

Wed Sep 12 2018

- 1.- HISTORY, INTERNET, SOCIETY & ENVIRON.
- 2.- HOW COMPUTERS WORK: HARDWARE & SOFTWARE
- 3.- HOW COMP. "THINK": THE LOGIC OF IT ALL
- 4.- Introduction RP
- 5.- Programming in Python
- 6.- Building the IoT

BINARY SYSTEM

128 64 32 16

0 0 0 0

8 4 2 1

0 0 0 0

1 0 1 0 1 0 1 0 ₁₆ =

$$= 128 + 32 + 8 + 2 = 170_{10}$$

$$(135) = \boxed{67} \cdot 2 + (1) \text{ remainder}$$

Integer division by 2

$$\begin{array}{rcl}
 67 & = & (33) \cdot 2 + (1) \\
 33 & = & (16) \cdot 2 + (1) \\
 16 & = & (8) \cdot 2 + (0) \\
 8 & = & (4) \cdot 2 + (0) \\
 4 & = & (2) \cdot 2 + (0) \\
 2 & = & (1) \cdot 2 + (0) \\
 1 & = & (0) \cdot 2 + (1)
 \end{array}$$

$$\boxed{1000\ 0111}_2 = 135_{10}$$

$$\begin{aligned}
 128 + 4 + 2 + 1 &= \\
 = 32 + 2 + 1 &= 135
 \end{aligned}$$

$$\begin{array}{rcl}
 273 \setminus d & = & 136.2 + \textcircled{1} \\
 136 & = & 68.2 + \textcircled{0} \\
 68 & = & 34.2 + \textcircled{0} \\
 34 & = & 17.2 + \textcircled{0} \\
 17 & = & 8.2 + \textcircled{1} \\
 8 & = & 4.2 + \textcircled{0} \\
 4 & = & 2.2 + \textcircled{0} \\
 2 & = & 1.2 + \textcircled{0} \\
 1 & = & 0.2 + \textcircled{1}
 \end{array}$$

$$\begin{aligned}
 273 \setminus d &= \\
 &= 1 \ 0001 \ 0001 \setminus b
 \end{aligned}$$

$$\frac{137}{2}$$

$$\frac{68}{2}$$

$$\frac{34}{2}$$

$$\frac{17}{2}$$

1000 1001 16

68

34

17

8

1

0

0

1

INTEGER
DIVISION
BY 2

$$\frac{8}{2}$$

$$\frac{4}{2}$$

$$\frac{2}{2}$$

$$\frac{2}{2}$$

$$\frac{1}{2}$$

4

2

1

0

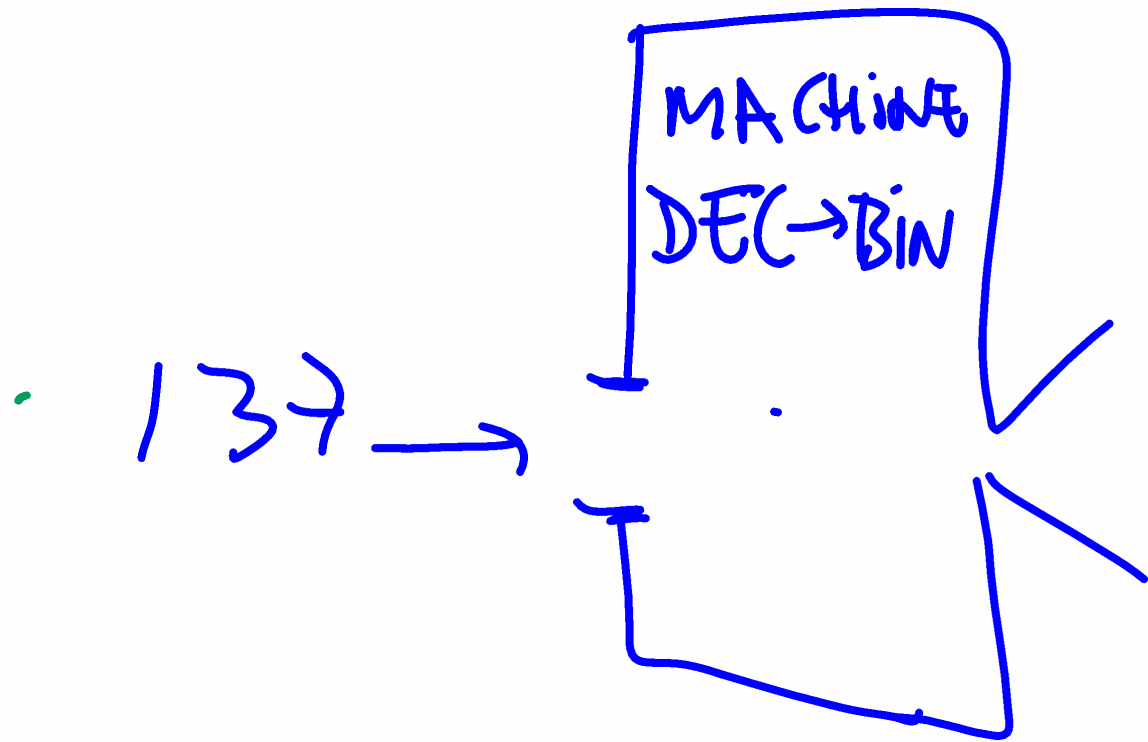
0

0

0

1

1



1
0
0
1
0
0
0
1

RECIPE DEC → BIN (ALGORITHM)

- 1) Take number & do Int division by 2
- 2) Store the remainder
- 3) if int part is zero
goto step 4
else take int part & goto step 1

4) Print all remainders
w/ 1st one on right

1 0 0 0 1 0 0 1 $\setminus b = 137 \setminus d$

0 1 0 0 0 1 0 0 $\setminus b = 68 \setminus d$

0 0 1 0 0 0 1 0 $\setminus b = 34 \setminus d$

0 0 0 1 0 0 0 1 $\setminus b = 17 \setminus d$

0 0 0 0 1 0 0 0 $\setminus b = 8 \setminus d$

0 0 0 0 0 1 0 0 $\setminus b = 4 \setminus d$

0 0 0 0 0 0 1 0 $\setminus b = 2 \setminus d$

0 0 0 0 0 0 0 1 $\setminus b = 1$

0 0 0 0 0 0 0 0

INTEGER division
By 2

$$00110100_2 = 52_{10}$$

$$0,1101000_2 = 104_{10}$$

HOMEWORK

WRITE A PROGRAM
IN JS W/ FOLLOWING
REQUIREMENTS:

1) Takes as input
an integer 0-255

AOL

2) Prints 8 binary
digits representing
the input

Example:

input = 1 $\Rightarrow$ output
0000_0001

Input = 15 $\Rightarrow$ 0000_1111

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