History of Operating System

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An operating system is a type of software that acts as an interface between the user and the hardware. It is responsible for handling various critical functions of the computer and utilizing resources very efficiently so the operating system is also known as a resource manager. The operating system also acts like a government because just as the government has authority over everything, similarly the operating system has authority over all resources. Various tasks that are handled by OS are file management, task management, garbage management, memory management, process management, disk management, I/O management, peripherals management, etc.

Function of Operating System

- Memory management
- Process management
- File management
- Device Management
- Deadlock Prevention
- Input/Output device management
- Act as a resource manager
- Time Management

Generation of Operating System

Below are four generations of operating systems.

- The First Generation
- The Second Generation
- The Third Generation

- The Fourth Generation

1. The First Generation (1940 to early 1950s)

In 1940, an operating system was not included in the creation of the first electrical computer. Early computer users had complete control over the device and wrote programs in pure machine language for every task. During the computer generation, a programmer can merely execute and solve basic mathematical calculations. an operating system is not needed for these computations.

2. The Second Generation (1955 – 1965)

GMOSIS, the first operating system (OS) was developed in the early 1950s. For the IBM Computer, General Motors has created the operating system. Because it gathers all related jobs into groups or batches and then submits them to the operating system using a punch card to finish all of them, the second-generation operating system was built on a single-stream batch processing system.

3. The Third Generation (1965 – 1980)

Because it gathers all similar jobs into groups or batches and then submits them to the second generation operating system using a punch card to finish all jobs in a machine, the second-generation operating system was based on a single stream batch processing system. Control is transferred to the operating system upon each job's completion, whether it be routinely or unexpectedly. The operating system cleans up after each work is finished before reading and starting the subsequent job on a punch card. Large, professionally operated machines known as mainframes were introduced after that. Operating system designers were able to create a new operating system in the late 1960s that was capable of multiprogramming—the simultaneous execution of several tasks in a single computer program.

In order to create operating systems that enable a CPU to be active at all times by carrying out multiple jobs on a computer at once, multiprogramming has to be introduced. With the release of the DEC PDP-1 in 1961, the third generation of minicomputers saw a new phase of growth and development.

4. The Fourth Generation (1980 – Present Day)

The fourth generation of personal computers is the result of these PDPs. The Generation IV (1980–Present)The evolution of the personal computer is linked to the fourth generation of operating systems. Nonetheless, the third-generation minicomputers and the personal computer have many similarities. At that time, minicomputers were only slightly more expensive than personal computers, which were highly expensive.

The development of Microsoft and the Windows operating system was a significant influence in the creation of personal computers. In 1975, Microsoft developed the first Windows operating system. Bill Gates and Paul Allen had the idea to advance personal computers after releasing the Microsoft Windows OS. As a result, the MS-DOS was released in

1981, but users found it extremely challenging to decipher its complex commands. Windows is now the most widely used and well-liked operating system available. Following then, Windows released a number of operating systems, including Windows 95, Windows 98, Windows XP, and Windows 7, the most recent operating system. The majority of Windows users are currently running Windows 10. Apple is another well-known operating system in addition to Windows.

Types of Operating System

Operating Systems have evolved in past years. It went through several changes before getting its original form. These changes in the operating system are known as the **evolution of operating systems**. OS improve itself with the invention of new technology. Basically , OS added the feature of new technology and making itself more powerful. Let us see the evolution of operating system year-wise in detail:

- No OS – (0s to 1940s)
- Batch Processing Systems -(1940s to 1950s)
- Multiprogramming Systems -(1950s to 1960s)
- Time-Sharing Systems -(1960s to 1970s)
- Introduction of GUI -(1970s to 1980s)
- Networked Systems – (1980s to 1990s)
- Mobile Operating Systems – (Late 1990s to Early 2000s)
- AI Integration – (2010s to ongoing)

1. No OS – (0s to 1940s)

As we know that before 1940s, there was no use of OS . Earlier, people are lacking OS in their computer system so they had to manually type instructions for each tasks in machine language(0-1 based language) . And at that time , it was very hard for users to implement even a simple task. And it was very time consuming and also not user-friendly . Because not everyone had that much level of understanding to understand the machine language and it required a deep understanding.

2. Batch Processing Systems -(1940s to 1950s)

With the growth of time, batch processing system came into the market .Now Users had facility to write their programs on punch cards and load it to the computer operator. And then operator make different batches of similar types of jobs and then serve the different batch(group of jobs) one by one to the CPU .CPU first executes jobs of one batch and them jump to the jobs of other batch in a sequence manner.

3. Multiprogramming Systems -(1950s to 1960s)

Multiprogramming was the first operating system where actual revolution began. It provide user facility to load the multiple program into the memory and provide a specific portion of memory to each program. When one program is waiting for any I/O operations (which take much time) at that time the OS give permission to CPU to switch from previous program to other program(which is first in ready queue) for continuous execution of program with interrupt.

4. Time-Sharing Systems -(1960s to 1970s)

Time-sharing systems is extended version of multiprogramming system. Here one extra feature was added to avoid the use of CPU for long time by any single program and give access of CPU to every program after a certain interval of time. Basically OS switches from one program to another program after a certain interval of time so that every program can get access of CPU and complete their work.

5. Introduction of GUI -(1970s to 1980s)

With the growth of time, Graphical User Interfaces (GUIs) came. First time OS became more user-friendly and changed the way of people to interact with computer. GUI provides computer system visual elements which made user's interaction with computer more comfortable and user-

friendly. User can just click on visual elements rather than typing commands. Here are some feature of GUI in Microsoft's windows icons, menus and windows.

6. Networked Systems – (1980s to 1990s)

At 1980s,the craze of computer networks at it's peak .A special type of Operating Systems needed to manage the network communication . The OS like Novell NetWare and Windows NT were developed to manage network communication which provide users facility to work in collaborative environment and made file sharing and remote access very easy.

7. Mobile Operating Systems – (Late 1990s to Early 2000s)

Invention of smartphones create a big revolution in software industry, To handle the operation of smartphones , a special type of operating systems were developed. Some of them are : iOS and Android etc. These operating systems were optimized with the time and became more powerful.

8. AI Integration – (2010s to ongoing)

With the growth of time, Artificial intelligence came into picture. Operating system integrates features of AI technology like Siri, Google Assistant, and Alexa and became more powerful and efficient in many way. These AI features with operating system create a entire new feature like voice commands, predictive text, and personalized recommendations.

Note: The above mentioned OS basically tells how the OS evolved with the time by adding new features but it doesn't mean that only new generation OS are in use and previously OS system are not in use, according to the need, all these OS are still used in software industry.

Advantages of Operating System

- Operating System manages external and internal devices for example, printers, scanners, and other.
- Operating System provides interfaces and drivers for proper communication between system and hardware devices.
- Allows multiple applications to run simultaneously.
- Manages the execution of processes, ensuring that the system remains responsive.
- Organizes and manages files on storage devices.
- Operating system allocates resources to various applications and ensures their efficient utilization.

Disadvantages of Operating System

- If an error occurred in your system, then there may be a chance that your data can be deleted therefore always have a backup of your data.
- Threats and viruses can attack our operating system at any time, making it challenging for the OS to keep the system protected from these dangers.
- For learning about new operating system can be a time-consuming and challenging, Specially for those who using particular Operating system for example switching from Windows OS to Linux is difficult.
- Keeping an operating system up-to-date requires regular maintenance, which can be time-consuming.
- Operating systems consume system resources, including CPU, memory, and storage, which can affect the performance of other applications.

Frequently Asked Questions on History of Operating System – FAQs

How has the development of computer hardware been impacted by the evolution of operating systems?

The design and advancement of computer hardware have been significantly influenced by the development of operating systems. By time by time hardware producers added new features and capabilities to their products as operating systems improved in order to better support the functionality offered by the operating systems after a long variation of time. Like for instance, basically the development of memory management units (MMUs) in hardware to handle memory addressing and protection followed the introduction of virtual memory in operating systems. Similarly, the demand for operating system multitasking and multiprocessing support prompted the creation of more potent and effective processors and other hardware components.

How has the development of distributed systems impacted how operating systems have changed over time?

Operating systems have been significantly impacted by the rise of distributed systems, such as client-server architectures and cloud computing. To support network communication, distributed file systems, and resource sharing across multiple machines, operating systems had to develop. Distributed operating systems also developed to offer scalability, fault tolerance, and coordination in distributed environments. These modifications improved the ability to manage resources across interconnected systems by advancing networking protocols, remote procedure calls, and distributed file systems.

What are the example of operating system?

There are many popular operating system for example Apple macOs, Microsoft windows, Google Android OS, Linux Operating System, and apple ios.

What Is Deadlock In Operating System?

Deadlock is a situation in operating system where a set of processes are blocked because each process is holding one resource and waiting for another resource for complete execution but this resource is allocated to other process this situation is known as Deadlock. Or any event that is not happened is a Deadlock.

What is the mother of operating system?

UNIX is the mother of operating System. Unix is an Operating System that is truly the base of all Operating Systems like Ubuntu, Solaris, POSIX, etc.

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