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 Port D as keyboard input, and Port B as output to the 7-segment display. The keyboard is composed of several keys (switches). Connect a switch to a pin of Port D from PD0 to PD6 as shown in Fig. 1. Connect the pins of Port B to a 7-segment display as shown in Fig. 1. 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.

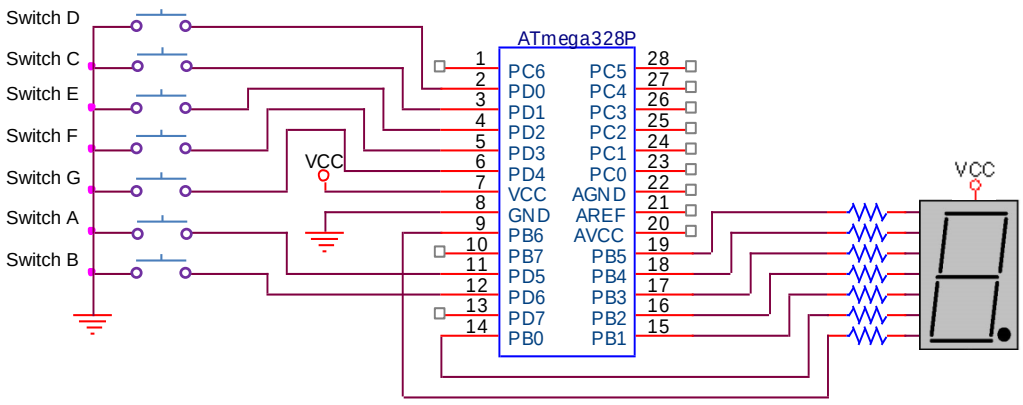

Figure 1: Circuit of ATmega328P, switches, and 7-segment

Deliverables

Demo the result to the TAs, or record it in a video. Provide the assembly program and a photo of your physical circuit as the appendix in your lab report. Upload your lab report to ceiba.