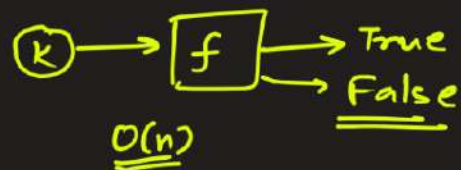


C++
Python

eg. A number is prime or not



10^6 10^{10}
 $\frac{n}{k}$ is an integer
 $\frac{n}{k}$ will also divide n

$O(n)$
 $(2) \rightarrow (n-1)$
 $(2) \rightarrow \frac{n}{2}$
 $(2) \rightarrow \sqrt{n}$

False
 $O(n)$ } 10^6 10^{10}
 $O(n)$
 $O(\sqrt{n})$ 10^3 10^5

WA

Pass

TLE

✓ Seg

✓ Compiler Error

Test Files

- Failed In1.txt → Out1.txt
- Pass In2.txt → Out2.txt
- small In5
- large In8.txt → Out8.txt
- TLE In9.txt → Out9.txt

$O(n)$

16

23

$n \sim 10^{10}$

1000000007

FALSE

False

True

True

$n \sim 10^9$

c++ → test.cpp

g++ test.cpp → a.out

./a.out < in.txt > res.txt

Memory

n = 1000000007

$O(n)$

Time limit : 1s 2s 5s 10s

C < C++ < Java < Python
1s - 2s 2-3s 5-6secs

True

$O(n)$

```
for (int i=2; i<n; i++) {  
    if (n%i==0) {  
        return "False";  
    }  
}  
return "True";
```

~ GHz 10^9 Hz 10^9 opns / Sec

10 lines - 10 opns

10⁹ 10¹⁰ opns

↳ 10s

10⁶ - 10⁸ operations

for 10⁶ → 10⁷ → 10⁸

n ~ 10⁶ - 10⁷
O(n) ✓

n ~ 10⁸ - 10⁹
O(n) ✗
↳ log n
√n

n ~ 10⁵

O(n²) ✗

O(n log n) ✓

O(n^{3/2}) ✓

IDE

Comp Platform

↳ 1-2 problems

n ~ 10³

O(n²) ✓

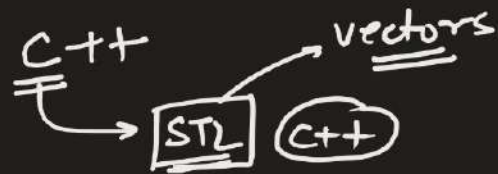
O(n³) ✗

O(n² log n) might.

Number Theory

Template

Python



VS Code



<https://www.codechef.com/practice/course/basic-math>



$2 \times \text{kms} - 1 \text{ day}$

$10 \times \text{kms}$ — 5 days
1 week

8-10

Test file

5 ✓
2 ✓
1 ✓
3 ✓
7 ✓
10 ✓



20
10
30
70
100

$\{ \begin{matrix} x \\ 10x \end{matrix} \}$

$\frac{O(1)}{O(t)} \frac{O(x)}{O(x)}$

(x)

$1 \leq t \leq 10$
 $10 \leq x \leq 10$

$O(t \cdot x)$

$ans = 0$
 $for(int \underline{i=0}; i < \underline{x}; i++)$
 $\underline{ans = ans + 10;}$
 $\frac{O(10)}{O(x)}$

test.cpp

```
#include<bits/stdc++.h>
using namespace std;
#define endl '\n'
void solve() {
    int x;
    cin >> x;
    cout << 10*x << endl;
}
int main() {

ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);
    int t = 1;
    // cin >> t;
    while(t--) {
        solve();
    }
    return 0;
}
```


test.py

```
def solve():  
    x = int(input())  
    print(10*x)  
t = 1  
# t = int(input())  
for i in range(t):  
    solve()
```

template.cpp

```
#include<bits/stdc++.h>
using namespace std;
#define endl '\n'
void solve() {

}
int main() {

    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);
    int t = 1;
    cin >> t;
    while(t--) {
        solve();
    }
    return 0;
}
```

Commands:

C++

```
g++ test.cpp
./a.out < in.txt > out.txt
```

Python

```
python3 test.py < in.txt > out.txt
```