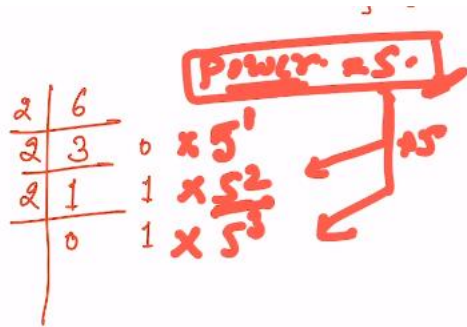


#### Q4. Find nth Magic Number

$A = 1 \rightarrow$	1	$\rightarrow 5^1$
$A = 2 \rightarrow$	10	$\rightarrow 5^2$
$A = 3 \rightarrow$	11	$\rightarrow 5^2 + 5^1$
$A = 4 \rightarrow$	100	$\rightarrow 5^3$
$A = 5 \rightarrow$	101	$\rightarrow 5^3 + 5^1$
$A = 6 \rightarrow$	110	$\rightarrow 5^3 + 5^2$
$A = 7 \rightarrow$	111	$\rightarrow 5^3 + 5^2 + 5^1$
$A = 8 \rightarrow$	1000	$\rightarrow 5^4$



pseudo code

```

int ans = 0, power = 5 // power = 5^1
while (N > 0) {
    r = N % 2
    N = N / 2
    ans += (r * power)
    power *= 5
}
return ans;

```

$\frac{N}{2^k} = 1$   
 $\Rightarrow N = 2^k$   
 $\Rightarrow \log_2 N = \log_2 2^k$   
 $\Rightarrow \boxed{\log_2 N = k}$

$\downarrow$   
 $\frac{N}{2}$   
 $\downarrow$   
 $\frac{N}{4}$   
 $\downarrow$   
 $\frac{N}{8}$   
 $\downarrow$   
 $\frac{N}{2^k}$