CS321 - Assignment 3

Problem Statement:

Assignment 3:

Issue a Logic Controller Interface (LCI) card and cable from Mr. Hemantha.

He will apprise you as to how it is to be connected to the connector beside the 8255s on the kit. Read the manual for more details and sample programs.

If in doubt ASK the TA or the Instructor. DO NOT TRY OUT THINGS WHICH YOU ARE NOT SURE ELSE YOU COULD DAMAGE THE EQUIPMENT.

The LCI card has 2 rows of 8 LEDs. Those in one row are connected to the pins of Port A of the 8255. The other set of 8 lines are connected to the pins of Port B. Thus, you can switch ON or OFF a specific LED connected to Port A when it is configured as an output port. The set of lines connected to Port B can be used to provide digital inputs to the kit/processor via Port B configured as an input port. So you have 8 output lines (Port A) and 8 input lines (Port B) to juggle with and program.

Write programs to realize the following:

(PART A) When D6 on the input port is made low, a program is triggered that starts to make the LEDs on the output port blink one at a time (D0 first then D1, then D2...) cyclically with a delay of one second in between. When D5 of the input port is made low this programs stops and waits for D6 at the input port to go low and commences again. When D2 of the input port is made low the program terminates.

(For alternate batches 1,3,5,7,.....)

(PART B) Angry Birds Ver 0.001

Imagine a program that makes a couple of random LEDs on the LCI card to light up (while others are OFF) momentarily. If the LED#4 & 07 were lit up then you need to press the keys 4 & 7 on the keyboard immediately to feed these LED-birds within the very limited time for which the LEDs are ON. If you do so you get some reward points that need to be displayed on the screen. If you don't you get penalties (also to be displayed). The same goes for other LED-birds. You get 5 chances to feed these LED-birds. Beyond a certain number points (Rewards-Penalties) the program goes to the next LEVEL-1 where the blinking speed increases giving you lesser time to react. If the rewards accumulated crosses a higher mark you graduate the next LEVEL-2. But what's the next level? This we leave it to your imagination. Naturally this level has to be harder than the previous levels 0 and 1. Imagine and program a more complex set of tasks/levels to be done by the gamer for LEVEL-2. (TRY TO

DO SOMETHING ORIGINAL AND NOT MERELY COPY IT FROM ANOTHER BATCH) Innovate and make the game more interesting and well, addictive too (!!)

(Bear in mind you have two 8255s on board.)

(For all other batches such as 2,4,6,8,...)

(PART B) Elevator Simulation:

Now that you have been able to manipulate inputs and outputs try simulating an elevator in an office building. Attempt this problem only after you first understand the actual working of a "real" elevator – the mechanical part and the sensing and control parts. Do bear in mind that the elevator control program should try and handle all issues of the real one. Note that an elevator ships human beings up and down several floors. Any bug or "*I did not think about that!*" or "I assumed that ….." kind of problems in your control program can cause loss of lives. You will be penalized for that.

The switches on the elevator form the bits of the input port of the LCI card while those of the output port could symbolize the eight floors. Requests (multiple ones too) could come from any floor on the input (port) side. Accordingly display how the

elevator ascends or descends the floors and services the resp. floors and brings people back to the ground floor.

Add new features to the elevator such as top priority for the boss's floor of the office. What if the boss moves around the building (one floor to another)? Can the floor where he is currently, be given top priority?

(Bear in mind you have two 8255s on board.)

Deadline:

Aug 27th 2018, 9:00am (for both part (a) and part (b))
Evaluation will be during the lab. hours on Aug 27th 2018 (Monday)