

Homework3/Project-1: CMPS 499-003 Embedded Software Systems Fall 2007

Date Assigned: Tuesday Oct 18, 2007

Date Due: Thursday, Oct 30, 2007

Objectives:

- 1. To revise advanced concepts about the architecture of an 8051 microcontroller such as timers and interrupts**
- 2. To develop software using such concepts**

Q1. Develop and test a software, using Keil extensions, that calls and executes a function X (use your own function) every 100ms. You can assume the chip (an 8051 device) is clocked via an oscillator working at 12MHz and it takes 12 oscillator cycles to execute a machine instruction.

Q2. Develop an advanced version of the software in Q1. which works through invocation of function X by interrupt service routine. The software must reload and restart the timer itself.

Q3. You are to program and develop an embedded (software) system that will be placed as a chip into a type of children toys. The desired characteristics of the toy (and the embedded software) are as follows. The toy is a little baby-toy that goes through the following states:- i) making funny sounds (5seconds), ii) tired speech and whining (2 seconds), iii) crying for food (3 seconds), iv) smiling and laughing (5 seconds). The states are sequential and cyclical.

Q4. Develop an 8051-based software that can control traffic lights at a two-street intersection. Develop your specification with clear statement of what each state denotes and how long you desire the system to remain in each state. Develop the software to meet your specifications.