ELEC 424
Mobile and Embedded Systems Design and Applications

Lab 02 Scheduling

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Part 1 System Init

The start of the clock path includes an external oscillating circuit, which oscillates at a rate of 16Mhz. The input and output of this circuit is connected to the STM32F103CB OSC_IN and OSC_OUT pins respectively. The HSE OSC inside of the STM32F103CB is connected to the input and output pins. The PLLXTPRE is then programmed to receive the signal from the HSE OSC divided by two. The PLLSRC is programmed to select the input from the PLLXTPRE. The signal is then multiplied by nine to achieve the 72MHz signal. SW selects PLLCLK and then the SYSCLK is clocked at 72MHz. The AHB Prescaler is selected to divide by a factor of one. Since PCLK1 max frequency is 36 MHz the APB1 Prescaler divides the system clock by two.

Part 2 Motors

In order to determine the PWM frequency CCR1 values must determined based on the values contained in the ARR register. The CCR1 register, compared to the ARR determines the duty cycle. If the CCR register contains a 0, the motors would not run because the signal generated from the CCR divided by ARR would be 0. If the motors must run at half the speed, the value contained in the CCR register must be half of the value in the ARR register. For 100%, the value contained in the CCR must be equal to the value in the ARR register.

http://youtu.be/KkHBtJK-zOQ

Part 3 Manual Scheduling

RTOS would make scheduling easier because it is designed to make sure that all tasks happen in a certain amount of time. This would guarantee that tasks with heavy computational requirements can execute within a certain time frame but then can be interrupted by another task, which has a higher priority.

In the system, which we have implemented, if a high priority task has heavy computational requirements the system would fail to execute other interrupts on time. This is because the high priority task would still be using resources and computing while the other interrupts is pending. In a time sensitive system this problem could be very critical.