Tutorial 1 – Suggested Answers

1. Suggest that this is done as a class exercise where groups of students use their PCs to search for plausible results.

OS Type	Characteristic	Example	Application
Single task	Runs only 1 task at any time	Specific purpose Microcontroller system board	TV Remote control system
Multi task	Able to run more than 1 task at any time simultaneously	Nokia OS for phones	Nokia phone OS
Single User	Only one user is able to use the system to perform any operations	MS-DOS	Simple single board computers which allow testing of programs
Multi User	Allows more than one user to access the system simultaneously	Linux	Airline booking system, Blackboard
Real-time	OS responds to actual time requirements e.g. control of an engine http://en.wikipedia.org/wiki/RTOS	Windows CE	Engine control, time specific response systems
Embedded	Attached to particular hardware or system, usually built specially for that system itself	Windows CE	Smart Microwave systems, Washing machines
Distributed	OS is distributed over several systems with each system talking/communicating with each other over a network https://www.cs.columbia.edu/~smb/classes/s06-4118/l26.pdf	MINIX	Robotic architectures, Advanced Systems

2. Explain the following terms

Term	Answer	How Windows 7 supports it
Batch Processing	http://en.wikipedia.org/wiki/Batch_processing	Cmd line batch file
Spooling	http://en.wikipedia.org/wiki/Spooling	By queuing jobs sent to a printer
Time Slice operations	http://www.ehow.com/list_7672195_operating-system-timeslicing-advantages.html	Run several GUI applications and you will see the jump in the time slice operation
Multi-tasking	http://en.wikipedia.org/wiki/Computer_multitasking	Open Task Manager by right-clicking the taskbar, and then clicking Start Task Manager. Observe the different programs running

3. There are a number of sites which promote this, choose one and use it as a guide
e.g.
http://www.webopedia.com/DidYouKnow/Hardware_Software/2002/FiveGenerations.asp
http://www.techiwarehouse.com/engine/a046ee08/Generations-of-Computer
http://www.computermuseum.li/Testpage/99HISTORYCD-Five-Generations.HTM

	1st Generation	2nd Generation	3rd Generation	4th Generation
Period	1940-1956	1956-1963	1964-1971	1971 – present
Build Tech	Vacuum Tubes	Transistors	Integrated Circuits	VLSI
Construction	Large buildings ENIAC 1	Mainframes	Minicomputers	Personal Computers & Workstations
OS Type	Embedded, Single purpose	Batch processing systems	Multi-user, multi-tasking	Multi-user, Multi-tasking

4. http://en.wikipedia.org/wiki/Microsoft_Windows

Operating System	Year	
MS-DOS	1981	Command line interface for x86 systems
Windows 1	1985	GUI interface
Window 3	1990	Allows access to protected modes of x386 allowing multi-tasking
Windows NT	1993	Protected mode, higher reliability
Windows XP	2001	Enhanced GUI with features of multi-tasking
Windows 7	2009	Most popular operating system used

5.

a) Embedded operating system
b) Runs only 1 task, proprietary to the board, efficient and fast, simpler to develop
c) Particular for the task, particular for the type of hardware.
d) Yes, OS has now to cater for other tasks as well as perform housekeeping/management
e) Additional tasks
   i) Loading an app into memory
   ii) Ensuring app does not exceed its limits in memory/io/resources
   iii) Manage the resources and allow apps to make use of them
   iv) Run the app
   v) Stop and remove app from the memory
f) Provide a library of system routines (e.g. Input, Output, Control – aka System API)
   Prevent app from directly accessing resources (only through the API) to make the app portable
   Standardization of what can be used and what cannot.

Modern operating systems provide APIs and libraries which make the development of the applications simpler. They also do not allow the app to use hardware directly, hence management of the device is done by the OS.

6. Linux Operating Systems Genres

	Desktop	Server
Memory	4GB RAM Limit (32bit)	16GB RAM Limit
Accessibility	GUI / CLI	CLI (can load GUI on top)
Programs	Programs first	Services have higher priority
Single/Multi User	Both	Both
Optimization	Speed of programs, GUI	Speed of services
I/O operations	Spooled	Spooled
Disk Systems	All types	All types
Configuration	GUI access	Text files
Application Programs	On Desktop	Usually services

Ask students to look at the different Linux Sites for reference.