

MongoDB Array Operations Explained =====

1. \$push – Add an element to an array ----- Adds a new value to an array field.

Example: `db.students.updateOne({ name: "Ali" }, { $push: { subjects: "Math" } })`

Before: { name: "Ali", subjects: ["Science"] } After: { name: "Ali", subjects: ["Science", "Math"] }

----- \$each – Push multiple values -----
Used with \$push to insert multiple items.

`db.students.updateOne({ name: "Ali" }, { $push: { subjects: { $each: ["English", "History"] } } })`

----- \$addToSet – Add only if it doesn't already exist
----- Prevents duplicates.

`db.students.updateOne({ name: "Ali" }, { $addToSet: { subjects: "Science" } })`

----- \$pop – Remove first or last element
----- 1 removes last, -1 removes first.

`db.students.updateOne({ name: "Ali" }, { $pop: { subjects: 1 } })`

----- \$pull – Remove specific value(s)
----- Removes elements that match a condition.

`db.students.updateOne({ name: "Ali" }, { $pull: { subjects: "Math" } })`

----- \$push with \$slice – Limit array length
----- Adds items and keeps only the last N.

`db.students.updateOne({ name: "Ali" }, { $push: { scores: { $each: [95, 87], $slice: -3 } } })`

----- \$position – Insert at specific index
----- Used with \$each.

`db.students.updateOne({ name: "Ali" }, { $push: { subjects: { $each: ["Geography"], $position: 1 } } })`

----- \$set – Update element at a specific index
----- `db.students.updateOne({ name: "Ali" }, { $set: { "subjects.1": "Biology" } })`

----- \$ – Positional Operator -----
Updates first matching array element.

`db.students.updateOne({ name: "Ali", "scores.subject": "Math" }, { $set: { "scores.$marks": 90 } })`

----- \$elemMatch – Match conditions inside arrays
----- `db.students.find({ scores: { $elemMatch: { subject: "Math", marks: { $gte: 80 } } } })`

----- \$size – Match arrays by length
----- `db.students.find({ subjects: { $size: 3 } })`

----- \$all – Match arrays containing all given values
----- `db.students.find({ subjects: { $all: ["Math", "Science"] } })`

----- Positional Operator (\$) Explained
----- Updates the first array element that matches a condition.

Example: `db.students.updateOne({ name: "Ali", "scores.subject": "Science" }, { $set: { "scores.$marks": 85 } })`

----- \$elemMatch Explained -----

Ensures all conditions apply to the same array element.

Example: `db.students.find({ scores: { $elemMatch: { subject: "Math", marks: { $gte: 80 } } } })`

Projection example: `db.students.find({ name: "Ali" }, { scores: { $elemMatch: { subject: "Math" } } })`

Output: `{ name: "Ali", scores: [{ subject: "Math", marks: 85 }] }`

----- Key Points Summary ----- - \$push adds elements, \$slice limits size. - \$set updates or creates fields. - \$ adds positional updates to first matching array element. - \$elemMatch ensures conditions apply to the same element. - \$all checks if array contains all given values. - \$size matches array length.