Embedded and Real-Time Systems

Final Project

Due to Dey 22th

In this project you use RTX operating system to facilitate multi-tasking and task communication and synchronization. Overall, this project reads temperature values and displays temperature, average temperature, and time on your PC. (Use the attached file to provide the input temperature data.)

In the first step, connect two KL25Z boards to each other using UART. There are 5 tasks in this project. Tasks 1 and 3 are running in the first board, and tasks 2 and 4 are running in the second board. Task 5 is running in both boards. The PC is connected to the second board.

The 5 tasks are as described below:

1) Task 1: Update the time value every 0.1 of a second. Set an event for task 4 every 1 second, and set an event for task2 every 5 seconds. Use the "Timer" module to wake-up this task every 0.1 of a second.
2) Task 2: Read Temperature sensor and Time every 5 seconds (this timing automatically happens when task 1 calls this task) and keep the record until the next reading. Set an event for task 3. Use task 1 event to wake-up task2.
3) Task 3: In a buffer keep the last 32 readings of temperature. Also receive the current time. Compute the average of the last 32 temperature readings.
4) Task 4: Update and display "time" every second (this timing automatically happens when task 1 calls this task). If push-button SW1 is pushed display current temperature and its associated time. If push-button SW2 is pushed display average temperature value and its associated time.
5) Task 5: Idle task. (Lowest priority task.)

Extra Credit:

- Diplay on an LCD display instead of PC terminal.

Notes:

- Connect push-buttons to the first board and use polling technique.

- You may use messaging between the boards to handle the requirements of the project.
- Consider that the KL25Z board has three UART interfaces.
- You do not need to provide a report for this project.

Deadline: Dey 22th, 23:55

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