CONVERSION DECIMAL TO BINARY NUMBER SYSTEM

by

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CONVERSION RULES

- The decimal whole number is consecutively divided by 2 and remainder is noted at each turn.
- The division is terminated when quotient equals to 0.
- Write the first remainder in 1st bit ,the 2nd in 2nd bit, continue until the last remainder is exhausted. Pad the remaining bits with zeros.

Byte Number 31

2	31	
2	15	-- 1
2	7	-- 1
2	3	-- 1
2	1	-- 1
	0	-- 1

0 0 0 1 1 1 1 1

Byte Number 47

2	47	
2	23	-- 1
2	11	-- 1
2	5	-- 1
2	2	-- 1
2	1	-- 0
	0	-- 1

0 0 1 0 1 1 1 1

INTEGER NUMBER 41

2	41	
	20	- 1
	10	- 0
	5	- 0
	2	- 1
	1	- 0
	0	- 1

0000 0000 0010 1001

ONE's Complement

- If 0's and 1's in a pattern are changed with 1's and 0's respectively, the number obtained is called 1's complement.

0 1 0 1 1 0 0 0	Original
1 0 1 0 0 1 1 1	1's Complement

- If 1 is added to 1's complement, the result is a number called 2's complement.

1 0 1 0 0 1 1 1	1's Complement
1	
1 0 1 0 1 0 0 0	2's Complement

ONE's Complement

- 1's complement is obtained by inverting the given pattern.
- Inversion means replacing 0 by 1 and 1 by 0.

7

TWO's Complement

- Adding 1 to 1's complement generates the 2's complement.
- The 2's complement of a +ve number (INTEGER or LONG) gives its NEGATIVE counterpart.

8

CONVERSION of –ve Numbers

- Negative Decimal numbers are converted to Binary numbers using 2's complement :

1. Absolute value of negative number is obtained and converted to binary notation.
2. 1's complement is obtained.
3. 1 is added to obtain 2's complement.

- The resulting binary number is equivalent to the given negative number.

9

INTEGER NUMBER -41

Write the number +41

0000 0000 0010 1001
1111 1111 1101 0110 write 1's C
1+ Get 2's C
1111 1111 1101 0111 ⇒ - 41

10

INTEGER NUMBER -650

Write the number +650 :

0000 0010 1000 1010
1111 1101 0111 0101 write 1's C
1+ Get 2's C
1111 1101 0111 0110 ⇒ - 650

11

INTEGER NUMBER -1

First write the number +1

0000 0000 0000 0001
1111 1111 1111 1110 write 1's C
1+ Get 2's C
1111 1111 1111 1111 ⇒ - 1

12

INTEGER NUMBER -32767

First write the number +32767

0111 1111 1111 1111

1000 0000 0000 0000 write 1's C

1+ Get 2's C

1000 0000 0000 0001 ⇒ - 32767

Can you write INTEGER –32768 by this technique?

13

14