

data

S T Q Q S S D

Minterms A B C D a c-2

0	0	0	0	0	1	1
1	0	0	0	1	0	1
2	0	0	1	0	1	2
3	0	0	1	1	1	3
4	0	1	0	0	0	4
5	0	1	0	1	1	5
6	0	1	1	0	1	6
7	0	1	1	1	1	7
8	1	0	0	0	1	-1
9	1	0	0	1	1	-1
10	1	0	1	0	1	-5
11	1	0	1	1	1	-5
12	1	1	0	0	0	-14
13	1	1	0	1	1	-3
14	1	1	1	0	1	-2
15	1	1	1	1	0	-1

a(0,2,3,5,6,7,8,9,10,11,13,14)

	$\overline{a}b\overline{c}d$ 00	$\overline{a}b\overline{c}d$ 01	$\overline{a}b\overline{c}d$ 11	$\overline{a}b\overline{c}d$ 10	
$\overline{a}b\overline{c}d$ 00	1	0	1	1	$\overline{a}b\overline{c}d$
$\overline{a}b\overline{c}d$ 01	0	1	1	1	$\overline{a}b\overline{c}d$
$\overline{a}b\overline{c}d$ 11	0	1	0	1	$\overline{a}b\overline{c}d$
$\overline{a}b\overline{c}d$ 10	1	1	1	1	$\overline{a}b\overline{c}d$

$$F_a = \overline{a}b\overline{c}d + \overline{a}b\overline{c}d + \overline{a}b\overline{c}d + \overline{a}b\overline{c}d + \overline{a}b\overline{c}d$$

Minterms	A	B	C	D	b	c-2
0	0	0	0	0	1	1
1	0	0	0	1	0	1
2	0	0	1	0	0	2
3	0	0	1	1	0	3
4	0	1	0	0	1	4
5	0	1	0	1	1	5
6	0	1	1	0	1	6
7	0	1	1	1	0	7
8	1	0	0	0	1	8
9	1	0	0	1	0	9
10	1	0	1	0	1	10
11	1	0	1	1	1	11
12	1	1	0	0	1	12
13	1	1	0	1	0	13
14	1	1	1	0	0	14
15	1	1	1	1	0	15

b) (0, 4, 5, 6, 8, 10, 11, 12)

	$\sim A \sim B$	$\sim A B$	$A \sim B$	$A B$
$\sim A \sim B$	1	0	0	0
$\sim A B$	1	1	0	1
$A \sim B$	1	0	1	0
$A B$	1	0	1	1

$$F = \sim A \sim B \sim D + C A \sim B + \sim A B \sim C + \sim C \sim D$$

$\rightarrow \sim A \sim B \sim D$

$\sim C A \sim B$

Minterms	A	B	C	D	C-1	C-2	C-3	Priority
0	0	0	0	0	1	1	1	0
1	0	0	0	1	0	1	0	1
2	0	0	1	0	1	2	0	2
3	0	0	1	1	0	3	0	3
4	0	1	0	0	0	4	0	4
5	0	1	0	1	0	5	0	5
6	0	1	1	0	1	6	0	6
7	0	1	1	1	0	7	0	7
8	1	0	0	0	1	8	0	8
9	1	0	0	1	0	9	0	9
10	1	0	1	0	1	10	0	10
11	1	0	1	1	0	11	0	11
12	1	1	0	0	0	12	0	12
13	1	1	0	1	0	13	0	13
14	1	1	1	0	1	14	0	14
15	1	1	1	1	0	15	0	15

C(0,2,6,8,10,14)

	no 00	no 01	no 11	no 10	
no 00	1	0	0	1	no 00.A.B
no 01	0	0	0	1	no 01
no 11	0	0	0	1	no 11
no 10	1	0	0	1	no 10.A.B

$$F_c = \text{no } 00.A.B + \text{no } 01 + \text{no } 10.A.B$$

data

S T Q Q S S D

Minterms	A	B	C	D	d	C-2	
0	0	0	0	0	1	1	1
1	0	0	0	1	0	1	1
2	0	0	1	0	1	2	1
3	0	0	1	1	1	3	1
4	0	1	0	0	0	1	1
5	0	1	0	1	1	5	1
6	0	1	1	0	1	6	1
7	0	1	1	1	0	7	1
8	1	0	0	0	1	8	1
9	1	0	0	1	0	9	1
10	1	0	1	0	1	10	1
11	1	0	1	1	1	11	1
12	1	1	0	0	0	12	1
13	1	1	0	1	1	13	1
14	1	1	1	0	1	14	1
15	1	1	1	1	0	15	1

d(0, 2, 3, 5, 6, 8, 10, 11, 13, 14)

$$F_d = \overline{A}\overline{B}\overline{C}\overline{D} + \overline{A}\overline{B}C\overline{D} + \overline{A}\overline{B}CD + \overline{A}B\overline{C}\overline{D} + \overline{A}B\overline{C}D + \overline{A}B\overline{D} + \overline{A}BD + \overline{A}BCD + \overline{A}BC\overline{D} + \overline{A}BCD + \overline{A}BC\overline{D} + \overline{A}BCD + \overline{A}BC\overline{D} + \overline{A}BCD + \overline{A}BC\overline{D}$$

	$\overline{A}\overline{B}$	$\overline{A}B$	$A\overline{B}$	AB
$\overline{C}\overline{D}$	1	0	1	1
$\overline{C}D$	0	1	0	1
$C\overline{D}$	0	1	0	1
CD	1	0	1	1

$\overline{A}\overline{B}\overline{C}\overline{D}$ $\overline{A}\overline{B}C\overline{D}$ $\overline{A}B\overline{C}\overline{D}$ $\overline{A}B\overline{C}D$ $\overline{A}B\overline{D}$ $\overline{A}BD$ $\overline{A}BCD$ $\overline{A}BC\overline{D}$

Minterms	A	B	C	D	Σ	C-2	P	A	Summation
0	0	0	0	0	1	1	0	1	0
1	0	0	0	1	1	2	0	0	1
2	0	0	1	0	0	2	0	0	0
3	0	0	1	1	1	3	0	0	1
4	0	1	0	0	1	4	1	0	0
5	0	1	0	1	1	5	1	0	1
6	0	1	1	0	1	6	1	0	0
7	0	1	1	1	1	7	1	0	1
8	1	0	0	0	1	8	0	1	0
9	1	0	0	1	1	9	0	1	1
10	1	0	1	0	1	10	0	1	0
11	1	0	1	1	1	11	0	1	1
12	1	1	0	0	1	12	1	1	0
13	1	1	0	1	1	13	1	1	1
14	1	1	1	0	1	14	1	1	0
15	1	1	1	1	1	15	1	1	1

11, 0, 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15

For $\neg A \neg B + A \neg B + \neg C + D$

	$\neg A \neg B$ 00	$\neg A B$ 01	$A \neg B$ 11	$A B$ 10
$\neg A \neg B$	1	1	1	0
$\neg A B$	1	1	1	1
$A \neg B$	1	1	1	0
$A B$	1	1	1	1

Minterms	A	B	C	D	1	C-2	13 ^e
0	0	0	0	0	1	1	1
1	0	0	0	1	1	1	1
2	0	0	1	0	1	2	1
3	0	0	1	1	1	3	1
4	0	1	0	0	1	4	1
5	0	1	0	1	0	5	1
6	0	1	1	0	0	6	1
7	0	1	1	1	1	7	1
8	1	0	0	0	1	8	1
9	1	0	0	1	1	9	1
10	1	0	1	0	0	10	1
11	1	0	1	1	0	11	1
12	1	1	0	0	1	12	1
13	1	1	0	1	1	13	1
14	1	1	1	0	1	14	1
15	1	1	1	1	1	15	1

$$F(A, B, C, D) = \sum m(0, 1, 2, 3, 4, 7, 8, 9, 12, 13, 14, 15)$$

$$F = \bar{A}\bar{B} + CD + CAB + A\bar{B}C + A\bar{B}D$$

	$\bar{A}\bar{B}$ 00	$\bar{A}B$ 01	AB 11	AB 10	
$\bar{A}\bar{B}$ 00	1	1	1	1	$\bar{A}\bar{B}$
$\bar{A}B$ 01	1	0	1	0	$\bar{A}B$
AB 11	1	1	1	1	AB
AB 10	1	1	0	0	AB

$\bar{A}\bar{B} + CD + CAB + A\bar{B}C + A\bar{B}D$

Minterms	A	B	C	D	g	e-2	13
0	0	0	0	0	0	1	
1	0	0	0	1	0	1	
2	0	0	1	0	1	1	
3	0	0	1	1	1	1	
4	0	1	0	0	1	1	
5	0	1	0	1	1	1	
6	0	1	1	0	1	1	
7	0	1	1	1	0	1	
8	1	0	0	0	1	1	
9	1	0	0	1	0	1	
10	1	0	1	0	1	1	
11	1	0	1	1	1	1	
12	1	1	0	0	1	1	
13	1	1	0	1	1	1	
14	1	1	1	0	1	1	
15	1	1	1	1	0	1	

g) 2, 3, 4, 5, 6, 8, 10, 11, 12, 13, 14

$$F_g = C \vee A \vee B + C \vee D + C \wedge A \vee B + B \vee C + A \vee C \vee D$$

	$\overline{C} \vee D$ 00	$\overline{C} \vee D$ 01	$C \vee D$ 11	$C \vee D$ 10	
$\overline{A} \vee B$ 00	0	0	1	1	$\overline{A} \vee B$
$\overline{A} \vee B$ 01	1	1	0	1	$\overline{A} \vee B$
$A \vee B$ 11	1	1	0	1	$A \vee B$
$A \vee B$ 10	1	0	1	1	$A \vee B$

$$C \vee D \vee B \vee C$$

Minterms	A	B	C	D	sim	C-2	A	complement
0	0	0	0	0	0	13	13	0
1	0	0	0	1	0	10	0	1
2	0	0	1	0	0	20	0	5
3	0	0	1	1	0	30	0	7
4	0	1	0	0	0	4	0	1
5	0	1	0	1	0	5	0	3
6	0	1	1	0	0	6	0	2
7	0	1	1	1	0	7	0	4
8	1	0	0	0	1	10	0	8
9	1	0	0	1	1	11	0	9
10	1	0	1	0	1	10	0	01
11	1	0	1	1	1	11	0	11
12	1	1	0	0	1	0	0	01
13	1	1	0	1	1	1	1	01
14	1	1	1	0	1	0	1	01
15	1	1	1	1	1	1	1	01

sum (8, 9, 10, 11, 12, 13, 14, 15)

		00	01	11	10	
WAB	00	0	0	0	0	
WAB	01	0	0	0	0	
AB	11	1	1	1	1	WAB
AB	10	1	1	1	1	WAB

Fin: A