

Logic design (Fall 2016)

Quiz # 4

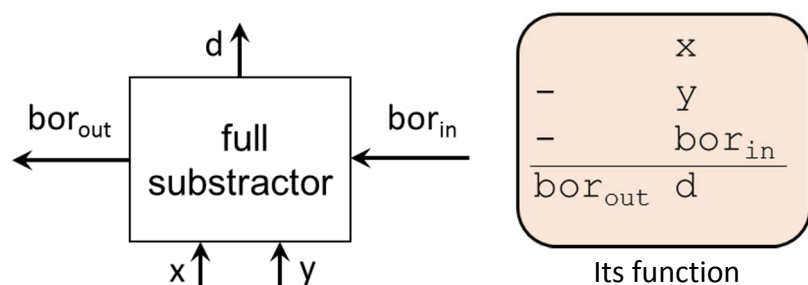
Name: _____ ID: _____

1. A full subtractor has three binary inputs (x, y, bor_{in}) and two outputs (d, bor_{out}).

(a) (28%) Complete the true table for a full subtractor.

(b) (21%) Find the minterm expansions for d

(c) (21%) Find the maxterm expansions for bor_{out}



x	y	bor _{in}	d	bor _{out}
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

$$d = m(1, 2, 4, 7) = x'y'\text{bor}_{in} + x'y\text{bor}_{in}' + xy'\text{bor}_{in}' + xy\text{bor}_{in}$$

$$\text{bor}_{out} = \prod M(0, 4, 5, 6) = (x + y + \text{bor}_{in})(x' + y + \text{bor}_{in})(x' + y + \text{bor}_{in}')(x' + y' + \text{bor}_{in})$$

(d) (30%) Complete the logic circuit of a full subtractor by filling in the blanks for (1) ~ (3) with x, y , or bor_{in} .

(1)	bor _{in} or y
(2)	x
(3)	y or bor _{in}

