CS2700 Homework 2

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Question 1.

11.1

(a) $ABC + \overline{A} * \overline{B} * \overline{C}$

ABC	$\overline{A} * \overline{B} * \overline{C}$	ABC	$\overline{A} * \overline{B} * \overline{C}$	$ABC + \overline{A} * \overline{B} * \overline{C}$
000	111	0	1	1
001	110	0	0	0
010	101	0	0	0
011	100	0	0	0
100	011	0	0	0
101	010	0	0	0
110	001	0	0	0
111	000	0	0	1

(b) $ABC + A\overline{B} * \overline{C} + \overline{A} * \overline{B} * \overline{C}$

ABC	$\overline{A} * \overline{B} * \overline{C}$	ABC	$A\overline{B} * \overline{C}$	$A * \overline{B} * \overline{C}$	$ABC + A\overline{B} * \overline{C} + \overline{A} * \overline{B} * \overline{C}$
000	111	0	1	0	1
001	110	0	0	0	0
010	101	0	0	0	0
011	100	0	0	0	0
100	011	0	0	1	1
101	010	0	0	0	0
110	001	0	0	0	0
111	000	1	0	0	1

(c) $A(B\overline{C} + \overline{B}C)$

ABC	$\overline{A} * \overline{B} * \overline{C}$	$B\overline{C}$	$\overline{B}C$	$A(B\overline{C} + \overline{B}C)$
000	111	0	0	0
001	110	0	1	0
010	101	1	0	0
011	100	0	0	0
100	011	0	0	0
101	010	0	1	1
110	001	1	0	1
111	000	0	0	0

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

ABC	$\overline{A} * \overline{B} * \overline{C}$	$A + B$	$A + C$	$\overline{A} + \overline{B}$	$(A + B)(A + C)(\overline{A} + \overline{B})$
000	111	0	0	1	0
001	110	0	1	1	0
010	101	1	0	1	0
011	100	1	1	1	1
100	011	1	1	1	1
101	010	1	1	1	1
110	001	1	1	0	0
111	000	1	1	0	0

Question 2.

11.3

(a) $F = \overline{V + A + L} = \overline{V} * \overline{A} * \overline{L}$

VAL	$\overline{V} * \overline{A} * \overline{L}$	F
000	111	1
001	110	0
010	101	0
011	100	0
100	011	0
101	010	0
110	001	0
111	000	0

(b) $F = \overline{A} + \overline{B} + \overline{C} + \overline{D} = \overline{ABCD}$

$ABCD$	$\overline{A} * \overline{B} * \overline{C} * \overline{D}$	F
0000	1111	1
0001	1110	0
0010	1101	0
0011	1100	0
0100	1011	0
0101	1010	0
0110	1001	0
0111	1000	0
1000	0111	0
1001	0110	0
1010	0101	0
1011	0100	0
1100	0011	0
1101	0010	0
1110	0001	0
1111	0000	0

Question 3.

3.3 32 bit instruction, 8bit opcode, 24bit address

(a) $2^24 = 2^20 * 2^4 = 1$ megabyte $*16 = 16$ megabytes of addressable memory

(b) 1.