Embedded Systems

Sheet 2

Embedded System Development Fundamentals

For the following questions: provide both the software part and draw the hardware schematic for all required embedded systems.

Q1:

Develop an embedded system connected to 8 bit dip-switches. The system produce a pulse of duration equal to the supplied 8 bit value (0→255) multiplied by 4.

Q2:

Develop an embedded system that produces continuous pulses with duration of X seconds and duty cycle of 50%. X could take values between (1 and 10 second). Use two push-button switches to increase or decrease the pulse speed.

Solve this problem without and with Interrupts.

Q3:

Develop an embedded system that produce an 8 bit binary value that count from 0 to 255. Each count should last 1 second.

Solve this problem without and with timers.

Q4:

Develop an embedded system that read 6 analog inputs and produce a pulse with duration equals to the read value. Use one push-button to switch between different inputs.

Q5:

Develop an embedded system that read analog input and produce a rotating light with speed relative to the read value. Rotating light can be made by arranging 10 LEDs in a circle.

Q6:

Develop an embedded system that read 3 analog inputs and light up one of three LEDs to show up which one is the largest input.

Q7 (**Exercise**):

Develop an embedded system that uses one push-button and a LED. If the user makes a normal press to the push-button the LED state is toggled between on and off. If the user makes a long press for 5 seconds or more, the LED starts to blink or stops based on the previous state.