

Computer Organisation Teaching and Learning Activities

The timetable should be used as a guide only, as it is subject to change. Students will be advised of any changes as they become known.

Wk	Topic	Face to Face		Text Reading & Independent Activities	Assessments
		Lecture	Tutorial (Laboratory / Practical)	PH6 (also PH5 and PH4): check whether eBook available on library site PH6: companion materials (e.g. online sections for further readings) at https://www.elsevier.com/books-and-journals/book-companion/9780128201091 PH5: companion materials (e.g. online sections for further readings) at https://booksite.elsevier.com/9780124077263/?ISBN=9780124077263	Assessment items
1	<p>Introduction: Detailed outline of the unit, approach to teaching, assessment structure.</p> <p>Basic components of computer, MIPS, PCSpim</p>	Lect. 01	<p>No tutorial in week 1</p> <p>Make sure you enrolled to a tutorial class.</p>	<p>Read Lecture note 1</p> <p>Text PH6 P54: Road Map for Major Components. [keep the road map in your mind for further references; no need to read through Ch 3-6 for now]</p> <ul style="list-style-type: none"> - Memory: Ch 5 - Datapath: Ch 3, 4, 6, Appendix C - Control: Ch 4, 6, Appendix C - I/O: Ch 5, 6 <p>Text PH5 P53: Road Map for Major Components.</p> <ul style="list-style-type: none"> - Memory: Ch 5 - Datapath: Ch 3, 4, 6, Appendix C - Control: Ch 4, 6, Appendix C - I/O: Ch 5, 6 <p>Text PH4 P55: Road Map for Major Components.</p> <ul style="list-style-type: none"> - Memory: Ch 5 - Datapath: Ch 3, 4, 7, Appendix A - Control: Ch 4, 7, Appendix A - I/O: Ch 6 <p>HP_AppA.pdf -> A-24: MIPS registers</p> <p>HP_AppA.pdf -> A-46: MIPS CPU</p>	
2	ISA-MIPS: MIPS assembly language, R, I, J instructions, decision making	Lect. 02	Prac 1 starts	Read Lecture note 2	

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				<p>PH6, §2.2-§2.3, P69: Operations and Operands PH5, §2.2-§2.3, P63: Operations and Operands PH4, §2.2-§2.3, P78: Operations and Operands</p> <p>PH6, §2.2-§2.3, §2.5: 1st-3rd Principle of hardware design PH5, §2.2-§2.3, §2.5: 1st-3rd Principle of hardware design P65: Design Principle 1 P67: Design Principle 2 P83: Design Principle 3</p> <p>PH4, §2.2-§2.3, §2.5, P79-P97: 1st-4th Principle of hardware design P79: Design Principle 1 P81: Design Principle 2 P86: Design Principle 3 P97: Design Principle 4</p> <p>PH6, §2.5, P86: pay attention to Stored-Program Concept PH5, §2.5, P86: pay attention to Stored-Program Concept PH4, §2.5, P101: pay attention to Stored-Program Concept</p> <p>PH6, §2.7, P96: Understand basic control structures PH5, §2.7, P90-P96: Understand basic control structures PH4, §2.7, P105-P111: Understand basic control structures</p> <p>HP_AppA.pdf -> A-21: Memory layout HP_AppA.pdf-> A-44: System services</p>	
3	Addressing: Constants, addressing, loops, arrays and pointers, processing text	Lect. 03	Prac 2 starts Prac 1 due	<p>Read Lecture note 3</p> <p>PH6, §2.3, P72: immediate operands; making the common case fast PH5, §2.3, P72: immediate operands; making the common case fast PH4, §2.3, P86: immediate operands; 3rd Principle of hardware design</p>	Laboratory exercises

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				<p>PH6, §2.10, P118: Addressing mode in MIPS PH5, §2.10, P111: Addressing mode in MIPS PH4, §2.10, P128: Addressing mode in MIPS</p> <p>PH6, §2.10, P125-P127: Instruction decoding and Instruction Formats PH5, §2.10, P118-P120: Instruction decoding and Instruction Formats PH4, §2.10, P134-P136: Instruction decoding and Instruction Formats Also refer to "instruction decoding.pdf" on vUWS</p> <p>PH6, §2.14, P147: Traversing arrays – index vs pointer PH5, §2.14, P141: Traversing arrays – index vs pointer PH4, §2.14, P157: Traversing arrays – index vs pointer</p> <p>HP_AppA.pdf -> A-43 (PH6, PH5) or P-43 (PH4) pack characters Also refer to "ascii_chart.pdf" on vUWS</p> <p>HP_AppA.pdf -> A-48 (PH6, PH5) or P-48 (PH4) explains directive .ascii</p>	
4	Memory: Memory layout, memory alignment, procedures	Lect. 04	Prac 3 starts Prac 2 due	<p>Read Lecture note 4</p> <p>PH6, §2.8, P102-P112: Procedure calling PH5, §2.8, P96-P106: Procedure calling PH4, §2.8, P112-P122: Procedure calling</p> <p>HP_AppA.pdf -> A-22: Procedure calling</p> <p>HP_AppA.pdf -> A-24: MIPS registers</p> <p>HP_AppA.pdf -> A-25: Stack frame</p>	Laboratory exercises
5	Numbers: Numbers, masking	Lect. 05	Prac 4 starts Prac 3 due	<p>Read Lecture note 5</p> <p>PH6, §3.1, §3.2, §3.3, §3.5: MIPS Arithmetic; MIPS FP Architecture PH5, §3.1, §3.2, §3.3, §3.5 [p211-p217 of §3.5]: MIPS Arithmetic; MIPS FP Architecture PH4, §3.1, §3.2, §3.3, §3.5 [p259-p265 of §3.5]: MIPS Arithmetic; MIPS FP Architecture</p>	Laboratory exercises

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				HP_AppA.pdf -> A-51: Arithmetic and Logical Instructions	
6	Virtual-Performance: Virtual memory, performance, benchmarks	Lect. 06	Prac 5 starts Prac 4 due	Read Lecture note 6 PH6: §5.1-§5.5: Memory hierarchy PH5: §5.1-§5.5: Memory hierarchy PH4: §5.1-§5.3: Memory hierarchy	Laboratory exercises Quiz 01
7	I/O systems: I/O, polling/interrupts, exceptions, kernel/user mode	Lect. 07	Prac 6 starts Prac 5 due	Read Lecture note 7 PH6 & PH5: instead of putting I/O together into a single chapter, it has the I/O related contents spread throughout the book PH6: §4.10: Exceptions (not as detailed as in PH4, so also refer to HP_AppA.pdf -> §A.7) PH5: §4.9, P325- P327: Exceptions (not as detailed as in PH4, so also refer to HP_AppA.pdf -> §A.7) PH4: §6.6, P586: Interfacing I/O HP_AppA.pdf -> §A.7 (A-33 to A-38): Exceptions & Interrupts HP_AppA.pdf -> §A.8 (A-38 to A-40): I/O	Laboratory exercises
8	Intra Session Break				
9	Bus-Disk: Disks, RAID	Lect. 08	Prac 7 starts Prac 6 due	Read Lecture note 8 PH4: §6.3, P575: Disk storage PH6: §5.11, P488 [§5.11-1 to §5.11-8]: RAID PH5: §5.11, P470 [§5.11-1 to §5.11-8]: RAID PH4: §6.9, P599: RAID	Laboratory exercises
10	Logic-Datapath: Datapath, combinational and sequential logic, gates, clocking	Lect. 09	Prac 8 starts Prac 7 due	Read Lecture note 9 PH6: Appendix B: The Basics of Logic Design PH5: Appendix B: The Basics of Logic Design PH4: Appendix C: The Basics of Logic Design	Laboratory exercises

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11	ALU: Arithmetic Logic Unit (ALU), Karnaugh maps	Lect. 10	Prac 9 starts Prac 8 due	Read Lecture note 10 PH6: Appendix B: The Basics of Logic Design PH5: Appendix B: The Basics of Logic Design PH4: Appendix C: The Basics of Logic Design	Laboratory exercises
12	Single cycle processor:	Lect. 11	Prac 10 starts Prac 9 due	Read Lecture note 11 PH6, §4.1-§4.4, P256-P284: The processor PH5, §4.1-§4.4, P244-P272: The processor PH4, §4.1-§4.4, P300-P329: The processor	Laboratory exercises Quiz 02
13	Pipelining: Pipelined datapath, Hazards in pipeline	Lect. 12	Prac 11 starts Prac 10 due	Read Lecture note 12 PH6, §4.6-§4.9, P285-P337: Pipelining, Pipelined datapath, Hazards in pipeline PH5, §4.5-§4.8, P272-P325: Pipelining, Pipelined datapath, Hazards in pipeline PH4, §4.5-§4.8, P330-P385: Pipelining, Pipelined datapath, Hazards in pipeline	Laboratory exercises
14	ISA Remarks and Unit Revision: RISC and CISC architectures, interpretation of 0-1 strings, Preparation for final exam.	Lect. 13	Prac 11 due [No labs accepted after this week!]	Read Lecture note 13 PH6, §2.19, P157-P166: x86 instructions PH5, §2.17, P149-P158: x86 instructions PH4, §2.17, P165-P174: x86 instructions Exam Information Sample exam papers	Laboratory exercises
15	Stuvac				
16	Formal Exam Period				