1. The following are general steps in setting up or installing I/O devices (EXCEPT)

a) Install any software drivers that are required

b) install a network card

b) Connect the input, output, or storage device

c) Turn on the device and follow any configuration instructions

2. I/O hardware contains

a) Bus

b) Controller

c) I/O port and its registers

d) All of the mentioned

3. The operating system controls the input and output device by the following functions (EXCEPT)

a) issue commands to the input/output devices

b) catch the interrupts and handle the errors

c) send commands to programmers

d) provide an interface between the input/output devices.

4. The following are peripheral I/O bus (EXCEPT)

a) SCSI

b) PCI

c) SATA

d) USB

5. Input/output devices connected to the system via the following BUS (EXCEPT)

a) Peripheral I/O Bus

b) Memory Bus

c) Driver Bus

d) General Bus

6. Describe how Electrical engineers’ perspectives on input and output devices different than programmers.

Electrical engineers look at I/O devices from a hardware point of view, while programmers don’t need to attend to hardware much and view I/O devices from a software point of view.

Electrical engineers are the ones who design the physical I/O devices and build them.

This is while programmers are only concerned about how the I/O devices interact with software.

7. Describe the reasons why the graphic card device is near to the CPU.

There are two reasons for this:

The main reason is that as a lot of data is required to be transferred between the graphic card device and the CPU and it simply would be more efficient for them to be placed near each other.

The other reason better heat dissipation. They both generate a lot of heat, and as such, putting them allows for more efficient cooling system.

8. What is the difference between central processing unit and graphics processing unit?

Both CPU and GPU are processors.

CPU is the brain of the computer and handles all the primary processing.

GPU on the other hand is designed using specific hardware components that are more efficient for graphical operations like rendering images and videos.

9. There are two mediums between the processor and the input/output devices, which are the I/O bus and interface module. Describe each of them.

I/O bus is the physical connection between the processor and the I/O devices, while the interface module is a circuit board that connects to the I/O bus and interfaces with a specific type of I/O device.

10. Describe the difference between device driver and device controller.

Both device driver and device controller are responsible for the communication between the operating system and hardware.

Device driver is a software interface between OS and hardware while device controller manages the hardware-level communication.

11. Provide TWO (2) Advantages and TWO (2) Disadvantages for Direct Memory Access.

Advantages:

1. Faster data transfer between devices and memory because it bypasses CPU.
2. Reduced CPU overhead.

Disadvantages:

1. Hardware compatibility because DMA requires hardware that is compatible with the DMA controller.
2. Security risks because DMA allows devices to directly access memory without going through CPU's security checks.

12. What are interrupts and how interrupt handling is done in modern operating systems?

An interrupt is a signal that is sent to processor by hardware or software to communicate with it that an event requires immediate attention.

Interrupt handling in modern operating systems:

1. Interrupt Request (IRQ): Hardware sends an IRQ signal to hardware when it needs the processor's attention.
2. Interrupt Service Routine (ISR): Processor stops its current task and executes an ISR. ISR saves the context of processor.
3. Interrupt Masking: While ISR is executing, processor disables interrupts from other devices to stop ISR from getting interrupted.
4. Interrupt Priority: Interrupts are prioritized, and the processor handles them in order of their priority.
5. Interrupt Completion: When ISR completes its task, it restores the saved context of the processor and enables interrupts from other devices.

13. Describe the following figure:

A picture containing text, screenshot, line, number

Description automatically generated

The “ccc” means that CPU is copying data to the disk which is handled by DMA controller.

This leaves CPU able to something else. In this case it’s choosing to run Process 2.