Q. arr [2,2,3,3,3,7,7,8,7,8,8]

for every set bits its basically the number of times number appears

o/o n == Remainder number

Total. o/o n = 3

extra number

Intuition

nth magic number

5^2 5^1 5^0

1 = 0 0 1 → 5

2 = 0 1 0 → 25

3 = 0 1 1 → 30 5+25

1 0 0

1 0 1

n = 6 nth magic number

n&1 = last number in binary

n>>1

0*5 + 1*5^2 + 1*5

Amazon magic numbers

first we find last bit

by n&1 = last = n%2

n = n >> 1;

ignore last digit

ans += last * base;

base *= 5;

How to find no of digits in base b

$(6)_{10} = 1$

$(6)_{10} = (110)_2 = 3$

(keep counting.
Right shift till we get 0)

Formula:?

integer value

$\log_b a = x$

$a = b^x$

$\log_2 6 = x$

$6 = 2^x$ → no. of digits in the base

$\log_2 10 = 3.32$

$10 = 2^{3.32}$

How many times 2 multiplied to get 10

$\log_b a = \frac{\log_x a}{\log_x b}$

No. of digits in base

(int) $(\log_b n) + 1$

$= \left(\frac{\log n}{\log b} + 1\right)$

(int) $(\log_b n) + 1$

Pascal's Triangle -

```
        1
      1   1
    1   2   1
  1   3   3   1
```

nth row sum

$$^nC_0 + {}^nC_1 + \cdots {}^nC_n = 2^n$$

nth row, $= 2^{n-1}$

Ans = $1 << (n-1)$ $(* 2^{n-1}$

$$^nC_r = \frac{n!}{r!(n-r)!}$$

$$^nP_r = \frac{n!}{(n-r)!}$$

select things out of n

↓

arrange things out of n

RULE AND COUNTING

COUNTING -

3 pens two markers

pick any one

1st, 2nd, 3rd, 4th, 5th

P1 P2 P3 — 3 ways

M1 M2 — 2 ways

OR

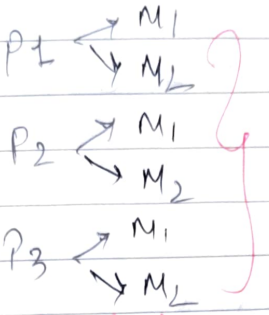
5 ways

OR always means addition (OR)

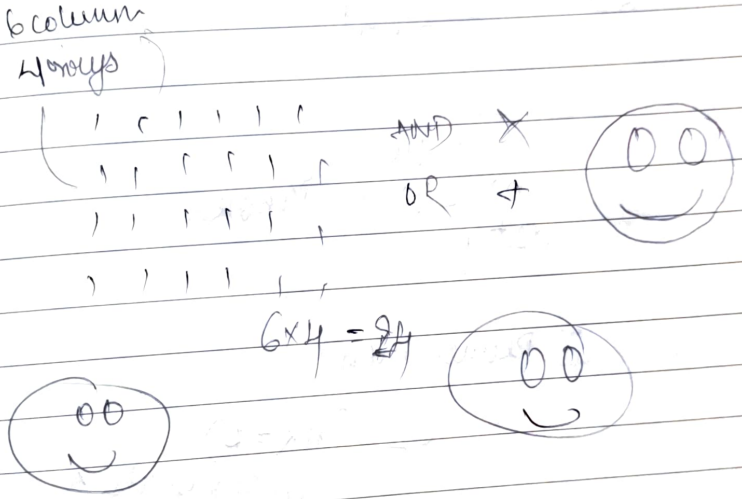
3ways (pen) + 2ways (marker) = 5 ways

(ii) one pen and one marker

3ways (pen) * 2ways (marker) = 6 ways.



3ways X 2ways (AND)



You are given a number find out if number of 2 or not.

(100000, 100010.

only (1) (one)

Ans.

if (n & (n-1) == 0)

Q1 a^b

$3^6 \Rightarrow 3*3*3*3*3*3$

Time Comp O(b)

$3^{(2+4)} = 3^2 . 3^4$

ans = 1

n = 110.

n >> 2 => 0. ignore.

$3^{(2+4)}$

is Prime (int n)

if (n <= 1)
return false;
}

int c = 2;
while (c*c <= n)
if (n%c == 0)
return false;
c++;
}
}

clean code

$i <= sqrt(N)$

OR $(i^2 <= N)$ same.

Prime Number

number divisible by 1 and itself

2, 3, 5, 7,

lets say 13 prime or not.

WKT ignore (1 and 13)

if (2-12) divides 13 then its not prime else its prime.

1 ~~1~~, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, ~~13~~

for(i=2; i<N; i++) {

if (N%i)

not prime : break.

}

prime

(36)

1 x 36 = 36
2 x 18 = 36
3 x 12 = 36
4 x 9 =
6 x 6
9 x 4
12 x 3
18 x 2
36 x 1

Check i <= sqrt(N)

complexity $\sqrt{N}$

if you checking 3 x 12 = 36 do you need to check 12 x 3 = 36 ?

2 x 1 = 36. 1 + 2 = 3 ?

is repeated hence ignore

(n-2) number you can only check for number < square root of number.

Q: Question: -

n = 40.

all numbers <= 40 which are

2, 3 39

Loop used to check

multiple of 2 —

3 —

4 —

Simple array.

finding array is sorted in ascending order.

arr = [1, 2, 4, 8, 9, 12]

arr[i] < arr[i+1]