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**Q1 ) Describe the main services provided by an operating system. Explain how each**

**provides convenience to the users?**

1- program execution :

* load program into main memory and then execute it in cpu

2- user interface :

* there’s two main kind of UI graphical user interface (GUI ) , command line interface ( CLI ) of command interpreter and batch interface
* it’s facilitate to use operating system services via system calls or programs
* in GUI icon represent program and usually it’s mouse based and each click button on an object represent different action which make it convenient to use for naive users

3- I/O operation :

* facilitate the communicating with files and using I/O devices

4- file-system manipulation :

* create file/directory read/write on file search for them list file information ,permission management

5- communication :

* process may exchange information with other process in same computer so operating system provide this service with two mechanism for communication between process through message passing and shared memory
* also process may exchange information with another computer in the same network

6- Error detection :

* keep monitoring the operating system to provide better performance

**Q2 )Why is command interpreter separate from the kernel in some cases of operating**

**systems?**

It is usually not part of the kernel since the command interpreter

is subject to changes

**Q3) What are the main steps of a system call execution?**

system call provide an interface to services made available by an operating system.

when the user invoke a system call , the system call handler switch from user mode to

kernel mode and then return status with any return value { of course switch to user mode when returning }

**Q4)Why use APIs rather than system calls?**

more consistency , reliability , ease of use and portability , programmer need to know

nothing about the implementation of the API’s he only need to know how it’s work and

what the is the returning value .

**Q5)What are the main system goals required for designing an operating system?**

* free errors
* efficiency
* reliable
* flexible
* easy to design and implement and maintain

**Q6)What is difference between system calls and system programs? List four types**

**with examples of both.**

* system call provide interface between process and operating system ، the system call allow user-process to request some services from operating system which is not allowed from process itself to do
* System programs provide basic functioning to users so that they do not need to write their own environment for program development
* in short system programs are bundles of useful system calls
* system call :

1. process control : abort , terminate , execute , load process
2. file management : create , open , close file
3. communication : send , receive
4. information maintenance : gettime , date , set time or date

* system program:

1. File modification : text editor , special commands to search
2. Programming language-support : compiler , assembler , debugger
3. Communication : browsing web pages , sending emails , send message to another screens
4. status information : task manager and registry

**Q7)Compare Linux, Unix and Windows operating systems in terms of system**

**design. You need to do an internet search**

* MAIN DIFFERENCES BETWEEN LINUX & WINDOWS (PROGRAMMERS LEVEL)

1. Full access vs. no access
2. Licensing freedom vs. licensing restrictions
3. Online peer support vs. paid help-desk support
4. Full vs. partial hardware support
5. Command line vs. no command line

* MAIN DIFFERENCES BETWEEN THE PREVIOUS TWO OPERATING SYSTEMS (ADMINISTRATOR LEVEL)

1. User interface{A |

Graphical user interface

In Linux, a number of desktop environments are

available, of which GNOME and KDE are the most

widely used.In windows, window manager is the Desktop

Window Manager on Windows Vista, and a Stacking

window manager built on top of GDI in older versions

B| Command-line interface

Linux is strongly integrated with the system console. The

command line can be used to recover the system if the

graphics subsystem fails. In Windows, The Command

Prompt exists to provide direct communication between

the user and the operating system. A .NET-based

command line environment called Windows PowerShell

has been developed.}

2. Installation

3. Stability

4. Performance

FOR MORE INFORMATION : http://www.ijens.org/vol\_12\_i\_04/126704-8181-ijecs-ijens.pdf

**Q8)Give a suitable situation in which it is unclear how to layer two system**

**components that require tight coupling of their functionalities.**

Device driver for backing store must be at a lower level than memory management , the

backing store driver would normally be above the CPU scheduler , CPU scheduler may

have more information about all the active process than can fit in memory therefore this

information may need to be swapped in and out of memory requiring the backing store

device routine to be below the CPU scheduler .

**Q9)Explain why a modular kernel may be the best of the current operating system**

**design techniques.**

because kernel has set of core component and links in additional services via modules.

so it’s provide the core services while other services are implemented dynamically as kernel is running . also this approach is similar to the microkernel approach in the primary module has only core functions and when some Non-Core services needed they loaded in kernel space. also it’s similar to layered system but it’s more flexible because module can call any other module through interface between them .