

Exam 3 Review

COMP370

Introduction to Computer Architecture

Topics

- Finite State Automata
- Flip-Flops
- Sequential Logic Circuit Design
- Assembler Programming
- Machine Language

Topics not covered in class
will not be on the exam.

Textbook Coverage

- Read Chapter 4

A word from our lawyer:

- The exam may contain questions from any of the material covered in class since the beginning of the class.

One Page of Notes

- You are allowed one and only one 8½ by 11 inch page of notes during this exam.
- You are not allowed to use more than 187 square inches of paper surface
- You will do better if you make your own page of notes and not copy your friend's notes.

Layers

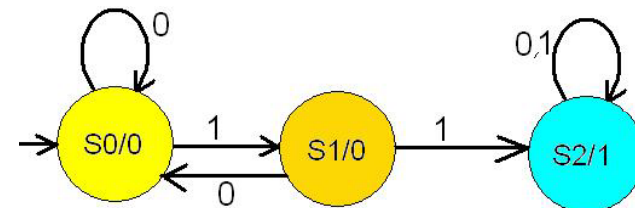
- Applications
- Middleware – other CS classes
- High level languages
- Machine Language – COMP375
- Microcode
- Logic circuits – COMP370
- Gates
- Transistors
- Silicon structures

Overview of Flip-Flop Design Process

1. Specifications start with a word description
2. Create a Finite State Automata to model the system
3. Create a state table to indicate next states
4. Convert next states and outputs to output and flip flop input equations
5. Simplify logic expressions
6. Draw resulting circuits

Example Flip-Flop Design

- The output will be true if two or more 1's are received in a row. Once true, the output should be true forever.



Create the Truth Table

Qa	Qb	in	Da	Db	out
0	0	0	0	0	0
0	0	1	0	1	0
0	1	0	0	0	0
0	1	1	1	0	0
1	0	0	1	0	1
1	0	1	1	0	1
1	1	0	d	d	d
1	1	1	d	d	d

Create Equation for Da

	Qb'In'	Qb'In	QbIn	QbIn'
Qa'	0	0	1	0
Qa	1	1	d	d

$$Da = Qa + Qb * In$$

Create Equation for Db

	Qb'In'	Qb'In	QbIn	QbIn'
Qa'	0	1	0	0
Qa	0	0	d	d

$$Db = Qa * Qb' * In$$

Create Equation for Output

	Qb'In'	Qb'In	QbIn	QbIn'
Qa'	0	0	0	0
Qa	1	1	d	d

$$\text{Output} = Qa$$

Jumping Around

- What does this do if the compare is true?
- What does this do if the compare is false?

```

        cmp  eax, dragon
        je   princess
princess: sub  eax, knight

```

Duplicate Names

- Remember that the AL register and the EAX register share 8 bits in the CPU.

```

        mov  al, eightones
        mov  eax, 0

        mov  eax, allones
        mov  al, 0

```

Likely Test Questions

- Design a sequential circuit using Flip-Flops
- Write a simple assembler program
- Explain what an assembler program does
- Convert machine language to assembler

Final Exam

The final exam is on Wednesday, May 6,
from 10:30am to 12:30pm.

The syllabus has an incorrect date and time