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INTD 290

Number Systems in pre-Columbian Context

2 Intro to Digits and Bases

1. D: All of the above
2. B: 10 digits
3. A: 8 digits
4. $255 = 2 \times 10^2 + 5 \times 10^1 + 5 \times 10^0$

3 Base-2, or Binary

1. $\overset{2^3\ 2^2\ 2^1\ 2^0}{1\ 0\ 0\ 0}_2 = 1 \times 2^3 = \boxed{8_{10}}$

   $1\ 0\ 0\ 1_2 = 1 \times 2^3 + 1 = \boxed{9_{10}}$

   $1\ 1\ 0\ 1_2 = 1 \times 2^3 + 1 \times 2^2 + 1 = \boxed{13_{10}}$

   $1\ 1\ 1\ 1_2 = 2^3 + 2^2 + 2^1 + 1 = \boxed{15_{10}}$

2. $32_{10} = 1 \times 2^5 \rightarrow \boxed{100000_2}$

   $42_{10} = 1 \times 2^5 = 32$
   0×2^4
   $1 \times 2^3 = 8$
   0×2^2
   1×2^1
   0×2^0
   $\rightarrow \boxed{101010_2}$

$11_{10} =$ $1 \times 2^3 = 8$
0×2^2
$1 \times 2^1 = 2$
$1 \times 2^0 = 1$
$\rightarrow \boxed{1011_2}$

$17_{10} =$ $1 \times 2^4 = 16$
0×2^3
0×2^2
0×2^1
$1 \times 2^0 = 1$
$\rightarrow \boxed{10001_2}$

4 Base-16, or Hexadecimals

1. B: C = 12_{10}

2. $255/16 = 15$, remainder 15 (LSB) $\rightarrow \boxed{FF_{16}}$

$15/16 = 0$, remainder 15 (MSB)

$F = 15_{10}$ in hex

5 Base-20 Systems

1. a) $20^2 = 400_{10} \rightarrow 100_{20}$
$20^1 = 20_{10} \rightarrow 10_{20}$
$20^0 = 1_{10} \rightarrow 1_{20}$

b)

c) $401_{10} =$ 1×20^2
0×20^1
1×20^0
$= \boxed{101_{20}}$

2. $25_{10} = 1 \times 20^1 + 5 \times 20^0 \rightarrow \boxed{15_{20}}$

$45 = 2 \times 20^1 + 5 \times 20^0 \rightarrow \boxed{25_{20}}$

$425 = 1 \times 20^2 + 1 \times 20^1 + 5 \times 20^0 \rightarrow \boxed{115_{20}}$

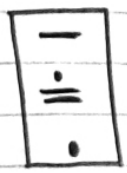
$625 = 1 \times 20^2 = 400$
$11 \times 20^1 = 220 \rightarrow \boxed{1B5_{20}}$
$5 \times 20^0 = 5$

$B = 11_{10}$

3. $25 =$  20^0, 20^1, 20^2

$45 =$  20^0, 20^1, 20^2

$425 =$  20^0, 20^1, 20^2

$625 =$  20^0, 20^1, 20^2