Lab 3: PWM

CS308- Embedded Systems Lab
E.R.T.S. Lab I.I.T. Bombay

Lab Objective:

This lab will introduce you to the use of:

1. PWM on the ARM- Cortex-M4

Prerequisite:

1. Lab 1 and Lab 2: Interfacing RGB LED and both the switches.
2. Reference material: Please go through Extra Resource material present in the Lab 03 folder before you proceed further.

Note: Please make a new project using the steps you used in Lab-0 for this lab.

Problem Statement:

In this lab you have to design *RGB LED controller* using SW1 and SW2 present in Launchpad board.*RGB LED controller* has two modes of operation. **Auto mode** and **Manual mode**

At initial, when program is loaded controller will be in Auto mode. Combination of SW1 an SW2 has to be pressed to go to **Manual mode**.When **Reset button** is pressed, controller will go to **Auto mode**.

1. Auto mode

- In Auto mode color of the RGB LED follows a pattern in a cycle.
- The pattern must follow the color circle as shown in Figure 1.
- In **Auto mode** SW1 will increase the speed of color transition and SW2 will decrease the speed.
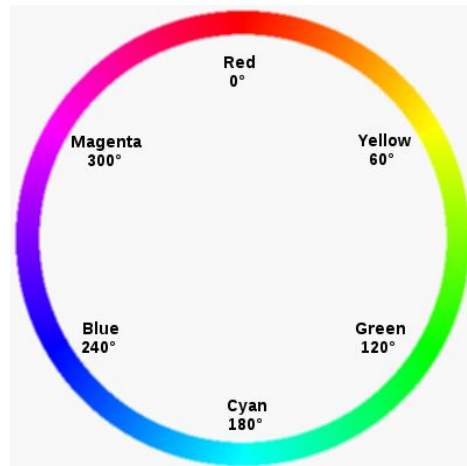

Figure 1 Color Circle for Pattern[1]

1. Image Courtesy: https://en.wikibooks.org/wiki/File:RGB_color_circle.png accessed on 27/01/2016

2. Manual mode

- In **Manual mode**, user must be able to select any one of the color from the color circle. For this intensity of any of the 3 LEDs must be controlled independently.

- **Mode 1 (Red LED control) -** When SW2 is pressed continuously(long press) and SW1 is pressed once controller goes to Manual Mode 1. In this mode, intensity of Red LED can be controlled using SW1 and SW2.

- **Mode 2 (Blue LED control) -** When SW2 is pressed continuously(long press) and SW1 is pressed twice controller goes to Manual Mode 2. In this mode, intensity of Blue LED can be controlled using SW1 and SW2.

- **Mode 3 (Green LED control) -** When SW1 and SW2 are pressed continuously controller goes to Manual Mode 3. In this mode, intensity of Green LED can be controlled using SW1 and SW2.

Demo and Submission :
- Draw the state chart for the implementation of *RGB LED controller.*
- Show the output for both the modes to TA and explain the working.

All the best