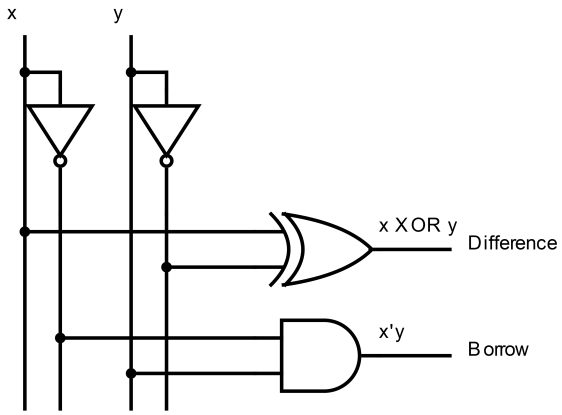
1. Design a half-subtractor circuit with input x and y and outputs D (Difference) and B_{out} (Borrow) which performs $x - y$.

x	y	D	B_{out}
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0

$$D = x \oplus y$$
$$B_{out} = x'y$$



2. Design a full-subtractor circuit with three inputs, x, y, and B_{prev}, which performs $x - y - B_{prev}$.

B_{prev}	x	y	D	B_{out}	
0	0	0	0	0	0
0	0	1	1	1	1
0	1	0	1	0	2
0	1	1	0	0	3
1	0	0	1	1	4
1	0	1	0	1	5
1	1	0	0	0	6
1	1	1	1	1	7

(D) xy

B_{prev}	00	01	11	10
0	0	1	0	1
1	1	0	1	0

(B_{out}) xy

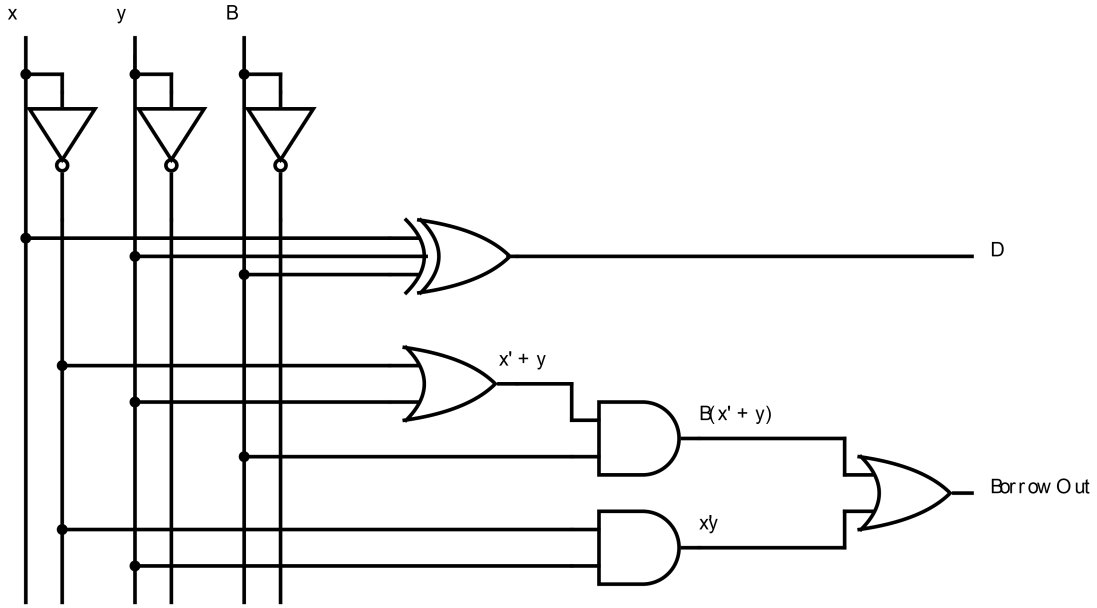
B_{prev}	00	01	11	10
0	0	1	0	0
1	1	1	1	0

1

[1]The package used for drawing kmaps does not support diagonal groups. I have used regular a regular 4x2 group in this case, however it should be observed to be representative of XOR, not a larger implicant.

$$\therefore D = x \oplus y \oplus B_{prev}$$

$$\therefore B_{out} = x'y + B_{prev}x' + B_{prev}y$$
$$= B_{prev}(x' + y) + x'y$$



[1]The application used to draw these circuits has issues rendering text. I apologize for any inconvenience..