

Topics to discuss

- Print all prime numbers till n .
- Sieve of Eratosthenes.
- Its time & space complexity.

```

static boolean prime(int n){
    if (n <= 1) return false;
    for (int i = 2; i * i <= n; i++) {
        if (n % i == 0)
            return false;
    }
    return true;
}

```

```

static void solution(int n){
    for (int i = 2; i <= n; i++){
        if (prime(i) == true)
            print(i);
    }
}

```

I/p : 10

#DSAWithArfin

O/p : 2, 3, 5, 7

I/p : 20

O/p : 2, 3, 5, 7, 11, 13, 17, 19

Sieve of Eratosthenes

$$n = 100$$
$$\sqrt{n} = 10$$

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
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
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```

static void sieveOfEratosthenes (int n) {
    boolean[] isPrime = new boolean [n+1];
    for (int i=2 ; i<=n ; i++)
        isPrime [i] = true;
    for (int i=2 ; i*i <= n ; i++) {
        for (int j=i*i ; j <= n ; j+=i)
            isPrime [j] = false;
    }
    for (int i=2 ; i<=n ; i++) {
        if (isPrime[i] == True)
            Print (i)
    }
}

```

$n=10$

0, 1, 2, 3, ..., 10

2 3 4 5 6 ... 10

T T F F T

$i=2$
 $j=2 \times 2 = 4$
 $j = j + i = 4 + 2 = 6$

$i=3$
 $j=3 \times 3 = 9$
 $j = j + i = 9 + 3 = 12$