COMP2121: Microprocessors and Interfacing

Course Introduction
http://www.cse.unsw.edu.au/~cs2121
Lecturers: Hui Wu
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Session 1, 2006

COMP 3221 Administration (1/2)

Lecturers:
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COMP 3221 Administration (2/2)

Course Homepage:
http://www.cse.unsw.edu.au/~cs2121

Course homepage contains:
- Lecture slides.
- All material related to the Laboratory Exercises.
- Pointers to supplementary material.
- Announcements.

Check it out frequently!

Syllabus (1/2)

Main Topics:
- Gates and flip-flops
- Instruction Set Architecture (ISA)
- Number representation, computer arithmetic
- Assembly and machine language Programming
- Interrupts and I/O interfacing
- Serial communication
- Analog Input and output
- Buses and memory systems
Syllabus (2/2)

Laboratory exercises:
- AVR assembly programming and I/O interfacing. Tools include AVR Studio, AVR board designed by David Johnson.

Assignments:
- Two assignments.
- To be released in Week 5 and Week 9, respectively.

Pre-requisite (1/2)
Computers and Computing (COMP1011 & COMP1021)
- The von Neumann model: memory/I-O/processing.
- The instruction set and execution cycle.
- Registers and address spaces.
- An expanded model of a computer: mass storage and I/O.
- The layered model of a computer: from gate- to user-level.
- C-Language Programming.

References

Main reference
- Fredrick M. Cady: Microcontrollers and Microcomputers — Principles of Software and Hardware Engineering.

Additional references

Laboratory Schedule
- Tuesday 1:00-3:00 pm EE233
- Tuesday 6:00-8:00 pm EE233
- Wednesday 9:00-11:00 am EE233
- Wednesday 4:00-6:00 pm EE233
- Thursday 5:00-7:00 pm EE233
- Friday 6:00-8:00 pm EE233

- You will be only allowed to attend the lab session that you are enrolled in. No exception allowed.
- Starts in Week 3.
Lab Format

° In a group of two students.
° You choose your partner in Sign Up Session (Week 3).
  It CANNOT be changed later.
° You will get a group account.
° You are assessed based on a system of checkpoints.
° The assessor marks your checkpoints.
° Lab demonstrators answer your questions.

Laboratory Preparation & Catch Up

° You CAN finish the laboratory exercises in the allocated time only if you do the preparation beforehand.
° You need to prepare for the laboratory outside the laboratory by:
  • Carefully reading the lab related documentation
  • Writing your programs and simulating them at home
° Leaving things to the last minute or walking into the laboratory without preparation may make you fail in this course.

Laboratory Structure & Specifications

• 5 experiments.
  □ Each experiment consists of several checkpoints.
  □ The full mark of each checkpoint is 5.
  □ Optional checkpoints give you extra marks.
• Lab specifications will be available on the course homepage one week before each experiment starts.

Assignments

• Two assignments.
• Details to be announced.
Tutorials

- No tutorial classes.
- Questions are available on the course page to help you understand the course material.

Course Grading Scheme

- Laboratory mark = 20
  - You must get at least 10 out of 20 to pass this course.
- Assignment mark = 20
  - Assignment 1: 10
  - Assignment 2: 10
- Final exam mark = 60

Plagiarism

- Plagiarism is strictly prohibited!
  - Once being caught for plagiarism in labs or assignments, you will get 0 mark in labs or assignments, and possibly fails in this course, depending on the degree of plagiarism.

Microprocessors are everywhere in our life.
Why AVR?

- RISC architecture with load-store memory access.
- Two-stage instruction pipelining.
- Internal program and data memory
- Wide variety of on-chip peripherals (digital I/O, ADC, EEPROM, UART, pulse width modulator (PWM) etc).

Microcontrollers vs Microprocessors

- A microprocessor is a CPU on a single chip.
- If a microprocessor, its associated support circuitry, memory and peripheral I/O components are implemented on a single chip, it is a microcontroller.
ERROR: undefined
OFFENDING COMMAND:

STACK: