Indian Institute of Technology Bombay
CS684: Embedded Systems

Hardware and Software Interrupts

ERTS Lab, CSE Department

1 Lab Objective

1. Understand External Interrupts, Timer Interrupts in ATmega 2560
2. Get acquainted with using the Hardware and Software Interrupts.

2 Pre-requisite

This lab assumes you have completed Lab-2, which means you are aware of the working of the PWM and Timers of ATmega2560.

3 Problem Statement

In this lab you have to use **2-way DIP switch** and on-board **USER_SW** provided in the lab kit and interface them with the board.

1. On-board **USER_SW** is connected to Interrupt pin 7 **(PE7/INT7)** of ATmega 2560. Write a program to turn ON Red LED as soon as user presses the Switch. LED should remain ON for **300ms** and then turn OFF. (Even if the user continuously presses the Switch, LED should remain ON only for 300ms and should then turn OFF.)
2. Interface one 2-way DIP switch to the ATmega 2560 as per Lab-1. Write a program to generate delay according to the combination of switch positions given in Table 1. Toggle the on-board Red LED according to the delay, i.e. LED should turn ON for the amount of time (delay) and turn OFF for the same time and this should repeat indefinitely. You can use any 16-bit Timer of ATmega2560 to generate the delay.

   Note: Interrupt generated by micro-controller should not be for every **1 msec**. Delay should be generated using Timer Interrupt **only** and not by **_delay_ms()** function. You can use Polling method to determine the switch positions.

S2	S1	Delay (approx. msec)
OFF	OFF	200
OFF	ON	400
ON	OFF	800
ON	ON	1600

Table 1: Switch positions and Delay

4 Demo and Submissions

- You have been issued a take-away kit to work on the experiment.
- You have to get your output verified by your TA on the lab day.
- There will be a folder **Lab-3** already created on that repo. Add Project folders of all the above **two** Problem Statements in that folder of Github repository shared with you.
- Name each folder as **Problem_Statement-1** and **Problem_Statement-2**.
- Deadline for completing **Lab 3** is **Wednesday**, **12th February 2020** by **5 PM**.
- Upload a well documented code with comments of the experiment every week after you have completed the experiment.