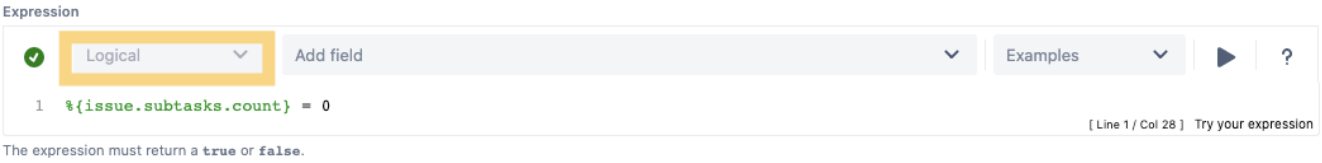
Logical mode

The **logical** parsing mode is used to construct **logical expressions**.

To construct these logical expressions, you can combine different **elements**, such as field codes, JWT expression parser functions and operators. The result must always return one of two distinct BOOLEAN values: **`true`** or **`false`**.

The main JWT features where you will be using the logical parsing mode are:

- Conditional execution
- Logical condition
- Logical validator
- Boolean condition
- JWT JQL functions



Example expressions

Parser expression	Description
`3 < 5`	This example returns: **`true`**
`3 > 5`	This example returns: **`false`**

Expressions can be **combined** or linked using operators to construct complex logical comparisons.

Parser expression	Description
`3 < 5 AND 7 > 5`	This example returns: **`true`**
`%{issue.assignee} = %{issue.reporter}`	This example returns: **`true`** if the current assignee has also reported the issue, **`false`** otherwise

Additional examples

Parser expression	Description
`false`	Simply returns **false**. You can use this expression for "switching off" a specific post function.

`{parent.votes} > 5`	A numerical comparison which returns **true** if the parent issue has more than **5** votes.

`%{issue.assignee} = %{issue.project.lead} and %{issue.issueType} = "Bug"`
 	
`(%{issue.assignee} = %{issue.project.lead}) and (%{issue.issueType} = "Bug")`
	A logical conjunction which takes two comparisons as operands.
	
	It returns **true** when the **assignee** of the issue is the **project lead** and if it's a **Bug**.
	
	The second expression has the same meaning but due to use of brackets may be more readable.

`%{issue.assignee} = null`	Returns **true** if the issue does **not** have an assignee. This expression uses the **null** value as an operator.

`%{issue.priority} IN ["Blocker", "Critical"]`
 	
`%{issue.priority} = "Blocker" OR %{issue.priority} = "Critical"`
	Returns **true** if the Priority has the value "**Blocker**" or "**Critical**". The first expressions uses a list whereas the second one uses single comparisons connected via the logical operator **OR**.

`%{issue.issueType} = "Bug" IMPLIES %{issue.versions} != null`	Returns **true** if **Affects version/s** is set whenever the issue type equals "**Bug** ".
`%{issue.priority} IN ["Blocker", "Critical", "Major"] IMPLIES (%{issue.assignee} != null AND %{issue.duedate} != null)`	Returns **true** if **Priority** is "**Blocker**", "**Critical**" or "**Major**", the issue is assigned and **Due date** is set.
`%{issue.labels} ~ ["Blocker", "Critical", "Major"]`	Returns **true** if **Labels** (which is a field holding a TEXT LIST) contains "**Blocker**", "**Critical**" or "**Major**".

Comparison operators

The **operators**, their **meaning** and the applicable **data types** you can use them with are listed below.

A comparison always returns a BOOLEAN value.

Overview of all case-sensitive comparison operators

All operators respect the **case** of the **characters**.

Operator	Meaning	Examples (all examples return `true`)

=	equal to	`1=1`
		`true = true`
		`[1, 2, 3] = [1, 2, 3]`
		`["blue", "red", "green"] = ["blue", "red", "green"]`
		
		When working with Lists, each elements' **existence** and its **order** are being evaluated.

!=	**not** equal to	`0 != 1`
		`"HELLO" != "Hello"`
		`%{issue.description} != "Hello"`
		`true != false`
		`[1, 2, 3] != [1, 3, 2]`
		`["blue", "red", "green"] != ["blue", "green", "red"]`
		
		When working with Lists, each elements' **existence** and its **order** are being evaluated.

<	less than	`1 < 2`
		`"abc" < "bbc"`
		`"abc" < "abcd"`

>	greater than	`2 > 1`
		`"bbc" > "abc"`
		`"abcd" > "abc"`

<=	less than or equal to	`3 <= 3`
>=	greater than or equal to	`"Hello world! Hello *" >= "Hello world"`

~	contains	`"Hello world!" ~ "world" #true. The text "world" is contained in the first text.`
		`%{issue.components.leads} ~ %{system.currentUser} #checks whether "Component leads"`
		`contains the "Current user".`
		`[1, 2, 3, 2, 2, 4] ~ [2, 1, 2] #true`
		`["blue", "red", "green", "red", "white", "red"] ~ ["red", "green", "red"] #true`
		`["green", "red"] ~ ["red", "green", "red"] #false`

!~	does **not** contain	`"Hello world!" !~ "world" #false. The text "world" is contained in the first text.`
		`%{issue.fixVersions} !~ %{issue.versions} #false if all "Affects version/s" are`
		`also selected as "Fix version/s".`
		`[1, 2, 3, 2, 2, 4] !~ [2, 1, 1, 4] #true`
		`["blue", "red", "green", "red", "red"] !~ ["red", "green", "green", "red"] #true`

in	is contained in	`"world" in "Hello world!" #true. The text "world" is contained in the first text.`
		`%{system.currentUser} in %{issue.components.leads} #true if current user is a component lead of any of the issue's components`
		`[1, 1, 2] in [2, 1, 1, 1, 4] #true`
		`["blue", "red", "red"] in ["red", "green", "blue", "red", "red"] #true`
		`2 in [1, 2, 3] #true`
		`"blue" in ["red, "blue", "white"] #true`

not in	is **not** contained in	`"Hello world!" not in "world" #true`
		`%{issue.versions} not in %{issue.fixVersions} #false if all "Affects version/s" are also selected as "Fix version/s".`
		`[1, 1, 2, 2] not in [2, 1, 1, 1, 4] #true`
		`["blue", "red", "red", "blue"] not in ["red", "blue", "red", "red"] #true`
		`5 not in [1, 2, 3, 3, 4] #true`
		`"orange" not in ["blue", "red", "white"] #true`

any in	any element is in	`%{issue.versions} any in %{issue.fixVersions} # true if any selected "Affects version/s" has also been selected as "Fix version/s".`
		`[1, 3] any in [3, 4, 5] #true`
		`["blue", "white"] any in ["black", "white", "green"] #true`

none in	**no** single element is in	`%{issue.versions} none in %{issue.fixVersions} #true if no selected "Affects version/s" has also been selected as "Fix version/s".`
		`[1, 2] none in [3, 4, 5] #true`
		`["blue", "red"] none in ["black", "white", "green"] #true`

When comparing lists, the **exact number** of occurence (cardinality) per element must match.

Parser expression	Output	Description
`["blue", "red", "green", "red", "white", "red"] ~ ["red", "green", "red"]`	**`true`**	This expression returns **`true`** , since the element (text) **red** appears at least **twice** in the first list and the element (text) **green** occurs at least **once** in the first list.
`["green", "red"] ~ ["red", "green", "red"]`	**`false`**	This expression returns **`false`** , since the element (text) **red** does **not app ear twice** in the first list.

Overview of all case ignoring comparison operators

The following comparison operators can be used with TEXT and TEXT LIST **data types** .

All operators **ignore** the **case** of the **characters**.

Operator	Meaning	Examples (all examples return `true`)

=~	equal to	`"HELLO" =~ "Hello" #true`
		`"up" =~ "UP" #true`
		`["blue", "red", "green"] =~ ["Blue", "RED", "Green"] #true`

!=~	**not** equal to	`" HELLO" !=~ "Hello" #false, since there is a whitespace in the first text`
		`"up" !=~ "down" #true`
		`("up" !=~ "UP") #false`
		`["blue", "red"] !=~ ["Blue", "green"] #true`
		`["blue", "red"] !=~ ["Red", "BLUE"] #true`
		`["blue", "red", "green"] !=~ ["Blue", "RED", "Green"] #false`

~~	contains	`"Hello World!" ~~ "world" #true, checks whether a text contains a substring.`
		`"A small step for a man" ~~ "STEP" #true`
		`["one", "two", "three"] ~~ ["TWO", "One"] #true, checks whether a text list contains all the elements of another text list.`

!~~	does **not** contain	`"Hello World!" !~~ "bye" #true, checks whether a text does not contain a substring.`
		`"A small step for a man" !~~ "big" #true`
		`["one", "two", "three"] !~~ ["Four"] #true, checks whether a text list does not contain a single element of another text list.`
		`(["one", "two", "three"] !~~ ["TWO"]) = false`

in~	is contained in	`"world" in~ "Hello World!" #true, checks whether a substring is contained in another text.`
		`"STEP" in~ "A small step for a man" #true`
		`["TWO", "One"] in~ ["one", "two", "three"] #true, checks whether all the elements of a text list are contained in another text list.`

not in~	is **not** contained in	`"bye" not in~ "Hello World!" #true, checks whether a substring is not contained in another text.`
		`"big" not in~ "A small step for a man" #true`
		`["Four"] not in~ ["one", "two", "three"] #true, checks whether any of the elements of a text list are not contained in another text list.`
		`["TWO"] not in~ ["one", "two", "three"] #false`

any in~	any element is in	`["blue", "violet"] any in~ ["Blue", "Red", "Green"] #true` `["Five", "One"] any in~ ["FOUR", "FIVE", "SIX"]"bye" #true`
none in~	**no** single element is in	`["Orange"] none in~ ["red", "blue", "green"] #true, checks whether none of the elements of a text list are not contained in another text list.` `["orange"] none in~ ["Red", "Orange"] #false`

Applicable data types

Below you find a comprehensive matrix of all **operators** and applicable **data types** .

Comparison Operator	BOOLEAN	NUMBER	TEXT	NUMBER LIST	TEXT LIST	ISSUE
`=`	✓	✓	✓	✓	✓	✓
`!=`	✓	✓	✓	✓	✓	✓
`<`	-	✓	✓	-	-	-
`>`	-	✓	✓	-	-	-
`<=`	-	✓	✓	-	-	-
`>=`	-	✓	✓	-	-	-
`~`	-	-	✓	✓	✓	✓
`!~`	-	-	✓	✓	✓	✓
`in`	-	-	✓	✓	✓	✓
`not in`	-	-	✓	✓	✓	✓
`any in`	-	-	-	✓	✓	✓
`none in`	-	-	-	✓	✓	✓
`=~`	-	-	✓	-	✓	-
`!=~`	-	-	✓	-	✓	-
`~~`	-	-	✓	-	✓	-
`!~~`	-	-	✓	-	✓	-
`in~`	-	-	✓	-	✓	-
`not in~`	-	-	✓	-	✓	-
`any in~`	-	-	-	-	✓	-
`none in~`	-	-	-	-	✓	-

Please be aware the both operands of the respective comparison must have the **same data type**. The only exceptions are the following:

- **Automatic casting from** NUMBER **to** TEXT **:** Whenever you write a numeric term at the right-hand side of a **c omparison operator** like =, and the left-hand side is occupied by a text term, the parser will automatically transform the right-hand side term into a text (e.g. "30" = 30 will be interpreted the same way as "30" = "30")
- **Single values as operand in list operations**: Operators `~, !~, in` and `not in` can be used for checking a single element **(** NUMBER **or** TEXT **)** against a NUMBER LIST or a TEXT LIST
- **Comparison with the null value:** A **field** which is not set or an empty text is interpreted as **null**. A NUMBER field, which doesn't contain a number, is also interpreted as `null` .

Things to remember

Remember	Examples
Operators `~, !~, in` and `not in` can be used for checking a single element **(** NUMBER **or** TEXT **)** against a NUMBER LIST or a TEXT LIST	`1 in [1, 2, 3]` `["blue", "red"] ~ "blue"`

Operators **`~, !~, in`** and **`not in`** when used with a **text** are useful to look for substrings in another string.	`"I love coding" ~ "love"`
	`"I don't like Mondays" !~ "Fridays"`
	`"love" in "I love coding"`
	`"Fridays" not in "I don't like Mondays"`

Operators **`~, !~, in`** and **`not in`** respect cardinality, i.e., container list must have at least the same number of elements as contained list.	`[1, 1] in [1, 1, 1]` `[1, 1] not in [1, 2, 3]`
Operators **`=`** and **`!=`** , when used for comparing lists, require to have the **same elements**, with the **same cardinality** and the **same order**.	`[1, 2, 3] = [1, 2, 3]` `[4, 5, 6] != [4, 6, 5]`

Operators **`<, >, <=`** and **`>=`** work according to lexicographical order when comparing text.	`1 < 2`
	`"abc" < "bbc"`
	`"abcd" > "abc"`

Logical operators

The table below lists all logical operators that can be used for **linking logical terms** in an expression.

Logical operators take logical terms (which return `BOOLEAN` values) as operands and can thus be built using:

- a boolean value
- a JWT expression parser function returning a boolean value
- a comparison
- a logical term enclosed by brackets **()**
- two logical terms connected with a logical operator, where boolean literals and comparisons themselves are logical terms.

Logical operators can only be used in **logical expressions** in the Logical mode or in combination with the conditional operator.

Overview of all logical operators

Operator	Meaning	Precedence
`NOT` or **`!`**	logical negation	1 (highest)
`AND` or **`&`**	logical conjunction	2
`OR` or **`|`**	logical disjunction	3
`XOR`	exclusive or, i.e., **`a XOR b`** is equivalent to **`a AND !b OR !a AND b`**	3
`IMPLIES` or **`IMP`**	logical implication, i.e., **`a IMPLIES b`** is equivalent to **`!a OR b`**	4
`XNOR` or **`EQV`**	logical equivalence, i.e., **`a EQV b`** is equivalent to **`a IMPLIES b AND b IMPLIES a`**	4 (lowest)

A single logical term can be enclosed by **brackets ()** in order to increase the readability of the expressions or to define a **precedence** which differs from the given one.

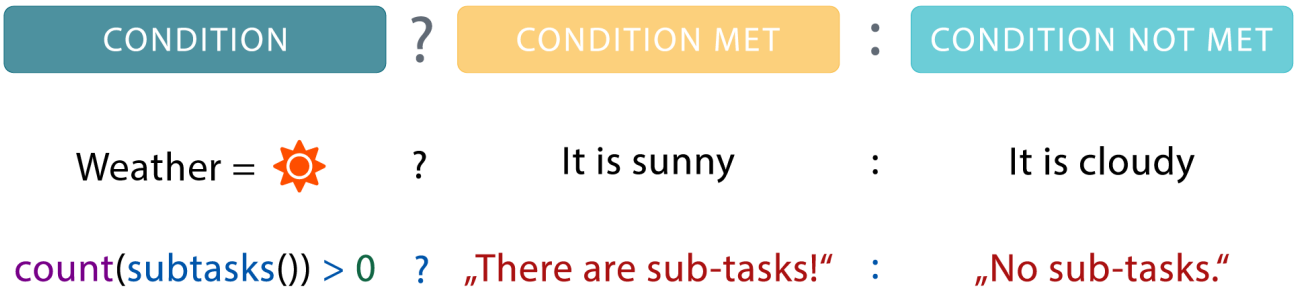
Logical operators can also be written in lower case (e.g. **`and`** , **`or`**)

Conditional operator

The conditional operator **?** **:** is a powerful operator to construct conditional expressions.

It basically allows you to construct the following expression: **IF** logical_expression **`true`** **THEN** term_1 **ELSE** term_2.

```
<logical_expression> ? <term_1> : <term_2>
```



The conditional operator is extremely helpful when being used in calculated fields.

Examples of using the conditional operator

Expression	Description
`%{issue.priority} = "Highest" ? "Please have a look at this issue immediately" : "No stress, come back later"`	**IF** the **priority** of an issue is **Blocker**, **THEN** this function will return **"Please have a look at this issue immediately**" **ELSE** it will return "**No stress, come back later**".
`{issue.duedate} != null ? ({...duedate} - {...currentDateTime}) / {HOUR} : 0`	**IF** an issue **does** have a due date set (due date is **not null**), **THEN** this function will return the number of **hours from the current date-time** to the **due date** **ELSE** it will return **`0`** .
`%{issue.somefield} = "Red" ? "Color" : "No color"`	**IF** a custom field (e.g. a select list) has a value of **Red**, **THEN** this function will return "**Color"**, **ELSE** it will return "**No color".**
`timePart({...currentDateTime}, LOCAL) > 21:00 AND timePart({...currentDateTime}, LOCAL) < 7:00 ? "Night" : "Day"`	**IF** the current time is **between 21:00 and 7:00** **THEN** this function will return "**Night**" , **ELSE** it will return "**Day**".

If you still have questions, feel free to refer to our support team.