

Here are some review questions for your Monday Test:

(1) Explain why a PLATFORM is not the same as an Operating System.

A PLATFORM consists of HARDWARE + OPERATING SYSTEM + APPLICATIONS.

For example, an Android Smartphone contains the chips, screen and battery as Hardware, Google Android as an OS, and applications like Google Chrome and WhatsApp.

The OS is only part of the platform. If you have a Windows OS on a laptop with a touch pad, there is no guarantee that it works the same as a desktop PC that has a mouse and a printer. They are probably COMPATIBLE, but they are not the same platform.

(2) Explain the difference between CLI and GUI, including a specific example.

CLI = Command Line Interface, like you see in the Terminal utility. There are no graphics, no mouse. You must TYPE commands, like "open calculator.app", rather than clicking on an icon. But the CLI does use the same File System as the GUI.

GUI = Graphical User Interface - this is a WIMP with Windows, Icons, Menues and Pointing device. Underneath this uses the same File System as CLI, but the user does not need to type any commands, so they don't need to know as much as the CLI user.

(3) Explain how Multi-tasking and Memory-Management are connected, and then explain how they are separate.

Multi-tasking requires many programs to be loaded into the RAM at the same time.

Then the OS can switch from one to the other, so the user can switch between applications.

Also, the OS can run many tasks "simultaneously" via "time-slicing" - running one task for a millisecond, then switching and running a different task for a millisecond, back and forth, giving the illusion that both tasks are running all the time. Since many tasks must be present in RAM, the OS uses Memory Management to avoid loading an application into a location that is already being used by another application.

Memory management is still important if you are not using multi-tasking, but it is much simpler.

It just needs to allocate memory when an application is loaded (started), and then de-allocate (free) the memory when the program terminates.

(4) Describe a specific example of a program that is an APPLICATION, but is not part of the Operating System. Then describe a specific example of a program that is part of the Operating System, but is not an APPLICATION.

A typical application is Microsoft Word. This is not part of the OS.

The Calculator program is also NOT part of the OS, although it is sold with the OS.

The OS can function perfectly well without the Calculator program.

A program that is part of the OS is Finder (in the Mac) or Explorer (in Windows).

These are the programs that control the User Interface - moving windows around, showing icons on the desktop, and responding when the user clicks the mouse.

(5) Explain how tasks can "run in the background", with an example of a background task.

The OS consists of hundreds of MODULES - these are small programs that perform small but important tasks. For example, there is a Wifi connection utility, that connects the computer to the local WIFI access point. The rest of the OS could run without this, but there would be no WIFI access. This program runs in the background - although it probably has a small icon on the User Interface so the user can use it. Such tasks run via Multi-tasking, with the OS running each task

for a millisecond or so before switching to the next task. These UTILITIES and DRIVERS run AUTONOMOUSLY, with user control or input.

(6) Explain what Virtual Memory is, why it is important, and how it works.

Virtual Memory is part of the OS Memory Management. When the OS needs to load a new program into the RAM, the RAM might already be full of running programs. Then the OS finds a task that is not currently being used. It SWAPS this task into Virtual Memory, which is an area on the Hard-Disk. Then the previously occupied memory is free, and can be used for the new task.

If the user or OS need the swapped-out task for some reason, then the OS must SWAP this task back into RAM, possibly swapping a different task out into Virtual Memory. The SWAPPING is quite slow, compared to normal operations. If this happens often, the user should consider installing more RAM, maybe moving from 4 GB to 8 GB, to avoid using Virtual Memory.

(7) State NORMAL numbers for each of the following :

- (a) RAM in a laptop (notebook) ----> 4 Gigabytes or 8 Gigabytes
- (b) secondary storage in a Smartphone ---> 16 GB or 32 GB
- (c) bandwidth in a home WIFI network ---> local bandwidth is 100 Megabits per sec
- (d) size of a Hard-Disk-Drive in a personal computer ---> 500 GB

(8) Describe 3 different computing PLATFORMS that might be owned by a 17 year old student.

- 1. Personal Computer (Mac or Windows)
- 2. Smartphone
- 3. Game console

(9) (a) Describe FOUR important responsibilities of a PC Operating System.

- 1. User-interface - this "desktop" that we see on the screen
- 2. Loading/starting programs
- 3. Memory management and Multi-tasking
- 4. File storage system
- 5. Peripheral management

(b) Describe ONE important feature of an OS on a DIFFERENT PLATFORM than a PC.

In a Smartphone, the OS must control the camera and photo storage.
It must also control connection to cell-phone network towers.

(10) Explain why it is desirable to have very similar Operating Systems on devices that have significantly different hardware components.

If devices need to exchange data files, like an iPhone and a MacBook, it is useful if they use the same file formats, and perhaps other services like iTunes.
Then your music can be coordinated between your iPhone and your MacBook.

(11) (a) Explain what the INTERNET OF THINGS is,

including 2 specific examples of IoT devices.

- (b) Explain why the IoT will require a STANDARD OS on many devices.
- (c) Explain why the IoT will likely have several different OS STANDARDS, rather than one single standard.
- (d) Explain why USB is probably NOT a significant part of IoT

===== HL Only =====

(12) Explain what an OS POLICY is, including one specific example.

A policy is a set of rules that control the behavior of an OS. For example, proper security requires that the OS does not simply execute and software that happens to be downloaded from a web-site. It will warn the user and require permission before executing the software.

But this can be de-activated, allowing the OS to simply execute all software - but this is a bad idea.

(14) Explain why question #13 is missing.

Triskaidekaphobia - fear of the number 13

(15) Explain what TASKS are, including where you might see them in a PC.

A TASK is any software that runs in a computer, including:

- Applications like MS Word
- System utilities like Finder
- Device drivers like the driver that manages USB connections

(16) Explain the difference between INTERRUPTS and POLLING communication protocols.

The teacher will explain this briefly on Friday. You can also read the following web-page:

<http://www.differencebetween.net/technology/difference-between-polling-and-interrupt/>