

EMBEDDED & REAL TIME SYSTEMS - ~~8002042~~

QUESTION BANK - Unit 2
Embedded

COMPUTING PLATFORM DESIGN

2marks

1. What is data register?
The Memory Data Register (MDR) is the register of a computer's control unit that contains the data to be stored in the computer storage (e.g. RAM), or the data after a fetch from the computer storage. It acts like a buffer and holds anything that is copied from the memory ready for the processor to use it.
2. Define Status registers?
A status register, flag register, or condition code register is a collection of status flag bits for a processor. The status register is a hardware register which contains information about the state of the processor.
3. Define memory mapped I/O?
Memory-Mapped I/O (MMIO) and Port-Mapped I/O (PMIO) (which is also called *isolated i/o*) are two complementary methods of performing input/output between the cpu and peripheral devices in a computer. Memory-mapped I/O, uses the same address bus to address both memory and i/o devices – the memory and registers of the i/o devices are mapped to (associated with) address values. So when an address is accessed by the cpu, it may refer to a portion of physical ram, but it can also refer to memory of the i/o device.
4. What is polling?
Polling, or polled operation, in computer science, refers to actively sampling the status of an external device by a client program as a synchronous activity. Polling is most often used in terms of input/output (I/O), and is also referred to as polled I/O or software-driven I/O.
5. Write about interrupt
In systems programming, an interrupt is a signal to the processor emitted by hardware or software indicating an event that needs immediate attention. An

interrupt alerts the processor to a high-priority condition requiring the interruption of the current code the processor is executing.

6. When interrupt acknowledge is used?

Interrupts occur when a peripheral device asserts an interrupt input pin of the micro-processor. Provided the interrupt is permitted, it will be acknowledged by the processor at the end of the current memory cycle. The processor then services the interrupt by branching to a special service routine written to handle that particular interrupt. Upon servicing the device, the processor is then instructed to continue with what it was doing previously by use of the "return from interrupt" instruction.

7. Interrupt priorities – define

The PC processes device interrupts according to their priority level. This is a function of which interrupt line they use to enter the interrupt controller. For this reason, the priority levels are directly tied to the interrupt numbers.

8. What is the use of interrupt vectors?

An interrupt vector is the memory location of an interrupt handler, which prioritizes interrupts and saves them in a queue if more than one interrupt is waiting to be handled.

9. What is masking?

Data masking or data obfuscation is the process of hiding original data with random characters or data. The main reason for applying masking to a data field is to protect data that is classified as personal identifiable data, personal sensitive data or commercially sensitive data, however the data must remain usable for the purposes of undertaking valid test cycles.

10. What is meant by NMI?

A non-maskable interrupt (NMI) is a hardware interrupt that cannot be ignored by standard interrupt masking techniques in the system. It is typically used to signal attention for non-recoverable hardware errors. (Some NMIs may be masked, but only by using proprietary methods specific to the particular NMI.)

11. Define RAM?

RAM is an acronym for *random access memory*, a type of computer memory that can be accessed randomly; that is, any byte of memory can be accessed

without touching the preceding bytes. RAM is the most common type of memory found in computers and other devices, such as printers.

12. What is dynamic RAM?

Dynamic Random-Access Memory (DRAM) is a type of random-access memory that stores each bit of data in a separate capacitor within an integrated circuit. The capacitor can be either charged or discharged; these two states are taken to represent the two values of a bit, conventionally called 0 and 1.

13. What is said to be synchronous DRAM?

Synchronous Dynamic Random Access Memory (SDRAM) is dynamic random access memory (DRAM) that is synchronized with the system bus. Classic DRAM has an asynchronous interface, which means that it responds as quickly as possible to changes in control inputs. SDRAM has a synchronous interface, meaning that it waits for a clock signal before responding to control inputs and is therefore synchronized with the computer's system bus.

14. Expand SIMMS and DIMMS?

A SIMM, or Single In-line Memory Module, is a type of memory module containing random-access memory used in computers from the early 1980s to the late 1990s. It differs from a Dual In-line Memory Module (DIMM), the most predominant form of memory module today, in that the contacts on a SIMM are redundant on both sides of the module.

15. What is ROM?

Read-Only memory (ROM) is a class of storage medium used in computers and other electronic devices. Data stored in ROM can only be modified slowly, with difficulty, or not at all, so it is mainly used to distribute firmware (software that is very closely tied to specific hardware, and unlikely to need frequent updates).

16. Define bus.

In computer architecture, a bus (from the Latin *omnibus*, meaning "for all") is a communication system that transfers data between components inside a computer, or between computers.

17. What are the classifications of I/O devices?

- human readable - keyboard, monitor, printer
- machine readable - disk drives, tape drives
- communication - communicating with remote devices: modem, network interface card (NIC)

18. What are the 4 types of data transfer used in USB?

Control Transfer, Isochronous Transfer, Interrupt Transfer, Bulk Transfer

19. Give the limitations of polling technique.

1) it is wasteful of the processors time, as it needlessly checks the status of all devices all the time, 2) it is inherently slow, as it checks the status of all I/O devices before it comes back to check any given one again, 3) when fast devices are connected to a system, polling may simply not be fast enough to satisfy the minimum service requirements, 4) priority of the device is determined by the order in the polling loop, but it is possible to change it via software.

20. What is USB? Where is it used?

It is an external bus standard that supports data transfer rates of 12 Mbps. A single USB port can be used to connect up to 127 peripheral devices, such as mice, modems, and keyboards.

UNIT 2

COMPUTING PLATFORM AND DESIGN ANALYSIS

1. Explain the following parameters:

The CPU bus

- Bus protocols
- DMA
- System bus configurations

Memory Devices

- Memory device organization
- Random Access memory
- Read only Memory

Input and Output Devices

- Timers and Counters
- A/D and D/A convertors
- Keyboards
- LEDS
- Displays
- Touch screen

2. Explain development and Debugging

- Development Environments
- Debugging Techniques
- Debugging Challenges

3. Explain Program Design

- State machine
- Circular buffer
- Queues

4. Explain in detail about model of programs

- Data flow graphs
- Control data flow graphs

5. Explain Assembly and Linking and Basic compilation techniques

- Assemblers
- Linking
- Statement translation
- Procedures
- Data structures