ECGR4101/5101, Fall 2009: Lab 6
Round Robin Scheduler - Version 1.1

Learning Objectives

You are to write a program that runs on your QSK62P board that uses the Round Robin Scheduler, with interrupts. You will need to also use timers and transmit serial data.

Laboratory Assignments

In this lab you will be programming the timers and using interrupts. The LED's will be used for signaling and the LCD can be used to display debugging information. This lab must be demonstrated to the TA.

1. The program should rely on Round Robin scheduling and use interrupts for the scheduler and UART only.

Requirements

Req. 1.   The code generated is written in C for the QSK62P or QSK62P Plus.
Req. 2.   The code is well commented and easy to follow
Req. 3.   You may not use the BNS functions.
Req. 4.   This board must use Round Robin Scheduling (RRS) for the LEDs and starting the serial communications.
Req. 5.   Toggle LED0 every 1 second (one second on, one second off).
Req. 6.   Toggle LED1 every 2 seconds.
Req. 7.   Toggle LED2 every 5 seconds.
Req. 8.   Schedule a character string transmission to the PC every 1 second via UART0.
Req. 9.   The string should be of the format
            `"LED0=ON     LED1=ON     LED2=ON "` or
            `"LED0=OFF    LED1=OFF    LED2=OFF"` (or any combination, whatever represents the true state).
Req. 10.   Each string sent to the PC must use a queue and interrupts. Each string must end with a CR and LF.
Req. 11.   The RRS timer tick is 1 milliseconds.
Req. 12.   The RRS Priority, high to low, is LED0, LED1, LED2, UART.
Req. 13.   The UART communications is via queues and interrupts, but the string is built and the first character sent due to RRS.
Req. 14.   The UART speed and configuration is any speed or configuration, but see the next requirement requirements for performance bonuses.
Req. 15.   Scoring: The lowest 20% of the lab group results with respect to speed will lose 4 points. The upper 20% of the lab group results with respect to speed will earn 4 points Extra Credit.
Req. 16.   Scoring: The lowest 20% of the lab group results with respect to code size will lose 4 points. The upper 20% of the lab group results with respect to code size will earn 4 points Extra Credit.
Req. 17.   You do not need to use the LCD, but it may be helpful while you debug your code. Note that the LCD code will negatively add to the code size, which will reduce your score.

Test Procedure

See the lab checkout sheet to understand the rubrics of the demonstration.

Lab Report

Include in your lab report observations and procedure like the following:

The general learning objectives of this lab were . . .
The general steps needed to complete this lab were . . .
Some detailed steps to complete this lab were . . . .
1. Step one
2. Step two
3.   . . . .
Some important observations while completing/testing this lab were . . .
In this lab we learned . . . .

Create a single pdf containing:

1. Your lab report

2. Your code (no need to include the sect30.inc, ncrt0.a30, LCD, or any .h files). Include all c files that have code that you wrote (but if you are smart, this should be one small file so that the code size is small). Ensure you use an 8 or 9 courier font so that most lines of code take one line of text.

3. The full map file.). Ensure you use an 8 or 9 courier font so that most lines take one line of text.

Upload this pdf to moodle. Name the file xxxxxxx_yyyyyyy_lab6.pdf, where xxxxxxx is the last name of one lab partner, and yyyyyyy is the last name of the other lab partner.

Next, upload the code file as text to Moodle. . Name the file xxxxxxx_yyyyyyy_lab6.c, where xxxxxxx is the last name of one lab partner, and yyyyyyy is the last name of the other lab partner.

FAILURE TO FOLLOW THESE SIMPLE INSTRUCTIONS COULD RESULT IN THE LOSS OF POINTS.