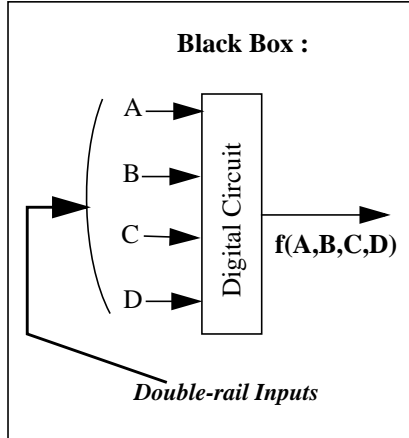
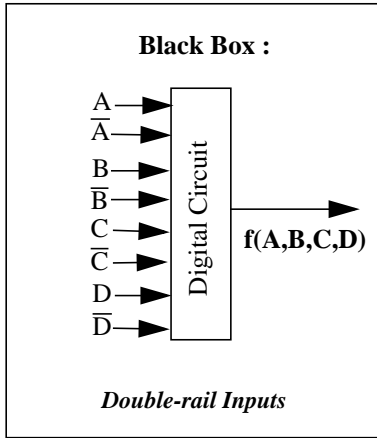


**Function  $f(A, B, C, D)$  in Different Representations**



**Truth Table :**

A	B	C	D	$f(A, B, C, D)$
0	0	0	0	0
1	0	0	1	1
2	0	0	1	0
3	0	1	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	1	1
10	1	0	1	0
11	1	0	1	0
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

**The minterm list :**

$$f(A, B, C, D) = \sum m(1,3,5,7,9,13,15)$$

**The canonical SOP expression :**

$$f(A, B, C, D) = \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}CD + \bar{A}B\bar{C}D + \bar{A}BCD + A\bar{B}\bar{C}D + A\bar{B}CD + ABCD$$

**The maxterm list :**

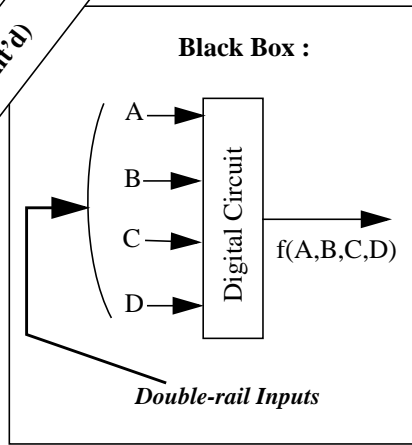
$$f(A, B, C, D) = \prod M(0,2,4,6,8,10,11,12,14)$$

**The canonical POS expression :**

$$f(A, B, C, D) = (A+B+C+D)(A+B+\bar{C}+D)(A+\bar{B}+C+D)(A+\bar{B}+\bar{C}+D)(\bar{A}+B+C+D)(\bar{A}+B+\bar{C}+D)(\bar{A}+B+\bar{C}+\bar{D})(\bar{A}+\bar{B}+C+D)(\bar{A}+\bar{B}+\bar{C}+D)$$

$  \begin{aligned}  f(A, B, C, D) &= D(AB + \bar{C}) + \bar{A}BCD + \bar{A}\bar{B}D \\  &= ABD + \bar{C}D + \bar{A}D(\bar{B} + BC) \\  &= ABD + \bar{C}D + \bar{A}D(\bar{B} + C) \\  &= ABD + \bar{C}D + \bar{A}\bar{B}D + \bar{A}CD \\  &= ABD + \bar{A}\bar{B}D + D(\bar{C} + C\bar{A}) \\  &= ABD + \bar{A}\bar{B}D + \bar{C}D + \bar{A}D \\  &= ABD + \bar{C}D + \bar{A}D(1 + \bar{B}) \\  &= ABD + \bar{C}D + \bar{A}D \\  &= \bar{C}D + D(\bar{A} + AB) \\  &= \bar{C}D + \bar{A}D + BD  \end{aligned}  $	<p><b>A nonminimal expression for function <math>f</math></b></p> $k(m + s) = km + ks$ $k + \bar{k}m = k + m$ $k(m + s) = km + ks$ $k(m + s) = km + ks$ $k + \bar{k}m = k + m \quad \& \quad k(m + s) = km + ks$ $k(m + s) = km + ks$ $k + 1 = 1 \quad \& \quad k1 = k$ $k(m + s) = km + ks$ $k + \bar{k}m = k + m \quad \& \quad k(m + s) = km + ks$	<p>Additional non-minimal expressions for function <math>f(A, B, C, D)</math></p> <p>Each expression represents function <math>f(A, B, C, D)</math></p> <p><b>Minimal SOP expression</b> ←</p>
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Function  $f(A, B, C, D)$  in Different Representations (cont'd)



**Truth Table :**

A B C D	f(A, B, C, D)
0 0 0 0	0
1 0 0 0	1
2 0 0 1	0
3 0 0 1	1
4 0 1 0	0
5 0 1 0	1
6 0 1 1	0
7 0 1 1	1
8 1 0 0	0
9 1 0 0	1
10 1 0 1	0
11 1 0 1	0
12 1 1 0	0
13 1 1 0	1
14 1 1 1	0
15 1 1 1	1

