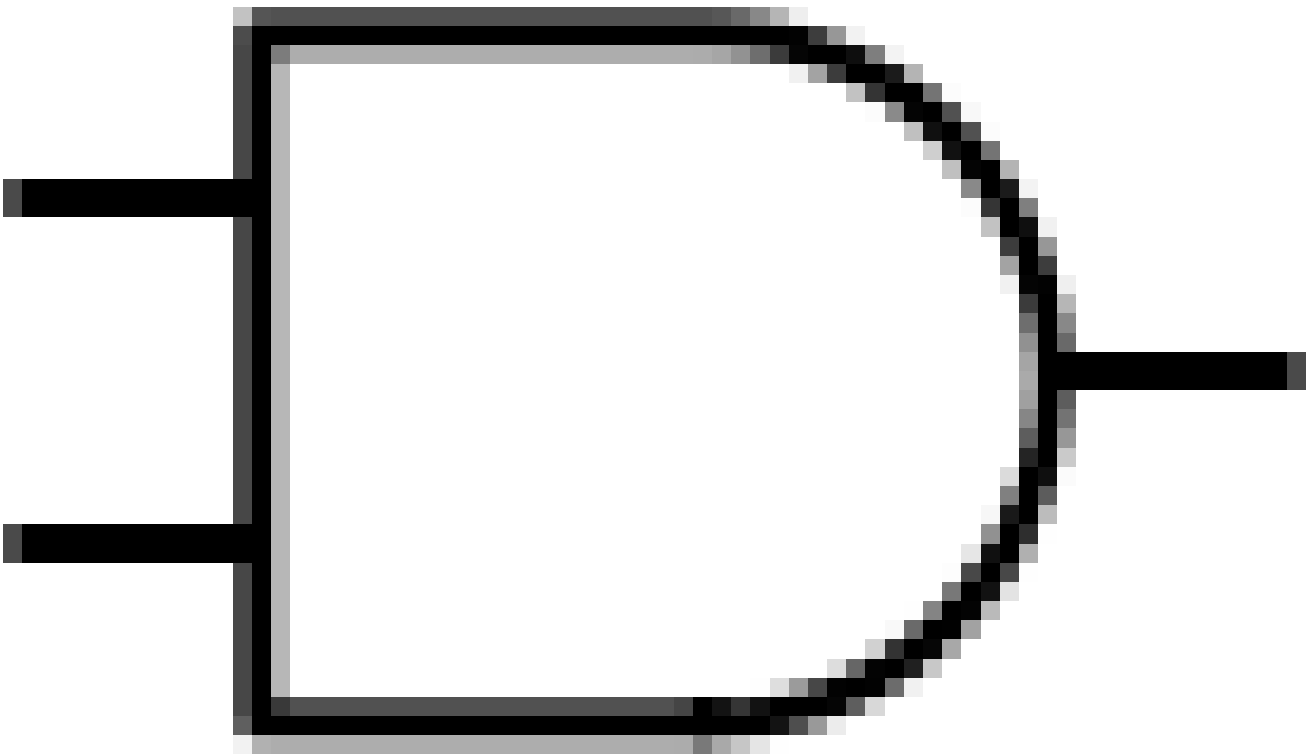


### Question 1:

What is the output of the AND gate with inputs 1, 0?



Options:

1. 1

2. 0

Correct Answer: 0

## Question 2:

Are these two circuits equivalent?

Expression 1:  $(((((a \text{ xnor } a) \text{ or } (a \text{ xor } b)) \text{ xor } ((c \text{ xnor } c) \text{ xnor } (\text{not } c))) \text{ or } (((a \text{ or } c) \text{ and } (a \text{ or } b)) \text{ or } ((c \text{ xor } b) \text{ nor } (c \text{ xor } a)))) \text{ nand } (((c \text{ and } c) \text{ and } (b \text{ or } a)) \text{ xnor } ((a \text{ or } a) \text{ nor } (a \text{ or } a))) \text{ and } (((\text{not } b) \text{ nor } (b \text{ xnor } b)) \text{ xor } ((b \text{ and } c) \text{ nor } (b \text{ and } c))))$

Expression 2:  $(((((a \text{ xnor } a) \text{ or } (a \text{ xor } b)) \text{ xor } ((c \text{ xnor } c) \text{ xnor } (\text{not } c))) \text{ or } (((a \text{ or } c) \text{ and } (a \text{ or } b)) \text{ or } ((c \text{ xor } b) \text{ nor } (c \text{ xor } a)))) \text{ nand } (((c \text{ and } c) \text{ and } (b \text{ or } a)) \text{ xnor } ((a \text{ or } a) \text{ nor } (a \text{ or } a))) \text{ and } (((\text{not } b) \text{ nor } (b \text{ xnor } b)) \text{ xor } ((b \text{ and } c) \text{ nor } (b \text{ and } c))))$





Options:

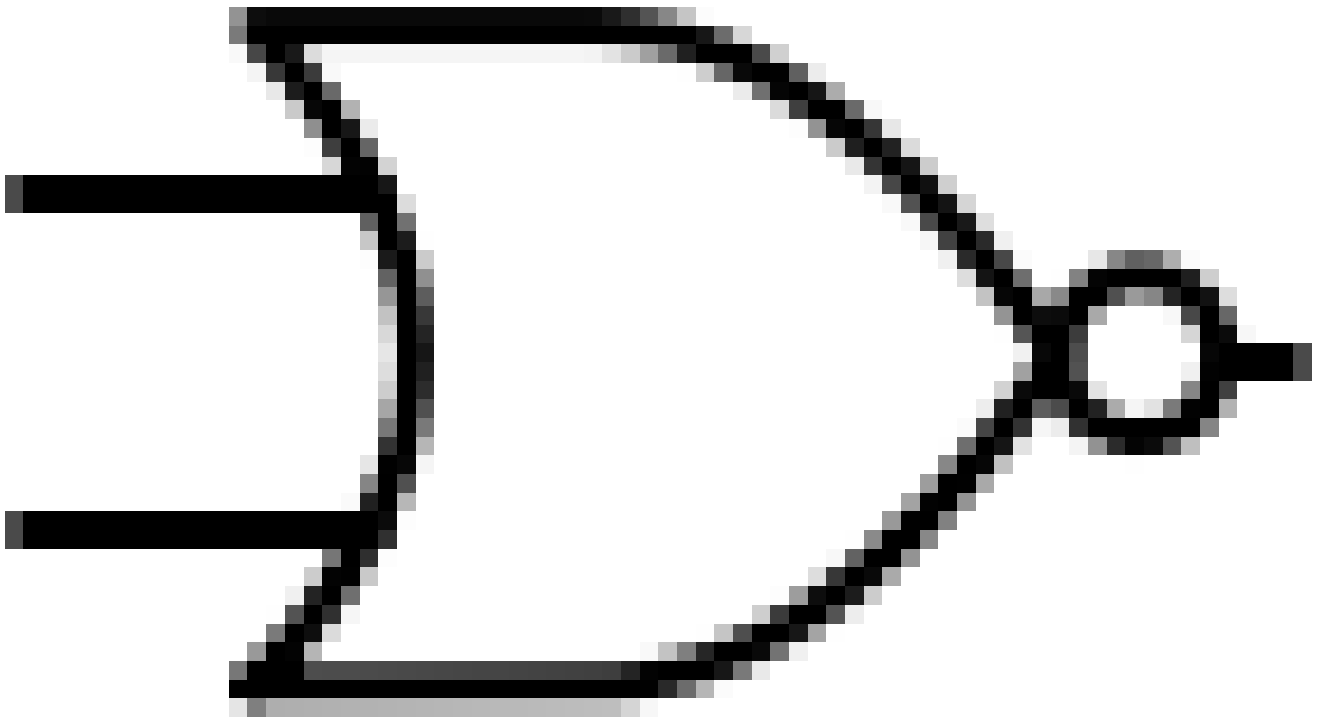
1. Yes

2. No

Correct Answer: yes

### Question 3:

What is the output of the NOR gate with inputs 0, 0?



Options:

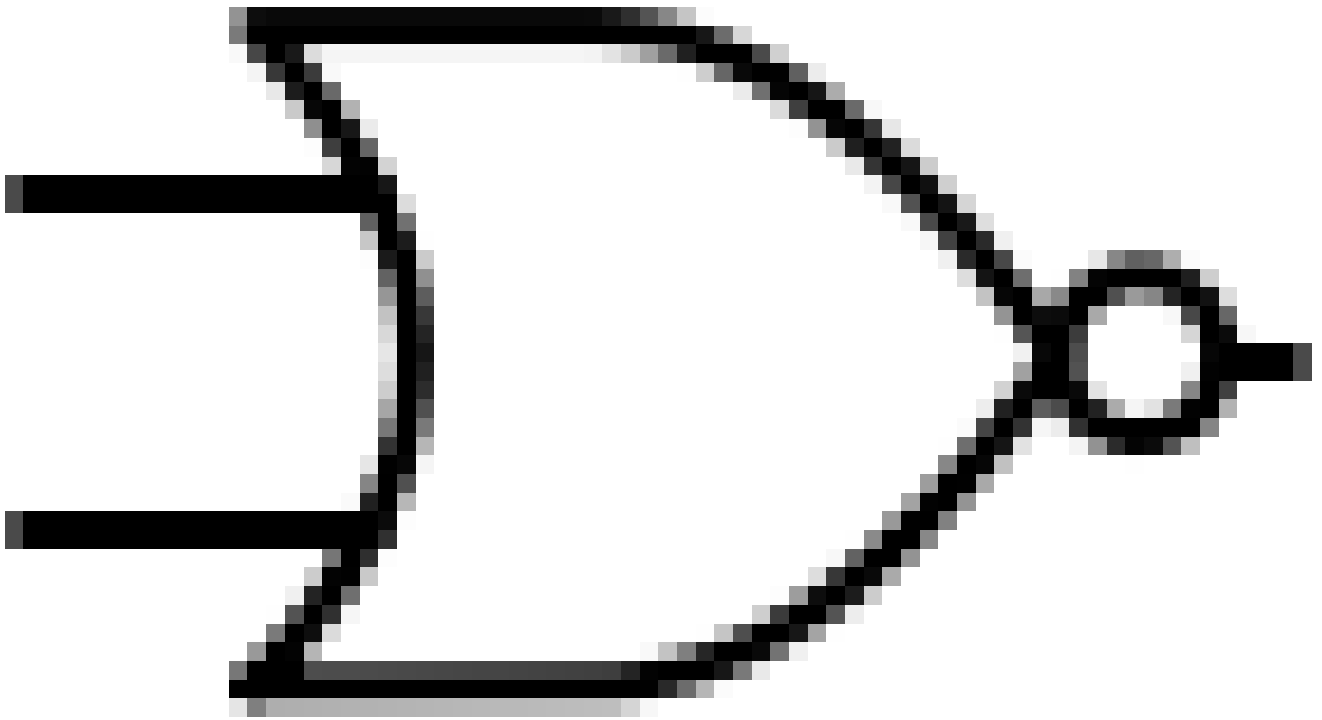
1. 1

2. 0

Correct Answer: 1

#### Question 4:

What is the output of the NOR gate with inputs 1, 1?



Options:

1. 1

2. 0

Correct Answer: 0

### Question 5:

Are these two circuits equivalent?

Expression 1:  $(((((b \oplus b) \wedge (b \downarrow c)) \oplus ((b \oplus c) \downarrow (c \vee c))) \oplus (\neg((b \downarrow b) \oplus (c \oplus a)))) \downarrow (((b \downarrow b) \oplus (c \downarrow a)) \oplus ((b \downarrow b) \wedge (c \oplus a)) \downarrow (((a \oplus b) \oplus (b \downarrow b)) \downarrow ((a \oplus b) \wedge (b \downarrow b))))$

Expression 2:  $(((((b \oplus b) \wedge (b \downarrow c)) \oplus ((b \oplus c) \downarrow (c \vee c))) \oplus (\neg((b \downarrow b) \oplus (c \oplus a)))) \downarrow (((b \downarrow b) \oplus (c \downarrow a)) \oplus ((b \downarrow b) \wedge (c \oplus a)) \downarrow (((a \oplus b) \oplus (b \downarrow b)) \downarrow ((a \oplus b) \wedge (b \downarrow b))))$







Options:

1. Yes

2. No

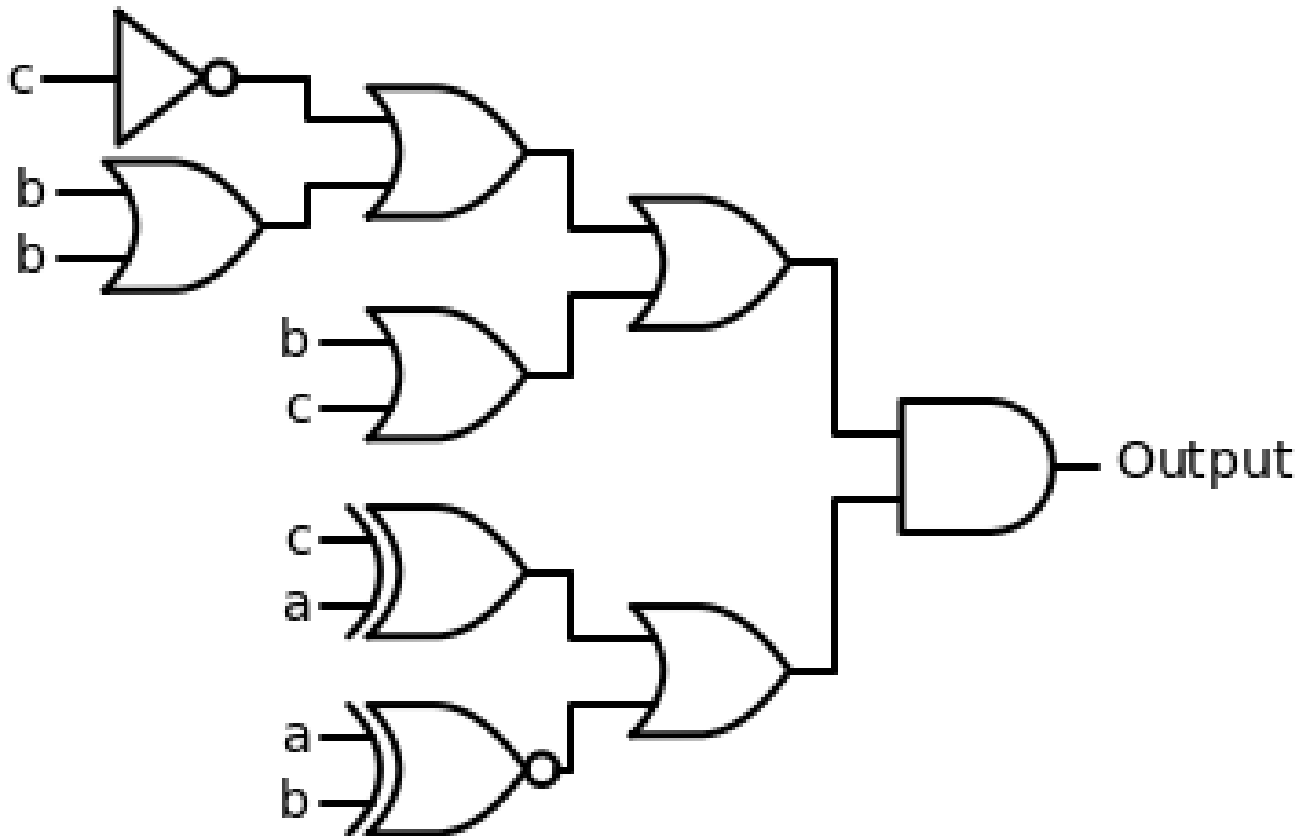
Correct Answer: yes

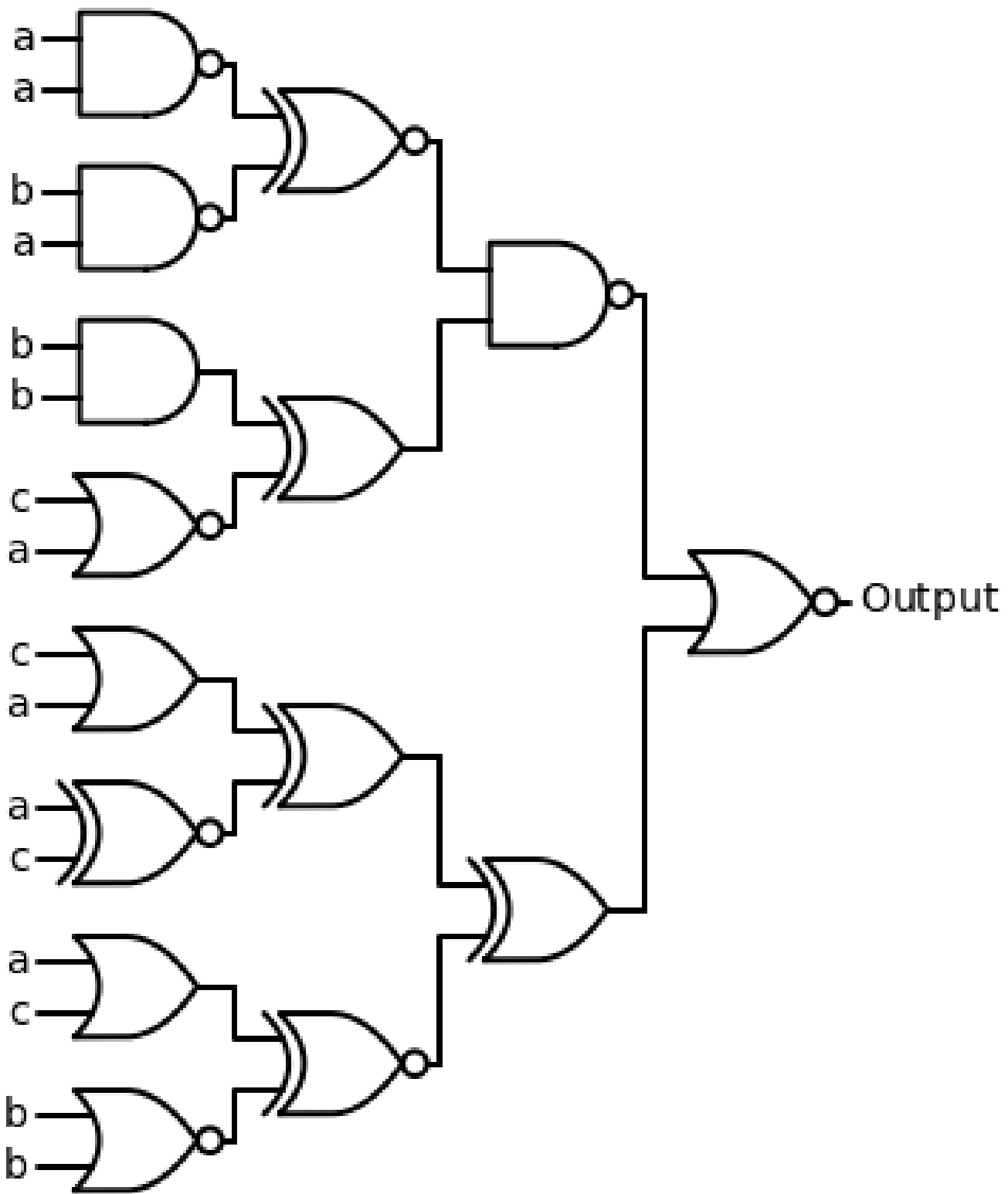
### Question 6:

Are these two circuits equivalent?

Expression 1:  $((((\text{not } c) \text{ or } (b \text{ or } b)) \text{ or } (\text{not } (b \text{ nor } c))) \text{ and } (\text{not } ((c \text{ xor } a) \text{ nor } (a \text{ xnor } b))))$

Expression 2:  $((((a \text{ nand } a) \text{ xnor } (b \text{ nand } a)) \text{ nand } ((b \text{ and } b) \text{ xor } (c \text{ nor } a))) \text{ nor } (((c \text{ or } a) \text{ xor } (a \text{ xnor } c)) \text{ xor } ((a \text{ or } c) \text{ xnor } (b \text{ nor } b))))$





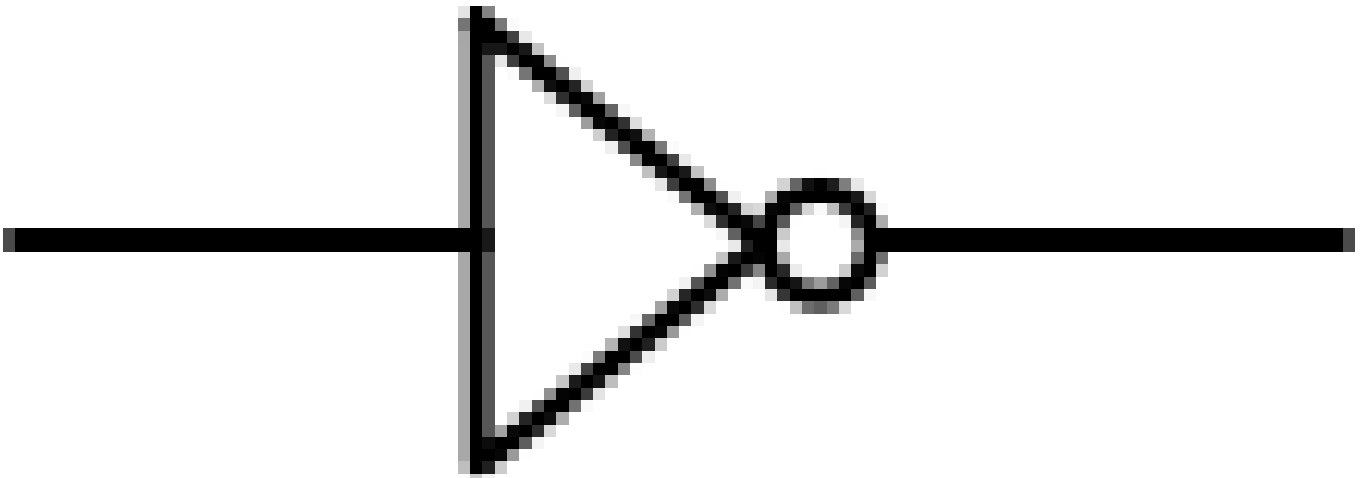
Options:

1. Yes
2. No

Correct Answer: no

Question 7:

What is the output of the NOT gate with input 1?



Options:

1. 0

2. 1

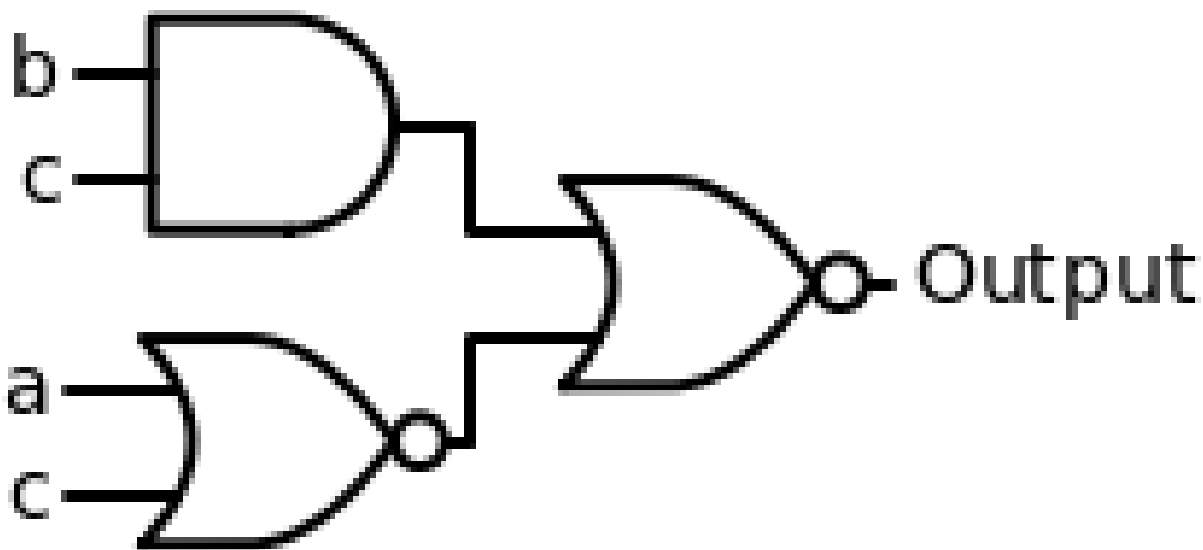
Correct Answer: 0

### Question 8:

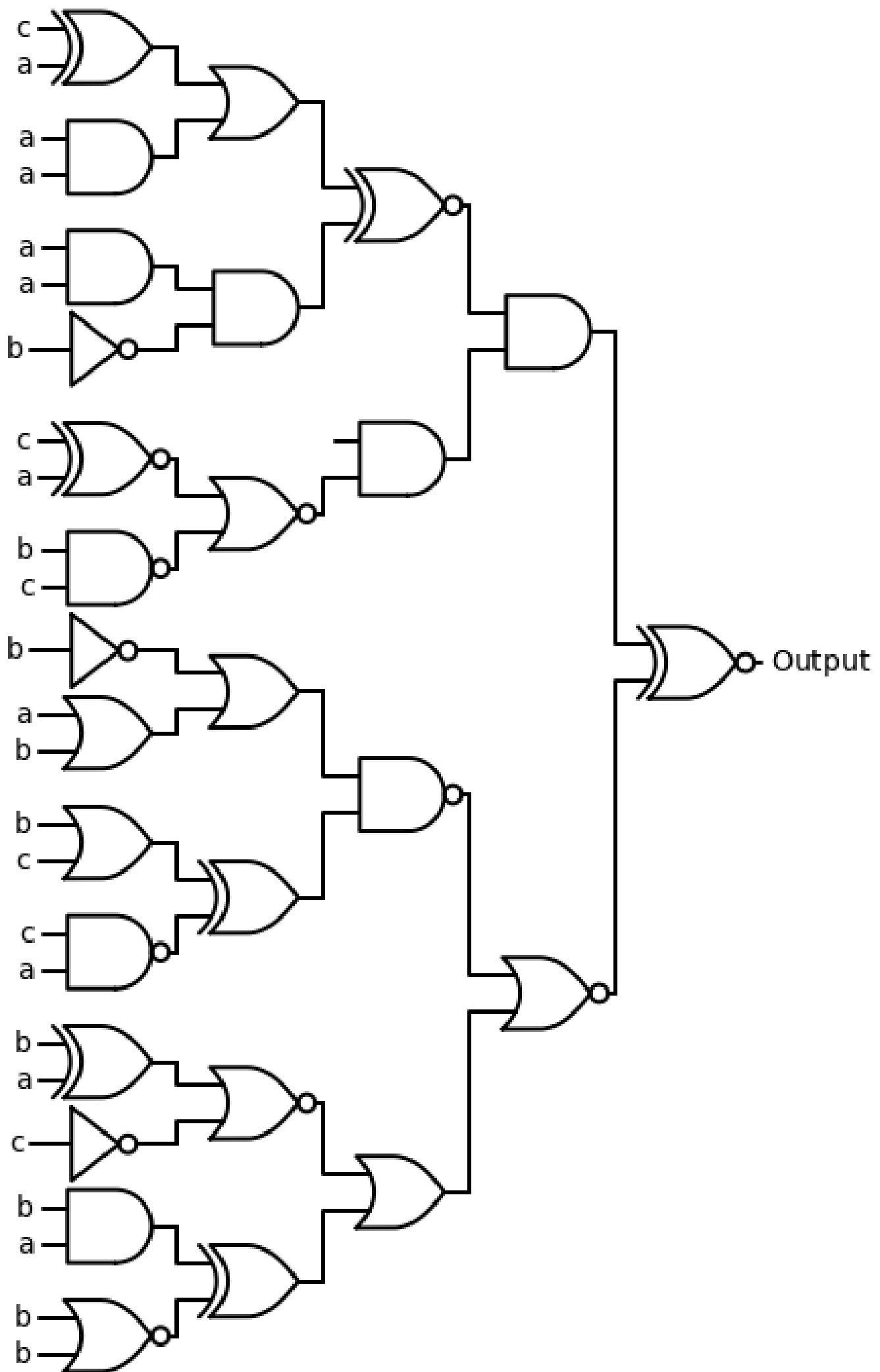
Are these two circuits equivalent?

Expression 1:  $((b \text{ and } c) \text{ nor } (a \text{ nor } c))$

Expression 2:  $(((((c \text{ xor } a) \text{ or } (a \text{ and } a)) \text{ xnor } ((a \text{ and } a) \text{ and } (\text{not } b))) \text{ and } ((\text{not } (\text{not } b)) \text{ and } ((c \text{ xnor } a) \text{ nor } (b \text{ nand } c)))) \text{ xnor } ((((\text{not } b) \text{ or } (a \text{ or } b)) \text{ nand } ((b \text{ or } c) \text{ xor } (c \text{ nand } a))) \text{ nor } (((b \text{ xor } a) \text{ nor } (\text{not } c)) \text{ or } ((b \text{ and } a) \text{ xor } (b \text{ nor } b))))))$







Options:

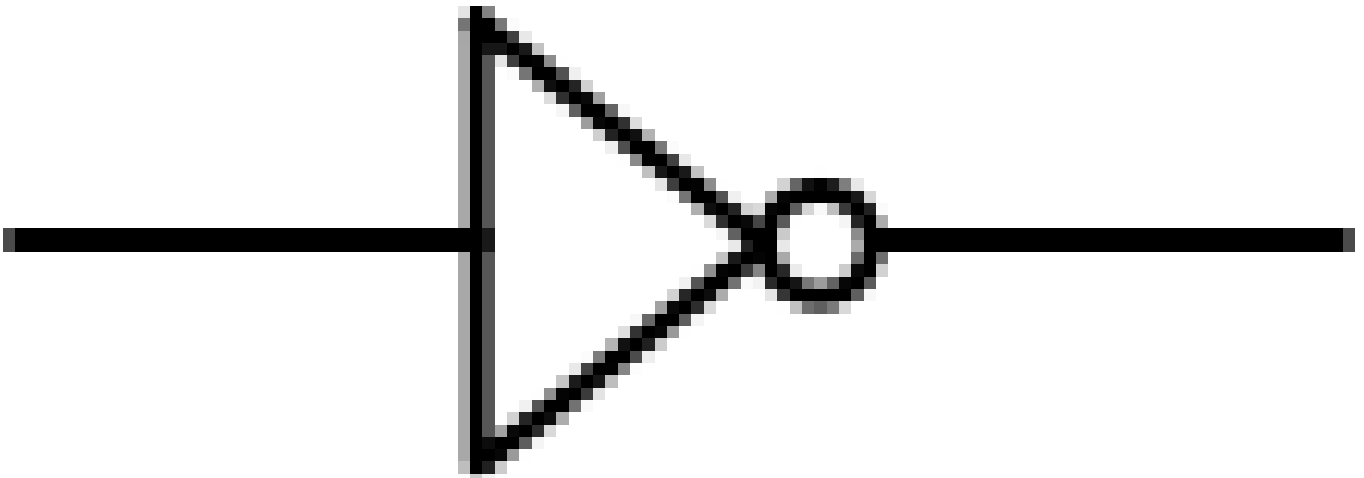
1. Yes

2. No

Correct Answer: no

Question 9:

What is the output of the NOT gate with input 0?



Options:

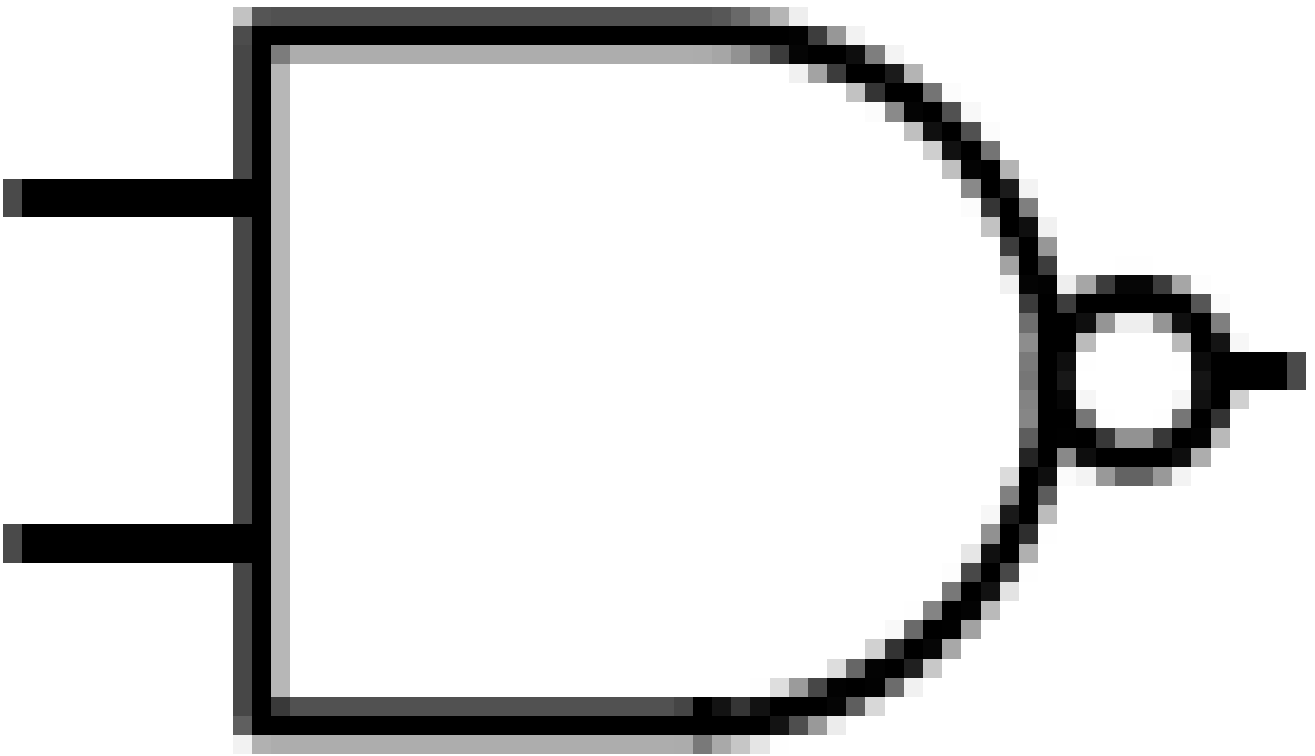
1. 0

2. 1

Correct Answer: 1

Question 10:

What is the output of the NAND gate with inputs 1, 0?



Options:

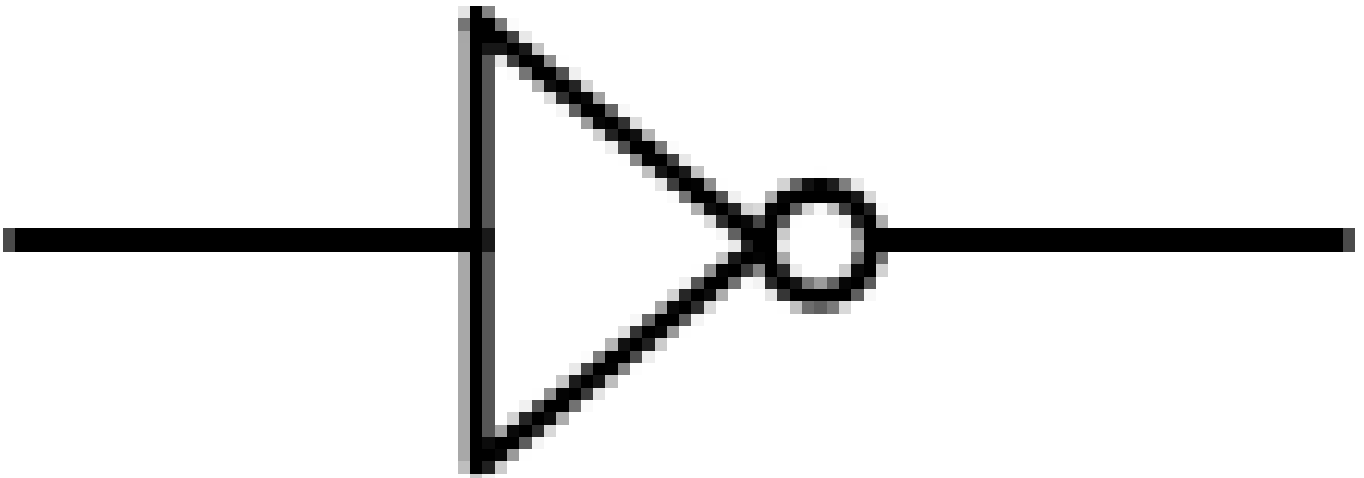
1. 1

2. 0

Correct Answer: 1

Question 11:

What is the output of the NOT gate with input 0?



Options:

1. 0

2. 1

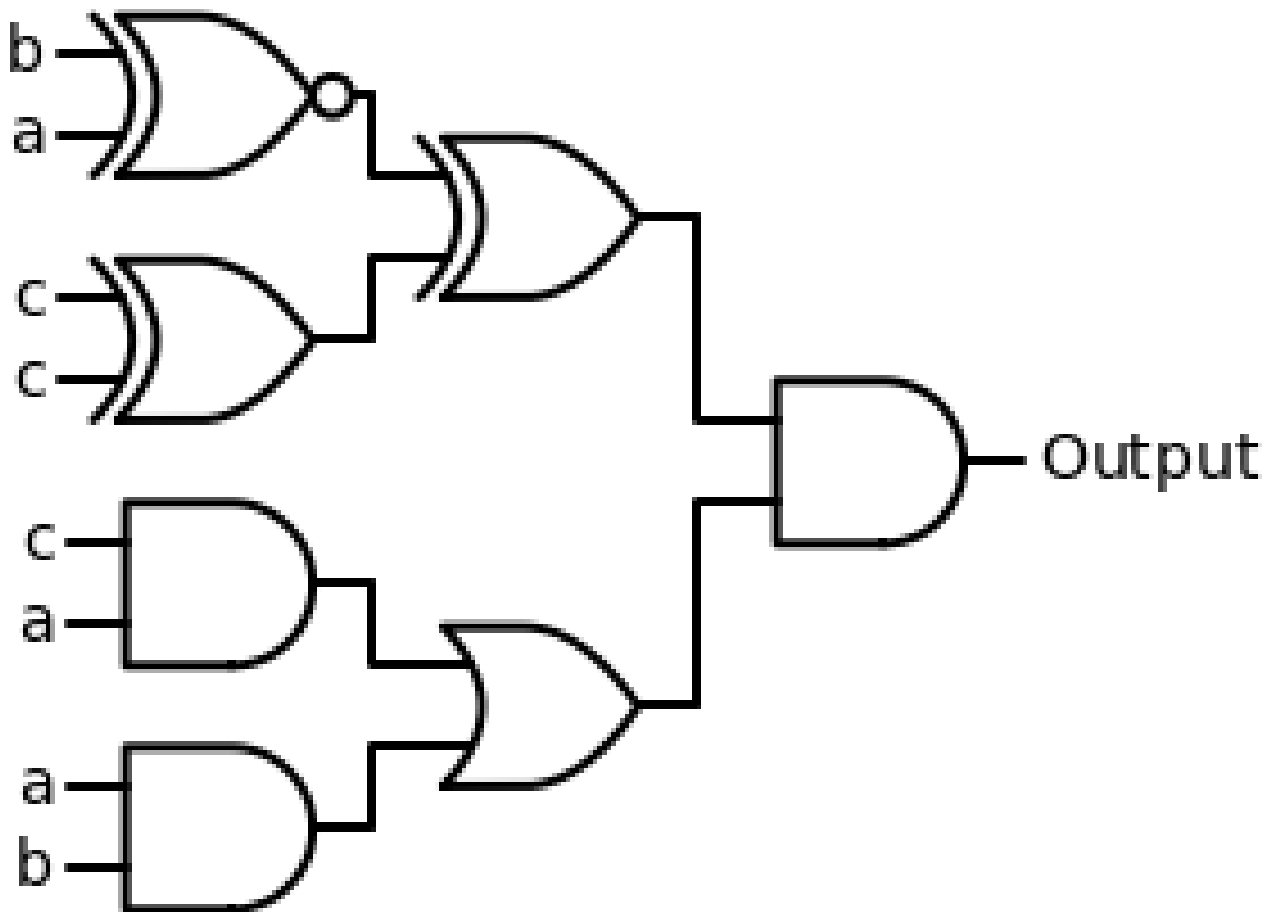
Correct Answer: 1

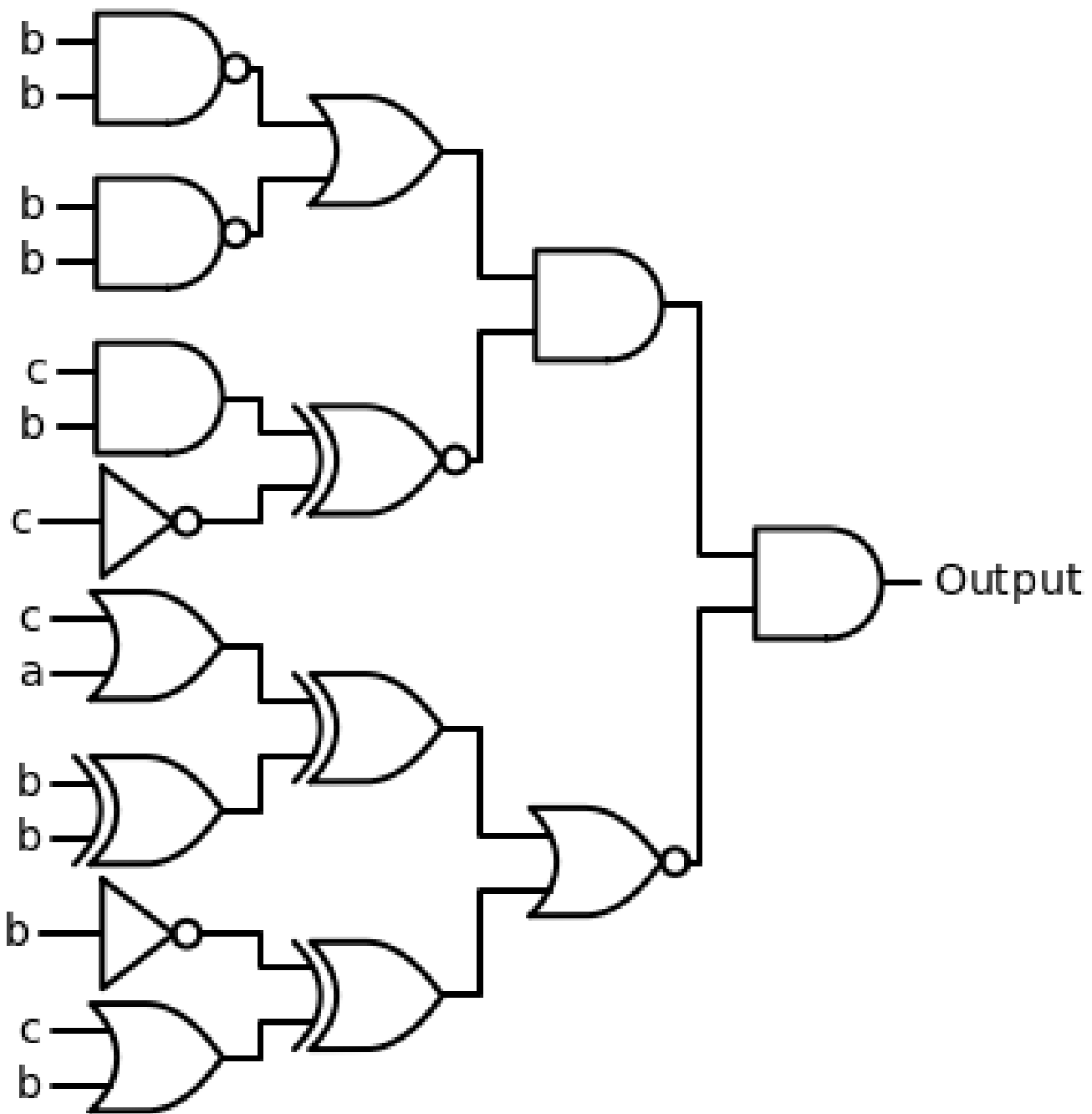
Question 12:

Are these two circuits equivalent?

Expression 1:  $((b \oplus a) \oplus (c \oplus c)) \text{ and } ((c \text{ and } a) \text{ or } (a \text{ and } b))$

Expression 2:  $((b \text{ nand } b) \text{ or } (b \text{ nand } b)) \text{ and } ((c \text{ and } b) \text{ xnor } (\text{not } c)) \text{ and } (((c \text{ or } a) \text{ xor } (b \text{ xor } b)) \text{ nor } ((\text{not } b) \text{ xor } (c \text{ or } b))))$





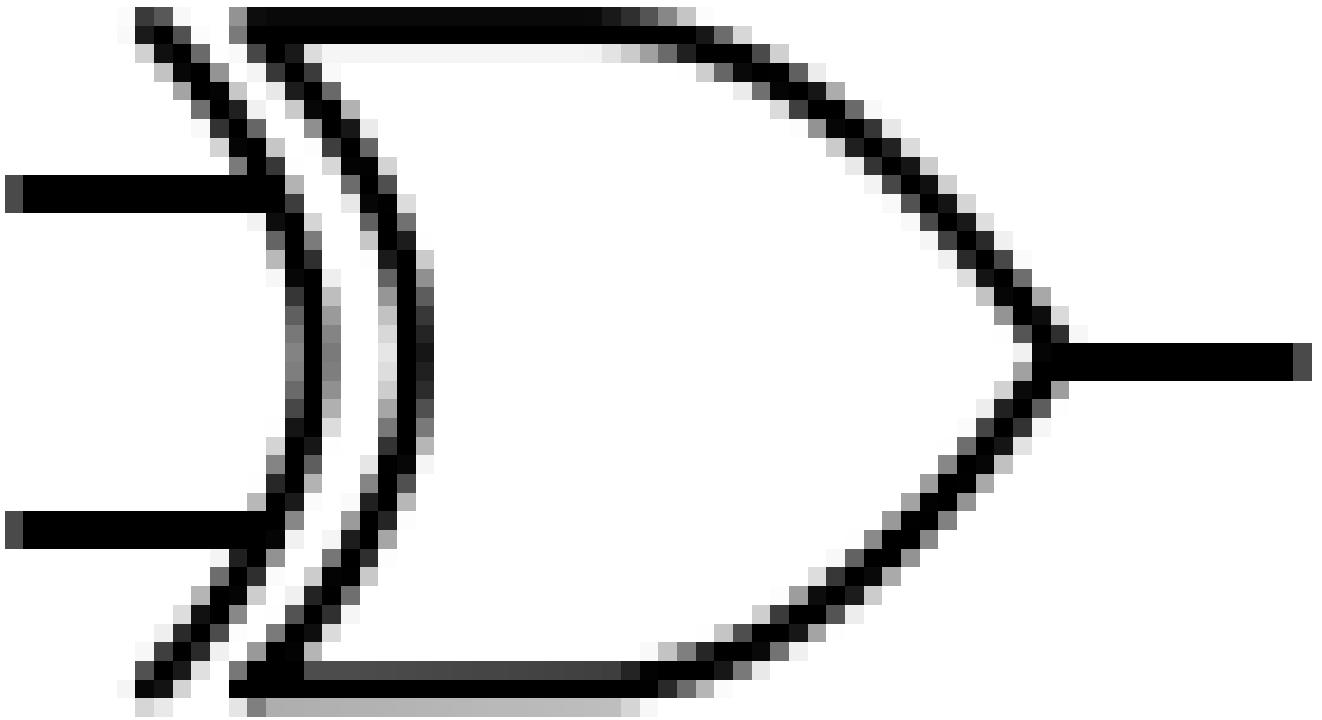
Options:

1. Yes
2. No

Correct Answer: no

Question 13:

What is the output of the XOR gate with inputs 1, 0?



Options:

1. 1

2. 0

Correct Answer: 1