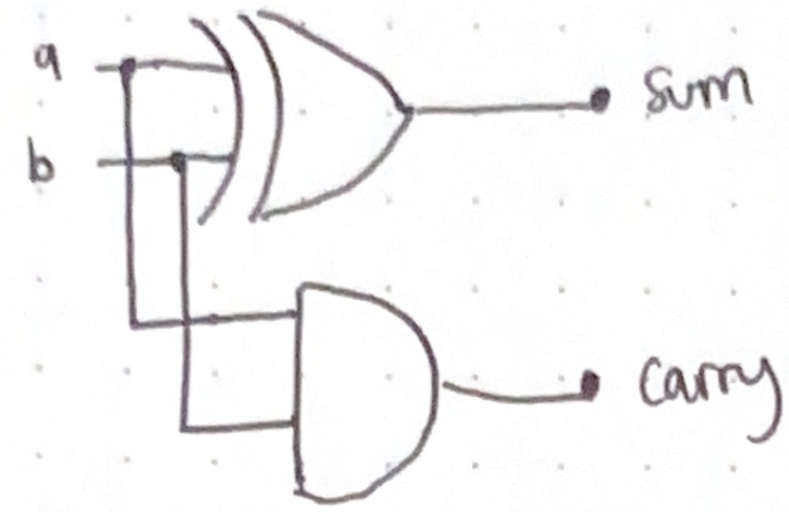
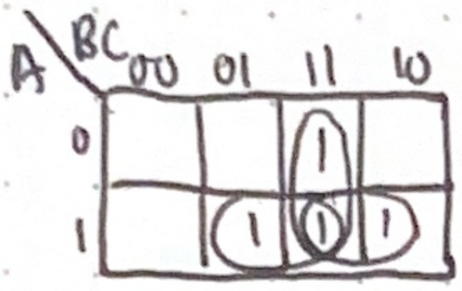
Homework 3

Half Adder

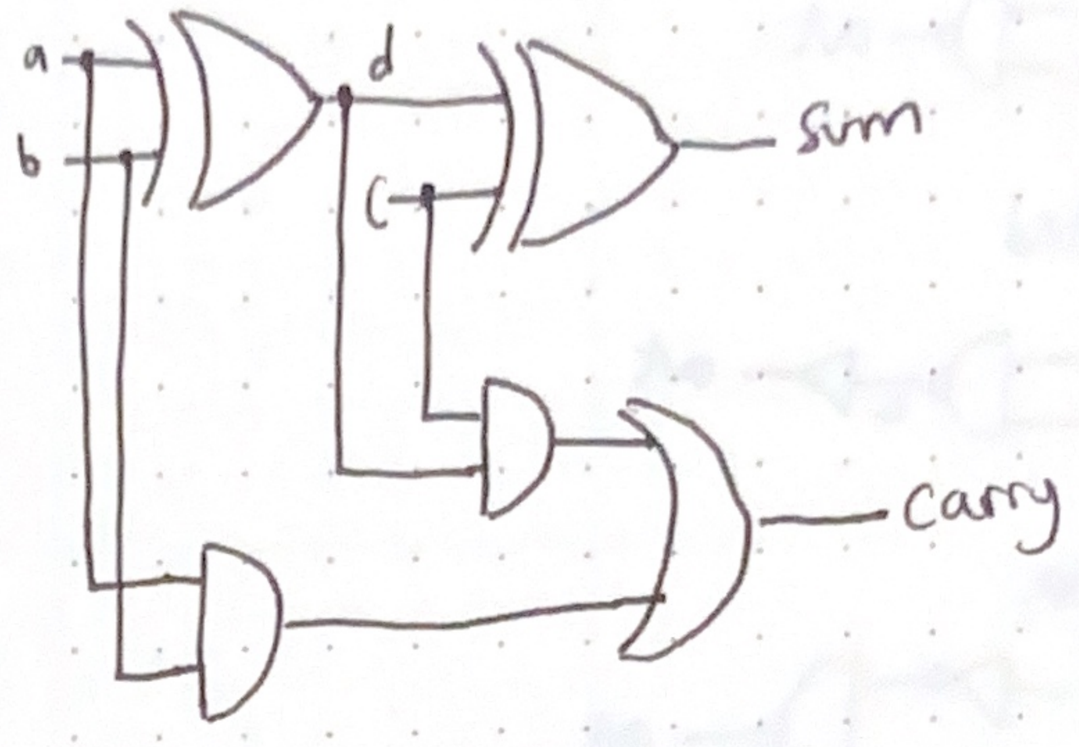




$$S = \bar{A}\bar{B}C + \bar{A}B\bar{C} + A\bar{B}\bar{C} + ABC$$
$$= A \oplus B \oplus C$$

$$C = AB + BC + AC$$
$$= AB + C(A \oplus B)$$

Full Adder



ALU

zx = 1	x = 0
nx = 0	x = 0
zy = 1	y = 0
ny = 1	y = -1 = $\bar{0}$
f = 1	

$x + y = x + (-1) = x + \bar{0}$

no = 0

$x + \bar{y} = x + (-y - 1)$
$= x - y - 1 \quad y \geq 0$
$= x - 1$

zx	nx	zy	ny	f	no	out
0^x	0^x	y=0	$\bar{0}$	$x+\bar{0}$	0	x-1

$\bar{a} + 1 = -a$
$\bar{a} = -a - 1$