

## **CSE4354/5354 Real-time Operating Systems Test Example Study Topics**

*Due to similarity to test questions, no solutions will be provided for these questions.*

1. Understand these elements of the MPU modules:
  - prioritization
  - read, write, and execution flags
  - configuration for flash, memory, and peripherals
  - base and size calculation
2. Understand these items related to interrupts:
  - how and what is placed on the stack when an interrupt is invoked
  - how are the values on the stack retrieved of a function of PSP and MSP
  - how do you know if the address of the errant data address is stored?
3. Explain how to switch from privileged to unprivileged mode.
4. Explain the difference between a real-time and multi-tasking operating system.
5. Explain the difference between a cooperative and preemptive operating system.
6. Why are global variables problematic when the MPU is used to protect memory?
7. Why are global and static variables problematic when a function is re-entrant?
8. Understand the importance of atomic operations for mutex implementation.
9. Given the rtos.c code, be prepared to determine the execution order of the tasks using the default or prioritized scheduler and cooperative or preemptive cases.
10. Be prepared to show the complete trace of how SVC isr and pendsv isr store values on the stack during a task switch.
11. For your project, how much time did it take from the time idle called yield() until idle2 started running exactly? (this is the task switch time including the scheduler, so make sure you study this for only two tasks – idle and idle2)
12. In general, know how to answer any questions related to steps up to and including the priority scheduler in the Project and the entire Mini Project.

*Please make sure you have all relevant pages of the evaluation board manual, datasheets, C calling and register convention document, class notes, and class code printed out before the exam (the sections should be obvious from the class examples, reading assignments, and these test questions). No computers are allowed during the exams as stated in the syllabus. Be sure to bring a calculator.*