BBM 432 – Embedded Systems
Lab 5
-Fastest Finger Reaction Game-

Preparation

You will need a Launchpad, the Nokia 5110 display, two switches and two 10K resistors for this lab.

Purpose

In this Lab, you will learn to how to interface the Nokia 5110 LCD. You will also use interrupts and measure time using SysTick.

System requirements

In this lab, you will implement a fastest finger reaction game. You have to interface the Nokia Display and the two switches.

You will first display the message "GET READY" on the screen. Seeing this message, two players get ready to press their switches. After a random amount of time between 0 and 10 seconds, you display the message "PRESS!". After seeing this message, both players aim to press the switch as soon as possible. You capture which switch is pressed first and display the winner on the screen. Also, you display the reaction times for both players on the Nokia screen.

If you observe a reaction time of less than 100 ms, you have to indicate a false start as it is not possible for a human to react less than 100 ms to a visual stimulus. The other player should be the winner. Similarly, if a user presses the button before the "PRESS" message, the other user should be declared as the winner.

Implementation

Nokia Screen Interfacing:

You can use "C:\Keil\Labware\Lab15_SpaceInvaders\Nokia5110.c" file to interface the Nokia 5110 LCD. You need to be careful about the pins to connect as it may vary among LCDs. Connect the LCD to your board using the comments at the beginning of the Nokia5110.c file. You can use the methods of the Nokia5110.c file that we describe in the lecture to display text and graphics.

Switch Interfacing:

You have to two connect external switches to the same GPIO port except Port F. For example, you can connect both of them to Port A. You have to distinguish among the different switches inside the ISR.

Time measurement:

You can start the SysTick timer at the same time you display the message “PRESS”. You can find the difference between the counter at the time the switch is pressed and reload value. Note that you also have to count the number of times that the timer expired because SysTick timer can overflow. You have to use SysTick interrupts to count the number of times the timer expired. The time difference between the “PRESS” message and the button press should be displayed in units of milliseconds.