

## Chapter 6

2. (a)  $A = 0, B = 0, C_{in} = 0$   
 (b)  $A = 1, B = 0, C_{in} = 0$  or  $A = 0, B = 1, C_{in} = 0$   
 or  $A = 0, B = 0, C_{in} = 1$   
 (c)  $A = 1, B = 1, C_{in} = 1$   
 (d)  $A = 1, B = 1, C_{in} = 0$  or  $A = 0, B = 1, C_{in} = 1$   
 or  $A = 1, B = 0, C_{in} = 1$
3. (a)  $\Sigma = 1, C_{out} = 0$  (b)  $\Sigma = 1, C_{out} = 0$   
 (c)  $\Sigma = 0, C_{out} = 1$  (d)  $\Sigma = 1, C_{out} = 1$
6. (a) When the  $\overline{Add/Subt}$  is HIGH, the two numbers are subtracted.  
 (b) When the input is LOW, the numbers are added.

10.  $A_1 = 0, B_1 = 0, \bar{S}_1 = 1$       0 1 1 0  
 $A_2 = 1, B_2 = 1, \bar{S}_2 = 1$       + 1 1 1 0  
 $A_3 = 1, B_3 = 1, \bar{S}_3 = 1$       1 0 1 0 0  
 $A_4 = 0, B_4 = 1, \bar{S}_4 = 0$       No, the output should be  
 $C_0 = 0, C_4 = 1$        $C_4 \bar{B}_4 \bar{S}_3 \bar{B}_2 \bar{S}_1 = 1 0 1 0 0$

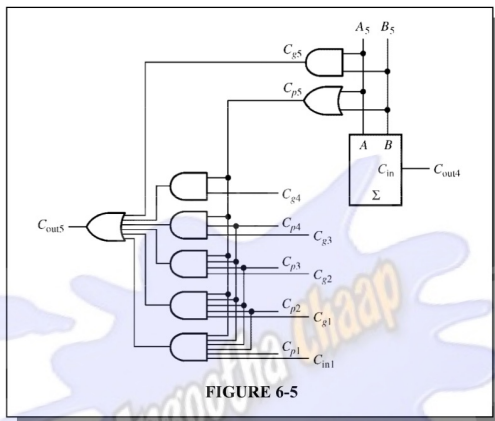
11.  $t_{p(\text{tot})} = 40 \text{ ns} + 6(25 \text{ ns}) + 35 \text{ ns} = 225 \text{ ns}$

12. Full-adder 5:

$$C_{in5} = C_{out4}$$

$$C_{out5} = C_{g5} + C_{p5}C_{g4} + C_{p5}C_{p4}C_{g3} + C_{p5}C_{p4}C_{p3}C_{g2} + C_{p5}C_{p4}C_{p3}C_{g2}C_{g1} + C_{p5}C_{p4}C_{p3}C_{p2}C_{p1}C_{in1}$$

The logic to be added to text Figure 6-18 is shown in Figure 6-5.



14. See Figure 6-7.

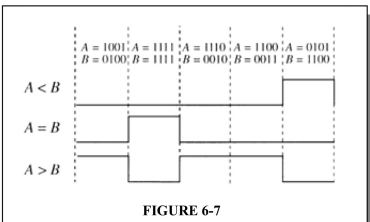


FIGURE 6-7

19.  $X = \overline{A_3 A_2 A_1 A_0} + A_3 A_2 A_1 A_0 + A_3 A_2 A_1 \overline{A_0} + A_3 A_2 A_1 A_0$

See Figure 6-9.

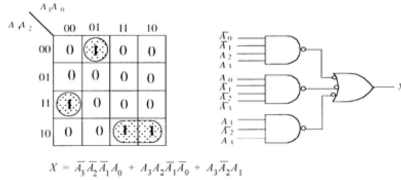


FIGURE 6-9

21. See Figure 6-11.

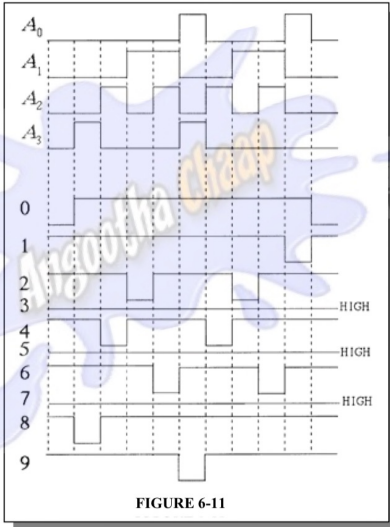


FIGURE 6-11

22. 0 1 6 9 4 4 4 8 0

24. Pin 2 is for decimal 5, pin 5 is for decimal 8, and pin 12 is for decimal 2. The highest priority input is pin 5.

The completed outputs are:  $\overline{A}, A, A, A_n = 0111$ , which is binary 8 (1000).

26. (a) 1010101010 binary  
1111111111 gray  
(b) 1111100000 binary  
1000010000 gray  
(c) 0000001110 binary  
0000001001 gray  
(d) 1111111111 binary  
1000000000 gray

See Figure 6-12.

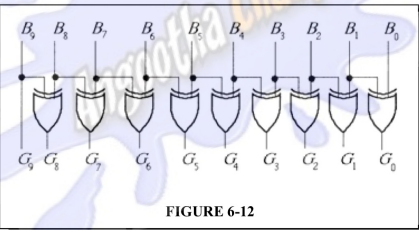
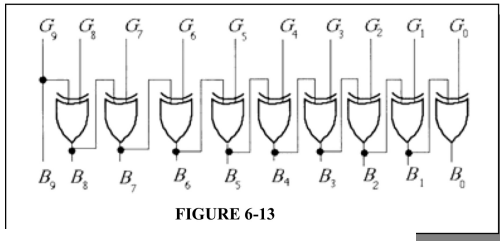


FIGURE 6-12

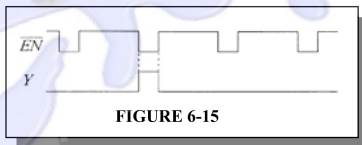
27. (a) 1010000000 gray  
1100000000 binary
- (b) 0011001100 gray  
0010001000 binary
- (c) 1111000111 gray  
1010000101 binary
- (d) 0000000001 gray  
0000000001 binary

See Figure 6-13.

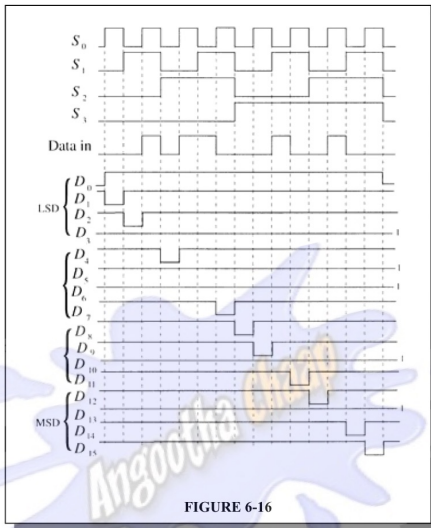


28.  $S_1S_0 = 01$  selects,  $D_1$ , therefore  $Y = 1$ .

30. See Figure 6-15.



31. See Figure 6-16.



33. See Figure 6-18.

