

ASSIGNMENT-V

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Section-A:-

Q-1) State any two peripheral devices
Ans - Printers, external floppy disc drives

Q-2) In DMA transfers, the required signals and addresser are given by the
Ans - c) DMA Controllers

Q-3) Which device allow you to enter data and instructions into a computer
Ans - a) Input Device

Q-4) Computer data is transmitted block by block in transmission known as
Ans - Synchronous Transmission

Q-5) Magnetic Disk Uses -:

Ans - Magnetic storage media, primarily hard disks are widely used to store computer data as well as audio and video signals

Q-6) Control Command Uses -:

Ans - They allow you to control processes relating to Operations Manager. With a control command, you can perform various tasks such as check the status of the system, assign & revoke authorities, etc.

Q-7) Status Command Uses -:

Ans - The Status command allows you to retrieve data device status information and if appended with the ALL option, will also provide addressing information about the related I/O control blocks. This command is especially helpful in device hang conditions.

Q-8.) Address Register Uses -

Ans- It is used to handle the address transferred to the memory unit & it can be handled either using a bus approach or direct input declaration for the memory.

Q-9.) Word Count Register Uses -

Ans- It specifies the no. of words that must be transferred. The data transfer may be done directly bet^w the device & memory under control of the DMA.

Q-10.) Control Register Uses -

Ans- It is a processor register that changes/controls the general behaviour of a CPU or other digital device. Common tasks performed by it are - interrupt control, switching & addressing mode, paging control & coprocessor control.

Q-1.) What is strobe signal?

Ans- A strobe signal refers to the specific type of control signal used to synchronize the transfer of data between different components & devices within a computer system. It acts as a timing mechanism to indicate when the data is valid & ready to be processed. It helps in synchronizing data transfers bet^w diff. components within computer system.

Q-2.) What is data bus?

Ans- A data bus is a data centric software framework for distributing and managing real time data in intelligent distributive systems. It allows applications & devices to work together as one.

Integrated system

Q-3) What is memory mapped?

Ans- Memory mapping is a mechanism that maps a portion of file, or an entire file, on disk to a range of addresses within an application's address space. The application can then access files on disk in the same way it accesses dynamic memory. The principal benefits of memory mapping are efficiency, faster file access, the ability to share memory betⁿ applications & more efficient coding.

Q-9) What is handshaking?

Ans- It is an I/O control approach to synchronise I/O devices with the microprocessor. As several I/O devices accept or release data at a much lower cost than the microprocessor, this technique is used to control the microprocessor to operate with an I/O device at the I/O devices data transfer rate.

Section - D

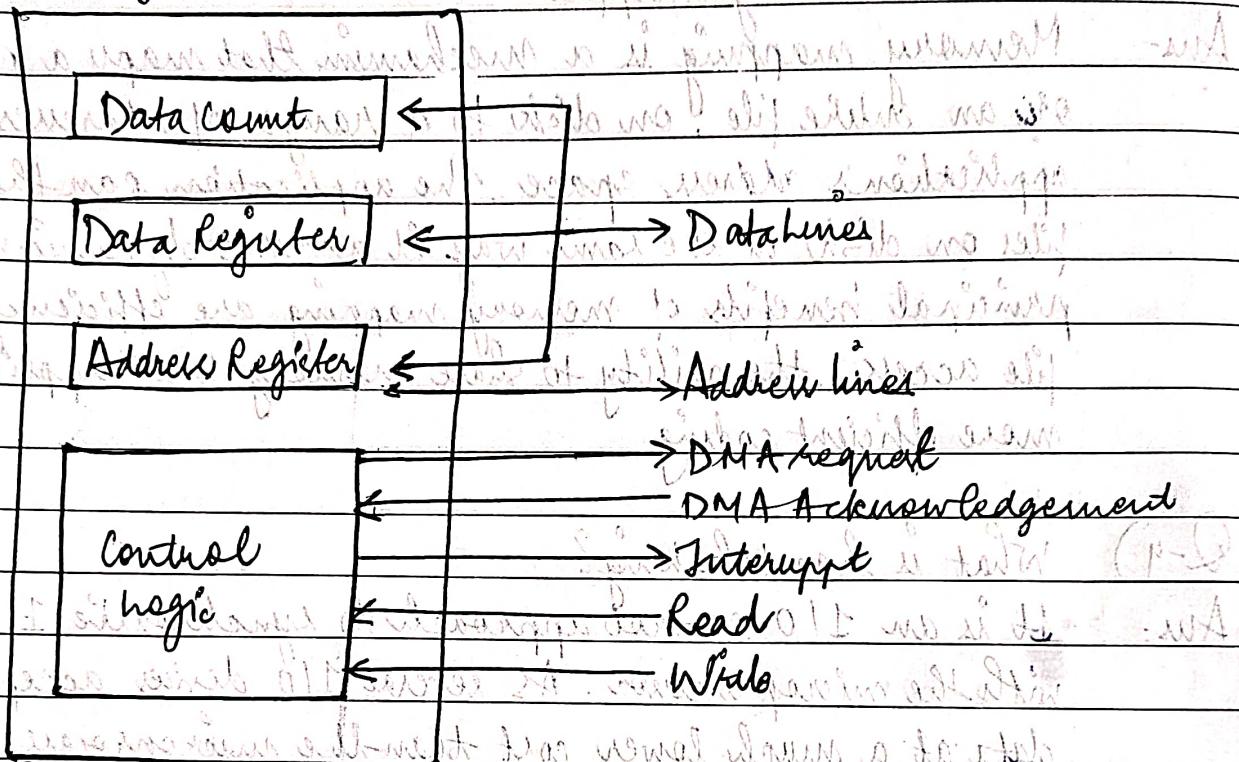
Q-1) Explain in detail about the DMA controller.

Ans- DMA controller is a hardware device that allows I/O devices to directly access memory with less participation of the processor. Direct Memory Access uses hardware for accessing the memory, that hardware is called a DMA controller. It has the work of transferring data betⁿ Input and Output devices & main memory with very less interaction with the processor.

→ DMA controller is a type of control unit that works as an interface for the data bus & the I/O devices. It also contains an address unit, which generates the address & selects an

I/O device for the transfer of data

Block diagram of DMA controller - :



→ The DMA controller register have 3 registers -

- (i) Address Register - It contains address to specify desired locations in memory.
- (ii) Word Count Register - It contains no. of words to be transferred.
- (iii) Control Register - It specifies transfer mode.

→ The CPU initializes DMA by sending the given info through the data bus -

- (i) The starting address of memory block where the data is available (to read) or where data are to be stored (to write.)
- (ii) It also sends word count which is the no. of words in the memory block to be read or written.
- (iii) Control to define the mode of transfer such as read & write
- (iv) A control to begin the DMA transfer

Q-2) Difference between isolated and memory-mapped I/O.

Ans -	Isolated I/O	Memory Mapped I/O
(i)	Memory and I/O have separate memory address space.	Both have same address space
(ii)	All address can be used by the memory.	Due to addition of I/O, addressable memory becomes less for memory.
(iii)	Separate instruction control read & write operation in I/O & Memory.	Same instruction can control both I/O & memory.
(iv)	In this I/O address are called ports. Normal memory address are for both.	Normal memory address are for both.
(v)	More efficient due to separate buses.	More efficient at initial stage.
(vi)	larger in size due to more buses.	Smaller in size.
(vii)	It is complex because separate logic is used to control both.	Simpler logic is used as I/O is treated as memory.
(viii)	<u>Advantages</u> -	<u>Advantages</u> -
	<ul style="list-style-type: none"> Large I/O address space Greater flexibility Improved reliability 	<ul style="list-style-type: none"> faster I/O operations Simplified programming Efficient use of memory space
(ix)	<u>Disadvantages</u> -	<u>Disadvantages</u> -
	<ul style="list-style-type: none"> Slower I/O operations More complex programming 	<ul style="list-style-type: none"> limited I/O address space Slower Response Time
(x)	<u>Applications</u> -	<u>Applications</u> -
	<ul style="list-style-type: none"> Embedded Systems Real Time Systems Microcontrollers 	<ul style="list-style-type: none"> Graphic Processing Network Communication Direct Memory Access (DMA)

Section - C -

Q-1) Explain the following terms: Bus Grant & Bus Request

Ans - Bus Grant & Bus Request are terms related to bus arbitration which is the process of determining which device on the shared bus is granted access to use it at a given time.

- (i) Bus Grant — : It is a signal or message sent by the bus arbiter to a requesting device indicating that it has been granted permission to use the bus. When a device wants to access the bus to perform a data transfer or initiate a communication, it sends a bus request to the arbiter. The arbiter evaluates the request from various devices and selects one to grant to the bus. Once a device receives the bus grant, it can proceed with using the bus for its intended purpose.
- (ii) Bus Request - It is a signal or message sent by the device to the bus arbiter to express its desire to use the bus for data transfer or communication. When a device needs to access the bus, it sends a bus request to the arbiter. The request typically includes information such as the type of transaction, priority level or other relevant details. The arbiter collects & evaluates all the bus requests it receives & determines which device will be granted access to the bus based on a predefined arbitration algorithm.

Bus arbitration ensures that only one device at a time can have control over the bus, preventing multiple devices from attempting to access the bus simultaneously, which could lead to conflicts & data corruption.

Q-2) What is valid data in terms of address bus & data bus?

Ans- Valid data refers to the integrity & correctness of the information being transmitted or stored on the address & data bus.

→ Address Bus - :

It is a unidirectional bus that carries memory addresses. When data is being carried from one device to another, the address bus carries the memory address that specifies the location from where data should be read from or written to. Valid data on the address bus means that the address being transmitted is accurate & points to a valid memory location in the system.



Data Bus :-

The data bus is a bidirectional bus used to transfer actual data between devices. It carries the information being read from or written to memory or other peripheral devices. Valid data on the data bus means that the information being transmitted is accurate & reflects the intended data to be stored or retrieved.