Primality test in O(sqrt(N)) :-

→ To determine if the given int is prime or not.

Br ⇒

```
bool isPrime(int n)
{
    If (n==1) return false;

    for ( i<n, i=2)
        If (n%i == 0) return false;

    return true;
}
```

⇒ **Better Approach:**

- All ~~numbers~~ divisors of a number N occur in Pairs (a, b), $a \times b = N$.

- 12: 1, 2, 3, 4, 6, 12

  pairs: (1,12) (4,3) (2,6)

classmate

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Claim: for a divisor pair (a, b) one of them lies below sqrt (N) and other lies above sqrt (N)

Proof:

There would be three cases

Case 1: Both a & b are below sqrt(N)

Case 2: Both a & b are above sqrt(N)

Case 3: One is below sqrt(N) and the other above.

Case 1: let's assume that this statement is true, hence

$a < sqrt(N)$ and $b < sqrt(N)$

But, then,

$a \times b < N$

which contradicts the fact that $a \times b = N$

Hence, Case 1 is not true.

Case 2: let's assume it is true, then,

$a > sqrt(N)$ & $b > sqrt(N)$

But then,

$a \times b > N$

Hence, Case 2 is utter bullshit.

Case3: One is - - .

$a = sqrt(M) \times sqrt(M) / b$ — (1)

Sub case1: $b < sqrt(M)$ gives $1 < sqrt(M)/b$

$a = sqrt(M) \times (1+x)$

Hence, $a > sqrt(M)$

Sub case2: $b > sqrt(M)$ gives $1 > sqrt(M)/b$

$a = sqrt(M) \times (1-x)$

Hence, $a < sqrt(M)$

Therefore, Case-3 is correct.

⇒ Considering the above stuff we can conclude that we only need to check till sqrt(M).