

Real-time and Embedded Systems Fall 2003-1 Lecture Schedule:

- (1) Monday, September 8, 2003: Definitions of real-time and embedded systems.
- (2) Wednesday, September 10, 2003: Introduction to microcontrollers, their general architecture, I/O features, and limitations. More detailed presentation on the Motorola 68HC12. (Try demonstrating the Port A and Port B parallel I/O, data direction registers and the Memory Modify command in the debug monitor using the lamp-switch boards.)
- (3) Monday, September 15, 2003: hardware-software partitioning, some elementary concepts in hardware-software co-design
- (4) Wednesday, September 17, 2003: Introduction to VxWorks elementary features.
- (5) Monday, September 22, 2003: Working the VxWorks simulator. Assignment of a VxWorks simulation project.
- (6) Wednesday, September 24, 2003: **demonstrations and write-ups of microcontroller interarrival time measurement project are due during class time.**
- (7) Monday, September 29, 2003: Configuring a target system in VxWorks.
- (8) Wednesday, October 1, 2003: Demonstrations of “the purple box” as a target and discussion of its peripherals.
- (9) Monday, October 6, 2003: Researching “the purple box” peripherals(a) the parallel port, (b) the A/D converter, anything else in there? (There will be a class project with an elected team manager/coordinator to develop driver software for “the purple box” I/O devices. Students are urged to look ahead to the October 29th lecture outline for more details and to think about the project and arrange to elect a team manager.)
- (10) Wednesday, October 8, 2003: **student demonstrations and write-ups of the VxWorks simulation project are due during class time.**
- (11) Monday, October 13, 2003:assignment of generating 1.0 kHz pulses using VxWorks software through the purple box’s printer port.
- (12) Wednesday, October 15, 2003: **Hour exam.**
- (13) Monday, October 20, 2003: **Student demonstrations and project write-ups of VxWorks software generation of pulses and stability measurements using the 68HC12 are due during class time.**
- (14) Wednesday, October 22, 2003: assignment of writing an external interrupt handler using VxWorks on a purple box.

(15) Monday, October 27, 2003: Revisiting the definitions and classifications of real-time and embedded systems from the perspective of having worked some projects. This material was developed by Dr. Swaminathan Natarajan of computer science who graciously permitted its presentation in this course.

(16) Wednesday, October 29, 2003: Officially assign class project of developing device drivers for the data acquisition port, the A/D converter, and whatever else we find on/in the “purple box”. The team manager should have been elected by this point. Every student will be required to document her/his contributions/efforts to the team project. These contributions/efforts will first need to be discussed with the team manager and then the instructor will read and grade the contributions/efforts of individual students by the end of the course. The team manager will attach his/her commentary about the authenticity of the alleged contributions and the level of effort for each class member. The team manager will be graded on her/his effectiveness in directing and managing the project. Naturally, both the team manager and individual students will be able to consult with/ bounce ideas off the course instructor.

(17) Monday, November 3, 2003: **Demos and write-ups of external interrupt handler project on purple box are due during class time.**

(18) Wednesday, November 5, 2003: The course instructor may be attending a conference this day. If so, the student project team will be expected to meet and have something significant to report on Monday.

(19) Monday, November 10, 2003: Topic TBA

(20) Wednesday, November 12, 2003: **Demonstration and write-up of purple box I/O device drivers project.** Hints for final exam. Course evaluations.

Course grading weights:

68HC12 project due Wednesday, September 24, 2003	-	15%
VxWorks Simulation project due Wednesday, October 8, 2003	-	15%
Hour Exam – Wednesday, October 15, 2003	-	15%
VxWorks OS/software pulse generation – Monday, October 20, 2003	-	10%
VxWorks purple box external IRQs – Monday, November 3, 2003	-	10%
Purple box I/O device drivers – Wednesday, November 12, 2003	-	15%
Final Exam	-	20%

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