

ENGR 101

Engineering Technology

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Victoria
UNIVERSITY OF WELLINGTON
*Te Whare Wānanga
o te Ūpoko o te Ika a Māui*



CAPITAL CITY UNIVERSITY

Week 5 Lecture 8b

- Circuit simulator

<https://www.falstad.com/circuit/>

- Course web page:

https://ecs.wgtn.ac.nz/Courses/XMUT101_2021T1/

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Exercise 6.1 – Simplify the following expressions using Boolean Laws

(a) $X = ABC + \overline{A}B + AB\overline{C}$

(b) $X = \overline{A}B\overline{C} + A\overline{B}\overline{C} + \overline{A}\overline{B}\overline{C} + \overline{A}\overline{B}C$

(c) $AB + \overline{A}C + BC = AB + \overline{A}C$

(d) $(A + B)(\overline{A} + C)(B + C) = (A + B)(\overline{A} + C)$

Exercise 6.1(b) $x = \overline{A} B \overline{C} + A \overline{B} \overline{C} + \overline{A} \overline{B} \overline{C} + \overline{A} \overline{B} C$

$x = A'BC' + AB'C' + A'B'C' + A'B'C'$	Boolean Law used
$= A'BC' + AB'C' + A'B'C' + A'B'C'$	4. Idempotent Law $A + A = A$
$= A'BC' + AB'C' + A'B'C'$	
$= A'BC' + B'C'(A + A')$	9. Distributive Law $A.(B+C) = (A.B) + (A.C)$
$= A'BC' + B'C'(1)$	6. Complement Law $A+A' = 1$
$= A'BC' + B'C'$	
$= C' (A'B + B')$	9. Distributive Law $A.(B+C) = (A.B) + (A.C)$
$= A'C' + B'C'$	11. Common Identities Law $A.(A'+B) = AB$; $A+(A'B) = A+B$

Exercise 6.1(b) $x = \bar{A} B \bar{C} + A \bar{B} \bar{C} + \bar{A} \bar{B} \bar{C} + \bar{A} \bar{B} C$

$$= A'BC' + AB'C' + A'B'C' + A'B'C'$$

Simplified expression: $y = A'C' + B'C'$

A	B	C	X
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

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Scroll Wheel & Middle Button



Left Mouse Button

Right Mouse Button