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| **EMBEDDED SYSTEM LABORATORY** |
| **LAB 3** |

**MULTITASK PROGRAMMING FOR ARM MICROCONTROLLER WITH ADC INTERFACE**

### I. LAB OBJECTIVES

### - In this Lab students will learn about ARM-CORTEX M3 (LPC1768) Microcontroller.

### - This Lab experiments are intended to implement basic ADC of ARM-CORTEX M3 Microcotroller to pheriperal devices in MB1700 Kit and write C code programming to control these devices.

### II. PRE-LAB : ADC Register Review

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A screenshot of a computer registration form

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A screenshot of a computer program

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A screenshot of a computer

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A screenshot of a computer error

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### III. LAB PROCERUCE

### The LPC1768 Microconttroler KIT using 100MHz system clock.

### III.1 Lab Experiment 1 : Write the C code to use GLCD Driver Library in GLCD to draw a rectangle 100x100 pixel at position x=50, y=50, then move the rectangle in different position of the LCD screen with moving delay 1 second using timer 1 polling method;

### III.2 Lab Experiment 2 : Write the C code to use GLCD Driver Library in GLCD to draw a bar graph 100x100 pixel at position x=150, y=5; then move the bar graph in different position of the LCD screen with joystick controlled by four buttons P1.23,P1.24,P1.25,P1.26;

### III.3 Lab Experiment 3 : Write the C code to use GLCD Driver Library in GLCD to display your name at position x=10, y=160 ; then scroll up your name in the screen.

### III.5 Lab Experiment 5 : Write the C code to get data From ADC channel 2 using polling method then display 8-bit high value result to 8 bit LED in the Experiment KIT .

### III.6 Lab Experiment 6 : Write the code to using Timer1 Interrupt to get data From ADC channel 2 using polling method then display 8-bit high value result to 8 bit LED with sampling time 1 second/1 time.

### III.7 Lab Experiment 7 : Write the code to using Timer1 Interrupt to get data From ADC channel 2 using polling method then display 12-bit value result to GLCD in form of text with sampling time 1 second/1 time.

### III.8 Lab Experiment 7 : Write the code to using Timer1 Interrupt to get data From ADC channel 2 using polling method then display 12-bit value result to GLCD in form of bar graph with sampling time 1 second/1 time.

**IV. LAB PERFORMANCE GRADING AND LAB REPORT GUIDELINES**

For each Lab experiment Students show the successful running results to Lab Instructor for Lab Performance grading.

Students write a report which includes : Algorithm flowchart and C++ Code for each experiment. In each block of the code or line of code, give the comments for the meaning of this block of code.