Università degli Studi di Milano

Laurea in Sicurezza dei sistemi e delle reti informatiche

Esercizi sulla notazione in complemento a 2 (solo testo)

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Fondamenti di informatica per la sicurezza

Indice

Esercizi

1. Esercizi di codifica in complemento a 2

Calcolare la codifica in complemento a 2 del numero x, usando n bit, specificando se si verifica un overflow:

1. $x = -1$, $n = 4$ [1111]
2. $x = -7$, $n = 4$ [1001]
3. $x = -20$, $n = 7$ [1101100]
4. $x = 44$, $n = 7$ [0101100]
5. $x = -31$, $n = 6$ [100001]
6. $x = 20$, $n = 6$ [010100]
7. $x = 16$, $n = 8$ [00010000]
8. $x = 40$, $n = 6$ [101000, overflow]
9. $x = -2$, $n = 4$ [1110]
10. $x = -5$, $n = 5$ [11011]
11. $x = -20$, $n = 6$ [101100]
12. $x = -24$, $n = 8$ [11101000]
13. $x = -17$, $n = 7$ [1101111]
14. $x = -13$, $n = 5$ [10011]
15. $x = -16$, $n = 5$ [10000]
16. $x = -26$, $n = 6$ [100110]
17. $x = -170$, $n = 8$ [01010110, overflow]
18. $x = 8$, $n = 4$ [1000, overflow]
19. $x = 22$, $n = 6$ [010110]
20. $x = 9$, $n = 5$ [01001]
21. $x = 8$, $n = 5$ [01000]
22. $x = -33$, $n = 6$ [011111, overflow]
23. $x = 12$, $n = 6$ [001100]
24. $x = -34$, $n = 7$ [1011110]
25. $x = -59$, $n = 7$ [1000101]
26. $x = -73$, $n = 7$ [0110111, overflow]
27. $x = 3$, $n = 7$ [0000011]
28. $x = 2$, $n = 4$ [0010]
29. $x = -127$, $n = 8$ [10000001]
30. $x = 42$, $n = 6$ [101010, overflow]

2. Esercizi di decodifica in complemento a 2

Calcolare il numero rappresentato dalla stringa binaria s, codificata in complemento a due:

1. $s = 1011$ [-5]
2. $s = 11001$ [-7]
3. $s = 0001011$ [11]
4. $s = 011010$ [26]
5. $s = 1111$ [-1]
6. $s = 00010001$ [17]
7. $s = 00100$ [4]
8. $s = 00011001$ [25]
9. $s = 100101$ [-27]
10. $s = 11010111$ [-41]
11. $s = 111$ [-1]
12. $s = 01001$ [9]
13. $s = 1101000$ [-24]
14. $s = 011$ [3]
15. $s = 100110$ [-26]
16. $s = 11111$ [-1]
17. $s = 10100001$ [-95]
18. $s = 001111$ [15]

19. $s = 01101$ [13]
20. $s = 0101110$ [46]
21. $s = 000$ [0]
22. $s = 1110$ [-2]
23. $s = 11011$ [-5]
24. $s = 01011101$ [93]
25. $s = 110010$ [-14]
26. $s = 110111$ [-9]
27. $s = 0011$ [3]
28. $s = 101100$ [-20]
29. $s = 1100100$ [-28]
30. $s = 01111$ [15]

3. Esercizi di inversione in complemento a 2

Calcolare la stringa binaria corrispondente all'inverso in complemento a 2 della stringa binaria s:

1. $s = 0101$ [1011]
2. $s = 000$ [000]
3. $s = 1110110$ [0001010]
4. $s = 010111$ [101001]
5. $s = 1011$ [0101]
6. $s = 011100$ [100100]
7. $s = 00100$ [11100]
8. $s = 1101$ [0011]
9. $s = 0101101$ [1010011]
10. $s = 10110$ [01010]
11. $s = 1010$ [0110]
12. $s = 0001101$ [1110011]
13. $s = 00100$ [11100]
14. $s = 0110111$ [1001001]
15. $s = 10011$ [01101]
16. $s = 0011011$ [1100101]
17. $s = 1000100$ [0111100]
18. $s = 1111$ [0001]
19. $s = 1010$ [0110]
20. $s = 0110100$ [1001100]
21. $s = 010110$ [101010]
22. $s = 11100$ [00100]
23. $s = 10000$ [10000, overflow]
24. $s = 0011110$ [1100010]
25. $s = 01110$ [10010]
26. $s = 01001$ [10111]
27. $s = 1001$ [0111]
28. $s = 1100$ [0100]
29. $s = 001$ [111]
30. $s = 010111$ [101001]

4. Esercizi di somma in complemento a 2

Date le stringhe binarie A e B, calcolare in complemento a due la loro somma, specificando se si verifica un overflow:

1. $A = 010011$, $B = 100111$ [111010]
2. $A = 1000$, $B = 0010$ [1010]
3. $A = 1110$, $B = 0100$ [0010]
4. $A = 111$, $B = 000$ [111]

5. $A = 0001,\ B = 0111$ [1000, overflow]
6. $A = 11010111,\ B = 00010101$ [11101100]
7. $A = 1000101,\ B = 0111100$ [0000001]
8. $A = 11010,\ B = 11011$ [10101]
9. $A = 10100,\ B = 11100$ [10000]
10. $A = 0110001,\ B = 1111110$ [0101111]
11. $A = 10001,\ B = 01011$ [11100]
12. $A = 111011,\ B = 010001$ [001100]
13. $A = 01010,\ B = 11111$ [01001]
14. $A = 111,\ B = 110$ [101]
15. $A = 0111,\ B = 0101$ [1100, overflow]
16. $A = 101,\ B = 010$ [111]
17. $A = 010,\ B = 110$ [000]
18. $A = 01101011,\ B = 10001001$ [11110100]
19. $A = 0011,\ B = 1101$ [0000]
20. $A = 01100010,\ B = 01010100$ [10110110, overflow]
21. $A = 001,\ B = 101$ [110]
22. $A = 0101110,\ B = 0111011$ [1101001, overflow]
23. $A = 1111,\ B = 0011$ [0010]
24. $A = 100,\ B = 010$ [110]
25. $A = 10001000,\ B = 10101110$ [00110110, overflow]
26. $A = 0000,\ B = 1111$ [1111]
27. $A = 010,\ B = 001$ [011]
28. $A = 11111,\ B = 10101$ [10100]
29. $A = 001101,\ B = 010000$ [011101]
30. $A = 111100,\ B = 011000$ [010100]

5. Esercizi di sottrazione in complemento a 2

Date le stringhe binarie A e B, calcolare in complemento a due la loro differenza, specificando se si verifica un overflow:

1. $A = 111101,\ B = 101110$ [001111]
2. $A = 010111,\ B = 100100$ [110011, overflow]
3. $A = 1010010,\ B = 1100010$ [1110000]
4. $A = 1001011,\ B = 1000110$ [0000101]
5. $A = 0100,\ B = 1100$ [1000, overflow]
6. $A = 1011101,\ B = 1111001$ [1100100]
7. $A = 1101100,\ B = 0000101$ [1100111]
8. $A = 1001101,\ B = 1011001$ [1110100]
9. $A = 00010,\ B = 01010$ [11000]
10. $A = 010,\ B = 111$ [011]
11. $A = 10101,\ B = 11001$ [11100]
12. $A = 1100111,\ B = 0111001$ [0101110, overflow]
13. $A = 1011,\ B = 1001$ [0010]
14. $A = 100101,\ B = 110100$ [110001]
15. $A = 11011100,\ B = 00110010$ [10101010]
16. $A = 0101010,\ B = 1110001$ [0111001]
17. $A = 0100110,\ B = 0110011$ [1110011]
18. $A = 100110,\ B = 111110$ [101000]
19. $A = 01100,\ B = 10101$ [10111, overflow]
20. $A = 01011,\ B = 00111$ [00100]
21. $A = 0011111,\ B = 1011011$ [1000100, overflow]
22. $A = 1100,\ B = 1000$ [0100]
23. $A = 0000,\ B = 0101$ [1011]

24. $A = 010101,\ B = 110101$ [100000, overflow]
25. $A = 00111,\ B = 10011$ [10100, overflow]
26. $A = 1000,\ B = 1010$ [1110]
27. $A = 011011,\ B = 000111$ [010100]
28. $A = 1111000,\ B = 1111110$ [1111010]
29. $A = 11010,\ B = 01001$ [10001]
30. $A = 010011,\ B = 010001$ [000010]