Logic gates, Multiplexer and Registers

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Computer support 2

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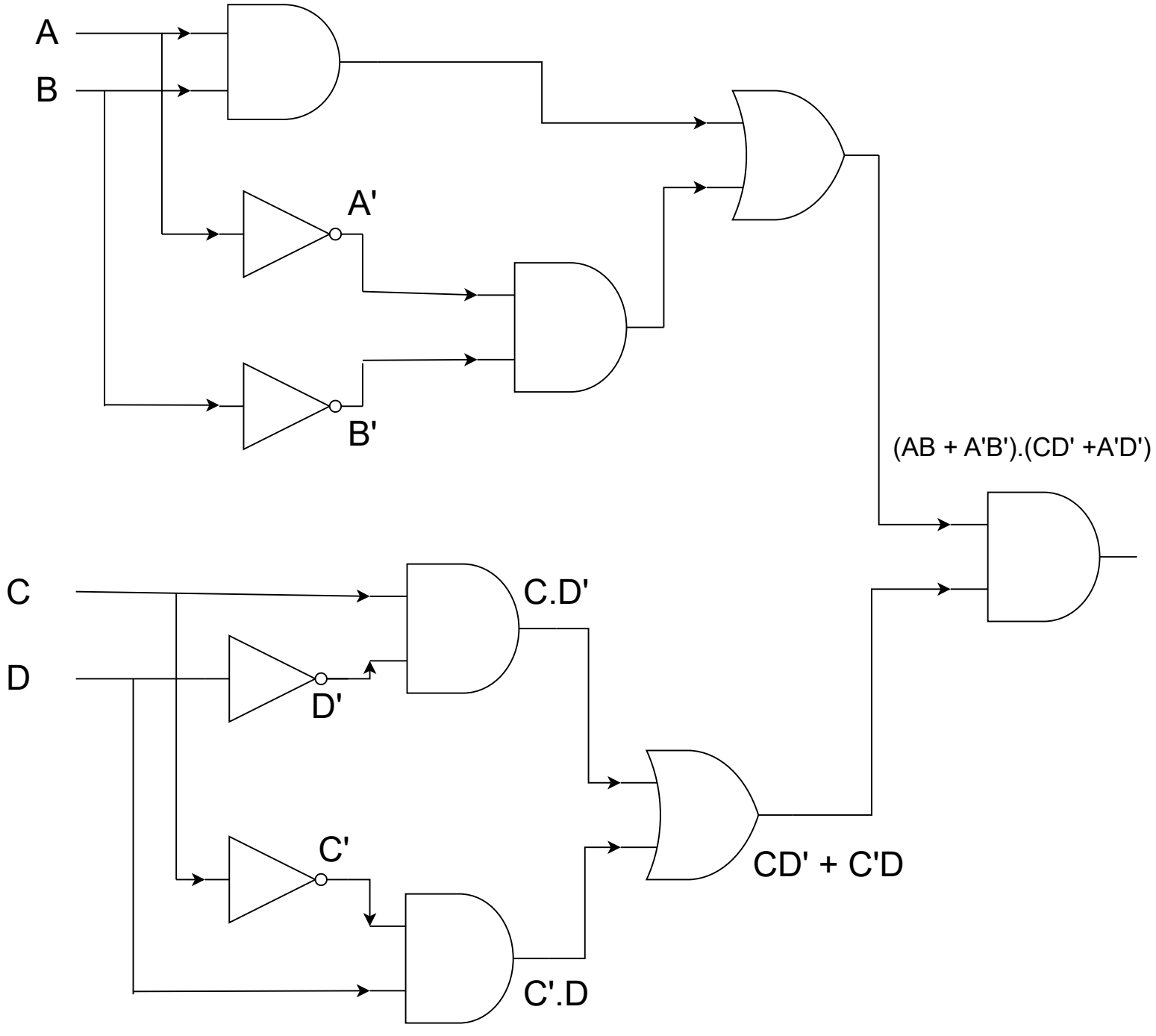
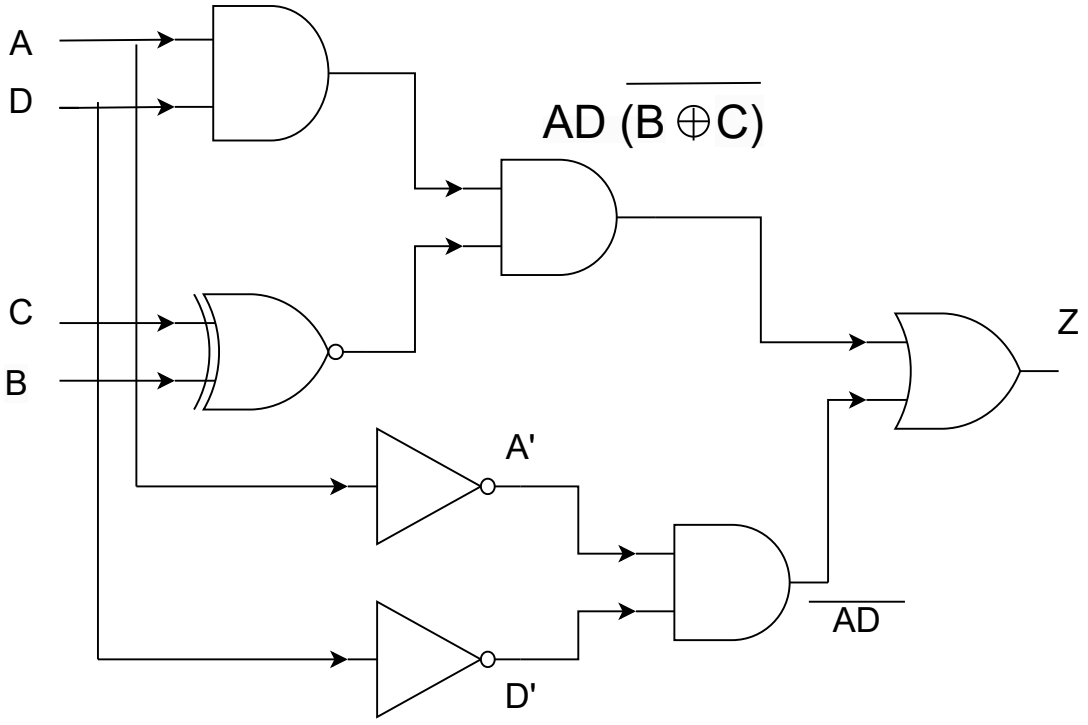
QUESTION 1 id: 20220157

LOGIC GATE FOR (AB + A'B').(CD' +A'D')



QUESTION 2 id: 20220157



TRUTH TABLE

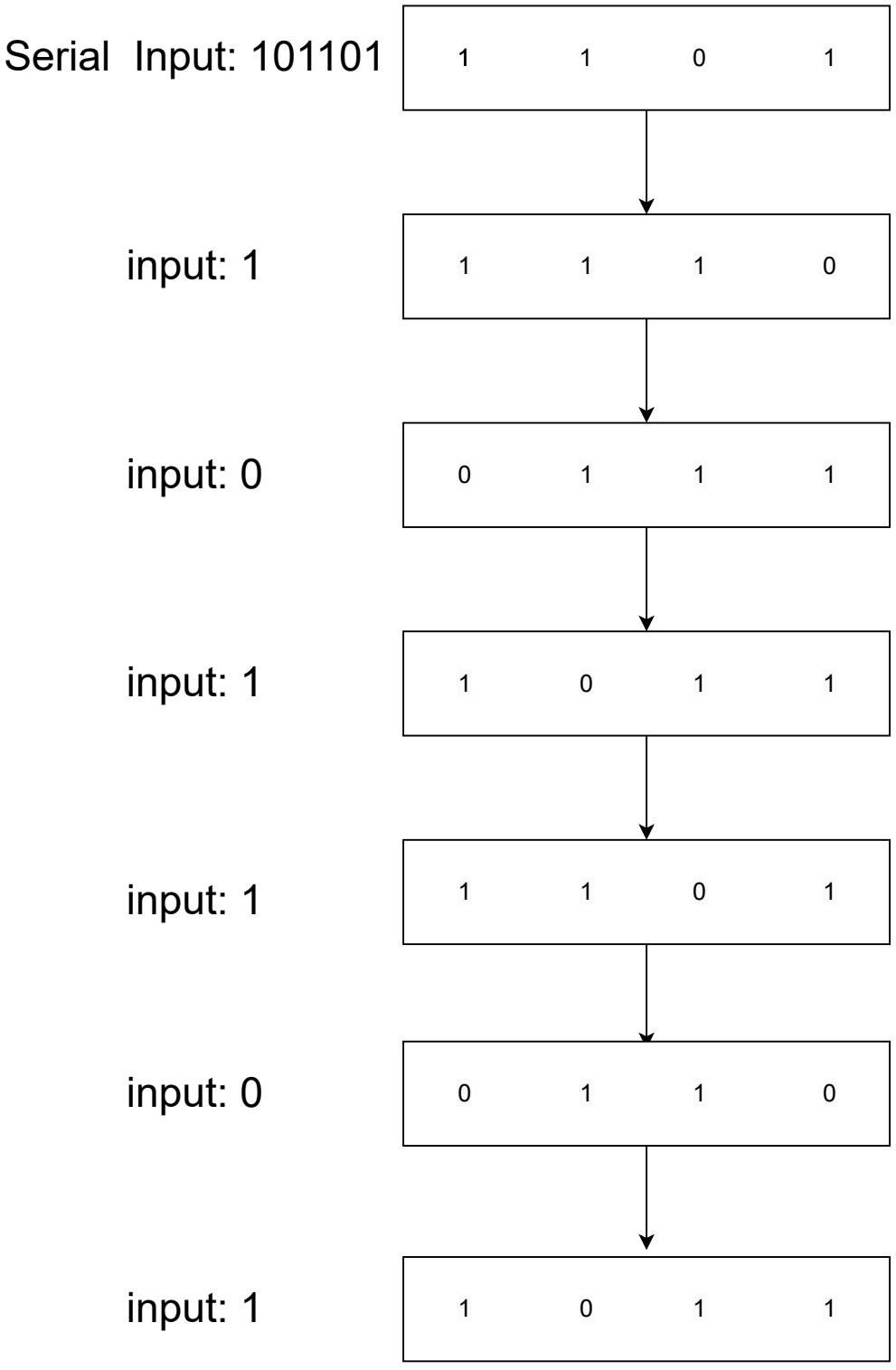
A	B	C	D	A'	D
0	0	0	0	1	1
0	0	0	1	1	0
0	0	1	0	1	1
0	0	1	1	1	0
0	1	0	0	1	1
0	1	0	1	1	0
0	1	1	0	1	1
0	1	1	1	1	0
1	0	0	0	0	1
1	0	0	1	0	0
1	0	1	0	0	1

D'	AD	(B (+) C)'	AD(B (+) C)' + A'D'
1	0	1	1
0	0	1	1
1	0	0	0
0	0	0	0
1	0	0	0
0	0	0	0
1	0	1	1
0	0	1	1
1	0	1	1
0	1	1	1

1	0	1	0	0	
1	0	1	1	0	
1	0	0	0	0	
1	0	0	1	0	
1	0	1	0	0	
1	0	1	1	0	

1	0	0	0
0	1	0	1
1	0	1	1
0	1	1	1
1	0	0	0
0	1	0	1

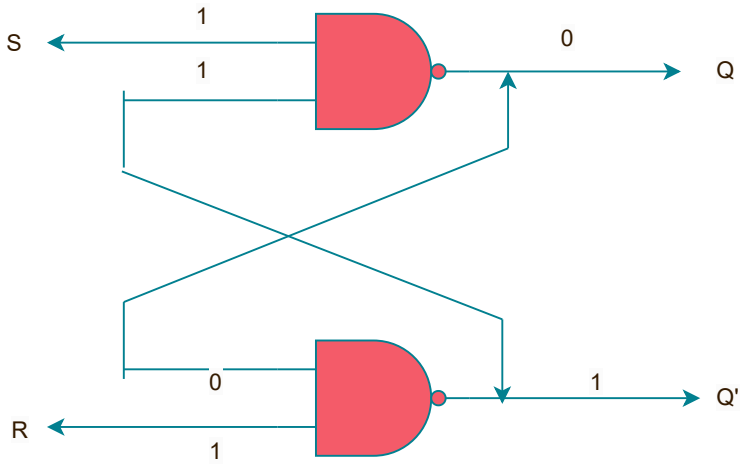
QUESTION 3 id: 20220157



Final Answer: 1011

QUESTION 4 id: 20220157

An SR latch is a simple type of digital circuit that can store a single bit of information (eg. either 0 or 1) and maintain its state even after the input signals have been removed



When both S and R input are low, the output of both the NAND gates will be high. Simply means if both the gates are active and will keep its current state.

When S is high and R is low, the output of the first NAND gate will be low, and the output of the second will be high. Meaning it will be in a set state

When S is low and R is high, the output fo the first NAND gate will be high, and the output of the second will be low. Meaning it will be in a reset state

When both state are high, the output of both gate will be low and this can cause an unpredictable behavior.

Truth Table

S	R	Q	Q'
1	0	1	0
0	1	0	1
0	0	Q	Q'
1	1	?	?

Text

QUESTION 5 id: 20220157

Encoders and decoders are two types of digital circuits that are commonly used in communication and computer systems. While they may seem similar at first, they have distinct construction and uses.

An encoder is a digital circuit that takes an input signal and converts it into a binary code. It is often used in digital communication systems to reduce the amount of data that needs to be transmitted. Encoders are also used in computer systems to convert analog signals, such as audio or video signals, into a digital format.

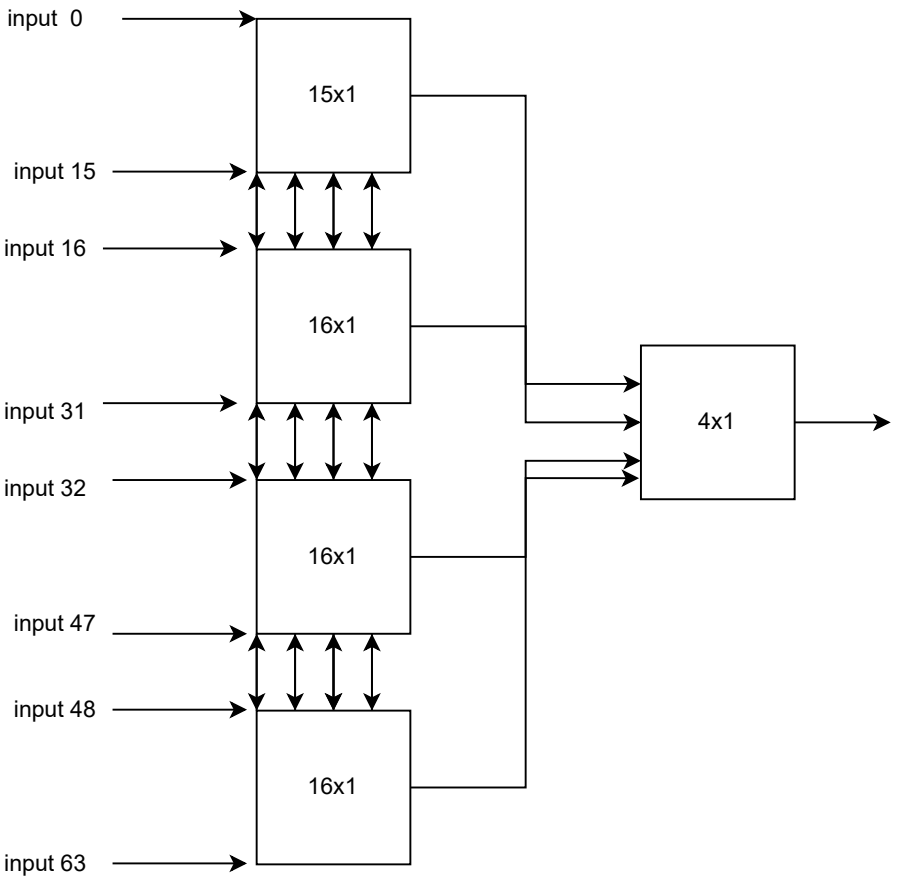
According to Electronics Tutorials, an encoder can be constructed using a variety of methods, including using logic gates, a priority encoder, or a quadrature encoder. A popular implementation of an encoder is the 74HC148 IC, which is a 8-to-3 line encoder. (Electronics Tutorials, n.d.)

On the other hand, a decoder is a digital circuit that takes a binary code and converts it into an output signal. It is commonly used in digital systems to control multiple output devices, such as LEDs or motors. Decoders are also used in memory systems to select a particular memory location.

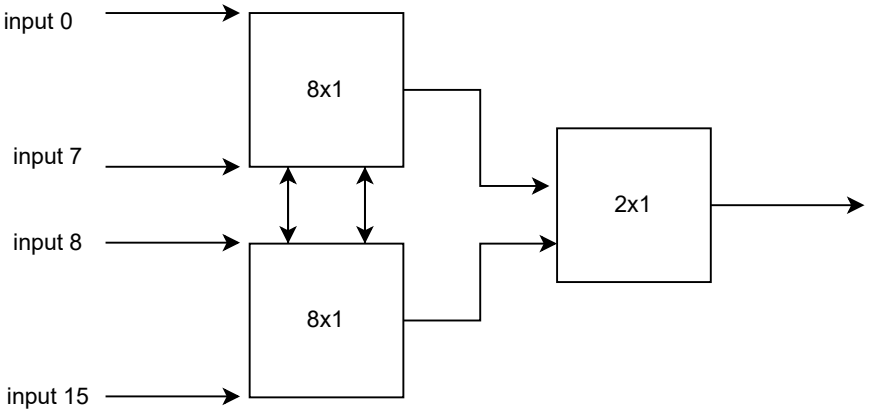
According to All About Circuits, a decoder can be constructed using a variety of methods, including using logic gates, a binary decoder, or a BCD decoder. A popular implementation of a decoder is the 74HC138 IC, which is a 3-to-8 line decoder. (All About Circuits, n.d.)

In conclusion, encoders and decoders are both important digital circuits that have distinct construction and uses. While encoders are used to convert input signals into binary codes, decoders are used to convert binary codes into output signals.Understanding the construction and use of these circuits is important for designing and implementing digital systems.

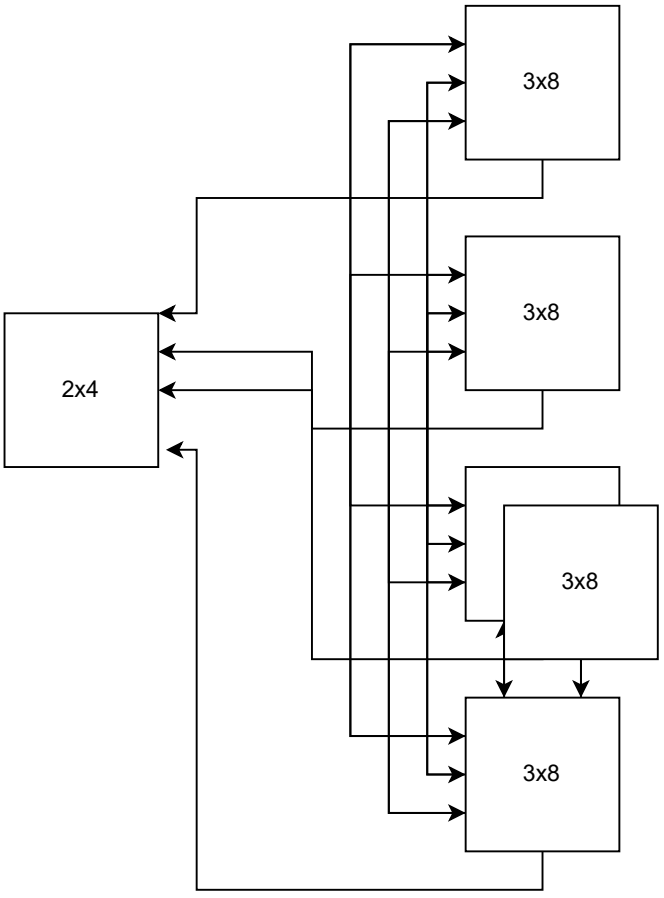
QUESTION 6 id: 20220157


input 0
15x1
input 15
input 16
16x1
input 31
input 32
16x1
input 47
input 48
16x1
input 63
4x1

QUESTION 7 id: 20220157



QUESTION 7 id: 20220157


3x8
3x8
2x4
3x8
3x8