

Assignment SEL 4533 Microcontroller

Semester: 2011/12
Academic Session: II

TITLE : _____

NAME 1 _____
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* Submit your title and group members to me by 24th April 2012

Develop an embedded system using microcontroller 68HC11 (or other microcontroller you can find). The system can be of any applications and must include ALL of the following specifications:

- i. can read from peripheral device (i.e. parallel input, analog, serial, etc)
- ii. can produce output (i.e. LED, seven segments, LCD, motors, etc).
- iii. involves some simple algorithm or intelligence according to the purpose of the system. For example, the system can be ‘an intelligent lift’, ‘automatic car parking counter’, ‘electronic dice’, ‘smart home’, etc.

You have to construct the complete circuit either using **68HC11 Trainer Kit¹** which is available for loan from Robotic Laboratory (Technician En. Noh) or use other microcontroller but on your group own expenses. You may expand the circuit using either proto-board or solder all the components on a strip board. Use **HCLoad²** bootloader to load program onto the microcontroller if you use **68HC11 Trainer Kit**.

Your group has to submit a report prior to the demonstration. Your report should not be more than 5 pages and consists of **Introduction, Problem Background, Objective, Methodology (Design specification, Hardware design and Software design), Results and Conclusion**. Please append your **Circuit diagram, list of components and codes**.

Finally, your group has to present and demonstrate the system in 10 minutes (7 minutes presentation + 3 minutes Q&A). The presentation is tentatively scheduled on 22nd May or 29th May 2012. Table 1 shows the marks allocation for Report, Presentation and Demonstration.

Table 1: Marks allocation

	Marks
Report and Presentation	60
Demo	40
<i>Simulation (THRSIM) (max 30)</i>	
<i>Actual embedded system (max 40)</i>	

¹ Please refer to **68HC11 Trainer Kit manual**

² Please refer to **HCLoad manual**

Guideline

1. You can loan a **Trainer Kit** from laboratory lab (Technician En. Noh)
2. Construct your system (you may start with a simple system first, i.e., blinking LEDs). You may construct and decorate your system as creative/interesting as possible. For example, you may construct a small model home to show how 'smart lighting system' works.
3. Write your program in **THRSIM** and compile it. It is a good idea to simulate your answer.
4. Use **HCLOAD** to download the machine code, S19 onto Trainer Kit via serial COM Port. There is one computer in Robotic Laboratory that has been setup with relevant software.
5. Prepare a presentation slide to explain and describe your system. The presentation should include Introduction, Problem Background, Objective, Methodology (Design specification, Hardware design and Software design), Results (Demo) and Conclusion.
6. All expenses are to be borne by your group members.

Inputs	Switch, keypad, IR, thermometer, force sensor, LDR, rheostat, encoder, DIY input, smoke, adour, compass, etc
Outputs	LED, LCD, Seven segment, DC motor, Servo motor, Stepper motor, Buzzer, GSM, wireless, etc