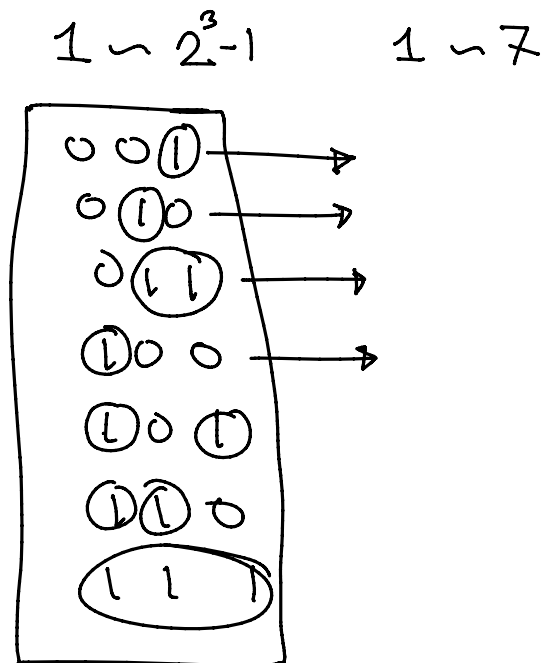


$n=3$
 $2^n = 1$



Sieve → $O(N \log N)$ $O(N \sqrt{N})$ $N \sqrt{N} > N \log N$
 $\sqrt{N} > \log N$

$1 \sim n$

$\frac{1}{1}$	$\frac{2}{1}$	$\frac{3}{1}$	$\frac{4}{1}$	$\frac{6}{1}$	$\frac{6}{1}$	$\frac{7}{1}$	$\frac{8}{1}$	$\frac{9}{1}$	$\frac{10}{1}$	$\frac{11}{1}$	$\frac{12}{1}$	$\frac{13}{1}$	$\frac{14}{1}$
1	1	1	1	1	1	1	1	1	1	1	1	1	1
	2	3	2	5	2	7	2	3	2	11	2	13	2
			4		3		4	9	5		3		7
					6		8		10		4		14
											6		
											12		

$k \rightarrow \frac{N}{k}$

// vector<int> divs [10⁶+1];
int sum [10⁶+1];

$$= \frac{N}{1} + \frac{N}{2} + \dots + \frac{N}{N} = N \left(1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{N} \right) = N \log N$$

for (i=1; i ≤ N; i++)

for (j=i; j ≤ N; j+=i)

for($j=i$; $j \leq N$; $j++$)

//divs[j].push_back(i);

$\phi(10) = 4$ $\left(\frac{1}{10}, \frac{3}{10}, \frac{7}{10}, \frac{9}{10}\right)$ sum [j] += i ;

$\phi(n) = (1, \dots, n, n)$

$\phi(4) = 2$ $\left(\frac{1}{4}, \frac{3}{4}\right)$

$F_n =$

$\frac{a}{b}$

$0 < a \leq b \leq n$, $\gcd(a, b) = 1$

$\begin{matrix} 1, n \\ 2, n \\ 3, n \\ \vdots \\ n, n \end{matrix}$

$n \leq 10^2$

$n \rightarrow F_n$

$n \leq 10^6$

$F_2 = \{1/2\}$

$F_4 = \{1/3, 2/3, 1/2, 1/4, 3/4\}$
= 5

$F_3 = \{1/3, 2/3, 1/2\}$

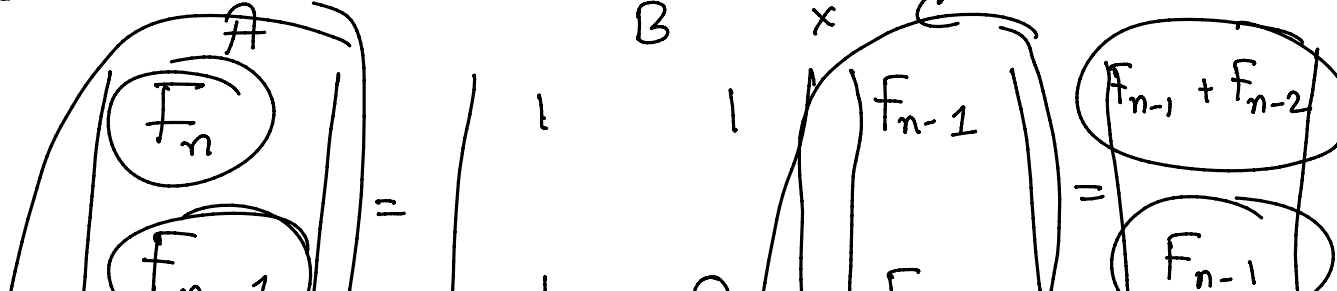
$F_n = F_{n-1} + \phi(n)$

$2/4 \rightarrow 1/2$

unsigned int \rightarrow modulo 2^{32}

unsigned long long \rightarrow modulo 2^{64}

$$F_n = F_{n-1} + F_{n-2}$$



$$\left(\left| F_{n-1} \right| \right) = 1 \quad 0 \quad \left(\left| F_{n-2} \right| \right) \left| F_{n-1} \right|$$

$$\begin{vmatrix} F_n \\ F_{n-1} \end{vmatrix} = \begin{vmatrix} 1 & 1 & \cdots & 1 \\ 1 & 0 & \cdots & 1 \end{vmatrix} \begin{matrix} F_1 \\ F_0 \end{matrix}$$

α^b

$$\phi(P) = P-1$$

Generating Function