

CS2450 Final Exam Study Guide

YOU ARE ALLOWED ONE PAGE SIZE 8.5" x 11" OF NOTES WITH ANYTHING YOU LIKE WRITTEN OR PRINTED ON THE FRONT OR BACK.

Anything covered in the book, in the notes, or on the assignments and quizzes could be on this exam. The only sure things to ignore are things specifically listed at the end of this guide.

DO NOT WAIT TO THE END TO PUT YOUR NAME ON THE TEST OR TO BUBBLE IN ANSWERS. IF YOU RUN OUT OF TIME YOU WILL NOT BE GIVEN EXTRA TIME.

THIS IS A LONG TEST. PRACTICE YOUR CONVERSIONS OR YOU WILL RUN OUT OF TIME. IF YOU DON'T KNOW AN ANSWER, DON'T SPEND 5 MINUTES SOUL SEARCHING. MARK AN ANSWER AND CONTINUE.

Use the study guide from test 1 in addition to this study guide. This test is cumulative. Use test 1 to study from but make sure you study everything from the test 1 material. Don't just study test 1 because some questions and topics that were not actually on test 1 could be on the final.

Be able to create a state diagram as shown in class.

Expect a lot of questions similar to the quiz questions.

Addressing modes: Immediate, Register, PC-Relative, Indirect, Base+Offset. Know the usage and limitations of each.

Be able to calculate the hex value of all opcodes using all addressing modes. There will be a fair number of these.

Be able to figure out what will be stored in any particular register or memory location given a list of register values, memory values, and one or more instructions. There will be a fair number of these.

Be able to figure out exactly which hardware devices are activated at each particular time of the fetch/execute cycle.

Understand the state diagram example as was discussed in class.

Know the register transfer notation and how it applies to the hardware and each instruction.

What is this instruction?

MAR \leftarrow PC, PC \leftarrow PC + 1

MDR \leftarrow M[MAR]

IR \leftarrow MDR

MAR \leftarrow PC + IR[8:0]

MDR \leftarrow M[MAR]

R2 \leftarrow MDR

Know the differences between all of the jump/branch instructions. JSR, JSRR, JMP, BRNZP, RET.

Know how and when to save registers.

Tristate buffers. Where and why they are needed.

Traps. Know what each one does and how to use it in a program. Even the ones we haven't talked about or used in detail.

Assembly language labels. How to use them. Where they go.

Assembly language pseudo-ops and how they work: .orig, .fill, .blkw, .stringz, .end.

Conditional Branches and NZP.

Assembling and simulation techniques: Step, Step Over, Step Out, Continue

Stacks, understand the code for push and pop, know what underflow and overflow are.

Interrupts, the PSR, Priority Levels, elevated privileges and the PR bit.

Know everything we have done in C including Pointers, Structures, and Files.

Create state diagrams and turn a state diagram to a truth table. There will not be anything on actually creating a state machine in Logisim.

Anything really, from the book, quizzes, notes, assignments.

The following two pages will be provided to you on the exam although the numbers will be different on the hardware diagram. I want you to learn what each line does, not memorize some numbers.

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
ADD ⁺	0001				DR			SR1			0	00		SR2		
ADD ⁺	0001				DR			SR1			1	imm5				
AND ⁺	0101				DR			SR1			0	00		SR2		
AND ⁺	0101				DR			SR1			1	imm5				
BR	0000				n	z	p	PCoffset9								
JMP	1100				000			BaseR			000000					
JSR	0100				1	PCoffset11										
JSRR	0100				0	00		BaseR			000000					
LD ⁺	0010				DR			PCoffset9								
LDI ⁺	1010				DR			PCoffset9								
LDR ⁺	0110				DR			BaseR			offset6					
LEA ⁺	1110				DR			PCoffset9								
NOT ⁺	1001				DR			SR			111111					
RET	1100				000			111			000000					
RTI	1000				000000000000											
ST	0011				SR			PCoffset9								
STI	1011				SR			PCoffset9								
STR	0111				SR			BaseR			offset6					
TRAP	1111				0000			trapvect8								
reserved	1101															

TRAPS

GETC	x20
OUT	x21
PUTS	x22
IN	x23
PUTSP	x24
HALT	x25

Memory Mapping

xFE00	KBSR
xFE02	KBDR
xFE04	DSR
xFE06	DDR

