Theory: Increment and decrement

8 minutes 4 / 5 problems solved

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In this topic, we will discuss one of the most famous operations in programming: **increment**. It is used in many programming languages including Java to increase a variable by one. Fun fact: this operation is used in the name of C++, and signifies the evolutionary nature of the changes from C.

§1. Using ++ and -- in Java

Java has two opposite operations called increment (`++`) and decrement (`--`) to increase/decrease the value of a variable by one.

```
int n = 10;
n++; // 11
n--; // 10
```

The code above is actually the same as below.

```
int n = 10;
n += 1; // 11
n -= 1; // 10
```

§2. Prefix and postfix forms

Both **increment** and **decrement** operators have two forms which are very important when using the result in the current statement:

- **prefix** (`++n` or `--n`) increases/decreases the value of a variable before it is used;
- **postfix** (`n++` or `n--`) increases/decreases the value of a variable after it is used.

The following examples demonstrate both forms of increment.

Prefix increment:

```
int a = 4;
int b = ++a;

System.out.println(a); // 5
System.out.println(b); // 5
```

In this case, the value of `a` has been incremented and then assigned to `b`. So, `b` is 5.

Postfix increment:

```
int a = 4;
int b = a++;

System.out.println(a); // 5
System.out.println(b); // 4
```

In Java, postfix operator has higher precedence than the assignment operator. However, it returns the original value of `a`, not the incremented one. That's why when we assign `a++` to `b`, we actually assign 4, while `a` itself has already been incremented. So, `b` is 4 and `a` is 5.

If that's still not clear enough for you, take a look at the code:

```
int a = 4;
System.out.println(a++ + a); // this is 9
```

Current topic:

- ✓ Increment and decrement — Stage 1

Topic depends on:

- ✓ Integer types and operations — Stage 1

Topic is required for:

- ✓ Characters — Stage 1
- ✓ The for-loop — Stage 2
- ✓ The while and do-while loops — Stage 2

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We hope that now you fully understand increment and decrement and their prefix and postfix forms.

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