Control Flow & Static Methods CS101

NIFR 2023

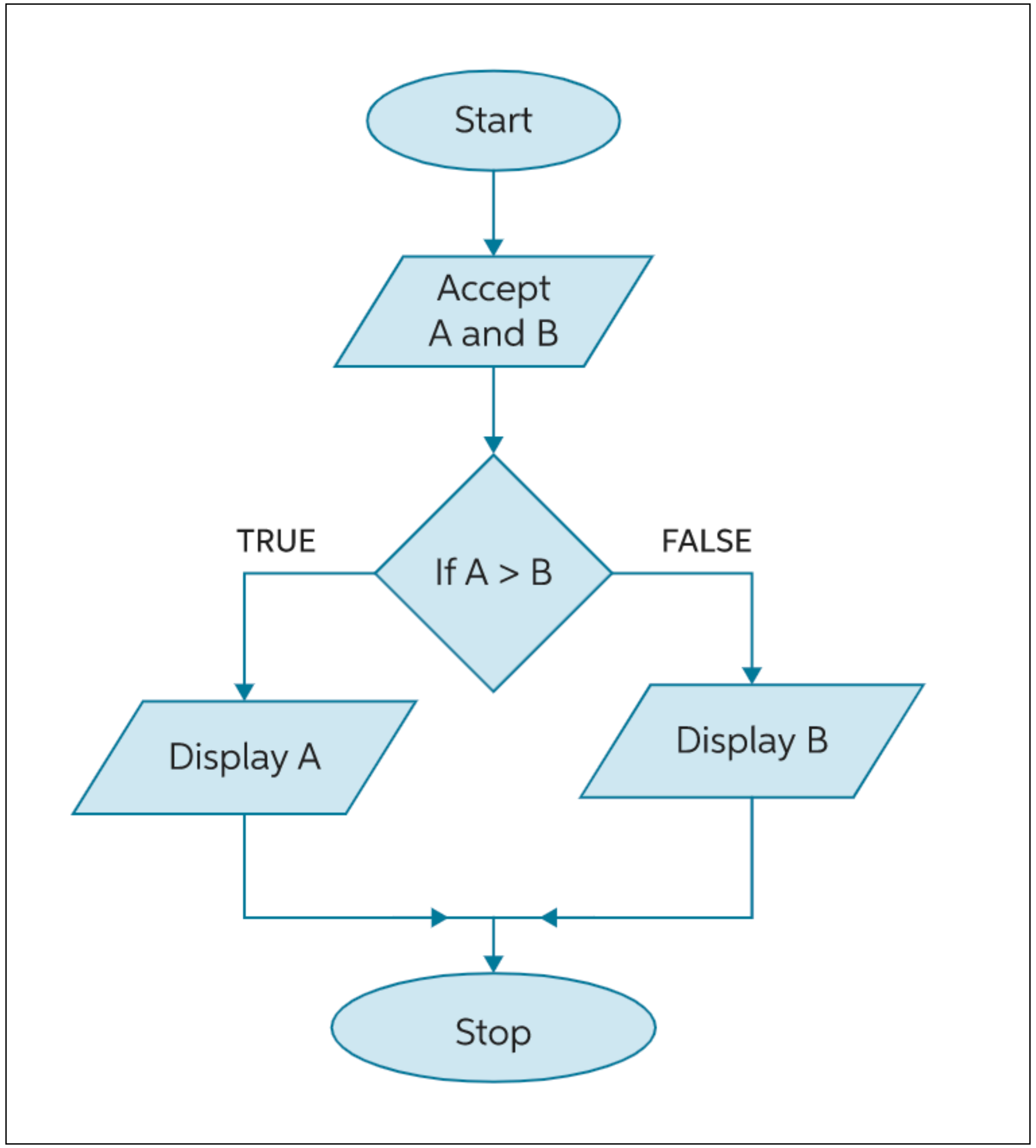
Agenda

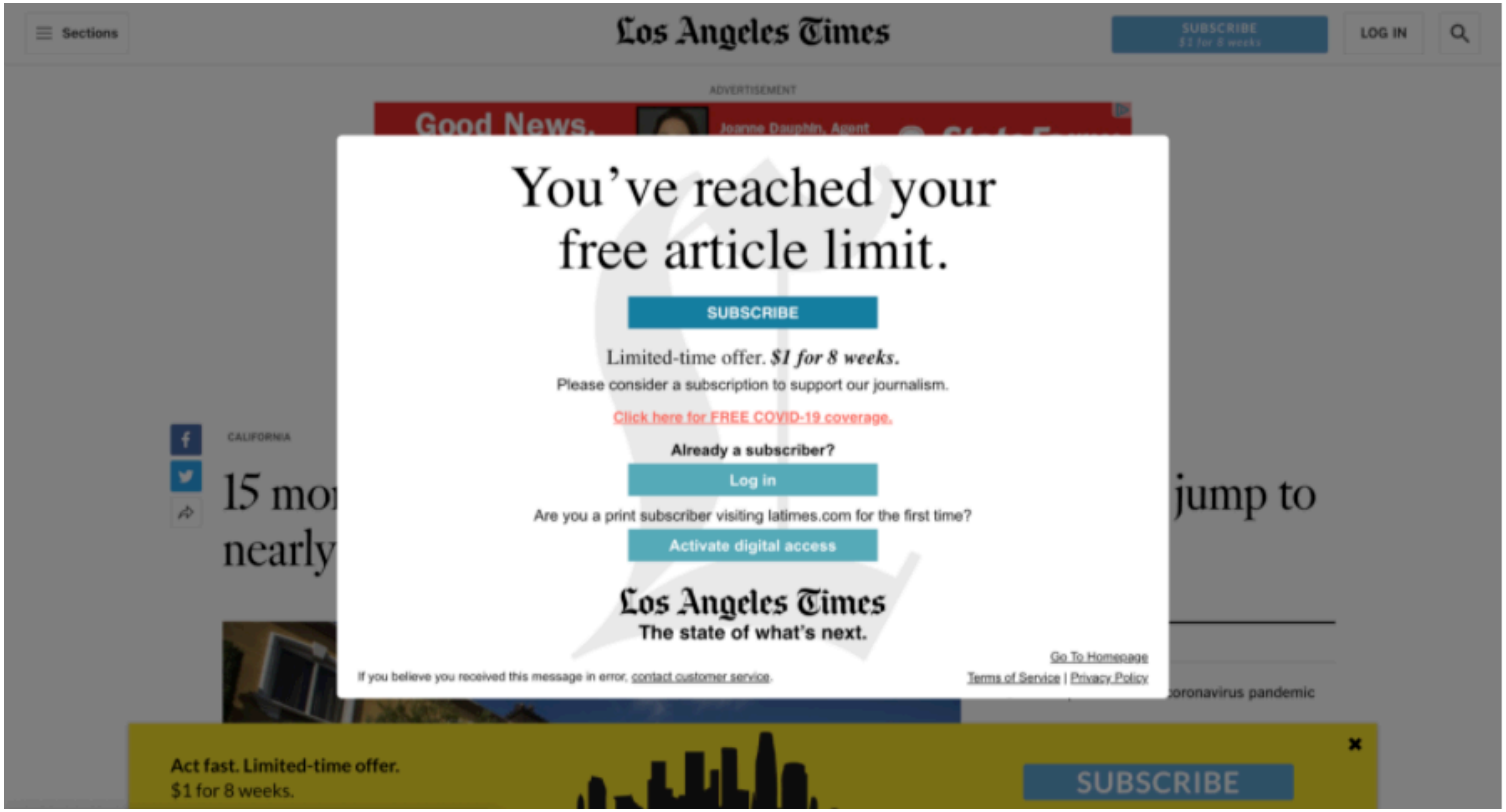
Application Development: CS101

- Conditionals
  - Switch statement
- Loops
- Static Methods
- Explainer
- Exercises
- Ugeopgave: spørgsmål

Examples:
https://github.com/nicklasdean/ita22-code-examples

Conditionals CS101


Start
Accept A and B
If A > B
TRUE
FALSE
Display A
Display B
Stop



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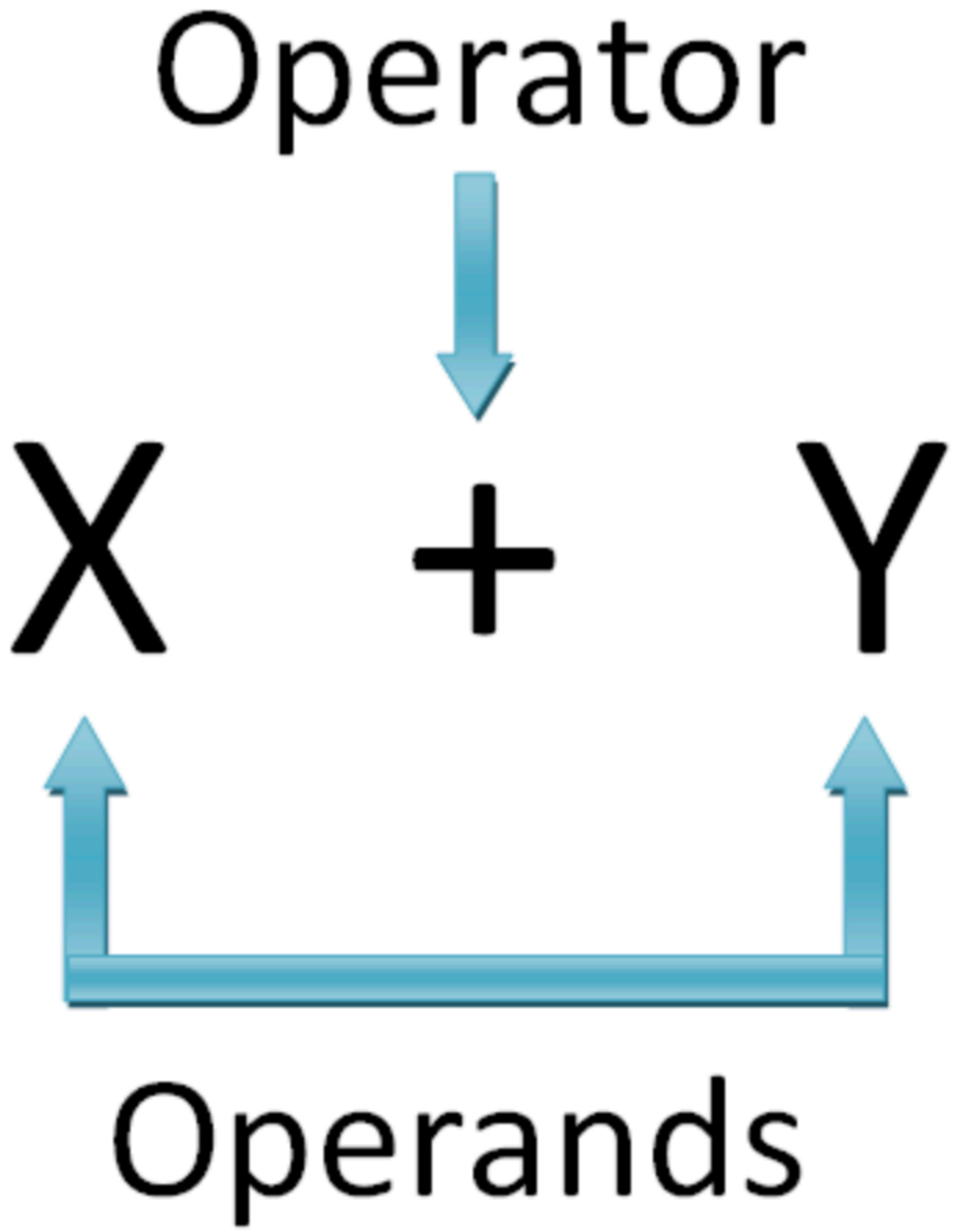
Anatomy of

```
if (){}
```

An expression



Operator	Name	Example
+	Addition	x + y
-	Subtraction	x - y
*	Multiplication	x * y
/	Division	x / y
%	Modulus	x % y
**	Exponentiation	x ** y
//	Floor division	x // y

Evaluating expressions

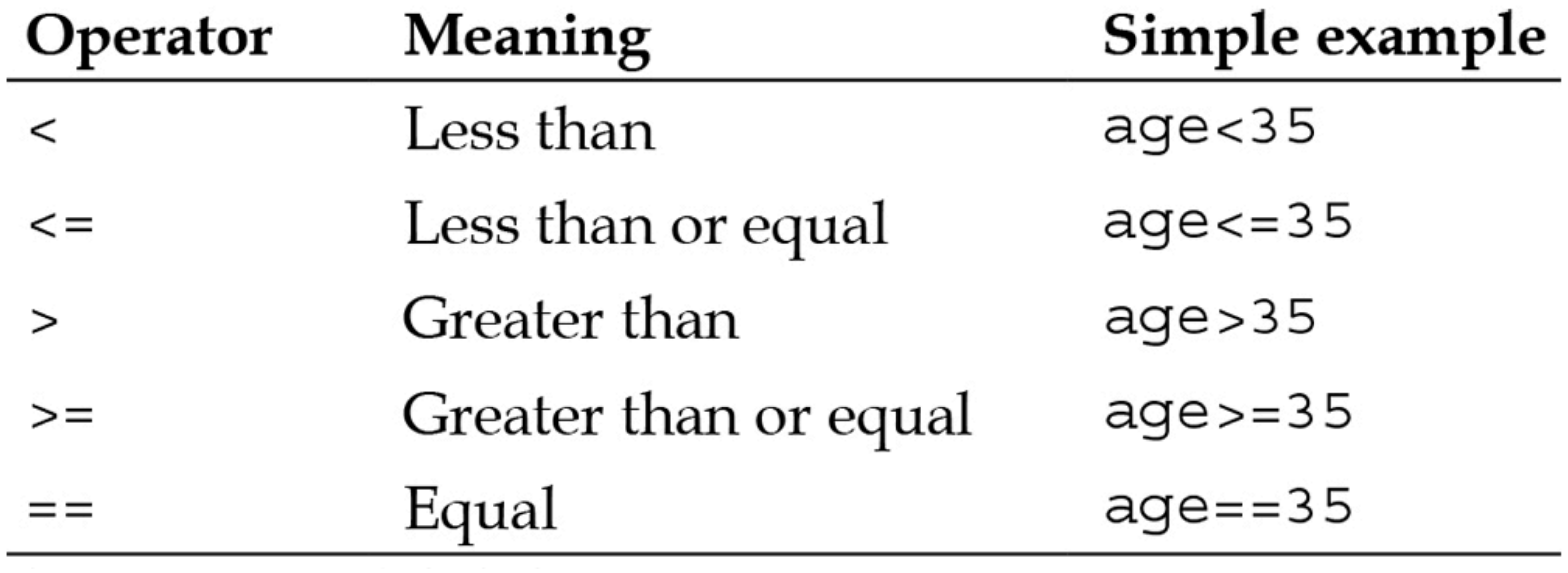
```
public class Example{
    public static void main(String[] args){´
    int heightFromUser;                 //Input from user
    final int HEIGHT_LIMIT = 160;    //Hard limit

    if(HEIGHT_LIMIT > heightFromUser){
        System.out.println("Sorry not tall enough to enter")
    }
}
```

Evaluating expressions

```
public class Example{
    public static void main(String[] args){´
    int heightFromUser;                //Input from user
    final int HEIGHT_LIMIT = 160;      //Hard limit

    if(HEIGHT_LIMIT > heightFromUser){
        System.out.println("Sorry not tall enough to enter")
    }
}
```

Operator, operand & expression

Relational operators



Operator	Meaning	Simple example
`<`	Less than	`age<35`
`<=`	Less than or equal	`age<=35`
`>`	Greater than	`age>35`
`>=`	Greater than or equal	`age>=35`
`==`	Equal	`age==35`

Else

```
public class Example{
    public static void main(String[] args){
    int heightFromUser;                 //Input from user
    final int HEIGHT_LIMIT = 160;    //Hard limit

    if(HEIGHT_LIMIT > heightFromUser){
        System.out.println("Sorry not tall enough to enter")
    }
    else{
        System.out.println("You can enter");
    }
    System.out.println("This is the end");
}
```

Else if

```
int time = 22;
if (time < 10) {
  System.out.println("Good morning.");
} else if (time < 20) {
  System.out.println("Good day.");
} else {
  System.out.println("Good evening.");
}
```

https://www.w3schools.com/java/java_conditions.asp

Logic operators

operations	and	or	not
operators	&&	||	!

a	*!a*
`true`	`false`
`false`	`true`

a	*b*	*a && b*	*a || b*
`false`	`false`	`false`	`false`
`false`	`true`	`false`	`true`
`true`	`false`	`false`	`true`
`true`	`true`	`true`	`true`

```
if(password.length > 8){
    if(password.contains("@")){
        //Acccepted
    }
    else{
        //Not acceptted
    }
}
else{
    //Not Accepted
}
```

```
if(password.length > 8 && password.contains("@")){
    //Acccepted
}
else{
    //Not Accepted
}
```

The switch statement

Anatomy of switch

```
public class Switch{
    public boolean switchExample() {
    switch(/*expression*/)
        case /*result 1*/:
            /*What to do*/
        case /*result 2*/:
            /*What to do*/
        case /*result 3*/:
            /*What to do*/
    }
}
```

Switch

- Multiple outcomes within the same expression
- if/else can create the same outcome
- Switch can be more readable
- Especially useful in compound results

```java
String dayOfTheWeek;

switch(getNumberOfWeek()){
    case 0:
        dayOfTheWeek = "monday";
        break;
    case 1:
        dayOfTheWeek = "tuesday";
        break;
    case 2:
        dayOfTheWeek = "wednesday";
        break;
    case 3:
        dayOfTheWeek = "thursday";
        break;
    case 4:
        dayOfTheWeek = "friday";
        break;
    case 5:
        dayOfTheWeek = "saturday";
        break;
    case 6:
        dayOfTheWeek = "sunday";
        break;
}
```

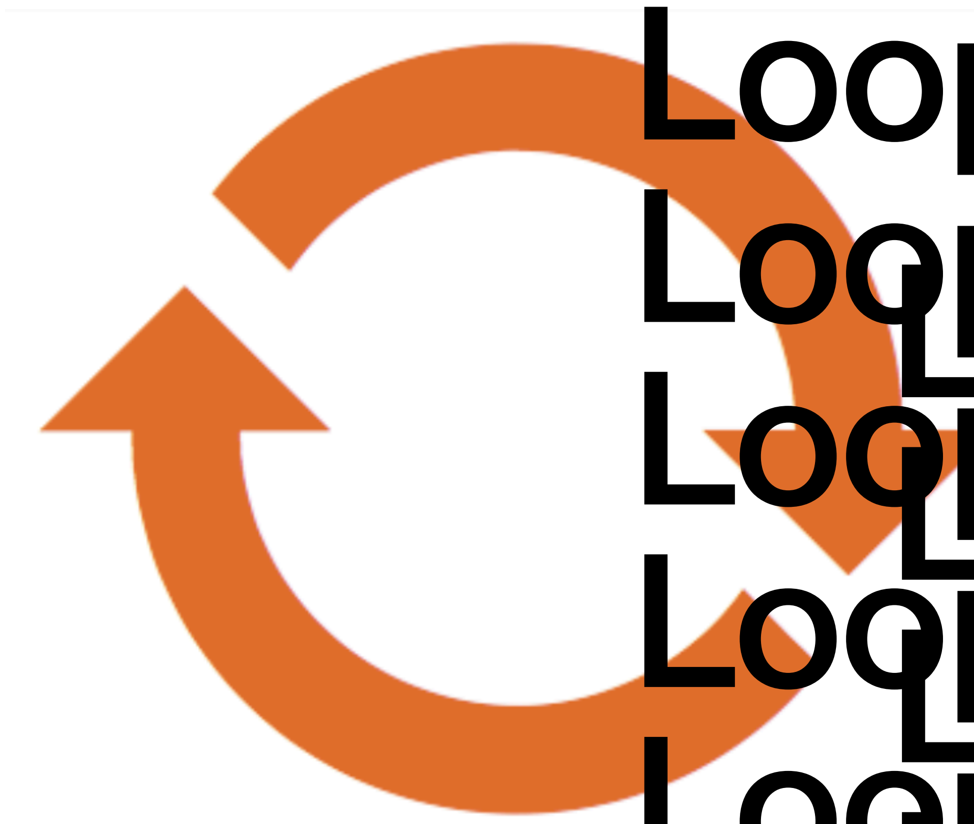
```
String season;

switch(getMonthInNumber()){
    case 11:
    case 0:
    case 1:
        season = "winter is coming";
        break;
    case 2:
    case 3:
    case 4:
        season = "Spring";
        break;
    case 5:
    case 6:
    case 7:
        season = "Summertime"
        break;
    case 8:
    case 9:
    case 10:
        season ="Fall"
}
```

Warmup exercise 1 15 min

- Request username and password from the user (Scanner)
- If the username is longer than 10 characters print out: “Too long”
- If the password contains “#” print out: “Invalid”
- Otherwise print out: “Accepted”

Loops CS101

What are loops?



Loops
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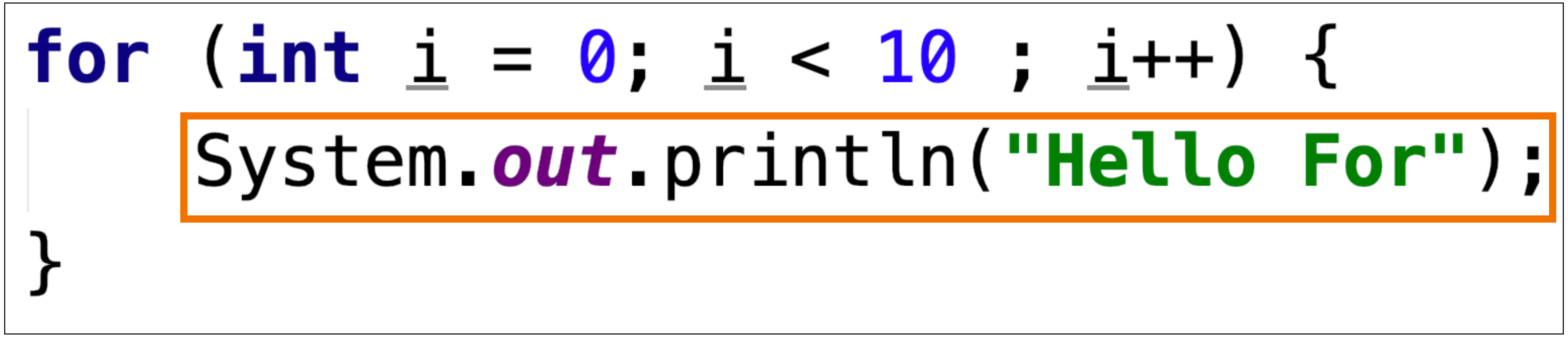
Loops

The program needs to do [something] a number of times

For loop

[something]

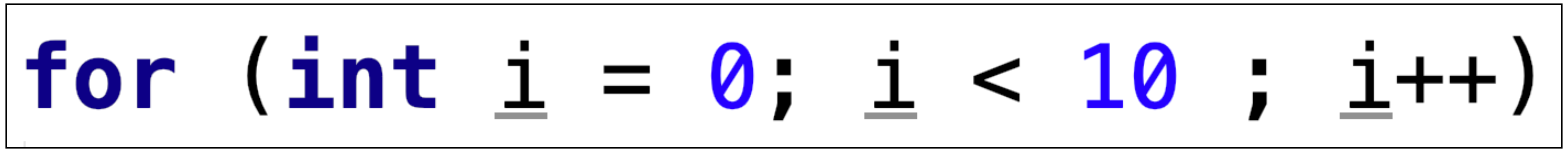


```
for (int i = 0; i < 10 ; i++) {
    System.out.println("Hello For");
}
```

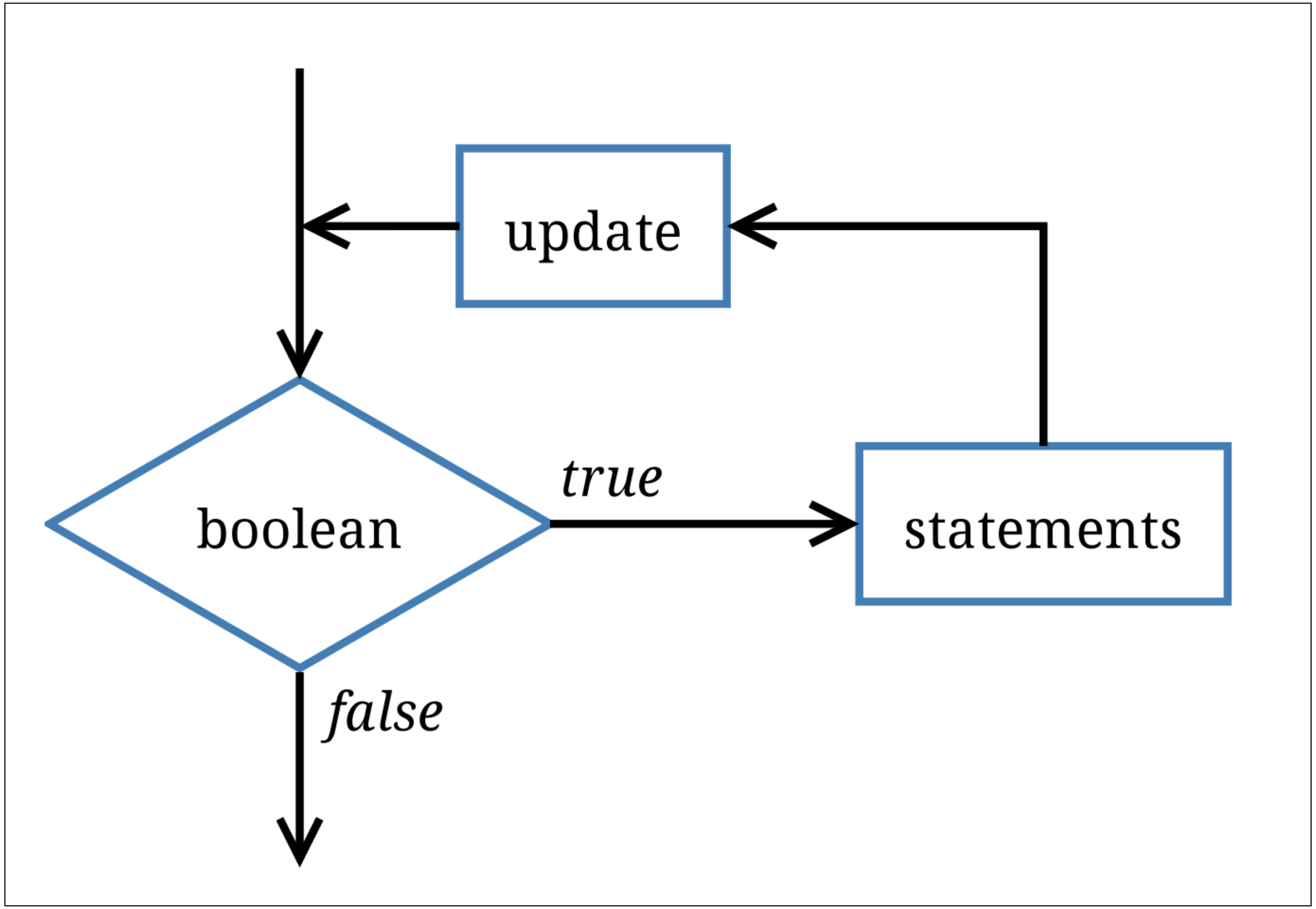
For loop “signature”

a number of times

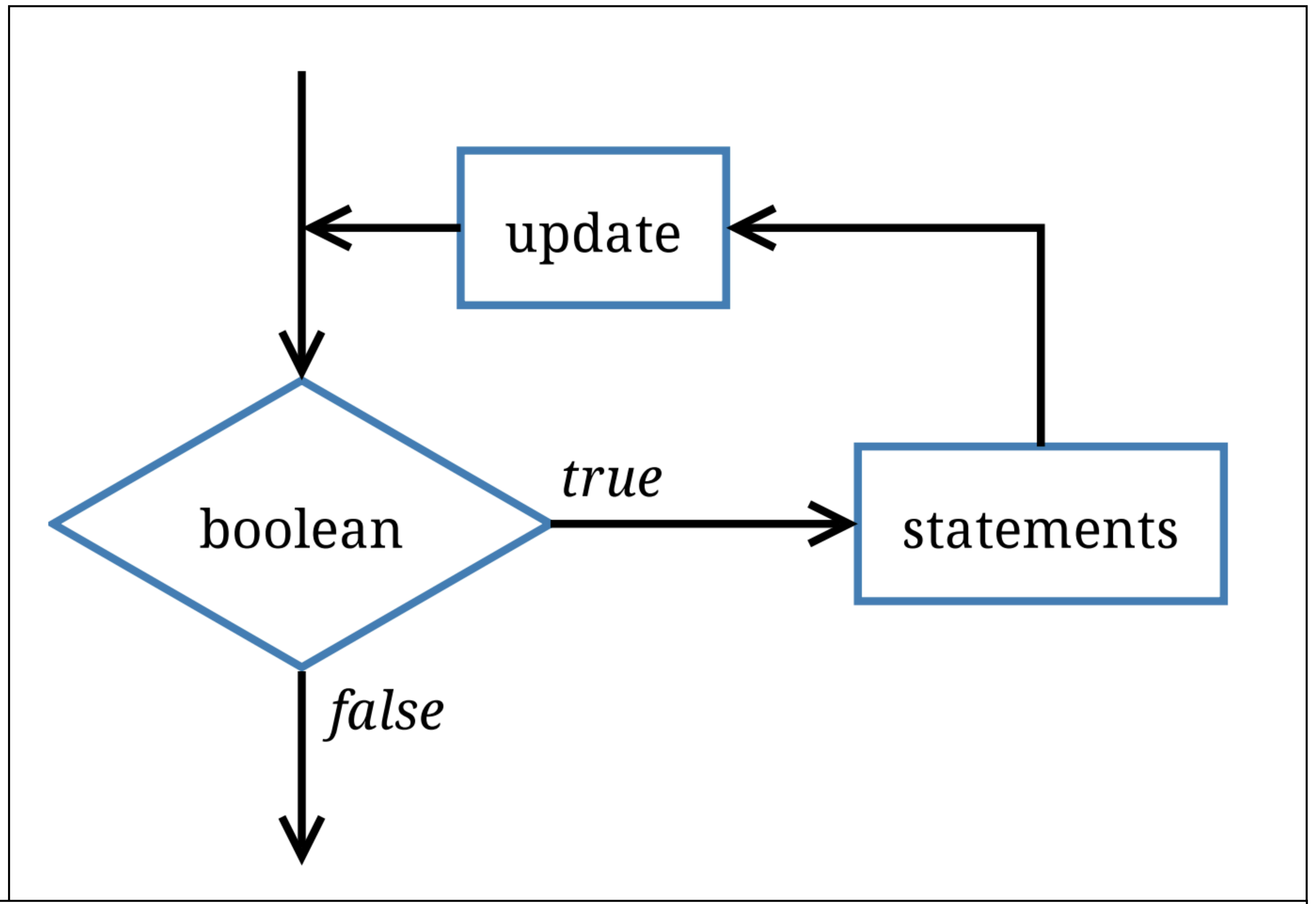
- For loops are used **when we know how** many iterations we need
- Incremental counter / iteration
- Can be decremental
- Counter variable can be used in the scope of the loop

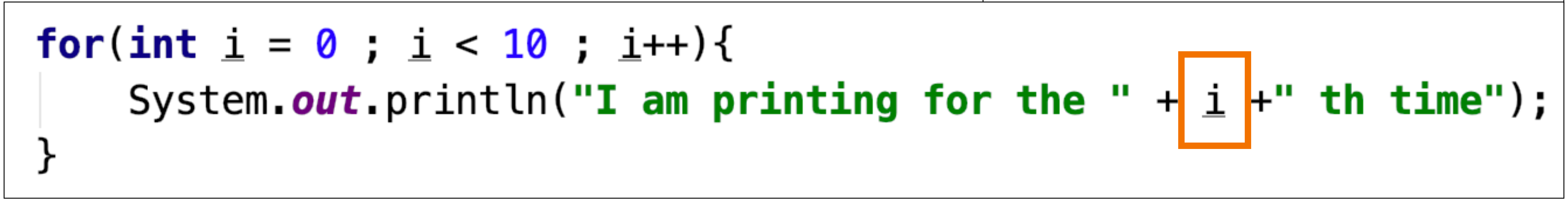


```
for (int i = 0; i < 10 ; i++)
```


update
boolean
true
statements
false

For loop





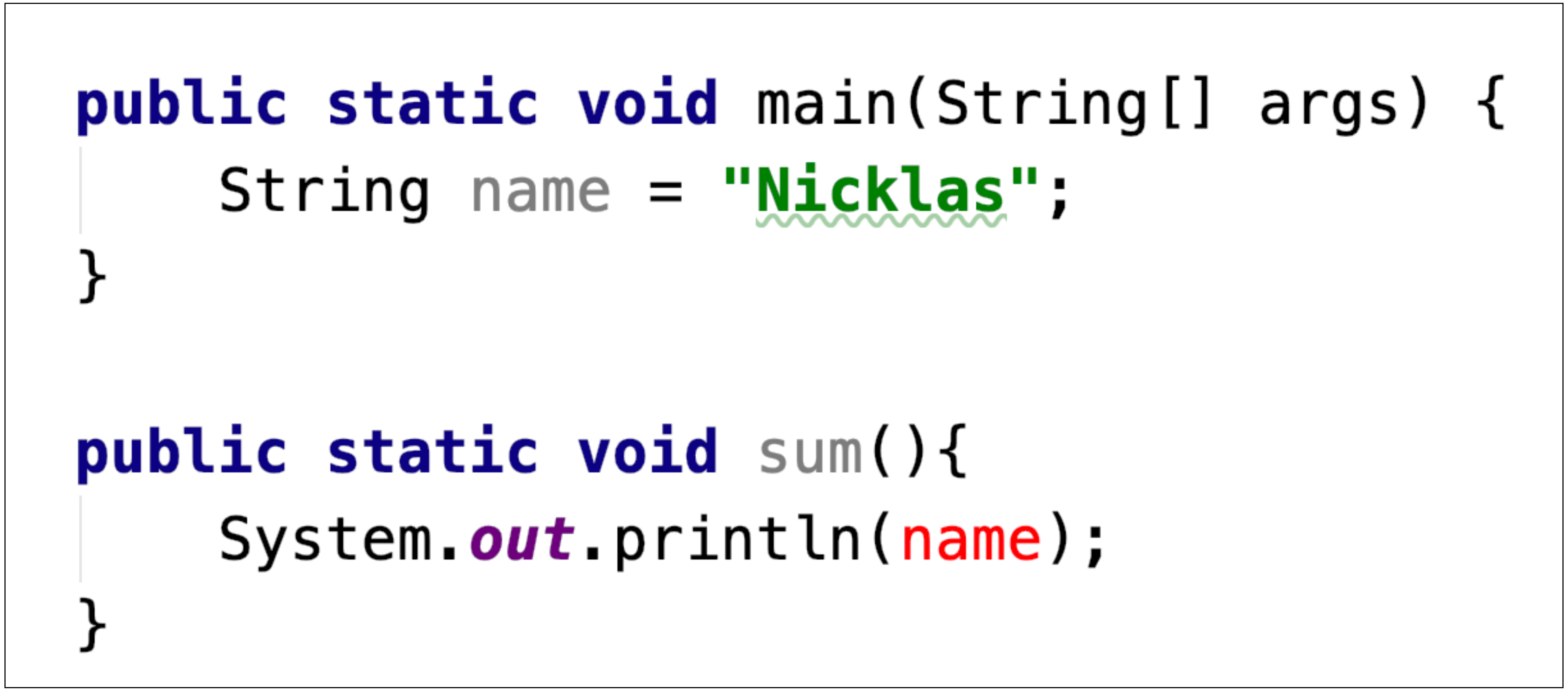
```
for(int i = 0 ; i < 10 ; i++){
    System.out.println("I am printing for the " + i +" th time");
}
```

Break

Methods CS101

```java
public class HelloWorld{
    public static void main(String[] args){
        //The main method will be executed first
        //It is at the bottom of the call stack
        System.out.println("Obligatory Hello World");
    }
}
```

Method scope



```
public static void main(String[] args) {
    String name = "Nicklas";
}

public static void sum(){
    System.out.println(name);
}
```

Defining the method

```
public static void main(String[] args){
    sumTwoNumbers(5,5);
}

public static void sumTwoNumbers(int first, int second){
    System.out.println("The result is: " + (first + second));
}
```

Calling the method

```java
public static void main(String[] args){
    sumTwoNumbers(5,5);
}

public static void sumTwoNumbers(int first, int second){
    System.out.println("The result is: " + (first + second));
}
```

Example: Returning the value

Why use methods?

- Writing reusable code
- DRY - Don’t repeat yourself
- Simpler and more accurate to test the sum of multiple small components than a single large

Explainer: Introduction

Exercises 1 CS101

Explaining a subject

Teacher/student exercise

- 20 min: Create a presentation on one or more subjects with a partner
- 5 min: Presentation & Active Critical Listening
- 5 min: Questions, common ground & differences

Explainer

Topics

a) What is the difference between a void method and a value method?

b) What is meant by the method scope?

c) What is method overloading?