

- 1) You're creating a database to contain information about students in a class (name and ID), and class projects done in pairs (two students and a project title). Should you use the relational model or MongoDB? Please justify your answer

Relational Database because it is a simple data model and to be more appropriate.

- 2) You're creating a database to contain information about students in a class (name and ID), and class projects. Projects may include any combination of students; they have a title and optional additional information such as materials, approvals, and milestones. Should you use the relational model or MongoDB? Please justify your answer

MongoDB because we need to use the flexible schema

- 3) You're creating a database to contain a set of sensor measurements from a two-dimensional grid. Each measurement is a time-sequence of readings, and each reading contains ten labeled values. Should you use the relational model or MongoDB? Please justify your answer

MongoDB because it would be easier to collect by the MongoDB as a simple data.

4) Choose one of the following applications

- a. IoT
- b. E-commerce
- c. Gaming
- d. Finance

Propose an appropriate Relational Model or MongoDB database schema

a. IoT MongoDB

```
{
  "name": String,
  "id" : int,
  "sensor": {
    "light": int,
    "smoke": int,
    "water": int, y,
  }
  "Output": {
    "light": int,
    "smoke": int,
    "water": int, y
  }
}
```

5.1

MongoDB Compass - localhost:27017/HwmongoDB.HwmongoDB

Connect View Collection Help

Local

6 DBS 6 COLLECTIONS

HOST localhost:27017

CLUSTER Standalone

EDITION MongoDB 5.0.6 Community

Filter your data

HwmongoDB

HwmongoDB

MySecondMongoDB

admin

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local

myfirstmongodb

HwmongoDB.HwmongoDB

Documents

DOCUMENTS 13 STORAGE SIZE 20.5KB AVG. SIZE 70B INDEXES 1 TOTAL SIZE 36.9KB AVG. SIZE 36.9KB

Documents Aggregations Schema Explain Plan Indexes Validation

FILTER { field: 'value' }

ADD DATA VIEW

Displaying documents 1 - 13 of 13

_id	ObjectId	name String	subject String	marks Int32	reason String
1	6237f3f2c7577fbc0b76f98d	"Ramesh"	"maths"	87	No field
2	6237f3f2c7577fbc0b76f98e	"Ramesh"	"english"	59	No field
3	6237f3f2c7577fbc0b76f98f	"Ramesh"	"science"	77	No field
4	6237f416c7577fbc0b76f990	"Rav"	"maths"	62	No field
5	6237f416c7577fbc0b76f991	"Rav"	"english"	83	No field
6	6237f416c7577fbc0b76f992	"Rav"	"science"	71	No field
7	6237f416c7577fbc0b76f993	"Alison"	"maths"	84	No field
8	6237f447c7577fbc0b76f994	"Alison"	"english"	82	No field
9	6237f447c7577fbc0b76f995	"Alison"	"science"	86	No field
10	6237f447c7577fbc0b76f996	"Steve"	"maths"	81	No field

>_MONGOSH

```
> db.HwmongoDB.aggregate([{$group: {_id: "$name", "mark": {$sum: "$marks"}}}])
{ "_id": "Alison", mark: 252 }
{ "_id": "Steve", mark: 247 }
{ "_id": "Jan", mark: 0 }
{ "_id": "Ramesh", mark: 223 }
{ "_id": "Rav", mark: 216 }
```

5.2

MongoDB Compass - localhost:27017/HwmongoDB.HwmongoDB

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Local

6 DBS 6 COLLECTIONS

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FILTER { field: 'value' }

ADD DATA VIEW

Displaying documents 1 - 13 of 13

_id	ObjectId	name String	subject String	marks Int32	reason String
3	6237f3f2c7577fbc0b76f98f	"Ramesh"	"science"	77	No field
4	6237f416c7577fbc0b76f990	"Rav"	"maths"	62	No field
5	6237f416c7577fbc0b76f991	"Rav"	"english"	83	No field
6	6237f416c7577fbc0b76f992	"Rav"	"science"	71	No field
7	6237f416c7577fbc0b76f993	"Alison"	"maths"	84	No field
8	6237f447c7577fbc0b76f994	"Alison"	"english"	82	No field
9	6237f447c7577fbc0b76f995	"Alison"	"science"	86	No field
10	6237f447c7577fbc0b76f996	"Steve"	"maths"	81	No field
11	6237f447c7577fbc0b76f997	"Steve"	"english"	89	No field
12	6237f45ac7577fbc0b76f998	"Steve"	"science"	77	No field
13	6237f45ac7577fbc0b76f999	"Jan"	"english"	0	"absent"

>_MONGOSH

```
> db.HwmongoDB.aggregate([{$group: {_id: "$subject", "mark": {$max: "$marks"}}}])
{ "_id": "maths", mark: 87 }
{ "_id": "english", mark: 89 }
{ "_id": "science", mark: 86 }
```

S.3

MongoDB Compass - localhost:27017/HwmongoDB.HwmongoDB

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DBS COLLECTIONS

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HwmongoDB.HwmongoDB

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Documents Aggregations Schema Explain Plan Indexes Validation

FILTER { field: 'value' }

ADD DATA VIEW

Displaying documents 1 - 13 of 13 REFRESH

_id	ObjectID	name	String	subject	String	marks	Int32	reason	String
5	6237f416c7577fbc0b76f991	"Rav"		"english"		83		No field	
6	6237f416c7577fbc0b76f992	"Rav"		"science"		71		No field	
7	6237f416c7577fbc0b76f993	"Allison"		"maths"		84		No field	
8	6237f447c7577fbc0b76f994	"Allison"		"english"		82		No field	
9	6237f447c7577fbc0b76f995	"Allison"		"science"		86		No field	
10	6237f447c7577fbc0b76f996	"Steve"		"maths"		81		No field	
11	6237f447c7577fbc0b76f997	"Steve"		"english"		89		No field	
12	6237f45ac7577fbc0b76f998	"Steve"		"science"		77		No field	
13	6237f45ac7577fbc0b76f999	"Jan"		"english"		0		"absent"	

```
>_MONGOSH
> db.HwmongoDB.aggregate([{$group: {_id: "$name", "mark": { $min: "$marks" }}}])
{
  "_id": "Allison", "mark": 82
}
{
  "_id": "Steve", "mark": 77
}
{
  "_id": "Jan", "mark": 0
}
{
  "_id": "Ramesh", "mark": 59
}
{
  "_id": "Rav", "mark": 62
}
```

S.4

MongoDB Compass - localhost:27017/HwmongoDB.HwmongoDB

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Displaying documents 1 - 13 of 13 REFRESH

_id	ObjectID	name	String	subject	String	marks	Int32	reason	String
2	6237f3f2c7577fbc0b76f98e	"Ramesh"		"english"		59		No field	
3	6237f3f2c7577fbc0b76f98f	"Ramesh"		"science"		77		No field	
4	6237f416c7577fbc0b76f990	"Rav"		"maths"		62		No field	
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9	6237f447c7577fbc0b76f995	"Allison"		"science"		86		No field	
10	6237f447c7577fbc0b76f996	"Steve"		"maths"		81		No field	
11	6237f447c7577fbc0b76f997	"Steve"		"english"		89		No field	
12	6237f45ac7577fbc0b76f998	"Steve"		"science"		77		No field	
13	6237f45ac7577fbc0b76f999	"Jan"		"english"		0		"absent"	

```
>_MONGOSH
> db.HwmongoDB.aggregate([{$group: {_id: "$subject", average: { $avg: "$marks" } }}, {$sort: {average: -1}}, {$limit: 2}])
{
  "_id": "maths", "average": 78.5
}
{
  "_id": "science", "average": 77.75
}
```