Training: Internet of Things & Embedded Programming

1. Basics of AVR architecture
   a. Atmega16 architecture and pin diagram.
   b. Programmable I/O PORTS.
   c. Internal & external oscillators.
   d. RESET options.
   e. Others microcontroller of AVR.
   f. Interview questions

2. Introduction of embedded software
   a. Code vision AVR/ AVR studio.
   b. Proteus simulation software.
   c. Other supporting software.

3. Code sequence
   a. Code sequence for microcontrollers programming.
   b. PORT initialization & its significance.
   c. Example of PORT initialization.
   d. PORT declaration & its significance.
   e. Example of PORT declaration.
   f. LED based programs with detailed analysis.
   g. Switch & LED based programs and their possible combinations.
   h. Exercise.

4. Input/output Programming

4.1. DC motor programming
   a. Discussion of amplifier circuit for DC MOTOR.
   b. DC motor based programming.
   c. Discussion of precautions required while coding for DC MOTOR.
   d. Programs based on combinations of switch, DC motor & LED.
   e. Coding of DC motor for robots.
   f. Coding of DC drives for DC motor.

4.2. Seven segment programming
   a. Seven segment library creation.
   b. Counter on seven segment.
   c. Switch controlled 7 segments for Air conditioners and TV.

d. Instrumentation of DC drive using seven segment (timer circuit).
e. Code for automatic washing machine using seven segment,
f. Codes based on seven segments in combination with other peripherals.
g. Coding for Multiple 7 seven segment,
h. Multiplexing of 7 seven segment,
i. Interview questions.

5. LCD programming

a. Discussion of Hardware of LCD module with pin diagram.
b. Modes in LCD.
c. Discussion of LCD library.
d. Switch controlled 7 segments for Air conditioners and TV.
e. Instrumentation of DC drive using LCD (timer circuit).
f. Code for automatic washing machine using LCD.
g. Other live Projects based on LCD in industries.
h. Function development for LCD.
i. Interview questions.

6. Hardware interrupts (INT0/1/2)

a. Basics of interrupt.
b. Discussion of interrupt registers.
c. Projects & Applications.
d. Interview questions.

7. Timer/counter

a. Basics of Timer/Counter.
b. Discussion of timer/counter registers.
c. PWM generation & its industrial application.
d. Timer interrupts.
e. Real time clock programming.
f. Exercises & Sensors programming based on timers.
g. Interview questions.

8. UART (universal asynchronous receiver transmitter) protocol

a. Basics of UART.
b. UART frame format.
c. Discussion of UART registers.
d. UART library.
e. Projects & applications of UART in industries.
f. Interview questions.

9. Fuse Bit Programming UART (universal asynchronous receiver transmitter) protocol
   a. Introduction of Fuse bits.
   b. LFUSE & HFUSE settings.
   c. Interview Questions.

10. ADC (analog to digital convertor)
   a. Basics of ADC.
   b. Discussion of ADC registers.
   c. ADC library.
   d. Sensor development.
   e. Projects & applications of ADC in industries.
   f. Interview questions.

11. SPI (serial peripheral interface) protocol
   a. Basics of SPI.
   b. Discussion of SPI registers.
   c. SPI library.
   d. Projects & applications of SPI in industries.
   e. Interview questions.

12. I2C or TWI (Twin wire interface) protocol
   a. Basics of I2C.
   b. Discussion of I2C registers.
   c. I2C library.
   d. Projects & applications of I2C in industries.
   e. Interview questions.

13. Atmega8 microcontroller
   a. Atmega8 architecture and pin diagram.
   b. All above codes on Atmega8 microcontroller.

14. Practical session on hardware and LIVE PROJECTS based on industry.
   a. Bluetooth based control systems.
   b. DC motor drive to change the speed of the industrial motors with learning mode.
   c. PWM based dimmer as a future lightening solution.
   14.1. And more.

15. Discussions On IOT (Internet of Things)

a. What Is Internet Of Things?
b. Significance Of IOT.
c. Applications Of IOT.
d. Benefits Of IOT For Students & Research Scholars?
e. Requirements Of Industry

16. Concepts Of Programming

16.1. Advanced C Programming

a. Optimized Codes For Conditions.
b. Optimized Codes Of Loops.
c. Discussion On Functions.
d. Header/Library File Formation.
e. Discussion Of Arrays, String & Structure.

16.2. Introduction Of Class

a. Define Class In Detail & Its Graphical Representation.
b. Syntax Of Class.
c. Define Object.
d. Constructors
e. Exercise On Class.

17. Concepts Of Web Designing

17.1. Introduction Of Html

a. What Is Html
b. Html Documents
c. Basic Structure Of An Html Document
d. Creating An Html Document
e. Mark Up Tags
f. Heading-Paragraphs
g. Line Breaks
h. Html Tags.

17.2. Elements Of Html

a. Introduction To Elements Of Html
b. Working With Text
c. Working With Lists, Tables And Frames
d. Working With Hyperlinks, Images And Multimedia
e. Working With Frames.
f. Exercises On Html.

17.3. Concepts Of PHP Programming

a. Introduction Of Php Programming.
b. Basic Structure Of Php.

c. Variable, Arrays Declaration.
d. Post & Get Commands.
e. Server Level Files & Data Handling.
f. Codes For Runtime Updates On Html Webpage.

18. IOT Programming

18.1. Introduction Of Node MCU Board

a. Architecture
b. Hardware Description.
c. Pin Diagram.
d. Internal Peripherals.
e. Modes Of Working.
f. Applied Protocols.
g. Capabilities.
h. Requirements.

18.2. Introduction Of Software IDE

a. Introduction To Arduino Software Ide.
b. Port Initialization & Its Significance.
c. Port Declaration & Its Significance.
d. Exercise.

18.3. Internal Peripherals Programming Of NODE MCU

a. Input-Output Programming.
b. Timer/Counter Programming.
c. Serial Programming: Uart (Universal Asynchronous Receiver Transmitter) Protocol.
d. Adc (Analog To Digital) Convertor.
e. Interview Questions.

18.4. Nodemcu Configuration As A Server

a. Project1: Development Of Graphical Webpage On Internet To Control Input Output Devices Using Tcp/Ip Protocol (4 Different Panels).
b. Project2: Graphical Panel For Led Light Intensity Control (3 Different Panels).
c. Project3: Webpage To Provide Real Time Temperature Monitoring (2 Different Panels).
d. Project4: Webpage To Count Visitors And Display In Real Time.

19. IOT Cloud Server Configuration

a. Providers Of Server?

b. Configure Domain Name.
c. Configure Server Control Panel.
d. File Handling On Server.
e. Server Troubleshooting.