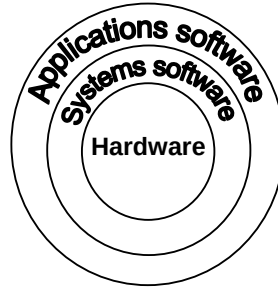


1. To go from a complex application to the simple low-level instructions involves several layers of software that are organized primarily in a hierarchical fashion as shown in the following figure.



- a) Can you name a few examples of applications software?

Answer: Applications software helps users personally to accomplish some specific tasks, usually not system-related ones. Examples include

- Business: word processing, spreadsheet, presentation, database systems ...
- Graphics and multi-media: photo editing, video and audio editing...
- Communication: web browsing, email clients, instant messaging ...
- Personal/Entertainment: personal finance, music playing, computer games...

- b) Can you name a few examples of operating system?

Answer: OS is operating system which interfaces between a user's program and the hardware and provides a variety of services and supervisory functions such as handling of input and output operations and allocation of storage and memory. Current popular OS include

- PC: Windows family
- Apple Mac: OS/X
- UNIX workstation: LINUX, Solaris, FreeBSD, IBM/AIX, HP/UX
- Mainframes by IBM: MVS/ESA, OS/290, VM/CMS, AIX
- Mobile devices: Android OS, Apple iOS (previously iPhone OS), Windows Phone, Nokia Symbian, RIM Blackberry

- c) Do you know why most of applications are platform dependent? E.g., an iPhone Apps can only work on iPhones while Android Apps can only work on Android devices.

- The term *platform* often refers to the combination of the type of hardware and the type of operating system running on it.
- A *hardware platform* can refer to a computer's architecture or processor architecture.
- A *software platform* can either be an operating system or programming environment, though more commonly it is a combination of both.
- Any operating system is hardware dependent, from interrupt handling, process scheduling to memory management, device I/O.
- Application software is built on top of OS and dependent on the OS to interact with the hardware (such as keyboard input and printer output). Hence, most application software is platform dependent.
- However, developing cross-platform software is also feasible, but it can be a very time-consuming task. Read more about cross-platform programming/development at: <http://en.wikipedia.org/wiki/Cross-platform>

2. Imaging without operating system, what inconvenience a user will face in using computers?

Answer: without operating system, users have to interact with the hardware by themselves and writing code (or programs) that must tell the computer exactly what to do.

Self-test

Choose the best answer.

- 1) The four main structural elements of a computer system are:
- A. Processor, Registers, I/O Modules & Main Memory
 - B. Processor, Registers, Main Memory & System Bus
 - C. Processor, Main Memory, I/O Modules & System Bus
 - D. None of the above

Answer: C

- 2) The two basic steps used by the processor in instruction processing are:
- A. Fetch and Instruction cycles
 - B. Instruction and Execute cycles
 - C. Fetch and Execute cycles
 - D. None of the above

Answer: C

- 3) A fetched instruction is normally loaded into the:
- A. Instruction Register (IR)
 - B. Program Counter (PC)
 - C. Accumulator (AC)
 - D. None of the above

Answer: A

- 4) The control/status register that contains the address of the next instruction to be fetched is called the:
- A. Instruction Register (IR)
 - B. Program Counter (PC)
 - C. Program Status Word (PSW)
 - D. All of the above

Answer: B

- 5) Small, fast memory located between the processor and main memory is called:
- A. WORM memory
 - B. Cache memory
 - C. CD-RW memory
 - D. None of the above

Answer: B

- 6) Which of the following description is correct when comparing cache, main memory and hard disk in order?
- A. Increasing cost per bit
 - B. Decreasing capacity
 - C. Increasing access time
 - D. All of the above

Answer: C