UNIX System Layers

T Dey
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Q:- Explain UNIX as a Layered Architecture.

The UNIX OS can be thought of as a layered system.

The innermost core is called the kernel. Kernel is a set of programs which perform various primitive operations requested by user processes.

The following services are provided by the UNIX Kernel.

* Controlling the creation, suspension and termination of processes. Inter-process communication is also controlled by the kernel.

* Scheduling processes on the CPU. In a time shared mode the CPU is shared by several processes. Thus each process is given a time slice. When the time slice expires the process is suspended and one of the waiting process is scheduled. The suspended process is scheduled again when its turn comes.

* Main memory is allocated to an executing process as requested by the process. Processes may have private and public address space. Kernel protects the private address space from accidental tampering.

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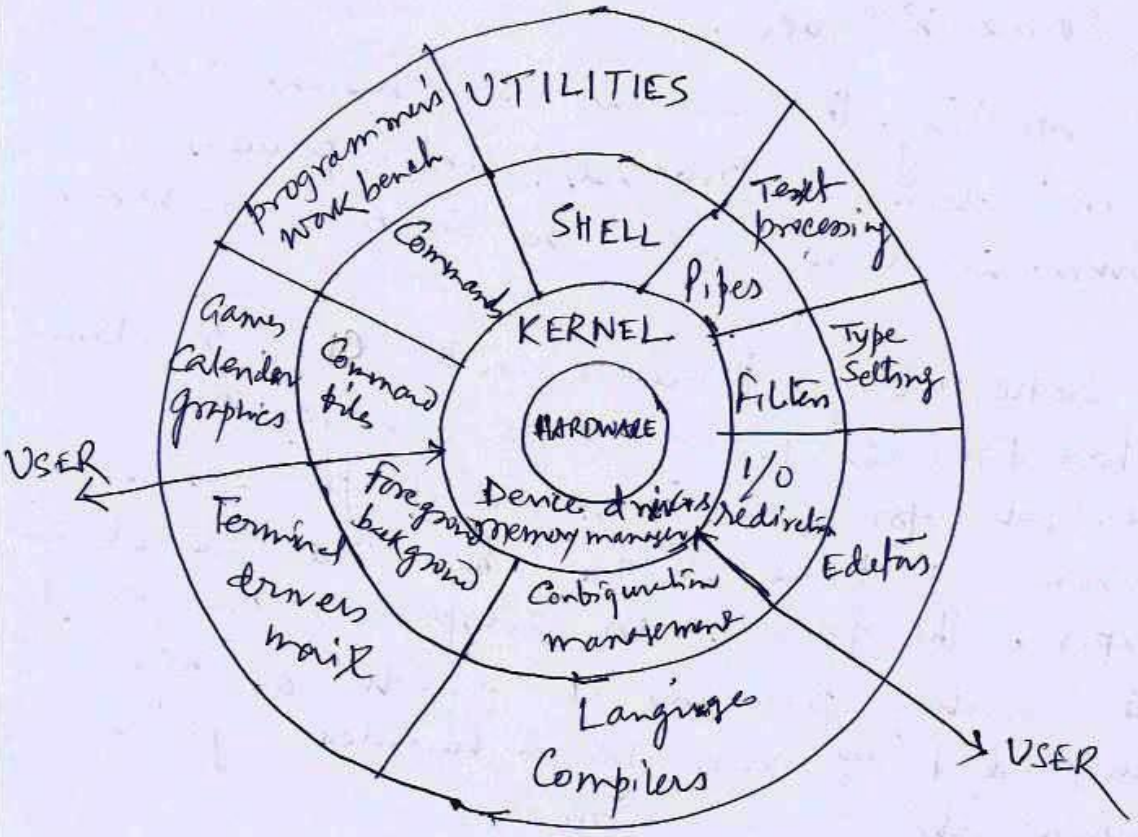
* It manages users' files by providing them space in secondary storage, protecting them from illegal access and ensuring efficient storage and retrieval.

* It also provides process controlled access to peripheral devices such as terminals disk drives, network devices etc.



Layers of UNIX operating System

figure-A

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The next layer has programs supported by the OS. The most interesting of these is one called shell which is a command interpreter.

There are a large number of very useful commands provided by shell. Users can create a series of shell commands and store it in a file. This file can be made an executive file and when invoked will act like a new shell command.

UNIX also provide a very interesting idea called pipe. A pipe is a way to send the output of one program as the input of another program. A pipeline is a connection of two or more programs through pipes.

There are a large family of UNIX shell programs that read an input, perform a single transformation and write an output. For example there is a command called grep which serches a file for lines that match a given pattern and outputs them. A command sort sorts a file as per some specification. ~~A Comma~~

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A Command that accepts its standard input, process it and sends the result to its standard output is called a ~~filter~~ filter.

The outermost layer of UNIX has language Compilers for C, Fortran 90 etc.

UNIX has some good text processing ~~programs~~ programs. Many additional utilities such as Calender, games, graphics etc are available. In the figure A the structure of the ~~for~~ layers in UNIX has drawn.

8:- Distinguish ~~feet~~ between a real time System and an online System.

Ans: An On-line system has files which are updated as soon as a transaction is Completed. Response time should be short but a delay would not be fatal.
ex:- Airline / Railway Reservation System.

A real time system is used in the control of Physical systems. The response time of such systems should ~~be~~ match the needs the physical System. A delay in response may lead to fatal failures.

for example:- A Satellite in orbit may be controlled by a Computer. The position, velocity, acceleration and spin information of the Satellite

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8:- Explain a multiprogrammed and time shared operating system.

Ans:- A multiprogrammed operating system keeps in a computer's memory a set of JOBs belonging to different users, schedules them on CPU, provides I/O facilities requested by each user and optimizes the use of computer's resources.
The primary objective of a multiprogrammed operating system is to maximize the number of programs executed by a computer in a specific period and keep all the units of computer simultaneously busy, in other words it maximize the throughput of a computer.

A time shared OS allows a number of users to simultaneously use a computer. The primary objective of a time shared OS is to provide fast response to each user of the computer. Programmer productivity is considerably improved through access to a time-shared OS [operating system]. multiprogrammed
UNIX is a very popular multiuser, timesharing OS implemented in a large class of machine from PCs to supercomputers.

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may be fed to a computer which may be programmed to compute the orbit and give instructions to rocket motors to correct the orbit. In such an application the operation is in "real time", that is the control has to be exercised during the actual functioning of the system. Any delay beyond the specified for control would be disastrous. Real time OSs have to work within strict time limits for critical jobs. Real time systems are required to be highly reliable. Any failure of a system which controls a space vechile in motion may result in a fatal accident. In such cases, duplicate systems are used so that if one system fails, the other will take over.

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Assignment 3: Q① What is Kernel? Write down the functionalities of a Kernel in UNIXOS.

Q② Explain UNIX as a Layered Architecture.

Q③ Distinguish between Online system with Real time systems.

Q④ Explain ~~UNIX~~ as multiprogramed and time shared operating System.

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