Workshop on Home-automation

In this Workshop we discuss about the use of embedded control systems in home and building automation systems. Both types of systems try to *fill in the specific automation requirements of private homes and buildings*, hereby increasing the comfort and security of the users and improving on overall energy efficiency. Home automation systems come from the need of automating processes in the house. Example: An immobile elderly person, a handicapped person. Building Automated Systems originate from the simple fact that it is easier to control lots of systems remotely from one place instead of running around, controlling each of these systems manually. (HVAC and chilled / hot water systems come to mind). Now that electronics is becoming more affordable and implemented in residential segment, the urge for electronic comfort is increasing by the day.

This 2 day workshop introduces students to the world of embedded technology using the Avr studio/WinAVR platform and Atmega8/16/32 microcontroller. The workshop is tailor-made to give participants hands-on experience in working with microcontrollers and building projects based on Home Automation and Controlling Systems.
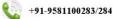
WORKSHOP SCHEDULE:

DAY 1

Session 1

- ➢ Introduction to Embedded System
- ➢ Difference Between μc and MU
- ➢ AVR Series Micro-Controllers
- ➢ Introduction to ATMEGA 8 Micro-Controller
- ➢ Introduction to different programming tools
- ➢ AVR Studio IDE – A Quick Coverage
- ➢ Introduction to progisp software
- ➢ Software's Installation
- ➢ Kit distribution
- ➢ Overview on AVR Development Board
- ➢ Programming in C – A Quick Coverage
- ➢ Getting your Hands Dirty With Programming – Simple Programs

Session 2

- ➢ Introduction to I/Os
- ➢ Overview of Digital I/Os

- ➢ Working with Digital I/O
- ➢ **Practical:** Program to switch on off LEDs
- ➢ **Practical:** LED blinking in different patterns
- ➢ Building a Simple Project - LED Binary Counter
- ➢ Working with 7 Segment
- ➢ **Practical:** Displaying number 0-9 on 7segment
- ➢ **Practical:** Displaying alphabets on 7segment
- ➢ Introduction to LCD
- ➢ Memory Mapping: CGRAM, CGROM and DDRAM
- ➢ Sending Command and Data to the LCD
- ➢ Interfacing16*2 LCD with ATMega8
- ➢ **Practical:** Displaying characters on LCD
- ➢ **Practical**: Displaying String on LCD
- ➢ **Practical:** Displaying number on LCD
- ➢ Building a simple project –Digital Stop Watch

DAY 2

Session 3

- ➢ About ADC
- ➢ Successive approximation method
- ➢ About resolution & reference voltage

- ➢ working with built ADC present in atmega8 controller
- ➢ Working with Analog Inputs & temperature sensor
- ➢ Light sensor using LDR
- ➢ Types of Light sensors
- ➢ LDR characteristics & it's Working
- ➢ Interfacing LDR to Microcontroller
- ➢ **Practical:** Designing automatic night lamp using LDR
- ➢ Temperature sensor & it's Working
- ➢ Types of Temperature sensor
- ➢ Interfacing Temperature sensor(LM35) to ADC channel of UC
- ➢ **Practical:** Driving a motor based on temperature

Session 4

- ➢ Humidity Sensor & its Working
- ➢ About Absolute Humidity
- ➢ Interfacing Humidity sensor to Microcontroller
- ➢ **Practical:** Driving a motor based on humidity value
- ➢ About Home Automation
- ➢ Different Technologies in Controlling Systems
- ➢ About DTMF technology
- ➢ Interfacing DTMF to UC
- ➢ About RELAYS

- ➢ **Practical:** Designing control systems for Appliances

- ➢ Review of the Workshop

- ➢ Q & A Session

Take Away for the Participants:

- ➢ Target and optimize 8 bit microcontrollers by using Embedded C.
- ➢ Use internal peripherals of a microcontroller such as ADC, I/O.
- ➢ Create and manage designs by using the Avr studio software design environment.
- ➢ Interface external peripherals such as motor driver, sensors, LCD etc.
- ➢ Different interfacing technologies for different Sensors.
- ➢ Exposure to the different softwares required for building an embedded systems.
- ➢ Hands-On experience in
- ➢ Interfacing Different Sensors to UC.
- ➢ Designing Home Appliances Control System.

Workshop Benefits and Highlights:

- • Learn & Interact with Robotics Experts and get to know basics of Robotics and its control.

- • Receive an unparalleled education on the art of Robotics with personal one-on-one attention.

- • Learn to program and build robots within 2 days.

- • PowerPoint Presentation, Live Demos, Interactive Question & Answer sessions and comprehensive material.

Benefits of the participants

- ➢ Certificate of Participation to all Participants from Indo Global Services
- ➢ Free Softcopy of workshop content
- ➢ Technology Learning Center summer training redemption coupon

Our Requirement for the program:

- Minimum of 50 teams for conducting the workshop
- One Computer CD-ROM drive for each team or students are requested to get their laptop preferably with Windows OS.
- LCD projector and microphone PA system.
- Seminar hall or computer lab for conducting the workshop.

Workshop Duration:

- 2 Days [7 Hours/Day]

Pre-requisites:

The modules are designed in order to cater the basics of Robotics and coding however following pre-requisites will be an added advantage.

- Basic knowledge of C programming.
- Basic Electronics.