Department of Electrical and Computer Engineering
College of Engineering and Applied Sciences
Western Michigan University

ECE 4510 Introduction to Microprocessors

Final Review

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Material from or based on: *The HCS12/9S12: An Introduction to Software & Hardware Interfacing*, Thomson Delmar Learning, 2006.

Final Exam (1 of 2)

- The Final Exam will be given 8:30 - 10:20am, on Wednesday, 24 June.
- It will be an open books, open notes test.
- Students can use any printed, publicly available material (that includes the Text, Motorola/Freescale Manuals and Data Sheets) as well as their OWN homework assignments, prelabs, and copies of their lab reports.
- No Bluebooks are required, please do the exam on the pages provided.

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Final Exam (2 of 2)

- The exam will be problem oriented (no essay questions).
- Students are responsible for topics covered in class, in the lab, in the lab project, in the homework assignments and in lecture notes posted on the Class Web Page.
- The final exam is comprehensive but more emphasis will be given to topics covered after the midterm exam.
- Immediately after the test students should return the Motorola Manuals they have borrowed for this term.

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Topics Review

- 9S12DP512 Architecture, Special Function Registers, and Memory Map
- 9S12DP512 Programmer's Model
  - Data Formats
  - Addressing Modes
  - CCR Register
  - Instructions, Instruction Fetch, and Execution Times
  - Assembler Directives
  - Special Syntax for C Programs, #Pragmas

- Programming the Flash Memory (in Tutorial, not a test problem)
- uC/OS-II RT Kernel (in Tutorial and on the Class Web Page, (not a test problem)

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Topics Review

- Interfacing to the 9S12DP512 Parallel Ports
  - Input and Output Ports
  - Polling Signals, Generating Delays by Program
  - Signal Buffers
- Non-TTL Signal Interfacing
- Glue Logic for I/O Interface Design

- 9S12DP512 Interrupts
  - Interrupt Vector Address Table
  - External Interrupts (IRQ*)
  - Enabling the Interrupt System
  - Skeleton Structure of a Main Program Segment along with an Interrupt Service Routine in C

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Topics Review

- 9S12DP512 Timer Module
  - Main Timer, Timer Overflow Interrupts
  - Output Compare, Generating Output Waveforms
  - Output Compare Interrupts
  - Input Capture
  - Pulse Width and Signal Frequency Measurement
  - Input Capture Interrupts
- 9S12DP512 Pulse Width Modulation Module
  - Programming the PWM Module
- Interfacing a DAC Converter to the 9S12DP512
- 9S12DP512 Analog-To-Digital (ATD) Conversion Module
  - Programming the ATD Module
  - ATD Interrupts

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Topics Review

- Asynchronous Serial Communications
  - Programming the Serial Communications Module (SCI)
  - SCI Interrupts
- Synchronous Peripheral Interface (SPI)
  - Programming the SPI Module
  - SPI Interrupts
- Controller Area Network (CAN)
  - Programming the MSCAN Module
  - MSCAN Interrupts

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Topics Review

- Static Memory System Design (on the Class Web Page)
  - EEPROM and SRAM Interfacing
  - Address Decoder Design
  - 9S12DP512 Extended Bus (not a test topic)
  - Read and Write Memory Cycle Critical Timing Analysis (not a test topic)

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