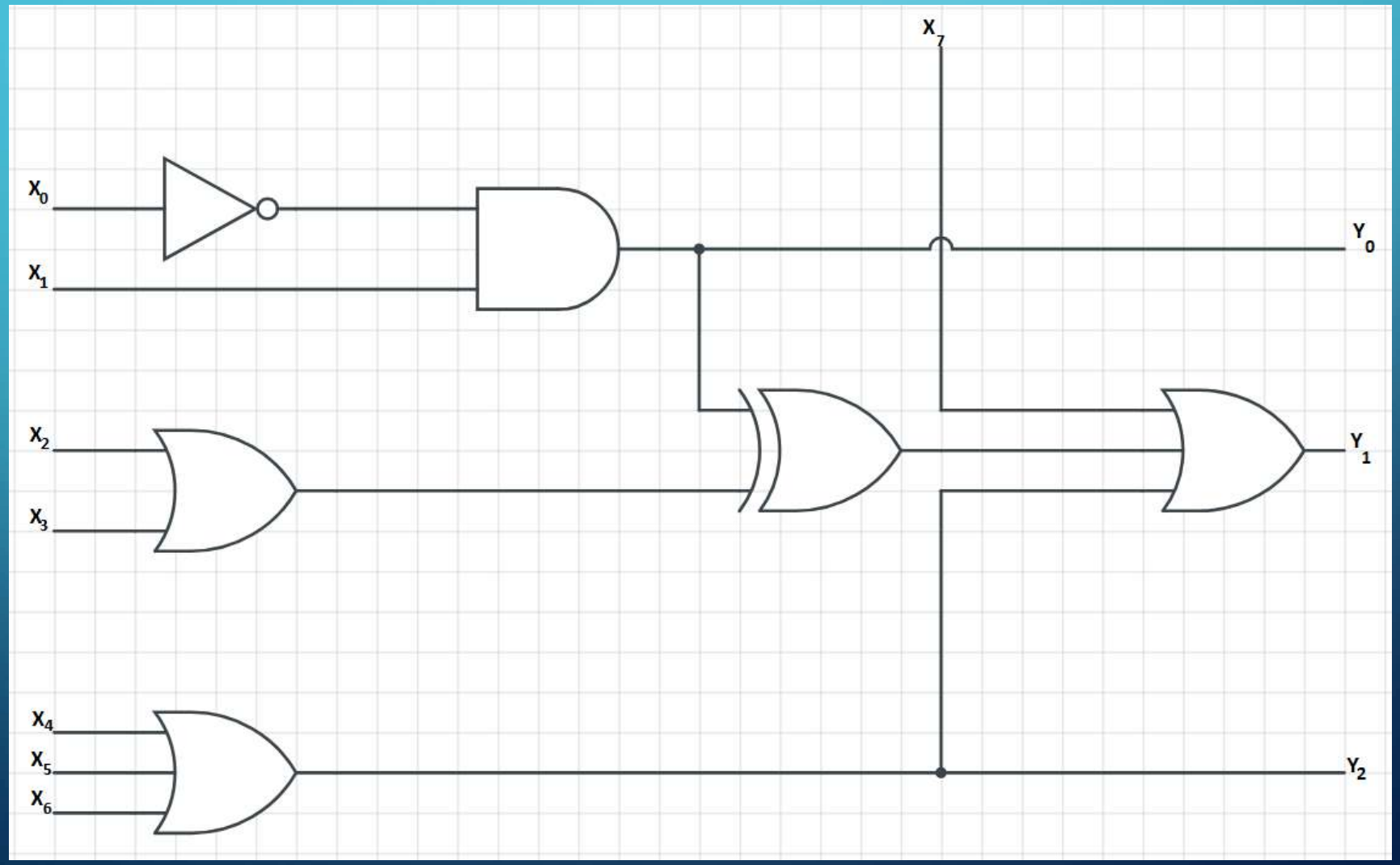
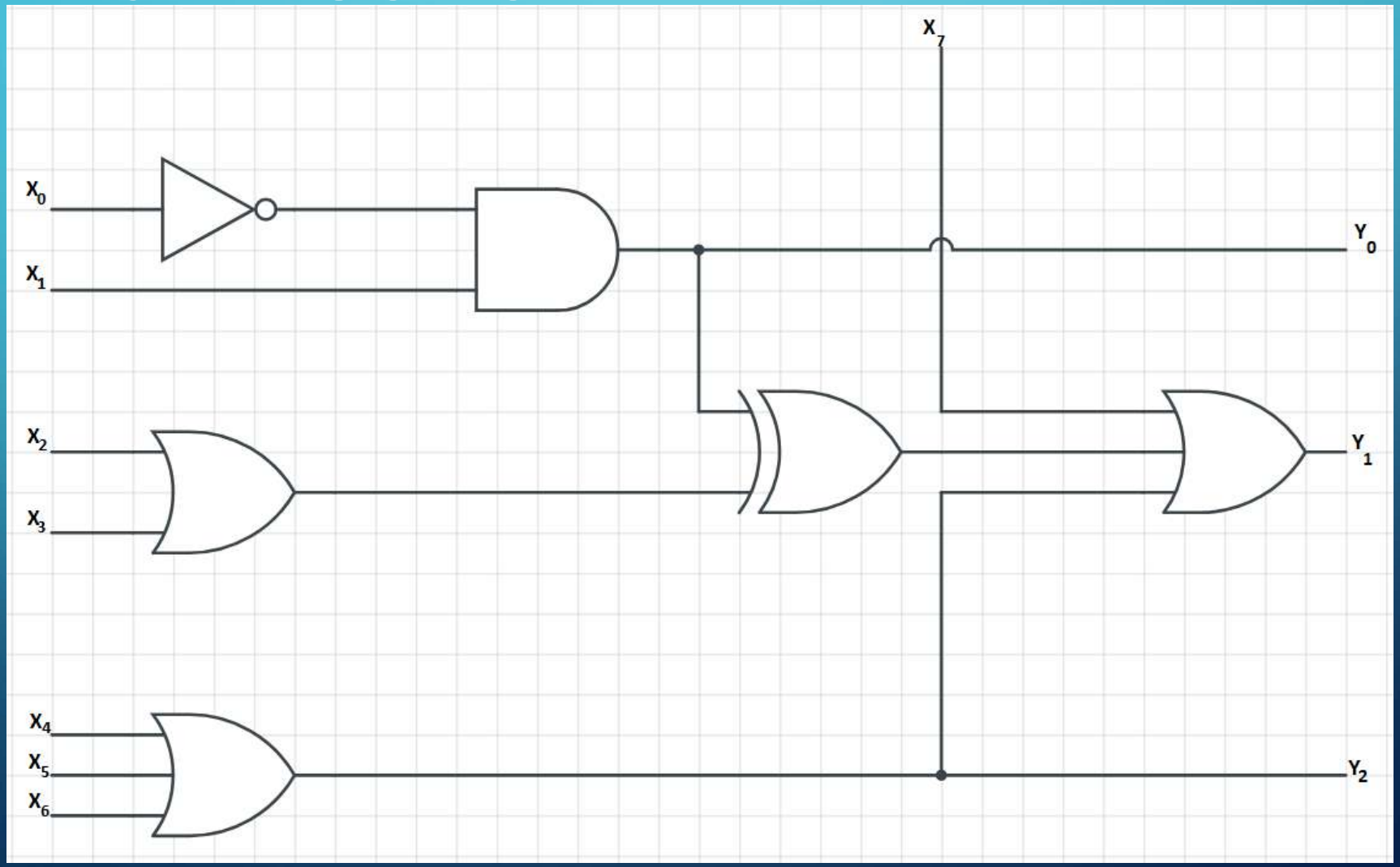
COS 284 TUTORIAL 3

CLASS TEST 2 RECAP

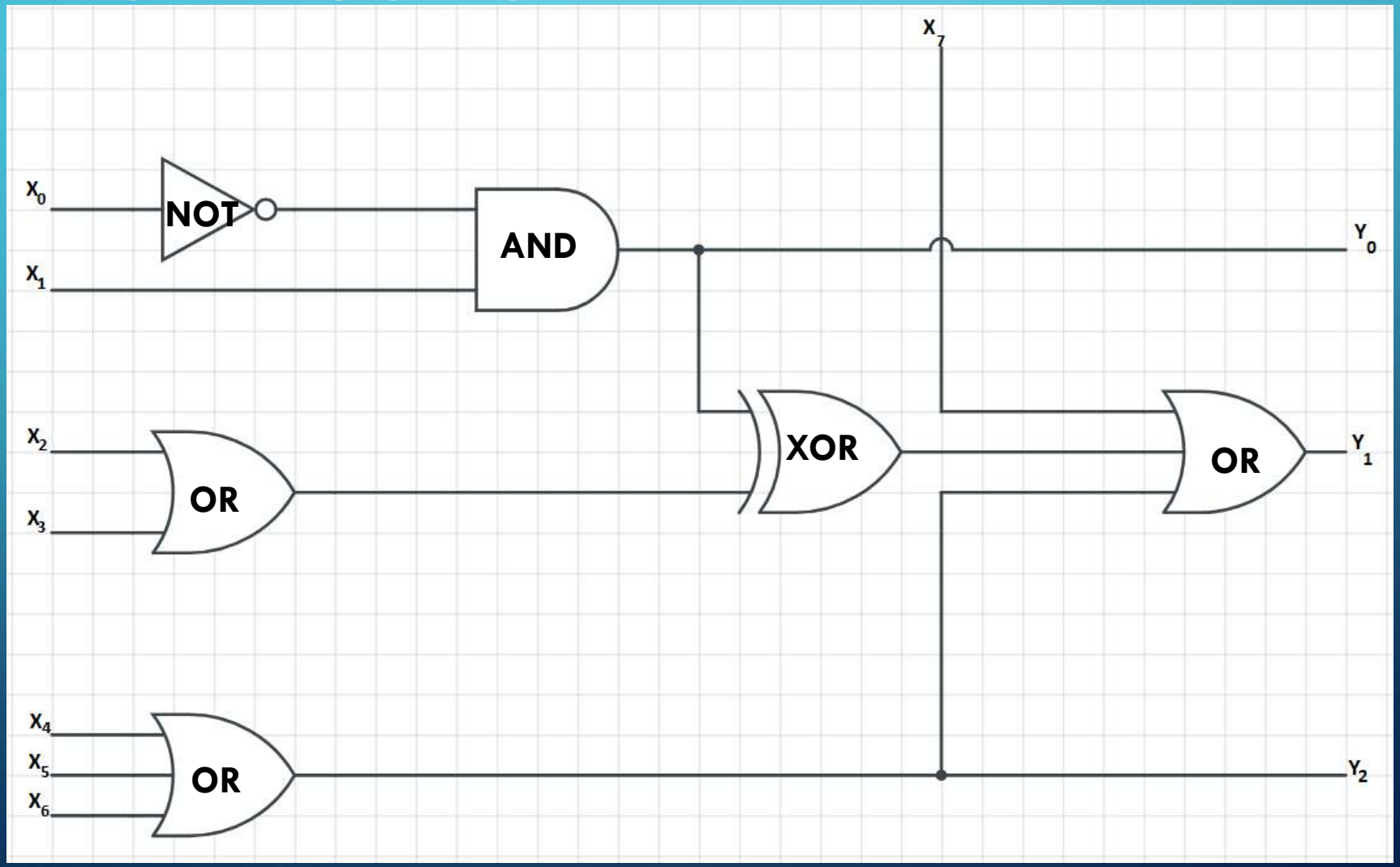
FOR DECIMAL INPUT X = 55 WHAT IS THE OUTPUT?



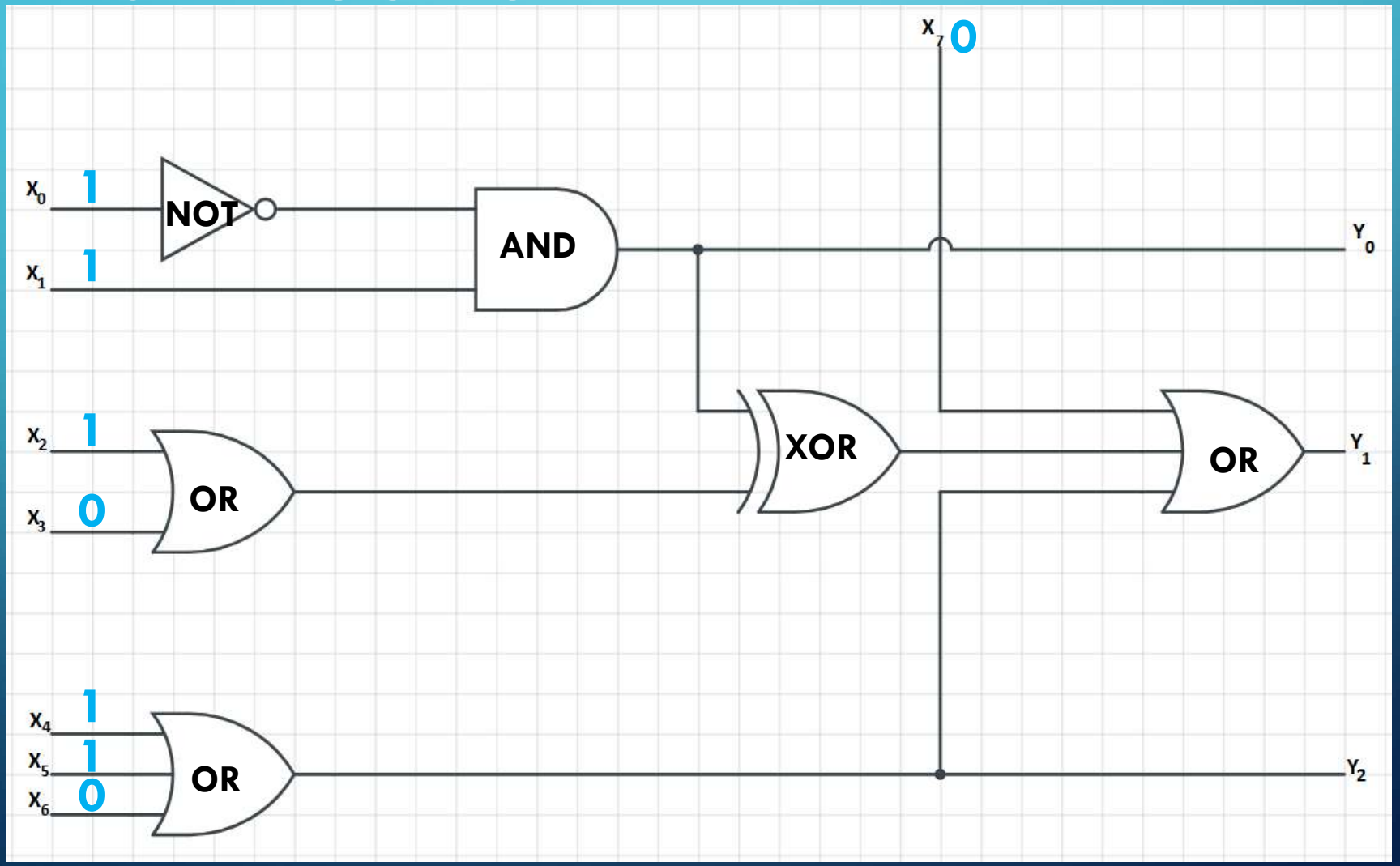
FOR BINARY INPUT $X_7X_6X_5X_4X_3X_2X_1X_0 = 00110111$ WHAT IS THE OUTPUT?



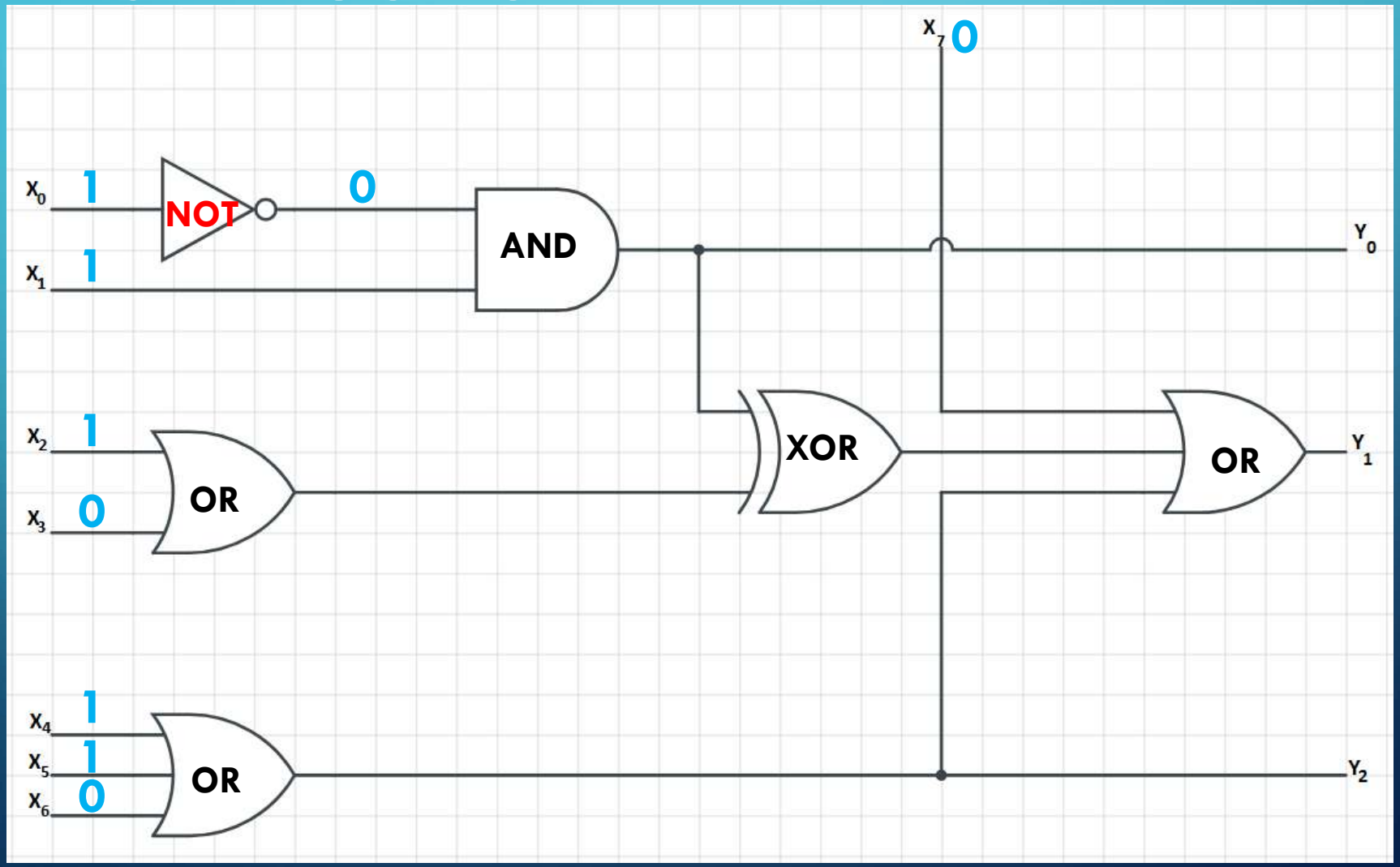
FOR BINARY INPUT $X_7X_6X_5X_4X_3X_2X_1X_0 = 00110111$ WHAT IS THE OUTPUT?



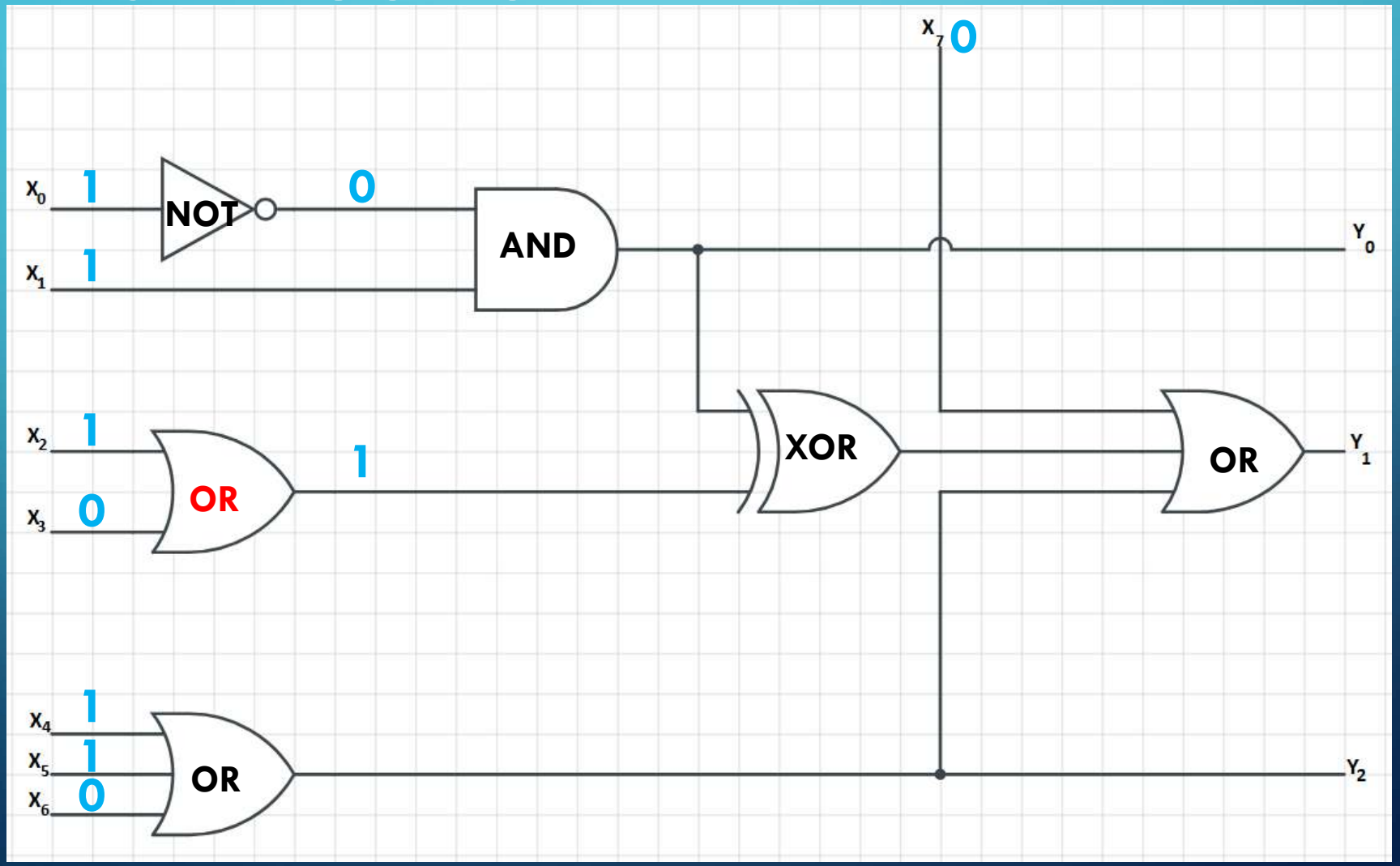
FOR BINARY INPUT $X_7X_6X_5X_4X_3X_2X_1X_0 = 00110111$ WHAT IS THE OUTPUT?



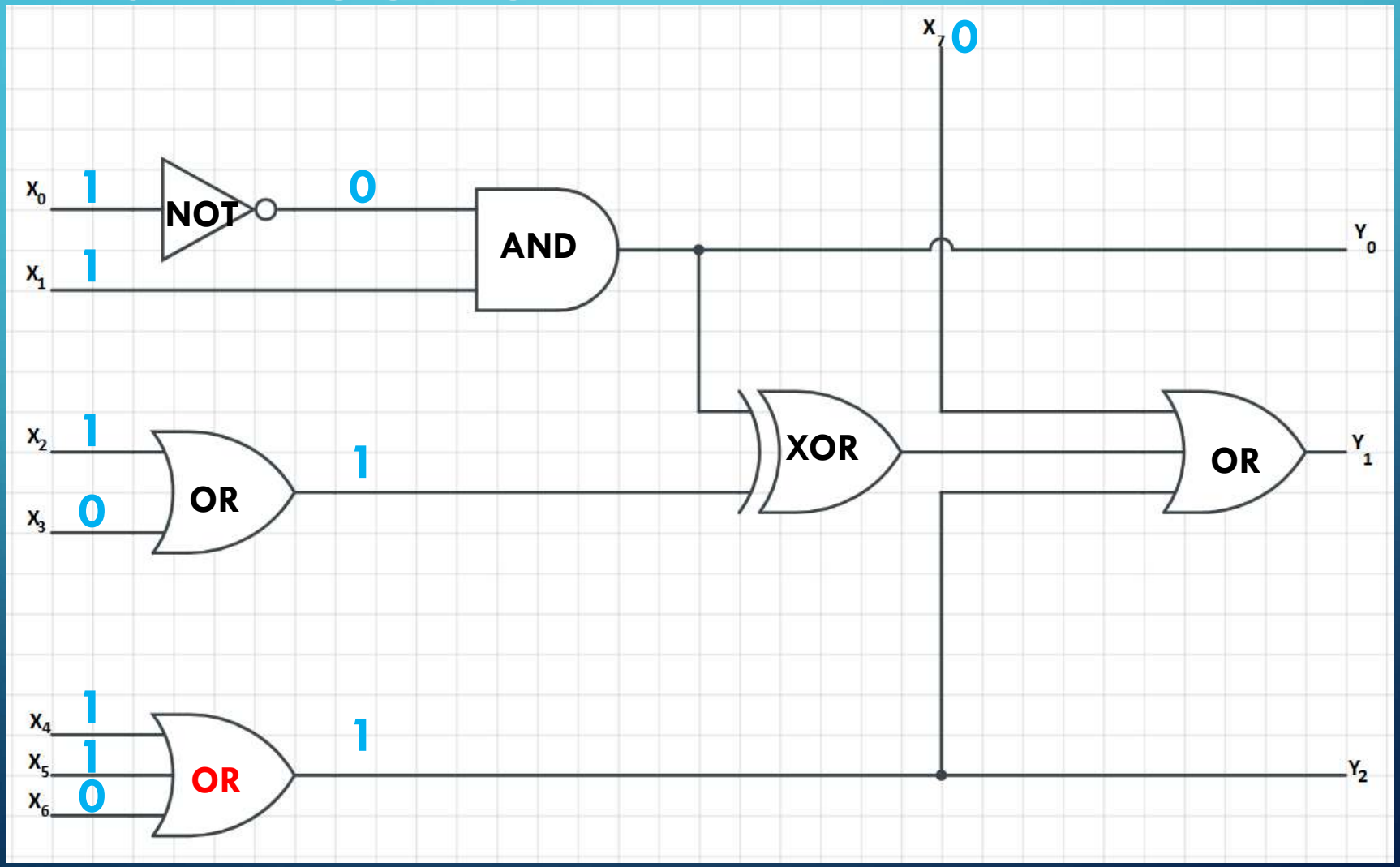
FOR BINARY INPUT $X_7X_6X_5X_4X_3X_2X_1X_0 = 00110111$ WHAT IS THE OUTPUT?



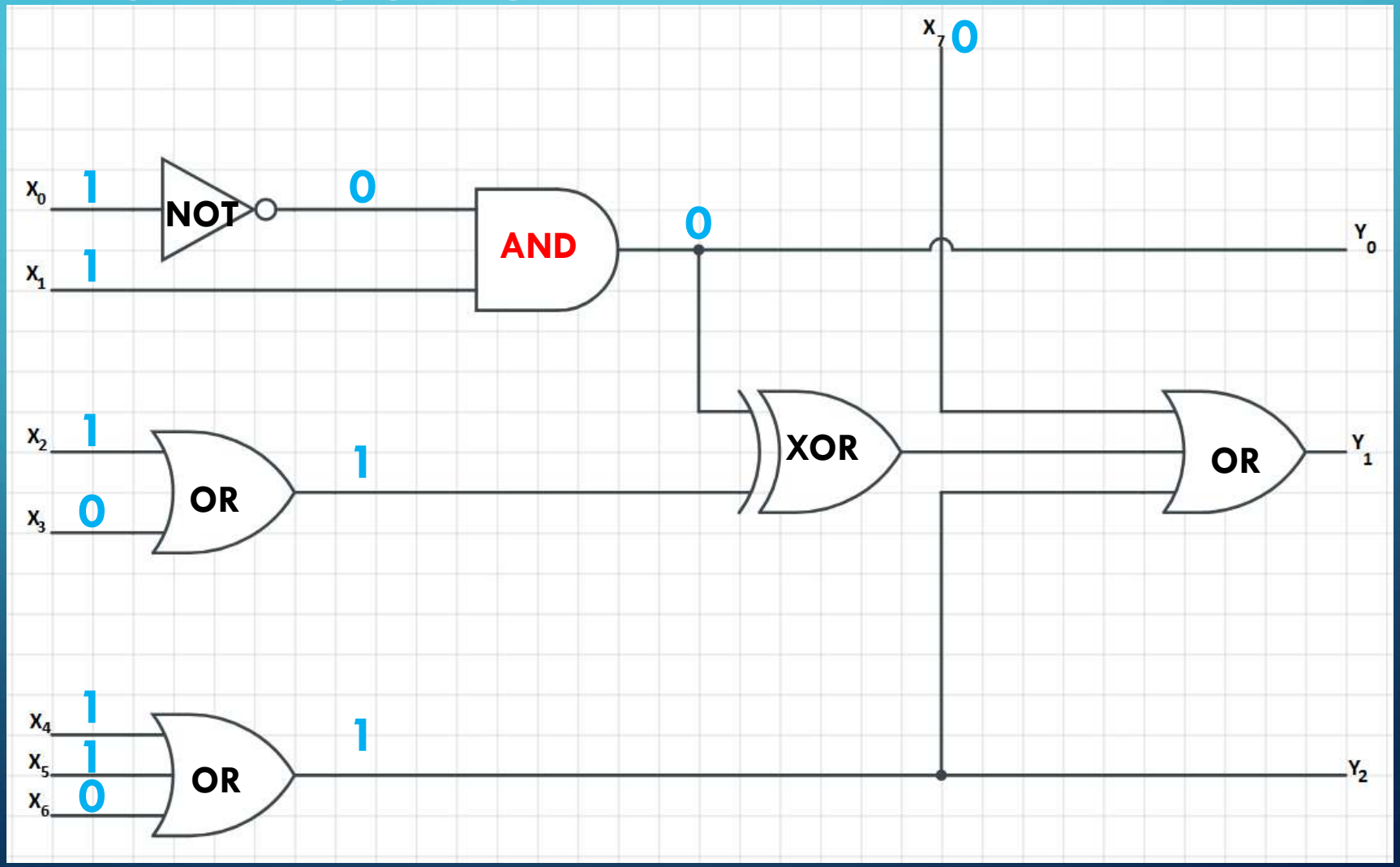
FOR BINARY INPUT $X_7X_6X_5X_4X_3X_2X_1X_0 = 00110111$ WHAT IS THE OUTPUT?



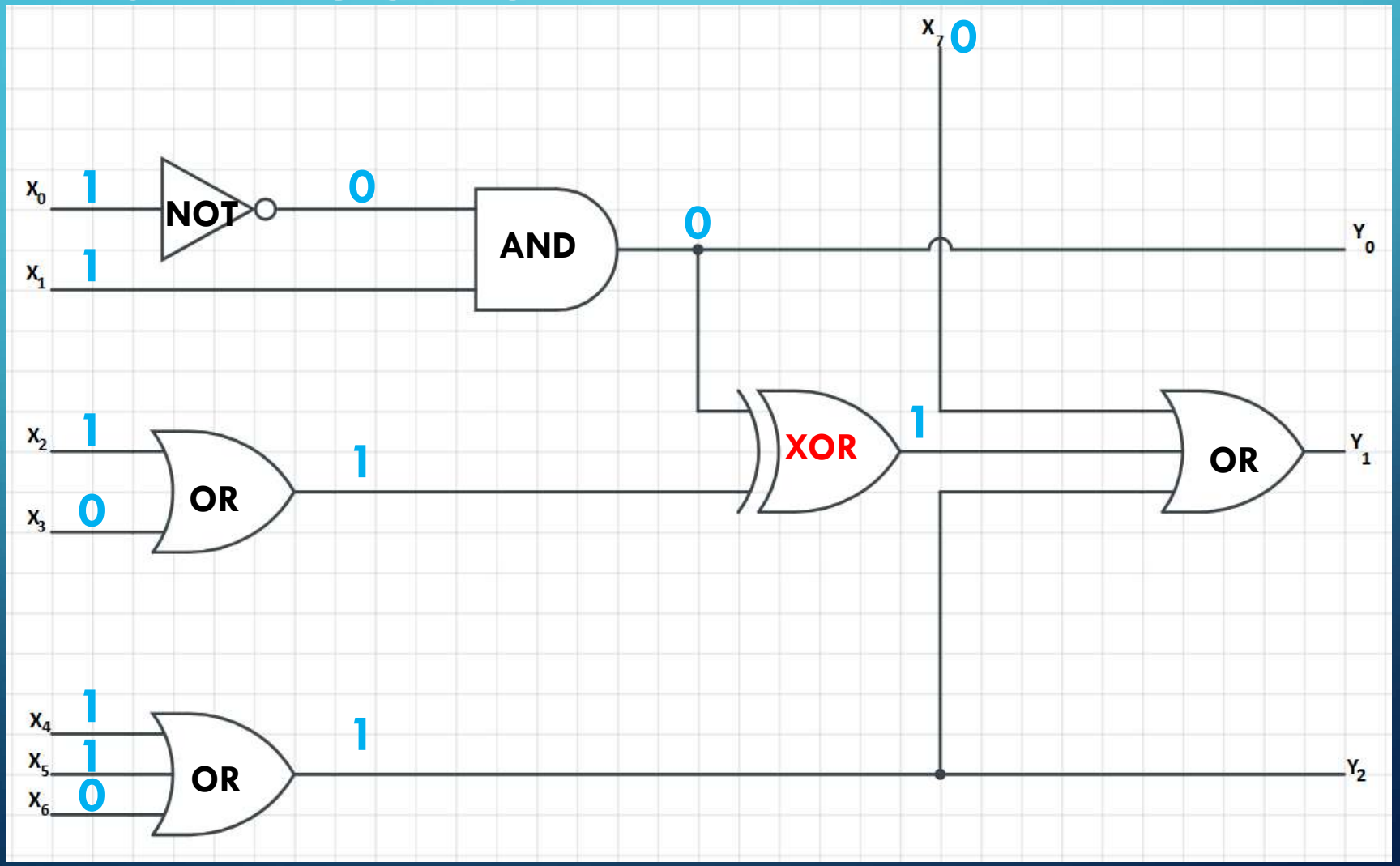
FOR BINARY INPUT $X_7X_6X_5X_4X_3X_2X_1X_0 = 00110111$ WHAT IS THE OUTPUT?



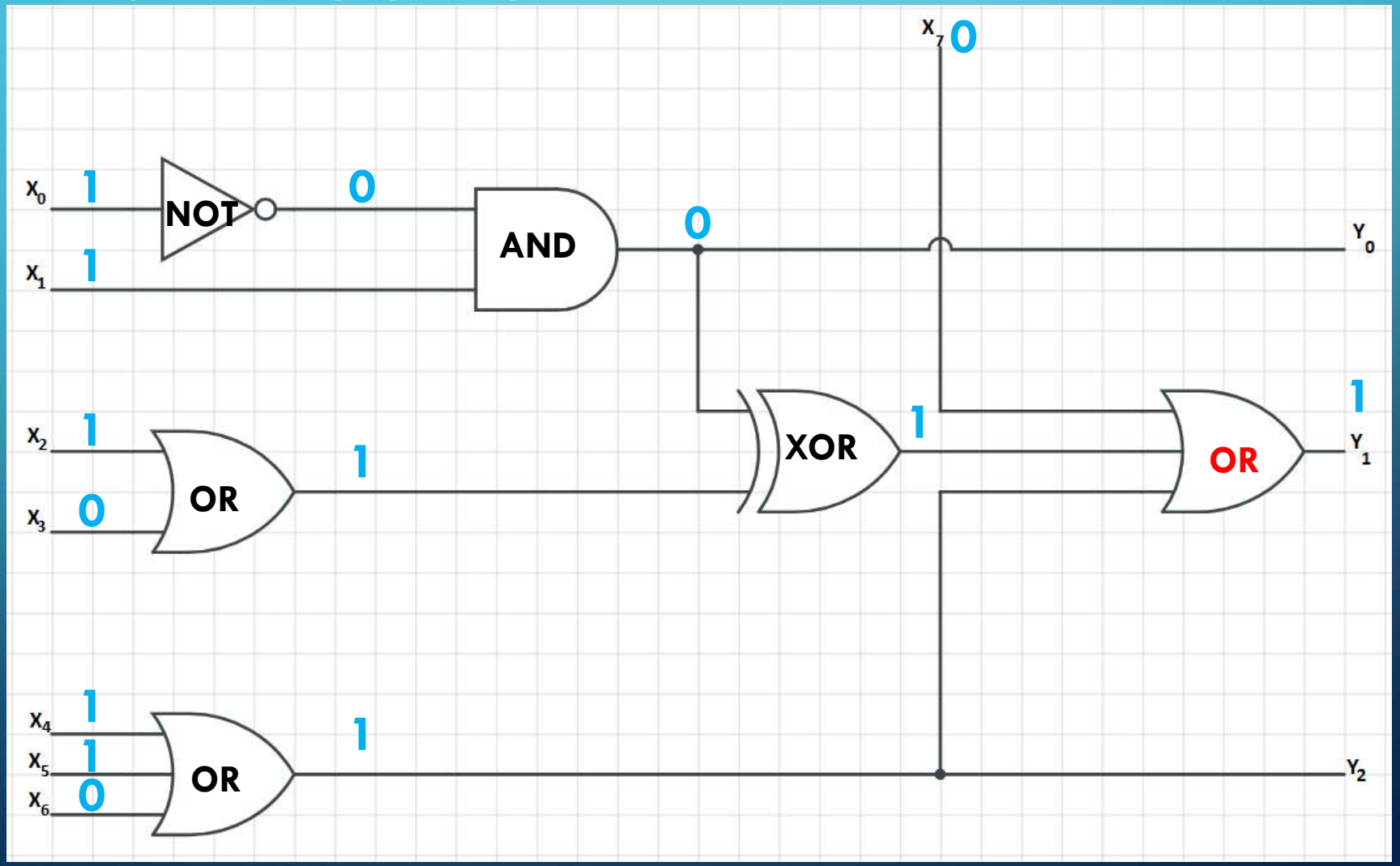
FOR BINARY INPUT $X_7X_6X_5X_4X_3X_2X_1X_0 = 00110111$ WHAT IS THE OUTPUT?



FOR BINARY INPUT $X_7X_6X_5X_4X_3X_2X_1X_0 = 00110111$ WHAT IS THE OUTPUT?



FOR BINARY INPUT $X_7X_6X_5X_4X_3X_2X_1X_0 = 00110111$ WHAT IS THE OUTPUT?



DRAW A COMBINATIONAL CIRCUIT THAT IMPLEMENTS THE GIVEN FUNCTION

F(x,y,z) = (xy)+(xz)'y'

DRAW A COMBINATIONAL CIRCUIT THAT IMPLEMENTS THE GIVEN FUNCTION

F(x,y,z) = (xy)+(xz)'y'

= (x AND y) OR NOT(x AND z) AND NOT(y)

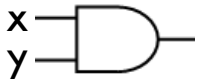
NOT operator has highest priority, followed by AND and then OR

DRAW A COMBINATIONAL CIRCUIT THAT IMPLEMENTS THE GIVEN FUNCTION

F(x,y,z) = (xy)+(xz)'y'

= (x AND y) OR NOT(x AND z) AND NOT(y)

NOT operator has highest priority, followed by AND and then OR

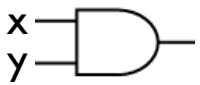


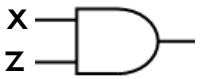
DRAW A COMBINATIONAL CIRCUIT THAT IMPLEMENTS THE GIVEN FUNCTION

F(x,y,z) = (xy)+(xz)'y'

= (x AND y) OR NOT(x AND z) AND NOT(y)

NOT operator has highest priority, followed by AND and then OR



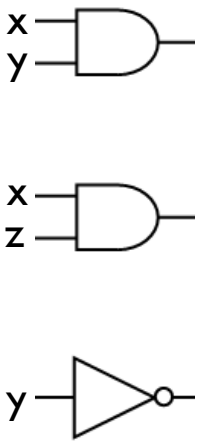


DRAW A COMBINATIONAL CIRCUIT THAT IMPLEMENTS THE GIVEN FUNCTION

F(x,y,z) = (xy)+(xz)'y'

= (x AND y) OR NOT(x AND z) AND NOT(y)

NOT operator has highest priority, followed by AND and then OR

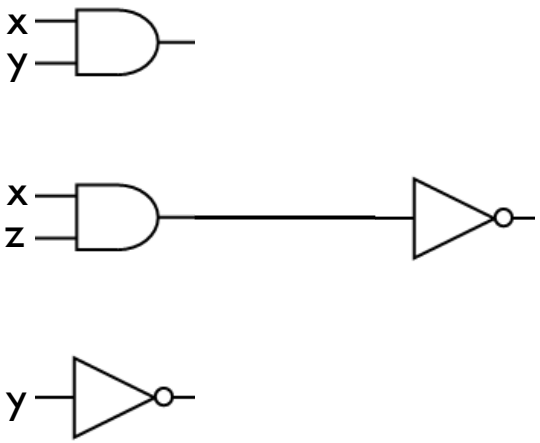


DRAW A COMBINATIONAL CIRCUIT THAT IMPLEMENTS THE GIVEN FUNCTION

F(x,y,z) = (xy)+(xz)'y'

= (x AND y) OR NOT(x AND z) AND NOT(y)

NOT operator has highest priority, followed by AND and then OR

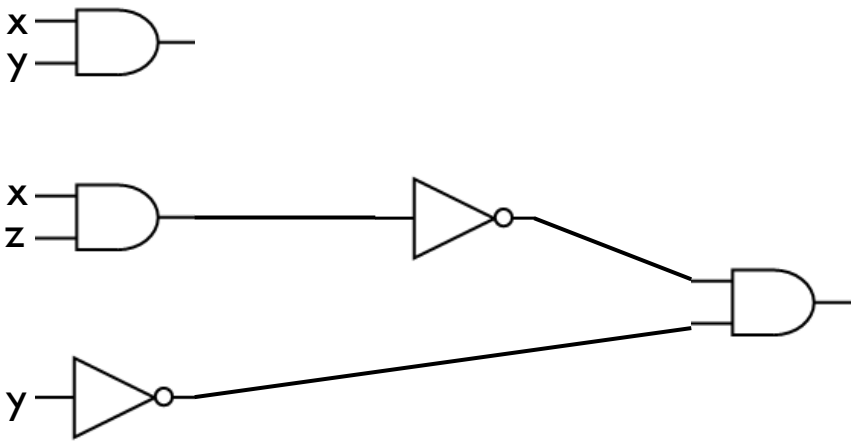


DRAW A COMBINATIONAL CIRCUIT THAT IMPLEMENTS THE GIVEN FUNCTION

F(x,y,z) = (xy)+(xz)'y'

= (x AND y) OR NOT(x AND z) AND NOT(y)

NOT operator has highest priority, followed by AND and then OR

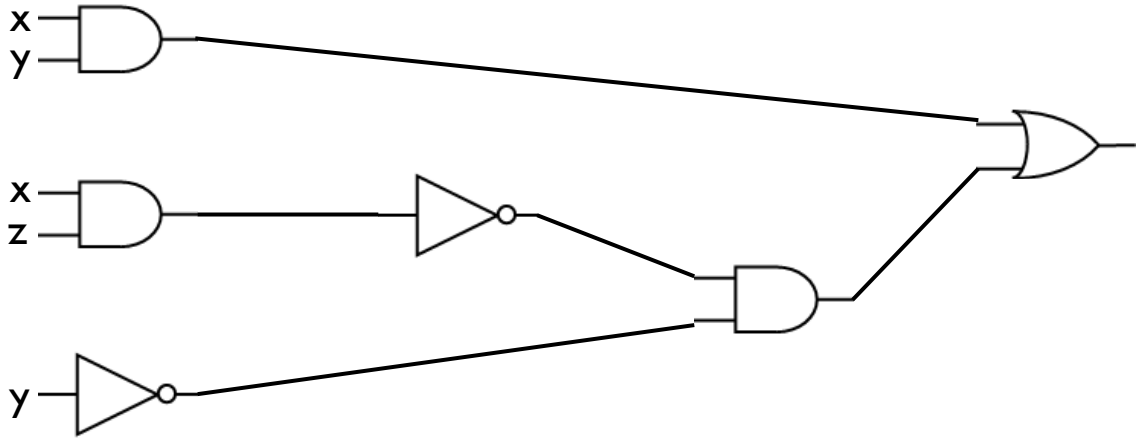


DRAW A COMBINATIONAL CIRCUIT THAT IMPLEMENTS THE GIVEN FUNCTION

F(x,y,z) = (xy)+(xz)'y'

= (x AND y) OR NOT(x AND z) AND NOT(y)

NOT operator has highest priority, followed by AND and then OR

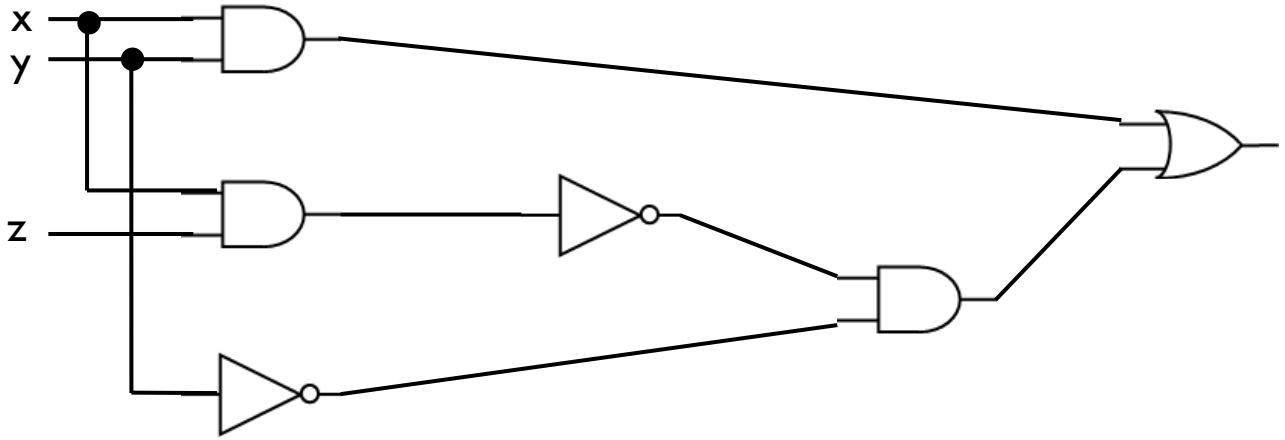


DRAW A COMBINATIONAL CIRCUIT THAT IMPLEMENTS THE GIVEN FUNCTION

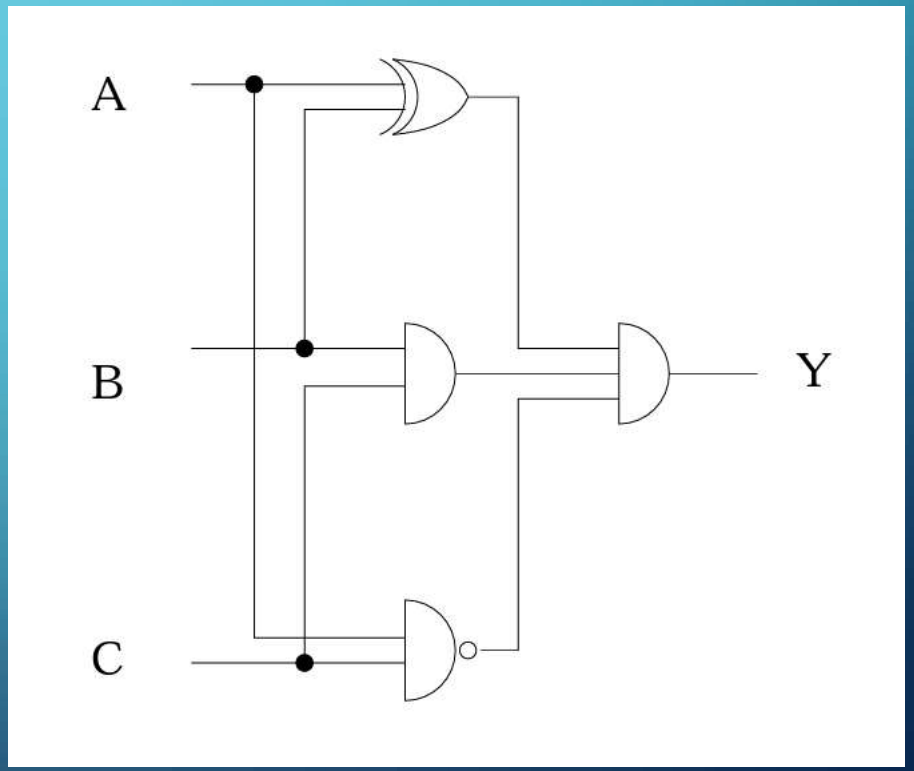
F(x,y,z) = (xy)+(xz)'y'

= (x AND y) OR NOT(x AND z) AND NOT(y)

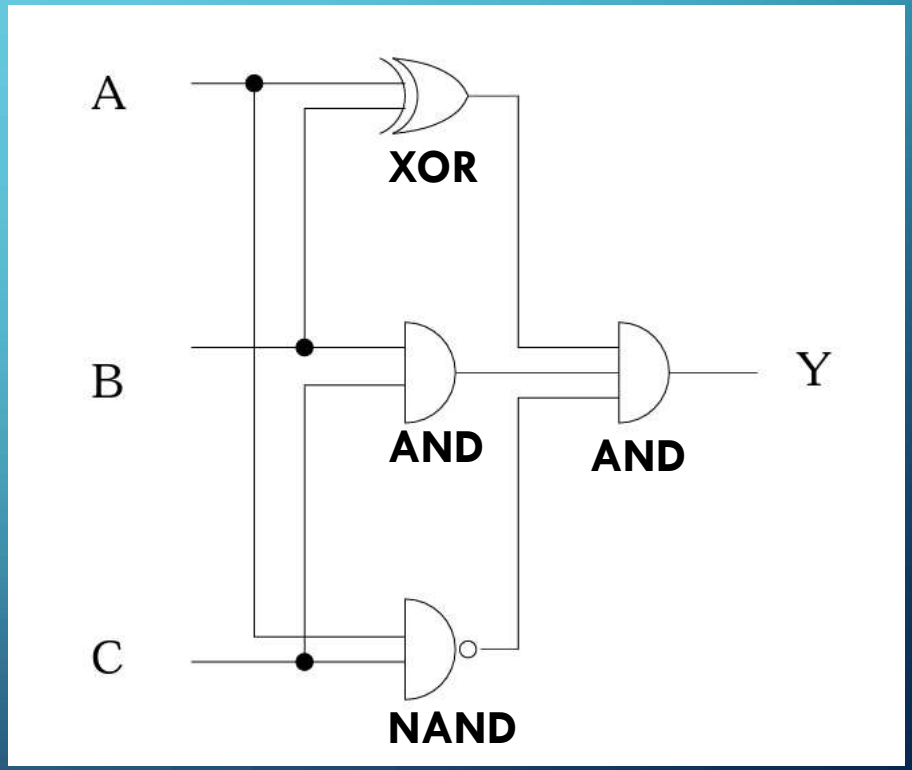
NOT operator has highest priority, followed by AND and then OR



PROVIDE THE PRODUCT-OF-SUMS FUNCTION THAT IMPLEMENTS THE FOLLOWING COMBINATIONAL CIRCUIT

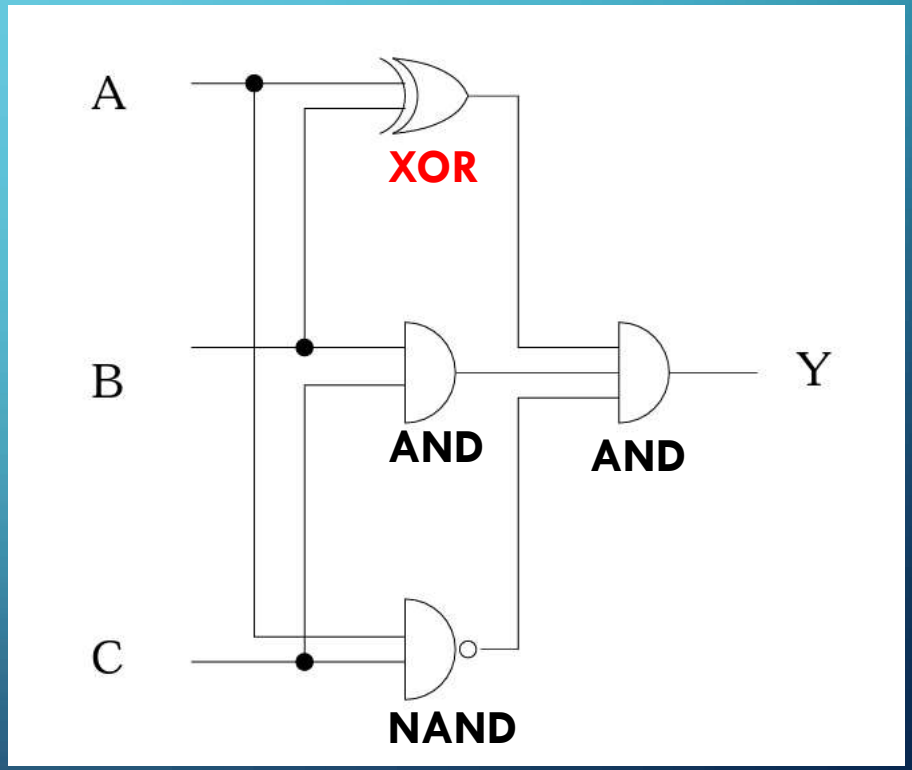


PROVIDE THE PRODUCT-OF-SUMS FUNCTION THAT IMPLEMENTS THE FOLLOWING COMBINATIONAL CIRCUIT



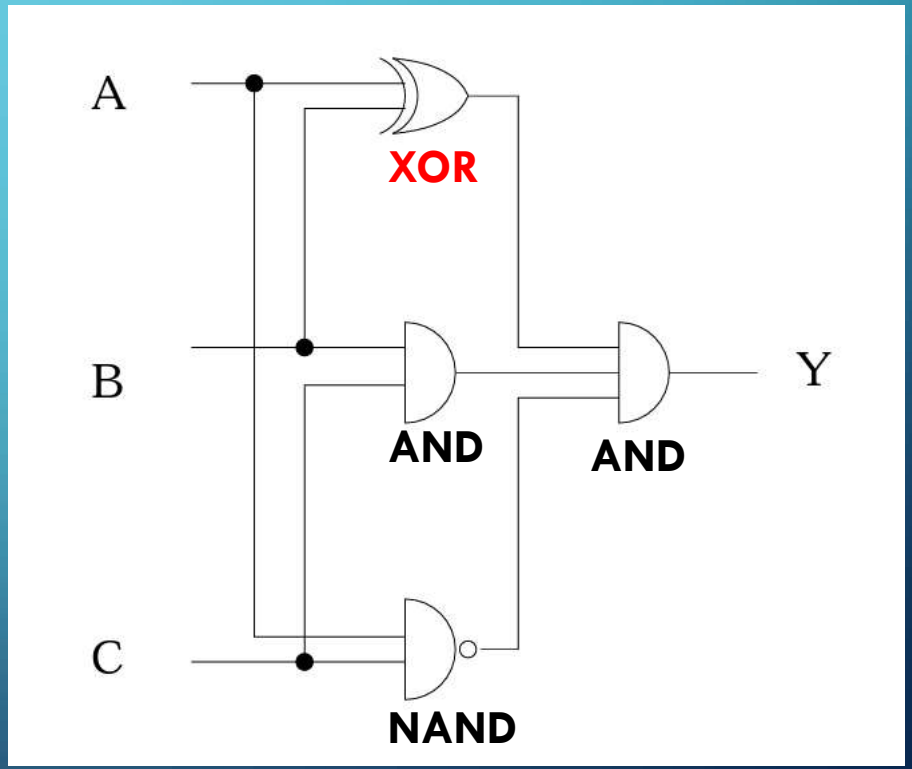
PROVIDE THE PRODUCT-OF-SUMS FUNCTION THAT IMPLEMENTS THE FOLLOWING COMBINATIONAL CIRCUIT

(A XOR B)



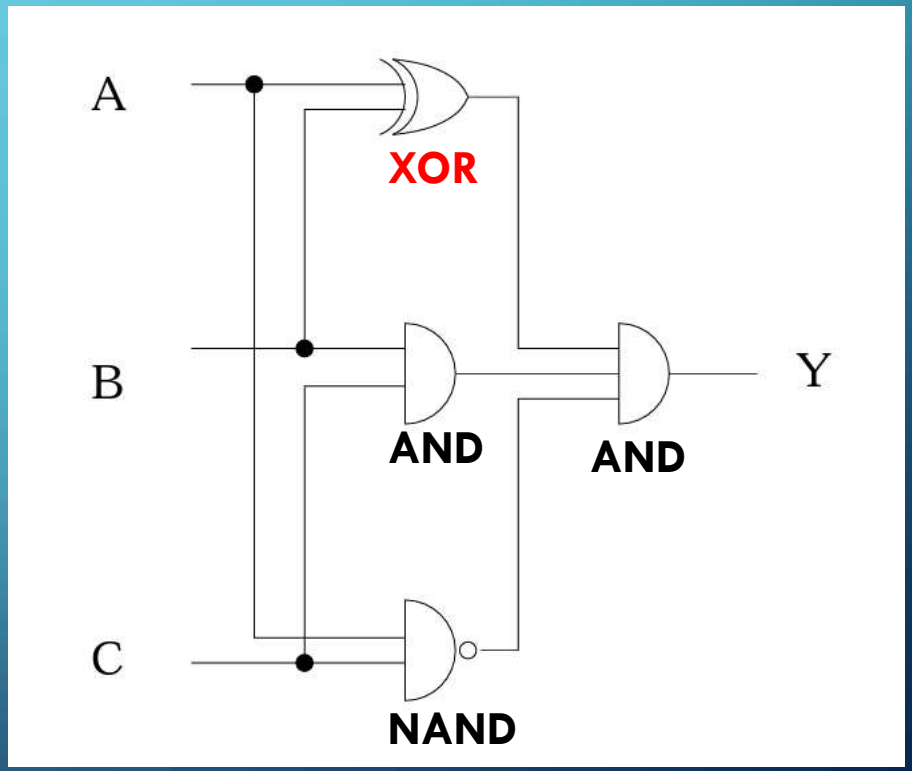
PROVIDE THE PRODUCT-OF-SUMS FUNCTION THAT IMPLEMENTS THE FOLLOWING COMBINATIONAL CIRCUIT

(A XOR B) = A'B + AB'



PROVIDE THE PRODUCT-OF-SUMS FUNCTION THAT IMPLEMENTS THE FOLLOWING COMBINATIONAL CIRCUIT

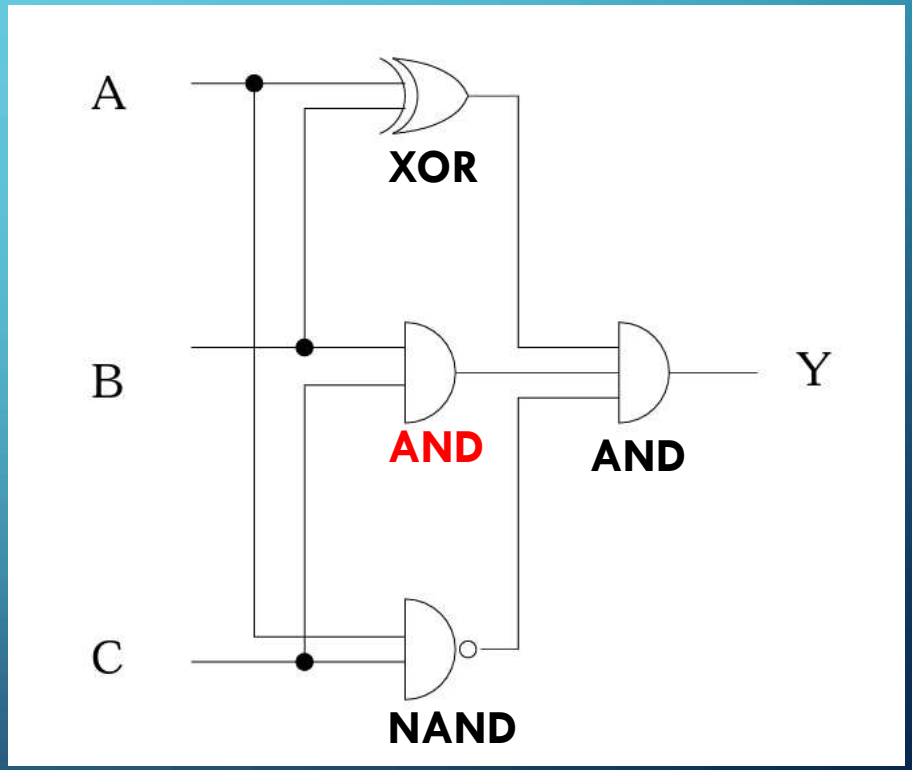
(A XOR B) = A'B + AB' = (A+B)(A'+B')



PROVIDE THE PRODUCT-OF-SUMS FUNCTION THAT IMPLEMENTS THE FOLLOWING COMBINATIONAL CIRCUIT

(A XOR B) = A'B + AB' = (A+B)(A'+B')

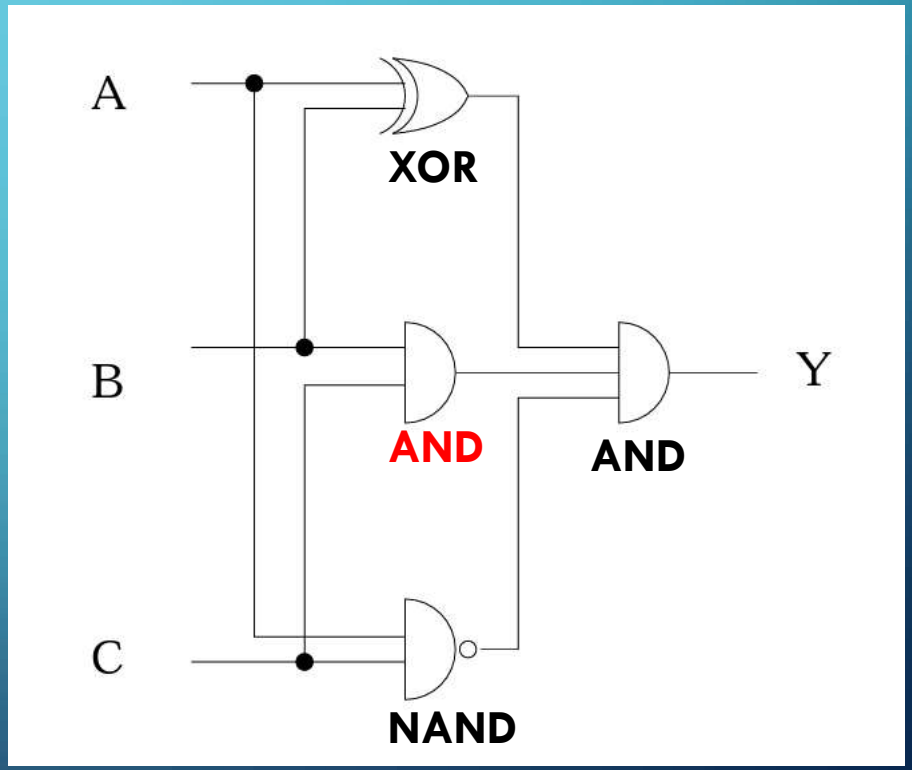
(B AND C)



PROVIDE THE PRODUCT-OF-SUMS FUNCTION THAT IMPLEMENTS THE FOLLOWING COMBINATIONAL CIRCUIT

(A XOR B) = A'B + AB' = (A+B)(A'+B')

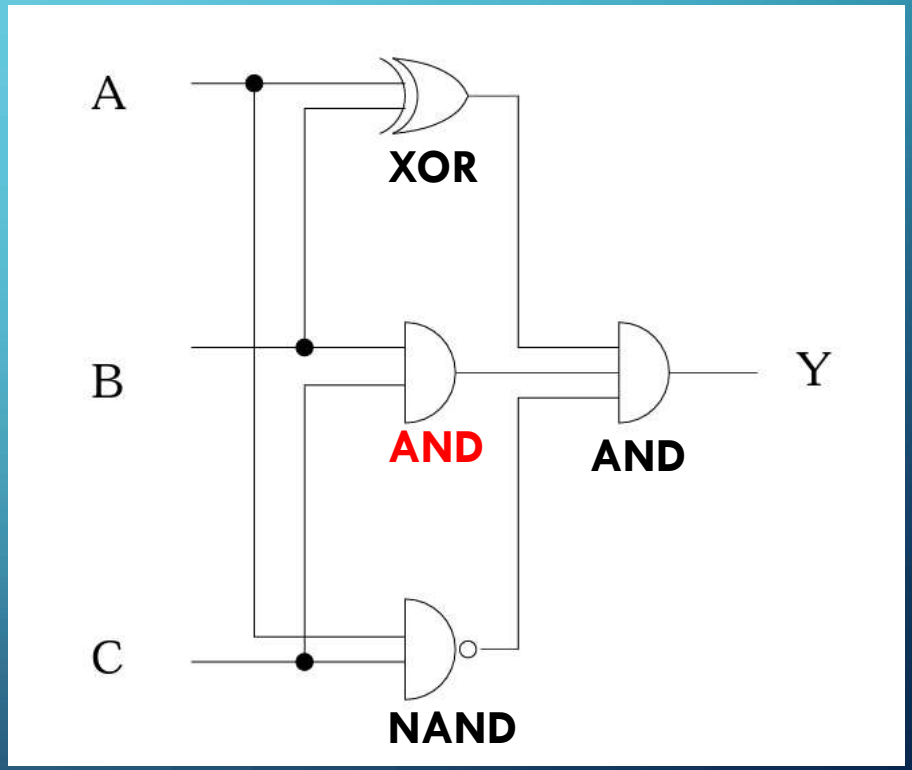
(B AND C) = BC



PROVIDE THE PRODUCT-OF-SUMS FUNCTION THAT IMPLEMENTS THE FOLLOWING COMBINATIONAL CIRCUIT

(A XOR B) = A'B + AB' = (A+B)(A'+B')

(B AND C) = BC = (B)(C)

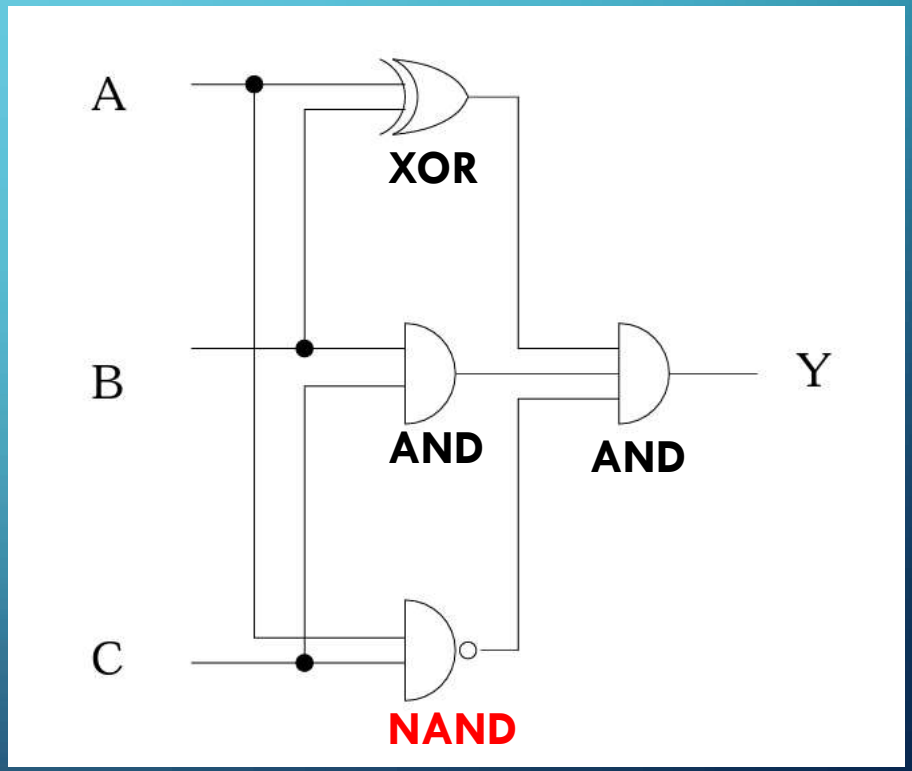


PROVIDE THE PRODUCT-OF-SUMS FUNCTION THAT IMPLEMENTS THE FOLLOWING COMBINATIONAL CIRCUIT

(A XOR B) = A'B + AB' = (A+B)(A'+B')

(B AND C) = BC = (B)(C)

(A NAND C)

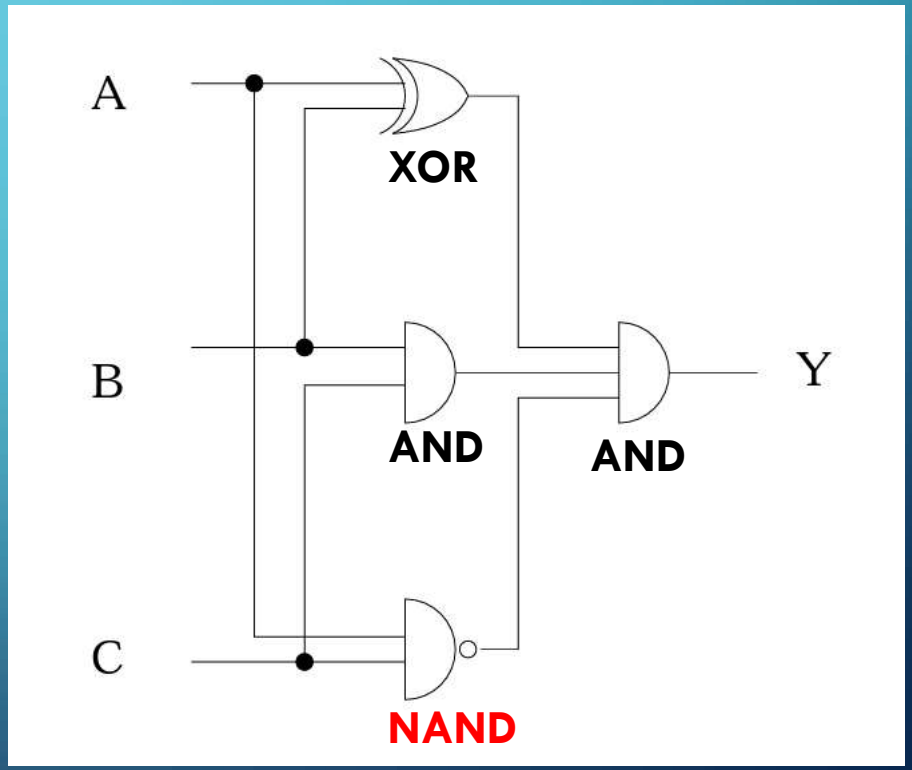


PROVIDE THE PRODUCT-OF-SUMS FUNCTION THAT IMPLEMENTS THE FOLLOWING COMBINATIONAL CIRCUIT

(A XOR B) = A'B + AB' = (A+B)(A'+B')

(B AND C) = BC = (B)(C)

(A NAND C) = (AC)'

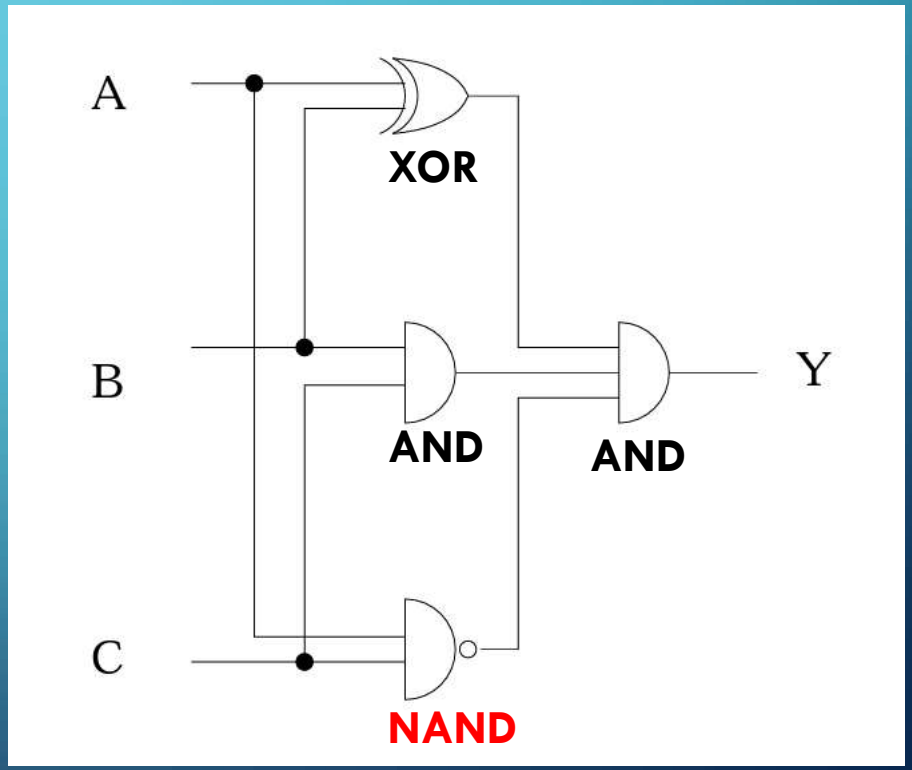


PROVIDE THE PRODUCT-OF-SUMS FUNCTION THAT IMPLEMENTS THE FOLLOWING COMBINATIONAL CIRCUIT

(A XOR B) = A'B + AB' = (A+B)(A'+B')

(B AND C) = BC = (B)(C)

(A NAND C) = (AC)' = (A'+C')



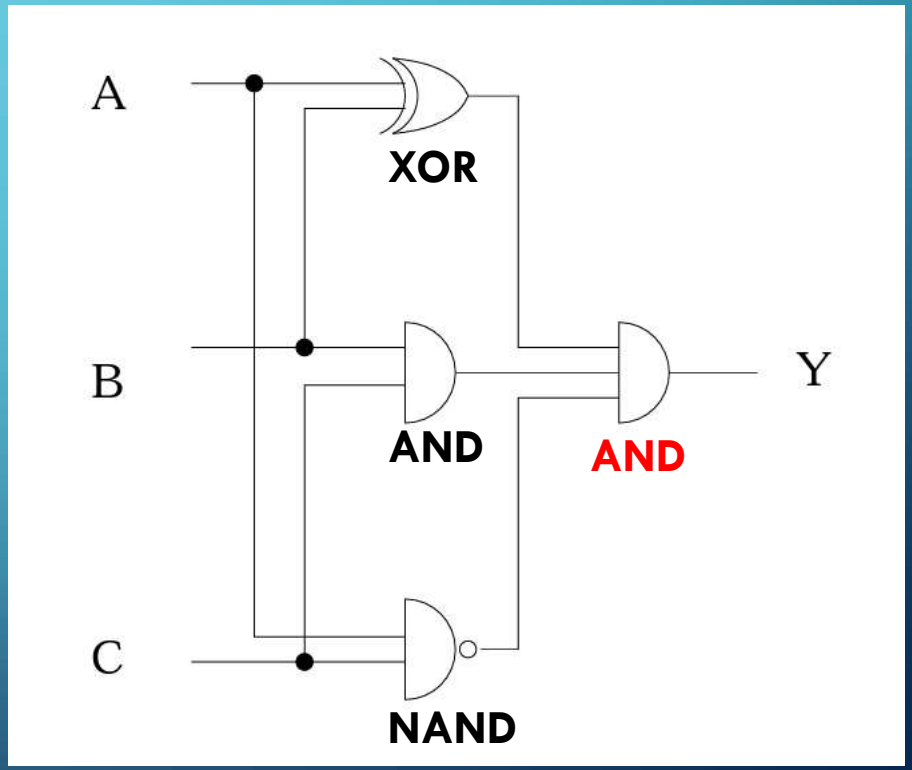
PROVIDE THE PRODUCT-OF-SUMS FUNCTION THAT IMPLEMENTS THE FOLLOWING COMBINATIONAL CIRCUIT

(A XOR B) = A'B + AB' = (A+B)(A'+B')

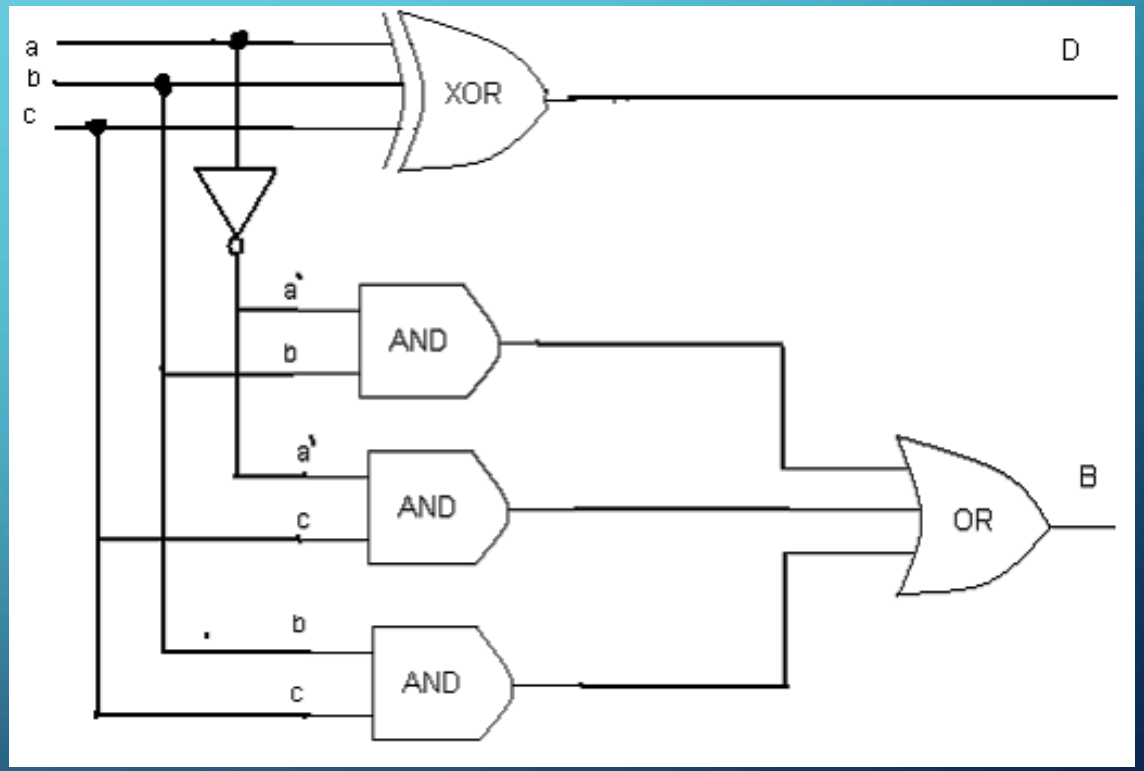
(B AND C) = BC = (B)(C)

(A NAND C) = (AC)' = (A'+C')

Y = (A+B)(A'+B')(B)(C)(A'+C')

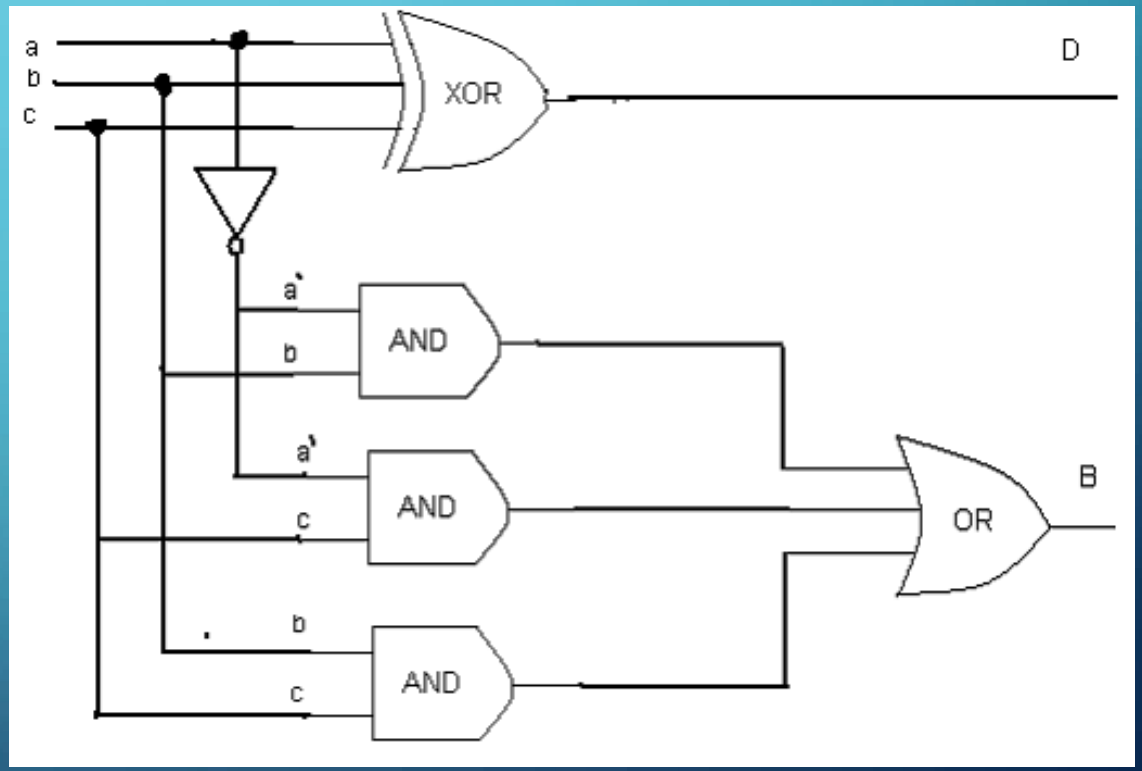


WHICH ARITHMETIC FUNCTION DOES THE FOLLOWING COMBINATIONAL CIRCUIT IMPLEMENT?



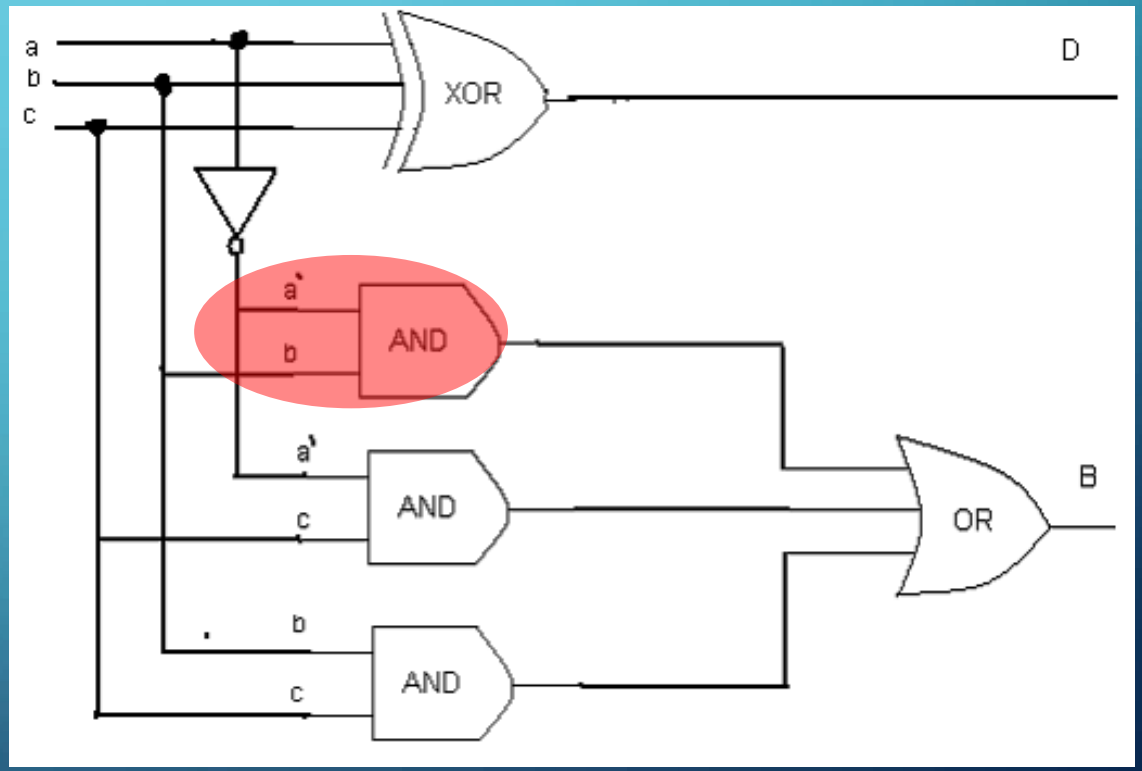
WHICH ARITHMETIC FUNCTION DOES THE FOLLOWING COMBINATIONAL CIRCUIT IMPLEMENT?

a	b	c	a'b	a'c	bc	D	B
0	0	0					
0	0	1					
0	1	0					
0	1	1					
1	0	0					
1	0	1					
1	1	0					
1	1	1					



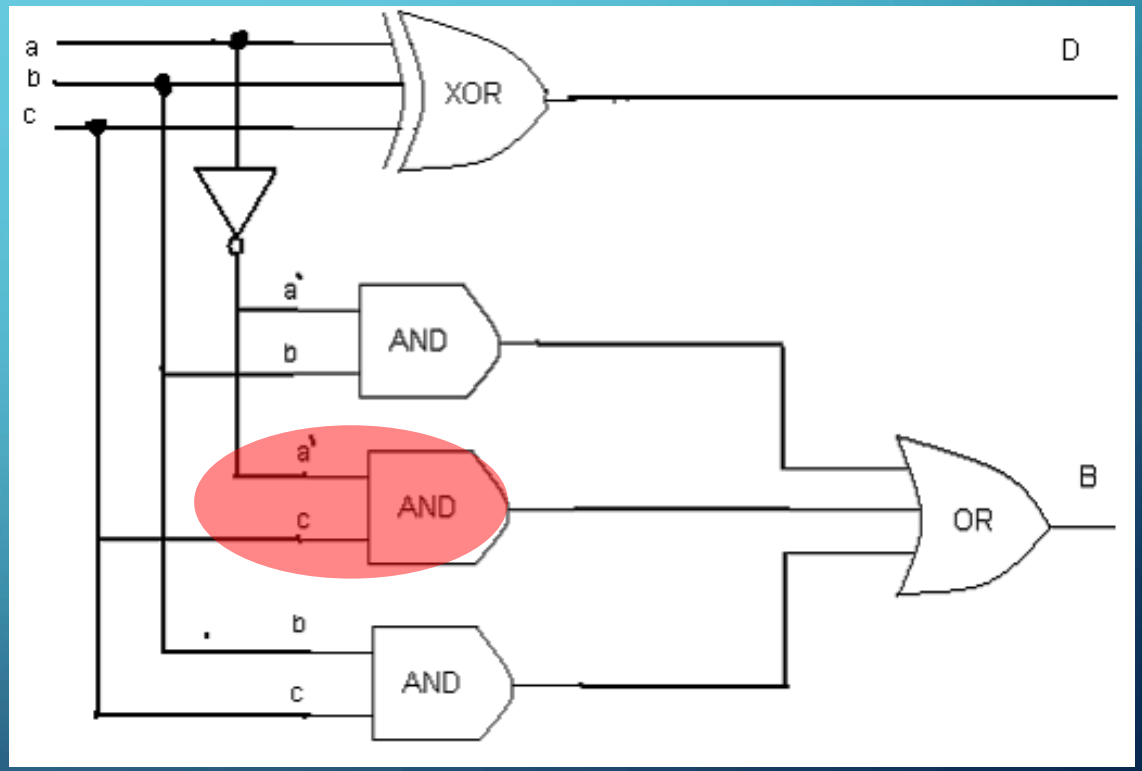
WHICH ARITHMETIC FUNCTION DOES THE FOLLOWING COMBINATIONAL CIRCUIT IMPLEMENT?

a	b	c	a'b	a'c	bc	D	B
0	0	0	0				
0	0	1	0				
0	1	0	1				
0	1	1	1				
1	0	0	0				
1	0	1	0				
1	1	0	0				
1	1	1	0				



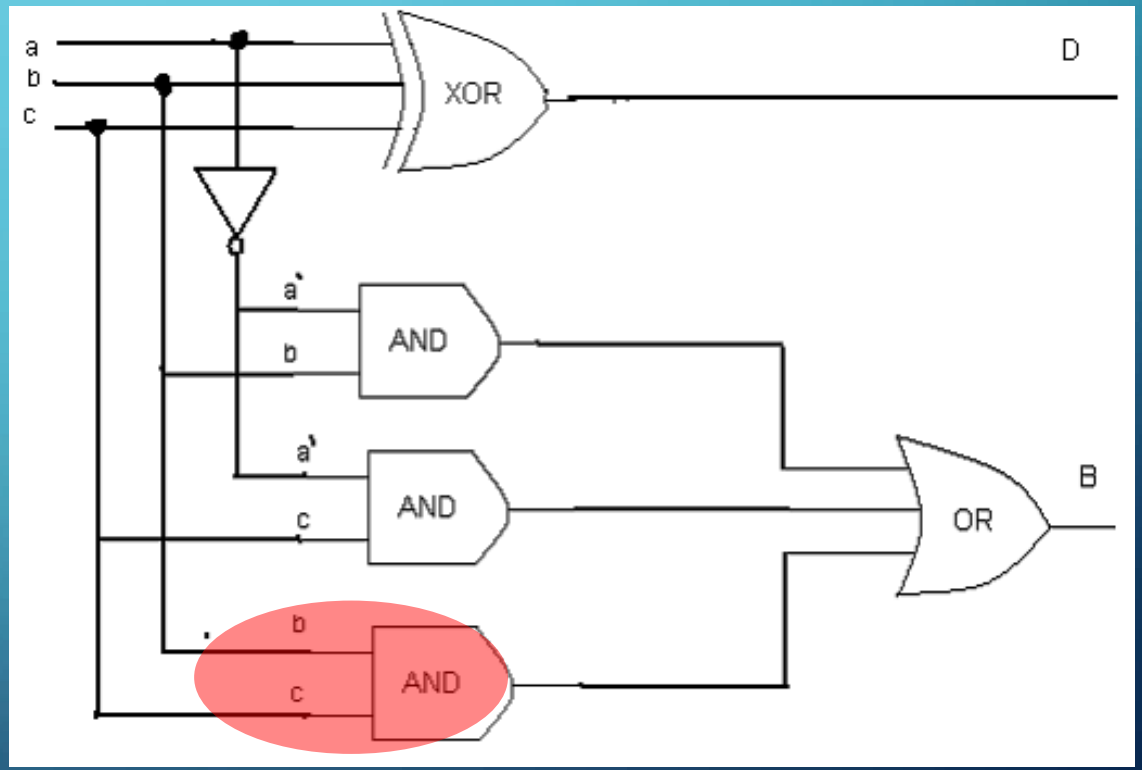
WHICH ARITHMETIC FUNCTION DOES THE FOLLOWING COMBINATIONAL CIRCUIT IMPLEMENT?

a	b	c	a'b	a'c	bc	D	B
0	0	0	0	0			
0	0	1	0	1			
0	1	0	1	0			
0	1	1	1	1			
1	0	0	0	0			
1	0	1	0	0			
1	1	0	0	0			
1	1	1	0	0			



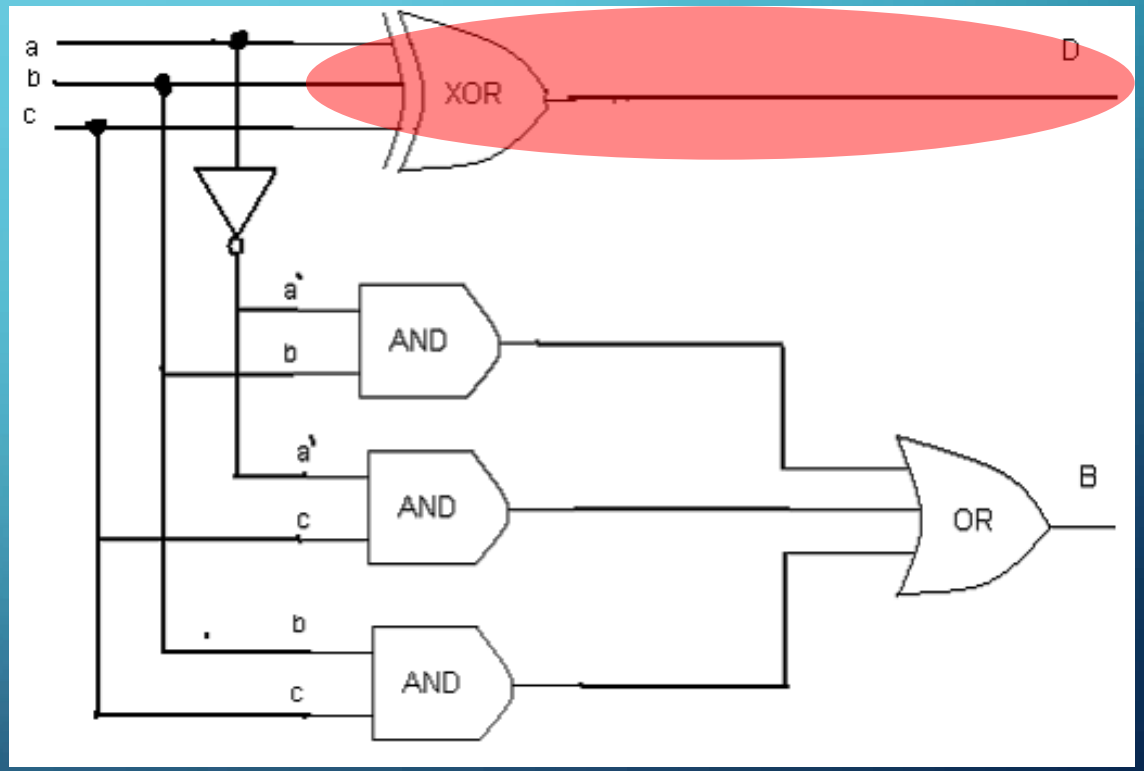
WHICH ARITHMETIC FUNCTION DOES THE FOLLOWING COMBINATIONAL CIRCUIT IMPLEMENT?

a	b	c	a'b	a'c	bc	D	B
0	0	0	0	0	0		
0	0	1	0	1	0		
0	1	0	1	0	0		
0	1	1	1	1	1		
1	0	0	0	0	0		
1	0	1	0	0	0		
1	1	0	0	0	0		
1	1	1	0	0	1		



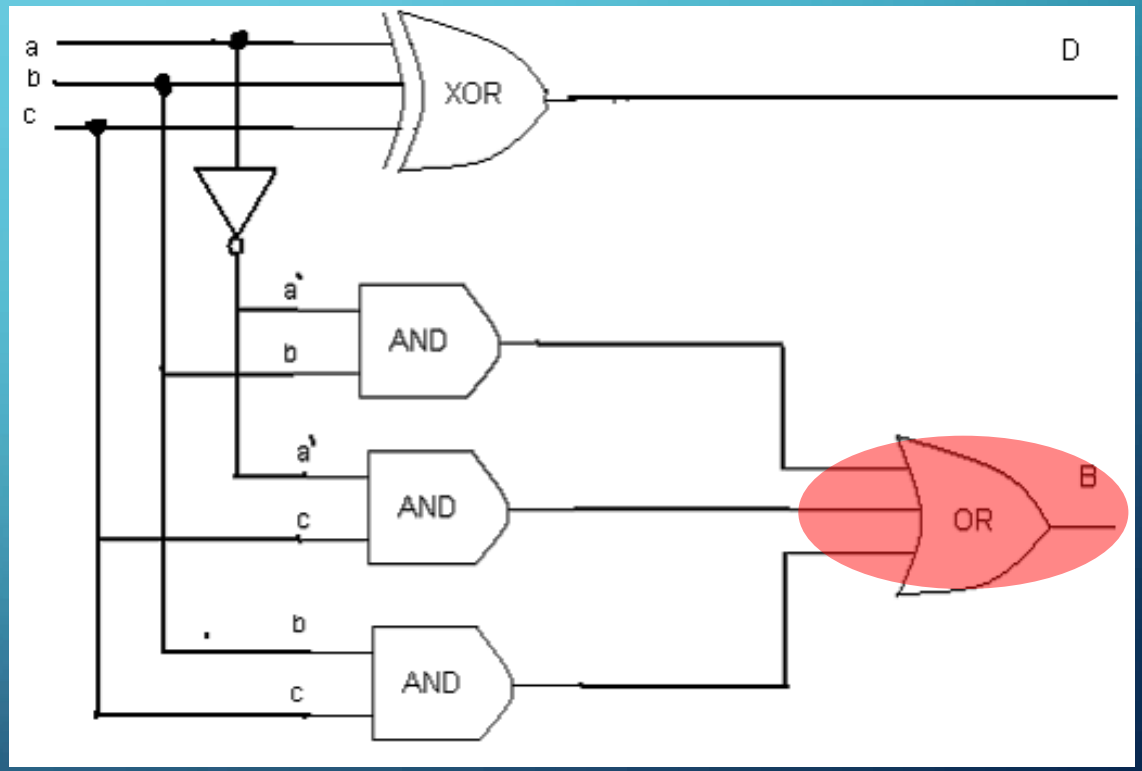
WHICH ARITHMETIC FUNCTION DOES THE FOLLOWING COMBINATIONAL CIRCUIT IMPLEMENT?

a	b	c	a'b	a'c	bc	D	B
0	0	0	0	0	0	0	
0	0	1	0	1	0	1	
0	1	0	1	0	0	1	
0	1	1	1	1	1	0	
1	0	0	0	0	0	1	
1	0	1	0	0	0	0	
1	1	0	0	0	0	0	
1	1	1	0	0	1	1	



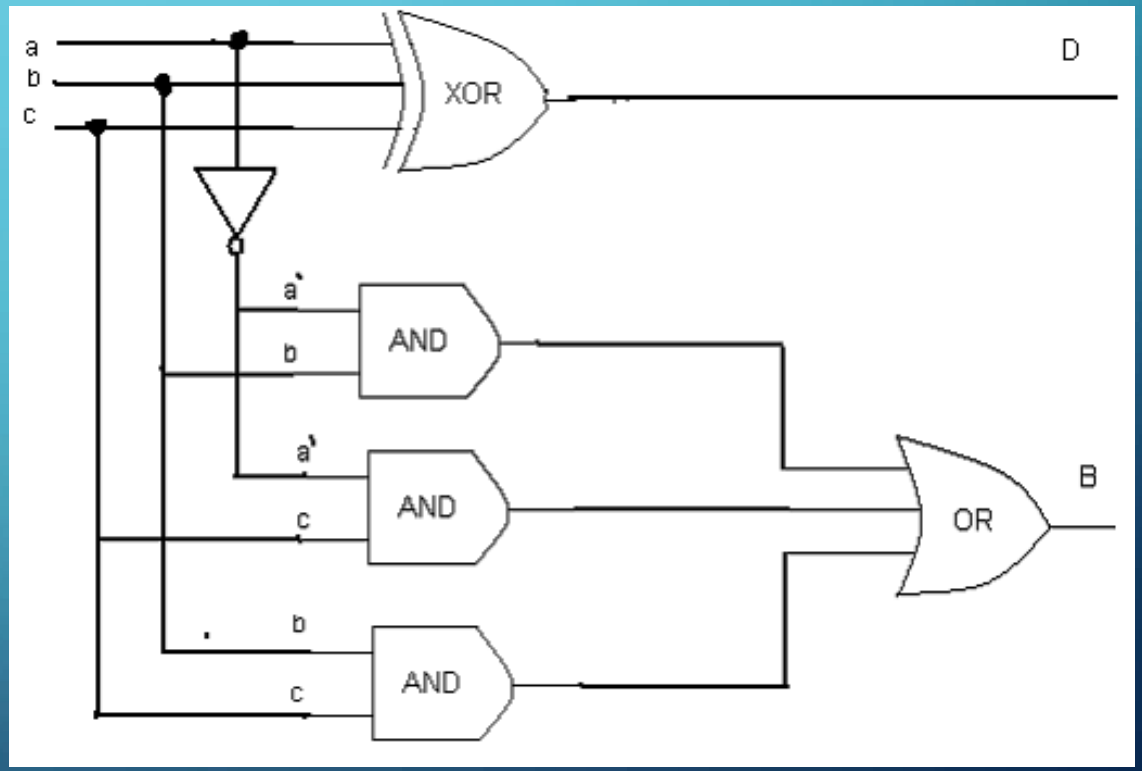
WHICH ARITHMETIC FUNCTION DOES THE FOLLOWING COMBINATIONAL CIRCUIT IMPLEMENT?

a	b	c	a'b	a'c	bc	D	B
0	0	0	0	0	0	0	0
0	0	1	0	1	0	1	1
0	1	0	1	0	0	1	1
0	1	1	1	1	1	0	1
1	0	0	0	0	0	1	0
1	0	1	0	0	0	0	0
1	1	0	0	0	0	0	0
1	1	1	0	0	1	1	1



WHICH ARITHMETIC FUNCTION DOES THE FOLLOWING COMBINATIONAL CIRCUIT IMPLEMENT?

a	b	c	D	B
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1



WHICH ARITHMETIC FUNCTION DOES THE FOLLOWING COMBINATIONAL CIRCUIT IMPLEMENT?

a	b	c	D	B
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

Full subtractor:

A circuit used for the subtraction of three input bits: minuend *a*, subtrahend *b*, and borrow in *c*.

WHICH ARITHMETIC FUNCTION DOES THE FOLLOWING COMBINATIONAL CIRCUIT IMPLEMENT?

a	b	c	D	B
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

Full subtractor:

A circuit used for the subtraction of three input bits: minuend *a*, subtrahend *b*, and borrow in *c*.

It generates two output bits: difference *D* and borrow out *B*.

WHICH ARITHMETIC FUNCTION DOES THE FOLLOWING COMBINATIONAL CIRCUIT IMPLEMENT?

a	b	c	D	B
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

Full subtractor:

A circuit used for the subtraction of three input bits: minuend *a*, subtrahend *b*, and borrow in *c*.

It generates two output bits: difference *D* and borrow out *B*.

The borrow in c is set when the previous digit is borrowed from *a*. Thus, the subtrahend *b* and borrow in c are both subtracted from *a*.

WHICH ARITHMETIC FUNCTION DOES THE FOLLOWING COMBINATIONAL CIRCUIT IMPLEMENT?

a	b	c	D	B
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

Full subtractor:

A circuit used for the subtraction of three input bits: minuend *a*, subtrahend *b*, and borrow in *c*.

It generates two output bits: difference *D* and borrow out *B*.

The borrow in c is set when the previous digit is borrowed from *a*. Thus, the subtrahend *b* and borrow in c are both subtracted from *a*.

A borrow out *B* needs to be generated when $a < b + c$. When a borrow out is generated, 2 is added in the current digit.

Therefore, the computed difference is $D = a - b - c + 2B$.