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**1) Describe the basic components of computer architecture according to the John von Neumann model. Briefly explain the operation of a computer.**

* John von Neumann, a model of mathematic was introduced the first time by John von Neumann in 1945, and this model has been used widespread hitherto in computer design.
* The basic components of computer architecture according to the John von Neumann model including:
  + (Central Processing Unit – CPU): this is a controlling center of computer, the instructions and data are processed by CPU. The Control Unit handles CPU activities by loading instructions from the memory and handling CPU activities to process those instructions.
  + (Memory): this is a place to save the instructions and data which is processed by the CPU.
  + (Input/Output): Authorization for the exchange of data between a computer and its users, for instance, keyboard, monitor, etc.
* The principle of the Jon von Neumann model is that computers handle instructions by ordering them from address to memory. This is performed by the Control Unit. Instructions are taken from memory and sent to the CPU for processing. After an instruction is processed, the result is either stored in the memory or transmitted to the Control Unit for other activities through the adapter.

**2) Shortly describe and explain the computer abstraction (the hierarchical layers from hardware to software).**

* Hardware:
  + execute low-level instructions
  + Processor, memory, I/O controllers.
* System software:
  + Compiler translates DLL code to machine code
  + Operating system service code
    - Handling I/O
    - Managing memory and storage
    - Scheduling tasks and sharing resources
* Application Software: Written in high-level language

**3) Given a color screen that uses 8 bits to represent a basic color (Red, Green, Blue) in each pixel, illustrate the minimum capacity of the screen buffer required to accommodate one image frame with a resolution of 1280x800 pixels?**

1 pixel = 8 bit = 1 byte

w = 1280, h = 800

* Screen = (#byte)\*h\*w = 1 \* 1280 \* 800 = 1 024 000 (bytes)
* 1 mb = 1 048 576 byte
* Screen 0.977 MB