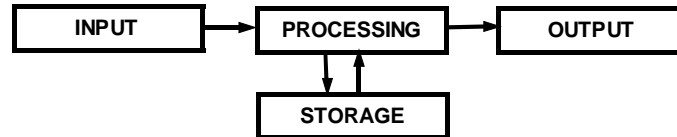


## General Knowledge Assignment 2

1. Provide a definition and 2 examples for each of the components of a computer system in the the diagram (10 marks)



**Input** – Input devices are devices that provide data for the processor. Some devices are designed primarily to provide input, while other devices provide both input and output. Examples of devices with the primary purpose of providing input include: Mouse, Keyboard, Scanner, Camera, Microphones.

**Processing** –The Processing component of the diagram specifies where the processing of input and stored data is achieved.

Companies that make (manufacturer) processors include:

- Intel, AMD, Motorola, Compaq, and IBM.

Specific computer 'processors' include:

- Intel Pentium, and Pentium II, and Pentium III;
- AMD K5, K6, K6-2, and K7
- Compaq Digital Alpha
- Cyrix
- IBM PowerPC
- Motorola PowerPC

**Output** – Output devices are the results of the processing sent out from the computer. Output devices include: Screen, Sounds,

**Storage** – Storage Devices are used by the computer for temporarily and long-term storage of data it uses for making calculations. Storage devices used for short-term fast-access storage include: RAM, and long-term storage includes: HDD, FDD, Tape

2. Describe the interaction between the following pairs: (2 marks)

**CPU : Memory**

The processor makes the calculations. Information is either obtained from the input device, or from storage. Information from storage is retrieved, including information stored in Memory.

**Keyboard : Screen**

Data entered on the keyboard is often displayed on the screen by the Operating System to show the computer user the results of their actions. The keyboard typing enters the processor where processing may occur, including the sending of output to the screen.

The computer does not have to display the typing on the screen, but it makes sense for the typing to be displayed on the screen, so in most cases when we type something on the keyboard the computer will display something on the screen.

3. Expand the following acronyms. (8 marks)
- CPU, VDU, CTRL, CRT, ROM, HD, FD, CD-ROM

**CPU** Central Processing Unit  
**VDU** Visual Display Unit  
**CTRL** Control  
**CRT** Cathode Ray Tube

**ROM** Read Only Memory  
**HD** Hard Disk  
**FD** Floppy Disk  
**CD-ROM** Compact Disk – Read Only Memory

- 4 Describe the technology used in RAM and HD including their advantages, disadvantages. (3 marks)
- RAM is an electronic storage device which uses electrical current to store binary information. The advantage to this storage mechanism is storing and retrieving information is as fast as electrical current can travel. Unfortunately, this speed comes at a higher cost than for other storage devices and all information is lost when electric current is stopped (for example when the computer is turned off.)

HD is an magneto-mechanical device where binary information is stored on 'magnetised' plates of metal. For information to be stored and retrieved from the HD the device has to mechanically move the 'read' head along the plate (similar to a gramophone record-player) and detect/change the magnetic state of that location. The disadvantage is this storage mechanism is much slower than RAM. The advantage is this storage is cheaper per storage space, and data is retained even when electricity is turned off.

- 5 Describe the following electrical power problems and give an example of at least one potential cause. (8 marks)

Spike, surge, brown-out, black-out.

**Spike** – A spike is a very high increase in line-voltage and a common cause for spikes is a lightning strike on the electrical power-lines. Lightning strikes sends with it thousands of voltage when it strikes, and the local household voltage in Tonga is around 230V, the very large increase in voltage generated by lightning adding its voltage to the line is called a "spike."

**Surge** – A power surge is a significant increase in line-voltage above the regular voltage setting. A voltage increase greater than 20% could be considered a "surge." With Tonga's voltage rating at 230V, an increase of 50Volts would be a surge.

Power Surges often occur when the power lines have been down and are reconnected. With the reconnection, all the voltage the power supply has to send through the electrical line suddenly enter into household electrical items at greater than the standard setting of 230V.

A common symptom, indicator, of power surge problems is power-supply damage to refrigerators.

**Brown-out** – A brown out is a significant drop in line-voltage below the regular voltage setting. A voltage decrease greater than 20% could be considered a "brown-out" and is also called a power "sag." With Tonga's voltage rating at 230V, a decrease of 50 Volts would be a "brown-out."

Brown-outs can occur when electrical items connected to the power-lines are competing, pulling for more voltage than is currently available. This often happens when power hungry devices are connected to the line, or devices that require a high voltage during start-up. Examples of devices which require a high voltage during start-up include: water pumps, laser-printers, washing machines.

A common symptom, indicator, of brown-outs are dimming lights or when lights flicker when turning on another electrical device.

**Black-out** – A black out is total power loss. Total power loss can occur for a number of reasons, including turning off the power-switch. A localised black out can occur if the fuse or circuit-breakers on the line has turned power off or an accident cutting the outside power-lines to your area. Long-term disastrous black-outs occur when the power company generators either fail, or the power-lines have been damaged to the point where it will require a long time to fix problems.

- 6 Describe the difference between a disk based and chip based OS, covering at least (speed, change, storage) (6 marks)

**Speed.** Answer: Chip based OS are faster than disk based OS.

Reason: Operating Systems are programmes that need to be retrieved from storage for the Processor to act on the program instructions. Because chip devices are faster for retrieving data, the chip-stored OS is generally faster than disk-stored OS.

**Change.** Answer: Chip based OSs cannot be changed whereas disk-based OS can be changed.

Reason: RAM chips lose data when electricity is turned off, so this is a poor storage location for an OS, since the OS needs to be up and running when the machine is turned on. To solve this problem, chip-based OS is generally stored in ROM chips, which can store information when electricity is turned off because the electronics have physically been configured to store the Operating System. Unfortunately this means the OS cannot be changed easily.

Disk-stored OSs can be updated, changed by loading the new OS onto the disk.

**Storage.** Chip based OS is usually smaller than disk based OS.

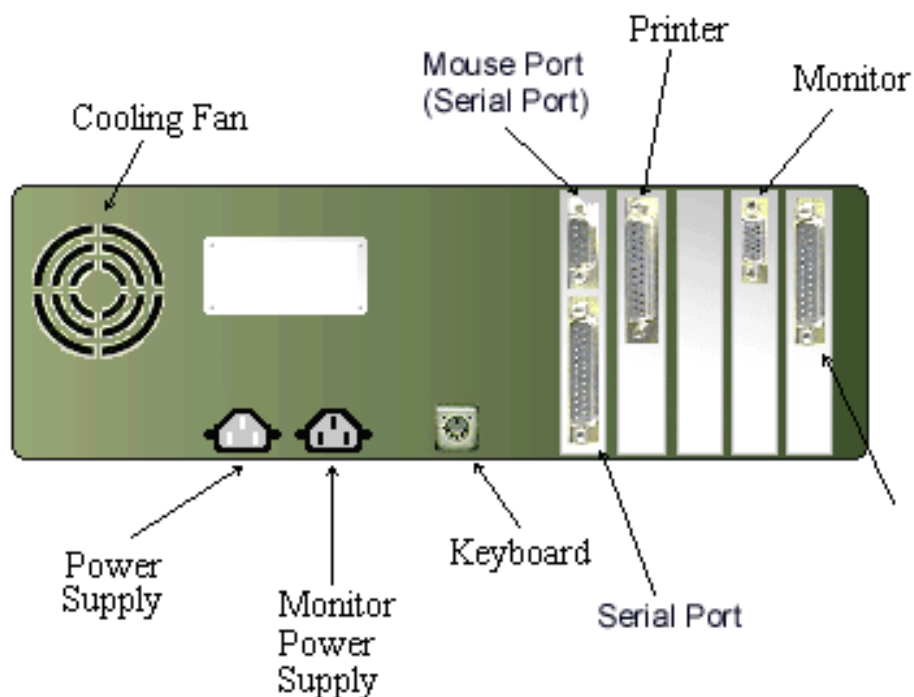
Reason: The costs for storage space on chips are usually much higher than storage space on disk. The high cost usually forces OS place onto chips to be smaller due to the limited space, whereas there is more space for the OS (a bigger OS) on disk.

- 7 Recommend at least 2 solutions for electrical problem relating to brown-outs. (2 marks)

**Solution 1:** The most common solution, for computers, is to use an Uninterruptable Power Supply (UPS). A UPS uses its battery storage to supplement current. When a brown-out occurs, the loss in line-voltage does not reach the computer (or devices connected to the UPS) because the UPS raises the line-voltage artificially by taking electrical current from its batteries and adding it to the line-voltage coming into the UPS before sending the voltage to the computer.

**Solution 2:** A second potential solution, where brown-outs can be traced to power hungry electrical equipment, is to use a different 'line' for the hungry equipment. By having the power hungry devices pulling their electrical current from a different line to other electrical equipment, this can minimise the effect of these tools on the overall line-voltage to these other tools.

- 8 Sketch a diagram of the ports on a computer case and describe the devices connected to these ports.



- 9 List and give a short description of the four major functions of an OS  
The operating system, is a system of programs that perform a variety of functions such as:

**Communicating with devices/peripherals.** Some of the most complex tasks performed by a computer involve communicating with computer monitors, printers, disk drives, and other peripheral devices. A computer's operating system generally includes programs to handle these tasks for

applications.

This is why in Windows 95/98 if we connect a new printer to the computer, or on the network, we have to configure the operating system to tell it what the new device is so it can install the software it requires to let applications print correctly to the printer.

Programs used as part of an operating system to communicate with a control device is often referred to as a 'device driver' or 'driver'. In the context of the Windows operating system, device drivers for printers are often referred to as Printer Drivers, while device drivers for Display Cards are often referred to as Display Drivers.

**File System.** Storage devices are an important part of the continuing operation and recordings of an operating system. A key component of general purpose operating systems is the management of secondary storage devices, and the allocation of storage units (commonly referred to as files.)

**Process Management.** A key attribute, function, of operating systems is to organise the use of CPU time by other programs. This function includes loading the program into memory, allocating it time and then executing the instructions in the program by passing it to the CPU.

**Memory Management.** When several software instructions are being processed, one of the tasks for the operating system is to keep track of the free space in the computer's memory and to make sure that no application task corrupts another application's memory area.

The more capable hardware and operating systems include a number of more complex tasks for the operating system to perform to maximise use of the hardware features and to increase the usefulness of the operating system for applications developers.