

Loop

iteration

Repeat

Repeat → loop

① → ②

↓
2 repeat

1-100 → 1-100

Loop

Syntax

for loop

while loop

Syntax

for loop

Expression

for (initia ; condi ; iteration)

- ① Initialization
- ② Conditional Exp.
- ③ Iteration Sta

{

// loop statement

Loop stop

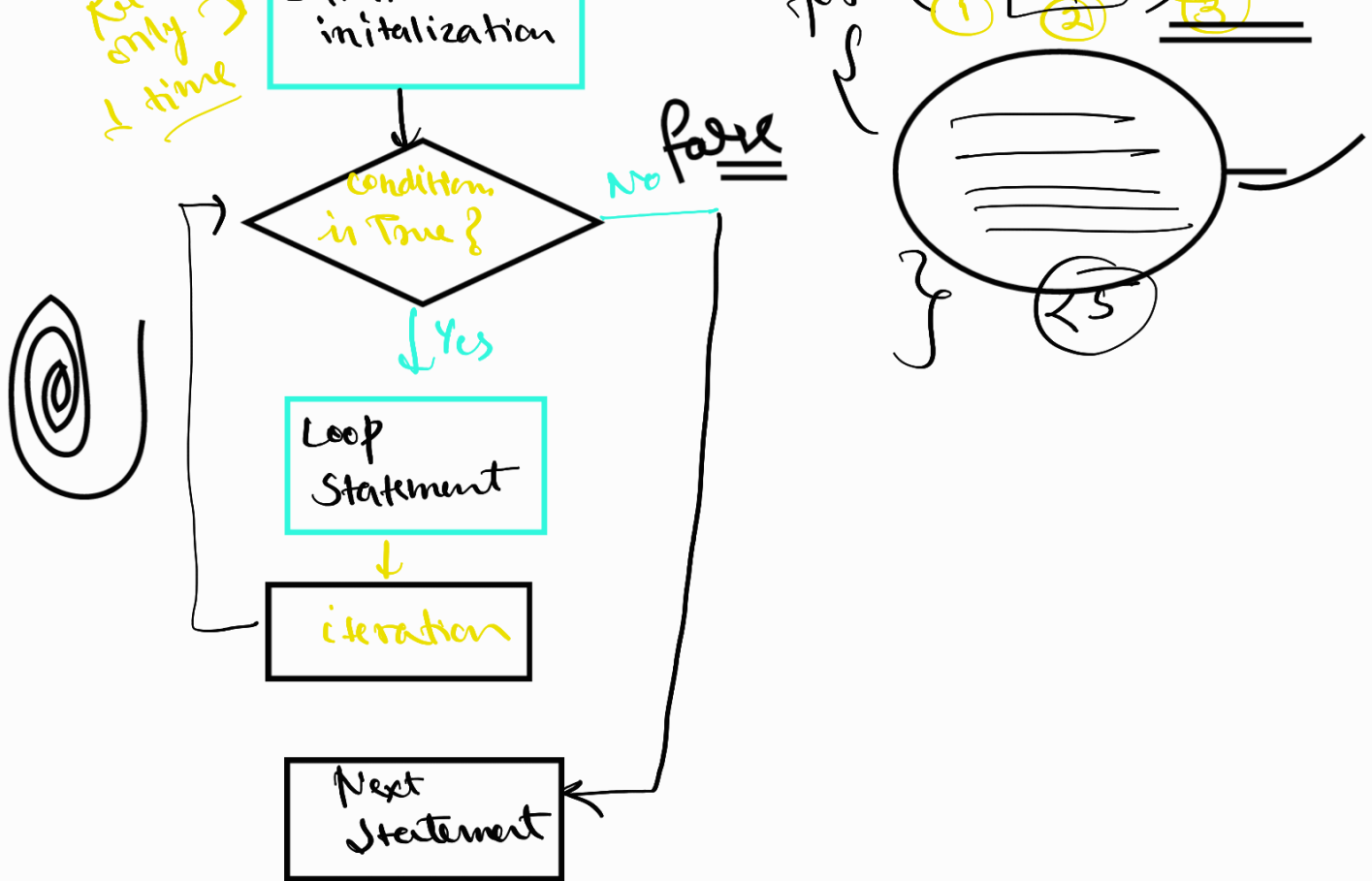
②

< > <=

}

↓
Evaluate

for (1 ; 2 ; 3)



Handwritten code and annotations for a for loop:

```

for (int i {}; i <= 10; i++)
{
    cout << i << endl;
}
  
```

Annotations and notes:

- Top left: "0 to 10" (underlined)
- Top center: "True" (underlined) with an arrow pointing to the condition.
- Top right: "variable counter" (underlined)
- Right side: "x" and "j" in circles, with "i = 0", "i < 10", "i++", "i = 1", and "i > 10" written below.
- Bottom left: "i > 10" (underlined)
- Bottom center: "i++ → 11" (circled) and "11 < 10" (underlined)
- Bottom right: "0 1, 2, 3, 4, 5, 6, 7, 8, 9, 10" (underlined)

for (; ;)

for (; ;)

for (;;)

(5)

$1 + 2 + 3 + 4 + 5$
✓
3
6 10 (15)

$$\frac{n(n+1)}{2}$$
$$\frac{5 \times 6}{2} = \underline{\underline{15}}$$

$n \times (n+1) / 2$

1-5 → (15) X

for loop

1 — 5

1 + 2 = 3 → sum

(4) + sum = sum = (5)

5 → (5)

10 (5)

Sum = 10

1 + 2 + 3 + 4 + 5

```
int sum = 0;  
for (int i = 1; i <= 10; i++)  
{  
    sum = sum + i;  
}
```

i <= 10	sum
1	0
2	1
3	3
4	6
5	10

} 45 + 10 ✓

cout << sum; → 55

False

6
7
8
9
10
11

15
21
28
36
45
55

n = 10

$$\frac{n(n+1)}{2} = \frac{10 \times 11}{2}$$

$$\Rightarrow \frac{110}{2} = \underline{\underline{55}}$$

