

Mathematics - 1

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Palindrome

2, 3, 4, 3, 2
← " →

int a = 23432

→ reverse num.

num[N], ~~mod~~

int id = n % 10

rev = rev * 10 + id

n = n / 10

$O(\log N)$ → as
no. of digits $(\log_{10} N + 1)$

string length n → $O(n)$

GCD or HCF

int a = 24

b = 36

GCD = 12

$O(\min(a, b))$

(int i = min(a, b); i > 1; i--) {

if (a % i == 0 & b % i == 0)

return i

}

return 1;

Euclid GCD:

$g(a, b) = g(a - b, b) \rightarrow g(a \% b, b)$
a > b

$gcd(36, 24) = gcd(12, 24)$

$gcd(12, 24) = gcd(12, 12)$

$gcd(12, 12) =$

↓
GCD

$gcd(17, 2) = gcd(15, 2)$

$gcd(15, 2) = gcd(13, 2)$

$gcd(13, 2) = gcd(11, 2)$

↓
GCD

→ used to delete some certain steps

LCM of 2 Numbers.

$$a \rightarrow b \quad \text{LCM} = \frac{a \times b}{\text{HCF}} = \frac{a \times b}{\text{gcd}(a, b)}$$

Trailing zeros in factorial

$$5! = 5 \times 4 \times 3 \times 2 \times 1 = \underline{120}$$

$$2 \times 5 = 10$$

Count no. of 5 coming in factorial

$$\left. \begin{array}{l} 5! = 1 \\ 10! = 2 \\ 15! = 3 \\ 20! = 4 \end{array} \right\} \text{Trailing zeros.}$$

$$\therefore n/5 = \underline{\underline{\text{ans}}}$$

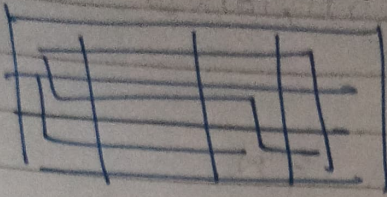
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$$125 \times \dots \times 100 \times \dots \times 75 \times \dots \times 50 \times \dots \times 25 \times \dots \times 20$$

$\swarrow 5$				
	25	20	15	2
$\swarrow 5$				1
	5	4	3	
$\swarrow 5$				
	1			

$$\frac{125}{5} = 25 + \frac{25}{5} = 30 + \frac{3}{5} = \underline{\underline{31}}$$

Unique Paths in a Grid:



m rows

n columns

total steps = m+n
above grid

anyhow that person needs to come down m times

$$m+n \leq m$$

← C_m

$$= \frac{(m+n)(m+n-1) + \dots + (m+n-n) + m}{n!}$$

$$= \frac{(m+1)(m+2)(m+3) \dots (m+n)}{1 \times 2 \times 3 \dots n}$$

from m+n
confirm m
we need to choose

$O(n)$

int res = 1

for (int i = 0; i < n; i++) {

res = $\frac{\text{res} * (m+i)}{i}$

}

i