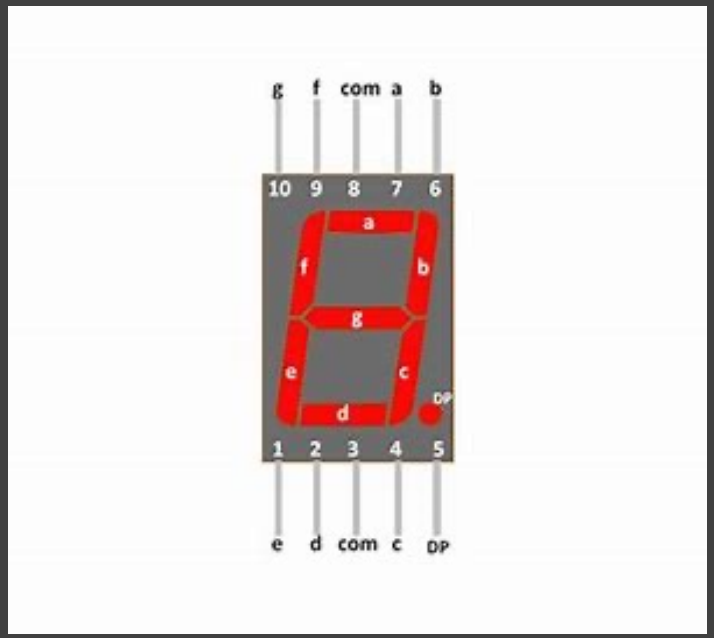
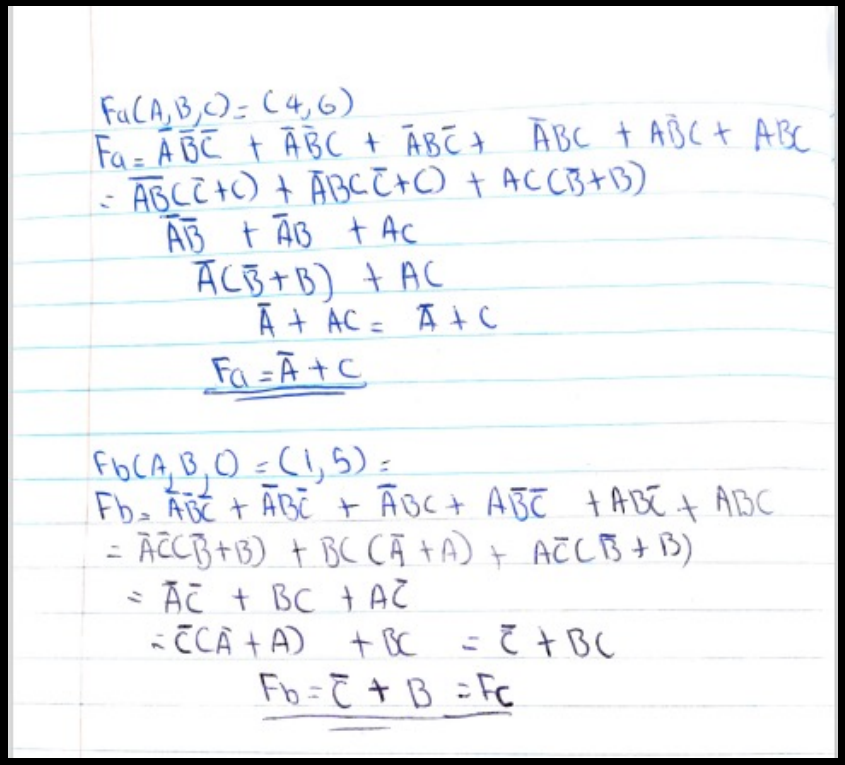
Truth Table

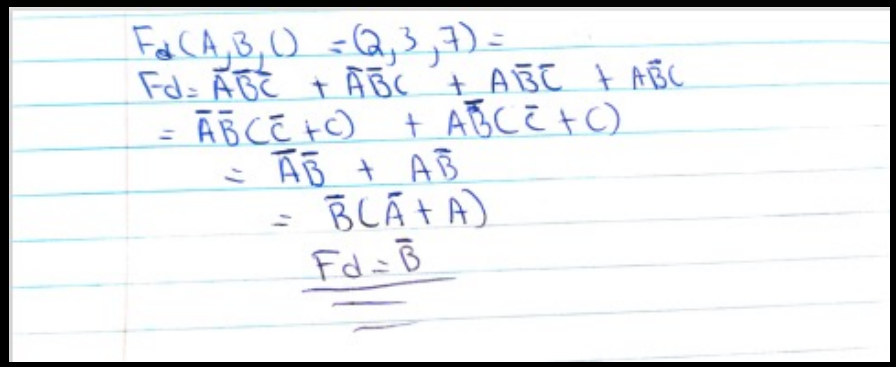
Truth table

States	Inputs A	B	C	Name	Outputs a	b	c	d	e	f	g
0	0	0	0	B	1	1	1	1	1	1	1
1	0	0	1	E	1	0	0	1	1	1	1
2	0	1	0	R	1	1	1	0	1	1	1
3	0	1	1	R	1	1	1	0	1	1	1
4	1	0	0	Y	0	1	1	1	0	1	1
5	1	0	1	C	1	0	0	1	1	1	0
6	1	1	0	H	0	1	1	0	1	1	1
7	1	1	1	R	1	1	1	0	1	1	1



Simplification





$F_e(A,B,C) = (4)$

$F_e = \bar{A}\bar{B}\bar{C} + \bar{A}\bar{B}C + \bar{A}B\bar{C} + \bar{A}BC + A\bar{B}C + AB\bar{C} + ABC$

$= \bar{A}\bar{B}(\bar{C}+C) + \bar{A}BC(\bar{C}+C) + ABC(\bar{C}+C) + AC(\bar{B}+B)$

$= \bar{A}\bar{B} + \bar{A}B + AB + AC$

$= \bar{A}(\bar{B}+B) + B(\bar{A}+A) + AC$

$= \bar{A} + B + AC = B + \bar{A} + C$

$F_e = \bar{A} + B + C$

$F_f(A,B,C) =$

$F_f = \bar{A}\bar{B}\bar{C} + \bar{A}\bar{B}C + \bar{A}B\bar{C} + \bar{A}BC + A\bar{B}C + AB\bar{C} + ABC$

$= \bar{A}\bar{B}(\bar{C}+C) + \bar{A}BC(\bar{C}+C) + A\bar{B}C(\bar{C}+C) + ABC(\bar{C}+C)$

$= \bar{A}\bar{B} + \bar{A}B + A\bar{B} + AB$

$= \bar{A}(\bar{B}+B) + A(\bar{B}+B)$

$\bar{A} + A = 1$

$F_f = 1$

$F_g(A,B,C) = (5)$

$F_g = \bar{A}\bar{B}\bar{C} + \bar{A}\bar{B}C + \bar{A}B\bar{C} + \bar{A}BC + A\bar{B}\bar{C} + AB\bar{C} + A\bar{B}C$

$= \bar{A}\bar{B}C(\bar{C}+C) + \bar{A}BC(\bar{C}+C) + A\bar{C}C(\bar{B}+B) + ABC(\bar{C}+C)$

$= \bar{A}B + \bar{A}B + A\bar{C} + AB$

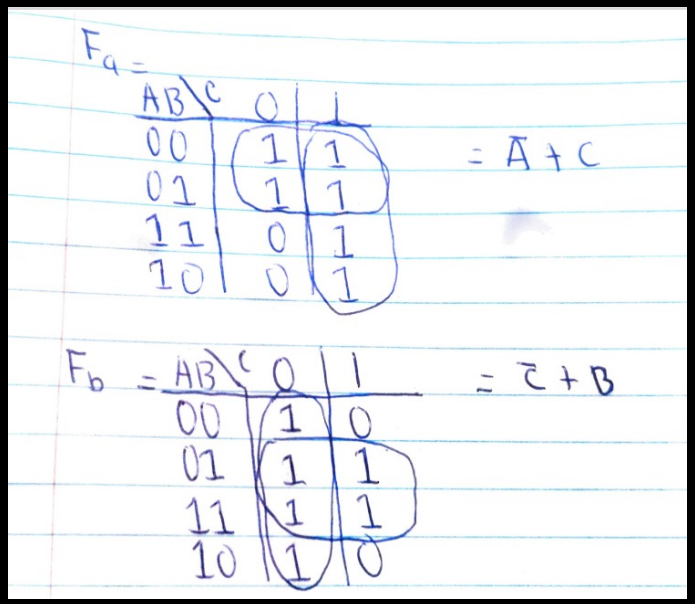
$\bar{A}C(\bar{B}+B) + A\bar{C} + BC(\bar{A}+A)$

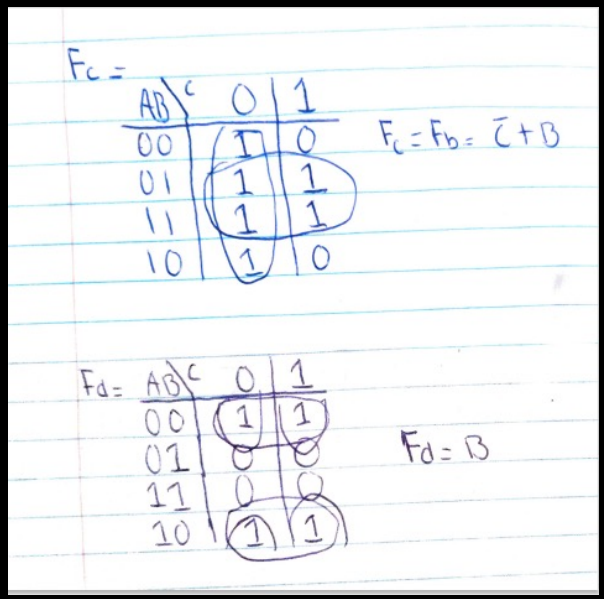
$\bar{A} + AC + B$

$\bar{A} + \bar{C} + B$

$F_g = \bar{A} + B + \bar{C}$

K-maps


F_a =
AB \ C | 0 | 1
00 | 1 | 1
01 | 1 | 1
11 | 0 | 1
10 | 0 | 1
$= \bar{A} + C$
F_b =
AB \ C | 0 | 1
00 | 1 | 0
01 | 1 | 1
11 | 1 | 1
10 | 1 | 0
$= \bar{C} + B$


F_c =
AB \ C | 0 | 1
00 | 1 | 0
01 | 1 | 1
11 | 1 | 1
10 | 1 | 0
$F_c = F_b = \bar{C} + B$
F_d =
AB \ C | 0 | 1
00 | 1 | 1
01 | 0 | 0
11 | 0 | 0
10 | 1 | 1
$F_d = B$

$F_d =$

AB \ C	0	1
00	1	1
01	0	0
11	0	0
10	1	1

$F_d = B$

$F_e =$

AB \ C	0	1
00	1	1
01	1	1
11	1	1
10	0	1

$= C + B + \bar{A}$

$F_e = \bar{A} + B + C$

$F_F =$

AB \ C	0	1
00	1	1
01	1	1
11	1	1
10	1	1

$F_F = 1$

$F_g =$

AB \ C	0	1
00	1	1
01	1	1
11	1	1
10	1	0

$= \bar{C} + B + \bar{A}$

$F_g = \bar{A} + B + \bar{C}$

Boolean Expressions