Embedded Systems Arduino Coding V2

On Board Features & Applications Development

1. **LED interfacing:** This Interfacing is to understand the OUTPUT operation of GPIO. Four LEDs available on the board with the line driving Transistor BC547.We can use any 4 GPIO of Arduino Nano to drive these LEDs. We can generate various pattern on led using Arduino programming, like

- LED Blinking Pattern
- LED Running Pattern
- LED even odd change pattern
- LED LSB-MSB interchange

2. **Switch interfacing:** This interfacing is to understand the INPUT operation of GPIO. Four PUSH to ON Switch available on the board. We can connect theses switches with any GPIO of Arduino Nano. We can develop various applications with switches using Arduino programming Like:

- Device ON/OFF control (in beginning we can use LED as device)
- Controlling Various LED pattern using single Switch
- Password Based Applications (with LCD)
- Button press Counter (With LCD)

3. **DC Motor Interfacing:** The L293D H-Bridge IC Available on the board for DC motor control.

With Arduino programming we can control the

- Speed of DC motor.
- Direction of DC motor.

Servo Motor: The On-Board servo Motor given to learn about servo motor-based applications. With Arduino programming we can control the

- Speed of servo
- Direction of servomotor
- Angle of Servo Motor

4. **LCD interfacing:** A 16*2 LCD available on board having permanent connection with Arduino Nano. This is the alphanumeric display mostly used in portable and hand-held device. With Arduino programming we can display various data on LCD like:

- Alphabetical Strings i.e. names (Temperature, pressure, Menus, Passwords etc.)
- Numerical Values like Counters, Temperature, Pressure, Humidity, etc.
- Password based system using keypad or switches.

5. **Temperature Sensor LM35 interfacing:** LM35 temperature Sensor available on board and connected with Arduino Nano Analog input pin. With Arduino programming we can develop temperature-based application i.e.

- Temperature Display on LCD.
- Temperature based automation.
- Temperature threshold values setting using switches.

6. **Light Sensor (LDR) Interfacing:** The LDR Light sensor Available on the board and connected with Analog input pin of Arduino Nano. With Arduino programming we can develop various Light-based applications like:

- Light Level monitoring on LCD
- Automatic light switching system with Light level Monitoring

7. **Ultrasonic Sensor Interfacing:** Ultrasonic Sensor HC-SR04 available on the board and connected with Arduino Nano. With ultrasonic sensor, using Arduino Programming we can display distance on LCD and develop distance-based Applications.
8. **Pulse Width Modulation (PWM) :** PWM is the on chip peripheral of Arduino Nano. With PWM using Arduino programming we can control the intensity of DC Light and Speed of Motors. We can also develop other PWM based application.
9. **Buzzer interfacing:** Buzzer used for alerting or alarming. A buzzer available on the board and connected with GPIO of Arduino Nano. With Arduino programming we can turn on the buzzer for alerting or sound indication.
10. **IR Obstacle Sensor:**

IR obstacle sensor is the digital output sensor. It can be used with any GPIO of Arduino Nano as digital input. We can develop obstacle detection-based application using Arduino programming like:

- Obstacle counting

Obstacle based automation (alarm, switching)