Project Architecture

1(a)

A	B	$\overline{A+B}$
0	0	1
0	1	0
1	0	0
1	1	0

=

A	B	$\bar{A}\cdot\bar{B}$
0	0	1
0	1	0
1	0	0
1	1	0

(b)

A	B	$\overline{A\cdot B}$
0	0	1
0	1	1
1	0	1
1	1	0

=

A	B	$\bar{A}+\bar{B}$
0	0	1
0	1	1
1	0	1
1	1	0

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

2. $E = ((A\cdot B)+(A\cdot C) + (B\cdot C))\cdot(\overline{A\cdot B\cdot C})$

$= ((A\cdot B)+(A\cdot C)+(B\cdot C))\cdot(\bar{A}+\bar{B}+\bar{C})$ (Morgan's law)

$= (A\cdot B)\cdot(\bar{A}+\bar{B}+\bar{C}) + (A\cdot C)(\bar{A}+\bar{B}+\bar{C}) + (B\cdot C)\cdot(\bar{A}+\bar{B}+\bar{C})$ (distributive law)

$= (A\cdot\bar{A}\cdot B)+(A\cdot B\cdot\bar{B})+(A\cdot B\cdot\bar{C})+(A\cdot\bar{A}\cdot C)+(A\cdot C\cdot\bar{B})+(A\cdot C\cdot\bar{C})$
$+ (\bar{A}\cdot B\cdot C)+(B\cdot\bar{B}\cdot C)+(B\cdot C\cdot\bar{C})$ (distributive law)

$= (A\cdot B\cdot\bar{C})+(A\cdot C\cdot\bar{B})+(\bar{A}\cdot B\cdot C)$ (inverse law)

$= (A\cdot B\cdot\bar{C})+(A\cdot\bar{B}\cdot C)+(\bar{A}\cdot B\cdot C)$ (associative law)