DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
UNIVERSITY OF BRITISH COLUMBIA
CPEN 391 – Computer Systems Design Studio
Fall 2015/2016 Term 2

Exercise 1.1
Using the Push-Button Switches and Parallel Port

In this exercise, you are going to create a NIOS system that monitors the status of the four push-button switches, and displays their status on the LCD. This exercise will allow you to test your understanding of:

a) Constructing a simple custom NIOS System
b) Using the parallel port input core and the LCD output core
c) Writing a C program that uses both bare-metal programming and HAL-based programming
d) Using Eclipse to write, download and test NIOS programs.

The design you will create is shown in Figure 1. The system has four inputs (the push-button switches on the DE2 board which are labeled KEY3, KEY2, KEY1, and KEY0). The output is the LCD display, as described in Tutorial 1.4. Your data and program memory are stored in SDRAM as described in Tutorial 1.2.

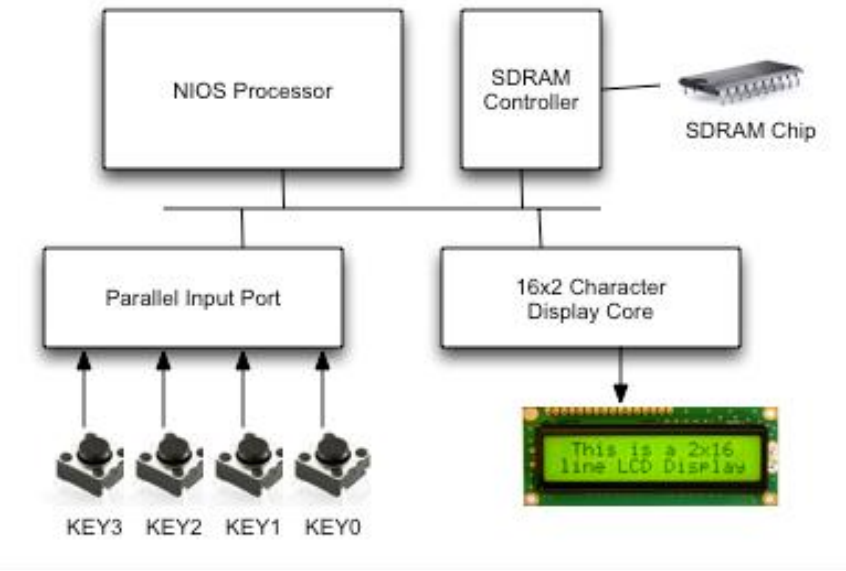

Figure 1: Overall System Design

The operation of your system is as follows. Each time the user presses one of the keys, the corresponding number is displayed on the LCD. Note that each number should be displayed once per key press, regardless of how long the key is held down (similar to a keyboard). You should decide what to do if the user presses two keys at once, or presses a key, then presses a second key before releasing the first key.

When you are done, show your working system to your TA to get it marked.