Problem Solving Practice

Convert the following decimals into single-precision floating point numbers.

111110000101011 010011000011000

Problem Solving Practice

Convert the given single-precision floating point number into binary number.

1 10000001 01001001110001000000000

Problem Solving Practice

1. Express the decimal number +9 as an 8-bit binary number in the sign-magnitude system.
2. Express the decimal number −33 as an 8-bit binary number in the 1's complement system.
3. Express the decimal number −46 as an 8-bit binary number in the 2's complement system.

Problem Solving Practice

Express the decimal number -39 as an 8-bit number in the sign-magnitude, 1's complement, and 2's complement forms.

8-bit number for $+39$.

00100111

In the *sign-magnitude form,* -39 is produced by changing the sign bit to a 1 and leaving the magnitude bits as they are. The number is

10100111

Problem Solving Practice

Express the decimal number -39 as an 8-bit number in the sign-magnitude, 1's complement, and 2's complement forms.

8-bit number for $+39$.

00100111

In the *1's complement form,* -39 is produced by taking the 1's complement of $+39$ (00100111).

11011000

Problem Solving Practice

Express the decimal number -39 as an 8-bit number in the sign-magnitude, 1's complement, and 2's complement forms.

8-bit number for $+39$.

00100111

In the *2's complement form,* -39 is produced by taking the 2's complement of $+39$ (00100111) as follows:

$$\begin{array}{rl} 11011000 & \text{1's complement} \\ + \quad\quad\quad 1 & \\ \hline \mathbf{11011001} & \text{2's complement} \end{array}$$

Problem Solving Practice

Determine the decimal values of the signed binary numbers expressed in 2's complement:

(a) 01010110 **(b)** 10101010

Problem Solving Practice

Parity Method for Error Detection

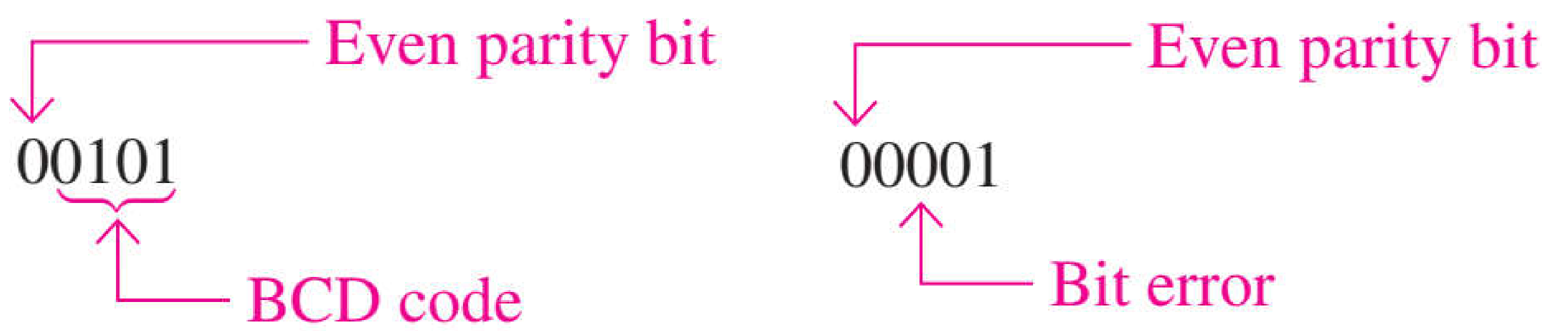
Any group of bits contain either an even or an odd number of 1s.
A parity bit is attached to a group of bits to make the total number of 1s in a group always even or always odd. An **even parity** bit makes the total number of 1s even, and an **odd parity** bit makes the total odd.

The BCD code with parity bits.

Even Parity		Odd Parity	
P	**BCD**	***P***	**BCD**
0	0000	1	0000
1	0001	0	0001
1	0010	0	0010
0	0011	1	0011
1	0100	0	0100
0	0101	1	0101
0	0110	1	0110
1	0111	0	0111
1	1000	0	1000
0	1001	1	1001

Problem Solving Practice

Parity Method for Error Detection



An odd parity system receives the following code groups: 10110, 11010, 110011, 110101110100, and 1100010101010. Determine which groups, if any, are in error.

Solution

Since odd parity is required, any group with an even number of 1s is incorrect. The following groups are in error: **110011** and **1100010101010**.

Problem Solving Practice

Parity Method for Error Detection

Assign the proper even parity bit to the following code groups:

(a) 1010

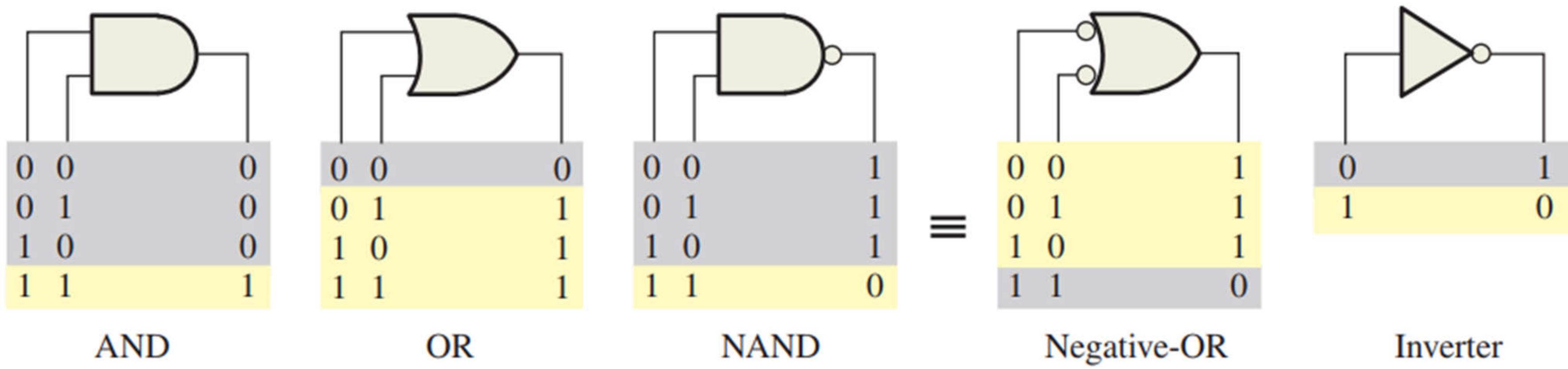
(b) 111000

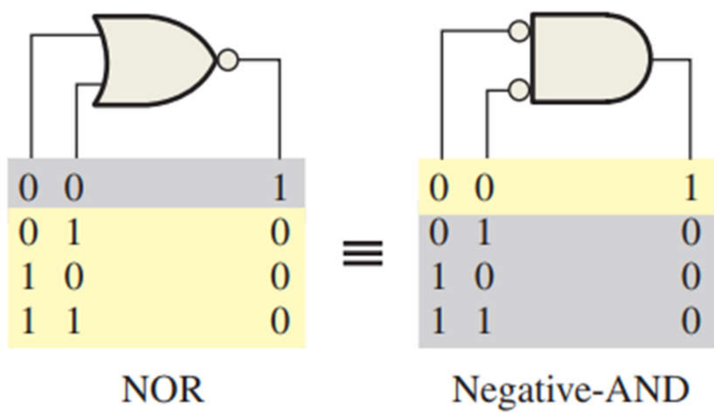
(c) 101101

(d) 100011100101

(e) 101101011111

Problem Solving Practice





Note: Active states are shown in yellow.

<u>Symbols and Terms</u>:

AND (all) , OR (any) , NOT (to)

H = ———— , L = ○———— .

<u>Rules for Active-Equivalent</u> :

OR (any) ⟷ AND (all)

INV (L) ⟷ NonINV (H)

NOT ⟷ NOT

Problem Solving Practice

$F(A,B,C) = \Pi\,(0,3,6,7)$

$F(A,B,C,D) = \Sigma\,(0,1,2,5,7,8,10,13,15)$

Problem Solving Practice

$F(A,B,C) = \Pi\,(0,3,6,7)$

0		0	
		0	0

0	
	0
0	0

$F(A,B,C,D) = \Sigma\,(0,1,2,5,7,8,10,13,15)$

1	1		1
	1	1	
	1	1	
1			1