LOGIC GATE

Quiz 3:

<http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/gatesfunc/QuizFrameSet.htm>

|  |  |  |
| --- | --- | --- |
| **type** | **NAND construction** | **NOR construction** |
| NOT |  |  |
| AND |  |  |
| NAND |  |  |
| OR |  |  |
| NOR |  |  |
| XOR |  |  |
| XNOR |  |  |

1. What does an EXOR gate do?

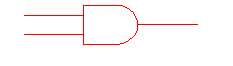
 Give a high output when one or more of its inputs are high

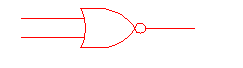
 Give a high output when only one of its inputs are high

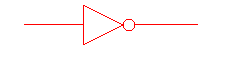
 Give a low output when one or more of its inputs are high

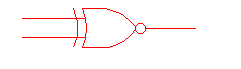
 Give a low output when only one of its inputs are high

2. Which of the following symbols represents a NOR gate?

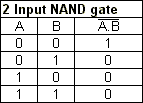
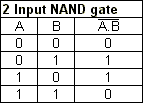
 A

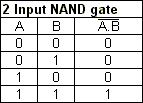
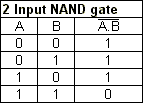
 B

 C

D

3. Which one of the following truth tables represents the behavoir a NAND gate?

 A   B 

 C   D 

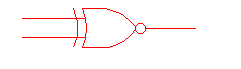
4. What does connecting together the inputs of NAND and NOR gates do?

* Help produce multi-input gates
* Produce and EXNOR gate
* Produce a NOT gate
* Damage the gate

5. How do you make a NAND gate out of an AND gate using inverters (NOT gates)?

* Invert the output from the AND gate
* Invert both the inputs to the AND gate
* Invert one of the inputs to the AND gate
* Invert both the inputs and output of the AND gate

6. What type of logic gate does this symbol represent?



* Exclusive OR
* Exclusive NOR
* OR
* NOR

7. How do you make a NOR gate out of an NAND gate using inverters (NOT gates)?

* Invert the output from the NAND gate
* Invert both the inputs to the NAND gate
* Invert one of the inputs to the NAND gate
* Invert both the inputs and output of the NAND gate

A B NOR Not A NotB NAND(NotA,NotB) OR(notA,NotB)

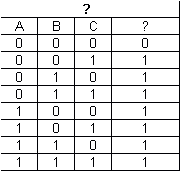
0 0 1 1 1 0 1

0 1 0 1 0 1 1

1 0 0 0 1 1 1

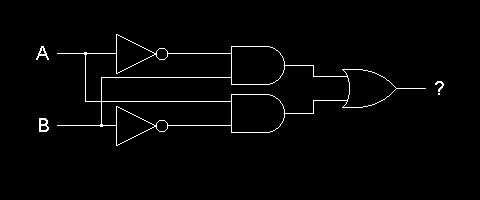
1 1 0 0 0 1 0

8. What type of logic gate's behaviour does this truth table represent?



* 2 input OR
* 3 input OR
* 3 input EXOR
* 4 input EXOR

9. What type of logic gate does this logic circuit configuration produce?



* NAND gate
* NOR gate
* EXOR gate
* EXNOR gate

10. How do you make an AND gate out of an OR gate using inverters (NOT gates)?

* Invert the output from the OR gate
* Invert both the inputs to the OR gate
* Invert one of the inputs to the OR gate
* Invert both the inputs and output of the OR gate

**Solution: 1b, 2b, 3d, 4c, 5a, 6b, 7d, 8b, 9c, 10d**

Quiz 4:

<http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/index.html>

1. Give the relationship that represents the dual of the Boolean property A + 1 = 1?   
(Note: \* = AND, + = OR and ' = NOT)

1. [A \* 1 = 1](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q1f1.html)
2. [A \* 0 = 0](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q1f2.html)
3. [A + 0 = 0](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q1f3.html)
4. [A \* A = A](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q1f4.html)
5. [A \* 1 = 1](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q1f5.html)

Solution: 2

2. Give the best definition of a literal?

1. [A Boolean variable](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q2f1.html)
2. [The complement of a Boolean variable](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q2f2.html)
3. [1 or 2](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q2f3.html)
4. [A Boolean variable interpreted literally](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q2f4.html)
5. [The actual understanding of a Boolean variable](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q2f5.html)

Solution: 3

3. Simplify the Boolean expression (A+B+C)(D+E)' + (A+B+C)(D+E) and choose the best answer.

1. [A + B + C](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q3f1.html)
2. [D + E](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q3f2.html)
3. [A'B'C'](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q3f3.html)
4. [D'E'](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q3f4.html)
5. [None of the above](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q3f5.html)

Solution: 1

4. Which of the following relationships represents the dual of the Boolean property x + x'y = x + y?

1. [x'(x + y') = x'y'](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q4f1.html)
2. [x(x'y) = xy](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q4f2.html)
3. [x\*x' + y = xy](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q4f3.html)
4. [x'(xy') = x'y'](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q4f4.html)
5. [x(x' + y) = xy](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q4f5.html)

Solution: 5 (thay phép + bằng \* và thay phép \* bằng +)

5. Given the function F(X,Y,Z) = XZ + Z(X'+ XY), the equivalent most simplified Boolean representation for F is:

1. [Z + YZ](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q5f1.html)
2. [Z + XYZ](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q5f2.html)
3. [XZ](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q5f3.html)
4. [X + YZ](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q5f4.html)
5. [None of the above](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q5f5.html)

Solution: 2

6. Which of the following Boolean functions is algebraically complete?

1. [F = xy](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q6f1.html)
2. [F = x + y](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q6f2.html)
3. [F = x'](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q6f3.html)
4. [F = xy + yz](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q6f4.html)
5. [F = x + y'](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q6f5.html)

**Solution: 5**

**NOT: F(0, B) = B'**

**OR: F(A, F(0, B)) = A + B**

**AND: F(0, F(F(0, A), B)) = A\*B**

7. Simplification of the Boolean expression (A + B)'(C + D + E)' + (A + B)' yields which of the following results?

1. [A + B](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q7f1.html)
2. [A'B'](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q7f2.html)
3. [C + D + E](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q7f3.html)
4. [C'D'E'](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q7f4.html)
5. [A'B'C'D'E'](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q7f5.html)

Solution: 2

=(A+B)’[(C+D+E)’ +1]

=(A+B)’

=A’B’

8. Given that F = A'B'+ C'+ D'+ E', which of the following represent the only correct expression for F'?

1. [F'= A+B+C+D+E](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q8f1.html)
2. [F'= ABCDE](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q8f2.html)
3. [F'= AB(C+D+E)](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q8f3.html)
4. [F'= AB+C'+D'+E'](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q8f4.html)
5. [F'= (A+B)CDE](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q8f5.html)

Solution: 5

F’ = (A’B’ + C’ +D’ +E’)’ = (A’B’)’.(C’+D’+E’)’= (A+B).CDE

9. An equivalent representation for the Boolean expression A' + 1 is

1. [A](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q9f1.html)
2. [A'](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q9f2.html)
3. [1](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q9f3.html)
4. [0](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q9f4.html)

Solution: 3

10. Simplification of the Boolean expression AB + ABC + ABCD + ABCDE + ABCDEF yields which of the following results?

1. [ABCDEF](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q10f1.html)
2. [AB](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q10f2.html)
3. [AB + CD + EF](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q10f3.html)
4. [A + B + C + D + E + F](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q10f4.html)
5. [A + B(C+D(E+F))](http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/boolalgebra/quiz/q10f5.html)

Solution: 2

Apply x + xy = x several times:

= AB +ABC + ABCD +(ABCDE + ABCDEF)

= AB +ABC + ABCD + ABCDE

= AB +ABC+ (ABCD + ABCDE)

= AB +ABC+ ABCD

= AB +(ABC+ ABCD)

= AB + ABC

= AB

<https://homepages.wmich.edu/~johnson/ece2500/Quiz3/quiz.html>

<https://faisalj.webs.com/IGCSE/logic%20gates.pdf>

<https://www.brainpop.com/math/algebra/logicgates/quiz/print.pdf>