

3 BIT  
Unsigned  
Range  
exceeding  
condition:

$2^2$	$2^1$	$2^0$		3 bit
0	0	0	→	0
0	0	1	→	1
0	1	0	→	2
0	1	1	→	3
1	0	0	→	4
1	0	1	→	5
1	1	0	→	6
1	1	1	→	7

3 BIT  
Unsigned  
Range  
exceeding  
condition:

4 bit

0

$2^3$   $2^2$   $2^1$   $2^0$

0 0 0 0

3 bit

0

1

0 0 0 1

1

2

0 0 1 0

2

3

0 0 1 1

3

4

0 1 0 0

4

5

0 1 0 1

5

6

0 1 1 0

6

7

0 1 1 1

7

8

1 0 0 0

0

$2^3$   $2^2$   $2^1$   $2^0$

1 0 0 1

1

1 0 1 0

2

1 0 1 1

3

MOD 8 / MOD  $2^3$

1 Mod 8 = 1

2 Mod 8 = 2

3 Mod 8 = 3

8 Mod 8 = 0

9 Mod 8 = 1

For 32 bit unsigned data  $\rightarrow \text{Mod } 2^{32}$

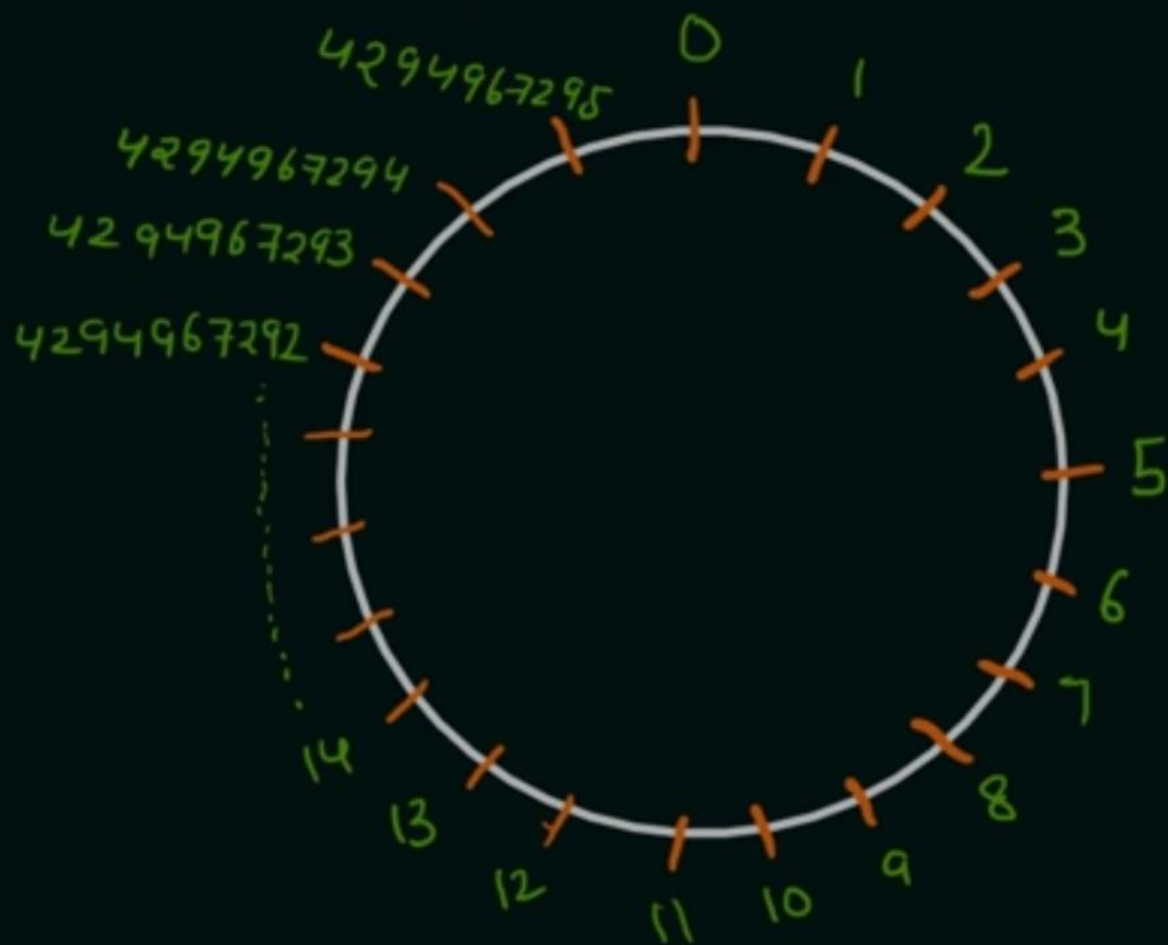
For n bit unsigned data  $\rightarrow \text{Mod } 2^n$



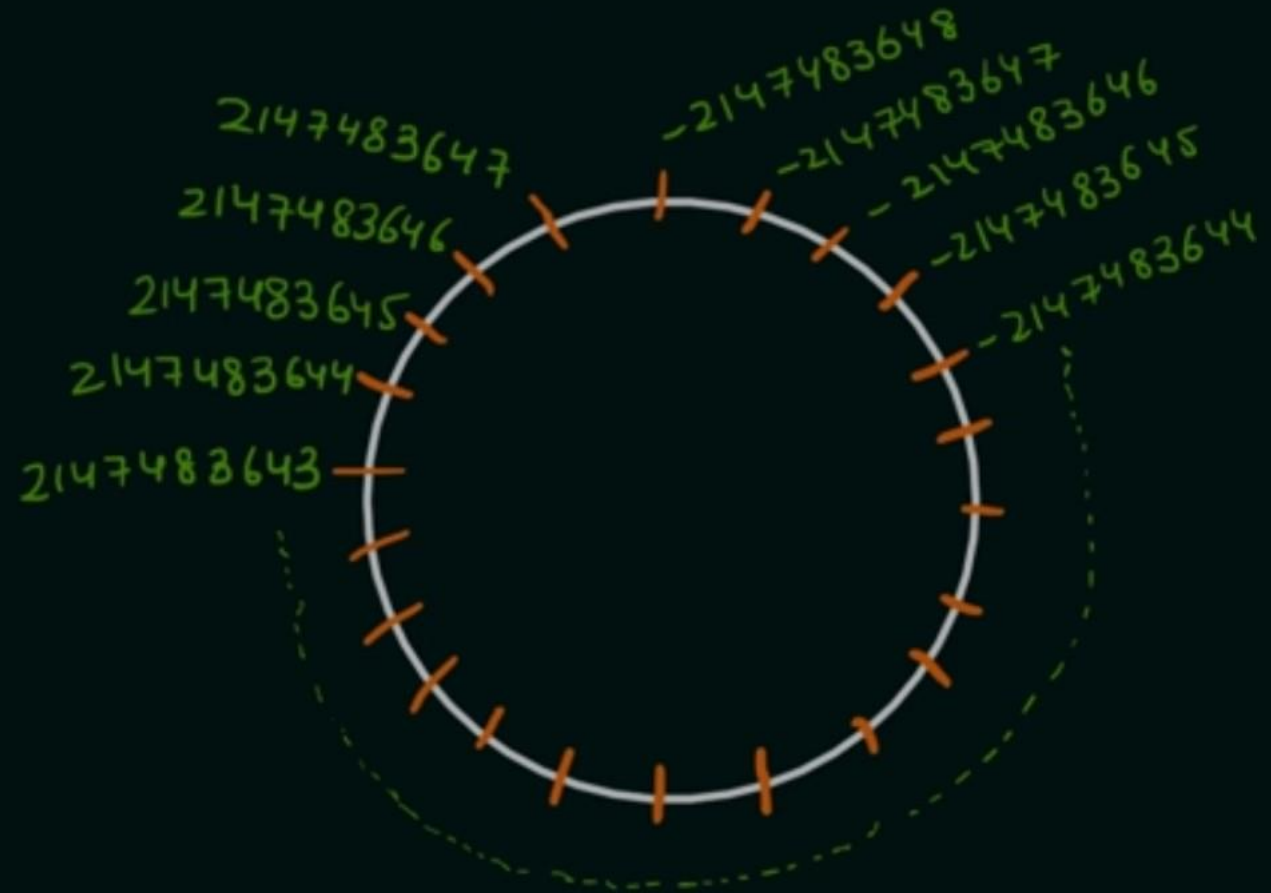
MOD 12 function

It's not 13 O'clock  
It's 1 O'clock

# SIGNED UNSIGNED RANGE REPRESENTATION



UNSIGNED



SIGNED