



## Industrial Automation Training Academy

*Presents*

### Arduino meets LabVIEW

*For:*

Electronics & Communication Engineering

Electrical Engineering

Instrumentation Engineering

Training Module: Arduino & LabVIEW

Arduino – UNO, Duemilanove & Due Series

LabVIEW – 2012 Version

## Training Curriculum:

Arduino – Smart Embedded Controller

# Embedded System Training

## PCB Designing, Wiring & Programming

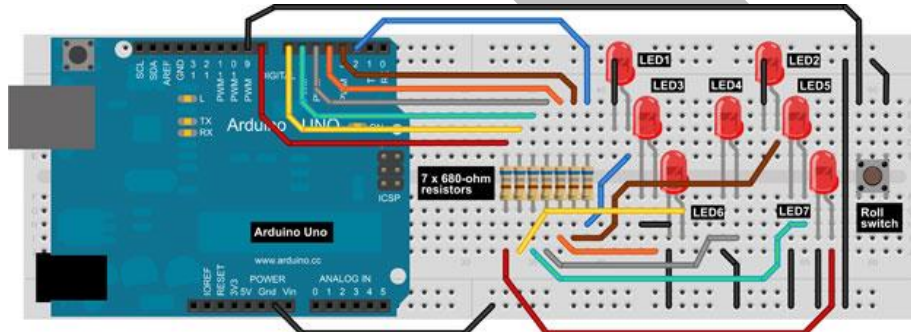
### Chapter 1

#### Getting started with Arduino – A smart Controller for an Engineer

- Introduction to Arduino
- Setup your computer to use Arduino
- Understanding electronics elements – Resistors, capacitors, transistors, relays etc.

#### Designing of Circuits using Fritzing Software

- Introduction to Fritzing – An Open Source Platform to design Arduino Circuits
- Study & Designing of Breadboard Layouts for Embedded Projects
- Study & Designing of Schematics Diagram of the project



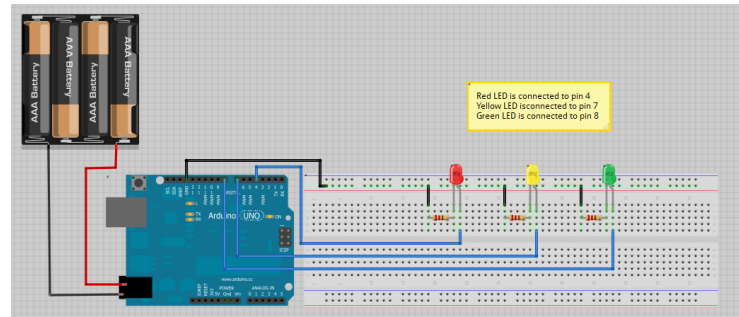
#### Introduction to Basic C – Programming Platform for Arduino

- Understanding Header Files, Functions, Loops, Case Structure, Conditional statements required to design Embedded Projects

## Chapter 2

### Working with LED's – Using Arduino – For Loop, While Loop, Conditional Statement (If-else)

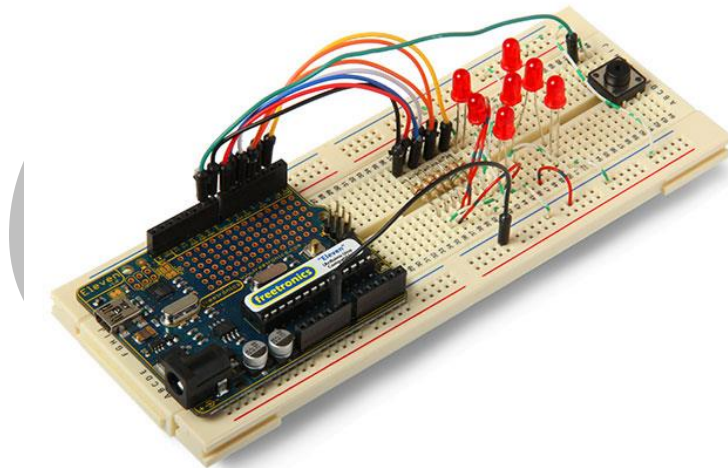
#### Blinking of LEDs



- Fading of LED
- Circling of LEDs
- Blinking of EVEN and ODD states of LEDs
- LED dice, Traffic light system. And many more projects

## Chapter 3

### Serial monitoring – Reading Feedback in Real time from Arduino Board



- Controlling of LEDs from your computer
- Reading analogue and digital inputs

## Chapter 4

### Digital inputs – Interfacing Digital Inputs to Arduino

- Controlling Outputs using push button, IR Sensor, Limit Switch

- Interfacing Relays & SSR to actuate Heavy Load at the output like Single Phase/ Three Phase Motor, Lamp, FAN, Pump etc.

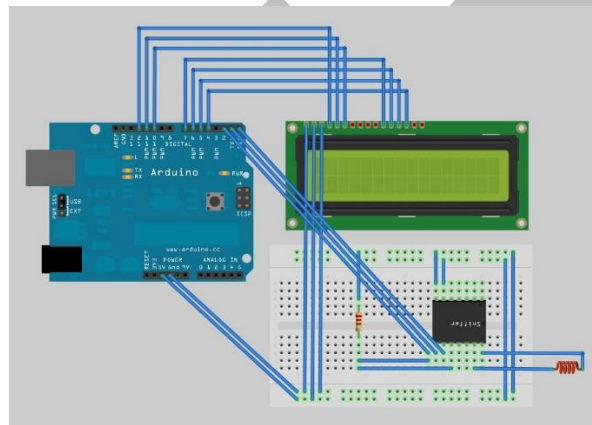
## Chapter 5

### Analogue inputs – Reading Analogue Inputs at Real Time

- Controlling Outputs (Motor, LED's) using a Joystick
- Controlling a DC motor using Pulse Width Modulation
- Fading of LEDs using potentiometers

## Chapter 6

### LCD displays



- Wiring of LCD screen with Arduino
- Displaying a message in LCD screen
- Screen navigation on LCD
- Turn ON a LED by entering the password
- Knowing the status of the LED
- Scrolling of text
- Displaying room temperature using LM 35 temperature sensor

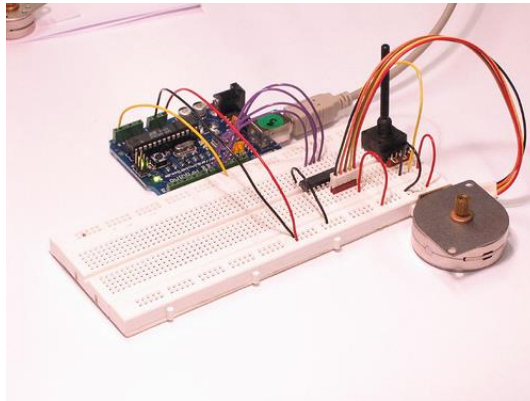
## Chapter 7

### Seven segment display

- Simple automatic countdown and count up. (FOR loop)
- Increment or decrement a number by using push button

## Chapter 8

### Servo/ Stepper motors



- Controlling Servo/Stepper Motor with Joystick
- Direction control of Servo Motor
- Servo Motor based Projects
- Synchronizing 2 Servo Motors

## Chapter 9

### LabVIEW 2012

#### Getting Started with LabVIEW

- Introduction to LabVIEW
- Introduction to VI (Virtual Instruments)
- Understanding DAQ (Data Acquisition Cards)

## Chapter 10

### Fundamentals of LabVIEW

- Understanding LabVIEW Environment
- Building the Front Panel (Concepts & How To?)
- Designing the Block Diagram (Concepts & How To?)
- Running & Debugging VI's
- Creating VI's (Concepts & How To?)
- Building VI Applications
- Loops & Structures
- Understanding Data Types – Strings, Arrays & Structures

## Chapter 11

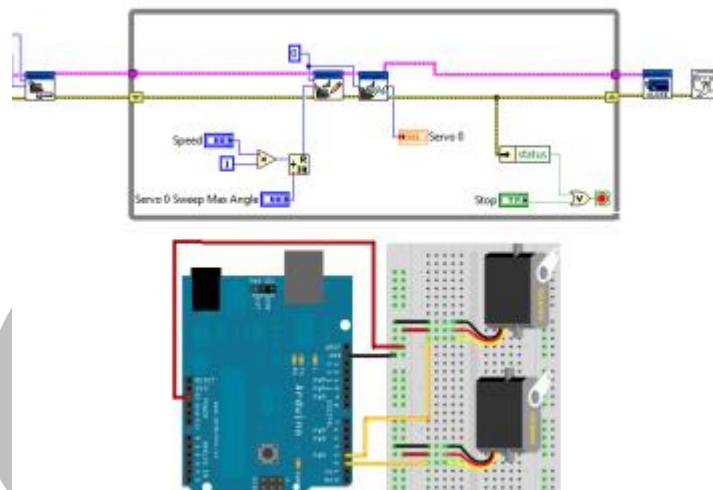
### Programming VI's & Functions

- Array Functions, Boolean Functions
- Comparison Functions, Numeric Functions
- String Functions, Timing Functions
- Waveforms & Charts

## Chapter 12

### Interfacing Arduino with LabVIEW

- Understanding Communication Parameters of Arduino & LabVIEW
- Read/Write Outputs of Arduino
- Reading Analogue & Digital information from Arduino
- Representation of Arduino Signals in Front Panel of LabVIEW
- Graphical Representation of Analogue Value of Arduino
- Controlling Arduino using Front Panel



- Understanding Following Arduino Functions in LabVIEW
  - I. Analog Read Pin – Reading the Analog Voltage in Visual Meter
  - II. Set Digital Pin Mode – Setting the Input/ Output mode by LabVIEW
  - III. Digital Read Pin - Reading the feedback of Arduino by LED's/ Numeric Form
  - IV. Digital Write Pin – Turning Outputs ON/OFF by Buttons, Switches etc.
  - V. PWM Write Pin – Writing the Values by Dial/ Knob
  - VI. Thermistor Read, IR Read – Visual Representation in LabVIEW
  - VII. Seven Segment Display
  - VIII. LCD Interfacing with LabVIEW- Real Time data Communication
- Home Automation Project using Arduino & LabVIEW

- Building Arduino- LabVIEW Application for Real time application
- Building Smart Projects

Following FREE Software's will be given to students who enrol for this Training:

- Arduino Programming Software
- Arduino Wiring Software - Fritzing
- Arduino Simulator
- Arduino Help books
- LabVIEW FREE Student Evaluation Version
- LabVIEW – Arduino Interface Package
- PLC/HMI Programming Software

### **Training Charges:**

Full Course Fee: **Rs 8000/-** including Taxes

Group Discount: 10% on group of 4 or more

### **Note:**

1. NFI will provide Hardware Trainer & Notebooks for the candidates
2. Post Training Exam will be conducted for the candidates for their evaluation

### **Training Methodology:**

**100% Practical on Hardware Trainers**