UNC Charlotte, ECGR 4892/6185/8185, Spring 2005: Lab 4

Round Robin Scheduling

Learning Objectives

General Information

The general steps for this lab are:

1. Generate a new project for the MSP430 Board. Name your new project Lab4.
2. Open and edit your main.c file to perform the lab functions.
3. Program the lab. Don't forget the necessary include files to get the correct functionality.
4. Compile the code into an executable file, and load onto the board.
5. Test the program and repeat steps 2, 3, and 4 until the program works as required.
6. Write your lab report.
7. Demonstrate for the professor and turn in your report and files.

Prelab Activity

None.

Laboratory Assignments

You may use the PCs in Smith 347 or your own PC to do this lab experiment. The machines in Smith 347 already have the software tools loaded. In this lab you will be utilizing onboard timers and I/O ports of the Renesas board and timers and I/O ports on the MSP430 board.

The goal is to:
1) Run round robin on the MSP430, performing three tasks (flash LED, Measure temp, send temp)
2) Transmit data to the Renesas board

Steps

1. Modify the main.c file and include the appropriate files. Include commenting along the way.
2. Build your program slowly, testing along the way. Perform compiles and solve each requirement one at a time. Make sure comments are written as you progress.
3. Continue to build and test the program until all of the requirements have been met. Did we mention you should write your comments as you progress, not at the end?
4. If you run into problems, use the break point functionality of KD30 to step through the code until you find the problem. (the same with the MSP430 tools)
5. Once all the requirements have been met, ensure that everything works.
6. Finish lab write-up and demonstrate for the professor.
7. Submit your report, C code (*.c) and .map files on a floppy disk, CD ROM, or email.

Requirements

Req. 1 – The code generated is written in C for the MSV30262-SKP and MSP430

Req. 2 – The code is well commented and easy to follow
Req. 3 – Round Robin scheduling must be used on the MSP430.
Req. 4 – On the MSP430, toggle the LEDs every 0.5 second (priority 2).
Req. 5 – On the MSP430, measure the internal temperature every 1.0 seconds (priority 0).
Req. 6 – On the MSP430, calculate the average temperature of the last 5.0 seconds, then send this value to the Renesas board via UART.
Req. 7 – The temperature read should be converted from 10 bits to 8 bits before transmission.
Req. 8 – The UART connection should run at 9600 baud, 8 data bits, 1 start, and one stop bit.
Req. 9 – There is no input signal needed from the Renesas board to the MSP430 board except an external clock signal.
Req. 10 – The Renesas board should receive the data, convert it to temperature, and display the temperature on the LCD.

Lab Report

Include in your lab report observations and procedure like the following:
The general learning objectives of this lab were . . .
Pre-lab question answers
The general steps needed to complete this lab were . . .
Some detailed steps to complete this lab were . . . .

1. *Step one*
2. *Step two*
3. *. . . .*

Code generated for this lab…
Some important observations while completing/testing this lab were . . .
In this lab we learned . . . .

Send the code the .map file, and the report to Sami via email.