Primality Testing $O(\sqrt{N})$

Sieve

~~1) 1 ~ n পর্যন্ত pn gen করো~~

2) 1 ~ n পর্যন্ত সংখ্যাগুলোর primality test করো p বার np সেটা যত কম করা

Eratosthenes

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

10, 15, 20

2 3 2

2 → 4
3 → 9
5 → 25

7 → 49

14, 21, 28, 35

2 3 2 5

```
vector<bool> marked(n+1, false);
marked[0] = marked[1] = 1;
for(i=2; i*i<=n; i++) {
    // some work
}
```

$$\frac{100}{1} + \frac{100}{2} + \frac{100}{3} + \frac{100}{4} + \cdots + \frac{100}{100}$$

1
2
3
4
:

$$= \frac{n}{1} + \frac{n}{2} + \frac{n}{3} + \cdots + \frac{n}{n}$$

$$= n\left(1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \cdots + \frac{1}{n}\right)$$

$n = 100$ $= n \log_2 n$

$$\frac{n}{2} + \frac{n}{3} + \frac{n}{5} + \frac{n}{7} + \frac{n}{11} + \cdots + \frac{n}{\sqrt{n}}$$

$$= n \ln(\ln(n))$$

—o—

Sieve
- divisor finding
- sod
- nod

1 2 3 4 5 6 7 8 9 10

1	2	3	4	5	6	7	8	9	10
1	1	1	1	1	1	1	1	1	1
	2	3	2	5	2	7	2	3	2
			4		3		4	9	5
					6		8		10

$$\frac{N}{1} + \frac{N}{2} + \frac{N}{3} + \cdots + \frac{N}{N} = N \log_2 N$$

$p^2 \rightarrow (2n+1)^2$

$4n^2 + 4n + 1$

$p - 1$

even

49 → odd

25 → odd