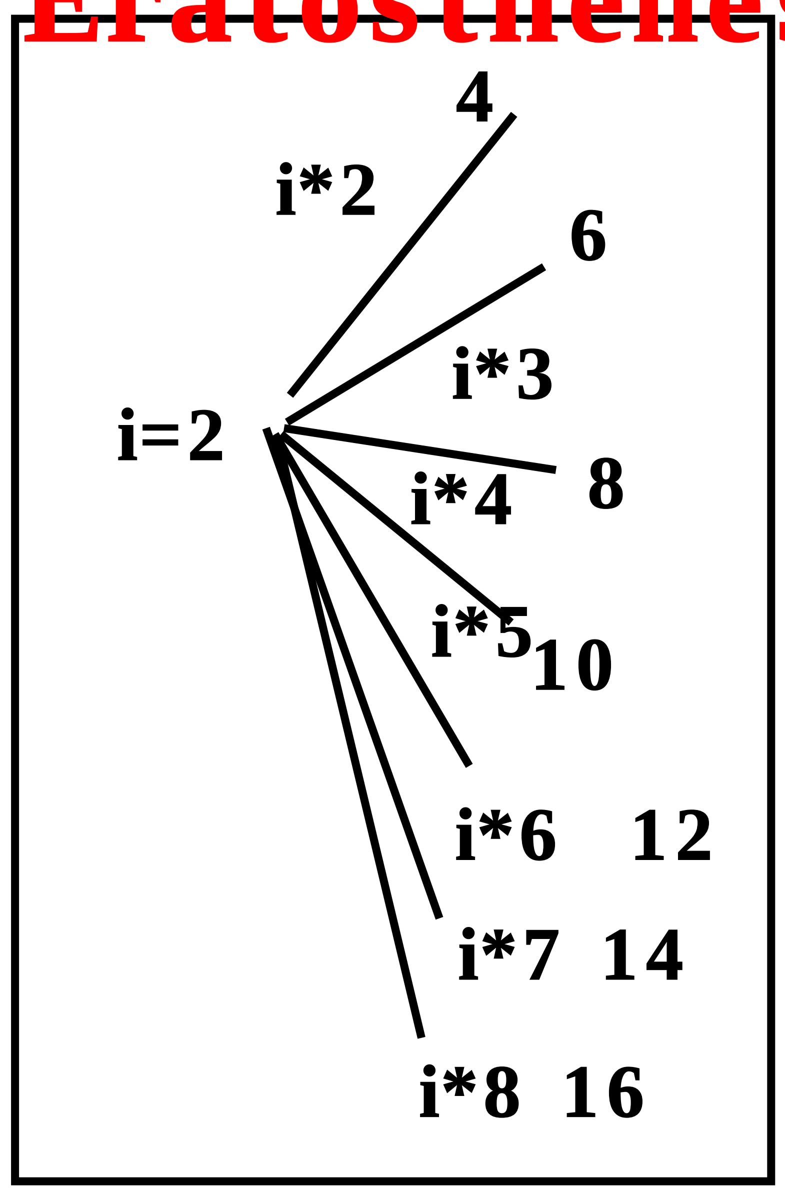
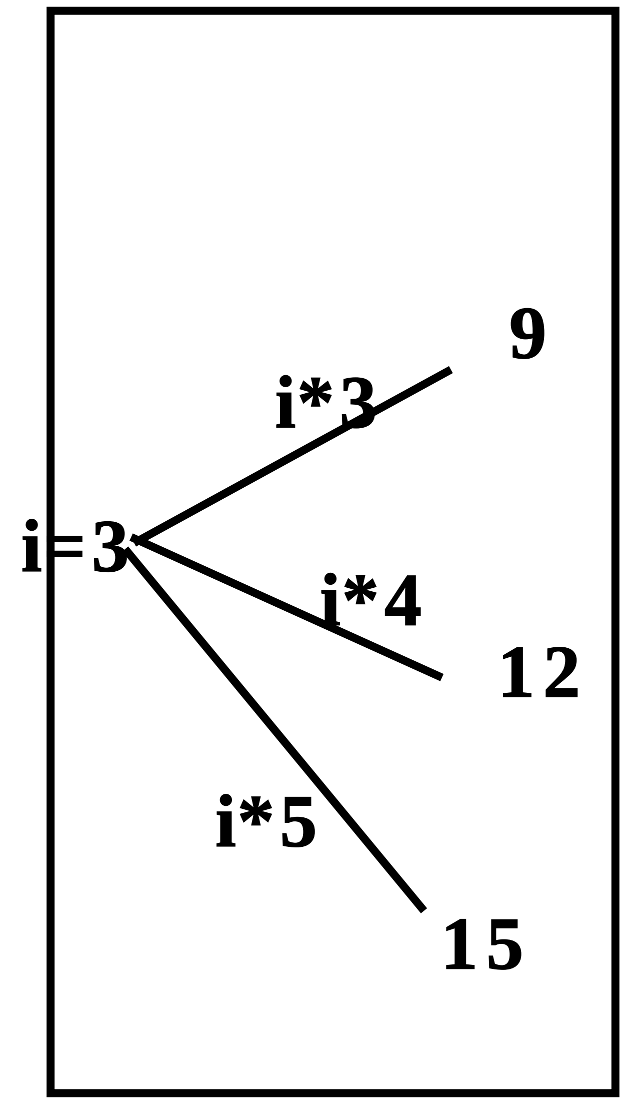
Sieve Of Eratosthenes

max = 16

	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
i = 2	T	T	T	T	~~T~~	T	~~T~~	T	~~T~~	T	~~T~~	T	~~T~~	T	~~T~~	T	~~T~~
i = 3	T	T	T	T	~~T~~	T	~~T~~	T	~~T~~	~~T~~	~~T~~	T	~~T~~	T	~~T~~	~~T~~	~~T~~
i = 4	Four is crossed. Stop																

1,2,3,5,7,11,13






```
void SieveOfEratosthenes() {
     boolean [] a = new boolean[n + 1] ;
     for (int i = 0; i <= n; ++i) {
       a[i] = true ;
     }
     a[0] = false ;
     a[1] = false ;

     for (int i = 2; (i <= SQRT(n) ; ++i) {
       if (a[i] == true) {
         //WRITE CODE
       }
     }
```

$\sqrt{n}$

log log n

Work done

$$\left[\frac{n}{2} + \frac{n}{3} + \frac{n}{5} + \frac{n}{7}\right]$$

(note no work done for 4,6 ...)

$$\sum_{p \text{ prime}} \frac{1}{p} = \frac{1}{2} + \frac{1}{3} + \frac{1}{5} + \frac{1}{7} + \frac{1}{11} + \frac{1}{13} + \frac{1}{17} + \cdots = \infty$$

$$\sum_{\substack{p \text{ prime} \\ p \le n}} \frac{1}{p} \ge \log\log(n+1) - \log\frac{\pi^2}{6}$$

This was proved by Leonhard Euler in 1737.

$$n * \left[\frac{1}{2} + \frac{1}{3} + \frac{1}{5} + \frac{1}{7} + \frac{1}{11} + \frac{1}{13} + \frac{1}{17} + \cdots\right]$$

$$n * \left[\log\log n\right]$$

O(n * log(log n))