DEPARTAMENTO
DE COMPUTACION
Facultad de Ciencias Exactas y Naturales - UBA

Práctica 1

Representación de la información

1er cuatrimestre 2022 Organización del Computador 1

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1. Ejercicio 1

1.a.

$33 = 16 \times 2 + 1$
$16 = 8 \times 2 + 0$
$8 = 4 \times 2 + 0$
$4 = 2 \times 2 + 0$
$2 = 0 \times 2 + 1$
$\Longrightarrow 33_{10} = 10001_2$

$33 = 11 \times 3 + 0$
$11 = 3 \times 3 + 2$
$3 = 1 \times 3 + 0$
$1 = 0 \times 3 + 1$
$\Longrightarrow 33_{10} = 1020_3$

$33 = 6 \times 5 + 3$
$6 = 1 \times 5 + 1$
$1 = 0 \times 5 + 1$
$\Longrightarrow 33_{10} = 113_5$

$100 = 50 \times 2 + 0$
$50 = 25 \times 2 + 0$
$25 = 12 \times 2 + 1$
$12 = 6 \times 2 + 0$
$6 = 3 \times 2 + 0$
$3 = 1 \times 2 + 1$
$1 = 0 \times 2 + 1$
$\Longrightarrow 100_{10} = 1100100_2$

$100 = 33 \times 3 + 1$
$33 = 11 \times 3 + 0$
$11 = 3 \times 3 + 2$
$3 = 1 \times 3 + 0$
$1 = 0 \times 3 + 1$
$\Longrightarrow 100_{10} = 10201_3$

$100 = 20 \times 5 + 0$
$20 = 4 \times 5 + 0$
$4 = 0 \times 5 + 4$
$\Longrightarrow 100_{10} = 400_5$

$1023 = 511 \times 2 + 1$
$511 = 255 \times 2 + 1$
$255 = 127 \times 2 + 1$
$127 = 63 \times 2 + 1$
$63 = 31 \times 2 + 1$
$31 = 15 \times 2 + 1$
$15 = 7 \times 2 + 1$
$7 = 3 \times 2 + 1$
$3 = 1 \times 2 + 1$
$1 = 0 \times 2 + 1$
$\Longrightarrow 1023_{10} = 1111111111_2$

$1023 = 341 \times 3 + 0$
$341 = 113 \times 3 + 2$
$113 = 37 \times 3 + 2$
$37 = 12 \times 3 + 1$
$12 = 4 \times 3 + 0$
$4 = 1 \times 3 + 1$
$1 = 0 \times 3 + 1$
$\Longrightarrow 1023_{10} = 1101220_3$

$1023 = 204 \times 5 + 3$
$204 = 40 \times 5 + 4$
$40 = 8 \times 5 + 0$
$8 = 1 \times 5 + 3$
$1 = 0 \times 5 + 1$
$\Longrightarrow 1023_{10} = 13043_5$

1.b.

Nota: a la derecha del igual se interpretan todos los números en base 10.

$1111_2 = (1 \times 2^3) + (1 \times 2^2) + (1 \times 2^1) + (1 \times 2^0)$
$= 8 + 4 + 2 + 1$
$= 15$

$1111_3 = (1 \times 3^3) + (1 \times 3^2) + (1 \times 3^1) + (1 \times 3^0)$
$= 27 + 9 + 3 + 1$
$= 40$

$1111_5 = (1 \times 5^3) + (1 \times 5^2) + (1 \times 5^1) + (1 \times 5^0)$
$= 125 + 25 + 5 + 1$
$= 156$

$\mathtt{CAFE}_{16} = (12 \times 16^3) + (10 \times 16^2) + (15 \times 16^1) + (14 \times 16^0)$
$= 49152 + 2560 + 240 + 14$
$= 51966$

1.c.

$17_8 = (1 \times 8^1) + (7 \times 8^0) = (15)_{10}$

$15 = 3 \times 5 + 0$
$3 = 0 \times 5 + 3$

$\Longrightarrow 17_8 = 15_{10} = 30_5$

$\mathtt{BABA}_{13} = (11 \times 13^3) + (10 \times 13^2) + (11 \times 13^1) + (10 \times 13^0) = (26010)_{10}$

$26010 = 4335 \times 6 + 0$
$4335 = 722 \times 6 + 3$
$722 = 120 \times 6 + 2$
$120 = 20 \times 6 + 0$
$20 = 3 \times 6 + 2$
$3 = 0 \times 6 + 3$

$\Longrightarrow \mathtt{BABA}_{13} = 26010_{10} = 320230_6$

1.d.

$(10\ 01\ 01\ 10\ 10\ 10\ 01\ 01)_2 = 21122211_4$
$(001\ 001\ 011\ 010\ 100\ 101)_2 = 113245_8$
$(1001\ 0110\ 1010\ 0101)_2 = \mathtt{96A5}_{16}$

2. Ejercicio 2