JOÃO PAULO GOMES ROCHA DA SILVA

ID #: UB384265IN47086

Bachelors of Information Technology

OPERATING SYSTEMS

ATLANTIC INTERNATIONAL UNIVERSITY

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Introduction

What is the OS?

It is a program or even a set of software that acts as an intermediary between the user and the hardware or physical machine. Controls all computer resources and it is this that provides the basis on which application programs can be written. The objectives of an OS are:

• Execute user programs and make it easier to solve problems.

• Make it easy to use the machine and integrates all components of a computer system

• Use the computer hardware in an efficient manner.

A computer is controlled by an OS (Operating System), an acronym used to describe this class of software. In practice an OS is the interface between the user and the machine whose main functions are:

- Processes management;
- Memory management;
- System Files;
- Input and Output;

An operating system consists of several components that allow the operation of the whole computer.

The most important components are:

- Kernel;
- Network;
- Safety;
- Interface;

The kernel (core), together with the drivers and device firmware, provide the most basic level of control over all hardware devices from your computer. This manages access to the RAM and determines which programs with higher priority and which hardware resources that they access applications.

The network is fundamental in most operating systems because it allows us to connect with other machine, including machines attic on the Internet. Thus, computers with different operating systems may participate on the same network and share resources between them, such as printers, scanners, etc.

Safety is another of the basic features in an operating system it must have mechanisms to protect the information, so that the processes accessing the permitted memory areas, etc.
The user *interface* may be graphical or command line (terminal). Currently, almost all operating systems have a GUI, but you can still find the terminal in many places.

After the computer BIOS startup, part of the operating system is loaded into system RAM. Computer programs running within the operating system and start to be called processes when executed.

Is a very easy to understand the operation of the operating system. The user interacts with the application that interacts with the operating system in a relationship Application <-> OS and OS interacts with the equipment through an relation Operating System <-> Equipment.
An operating system (OS) is the set of basic programs, an electronic device, manages the physical devices and receives user instructions or other applications. These applications must be adapted to an operating system.

The computer level, particularly in the computer, the operating system makes the processor management, memories, and directs the operation of input devices, output and input / output. This system also has the user interface, allowing the organization and display of the elements in multiple windows, the entire contents of the hard disk drives and other storage units.

The operating system is divided into two basic levels:

- The **system software** responsible for managing hardware resources and make them accessible to the user and their application programs. It includes the operating system and other components such as system utilities, device drivers, among others.

- The **application software**, which is encompassed all computer programs which are intended to perform tasks of interest to the user, such as spreadsheets, databases, word processing, drawing programs, etc.

The most popular computer operating systems are Windows PC, MAC OS for Apple computers, Linux and Ubuntu PC and servers, Unix for servers only. In mobile phones or smartphones, we find Android operating systems, iOS, Symbian and Windows Phone, among others.

The operating system basically works as interpreter between the user and the computing device. Currently, Windows is the most used system in personal computers worldwide.
History of operating systems

In the first generation (roughly 1945-1955), computers were so large that inhabited large rooms. Were basically built with valves and panels, operating systems "did not exist". Developers, who were also the operators controlled the computer through switches, wires and warning lights.

The next generation (roughly 1955-1965), were created the batch systems (batch systems), which allowed better use of computing resources. The base operating system was a monitor program, used to queue tasks. The user was removed from the computer; each program was written on punch cards, which in turn were loaded, together with the respective compiler (typically FORTRAN or COBOL), by an operator, who in turn used a call control language (JCL Job Control Language).

Types of Operating Systems

Operating systems are a set of instructions executed by the processor. Its function is to control the operation of a computer, managing the use and sharing of their various resources, such as processors, memory and input and output devices. No OS, user should know deeply the computer to interact with it. Imply slow work and the possibility of errors. The difference between a conventional OS and applications is how the routines are executed as a function of time. The OS has no beginning, middle and end as applications. They rely on asynchronous events. It can also be called monitor program, Executive, Supervisor or Controller.

Examples of active operating systems:

* Windows
* Mac OS X
* Linux
* Solaris
* FreeBSD
* Haiku
* eComStation
* FreeDOS
* Unix System V
* AmigaOS
* Minix
Examples of important operating systems that have been discontinued:

* MS-DOS
* OS / 2
* BeOS
* NeXTStep
* CP / M

It should be noted that the group will not speak of all operating systems because they are many. However some group will SO's assets.

Every day you turn on your computer to work, play, surf the web, play games and do many other things. A few seconds after pressing the "power" button, an important component comes into play: the operating system.

Today, the market is well targeted, but many people still use Windows. However, history was not always so. Over the years, several companies have developed systems to suit different types of users. I will talk a little about these many platforms.

**The computer was formless and empty**

The giant computers that took up entire rooms and required the aid of humans born there by the 1950s these early machines, the tasks were performed by technicians who dictated what would be accomplished by the hardware itself.

![Image of early computers](image)

An employee was hired specifically to enable and disable key, which served to indicate if a component should be on or off. When you turn off a switch, for example, information ran by meters or kilometers of wire and lit a light, indicating that particular function was disabled.

At that time, it was common for a person to design and program a computer. Although work for the tasks required, these PCs always needed human intervention and could not use programmed routines. The story changed with the first OS.
1969 - UNIX

- available
- closed source

In the 1960s, a team of developers at AT&T Bell Labs decided to work in a more objective and simplified software than the one that was used in mainframes of the time. After a few years, more precisely in 1969, the result was the proprietary operating system dubbed UNIX (Computer Service and Uniplexada Information).

Initially, the system was programmed specifically for one type of machine, but in 1973 the software was recoded to the C language. Although it is a software with closed source, AT&T has provided copies to universities.

1977 - BSD

- unavailable
- initially: closed source
- currently: open source

In 1977, UNIX had her first child. Although it had its own characteristics, the BSD was clearly linked with its predecessor, as it used part of the source code and system design that was created by AT&T. Initially, the system was only a UNIX extension and aggregated a few features.

Just as his "father", the BSD has also adopted the idea of closed source (something that was changed after decades), but this was not really a problem, since he was facing for use in university and large machines.
1978 - Apple DOS

- unavailable
- closed source

The first Apple operating system came to equip the Apple II computers. As its name suggests, this was a system that worked on disks (time when there were no hard drives).

This software, which was developed by third parties, was very rudimentary and had only a few basic components: a file manager, a catalog, functions to open and remove data, a boot program and some other elements.

1979 - Atari DOS

- unavailable
- closed source

On first reading probably we associate this name with the video game, but the name was also used to baptize the system and the computers of the famous manufacturer of consoles. Atari DOS software was used throughout the family of personal computers 8-bits of the mark.

Like other systems of the time, Atari DOS was very limited and brought some very basic tools in the main menu. He received a number of updates over the years, but their code did not arrive until today.
1980 - Apple SOS

- unavailable
- closed source

With the sales success of the Apple II, the manufacturer, of course, decided to bet on the Apple III and therefore required an evolved system to conquer the consumer. At the time, Apple opted for a slightly different from the predecessor system, but the changes were not as significant.

1980 - Xenix

- unavailable
- closed source

Before you even think of MS-DOS, Microsoft worked somewhat with Unix. In fact, the company has not developed the system, and the whole development was made by AT & T. Also in 1980, the company launched the Xenix for the Zilog Z8000 computers (the beginning of the 16-bit machines).

Over time, Xenix became one of the most Unix systems used by home users. After a few years, Microsoft sold the rights to third (such as Intel and SCO), he decided to work with the 86-DOS.
1980-86-DOS (Q-DOS)

- unavailable
- closed source

As its name suggests, this is an operating system developed specifically for the Intel 8086 processors. Developed by Seattle Computer Products, this software did not last long, as Microsoft bought the idea and decided to turn it into MS-DOS.

1981 - MS-DOS / IBM PC DOS

- unavailable
- closed source

As you well might imagine, from the early times Microsoft works only with software. At the beginning, the company has partnered with IBM to sell your system along with the PCs of the company.

The software is very well accepted and received modifications over the years. In the version 2.0, MS-DOS supported hard drives 10MB and file structure "tree". In the next step, Microsoft added support for FAT16 and networks. Thus was the beginning of what is now Windows.

1981 - Pilot

- unavailable
- closed source

Apple and Microsoft were making great progress with its software, but it was Xerox that launched the first operating system with graphical interface. The company created the mouse and launched the Xerox Star to offer a complete experience for the consumer.

Despite making significant progress, the Pilot system was not a commercial success, perhaps because it was something isolated and was so expensive.
1982 - SunOS
- unavailable
- closed source

Using BSD based, Sun Microsystems has created its own operating system. The software is designed to be marketed to the servers and workstations created by the company. It lasted a long time and has continued to evolve until the developer changed its name to Solaris.

1983 - Apple ProDOS
- unavailable
- closed source

After so many projects, Apple released a more professional system. This new software is based on Apple SOS and had some problems that other systems did not have. However, with the release of AppleWorks suite, Apple managed to draw the attention of consumers.

1983 - Lisa OS
- unavailable
- closed source

Also based on the old Apple SOS, this system came with a number of fixes and impressed with his ability to work with multiple tasks and the virtual memory feature. These were important aspects of the software work well with a revolutionary graphical interface.

In addition to offering the typical features that existed in the Pilot, the Lisa OS has come to make the most enjoyable usability for those who used the computer at home. With a top menu, Apple has managed to win over the public.
Hewlett-Packard was already a few years in the computing industry, but it took a bet on its own operating system. HP-UX was the first to bring a manager of logical drives and access control lists. The system worked and today is a Unix platform available for large servers.

After setting the interface, Apple decided to simplify things for consumers. Many of the commands that frightened users were removed and replaced with mouse gestures. This was the beginning of the computer age "friendly". Mac OS (which originally bore the name System) was the basis of the long success of Apple.
1985 - AmigaOS

- available
- closed source

Apple was dominating, but Amiga entered headlong into business with your proprietary system. Computers with AmigaOS even arrived in Brazil. They were equipped with Motorola processors and were quite unlike anything that existed.

Even as a beginner, in its early versions, the system already offered GUI. He was not much for the competitors, but the race was difficult at the time. Although not a sales burst, AmigaOS still exists and works on machines with PowerPC architecture.

1985 - Windows 1.0

- unavailable
- closed source

Running after the injury, Microsoft released its first system with graphical user interface and support for multiple tasks. MS software copied some things Macintosh, but it was quite different in several respects. This system was running on MS-DOS, but already had some advanced drivers to improve usability.
1985 - RISC/os

- unavailable
- shared code

After several Unix-based systems, some began to mix code base elements with other software. The RISC/os, for example, carried BSD UNIX elements and some of the features. This was one of the first systems with 64-bit architecture, but it did not really work and was soon discontinued.

1986 - GEOS

- available
- closed source

As the years passed, more companies have adopted the idea of the graphical interface for systems. The GEOS was a Berkeley Softworks software that equipped computers Commodore. He already came with a word processor and a program for drawings. The last descendant of this OS appeared in 2009, but he is still very rudimentary.

1986 - LynxOS

- available
- closed source

Trying to escape from the trivial, this system has come to offer processing operations in real time. Instead of using temporary data, LynxOS worked to provide immediate results. It is a very common system for aviation, telecommunications, industrial process control and other activities.
1987 - MINIX

- available
- open code

After so many versions of Unix aimed at large enterprises and domestic systems, a man named Andrew S. Tanenbaum released a simplified software for educational purposes. MINIX was one of the inspirations for the release of Linux acclaimed.

1987 - OS/2

- unavailable
- closed source

After MS-DOS and Windows, Microsoft and IBM were thinking of launching a more evolved system. The Operating System / 2 featured a more advanced graphical interface. It was created especially for the new IBM computers and after some time Microsoft left the project.

1987 - Windows 2.0

- unavailable
- closed source

While giving some attention to OS / 2, Microsoft also developed in parallel Windows 2.0. The new version of the system was beginning to take a few steps to get to what we know today. Now, the windows could overlap each other and the resources already existing maximize and minimize.
1988 - / ROSE and System 6

- unavailable
- closed source

Apple continued to invest in your system, but the System 6 was not the best move of the company. He brought some unintelligent features (such as MacroMaker which served to automate the activities) and showed great progress.

At the same time, Apple bet on a system that was running on the Macintosh co-processing platform. The A / ROSE should facilitate the introduction of new hardware on the computers of Apple, but unfortunately, the system had a number of problems.

1989 - NeXTSTEP

- unavailable
- closed source

After leaving Apple, Steve Jobs founded NeXT. His new company developed the NeXTSTEP system, which was based on Unix and had BSD code. The system was already with graphical interface, a dock (as is the future of Apple systems), 3D widgets, commands to drag items and fully colored icons. That was the beginning of OS X.
1990 - Windows 3.0

- unavailable
- closed source

Windows 3.0 showed some changes, particularly with respect to hardware support. This system was able to work with Intel processors 8086/8088, 80286 and 80386.

1991 - Linux

- available
- free and open source

Finally, after twenty-odd years of history, Linux was born. Although not the preferred system of many, the penguin was one of the most important in the history, since bringing free and open source.

Initially, Linus Torvalds system took advantage of libraries and applications GNU. The curious of this system is that it became popular as a single platform. From the beginning, Torvalds distributed the free system kernel, ensuring that many other systems could be developed and offer new experiences for users.

Linux continues in constant development, and its core is updated to include new technologies and improvements. The main highlight of this software is that it only evolved and did not need to worry about GUI and additional.
1991 - System 7

- unavailable
- closed source

The release of System 7 (or) was an important step in Apple's history. This system has come consolidated and added a number of new features for the user. Thanks to the evolution also of hardware components and peripherals, software that appealed to consumers. It was the first system from Apple to be made available on CD.

1991 - BeOS

- available (as Haiku)
- closed source

Thinking about the possibilities of exploring multimedia files and work with images and videos, the Be developed BeOS. The Be system came to compete directly with Windows and Mac OS. As competitors, he also worked with windows, menus and other features. The project is over, but it is still available as Haiku.

1991 - Workplace OS

- unavailable
- closed source

From time to time, IBM was trying to create new systems for their computers. This time, the company bet on a platform to run almost everything. Workplace OS was able to run DOS programs, OS / 2, AIX, Windows and others.

It was based on the PowerPC architecture and brought part of the UNIX code. It was discontinued due to poor performance and low public acceptance.
1992 - Windows 3.1

- unavailable
- closed source

Windows 3.1 a more well-developed network interface, better support for running multimedia files and TrueType fonts. In just two months, the 3.1 version has sold 3 million copies.

1992 - Solaris

- available
- closed source

Continuing the SunOS, Sun Microsystems launched the Solaris. The new system was also based on UNIX and to continue its original idea, Sun continued focusing on servers and workstations. Like other systems, the Solaris brought its own graphical interface and an advanced working environment.

1993 - Debian

- available
- free and open source

Two years after the birth of Linux, came one of the greatest of all time systems. Debian arrived with both feet on the chest of the giant companies showing all that Penguin had to offer. The Debian Project system met the Linux Kernel (an adaptation of an earlier version known as SLS) and the GNU tools.

One of the highlights was his support for the most different architectures. Debian runs on x86, x64, PowerPC, SPARC, ARM, MIPS, S390 and IA-64. Due to the versatility, the system won many descendants, including Ubuntu.
Currently, it has a giant database and can easily adapt to any needs. It is one of Linux systems commonly used.

1993 - FreeBSD, NetBSD

- available
- open code

At that time, the running operating systems was increasingly insane. All had new ideas and wanted to enter the market. In 1993, the Berkeley Software Distribution launched the NetBSD and the FreeBSD Project. The company released FreeBSD. Both systems still exist and are free.

1993 - Slackware

- available
- free and open source

In parallel with Debian, was born another great version of Linux. Slackware was also based on the SLS and the Linux Kernel. He came to offer ease with some scripts. Considering the long evolution, this distribution also has a huge database and has won many descendants.
1994 - Copland (System 8)

- unavailable
- closed source

The eighth version of Apple’s system would come to bring more security and improve multitasking system. It happens, however, that the software had a very short life, since Apple acquired NeXT logo and began working on a new system.

1994 - SUSE

- available

1995 - Red Hat

- available
1995 - Windows 95

- unavailable
- closed source

Windows 95 was so important that just setting some standards. The way the desktop is organized, which is still used in Windows 7 and 8, the Start menu, the taskbar, and Windows Explorer have been new developments that facilitated the use of the system.

After some updates, Windows 95 now supports the reading of USB devices, the Internet Explorer browser (which never left the Microsoft System) and other functions. This system was responsible for making Windows the most used system in the world.

1996 -

- unavailable
- closed source

While working on NeXTSTEP, Apple decided to launch an intermediate system to please its users. Rhapsody was an adapted software OpenStep and had a very similar interface to the Mac OS. His life was not as short as the company took to launch OS X.

1997 - Symbian

- available

One of the first mobile system is Symbian. He equipped a number of mobile phones from Nokia and other manufacturers. For over ten years, the software has been updated to match the latest trends. The system eventually died (but is still supported) in the hands of Nokia.
1998 - Windows 98

- unavailable

Replacing Windows 95, the new version of the system was also able to run 16 and 32 bit programs. Its main advantages were already native support for USB devices and more advanced drivers. Also, it came with DirectX 5, which guarantees the implementation of more advanced games.

1998 - Mandrake (Mandriva)

- Available

1999 - Windows 98 SE

- unavailable
- closed source

As its name suggests, the Second Edition of Windows 98 came to correct the flaws of its predecessor. Improvements were made in the communication network, the support for drivers and DirectX update.
1999 - Yellow Dog Linux

- Available

Despite being unknown to many, the Yellow Dog Linux is a free and open source system that is still alive. This version of the Penguin is exclusive to PowerPC architectures. It uses much of the Red Hat code and brings some software installed by default.

2000 - Windows 2000

- unavailable
- closed source

Designed especially for network servers and clients, Windows 2000 (NT 5.0) supported NTFS 3.0, file encryption system and other advanced features. He was replaced by Windows 2003.

2000 - Windows ME

- unavailable
- closed source

Microsoft was hitting on his bets, but it proved he could make great blunders. Windows ME was the system with the largest amount of bugs that the company launched. In addition to being slow, it focused only on some visuals that did not help the system to stay alive for long.
2000 - Knoppix

- available

Among the many versions of Linux, Knoppix received some attention at the time of its release. Based on Debian, the system has come to offer the resources of the free system without the need for an installation. It was enough to put the Knoppix CD in the PC and start to enjoy a Linux very light.

2001 - Windows XP

- unavailable (support ends from 2014)
- closed source

Due to the disaster of Windows ME, Microsoft came with everything in Windows XP. This was probably the most used system for all. He had a completely redesigned interface, brought a number of new features for networks, DirectX 8.1, enhanced support for multiple users, the new security features and more. This system won many updates.
2001 - OS X

- unavailable
- closed source

After so many years working on their own system, Apple finally released a UNIX-based system. The OS X came to revolutionize the history of the company. Since the launch of this system, Apple is only making improvements and has not released a completely new version.

Mac OS X, as it was also called, brought protected memory, the dock (similar to what is used today), the terminal, a mail client, support for OpenGL and many other features.

2002 - Gentoo Linux

- available

2003 - Fedora

- available
2003 - Kurumin

- x86 and x64
- discontinued
- open code

Among the many Linux versions, one in particular, has received special attention from Brazilians: Kurumin. The system created by Carlos E. Morimoto was created based on Debian and took the operating characteristic directly from the CD (something that was introduced Knoppix).

In addition to this functionality, Kurumin became famous for bringing some automatic features. The system had the "ClicaAki" (Control Panel Kurumin), which actually was a simplified store lowered and settled the programs in a few clicks.

Unfortunately, Kurumin was discontinued in 2009. The latest version of the system was the NG 8, which was based on Ubuntu 8. This was a system that will be missed.

2004 - Ubuntu

- i486, x86, x64 and ARM
- available
- updates on development
- open and free code

After 13 years of Linux invention, born the system today is the most popular with the face of Penguin. Based on Debian, this system made things more user friendly for the user. Ubuntu receives two annual updates and features enhanced support for various types of hardware (including NVIDIA and AMD cards).
2004 - Mac OS X Tiger

- IA-32, x86-64 and PowerPC
- available
- closed source (with open source components)

This was the first system to support Apple's Intel processors. In four years of development, Apple added to your system the following features: Dashboard, Smart Folders, Spotlight and other tools.

2006 - Linux Mint

- i486, x86 x64
- available
- open and free code

2006 - OpenSUSE

- IA-32, x86 and x64
- available
- open and free code
2006 - Windows Vista

- IA-32, x86 and x64
- available
- closed source

Trying to innovate, Microsoft ended up giving another blunder. Windows Vista came to create a new experience and attract users of Windows XP. Because of a number of performance problems, the system was not successful in the mission. Nevertheless, some features (such as Windows Search and Windows Aero) were innovations that helped in the development of the successor system.

2007 -

- ARM and proprietary architectures
- available
- updates on development
- closed source

The great revolution in the mobile market occurred when Apple launched the famous iPhone. At the time, there was nothing similar to the smartphone and the Apple system. IOS was created based on OS X and introduced the world features easy to use. Recently, the system has undergone a makeover in its visual and continues making strides in introducing new features.
2008 - OpenSolaris
- SPARC, IA-32, x86, x64, PowerPC, System z on z / VM and ARM
- discontinued
- open and free code

2008 - Android
- ARM, x86, MIPS and i.MX
- available
- updates on development
- open source (with proprietary drivers)

Previously developed by Android Inc. Android was acquired by Google yet in 2005. Since then, the search giant has been working to conquer the mobile market. Today, Android is the most widely used portable system in the world, and he is gaining prominence as a pioneer in the launch of various features.

2009 - WebOS
- ARM
- Available
- open code
2009 - Windows 7

- IA-32, x86 and x64
- available
- closed source

Considering the disappointments of Windows Vista, Microsoft has again decided to run after the injury. Windows 7 comes to fix all the problems predecessor and offer performance above all else. The system has not achieved the appreciation that Windows XP had, but managed to win over the public.

2012 - Windows 8

- x86, x64, IA-32 and ARM
- available
- updates on development
- closed source

Thinking of moving to the sector of the tablets and revolutionize the way people use PCs, Microsoft bet on a redesign of your system. Building on elements of Windows Phone, the new Windows 8 brought a new Start Menu. In addition, it maintains compatibility with older programs and brings support for new apps.

2015 - Windows 10

- closed source

The Windows 10 received largely positive reviews since its original release date in July 2015; critics praised Microsoft’s decision to eliminate some of the mechanical introduced in Windows 8, as well as adding more targeted for use in desktop computing environment, much also previous versions of Windows, regardless of the Windows touch interface 10 it was criticized for having several regressions compared to the Windows 8 touch interface.
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