

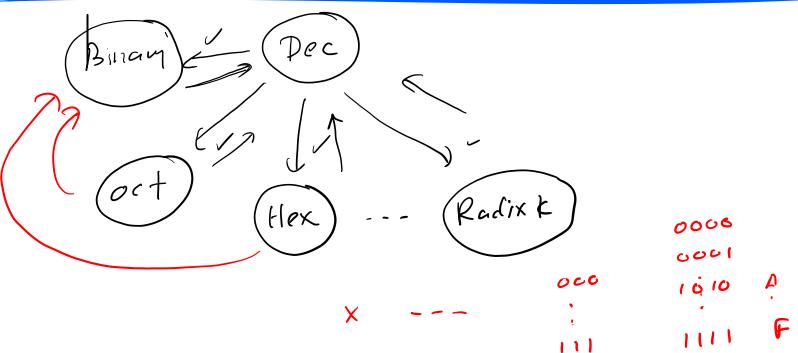
CSSE2010/CSSE7201 Lecture 10B

Review Session

School of Information Technology and Electrical Engineering
The University of Queensland



Binary Numbers-Conversions





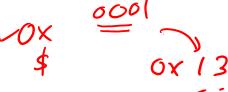
What is 1011010111010011₂ in 5-digit

- 4%. 0xB5D30
- 17%B. 0x0B5C3
- **√7⊚C.** 0x0B5D3
 - 4<mark>%. 0</mark>xB54E3
 - 46. Non of the above

TurningPoint

- App region is "East Asia"
- Web address is http://responsewaresg.net/
- Guest (not signin)
- Enter Session ID: csse2010

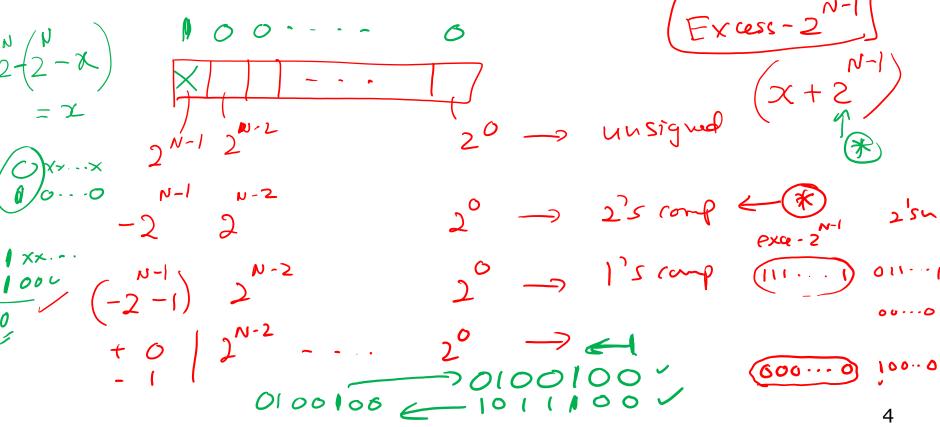
 ≤ 5 2
- Enter student number (as User ID)







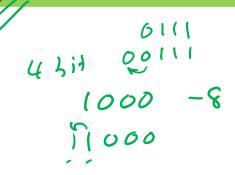
Binary Numbers-Signed numbers

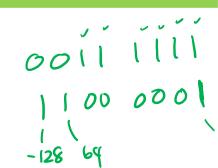


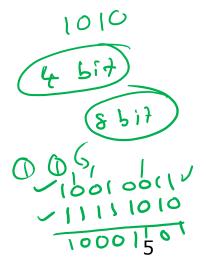


What is -63 in 8-bit 2's complement?

- ²⁴% 10000001
- 28%B. 11000000
- 24%C. 11100001
- 200. None of the above









Logic gates and Boolean Expressions



Logic gates and Boolean Expressions

$$A+A=A$$

$$A\cdot A=A$$

$$A\cdot A=O$$

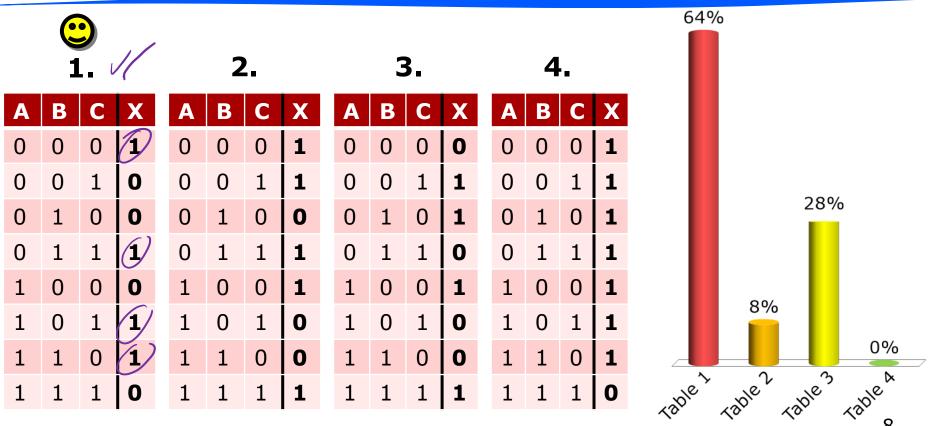
$$A+A=O$$

$$A+O=A$$

$$A+$$



What's the truth table for a 3-input XNOR gate





How do you call each row (input /combination) of a truth table?





What is the simplified SOP expression for this Boolean function

Α	В	С	M
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	
1	1	0	1
1	1	1	1

$$\begin{array}{c}
0 \\
0 \\
0 \\
0
\end{array}$$

$$M = \overline{ABC} + \overline{ABC} + \overline{ABC} + \overline{ABC}$$

$$M = \overline{ABC} + \overline{ABC} + \overline{ABC} + \overline{ABC} + \overline{ABC} + \overline{ABC}$$

$$M = \overline{ABC} + \overline{ABC} + \overline{ABC} + \overline{ABC} + \overline{ABC} + \overline{ABC}$$

$$M = \overline{BC} + \overline{AC} + \overline{ABC} + \overline{ABC} + \overline{ABC}$$

$$Simplified$$

$$\sqrt{BC} + \overline{ACC} + \overline{ABC} + \overline{ABC}$$

$$\sqrt{BC} + \overline{ACC} + \overline{ABC} + \overline{ABC}$$

$$\sqrt{BC} + \overline{ACC} + \overline{ABC} + \overline{ABC}$$

$$\sqrt{BC} + \overline{ACC} + \overline{ABC}$$

$$\sqrt{BC} + \overline{ACC}$$

$$\sqrt{BC}$$

$$\sqrt{CC}$$

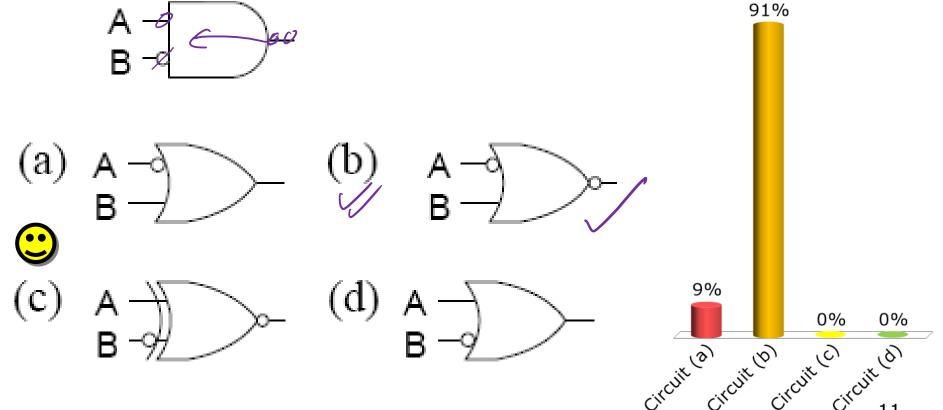
$$\sqrt{CC}$$

$$\sqrt{CC}$$

$$\sqrt{C$$

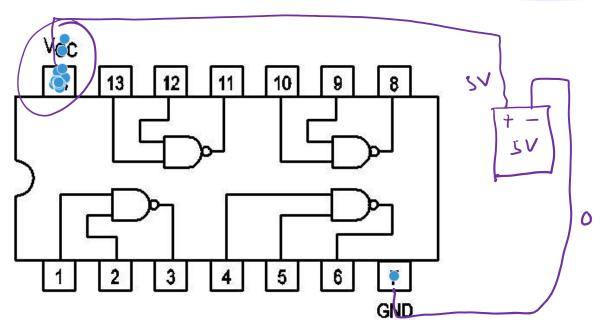


Which of the following circuits is equivalent to ...





Where do you connect the positive terminal of a 5V DC power supply in the logic IC below?





Boolean Simplifications

Show that,

$$xy + yz + \overline{x}z = xy + \overline{x}z$$

$$xy + y\overline{z}(x+\overline{n}) + \overline{n}\overline{z}$$

$$xy + y\overline{z}(x+\overline{n}) + \overline{n}\overline{z}$$

$$xy + y\overline{z} + \overline{n}y\overline{z} + \overline{n}\overline{z}$$

$$xy + y\overline{z} + \overline{x}z = xy + \overline{x}z$$

$$xy + y\overline{z} + \overline{x}z = xy + \overline{x}z$$

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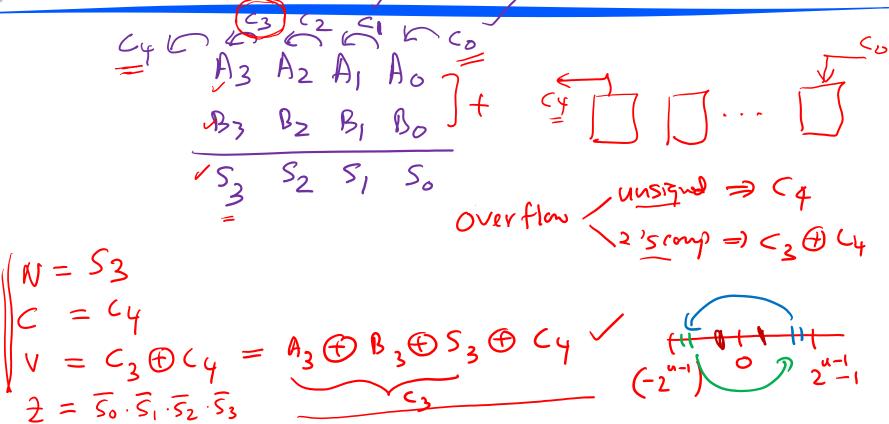
$$xy + y\overline{z} + \overline{x}z = xy + \overline{x}z$$

$$xy + y\overline{z} + \overline{x}z = xy + \overline{x}z$$

$$xy + y\overline{z} + \overline{x}z = xy + \overline{x}z$$



Binary arithmetic





What is the 8-bit result of the two's compliment addition 10110101+11001111



- A. 10000101
- B. 10000100
- C. 10010100
- D. Non of the above



Which of the following expressions is NOT equal to the SUM output of a full-adder circuit

22% A.
$$S = A \oplus B \oplus C_{in}$$

13% B. $S = C_{in} \oplus (A\overline{B} + B\overline{A})$

22% C. $S = A\overline{B}\overline{C_{in}} + \overline{A}\overline{B}\overline{C_{in}} + \overline{A}\overline{B}C_{in} + A\overline{B}C_{in}$

4 D. Non of the above

A
$$S = A \oplus R \oplus Cin$$

$$Cin \Rightarrow S = AB + BC + AC$$

$$Cin \Rightarrow S = AB + BC + AC$$

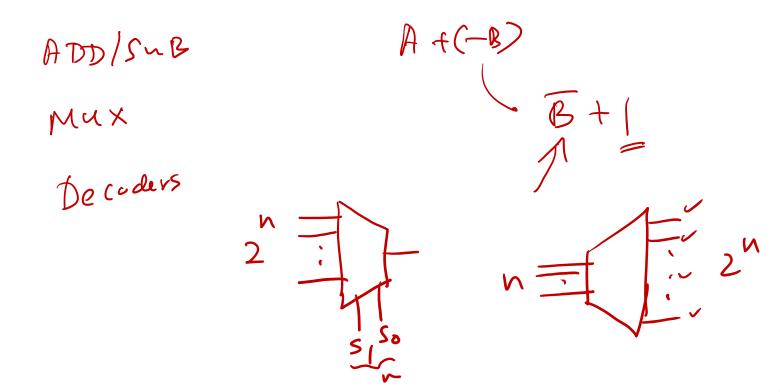
$$S = AB + BC + AC$$

$$S = AB + BC + AC$$

$$S = AB + BC + AC$$



Combinational Logic Circuits





Logic Functions using MUX

Consider the multiplexer shown. What must the inputs A,B,C,D be so that the multiplexer output is

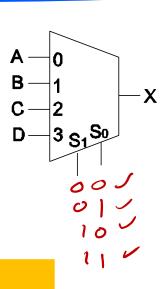
$$\checkmark X = \overline{S_0}y + \overline{y}(S_0 \oplus S_1)$$

$$0\% 1. A=0, B=1, C=y, D=1$$

$$\sqrt[6]{6}$$
 A=y, B= \overline{y} , C=1, D=0

13%3.
$$A=1$$
, $B=\overline{y}$, $C=y$, $D=0$

20%4.
$$A=y$$
, $B=\overline{y}$, $C=0$, $D=1$

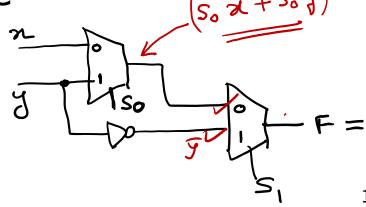




What is the logic function produced by the following MUX circuit?

0% A.
$$F = s_1 y + s_1 s_0 x + s_1 s_0 \bar{y}$$

$$19\%_{B} F = s_1 \bar{y} + s_1 \bar{s_0} x + s_1 s_0 \bar{y}$$



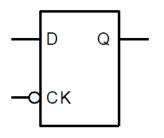


Sequential Circuits



What device does this symbol correspond to?

- 14%4. Positive edge triggered D flip-flop
- 33%B. Negative edge triggered D latch
- ²C. Active low level triggered D latch
- 24% None of the above



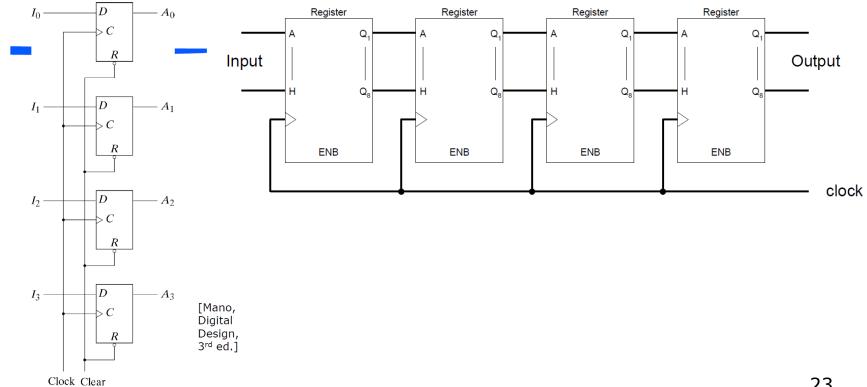


What device does this symbol correspond to?

- A. A negative edge triggered D flip-flop
- B. positive edge triggered D flip-flop
- C. positive edge triggered D flip-flop with synchronous reset
- D. Agositive edge triggered D flip-flop with asynchronous set
- E. None of the above

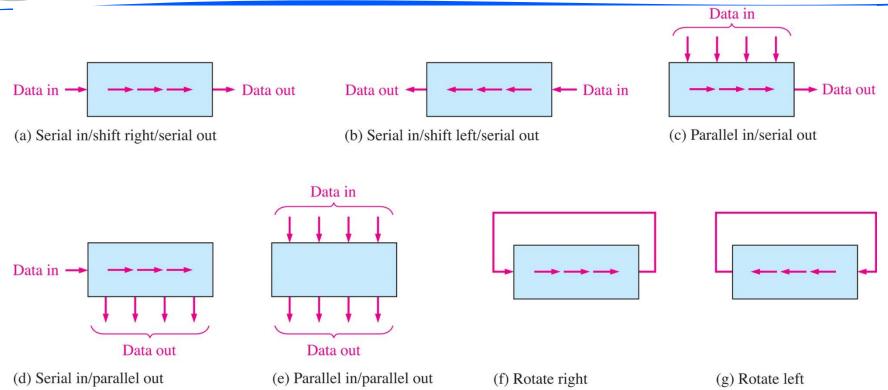


Registers



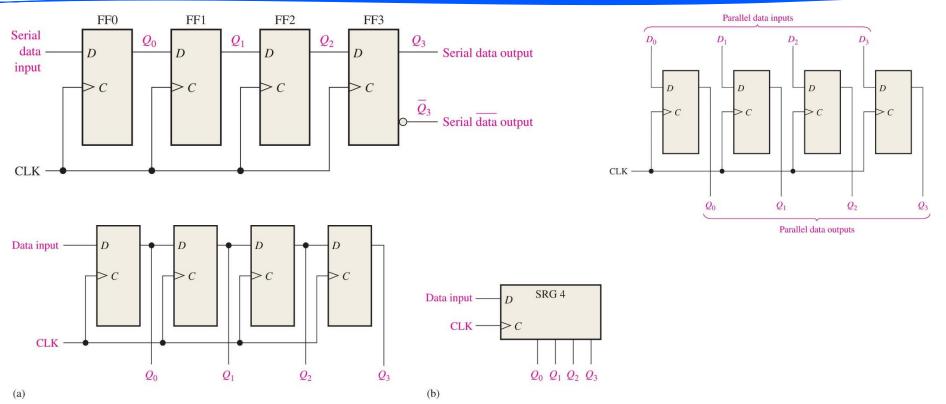


Various Shit Registers





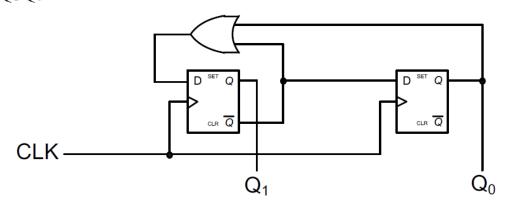
Various Shit Registers





Counter – sample exam #2, Q17

17. What sequence will the following synchronous counter count through, if it starts at $Q_1Q_0 = 00$?



- (a) $Q_1Q_0: 00 \to 01 \to 11 \to 10 \to 10 \to ...$
- (b) $Q_1Q_0: 00 \to 01 \to 11 \to 00 \to ...$
- (c) $Q_1Q_0: 00 \to 11 \to 01 \to 00 \to ...$
- (d) $Q_1Q_0: 00 \to 11 \to 10 \to 00 \to ...$
- (e) None of the above



State Machines



State machines - sample exam #2, Q20

Current	Next State		Outputs
State	A=0	A=1	(X,Y)
SA	SA	SB	0.0
SB	SA	SC	0.0
SC	SA	SD	0 1
SD	SD	SE	1 0
SE	SA	SE	1 1

Which of the following state diagrams is an equivalent representation of this state table? (Input: A, Outputs: XY)

