COMP 2008 COMPUTER ORGANISATION

Credit Points 10

Legacy Code 300096

Coordinator Jianhua Yang (https://directory.westernsydney.edu.au/search/name/Jianhua Yang/)

Description This subject is designed for computer science students, particularly those interested in systems programming and hardware development. The students will learn about the interface between the hardware and software of a computer system. This will involve study of some aspects of computer architecture and low level interfacing to gain an insight into central processing unit (CPU) organisation at the assembly language level. After completing this subject students will be able to write procedures in an assembly language, use their understanding of the relationship between the instruction set architecture and the implementation of high level languages to write efficient programs.

School Computer, Data & Math Sciences

Discipline Programming

Student Contribution Band HECS Band 2 10cp

Check your HECS Band contribution amount via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 2 subject

Pre-requisite(s) The following pre-requisite unit applies to course 3771 only
ENGR 1045 Engineering Programming Fundamentals

The following pre-requisites apply to all courses except 3771
COMP 1005 Programming Fundamentals OR
ELEC 1006 Engineering Computing AND
MATH 1006 Discrete Mathematics OR
MATH 1016 Mathematics for Engineers 1

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Consider the Instruction Set Architecture (ISA) in order to carry out assembly programming tasks.
2. Examine the stored program concept and internal representation of different types of data.
3. Examine the memory hierarchy and how this relates to computer system performance.
4. Identify the hardware mechanisms that support interrupt handling and how the latter is used to implement I/O control.
5. Explain the structure of datapath and control as well as the basic instruction level parallelism using pipelining.
6. Critique fundamental issues in evaluating computer system performance.

Subject Content

1. Machine level representation of data including integer and floating point arithmetic, characters, and arrays; arithmetic and logical operations.
2. Assembly level machine organisation and assembly language programming including instruction set architecture, instruction formats, instruction execution cycle, addressing modes, subroutine call and return mechanisms.
3. Memory organisation and architecture including memory hierarchy, main memory, cache memories, virtual memory.
4. Types and characteristics of I/O devices, interfacing and communication within a computer system, physical organisation and performance of magnetic disks.
5. Hardware support for interrupts, programmed and interrupt-driven I/O, interrupt priority levels.
6. Pipelining and instruction level parallelism (ILP), pipeline hazards.
7. The basics of logic circuit design including fundamental building blocks and minimisation of logic expressions.
8. Functional level machine organisation, implementation of datapath and control unit.
9. Computer system performance measurements and benchmarking, Amdahl's law.

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task
Practical	11 x 2 hours	40	N	Individual
Quiz	2 x 20 minutes (per Quiz)	10	N	Individual
Final Exam	2 hours	50	N	Individual

Prescribed Texts

- Patterson, D., & Hennessy, J. (2020). *Computer Organization and Design MIPS Edition* (6th ed.). Morgan Kaufmann.

Teaching Periods

Spring (2022)

Penrith (Kingswood)

Day

Subject Contact Jianhua Yang (https://directory.westernsydney.edu.au/search/name/Jianhua Yang/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=COMP2008_22-SPR_KW_D#subjects)

Parramatta - Victoria Rd

Day

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Spring (2023)

Penrith (Kingswood)

On-site

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Parramatta - Victoria Rd

On-site

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