PRINCIPLES AND APPLICATION OF MICROCONTROLLERS
AVR Lab11: Electronic Piano Keyboard (with 7-segment)

Introduction

In this lab, you are required to design and build an electronic piano keyboard. The keyboard should contain 7 keys for musical notes C, D, E, F, G, A, and B. It also contains a 7-segment display. The display is used to show the letter of a note when the corresponding key on the keyboard is pressed. After completing this lab you should be able to:

- Master in assembly structured programming
- Use 7-segmenet displays

Parts List

- A breadboard
- An AVR ATmega328P microcontroller
- Button switches
- A 7-segment display
- Resistors

Procedure

Use a port as keyboard input, and another port as output to the 7-segment display. The keyboard is composed of several keys (switches). Connect a switch to a pin of the input port. Connect the pins of the output port to a 7-segment display. Remember that 7-segment display is composed of 7 LEDs. Place appropriate resistors when wiring the display to the microcontroller to prevent burnout. Write an assembly program that shows the letter of a note when the corresponding key on the keyboard is pressed.

Deliverables

Basic + advanced points (100%):

Demo the result to the TAs, or record it in a video. Upload the followings to ceiba: 1) your C program source code, 2) a photo of your physical circuit, and 3) contributions from each teammate to the lab. The contributions must include the information of the tasks each teammate has done and the contributions in percentage. The total percentage should be 100%. All the teammates have to agree with the contributions before they are uploaded.