```
count = 0                          initialization
while ( count ≤ N ) {              condition
    print ( count )                }  Loop work
    .
    .
    .
    count ++                       update
}
```

For loops :

```
for ( initialization ; condition ; update ) {
        }  Loop work
}
```

Q. Print 1, 2, 3, ---- N

```
for(int i=1 ; i<=N ; i++) {
    print(i)
}
```

Q. Print 1, 3, 5, 7, ---- till N

```
for(int i=1 ; i<=N ; i=i+2) {
    print(i)
}
```

Change this code

What are factors of a number ? Divisors

i is factor of N if N % i == 0

Factors of 6 → 1, 2, 3, 6

Factors of 10 → 1, 2, 5, 10

Factors of 24 → 1, 2, 3, 4, 6, 8, 12, 24

Q Print factors of N using for loop

```
for( int i=1 ; i<=N ; i++ ){
    if (N % i == 0) {
        print (i)
    }
}
```

ZERO difference performance wise in for loop & while loop

For more complex updates & conditions → while loop

Prime Numbers → Divisible by 1 & itself.

→ Has exactly 2 factors

1 → not a prime

5 → 1, 5

7 → 1, 7

23 → 1, 23

Q Check if N is prime

```
count = 0
for ( i = 1 ; i ≤ N ; i++ ) {
    if ( N % i == 0 ) {
        count ++
    }
}

if ( count == 2 ) {
    print ("Prime")
}
else {
    print ("Not prime")
}
```

1

2

3

101

```
count = 0
for ( i = 1 ; i ≤ N ; i++ ) {
    if ( N % i == 0 ) {
        count ++
    }
    if ( count > 2 ) {
        break;
    }
}

if ( count == 2 ) {
    print ("Prime")
}
else {
    print ("Not prime")
}
```

```
for (i = 1 ; i ≤ 20 ; i++ ) {
    if ( i % 4 == 0 )
        continue
    print (i)
}
```

1 2 3 5 6 7 9 10 11 13 14 15 17 18 19

Break & Continue

Break → exit loop right now !!!
Get out of this loop right now !!

```
for ( i = 0 ; i ≤ 22 ; i++ ) {
    if ( i > 17 ) {
        break
    }
    print (i)
}
```

0 1 2 ---- 14 15 16 17

Continue → Dont exit the loop entirely.
Just move to next update

```
for ( i = 0 ; i ≤ 22 ; i++ ) {
    if ( i % 2 == 0 )
        continue ;
    }
    print (i)
}
```

1 3 5 7 9 11
13 15 17 19 21

How to solve questions with T testcases

T = 4

Is prime or not ?

10
17
5
12

```
int T = scn.nextInt()

for (int i = 1 ; i ≤ T ; i++) {

    // Read input

    // Process

    print ("Result for test case " + t + ": ")
}
```

Scope of a variable (where does the variable live?)

1)
```
int x = 10
int y = 15
print (x + "  " + y)
```
10 15

2)
```
int x = 10
{
    int y = 15
    print (x + "  " + y)
}
{
    print (x + "  " + y)
}
```
10 15

error

$x = 10$

3)

```
int   x = 10
int   y = 15

{
    y = 10

    print (x + "   " + y)
}                  10          10
{

    print (x + "   " + y)
          10          10
}
```

$y = 15$ 10