SEIVE OF FRATOSTHENES

The Seive of Eratorthenes is an efficient algorithm finding au prime numbers up to a given intéger 1.

include (stdio.h) # include (staboof.h)

void sieve-of-eratolint n) {

bool is-prime [n+1]; // Boolean array to mark prime numbers

"Initialize all entries astrue -for (int 1=0; 1<=9; 1++) } is-prime[i]=true;

Initially, we assume all numbers from This loop rum from 0 to n and sets all values of is-prime[i] to true.

is-prime [0] = is-prime [1] = false; 11 0 and 1 are not prime numbers iterate over each no. p from 2 to An. if is-prime cp] is true, p is prime yo. -for (int p=2; p*p <=n; p++) {

11 If is-prime [p] is true, mark its multiples as falce if (is-prime [p]) of start marking multiples of p as take, beginning for (ist l-n + 1) of the prime [p]) of start marking multiples of p as take, beginning to for (int 1=p*p; i<=n; i+=p) & cover bui multiples of p.

1/4 Start with p=2, the smallest prime number.

why start from p??
. Au smalley multiples (p, 2p, ..., (p-1) p) are
already marked by smalley primes.

" print au prime numbers printf ("Frime number up to %d: \n", n); for (int i=2; i<= n; l++) { if (is-prime [i]) & har if we is youthouse to wind all is all proceedings uponly the graphent print ("%d", i); printf ("\n"); (d. kaad b k3 % shudski) # f la lattoport la azis biav of yours applicad W: [brir] among it lood int main () { mer to int my student victors the stilling of printf ("Enter the value of n: "); scanfl"%d", wn); Seire-of-erato (n); two ore bloom it; odd the pringer is some in is temperated is true p is from the

TIME COMPLEXITY = O('m(log (logn 1)) .Tir espainarin 1975

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the property of the property o

TWINS. -> implement using Seive-of- Eratosthenes.

- They are both prime. A prime number is an integer greater than 1 that has no positive divisors other than 1 and itself.
- Their absolute difference is exactly equal to 2 (i.e 1j-i1=2).
- Given ay inclusive interval of integers from n tom, find the number of pairs of twins there are in the interval (i.e[n,m])?

Note that pairs (i, j) and (j, i) are considered to be the samepair.

- Output format Print a single integer denoting the number of pales of twins. [3, 13]

Sample output = 3. There are three pairs of twins: (3,5), (5,7) and (11,13),

Complexity

Sieve of Eratosthenes: O(mlog logm), where n= R -> Counting Twins: 0 (R-L+1) / filtering Prime: 0(R-L+1)

-> Finding twin paux: 0 (number of primes in range).

2. S. C = O(MAX) for the ic-prime array.

O(R) for the is-prime array.

Malaysahi

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11 Function to count twin primes in the range [L, R]
                                                                                                                                                       of the appropriate the second the
                               count-twin-primes (int L, int B) {
                                                                                                                                         at more will enough to
                                   bool is-prime [MAX+1]; Il Declare an array to make primes
                                   Sieve-of-erato (R, is-prime): I love that or hard we marine
                                                                                                           on over stack attent to rank to know the
                                     int twin_count=0;
                                                                                                                10 (L. 1) beco (jed) solar front JOH
                    Il Herate through the range [L, R] & checkfor twin primes
                          -for (int "=L", "<=R-2; 1++)}
                                                if ( is-prime [i] du is-prime [i+2]) >
                                                       -twin count ++; " pritopot populari organica trint
                                            Yelway twin-count ++;
                      They repet three fourthwise: (3,5), (5,7) and (92.7)
int main 1) }
           int L,R;
            printf (" Lange" (15); police) : soprationed provide = 3.7
            xanf ("%d %d", &L, &R);
             if (R > MAX) & in spire paradaupe jo : sping nine parton !
                            busyt 1 "
                                                                                     ", max);
                     2
                                                                               les des prime de collections
```

return o;

hy ftwind

int e result = count_twin-primes (L, R);

", L, R, result);