Assignment 8

What do you learn today ?

- Interfacing a PS-2 keyboard with Xilinx Spartan 3 starter kit
- Writing an **FSM interpreter** in VHDL
- Interfacing a 7 segment LED Display

Problem Statement

There is an onboard PS-2 port provided in Xilinx Spartan-3 kit. Your objective in this assignment is to interface a PS-2 keyboard with Spartan board and display the typed characters on a 7 segment LED display. The LED display supports 4 characters at once.
You have to write an interpreter in VHDL to interpret the code received from keyboard into a character. The interpreter in this case should work like an FSM. There is a unique **scan code** generated for each character typed from keyboard. Interpretation should be done for following keys:
1. Printable characters: alphabets and numerals
2. Control keys: CAPS LOCK, SPACEBAR and BACKSPACE
    a. When CAPSLOCK is ON, uppercase alphabets should be printed and otherwise when CAPS LOCK is OFF.
    b. When SPACEBAR is pressed, a space should follow
    c. For a stroke of BACKSPACE, the last character must be erased

NOTE: There are many characters which cannot be printed using a 7 segment LED display. Your interpreter should just ignore such characters.

Display of characters on LED display should be done in following way:
- Keystrokes : CAPSLOCK A CAPSLOCK B C D
  Display : dcbA
- Keystrokes: A CAPSLOCK H SPACE 3
  Display: 3   H a
- Keystrokes: 1 2 3 BACKSPACE 4 5
  Display: 5 4 2 1

Helpful links:
Spartan 3 user guide (interfacing with PS-2 keyboard given)
Displaying characters on 7 segment LED display
Scan Codes for PS-2 keyboard

NOTE:
- The assignment must be mailed to dslab2013.iitd@gmail.com
- This time codes will be checked by software for copying.
- Submit a zip file named assignno_entryno having 2 folders:
    1. CODE: Suitable files associated with the assignment.
    2. DOCUMENTATION: .pdf and .tex file of your report.

Copying is counter-productive (since you pay for us to teach you what you are copying) and will be penalized.