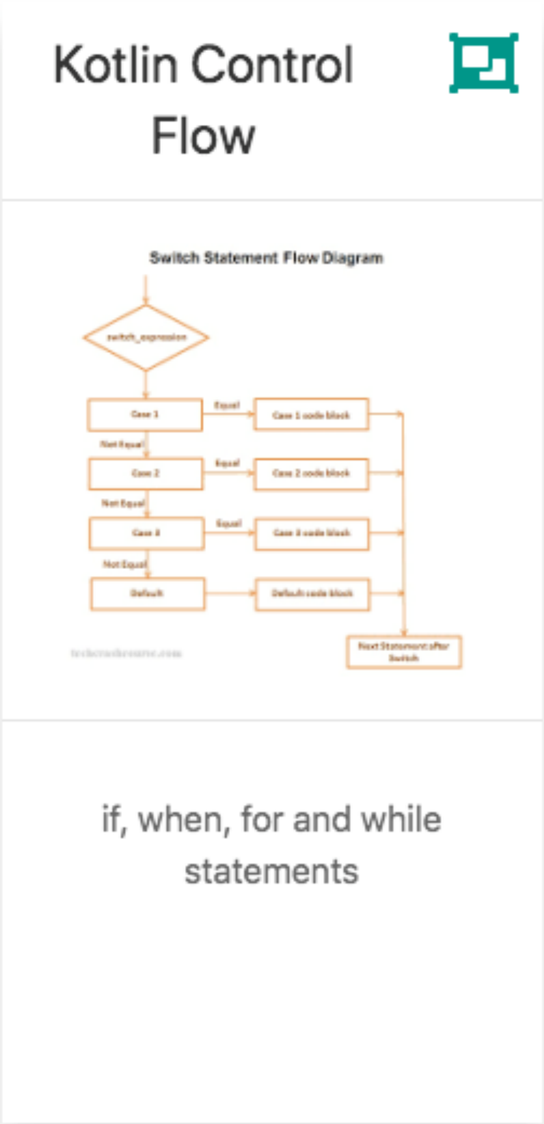
Control Flow



If Expression

In Kotlin, `if` is an expression, i.e. it returns a value. Therefore there is no ternary operator (condition ? then : else), because ordinary `if` works fine in this role.

```
// Traditional usage
var max = a
if (a < b) max = b

// With else
var max: Int
if (a > b) {
    max = a
} else {
    max = b
}

// As expression
val max = if (a > b) a else b
```

`if` branches can be blocks, and the last expression is the value of a block:

```
val max = if (a > b) {
    print("Choose a")
    a
} else {
    print("Choose b")
    b
}
```

If you're using `if` as an expression rather than a statement (for example, returning its value or assigning it to a variable), the expression is required to have an `else` branch.

When Expression

when replaces the switch operator of C-like languages. In the simplest form it looks like this

```
when (x) {
    1 -> print("x == 1")
    2 -> print("x == 2")
    else -> { // Note the block
        print("x is neither 1 nor 2")
    }
}
```

when matches its argument against all branches sequentially until some branch condition is satisfied. when can be used either as an expression or as a statement. If it is used as an expression, the value of the satisfied branch becomes the value of the overall expression. If it is used as a statement, the values of individual branches are ignored. (Just like with `if`, each branch can be a block, and its value is the value of the last expression in the block.)

The `else` branch is evaluated if none of the other branch conditions are satisfied. If `when` is used as an expression, the `else` branch is mandatory, unless the compiler can prove that all possible cases are covered with branch conditions (as, for example, with `enum` class entries and `sealed` class subtypes).

If many cases should be handled in the same way, the branch conditions may be combined with a comma:

```
when (x) {
    0, 1 -> print("x == 0 or x == 1")
    else -> print("otherwise")
}
```

We can use arbitrary expressions (not only constants) as branch conditions

```
when (x) {
    parseInt(s) -> print("s encodes x")
    else -> print("s does not encode x")
}
```

We can also check a value for being `in` or `!in` a range or a collection:

```
when (x) {
    in 1..10 -> print("x is in the range")
    in validNumbers -> print("x is valid")
    !in 10..20 -> print("x is outside the range")
    else -> print("none of the above")
}
```

Another possibility is to check that a value `is` or `!is` of a particular type. Note that, due to smart casts, you can access the methods and properties of the type without any extra checks.

```
fun hasPrefix(x: Any) = when(x) {
    is String -> x.startsWith("prefix")
    else -> false
}
```

`when` can also be used as a replacement for an `if`-`else if` chain. If no argument is supplied, the branch conditions are simply boolean expressions, and a branch is executed when its condition is true:

```
when {
    x.isOdd() -> print("x is odd")
    x.isEven() -> print("x is even")
    else -> print("x is funny")
}
```

For Loops

`for` loop iterates through anything that provides an iterator. This is equivalent to the `foreach` loop in languages like C#. The syntax is as follows:

```
for (item in collection) print(item)
```

The body can be a block.

```
for (item: Int in ints) {
    // ...
}
```

As mentioned before, `for` iterates through anything that provides an iterator, i.e.

- has a member- or extension-function `iterator()`, whose return type
  - has a member- or extension-function `next()`, and
  - has a member- or extension-function `hasNext()` that returns `Boolean`.

All of these three functions need to be marked as `operator`.

To iterate over a range of numbers, use a range expression:

```
for (i in 1..3) {
    println(i)
}
for (i in 6 downTo 0 step 2) {
    println(i)
}
```

Target platform: JVM Running on kotlin v. 1.2.71

A `for` loop over a range or an array is compiled to an index-based loop that does not create an iterator object.

If you want to iterate through an array or a list with an index, you can do it this way:

```
for (i in array.indices) {
    println(array[i])
}
```

Target platform: JVM Running on kotlin v. 1.2.71

Alternatively, you can use the `withIndex` library function:

```
for ((index, value) in array.withIndex()) {
    println("the element at $index is $value")
}
```

While Loops

`while` and `do..while` work as usual

```
while (x > 0) {
    x--
}

do {
    val y = retrieveData()
} while (y != null) // y is visible here!
```

Break and continue in loops

Kotlin supports traditional `break` and `continue` operators in loops.