

**Problem Set 1 Solution**  
**COS111 Spring 2002**

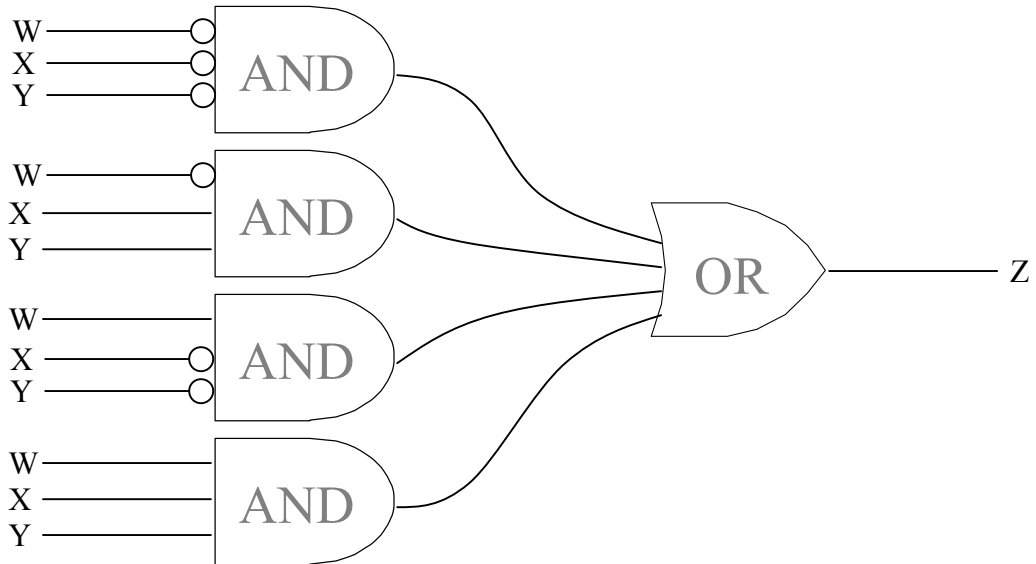
**Problem 1**

(a)

X	Y	NOT X	NOT Y	(NOT X) OR (NOT Y)	NOT ((NOT X) OR (NOT Y))
0	0	1	1	1	0
0	1	1	0	1	0
1	0	0	1	1	0
1	1	0	0	0	1

(b) AND

**Problem 2**

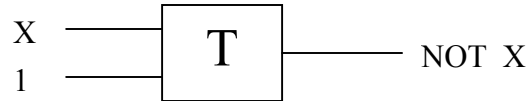


Extra credit:  $Z = 1$  only if  $X = Y$  (regardless of W).

### Problem 3

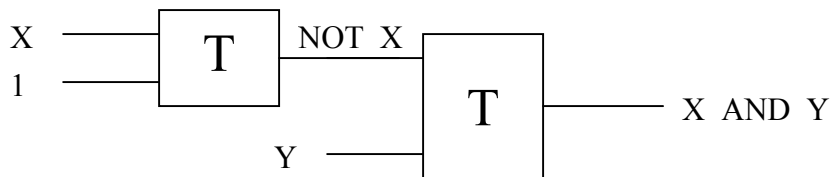
$$T(X,Y) = (\text{NOT } X) \text{ AND } Y$$

(a) NOT gate

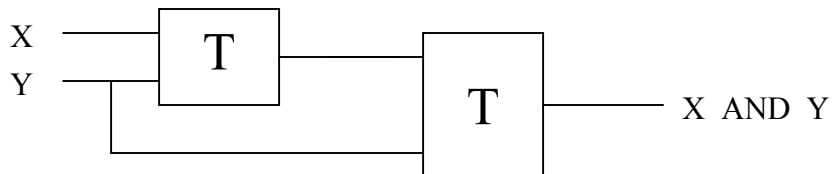


(b) AND gate

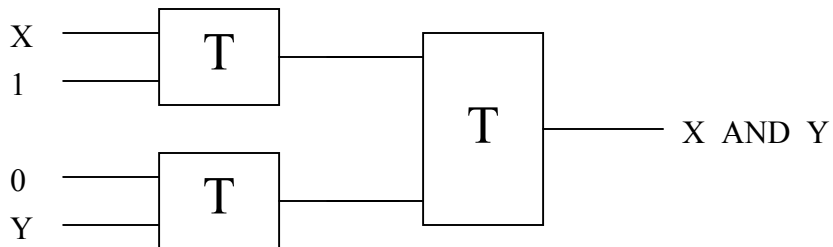
Solution 1:



Solution 2:



Solution 3:



### Problem 4

900 MHz

$$75 \times 60 \times 900,000,000 = 4,050,000,000,000 = 4.05 \times 10^{12}$$