Sieve of Eratosthenes - simple sieve

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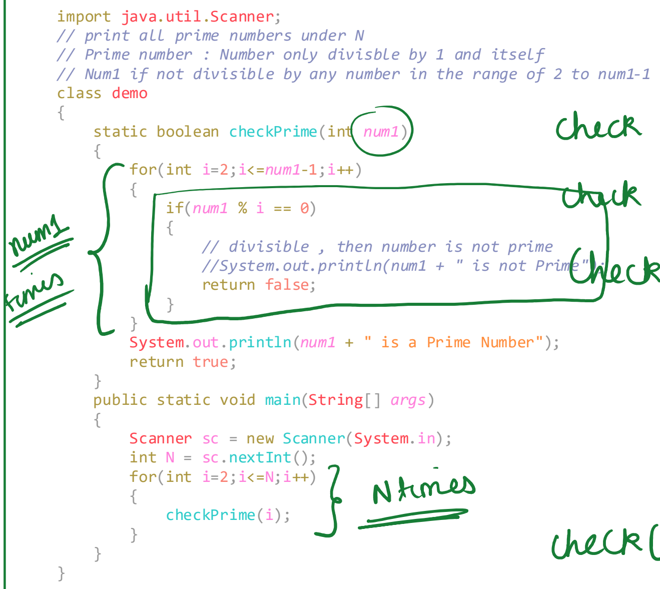
Find all prime numbers that are less than 'N' , where N is the input

Input : 9
Output : 2 3 5 7

Range (2 to N) ==> find all prime numbers



```java
import java.util.Scanner;
// print all prime numbers under N
// Prime number : Number only divisble by 1 and itself
// Num1 if not divisible by any number in the range of 2 to num1-1
class demo
{
    static boolean checkPrime(int num1)
    {
        for(int i=2;i<=num1-1;i++)
        {
            if(num1 % i == 0)
            {
                // divisible , then number is not prime
                //System.out.println(num1 + " is not Prime");
                return false;
            }
        }
        System.out.println(num1 + " is a Prime Number");
        return true;
    }
    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);
        int N = sc.nextInt();
        for(int i=2;i<=N;i++)
        {
            checkPrime(i);
        }
    }
}
```

num1 times

N times

checkprime loop

check (2) → 0

check (3) → 1

check (4) → 2

→ 3

→ 4

→ 5

check(100) → 98

$\Rightarrow 0+1+2+3+\ldots\ldots\ldots+98$

$\Rightarrow 1+2+3+4+\ldots+(n-2)$

$\Rightarrow n(n\quad) \Rightarrow \underline{O(n^2)}$

Prime Number Under $\boxed{50}$ ← num

$\sqrt{50} = 7.1$

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	31
32	33	34	35	36	37	38	39	40	41
42	43	44	45	46	47	48	49	50	

42	43	44	45	46	47	48	49	50	

Step 1. Store all natural numbers from 2 to Num in an array

Step 2. Mark all numbers as Prime

Step 3. Iterate from the beginning

    if the number is marked Prime

    - Mark all multiples of the number as not prime starting from number^2

num = 50

$\sqrt{50} = 7.1\sim\sim$

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	31
32	33	34	35	36	37	38	39	40	41
42	43	44	45	46	47	48	49	50	

$O(n)$

isprime

0	1	2	3	4	. . .	. .	. .	99	100
True	False	True	True	True	True	True	. . .	True	True