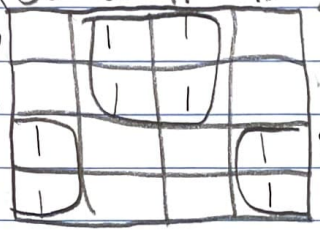
CS274: 4/8/21

# HW4

Binary coded Decimal (BCD) to Unsigned Binary

| | A | B | C | D | S | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $S_6$ | $S_4$ | $S_3$ | $S_2$ | $S_1$ | $S_0$ |
| (0) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (1) | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| (2) | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| (3) | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| (4) | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| (5) | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| (6) | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| (7) | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| (8) | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| (9) | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 |
| (10) | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| (11) | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 |
| (12) | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| (13) | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 |
| (14) | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |
| (15) | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |

$S_1$ (columns $\bar{A}\bar{B}$, $\bar{A}B$, $AB$, $A\bar{B}$ = 00, 01, 11, 10; rows $\bar{C}\bar{D}$, $\bar{C}D$, $CD$, $C\bar{D}$ = 00, 01, 11, 10)

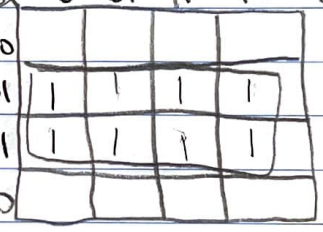


$\sum(2,3,4,5,10,11,12,13)$

$B\bar{C} + \bar{B}C$

$S_1 = B \oplus C$

$S_0$ (columns 00, 01, 11, 10; rows 00, 01, 11, 10)

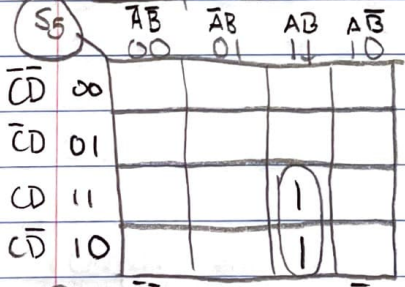


$\sum(1,3,5,7,9,11,13,15)$

$S_0 = D$

## K-maps / Minterms

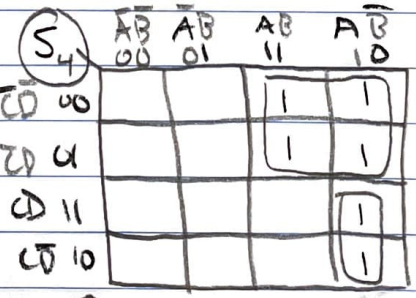
$S_5$ (columns $\bar{A}\bar{B}$, $\bar{A}B$, $AB$, $A\bar{B}$ = 00, 01, 11, 10; rows $\bar{C}\bar{D}$, $\bar{C}D$, $CD$, $C\bar{D}$ = 00, 01, 11, 10)



$\sum(14,15)$

$S_5 = ABC$

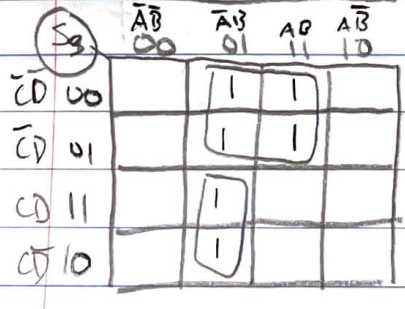
$S_4$ (columns $\bar{A}\bar{B}$, $\bar{A}B$, $AB$, $A\bar{B}$ = 00, 01, 11, 10; rows $\bar{C}\bar{D}$, $\bar{C}D$, $CD$, $C\bar{D}$ = 00, 01, 11, 10)



$\sum(8,9,10,11,12,13)$

$S_4 = A\bar{B}C + A\bar{C}$

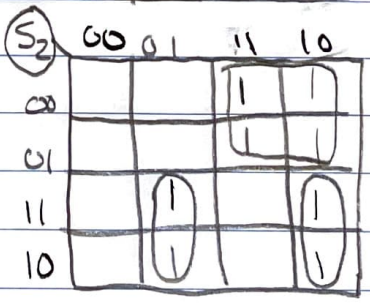
$S_3$ (columns $\bar{A}\bar{B}$, $\bar{A}B$, $AB$, $A\bar{B}$ = 00, 01, 11, 10; rows $\bar{C}\bar{D}$, $\bar{C}D$, $CD$, $C\bar{D}$ = 00, 01, 11, 10)



$\sum(4,5,6,7,12,13)$

$S_3 = B\bar{C} + \bar{A}BC$

$S_2$ (columns 00, 01, 11, 10; rows 00, 01, 11, 10)



$\sum(6,7,8,9,10,11,12,13)$

$S_2 = \bar{A}BC + A\bar{B}C + A\bar{C}$