Solutions

Each answer shows the steps, then the **result**.

2.1

- rows 00, 01, 10 give **1**
- row 11 gives **0**

2.2

- (i) **0**
- (ii) NOT 1 = **0**
- (iii) 0 OR 1 = **1**

2.3

A	B	**NOT** A	X
0	0	1	0
0	1	1	1
1	0	0	0
1	1	0	0

- NOT A column
- X is 1 only for $A = 0$, $B = 1$

3.1 C

- NOR: NOT (A OR B)

3.2 D

- $2^4 = 16$

3.3 B

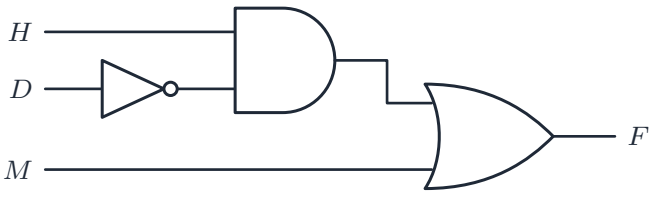
- $Q = 0$ needs $C = 1$, and $P = 0$ needs A AND $B = 0$

3.4

(a)

- $F = (H$ **AND NOT** $D)$ **OR** M

(b)



- NOT gate on D

- AND gate with inputs H and NOT D
- OR gate with inputs the AND output and M, output F

(c)

H	D	M	**NOT** D	H **AND NOT** D	F
0	0	0	1	0	0
0	0	1	1	0	1
0	1	0	0	0	0
0	1	1	0	0	1
1	0	0	1	1	1
1	0	1	1	1	1
1	1	0	0	0	0
1	1	1	0	0	1

- 8 rows in binary order
- NOT D column
- AND column
- F column

(d)

- **5**