



Universidad Carlos III de Madrid
Digital Electronics
Exercises

- Convert the following binary numbers to decimal, octal, hexadecimal, natural BCD and Gray code:
 - 10101010
 - 11000110
 - 01010100
- Convert the following decimal numbers to binary, octal, hexadecimal, natural BCD and Gray code:
 - 126
 - 100
 - 147
- Convert the following numbers to binary, hexadecimal and natural BCD:
 - 123_8
 - 702_8
 - 12_8
- Convert the following numbers to binary, decimal, octal and natural BCD:
 - 123_{16}
 - $BABA_{16}$
 - $AD0_{16}$

- Simplify the following logic functions using Karnaugh maps:

$$f_1 = \sum_3 (0,1,2,7)$$

$$f_2 = \sum_3 (0,1,2,4)$$

$$f_3 = abc + \bar{a}c + b\bar{c}$$

- Simplify the following logic functions using Karnaugh maps:

$$f_1 = \sum_4 (0,1,2,3,4,5,6,9)$$

$$f_2 = \sum_4 (0,1,2,8,10)$$

$$f_3 = \sum_4 (3,6,7,10,11,14)$$

$$f_4 = \prod_4 (4,5,7,13)$$

$$f_5 = \prod_4 (1,3,5,10,11,12,13,14,15)$$

$$f_6 = ac + ad + \bar{a}\bar{b}\bar{c} + \bar{a}\bar{c}\bar{d}$$

- Simplify the following logic functions using Karnaugh maps:

$$f_1 = \sum_5 (0,1,2,3,4,18,19,20,21,22,23,26,27)$$

$$f_2 = \prod_5 (4,5,6,7,12,13,20,21,22,23,24,25,26,28,29)$$



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8. Simplify the following logic functions using Karnaugh maps:

$$f_1 = \sum_4 (0,2,3,9,11) + \Delta_4 (4,10)$$

$$f_2 = \sum_4 (4,6,11) + \Delta_4 (5,7,13,15)$$