

**The Hong Kong Polytechnic University**  
**Department of Electronic and Information Engineering**

**EIE3105 Integrated Project (Part I)**

**Laboratory Exercise 3: AVR Interrupt Programming**

**(Deadline: Check the course information)**

**Objective:** To develop C programs with interrupts under the Arduino platform.

**Equipment:** Atmel Studio 6 and the Arduino Starter Kit

**Procedure:**

*Section A: Write a single C program to implement two applications in Lab 2.*

Implement Section B and C of Lab 2 in the Arduino Uno so that two applications (traffic light and counting) can be executed at the same time. Note that CTC mode should be used. Moreover, you must use interrupts to implement these two applications (i.e., timer and counter programming). The clock frequency of the Arduino Start Kit is 16 MHz. Note that you should write a simple application (e.g., flash one LED only) to check whether you can setup a timer properly by using an interrupt.

*Section B: Replace the counting application by using an external hardware interrupt.*

In Section A, counter programming is used to implement the application. In this section, an external hardware interrupt INT0 is used as a counter to implement the same application.

*Section C: Use an external hardware interrupt to enable the simulation of the traffic lights.*

Connect a switch to an external hardware interrupt INT1 pin. Write a C program so that the simulation of the traffic lights can be started by pressing the switch once. If the switch is pressed again, the simulation of the traffic lights will be stopped (i.e., all LEDs are OFF).

**Demonstrate your applications in Section A, B and C to our tutors or technicians.**

**Instructions:**

1. You are required to demonstrate your programs to our tutor or technicians.
2. Zip all programs (including the whole projects) in Section A, B and C to a single file. Submit it to Blackboard.
3. Deadline: **Check the course information**.

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