MSIB magang dan studi independen bersertifikat | INFINITE LEARNING

Kotlin Fundamental

How to write Kotlin code

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What are Fundamentals?

Why efficient?

Should only use the fundamentals?

At the end of the framework, why learn fundamentals?

https://medium.com/purwadhikaconnect/haruskah-belajar-coding-dari-fundamental-bcaf434b032b

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Table of Content

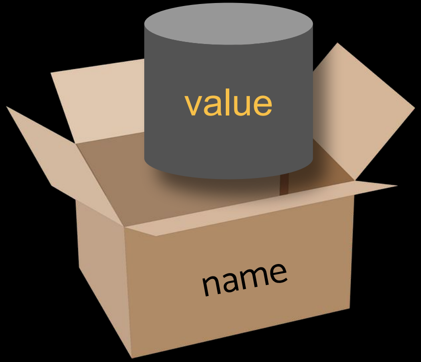
- Variable & Data types
- Functions
- If Expressions
- Nullable Types
- Safe calls & Elvis Operator
- String templates

Variable & Data types

Variable

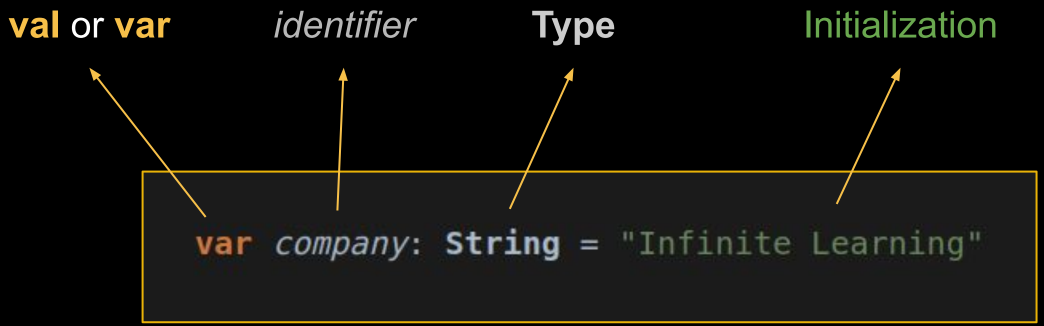
Variables are an important part of any programming.

A **variable** is a name that is entered into a computer memory location that is used to store a value in a computer program, then the name is used to retrieve the stored value and use it in the program.



Variable in Kotlin

In Kotlin variables will require the keywords **var** or **val**, *identifier*, *type* and *initialization*.



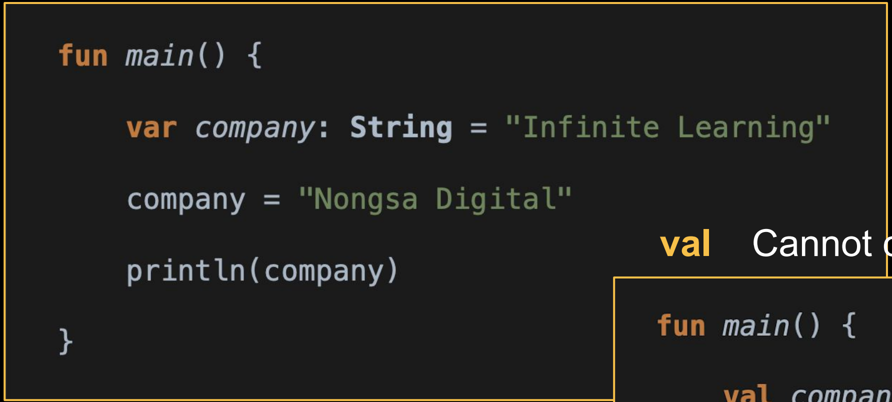
```kotlin
var company: String = "Infinite Learning"
```

Kotlin supports *type inference* so we are allowed to not write data types explicitly.

```kotlin
var company = "Infinite Learning"
```

Variable in Kotlin

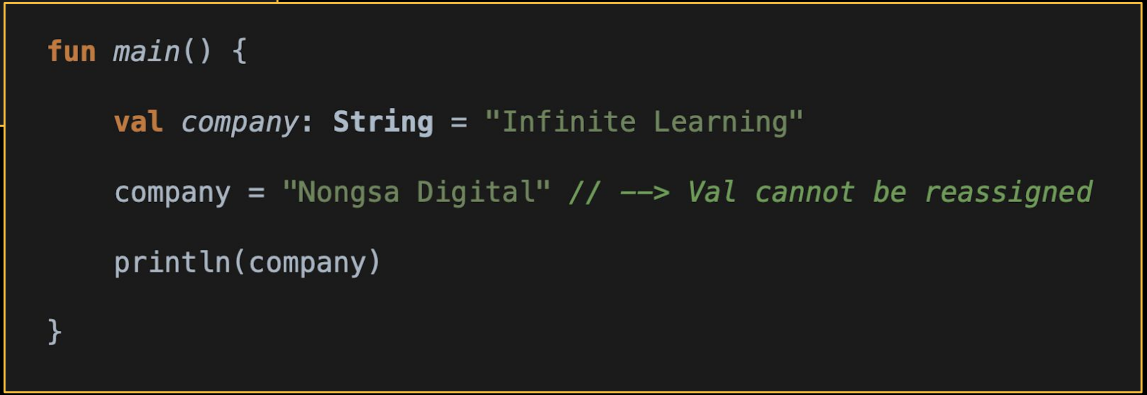
var Can change the initialized value. **1**



```kotlin
fun main() {

    var company: String = "Infinite Learning"

    company = "Nongsa Digital"

    println(company)

}
```

Let's code…

val Cannot change the value that was previously initialized. **2**



```kotlin
fun main() {

    val company: String = "Infinite Learning"

    company = "Nongsa Digital" // --> Val cannot be reassigned

    println(company)

}
```

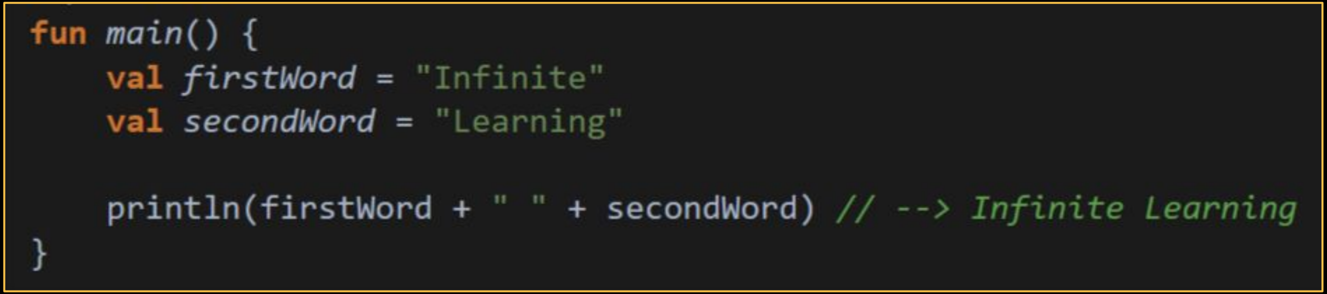
Any question?

Data Types

Data Types

Data type is a data classifier based on the **type** of data owned by the **variable**

The data type also determines the **operations** that can be performed on a variable and how the **value** of a variable is **stored**



```kotlin
fun main() {
    val firstWord = "Infinite"
    val secondWord = "Learning"

    println(firstWord + " " + secondWord) // --> Infinite Learning
}
```

Data Types

Data type is a classification of data based on the type of data.

Data Types	Description	Example
Character	Just one character	'A'
String	Just Text	"Kampus Merdeka"
Boolean	Just two values	true / false
Numbers	Double, Long, Int, Short, Byte	128, -15, 2.7182818284
Array	Save multiple objects	arrayOf(2, 4, 6, 9, "Infinite Learning" , true)

Data Types : Character

- Char is a data type whose value type is text.
- Characters type are represented using the **Char**.
- Char type variable define can use single quotes (**' '**)
- Char can only be used to store **single** characters

```
var grade: Char = 'A'
```

Data Types : Character

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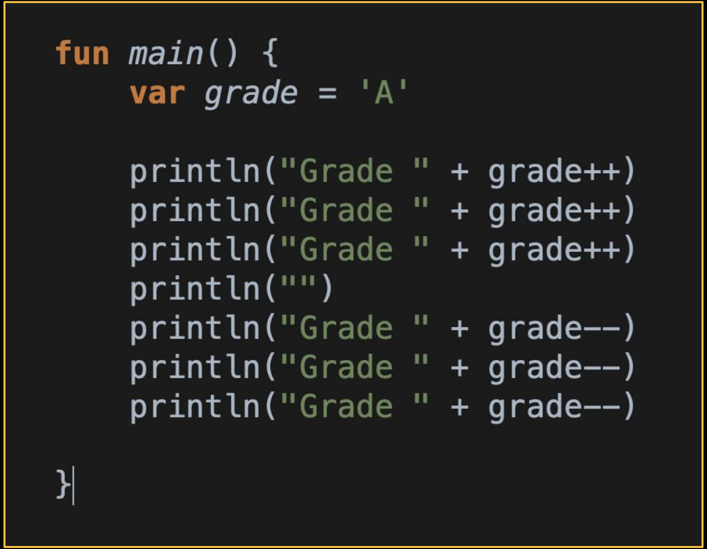
Increment (++) and decrement (--) operations on the Char data type

Let’s code…



```
fun main() {
    var grade = 'A'

    println("Grade " + grade++)
    println("Grade " + grade++)
    println("Grade " + grade++)
    println("")
    println("Grade " + grade--)
    println("Grade " + grade--)
    println("Grade " + grade--)

}
```

Data Types : String

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- Not only Char, the **String** data type is also a text value. The difference is, String can hold several characters in it.
- String data type are represented using the **String**.
- Defines a variable with double quotes (**" "**).

```
val stringText  = "Kotlin Language"
```

Data Types : String

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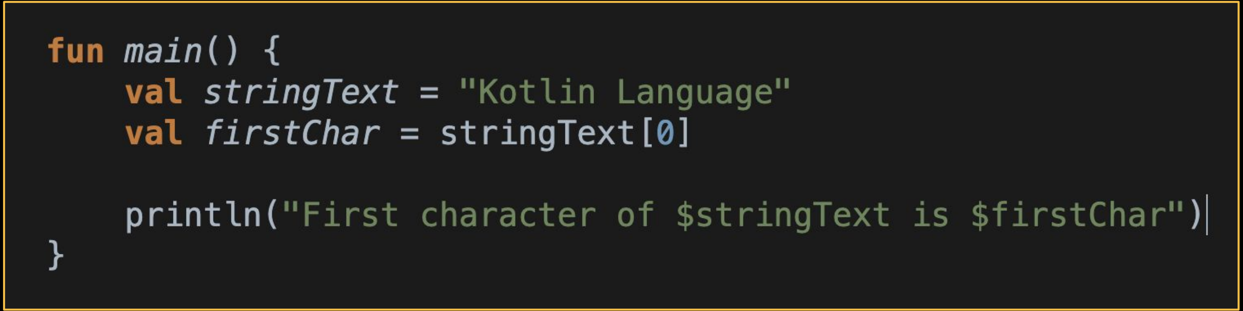
Basically a set of characters in a String value is in the form of an Array, so we can retrieve a single character by using **indexing**.

What is Indexing?

Indexing is an easy way to get elements in a collection by using the index or position of the element. The position of an element starts from 0.

Let's code…



```kotlin
fun main() {
    val stringText = "Kotlin Language"
    val firstChar = stringText[0]

    println("First character of $stringText is $firstChar")
}
```

Data Types : String

Kotlin have two kinds of string, Escaped String and Raw String.

Escaped string is declared within double quote (" ") and may contain escape characters like:

\t	: add tabs to the text.
\n	: create a new line in the text.
\'	: adds a single quote character to the text.
\"	: adds a double quote character to the text.
\\	: adds a backslash character to the text.

Data Types : String

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Escaped string is declared within double quote (" ") and may contain escape characters like **\t**, **\n**, **\'**, **\"**, \.

Let's code…

```
fun main() {

    val stringText  = "Kampus Merdeka \nby \"Infininte Learning\""
    println(stringText)

}
```

Data Types : String

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Raw string is declared within triple quote (""" """) and may contain multiple lines of text without any escape characters.

Let’s code…

```
fun main() {

    val stringText  = """
    Belajar Bahasa Kotlin
    ---------------------
    Di Infinite Learning
    Bersama Kampus Merdeka
    """

    println(stringText)

}
```

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Any question?

Data Types : Boolean

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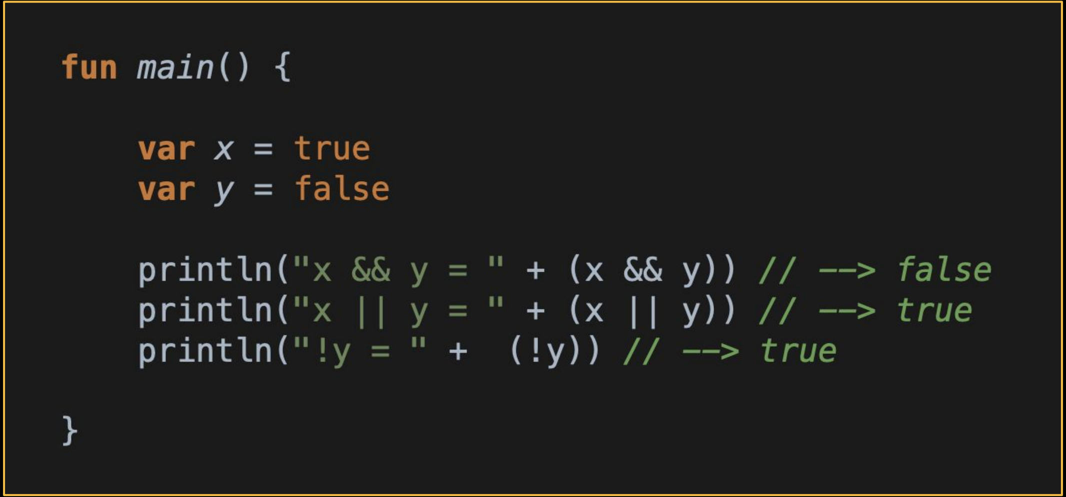
Boolean is a data type that has only two values, **true** and **false**. There are 3 (three) operators that can be used in Boolean.

Operator	Name	Description	Example
&&	Logical and	Returns true if both operands are true	x && y
||	Logical or	Returns true if either of the operands is true	x || y
!	Logical not	Reverse the result, returns false if the operand is true	!x

Data Types : Boolean

Let’s code…



```
fun main() {

    var x = true
    var y = false

    println("x && y = " + (x && y)) // --> false
    println("x || y = " + (x || y)) // --> true
    println("!y = " +  (!y)) // --> true

}
```

Data Types : Boolean Expression

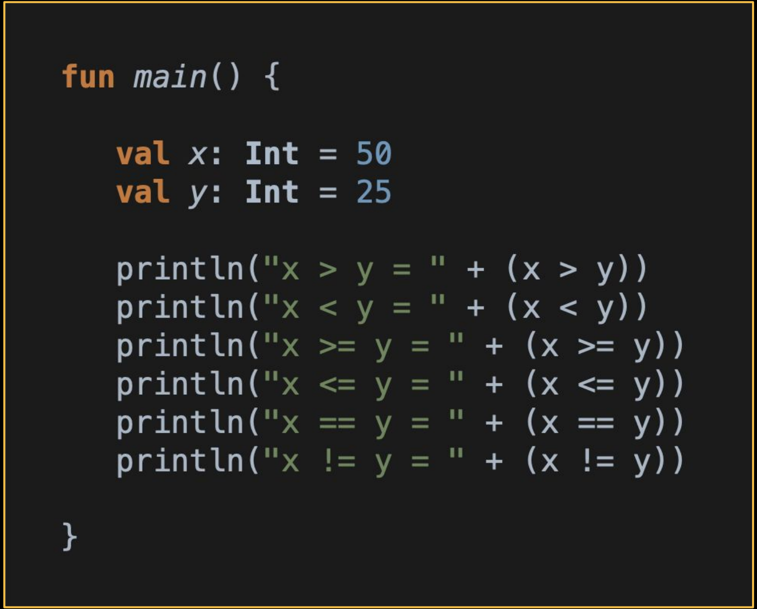
Boolean variable mostly used with checking conditions with **if...else expressions**. A boolean expression makes use of relational operators, for example:

> **<=**

< **==**

>= **!=**

Let’s code…



```
fun main() {

    val x: Int = 50
    val y: Int = 25

    println("x > y = " + (x > y))
    println("x < y = " + (x < y))
    println("x >= y = " + (x >= y))
    println("x <= y = " + (x <= y))
    println("x == y = " + (x == y))
    println("x != y = " + (x != y))

}
```

Data Types : Boolean Functions

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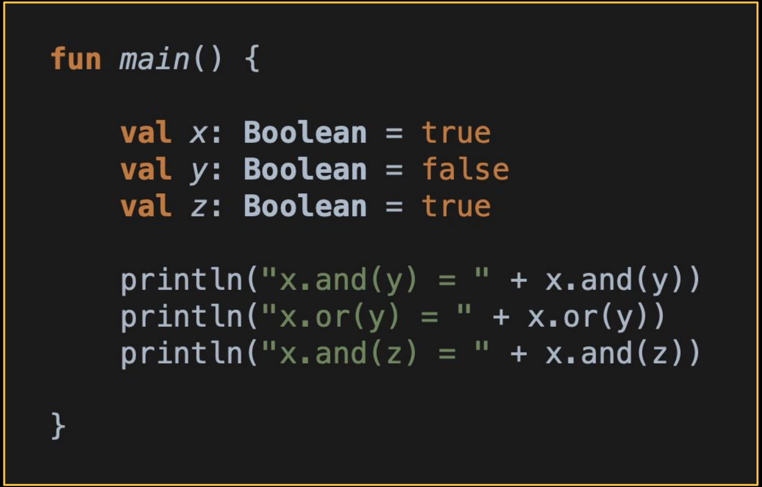
Kotlin provides **and()** and **or()** functions to perform logical AND and logical OR operations between two boolean operands.

Let's code…



```
fun main() {

    val x: Boolean = true
    val y: Boolean = false
    val z: Boolean = true

    println("x.and(y) = " + x.and(y))
    println("x.or(y) = " + x.or(y))
    println("x.and(z) = " + x.and(z))

}
```

Data Types : Numbers

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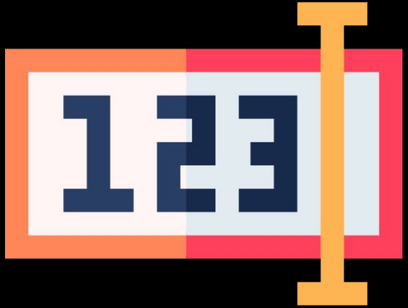
Number data types are used to define variables which hold numeric values.

Some of the default types that represent Numbers are **Byte**, **Short**, **Int**, **Long**, **Float**, and **Double**.



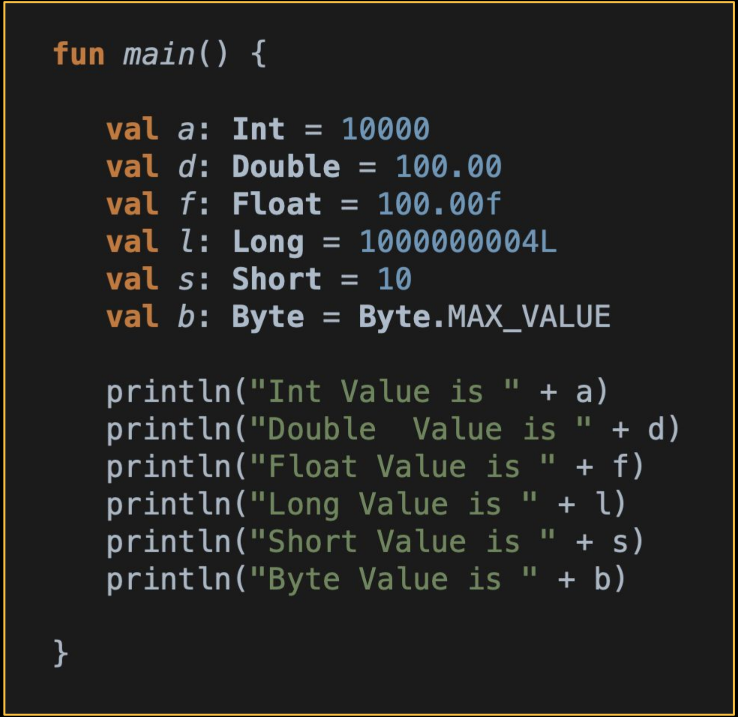
Data Types : Numbers

Each Number data type has a different size (bit unit), depending on the amount of value that can be stored. As shown in the following table:

Data Type	Size (bits)	Data Range
Byte	8 bit	-128 to 127
Short	16 bit	-32768 to 32767
Int	32 bit	-2,147,483,648 to 2,147,483,647
Long	64 bit	-9,223,372,036,854,775,808 to +9,223,372,036,854,775,807
Float	32 bit	1.40129846432481707e-45 to 3.40282346638528860e+38
Double	64 bit	4.94065645841246544e-324 to 1.79769313486231570e+308

Data Types : Numbers

Let’s code…



```kotlin
fun main() {

    val a: Int = 10000
    val d: Double = 100.00
    val f: Float = 100.00f
    val l: Long = 1000000004L
    val s: Short = 10
    val b: Byte = Byte.MAX_VALUE

    println("Int Value is " + a)
    println("Double  Value is " + d)
    println("Float Value is " + f)
    println("Long Value is " + l)
    println("Short Value is " + s)
    println("Byte Value is " + b)

}
```

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Any question?

Data Types : Array

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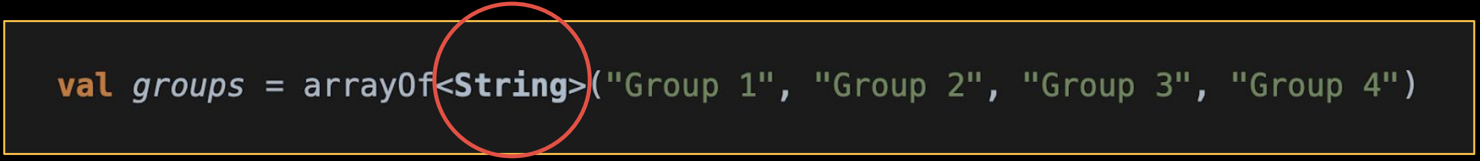
- Array is a data type that can store multiple values or objects in a variable.
- Arrays in Kotlin are represented by the **Array**.
- To create an Array, we can use a library function **arrayOf()**

Optionally with provide a data type as follows:



```kotlin
val groups = arrayOf<String>("Group 1", "Group 2", "Group 3", "Group 4")
```

Get and Set the Elements of an Array

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Use the index number inside square brackets (**[ ]**) for access an array element. Array index starts with zero (0). So if access 1th element of the array then give number 0 as the index.

Kotlin provides **get()** and **set()** member functions to get and set the value at a particular index.

Get the value

```
group[0]
group.get(0)
```

Set the value

```
groups[0] = "Group 1"
groups.set(1, "Group Dua")
```

Get and Set the Elements of an Array

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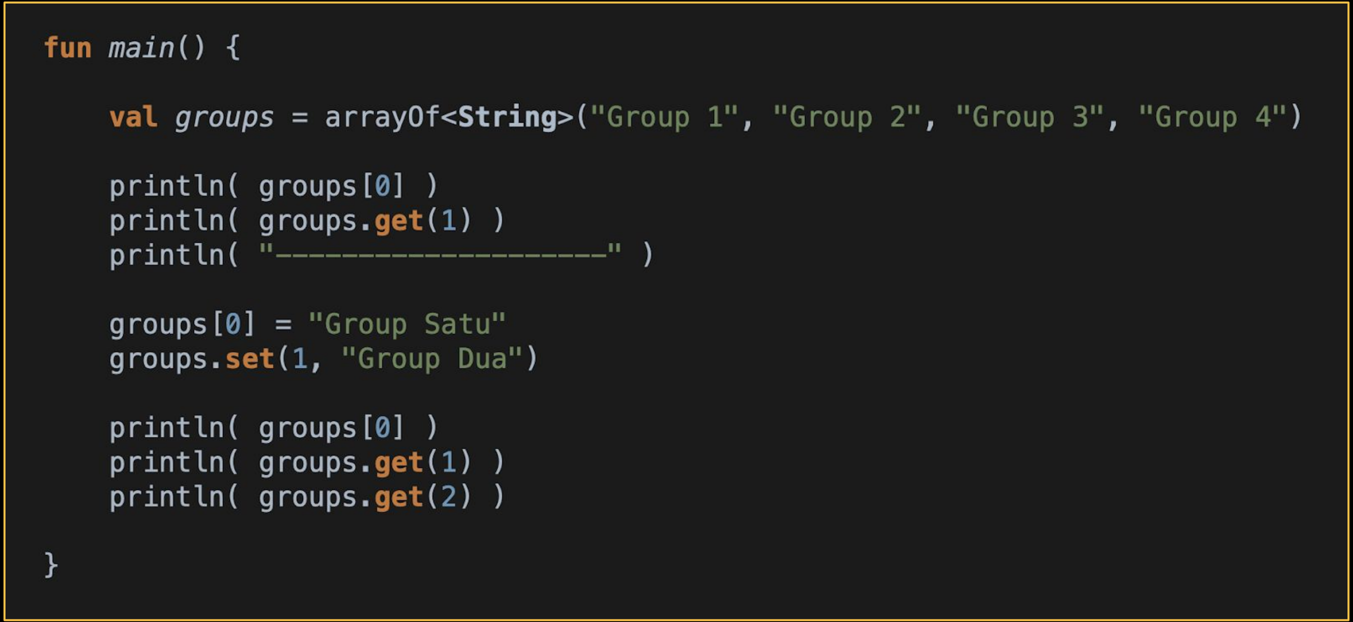
Let’s code…



```kotlin
fun main() {

    val groups = arrayOf<String>("Group 1", "Group 2", "Group 3", "Group 4")

    println( groups[0] )
    println( groups.get(1) )
    println( "--------------------" )

    groups[0] = "Group Satu"
    groups.set(1, "Group Dua")

    println( groups[0] )
    println( groups.get(1) )
    println( groups.get(2) )

}
```

Primitive type Arrays

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Kotlin also has built-in factory methods to create arrays of primitive data types.

intArrayOf() : **IntArray**

booleanArrayOf() : **BooleanArray**

charArrayOf() : **CharArray**

longArrayOf() : **LongArray**

shortArrayOf() : **ShortArray**

byteArrayOf() : **ByteArray**

Let's code…

```
val groups = intArrayOf(1, 2, 3, 4)
```

```
fun main() {
    val intArray = intArrayOf(2, 9, 11, 15)  // [2, 9, 11, 15]
    intArray[2] = 30                         // [2, 9, 30, 15]

    print(intArray[2])
}
```

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Any question?

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Functions

Functions

- A function is a procedure that is related to messages and objects
- Functions are created to perform specific tasks
- A function can be said to be a mini program that will run when called
- Reusable and decomposition

Functions : Create a function

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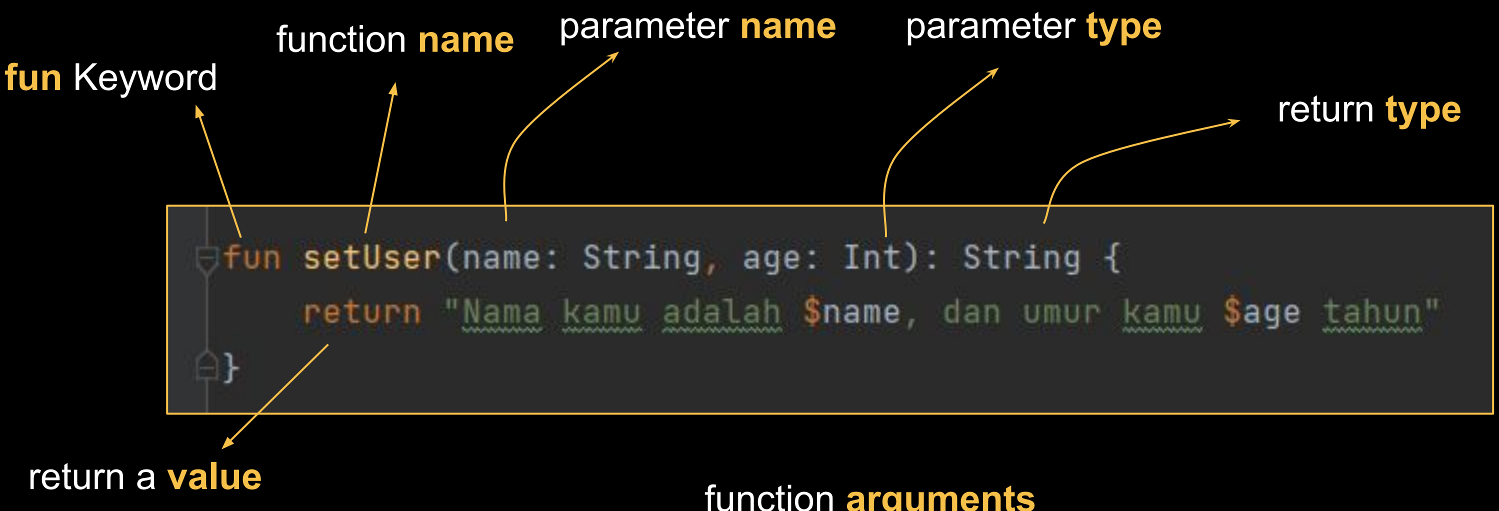
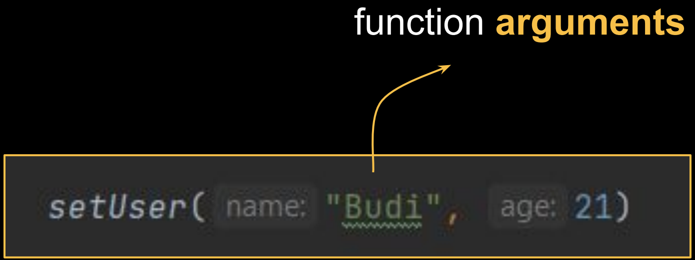
- Function declarations with the keyword **fun**
- Continue the **name** of the desired function
- Setting **parameters** (optional)
  - Parameter **name**
  - **Tipe** parameter separated by (:)
  - Each parameter of a function is separated by a **comma** (,)
- Specify the return **type** of the function (optional)
- Function **body is inside { }** (in which there is an **expression** or **statement** to run)

Functions : Structure



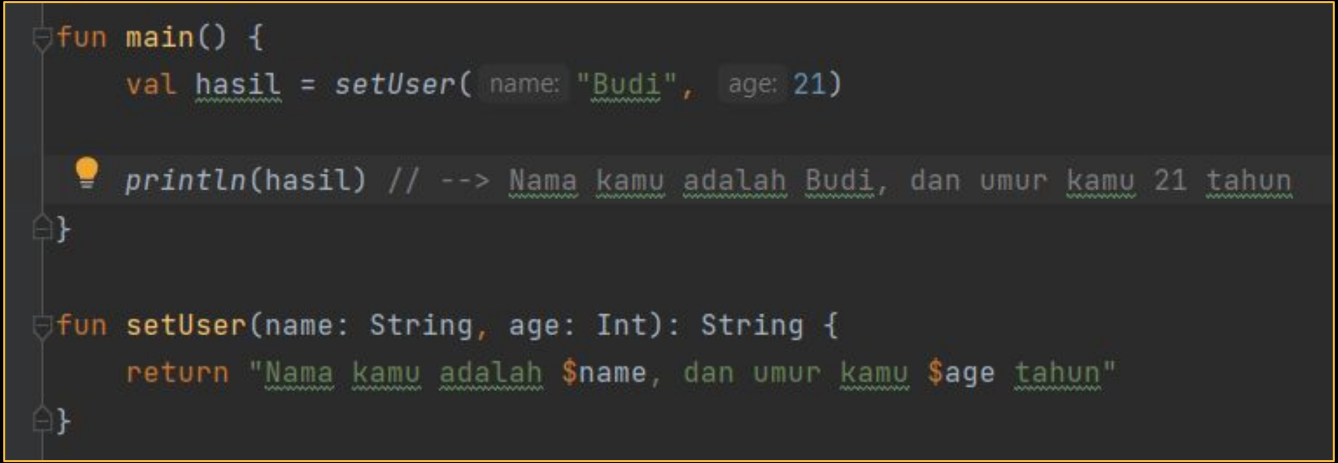
```
fun setUser(name: String, age: Int): String {
    return "Nama kamu adalah $name, dan umur kamu $age tahun"
}
```



```
setUser( name: "Budi", age: 21)
```

Functions

Let’s to code



```
fun main() {
    val hasil = setUser( name: "Budi",  age: 21)

    println(hasil) // --> Nama kamu adalah Budi, dan umur kamu 21 tahun
}

fun setUser(name: String, age: Int): String {
    return "Nama kamu adalah $name, dan umur kamu $age tahun"
}
```

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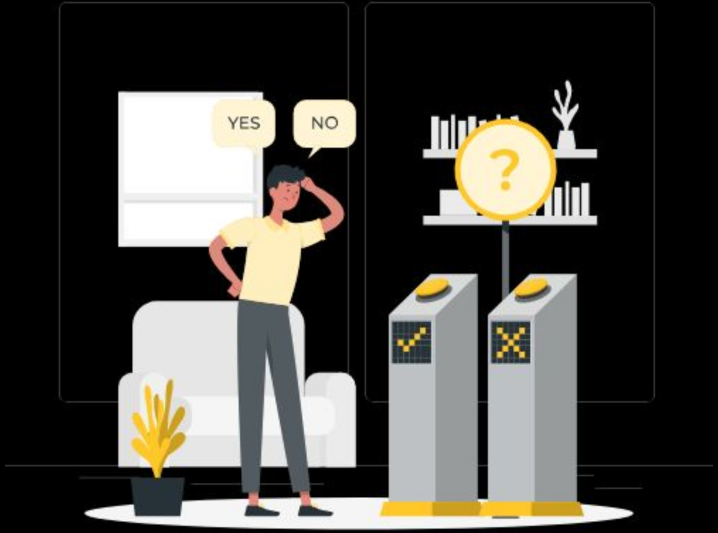
If Expressions



If Expressions

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- **If expression** is used when initializing the value of a variable based on a condition.
- If expression is represented by the keyword **if.**
- *if* is used to test a condition to run a process.
- *if* will execute a statement or expression if the evaluation result in the *if* block is **true**. Otherwise, it will be passed if it evaluates to **false**.

If Statement

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Let's start with traditional **if...else** statement.

Why is it called an **If statement**? because If **doesn't return any value**, it's a command to print the data to the screen. (Just branching)

```
val condition = true

if (condition) {
    println("code block to be executed if condition is true")
} else {
    println("code block to be executed if condition is false")
}
```

Come on, try the code!

if…else Expression

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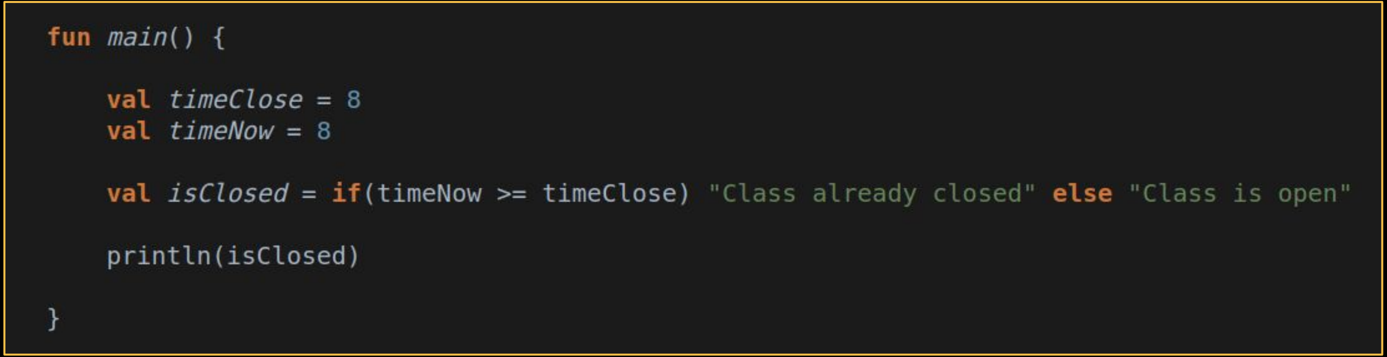
If in Kotlin can also be used as an expression. Let's try using an if statement that can return a value to a variable.
Why is it called an **IF expression**? because the If statement that **returns a value** and is **stored** in a variable

And now let's try for if...else expression:



```
fun main() {

    val timeClose = 8
    val timeNow = 8

    val isClosed = if(timeNow >= timeClose) "Class already closed" else "Class is open"

    println(isClosed)

}
```

if…else Expression

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We can use else if condition to specify a new condition if the first condition is false.

```kotlin
fun main() {

    val timeOpen = 8
    val timeClose = 12
    val timeNow = 7

    val classStatus = if(timeNow >= timeClose) {
        "Class already closed"
    } else if(timeNow >= timeOpen) {
        "Class is open"
    } else {
        "Class is not open yet"
    }

    println(classStatus)

}
```

Let's code it!

```kotlin
fun main() {
    val time = 16 // waktu saat ini dalam format 24 jam

    val status = if (time < 8 || time >= 20) "Tutup" else "Buka"

    println("Cafe saat ini $status") // output: Cafe saat ini Tutup
}
```

Any question?

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Nullable Types

Kotlin makes it easy to manage nullable variables.

Kotlin is able to distinguish between null and non-null objects.

Nullable Types

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"The Billion Dollar Mistake"

Because it is very common and can be fatal, **NPE** is known by the term above.

NullPointerException (NPE) is an error that occurs when accessing or managing the value of an uninitialized variable or a null value variable.

Kotlin comes with easy nullability handling that minimizes the occurrence of NullPointerExceptions.

Nullable Types

Kotlin is able to distinguish between null and non-null objects when they are created.

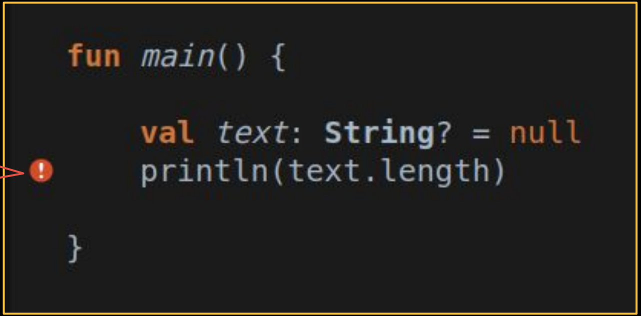
```kotlin
val text: String = null // Null can not be a value of a non-null type String
```

Add sign ? after specifying the object type so it can be null

```kotlin
val text: String? = null
```

Nullable Types

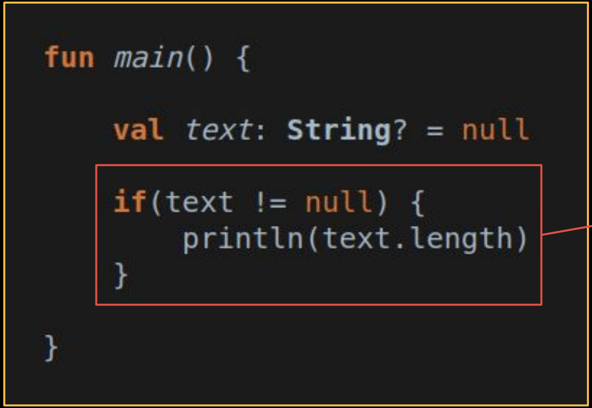
Only safe (?.) or non-null asserted (!!.) calls are allowed on a nullable receiver of type String?



```kotlin
fun main() {

    val text: String? = null
    println(text.length)

}
```



```kotlin
fun main() {

    val text: String? = null

    if(text != null) {
        println(text.length)
    }

}
```

Check if the object is null or not.

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Safe calls & Elvis Operator

Safe calls & Elvis Operator

To use a safe call, replace the (.) with (?.) sign when accessing or managing values from nullable objects.

Safe Call will guarantee that the code we write is safe from **NullPointerException**.

```kotlin
val safeText: String? = null
safeText?.length
```

Handle nullable objects in an easier way using **Safe Calls** and **Elvis Operators**.

By implementing the safe call as above, the compiler will skip the process if the object is null.

Safe calls & Elvis Operator

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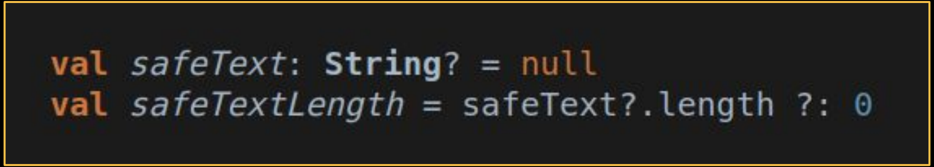
The **Elvis operator** allows you to set a default value if the object is null.

By adding a (**?:**) at the end of the object value that has used Safe Call, then continued by writing the **default value**.



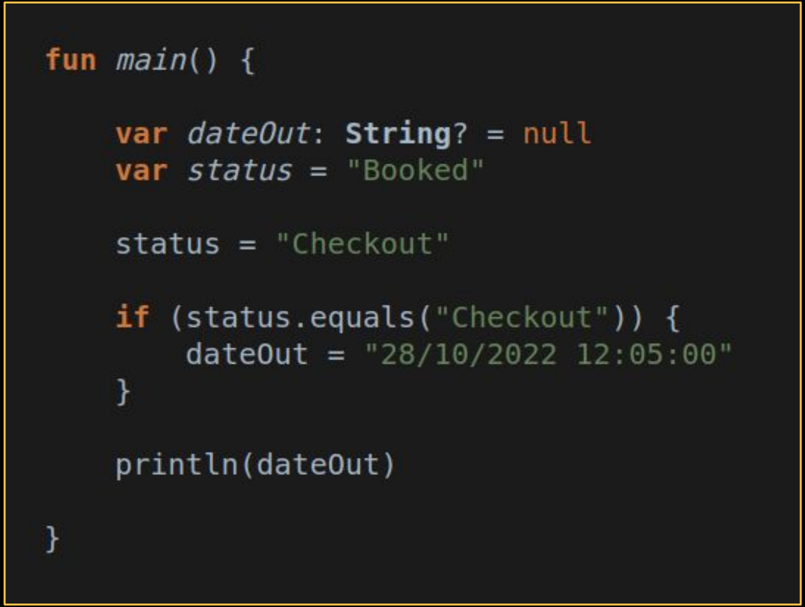
```kotlin
val safeText: String? = null
val safeTextLength = safeText?.length ?: 0
```

Code it!

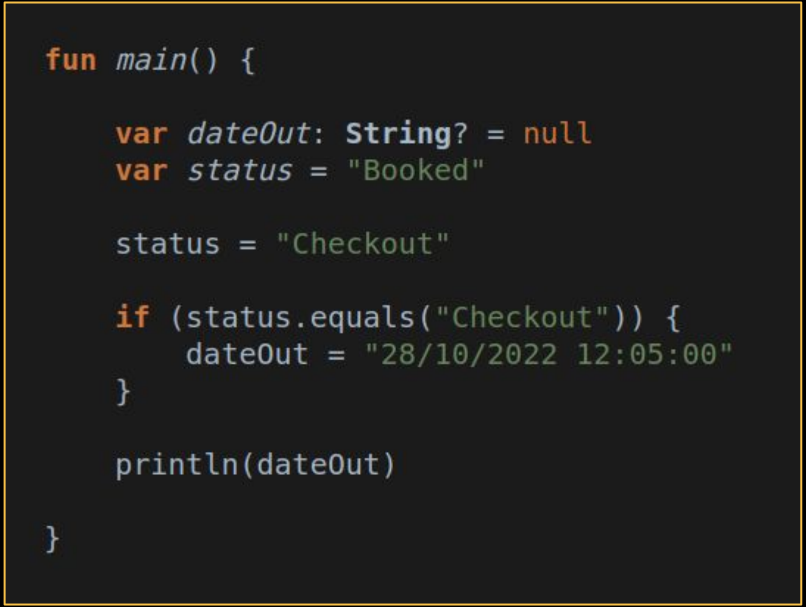
Elvis will return the default value (**0**) if ***safeText*** variable is null.

Safe calls & Elvis Operator

Let's code…



```kotlin
fun main() {

    var dateOut: String? = null
    var status = "Booked"

    status = "Checkout"

    if (status.equals("Checkout")) {
        dateOut = "28/10/2022 12:05:00"
    }

    println(dateOut)

}
```



```kotlin
fun main() {

    var dateOut: String? = null
    var status = "Booked"

    status = "Checkout"

    if (status.equals("Checkout")) {
        dateOut = "28/10/2022 12:05:00"
    }

    println(dateOut)

}
```

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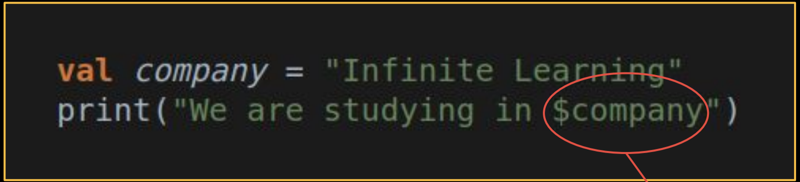
String Template

String Template

String Template is a feature that allows to insert variables into String without concatenation (merging String objects using +)



```kotlin
val company = "Infinite Learning"
print("We are studying in $company")
```

variable

String Template

Let's code…

Without String Template

```
fun main() {

    val company = "Infinite Learning"
    print("We are studying in " + $company)

}
```

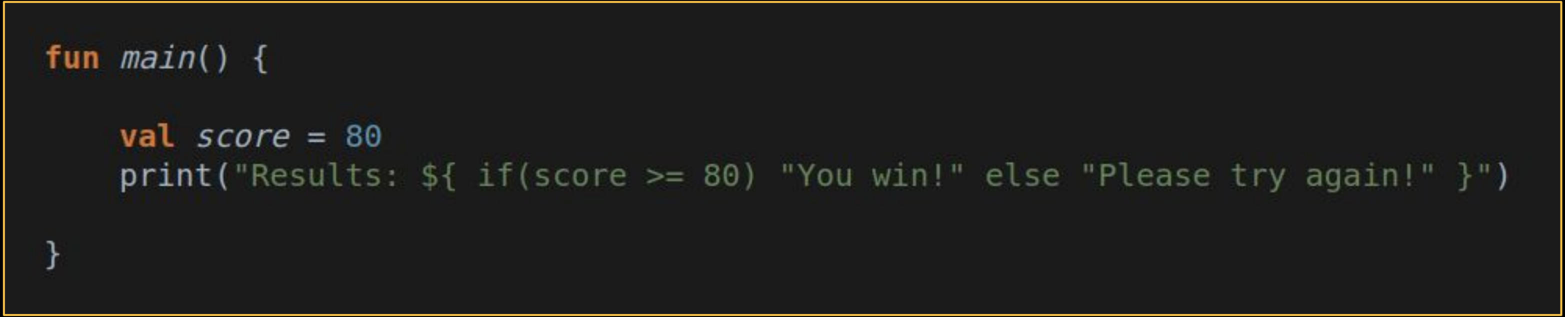
Using String Template

```
fun main() {

    val company = "Infinite Learning"
    print("We are studying in $company")

}
```

String Template

Kotlin also makes it possible to insert expressions into template strings. By inserting the expression into curly braces followed by the $ character.

Let’s code it!



```
fun main() {

    val score = 80
    print("Results: ${ if(score >= 80) "You win!" else "Please try again!" }")

}
```

GUIDING RESOURCE

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Guiding Resources:

1. https://kotlinlang.org/docs/home.html
2. https://www.w3schools.com/kotlin
3. https://www.tutorialspoint.com/kotlin
4. https://developer.android.com/codelabs/basic-android-kotlin-compose-variables#4

Design Asset:

https://storyset.com

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Cheers 🍻

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