SEM/SET for COMP1047

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COMP1047 AY2324: Final Exam Review Guideline

- NO calculator is allowed.
- We will provide you the MIPS Ref Card and a Hexadecimal Digit Table appended at the end of the exam paper.
- Dictionary is permitted as per usual exam rules.

- The final exam covers the three (3) aspects that have been taught in the lecture and exercised in the labs:
  - Basic Concepts and MIPS programming
  - ISA and CPU Design
  - Computer Networking

Basic concepts and MIPS programming

- Week 1: Introduction & Computer Performance
  - General concepts (no need to memorize exact numbers)
  - von Neumann architecture
  - Timing – Response time, CPU Timing related, relative performance, CPI related
  - Other performance metrics – power/energy, reliability, etc.
- Weeks 2 & 3: MIPS programming 1 & 2
  - All concepts: registers, memory (address, data, addressing, endianness), immediate, etc.
  - and related instructions: arithmetic, memory, logical, branch/jump, etc.
  - Arrays and Procedures, but no recursive procedures.
  - Syscall will not be covered.

ISA and CPU design

- Week 4: MIPS ISA
  - R-, I-, J-types instructions – definitions, design, and conversion. MIPS ref card will be provided for assistance.
  - Content in the handout may be included, too.

- Week 4: ALU Design
  - All concepts including
    - Basic hardware principles and functionalities
      - Hardware details will not be covered, such as 1-bit adder logical expression, multi-bit adders design.
    - ALU design principle, schematic, and control
    - Add, Sub, And, Or, Slt, Nor, Nand, etc.

- Week 5: Single-Cycle CPU design
  - All concepts including
    - Drawing the datapaths for R-type, lw, sw, beq instructions.
    - You don’t need to know how the controller is designed, but need to know what are the corresponding control signals required to make the components work properly.