

$aaab\boxed{b}$   
 $aa\boxed{b}ab$   
 $aa\boxed{b}ba$   
 $a\boxed{b}aa\boxed{b}$   
 $a\boxed{b}a\boxed{b}a$   
 $a\boxed{b}baa$   
 $b\boxed{a}aa\boxed{b}$   
 $b\boxed{a}a\boxed{b}a$   
 $b\boxed{a}b\boxed{a}a$   
 $b\boxed{b}aaa$

$\begin{matrix} (3) \} 1 \\ (2) \} 2 \\ (2) \} 2 \\ (1) \} 3 \end{matrix}$

$k = 5$

position of 1<sup>st</sup> b

$\boxed{\_b\_b\_}$

$00011$   
 $00101$   
 $00110$   
 $01001$

$\downarrow$   
 $\begin{matrix} 1 & 3 & 6 & 10 \\ 1 & 23 & 456 & 78910 \end{matrix}$   
 $\_0\_$

### Number Theory

$\begin{matrix} \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & & & & & & & & \\ \textcircled{1} & \textcircled{2} & \textcircled{3} & \textcircled{4} & \textcircled{5} & \textcircled{6} & \textcircled{7} & \textcircled{8} & \textcircled{9} & \textcircled{10} & \textcircled{11} & \textcircled{12} & \textcircled{13} \\ \textcircled{14} & \textcircled{15} & \textcircled{16} & \textcircled{17} & \textcircled{18} & \textcircled{19} & \textcircled{20} & \textcircled{21} & \textcircled{22} & \textcircled{23} & \textcircled{24} & \textcircled{25} & \textcircled{26} \\ \textcircled{27} & \textcircled{28} & \textcircled{29} & \textcircled{30} & \textcircled{31} & \textcircled{32} & \textcircled{33} & \textcircled{34} & \textcircled{35} & \textcircled{36} & \textcircled{37} & \textcircled{38} & \textcircled{39} \\ \textcircled{40} & & & & & & & & & & & & \end{matrix}$

$[1, 4]$

$$i \leq \sqrt{n}$$

$$\Rightarrow i \cdot i \leq n$$

$$T = 1 \text{ sec}$$

$$\sqrt{25} \approx 5.000 \dots 1$$

for( $i=2$ ;  $i \leq \sqrt{n}$ ;  $i++$ ) 30 बार  $n=1000$

if (  $\boxed{\text{for}(j=i^2; j \leq n; j+=i)}$  ) 11 बार

$$\frac{n}{1} + \frac{n}{2} + \frac{n}{5} + \frac{n}{7} + \frac{n}{11}$$

$$\left[ \frac{n}{2} + \frac{n}{3} + \frac{n}{5} + \frac{n}{7} + \frac{n}{11} \right] + \frac{n}{13} + \frac{n}{17} + \frac{n}{19} + \frac{n}{23} + \frac{n}{29} + \frac{n}{31}$$

1560  $\leftarrow 500 + 333 + 200 + 142 + 90 + 76 + 58 + 52 + 43 + 34 + 32$

$$N \rightarrow \frac{N}{2} + \frac{N}{3} + \dots + \frac{N}{p_x}$$

$$(1 \sim \sqrt{N})$$

$$(1 \sim 31)$$

$$\frac{\sqrt{N}}{\ln \sqrt{N}}$$

$$x = \frac{\sqrt{N}}{\ln(\sqrt{N})}$$

$$\rho_x$$

$$x=0$$

$$\frac{N}{\ln(N)}$$

$$N \left( \frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + \dots + \frac{1}{N} \right) \approx N \log(N)$$

$$4N \rightarrow \underbrace{N \log(\log(N))}_N$$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2		2		2		2		2		2		2	
		3			3			3			3			3
			4				4				4			
				5					5					5
					6						6			
						7							7	

vector<int> divs [MAX+5];  $O(n \log n)$

for (i=1; i ≤ n; i++)

for (j=i; j ≤ n; j+=i)

divs[j].push-back(i);

datatype arr[N][M];

1000 byte

$M = N = 10^3$

$$\begin{aligned} & \frac{n}{1} + \frac{n}{2} + \frac{n}{3} + \dots + \frac{n}{n} \\ &= n \left( 1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{n} \right) \\ & \quad \underbrace{\hspace{10em}}_{\text{Harmonic Sum}} \\ & \approx n \log_2 n \end{aligned}$$