CS/SE 2340
Review Sheet for ▮▮▮▮▮▮Exam

Below are the major topics covered in Midterm exam and a categorization of the relevant examples. All examples are in the lecture slides uploaded in the e-learning.

Chapter 1- Computer Abstractions and Technology
A. Class of computers
B. Level of program codes
C. Components of computers and components of CPU
D. Liquid Cryptical Display
E. Performance (response time, throughput time, relative performance, execution time, cpu execution time, instruction count, and CPI)
- Example: Lecture Slides- Ch1- Part 2- Page 4
- Example: Lecture Slides- Ch1-Part 2- Page 8
- Example: Lecture Slides- Ch1-Part 2- Page 10
- Example: Lecture Slides- Ch1-Part 2- Page 12-13
F. Power trend
- Example: Lecture Slides- Ch1-Part 3- Page 4
G. CPU Benchmark and power benchmark
- Example: Lecture Slides- Ch1-Part 3- Page 8 and 9

Chapter 2- Instructions: Language of the Computer
A. MIPS Instruction set
B. Operands of computer hardware
- Example: Lecture Slides- Ch2- Part 1and 2 - Page 8
C. Memory operands
- Example: Lecture Slides- Ch2- Part 1and 2 - Page 13
D. Registers vs memory
E. Singed and unsigned numbers and 2's complement signed integers
- Example: Lecture Slides- Ch2- Part 1and 2 -- Pages 18-21
F. Hexadecimal numbers
- Example: Lecture Slides- Ch2- Part 3 and 4- Pages 6-7
G. R- format and I format instructions
H. MIPS Instruction encoding
- Example: Lecture Slides- Ch2- Part 3 and 4- Page 13
I. Logical operation and shift operations
- Example: Lecture Slides- Ch2- Part 3 and 4- Pages 17- 21
J. Instruction for making decision
- Example: Lecture Slides- Ch2- Part 4 and 5- Page 3
K. Compiling Loop statements

- Example: Lecture Slides- Ch2- Part 4 and 5- Page 4-5
L. Conditional operations
M. Procedure steps and instruction for procedures
  - Example: Lecture Slides- Ch2- Part 4 and 5- Pages 16-18
N. Nested procedure
  - Example: Lecture Slides- Ch2- Part 6 and 7- Pages 5-6
O. Communicating with people
  - Example: Lecture Slides- Ch2- Part 7 and 8- Page 6-7
P. 32 bit constants
  - Example: Lecture Slides- Ch2- Part 7 and 8- Page 9
Q. J type instructions
R. Addressing in branch and jump
  - Example: Lecture Slides- Ch2- Part 7 and 8- Page 12-13
  - Example: Lecture Slides- Ch2- Part 7 and 8- Page 14
S. MIPS code for swapping two elements of array
  - Example: Lecture Slides- Ch2- Part 8 and 9- Pages 14-15

Chapter 3-Arithmetic for Computers
A. Addition and subtraction
  - Example: Lecture Slides- Ch3- Part1- page 3-4
B. Overflow and underflow
C. C. Multiplication
  - Example: Lecture Slides- Ch3- Part1- page 22
D. Division
  - Example: Lecture Slides- Ch3- Part1- page 27
E. Scientific notation and normalized numbers
F. Floating points
G. Underflow and overflow for floating points
H. IEEE 754 Floating points standard
  - Example: Lecture Slides- Ch3- Part1- page 10-11
  - Example: Lecture Slides- Ch3- Part1- page 13
I. Floating point addition and subtraction
  - Example: Lecture Slides- Ch3- Part1- page 16-17
  - Example: Lecture Slides- Ch3- Part1- page 18-20
J. Floating point multiplication
  - Example: Lecture Slides- Ch3- Part1- page 22-23
  - Example: Lecture Slides- Ch3- Part1- page 22-23
K. Floating point instructions
  - Example: Lecture Slides- Ch3- Part1- page 28-29

Chapter 4-The Processor
A. basic MIPS implementation
B. Logic design conventions

C. Clocking methodology
D. Building a data path
E. Pipelining
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F. Pipeline hazards
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Chapter 5-Exploiting Memory Hierarchy
A. Temporal locality and spatial locality
B. Memory hierarchy
C. Hit rate, miss rate and miss penalty
D. The basic of cache
E. Direct mapped cache
F. Accessing a cache
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G. Block size considerations
H. Handling cache misses
I. Handling write (write through, write back, and write buffer)
J. Measuring and improving cache
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K. Reducing cache miss (direct mapped, set associative, and fully associative)
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L. Virtual memory (physical address, virtual address, page fault, address translation,)
M. Page table
N. Page fault
O. TLB and LRU

Please also review all quizzes, all assignments. Good luck!