Recovery Learning

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Mathematics

Converting Base 2 to Base 10

Step 1:List the digits in order, as they appear in the number they've given.
Step 2:Then, in another row, count these digits from off the **RIGHT**, starting with zero.
*Reminder: The first row above (labelled "digits") contains the digits from the binary number; the second row (labelled "numbering") contains the power of 8 (the base) corresponding to each digit.
2^1=2 Rule:Two to the power of 1 is 2 2^0= 1 Rule: Any number to the power of 0 is one.

Example 1: 110001_2 to base $_{10}$
Step 1:

Digits	1	1	0	0	0	1
numbering	5	4	3	2	1	0

Step 2:$1\times2^5 + 1\times2^4 + 0 \times 2^3 + 0 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$
Step 3:$1\times32 + 1\times 16 + 0 \times 8 + 0 \times 4 + 0 \times 2 + 1 \times 1$
Step 4: $32 + 16 + 0 + 0 + 0 + 0 + 1$
Step 5: 49
Ans= 110001_2= $\underline{49}_{10}$

Example 2: 10011100_2 to base $_{10}$
Step 1:

Digits	1	0	0	1	1	1	0	0
numbering	7	6	5	4	3	2	1	0

Step 2: $1x\ 2^7 + 0x\ 2^6 + 0x2^5 + 1x2^4 + 1 \times 2^3 + 1x2^2 + 0x\ 2^1 + 0x2^0$
Step 3: $1x128 + 0 \times 64 + 0x\ 32 + 1 \times 16 + 1x\ 8 + 1x\ 4 + 0x\ 2 + 0x1$
Step 4: 128+0+0+16+8+4+0+0
Step 5: 156
Ans= 10011100_2= $\underline{156}_{10}$

Activity 3

Convert these numbers from Base $_2$ to Base $_{10}$. Show **ALL** working.

1)1010_2= _____$_{10}$
2) 11000_2= _____ $_{10}$
3)101011_2= _____$_{10}$
4)1001010_2= _____$_{10}$
5) 10111001_2=_____$_{10}$

LIVEWORKSHEETS