ALM-2 Class Test

Student Name : G. Sreehitha

Register Name : 2300032163

Subject code : 23CS02HF

Subject Name : Embedded System Design.

Year & section : 2nd and sec-18.

Date of Exam : 14-02-25

Duration : 90 minutes.

Questions

1) Develop a classification chart of embedded systems based on generation, size and application.

3) Outline the outcomes of each stages of Top Down approach for an Embedded System Design paradigm

4) Summarize the selection criteria for choosing a processor for an embedded system. And also on which phases of Top down approach it belongs.

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5) Describe embedded System applied in the automotive industry. And elaborate with a suitable example.

6) Explain the role of the oscillator unit in Embedded System and its impact on system performances.

7) Illustrate the integration of sensors and actuators in an embedded system. Using a practical example to illustrate their interaction.

8) Plan an Embedded systems majorly focuses memory strage. Create a list of advantages and limitations of all possible memory types used in the embedded systems and choose a type for the applicatin. And also shows that why you have choosen the type of memory.

10) Explain how pwm control with an motors? And also elaborate the advantages of using pwm for motor control.

11) Choose memory mangement strategies for embedded systems including factors ouch as speed ; size and power consumption

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14) Explain the importance of timers, counters and watchdog timers in maintaining the functionality and reliability of embedded systems?.

Answers

1) A classification chart of embedded systems based on generation, size and application.

By generation

First generation - 8 bit microcontroller.

Second generation: 16-32 bit microcontroller.

Third generation: Advanced RISC processor.

By size: It has a small size.

3) The stages of Top Down approach for an Embedded system Design paradigm.

System specification: Define requirements (Ex: power).

HW-SW: Requires Hardware and software.

Testing: Debugging and testing the output.

4) Processor selection for an embedded system depends on performance, power efficiency. This is the selection criteria for choosing a processor

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for an embedded system.

14) The importance of timers, counters and watchdog timers in maintaining the functionality and reliability.

Timers: sets the time, tasks and sychnizatin.

watchdog timers: Together, they enhance the reliability, time control.

5) Embedded systems in automotive industry control engine management, safetly (ABS, air bags). and (AADS) driver assistance.

10) PWM control with motors:

PWM (Pulse width modulatin): PWM controls the speed of the motor by varying the motor cycle and managing the power efficiency.

6) The oscillator unit in embedded system generates a clock signal to syncronize operations, impacting processing speed, timing accuracy and power efficiency.

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7) In an embedded system, sensors and actuators. Sensors collects data. The microcontroller processor it, and actuators perform actions. For example, in an automotive temperature control system. A temperature sensor detects heat and a form of heater adjusts temperature accordingly.

8) Memory Types in Embedded systems.
Advantages and limitations:

ROM: Non-volatile, stores firmware permanently.

Flash memory: Rewritable, used for firmware updates.

SRAM: fast Access, no-refresh needed.

DRAM: High capacity, High cost, refresh needed.

11) Memory selection for embedded systems.
depends on speed for Access, size (Flash for firmware, EEPROM for non-volatile storage, and power consumption (SRAM consumes more

power). The right choice balances performances, cost and energy efficiency based on application needs.