10CS72: EMBEDDED COMPUTING SYSTEM

QUESTION BANK

1) Explain the differences between monolithical and micro kernel

2) Explain the difference between kernel services in general purpose OS and RTOS

3) Explain the following

      Release time, Deadline, Periodic, Aperiodic job, Hard and Soft Real time systems

4) How are tasks, processes and threads different from each other

5) Explain differences between process creation and thread creation

6) Explain the calls provided by the pthread library for creating and managing threads

7) Problem on non-preemptive and preemptive scheduling

8) Explain Direct Mapped Cache and its limitations

9) Explain the limitations of direct mapped cache and how is it overcome by set-associative cache. Explain with an example.

10) Explain segment address translation and paged address translation

11) Explain address translation in ARM

12) Explain ARM pipeline execution and its drawbacks.

13) How does Strong ARM reduce power consumption?

14) Explain Huffman coding with an example. Write the requirements form for the Data Compressor.

15) What is a bus ? Write the Microprocessor and Bus architecture.

16) Explain the types of interfaces for interfacing the CPU with Memory or I/O devices. Explain the interface logic to interface a simple i/o device.

17) Explain Direct Memory Access with a neat diagram. What is cycle stealing ? Draw and explain the Bus Transfer Sequence Diagram.

18) Explain with a neat diagram, the architecture of ARM AMBA Bus.

19)What are the challenges in debugging embedded systems ? Explain the hardware and software tools available for debugging ES.

20) What are evaluation boards ? how does it help the design and development of embedded system ?

1. Explain Shared Memory concept. What mechanisms does the kernel provide to support this?
2. Explain the difference between named and unnamed pipes
3. What are Memory Mapped Objects ? List the calls provided by Windows CE with their prototypes for memory mapped objects.
4. Explain Message Queue. Explain the calls provided by Windows CE with their prototypes for message queues
5. What is a Socket ? Explain with a skeleton program, the calls for socket programming for connection oriented service.
6. Explain the task synchronization issues
7. Explain the Priority Inversion problem. What are the workarounds for this problem ?
8. What is busy wait/spin lock ? Why is it used ?
9. How is task synchronization and mutual exclusion done using sleep and wakeup ?
         OR
   What are the 3 typical uses of Semaphores ?
10. List the functional and non-functional requirements to choose an RTOS
11. What are the popular scheduling algorithms used in RTOS ?
12. Differentiate between Rate Monotonic Scheduling and Earliest Deadline First algorithms using suitable examples and timing diagrams
13. What are the power management policies for conserving energy in embedded systems ? Explain ACPI.
14. Explain the different Bus Arbitration schemes used.
15. What is data – push programming ?
16. What are the different bus protocols for network support for embedded systems ?
17. Explain the I^2C bus protocol
18. Explain the CAN bus Protocol
19. Explain the issues to be considered for network based design of embedded systems
20. Write the IP Packet format and explain the header fields
21. Explain the Javacam architecture with a neat diagram
22. Write a note on SHARC I/O Processors
23. Write a note on Myrinet

MORE QUESTIONS:

UNIT 1

1. What is an embedded system? Differentiate between a General purpose Computing system and an embedded system.

2. What are the essential structural units in (i) microprocessor (ii) embedded processor (iii) DSP?

3. What are different categories of embedded system? Give examples.

4. Differentiate between Hard and Soft real time embedded system.

5. Explain the hardware architecture of an Embedded system.

6. List different types of memory and explain its differences.

7. Differentiate between an Embedded system and Real time operating system.

8. How does DSP differ from GPP?

9. What are techniques of power and energy management in a system?

10. Explain the need of Watchdog timer and reset after the watched time.

11. Explain design process in embedded system.

12. Define design metrics in embedded system. What are the constraints of Embedded system design?

13. Mention different components that may be embedded in System on chip (SOC). Explain about any two components.

UNIT 2

1. Compare the advantages and disadvantages of data transfer using and parallel port/devices.

2. Explain 3 modes of serial communication using serial devices with one example each.

3. Describe and compare UART, RS232, SDIO devices.

4. What are the advantages of a device port having multibyte input and output buffer?

5. What is parallel port? Explain the parallel port interfacing with keypad.

6. Explain the sophisticated interfacing features in device ports?

UNIT-3

1. What are the different states of timer ? Why is it needed in embedded system? What are the uses of Timer device?

2. Explain use of each control bit of I2C protocol.

3. Explain the advantages of Wireless devices. How do wireless devices network using different protocols.

4. Explain USB and IEEE 1394 bus standard.

5. Explain format of bits at CAN bus.

6. Explain parallel bus using PCI and AMBA-APB bus.

7. Explain PCI and PCI/X buses.

8. What is Internet enabled systems. Explain protocols used in these systems.

9. Explain IRDA and Zigbee.

UNIT-4

1. Explain the disadvantage of busy and wait transfer mode for the IO devices.

2. ISR can be executed in two parts. Explain?

3. Explain Interrupt Sources.

4. How is Vector address used for Interrupt sources?

5. How are vector address assigned for exception and user defined interrupts.

6. Interrupt mechanism in each processor differs from a processor familyto another. Explain?

7. Explain the classification of interrupts.

8. How identification of previously occurred interrupt from source is performed.

9. Define Context, Context switching, Latency, Deadline and vector Priority Polling Method

10. Explain Interrupt service mechanism in 68HC11 processor.

11. DMA helps in reducing the processor load by providing direct access for the IOs. Explain?

12. How do Device driver function and ISR differs. How do ISR calls differs in 80x86 and8051?

13. What are uses of software and hardware assigned priorities in Interrupt Service Mechanism.

UNIT 5

1. Explain the programming model using DFG and CDFG. Illustrate with one example.

2. Explain with one example each about APEG, SDFG, HSDFG and resynchronization.

3. How programming task is reduced using FSM? Justify.

4. Why does program complexity increase with a reduced number of DFG's? Explain

5. What do you mean by complete dynamic scheduling and complete static scheduling in microprocessor?

UNIT 7

1. What is RTOS? Explain the function of RTOS

2. Explain encapsulation using semaphores and queues

3. Explain methods of saving and optimizing the memory space.

4. Explain methods of saving and optimizing the power needs

5. When do you use co operative scheduling and pre emptive scheduling?

6. Compare queue scheduling strategies for real time scheduling i.e. pre emptive and round robin scheduling

7. Explain critical section service by a pre emptive scheduler

8. Petri net based concept model

9. Define EDF, RMS, Fixed real time scheduling

10. What are the cases in which time slice scheduling helps?

11. Explain performance matrices in scheduling models for periodic and sporadic tasks