Class 6

AGGREGATION OPERATIONS

Aggregation in MongoDB is a powerful feature that allows for complex data transformations and computations on collections of documents. It enables users to group, filter, and manipulate data to produce summarized results.

What is aggregation?

- MongoDB Aggregation is a database process that allows us to perform complex data transformations and computations on collections of documents or rows.

Aggregate Operation:

- Execute Aggregation operations ($avg, $min,$max, $push, $addToSet etc.). students encourage to execute several queries to demonstrate various aggregation operators)

Introduction:

- Aggregation means grouping together
- For example sum, avg, min, max

Syntax: db.collection.aggregate(<AGGREGATE OPERATION>)

Types:

Expression Type	Description	Syntax
Accumulators	Perform calculations on entire groups of documents	
* $sum	Calculates the sum of all values in a numeric field within a group.	"$fieldName": { $sum: "$fieldName" }
* $avg	Calculates the average of all values in a numeric field within a group.	"$fieldName": { $avg: "$fieldName" }
* $min	Finds the minimum value in a field within a group.	"$fieldName": { $min: "$fieldName" }
* $max	Finds the maximum value in a field within a group.	"$fieldName": { $max: "$fieldName" }
* $push	Creates an array containing all unique or duplicate values from a field	"$arrayName": { $push: "$fieldName" }
* $addToSet	Creates an array containing only unique values from a field within a group.	"$arrayName": { $addToSet: "$fieldName" }
* $first	Returns the first value in a field within a group (or entire collection).	"$fieldName": { $first: "$fieldName" }
* $last	Returns the last value in a field within a group (or entire collection).	"$fieldName": { $last: "$fieldName" }

Example 1: Average GPA of all students

```
test> db.stu.aggregate([
... {$group:{_id:null,averageGPA:{$avg:"$gpa"}}}
... ]);
[ { _id: null, averageGPA: 2.98556 } ]
```

Explanation:

$group: Group all documents together.

_id: null: Sets the group identifier to null (optional, as there's only one group in this case).

averageGPA: Calculates the average value of the "gpa" field using the **$avg** operator.

Example 2:

```
test> db.stu.aggregate([
... {$group:{_id:null,minAge:{$min:"$age"},maxAge:{$max:"$age"}}}
... ]);
[ { _id: null, minAge: 18, maxAge: 25 } ]
```

Explanation:

- Similar to the previous example, it uses $group to group all documents.

- minAge: Uses the $min operator to find the minimum value in the "age" field.

- maxAge: Uses the $max operator to find the maximum value in the "age" field