensor aligns itself with oncoming airflow.

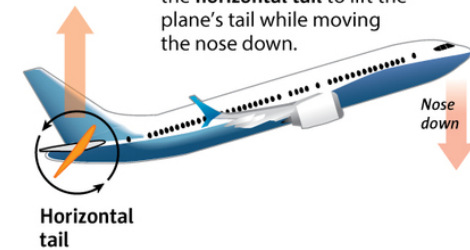


2. Data from the sensor is sent to the flight computer.



... the MCAS activates.

3. MCAS automatically swivels the horizontal tail to lift the plane's tail while moving the nose down.



Sources: Boeing, FAA, Indonesia National Transportation Safety Committee, Leeham.net, and The Air Current

Reporting by DOMINIC GATES,
Graphic by MARK NOWLIN / THE SEATTLE TIMES

<https://www.inverse.com/article/48373-nvidia-a-i-expert-tesla-is-still-a-partner-despite-in-house-autonomy-chip> <https://www.seattletimes.com/seattle-news/times-watchdog/the-inside-story-of-mcas-how-boeings-737-max-system-gained-power-and-lost-safeguards/>

◆ Other Programmable Hardware w/ OS? (10m)



<https://www.zdnet.com/article/the-rise-fall-and-rise-of-the-supercomputer-in-the-cloud-era/> <http://wikimapia.org/349836/Cleveland-Clinic-Hospital-Campus>

♦ Whys and What Ifs (20m)

- ♣ Why do we have processes? What if we had 0 processes?
- ♣ Why do we have memory? What if we had 0 memory?
- ♣ Why do we have i/o drivers? What if we had 0 i/o?

♣ Why do we have files? What if we had 0 files?

♣ Why do we have users? What if we had 0 users?

♦ A Lot of Architectures Requiring our OS Designs

