



Helping Ron 2

NOTE : A's col should

be equal to B's Row

Mandatory Condition for Multiplication

$$A \times B = C$$

$(p \times q)$        $(q \times r)$        $(p \times r)$

$$\begin{matrix} 0 & 1 & 2 \\ 0 & A_{00} & A_{01} & A_{02} \\ 1 & A_{10} & A_{11} & A_{12} \end{matrix}$$

$2 \times 3$

X

$$\begin{matrix} 0 & 1 & 2 & 3 \\ 0 & B_{00} & B_{01} & B_{02} & B_{03} \\ 1 & B_{10} & B_{11} & B_{12} & B_{13} \\ 2 & B_{20} & B_{21} & B_{22} & B_{12} \end{matrix}$$

$3 \times 4$

Row No.  
from A

$$\begin{matrix} 0 & C_{00} & C_{01} & C_{02} & C_{03} \\ 1 & C_{10} & C_{11} & C_{12} & C_{13} \end{matrix}$$

$(2 \times 4)$

Col No. from B

$$C_{00} = A_{00} \times B_{00} + A_{01} \times B_{10} + A_{02} \times B_{20}$$

$$C_{01} = A_{00} \times B_{01} + A_{01} \times B_{11} + A_{02} \times B_{21}$$

$$C_{02} = A_{00} \times B_{02} + A_{01} \times B_{12} + A_{02} \times B_{22}$$

$\begin{matrix} 0 & \xrightarrow{\hspace{1cm}} & 2 & \rightarrow & k \\ \underline{0} & \xrightarrow{\hspace{1cm}} & \underline{2} & & \end{matrix}$   
 $\underline{(0 \rightarrow 2)}$

C 0 0	A 0, 0	B 0, 0	A 0, 1	B 1, 0	A 0, 2	B 2, 0
C 0 1	A 0, 0	B 0, 1	A 0, 1	B 1, 1	A 0, 2	B 2, 1
C 0 2	A 0, 0	B 0, 2	A 0, 1	B 1, 2	A 0, 2	B 2, 2
C 0 3	A 0, 0	B 0, 3	A 0, 1	B 1, 3	A 0, 2	B 2, 3
C 1 0	A 1, 0	B 0, 0	A 1, 1	B 1, 0	A 1, 2	B 2, 0
C 1 1	A 1, 0	B 0, 1	A 1, 1	B 1, 1	A 1, 2	B 2, 1
C 1 2	A 1, 0	B 0, 2	A 1, 1	B 1, 2	A 1, 2	B 2, 2
C 1 3	A 1, 0	B 0, 3	A 1, 1	B 1, 3	A 1, 2	B 2, 3
0 0 0	0	0	0	0	0	0

## Prime Number

NOTE : 1 is not prime.

$$N = 36 \xrightarrow{\text{No } |} \text{Not Prime}$$

prime numbers are divisible by 1 or itself.

→ i.e. factors of a prime number are (1, N)

$$N = 36 \quad \text{Not Prime!}$$

$$\begin{aligned} &\Rightarrow 1 \times 36 & 36 \times 1 \\ &2 \times 18 & 18 \times 2 \\ &3 \times 12 & 12 \times 3 \\ &4 \times 9 & 9 \times 4 \\ &6 \times 6 & \end{aligned}$$

No. of factors  $> 2$

$$N = 7 \quad \text{Prime!}$$

$$\Rightarrow 1 \times 7, 7 \times 1$$

No. of factors  
 $= 2$

## Bruno force :

```
int contfact = 0;  
for (int i = 1; i <= N; i++)  
{  
    if (N % i == 0)  
        contfact++;  
}  
if (contfact == 2)  
    print (Prime),  
else  
    print (Not prime);
```

TC : O(N) }  
SC : O(1) }

optimize this?

$$N = 36$$

$$\begin{array}{ll} 1 \times 36 & 36 \times 1 \\ 2 \times 18 & 18 \times 2 \\ 3 \times 12 & 12 \times 3 \\ 4 \times 9 & 9 \times 4 \end{array}$$

$$6 \times 6$$

If find any factor.

$$2 \rightarrow \sqrt[N]{N}$$

↓

Not Prime

$$N = 13$$

$$1 \times 13 \quad 13 \times 1$$

$$N = 20$$

$$\begin{array}{ll} 1 \times 20 & 20 \times 1 \\ 2 \times 10 & 10 \times 2 \\ 4 \times 5 & 5 \times 4 \end{array}$$

$$N = 100$$

$$1 \times 100 \quad 100 \times 1$$

$$\left\{ \begin{array}{ll} 2 \times 50 & 50 \times 2 \\ 4 \times 25 & 25 \times 4 \\ 5 \times 20 & 20 \times 5 \end{array} \right.$$

$$\begin{array}{c} 10 \\ \downarrow \end{array}$$

$$\sqrt[10]{100}$$

11       $i \leq \underline{\underline{119}}$   
 for ( int  $i = 2$ ;  $\underline{i \times i \leq N}$ ;  $i++$  )  
 {  
     if (  $N \% i == 0$  )  
         {  
             print (Not Prime);  
             return;  
         }  
     }  
     print (Prime)

$N = 119$   
 $i = \cancel{2} \cancel{3} \cancel{4} \cancel{5} \cancel{6} \cancel{8} 7$   
 $\frac{119}{7} = \underline{\underline{17}}$

$$2 \rightarrow \underline{\underline{N}}$$

$$\left\{ \begin{array}{l} TC: O(\sqrt{N}) \\ SC: O(1) \end{array} \right\}$$

$[4, 3, 7, 11, 5]$



sort()      ascending!

$[3, 4, 5, 7, 11]$



largest Prime

life Bar

Steps

	0	1	2	3	4
0	0	1	1	0	0
1	1	1	0	1	0
2	1	0	1	0	1
3	0	0	0	0	1

levels

$\rightarrow 2$   
 $\rightarrow 3 \}$        $ans = 1$   
 $\rightarrow 3$   
 $\rightarrow 1$

```

for (int i=0 ; i < n ; i++)
{
    int currentLifes = 0;
    for (int j=0 ; j < m ; j++)
    {
        if (mat[i][j] == 1)
            currentLifes++;
    }
    point C _____
}

```

