Task 13 : Use Case

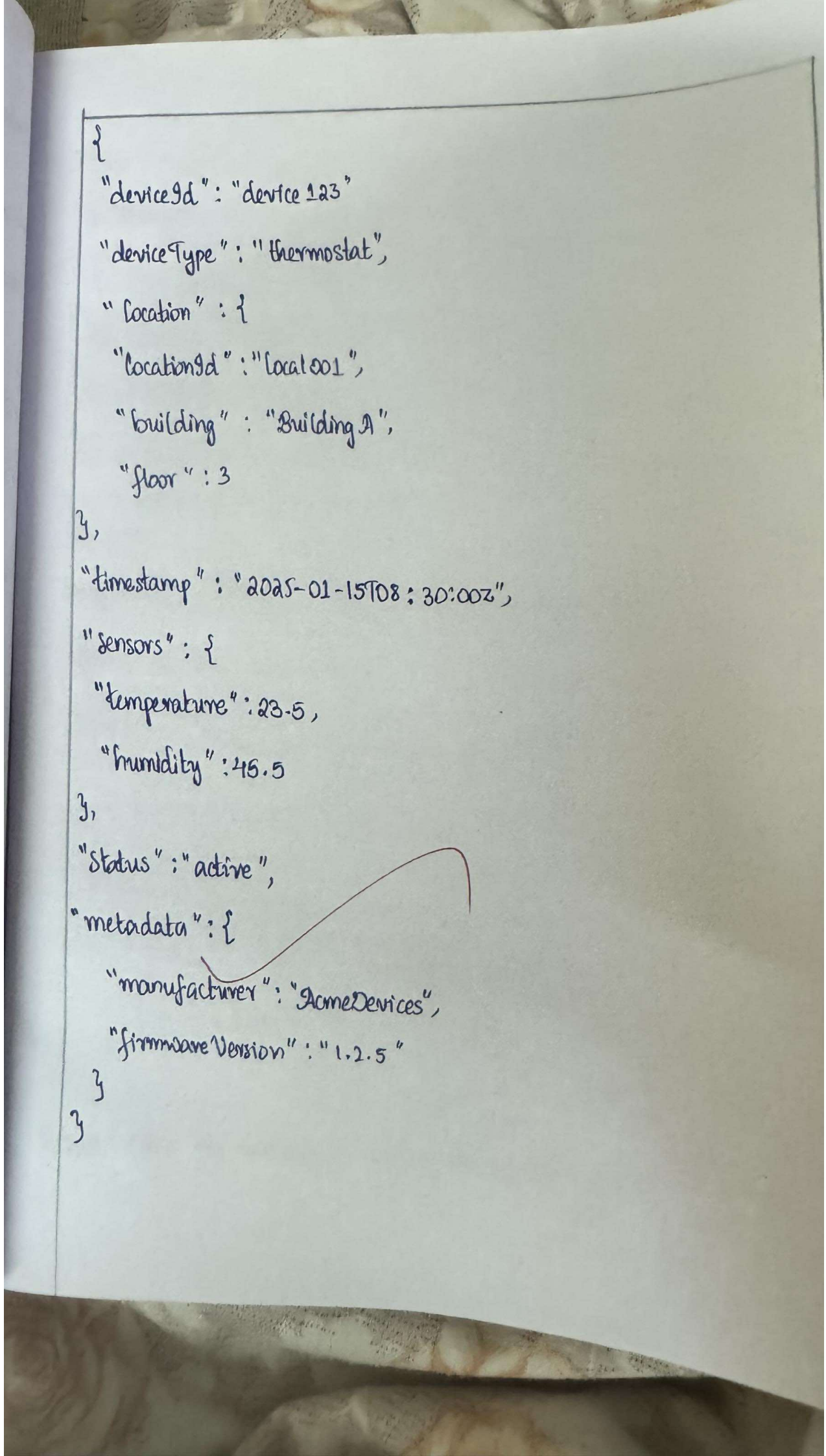
Indexing Various devices in IoT platform :

- Scenario : An IoT platform needs to support a wide variety of devices.
- Requirement : Efficient data storage and indexing to query by device id, location, or parameter.
- Challenge : Device data structure may differ :
- Goal : Quick retrieval by common queries.

Why a JSON-Based Document Database (MongoDB) fits

1. Flexible Schema
   - Device data can vary widely
   - MongoDB stores each document as JSON-like BSON.
2. Indexing Support
   - Can create indexes on deviceId, locationId, or even nested program like sensor.
3. Scalability
   - IoT platforms generate massive, high-frequency data, which MongoDB, can handle via sharding and horizontal scaling.

Example JSON Document for IoT Devices Data :



```
{
 "deviceId": "device123"
 "deviceType": "thermostat",
 "location": {
  "locationId": "local001",
  "building": "Building A",
  "floor": 3
},
"timestamp": "2025-01-15T08:30:00z",
"sensors": {
 "temperature": 23.5,
  "humidity": 45.5
},
"status": "active",
"metadata": {
  "manufacturer": "AcmeDevices",
  "firmwareVersion": "1.2.5"
 }
}
```

How Indexing Helps:-

In MongoDB, we can create indexes like:

```
db.deviceData.createIndex({"deviceId":1});
db.deviceData.createIndex({"location.locationId":1});
db.deviceData.createIndex({"deviceId":1,"location.locationId":1});
db.deviceData.createIndex({"sensors.temperature":1});
```

Benefits:

- Fetch all records of a device in different locations quickly.
- Query all devices in a location.
- Retrieve temperature readings across all thermostats.

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EX NO.	13
PERFORMANCE (5)	5
RESULT AND ANALYSIS (3)	5
VIVA VOCE (3)	5
RECORD (4)	
TOTAL (15)	15
SIGN WITH DATE	

VEL TECH	
EX NO.	
PERFORMANCE (5)	
RESULT AND ANALYSIS (5)	
VIVA VOCE (5)	
RECORD (5)	
TOTAL (20)	
SIGN WITH DATE	

Result: Thus the use case is successfully verified and executed successfully.