INTD 290 (number systems)

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Asynchronous Activity Worksheet

Introduction to Digits and Bases

Asynchronous lesson 0.1

1. D
2. B
3. B
4. $255 = 2 \times 10^2 + 5 \times 10^1 + 5 \times 10^0$

Base-2 or Binary

1. convert binary → decimal numbers
   - 1000
     $= 1 \times 2^3 + 0 \times 2^2 + 0 \times 2^1 + 0 \times 2^0$
     $= 8$
   - 1001
     $= 1 \times 2^3 + 0 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$
     $= 9$
   - 1111
     $= 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$
     $8 + 4 + 2 + 1$
     $= 15$
2. Convert the following numbers to binary numbers
   - 32 → 00000
     32/2 = 16 r 0
     16/2 = 8 r 0
     8/2 = 4 r 0
     4/2 = 2 r 0
     2/2 = 1 r 0
     1/2 = 0 r 1
   - 11 → 1101
     11/2 = 5 r 1
     5/2 = 2 r 1
     2/2 = 1 r 0
     1/2 = 0 r 1
   - 42 → 01011
     42/2 = 21 r 0
     21/2 = 10 r 1
     10/2 = 5 r 0
     5/2 = 2 r 1
     1/2 = 0 r 1
   - 17 → 10001
     17/2 = 8 r 1
     8/2 = 4 r 0
     4/2 = 2 r 0
     2/2 = 1 r 0
     1/2 = 0 r 1

4 Base-16 or Hexadecimals
asynchronous lesson 0.3

① B

② 255

255/16 = 15 r 14

15/16 = 0 r 15

$255 = 15 \times 16^1 + 15 \times 16^0$

FF

5 Base-20 systems
asychronous lesson 0.3

① a) $20^0 = 1 \rightarrow$ •

b) $20^1 = 20$

c) $20^2 = 400$

b) $400/20 = 20$ r 0 LSB

20/20 = 1 r 0 100

1/20 = 0 r 1 MSB

$400 = 1 \times 20^2 + 0 \times 20^1 + 0 \times 20^0$

c) 401/20 = 20 r 1 L 101

20/20 = 1 r 0

1/20 = 0 r 1 M

$401 = 1 \times 20^2 + 0 \times 20^1 + 1 \times 20^0$

② • 25/20 = 1 r 5 L 15

1/20 = 0 r 1 M

$25 = 1 \times 20^1 + 5 \times 20^0$

• 45/20 = 2 r 5 25

2/20 = 0 r 2

$45 = 2 \times 20^1 + 5 \times 20^0$

asynchronous activity cont.

- $425/20 = 21 r 5$
  $21/20 = 1 r 1$ 115
  $1/20 = 0 r 1$

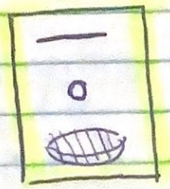
$425 = 1 \times 20^2 + 1 \times 20^1 + 5 \times 20^0$

- $625/20 = 31 r 5$
  $31/20 = 1 r 11$
  $1/20 = 0 r 1$

1 11 5

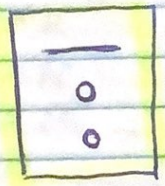
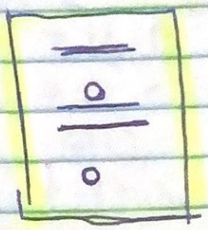
$625 = 1 \times 20^2 + 11 \times 20^1 + 5 \times 20^0$

③ • 25



• 45

• 425



• 625