

Operators in MongoDB

1. \$exists

The `$exists` operator is used to match documents that contain a specific field, or alternatively, those that do not. It checks if a field is present (`true`) or absent (`false`) in a document.

- Syntax:

```
{ field: { $exists: <boolean> } }
```

-Example:

```
// Find all documents where the "age" field exists.
```

```
{ age: { $exists: true } }
```

```
// Find all documents where the "address" field does not exist.
```

```
{ address: { $exists: false } }
```

2.\$type

The ``$type`` operator matches documents where the specified field is of a certain BSON data type. You can use either type numbers (1-18) or aliases (e.g., "int", "string").

- **Syntax**:

```
{ field: { $type: <BSON type> } }
```

```
// Find documents where "price" is stored as a double (decimal).  
{ price: { $type: "double" } }
```

```
// Find documents where "name" is stored as a string.  
{ name: { $type: "string" } }
```

- ****Supported Types****:

- ``double`` (1)
- ``string`` (2)
- ``object`` (3)
- ``array`` (4)
- ``binary`` (5)
- ``bool`` (8)
- ``date`` (9), etc.

3` \$all

The ``$all`` operator matches documents where an array field contains all specified elements, regardless of their order.

```
- **Syntax**:  
  ```javascript  
 { arrayField: { $all: [<value1>, <value2>, ...] } }
  ```  
  
- **Example**:  
  ```javascript  
 // Find documents where "tags" contain both "mongodb" and "database".
 { tags: { $all: ["mongodb", "database"] } }
  ```
```

4. `\$elemMatch`

The `\$elemMatch` operator matches documents where at least one element in an array field satisfies multiple conditions.

```
- **Syntax**:  
  ``javascript  
  { arrayField: { $elemMatch: { <condition1>, <condition2>, ... } } }  
  ``  
  
- **Example**:  
  ``javascript  
  // Find documents where there's a score between 80 and 90.  
  { scores: { $elemMatch: { $gt: 80, $lt: 90 } } }  
  ``
```

5. `\$text`

The `\$text` operator performs a text search on fields indexed with a text index, allowing for search capabilities like full-text search.

```
- **Syntax**:  
  ``javascript  
  { $text: { $search: "<string>" } }  
  ``  
  
- **Example**:  
  ``javascript  
  // Find documents containing the term "database".  
  { $text: { $search: "database" } }  
  
  // Find documents that must include "database" and optionally  
  "system".  
  { $text: { $search: "database system" } }  
  ``
```

6.\$push

The ``$push`` operator appends a specified value to an array field in a document. If the field doesn't exist, ``$push`` will create it.

```
- **Syntax**:  
  ``javascript  
  { $push: { arrayField: <value> } }  
  ``  
  
- **Example**:  
  ``javascript  
  // Add "new_tag" to the "tags" array field.  
  { $push: { tags: "new_tag" } }  
  ``
```

7.\$pop

The ``$pop`` operator removes the first or last element of an array. It takes either ``-1`` (first element) or ``1`` (last element) as an argument.

```
- **Syntax**:  
  ``javascript  
  { $pop: { arrayField: <1 | -1> } }  
  ``  
  
- **Example**:  
  ``javascript  
  // Remove the last element from the "tags" array.  
  { $pop: { tags: 1 } }  
  
  // Remove the first element from the "tags" array.  
  { $pop: { tags: -1 } }  
  ``
```

8.\$sort

The ``$sort`` operator orders documents in a specified direction. It can be used in aggregation pipelines or with the ``find()`` method.

```
- **Syntax**:  
  ``javascript  
  { $sort: { field1: <1 | -1>, field2: <1 | -1>, ... } }  
  ``  
  
- **Example**:  
  ``javascript  
  // Sort documents by "age" ascending, and "name" descending.  
  { $sort: { age: 1, name: -1 } }  
  ``
```

9.\$limit

The ``$limit`` operator restricts the number of documents passed to the next stage of the aggregation pipeline or returned by a query.

```
- **Syntax**:  
  ``javascript  
  { $limit: <number> }  
  ``  
  
- **Example**:  
  ``javascript  
  // Limit the result set to 5 documents.  
  { $limit: 5 }  
  ``
```

10.\$project

The ``$project`` operator shapes the output by including or excluding specific fields, adding computed fields, or renaming fields in aggregation pipelines.

```
- **Syntax**:
  ```javascript
 { $project: { field1: <0 | 1>, field2: <0 | 1>, newField: <expression>
} }
  ```

- **Example**:
  ```javascript
 // Project only "name" and "age", and create a new field
 "year_of_birth".
 {
 $project: {
 name: 1,
 age: 1,
 year_of_birth: { $subtract: [2024, "$age"] }
 }
 }
  ```
```

Comparison Operators

Comparison operators are used to compare field values in documents with specified values. All comparison operators are prefixed with `$`.

1. Equality: `$eq`

- Matches documents where the value of a field is equal to a specified value.
 - Syntax: `{ field: { $eq: value } }`
 - Example: `{ age: { $eq: 25 } }`
Finds documents where `age` is equal to 25.
-

2. Not Equal: `$ne`

- Matches documents where the value of a field is not equal to a specified value.
 - Syntax: `{ field: { $ne: value } }`
 - Example: `{ age: { $ne: 25 } }`
Finds documents where `age` is not 25.
-

3. Greater Than: `$gt`

- Matches documents where the value of a field is greater than a specified value.

- Syntax: `{ field: { $gt: value } }`
 - Example: `{ age: { $gt: 25 } }`
Finds documents where `age` is greater than 25.
-

4. Greater Than or Equal To: `$gte`

- Matches documents where the value of a field is greater than or equal to a specified value.
 - Syntax: `{ field: { $gte: value } }`
 - Example: `{ age: { $gte: 25 } }`
Finds documents where `age` is 25 or more.
-

5. Less Than: `$lt`

- Matches documents where the value of a field is less than a specified value.
 - Syntax: `{ field: { $lt: value } }`
 - Example: `{ age: { $lt: 25 } }`
Finds documents where `age` is less than 25.
-

6. Less Than or Equal To: `$lte`

- Matches documents where the value of a field is less than or equal to a specified value.
- Syntax: `{ field: { $lte: value } }`

- Example: `{ age: { $lte: 25 } }`
Finds documents where `age` is 25 or less.
-

7. In: `$in`

- Matches documents where the value of a field equals any value in the specified array.
 - Syntax: `{ field: { $in: [value1, value2, ...] } }`
 - Example: `{ age: { $in: [20, 25, 30] } }`
Finds documents where `age` is 20, 25, or 30.
-

8. Not In: `$nin`

- Matches documents where the value of a field does not equal any value in the specified array.
 - Syntax: `{ field: { $nin: [value1, value2, ...] } }`
 - Example: `{ age: { $nin: [20, 25, 30] } }`
Finds documents where `age` is not 20, 25, or 30.
-

9. Exists: `$exists`

- Matches documents where a field exists or does not exist.
- Syntax: `{ field: { $exists: true | false } }`

- Example: `{ phone: { $exists: true } }`
Finds documents where the `phone` field exists.

Logical Operators

Logical operators combine multiple conditions or expressions.
All logical operators are prefixed with `$`.

1. AND: `$and`

- Matches documents that satisfy all the conditions in the array.
 - Syntax: `{ $and: [{ condition1 }, { condition2 }, ...] }`
 - Example: `{ $and: [{ age: { $gt: 20 } }, { age: { $lt: 30 } }] }`
Finds documents where `age` is between 21 and 29.
-

2. OR: `$or`

- Matches documents that satisfy at least one condition in the array.
- Syntax: `{ $or: [{ condition1 }, { condition2 }, ...] }`
- Example: `{ $or: [{ age: { $lt: 20 } }, { age: { $gt: 30 } }] }`
Finds documents where `age` is less than 20 or greater than 30.

3. NOT: \$not

- Matches documents that do not satisfy a specified condition.
 - Syntax: `{ field: { $not: { condition } } }`
 - Example: `{ age: { $not: { $gte: 25 } } }`
Finds documents where `age` is less than 25.
-

4. NOR: \$nor

- Matches documents that do not satisfy any of the conditions in the array.
- Syntax: `{ $nor: [{ condition1 }, { condition2 }, ...] }`
- Example: `{ $nor: [{ age: { $lt: 20 } }, { age: { $gt: 30 } }] }`
Finds documents where `age` is between 20 and 30 (inclusive).