Applications of the 8051 microcontroller 10 day workshop

Workshop time : 3 hours (Day 1 to Day 8), 6 hours (Day 9 to Day 10)

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The task in this workshop is to design programs or applications that can run on the microcontroller chip fitted in a development board like one produced by YuFei DianZi(与飞电子) and another produced by 海克科技开发有限公司. We have chosen the development board produced by 与飞电子 because is relatively cheaper compared to other boards with similar functionalities.

1. Workshop pre-requisites.

✓ Interest to learn about the 8051 microcontroller and its usages.

Other necessary but not mandatory pre-requisites include:

✓ Basic knowledge of a structured programming language like C.
✓ Basic knowledge of analogue and digital circuits.

2. Workshop Content Arrangement.

■ Day One
  ↓ Introduction to the Microcontroller Unit.
    ✓ Background, Future and applications of the microcontroller unit.
    ✓ Internal Structure of the 8051 microcontroller.
    ✓ Common Programming Technologies for the 8051 microcontroller.
    ✓ Hello world(numbers systems, logic gates, programming software, blinking an LED)
  ↓ Output Devices(1)
    ✓ Buzzer
    ✓ LEDs
■ Day Two
    ✓ LED matrix
    ✓ 7 segment static display
■ Day Three
    ✓ 7 segment dynamic display
    ✓ LCD display
■ Day Four
  ↓ Input Devices(1)
    ✓ Independent Keys
    ✓ Matrix Keyboard
■ Day Five
  ↓ Internal Resources
    ✓ Timer and Counter
    ✓ Interrupt Service Routine (IRS)
■ Day Six

- Output Devices(2)
  - ✓ Digital to Analog Convertor(D/A).
  - ✓ Activation of DC and Alternating Current Loads.
- Day Seven
  - ✓ Pulse Width Modulation (PWM).
  - Input Devices(2)
    - ✓ Analog to Digital Convertor(A/D).
- Day Eight
  - Communication Technologies
    - ✓ Universal Asynchronous Receiver/Transmitter (UART)
    - ✓ Inter Integrated Circuit
    - ✓ Others
- Day Nine
  - Programming and design Hackathon Start (morning and evening)
- Day Ten
  - Programming and design Hackathon Finish (morning and evening)

3. **Reference Resources for the workshop**.

- ✓ The 8051 Microcontroller and Embedded Systems Using Assembly and C by Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. McKinlay.
- ✓ Introduction to Microcontrollers by Gunther Gridling, Bettina Weiss.
- ✓ Datasheets for the different chips
- ✓ Schematics for the Wiring of the components on the development board.

4. Evaluation of Achievement.

The achievement of the participants will be evaluated according to the projects they accomplish in their groups in the last two days of the workshop. If time allows, each group will be allowed a chance to present their project to the rest of the students.