INTRODUCTION:

MongoDB, the most popular NoSQL database, is an open-source document-oriented database. The term 'NoSQL' means 'non-relational'. It means that MongoDB isn't based on the table-like relational database structure but provides an altogether different mechanism for storage and retrieval of data. This format of storage is called BSON (similar to JSON format).

A simple MongoDB document Structure:

```
{
   title: 'Geeksforgeeks',
   by: 'Harshit Gupta',
   url: 'https://www.geeksforgeeks.org',
 type: 'NoSQL'
   }
```

SQL databases store data in tabular format. This data is stored in a predefined data model which is not very much flexible for today's real-world highly growing applications. **Modern applications are more networked, social and interactive than ever**. Applications are storing more and more data and are accessing it at higher rates.

What is Data?

DATA is statically raw and unprocessed information.

For example – name, class, marks, etc. In computer language, a piece of information that can be translated into a form for efficient movement and processing is called data. Data is interchangeable information.

What is Database?

DATABASE is a collection of data that is organized, which is also called structured data. It can be accessed or stored in a computer system.

- Database is a container for collections.
- Each database gets its own set of files.
- A single MongoDB server has multiple databases.

Data Types:

Databases can hold various kinds of information, including text, numbers, images, videos and more.

SQL AND NO-SQL:

SQL: SQL stands for **S**tructured **Q**uery **L**anguages. To access a database, we use SQL statements.

NO-SQL: NO-SQL databases (also known as "not only SQL") are nontabular databases that store data differently than traditional relational databases.

| SQL	NoSQL
RELATIONAL DATABASE MANAGEMENT SYSTEM (RDBMS)	Non-relational or distributed database system.
These databases have fixed or static or predefined schema	They have a dynamic schema
These databases are not suited for hierarchical data storage.	These databases are best suited for hierarchical data storage.
These databases are best suited for complex queries	These databases are not so good for complex queries
Examples: MySQL, PostgreSQL, Oracle, MS-SQL Server, etc	**Examples:** MongoDB, HBase, Neo4j, Cassandra, etc

Features of MongoDB:

- **Document Oriented**: MongoDB stores the main subject in the minimal number of documents and not by breaking it up into multiple relational structures like RDBMS. For example, it stores all the information of a computer in a single document called Computer and not in distinct relational structures like CPU, RAM, Hard disk, etc.

- **Indexing**: Without indexing, a database would have to scan every document of a collection to select those that match the query which would be inefficient. So, for efficient searching Indexing is a must and MongoDB uses it to process huge volumes of data in very less time.

- **Scalability**: MongoDB scales horizontally using sharding (partitioning data across various servers). Data is partitioned into data chunks using the shard key, and these data chunks are evenly distributed across shards that reside across many physical servers. Also, new machines can be added to a running database.

- **Replication and High Availability**: MongoDB increases the data availability with multiple copies of data on different servers. By providing redundancy, it protects the database from hardware failures. If one server goes down, the data can be retrieved easily from other active servers which also had the data stored on them.

- **Aggregation**: Aggregation operations process data records and return the computed results. It is similar to the GROUPBY clause in SQL. A few aggregation expressions are sum, avg, min, max, etc

Steps to install MongoDB using MSI:

To install MongoDB on Windows, first, download the MongoDB server and then install the MongoDB shell. The Steps below explain the installation process in detail and provide the required resources for the smooth **download and install MongoDB**.

Step 1: Go to the [MongoDB Download Center](#) to download the MongoDB Community Server.
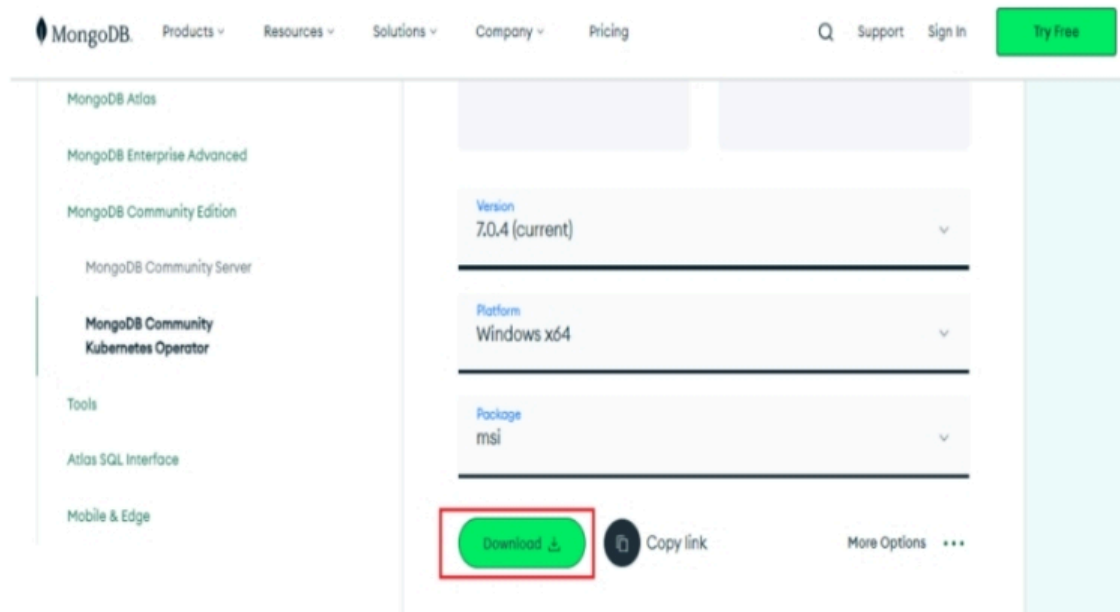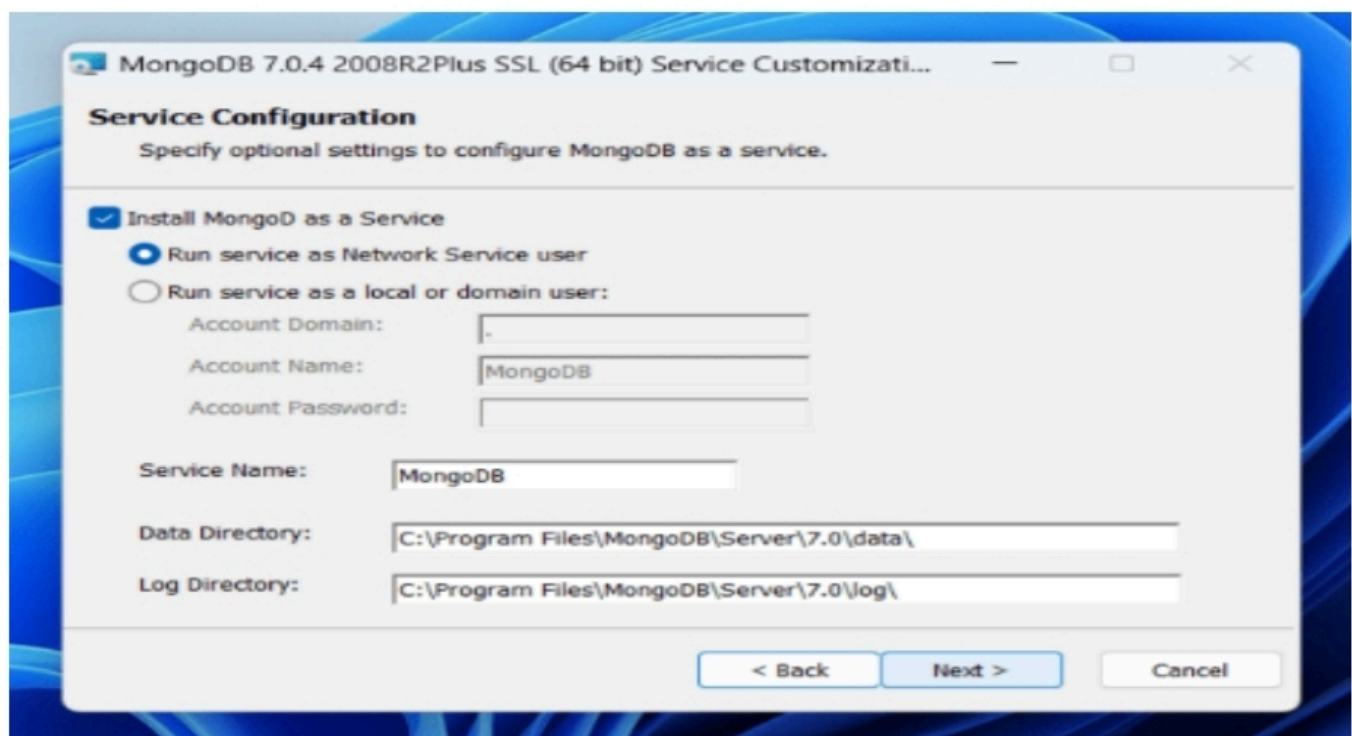

Here, You can select any version, Windows, and package according to your requirement. For Windows, we need to choose:

- Version: 7.0.4
- OS: Windows x64
- Package: MSI

Step 2: When the download is complete open the MSI file and click the in the startup screen:

**Step 3:** Now accept the End-User License Agreement and click the next button:

Step 4: Now select the *complete option* to install all the program features. Here, if you can want to install only selected program features and want to select the location of the installation, then use the *Custom option:*
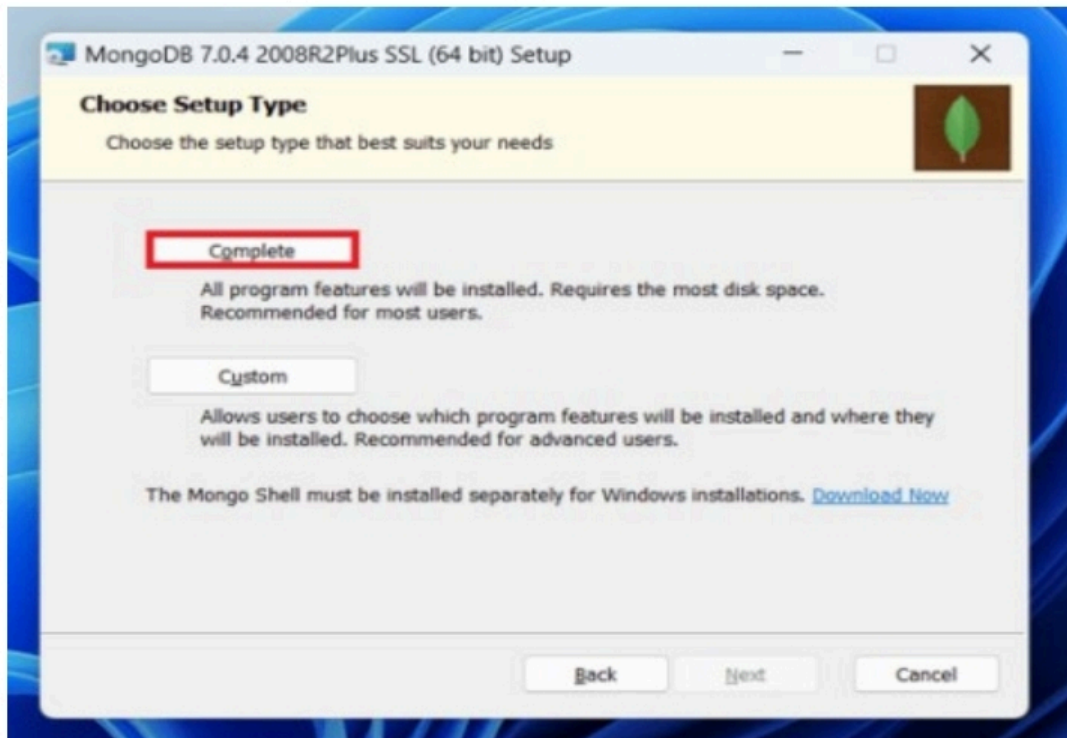
Step 5: Select "Run service as Network Service user" and copy the path of the data directory. Click Next:
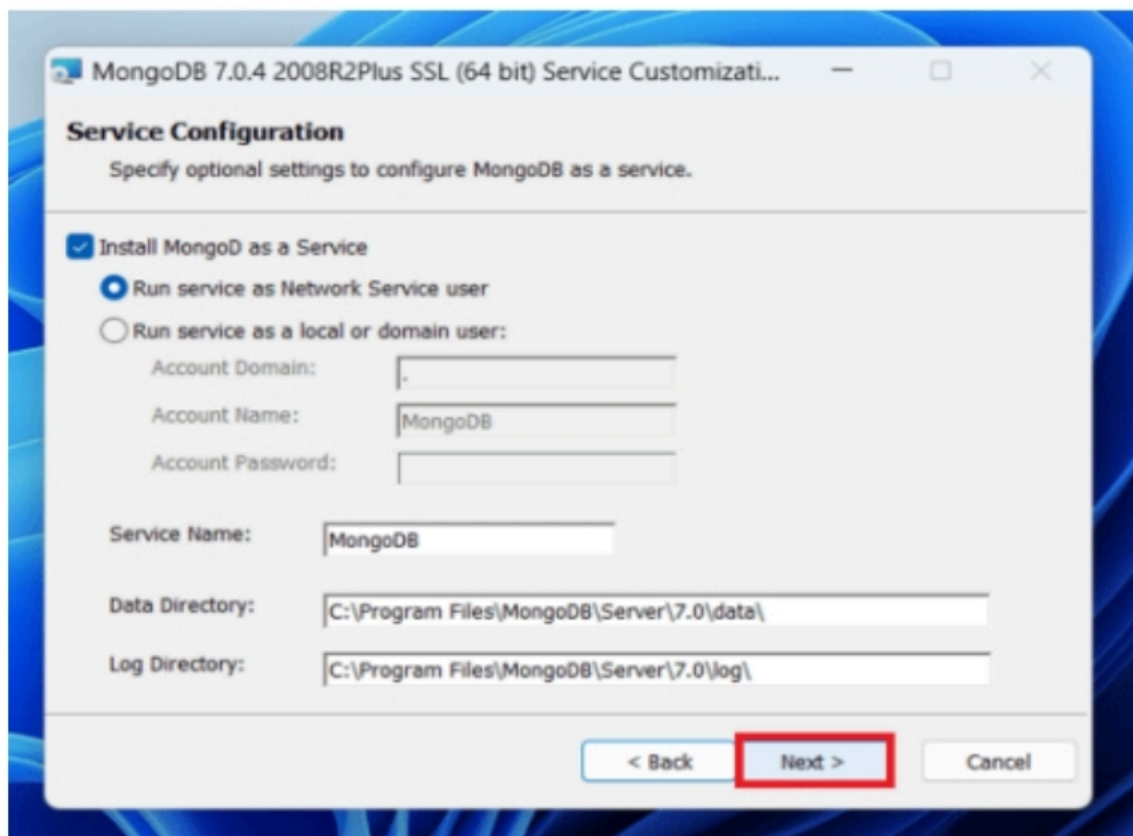
Step 6: Click the *Install button* to start the MongoDB installation process:
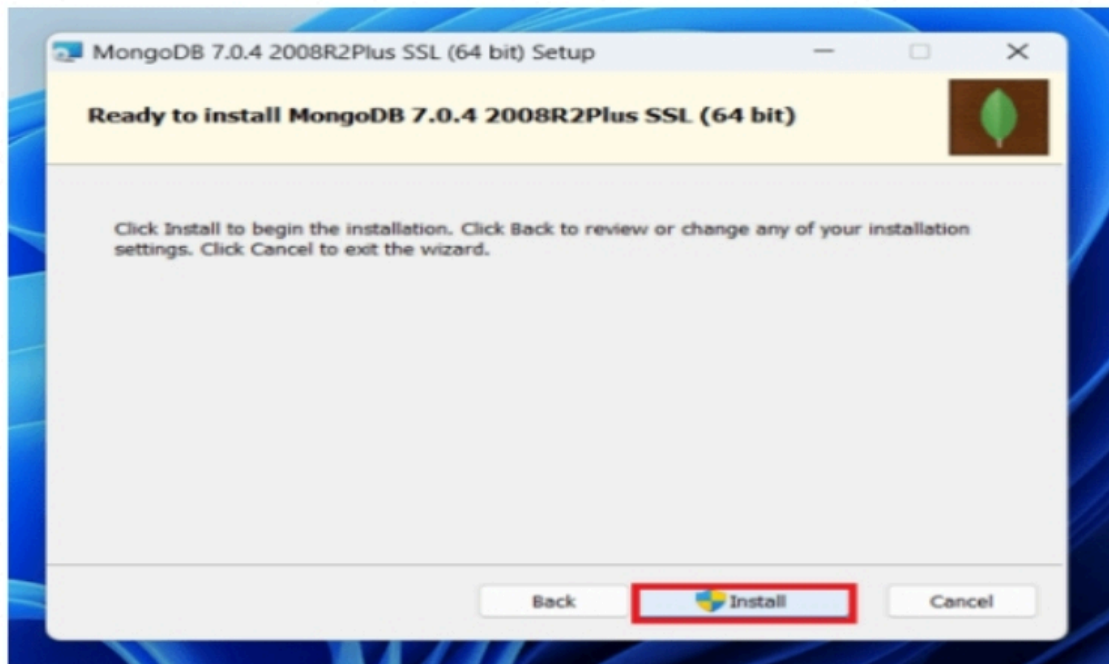
Step 7: After clicking on the install button installation of MongoDB begins:

Step 8: Now click the *Finish button* to complete the MongoDB installation process:

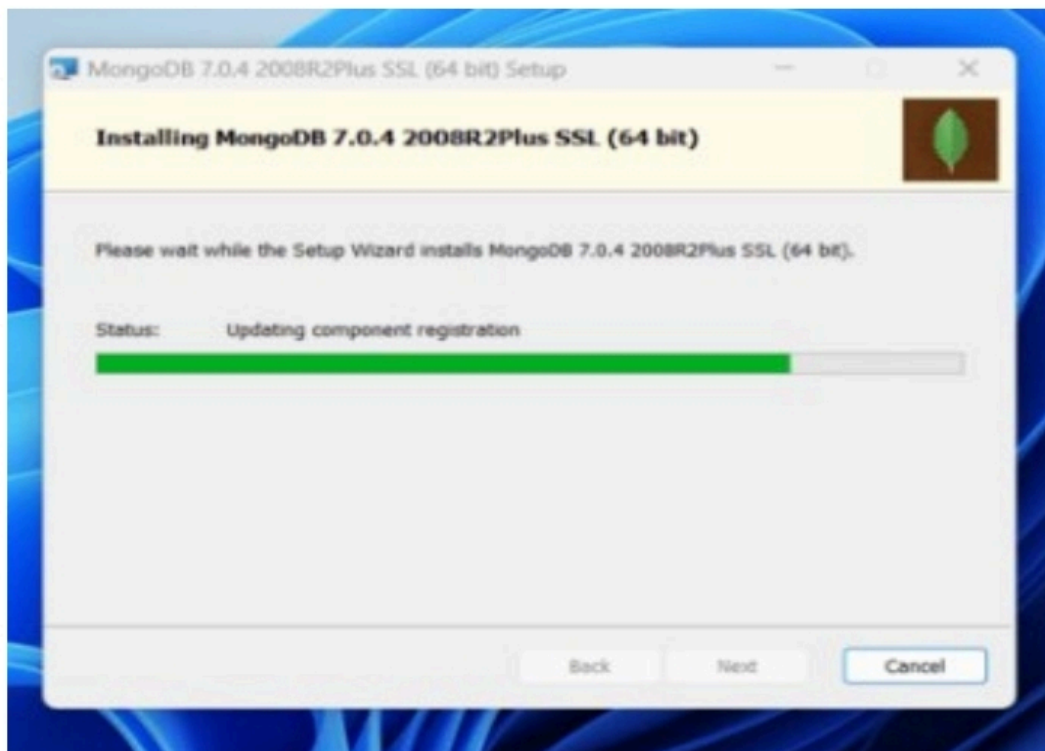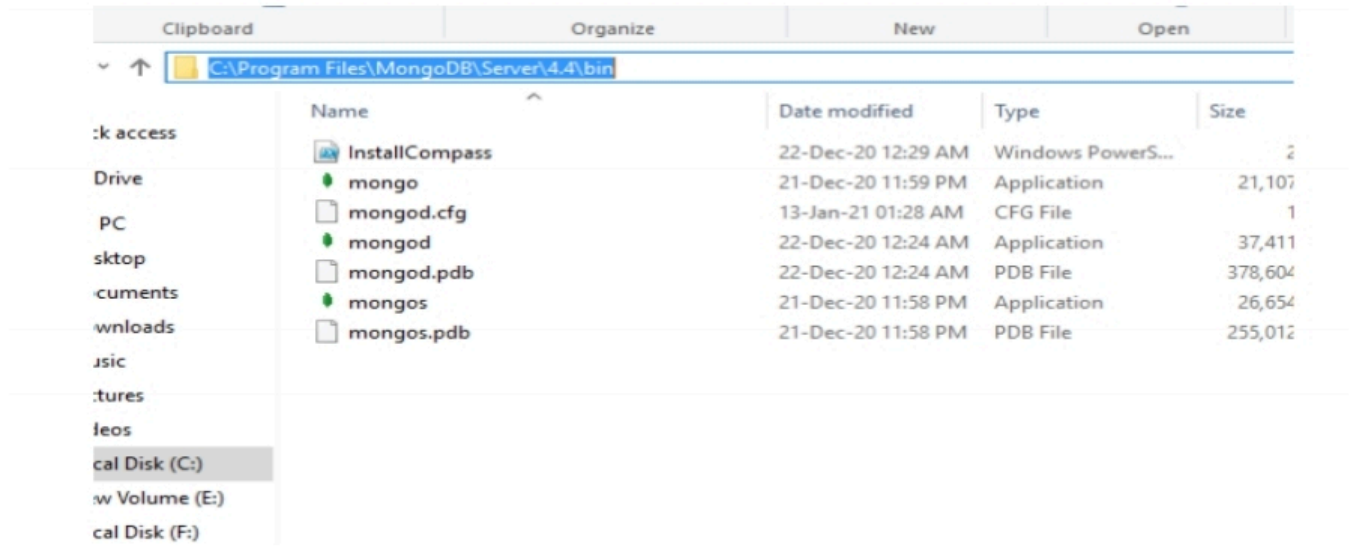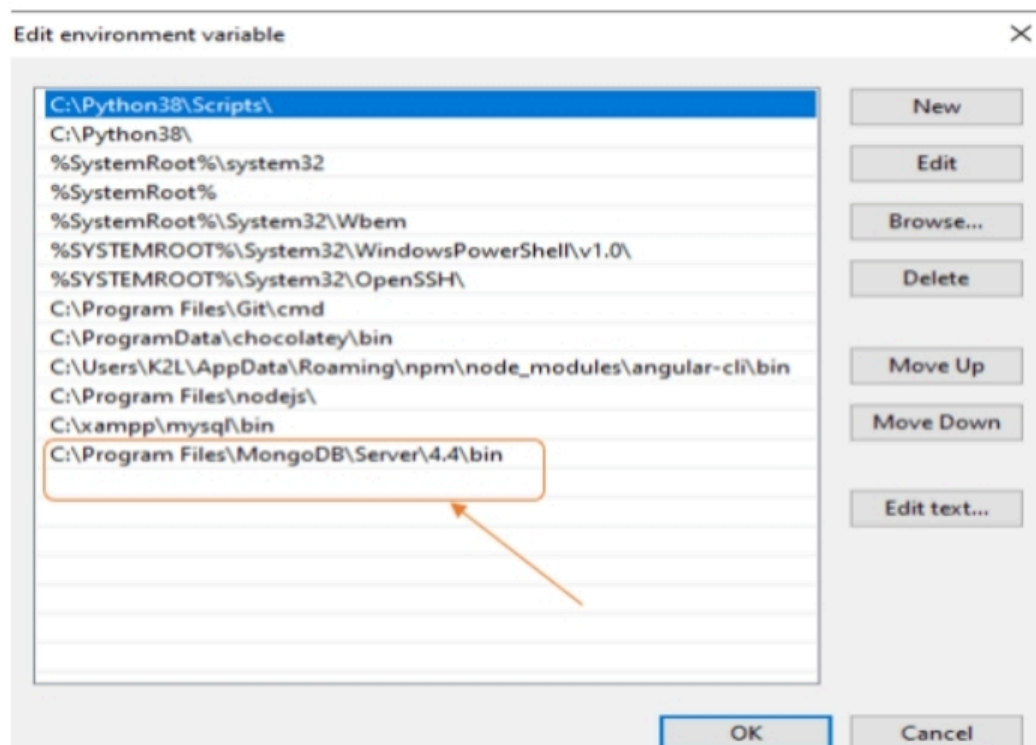**Step 9:** Now we go to the location where MongoDB installed in step 5 in your system and copy the bin path:

	Clipboard		Organize		New		Open	

∨ ↑ 📁 C:\Program Files\MongoDB\Server\4.4\bin

	Name	Date modified	Type	Size
:k access				
	🔲 InstallCompass	22-Dec-20 12:29 AM	Windows PowerS...	2
Drive	♦ mongo	21-Dec-20 11:59 PM	Application	21,107
PC	🗋 mongod.cfg	13-Jan-21 01:28 AM	CFG File	1
sktop	♦ mongod	22-Dec-20 12:24 AM	Application	37,411
cuments	🗋 mongod.pdb	22-Dec-20 12:24 AM	PDB File	378,604
wnloads	♦ mongos	21-Dec-20 11:58 PM	Application	26,654
isic	🗋 mongos.pdb	21-Dec-20 11:58 PM	PDB File	255,012
tures				
leos				
cal Disk (C:)				
w Volume (E:)				
cal Disk (F:)				

Step 10: Now, to create an environment variable open system properties >> Environment Variable >> System variable >> path >> Edit Environment variable and paste the copied link to your environment system and click Ok:

Edit environment variable ✕

C:\Python38\Scripts\
C:\Python38\
%SystemRoot%\system32
%SystemRoot%
%SystemRoot%\System32\Wbem
%SYSTEMROOT%\System32\WindowsPowerShell\v1.0\
%SYSTEMROOT%\System32\OpenSSH\
C:\Program Files\Git\cmd
C:\ProgramData\chocolatey\bin
C:\Users\K2L\AppData\Roaming\npm\node_modules\angular-cli\bin
C:\Program Files\nodejs\
C:\xampp\mysql\bin
C:\Program Files\MongoDB\Server\4.4\bin

New
Edit
Browse...
Delete
Move Up
Move Down
Edit text...

OK   Cancel

Step 11: After setting the environment variable, we will run the MongoDB server, i.e. mongod. So, open the command prompt and run the following command:

```
mongod
```

When you run this command you will get an error i.e. *C:/data/db/ not found.*

Step 12: Now, Open C drive and create a folder named "data" inside this folder create another folder named "db". After creating these folders. Again open the command prompt and run the following command:

```
mongod
```

Now, this time the MongoDB server(i.e., mongod) will run successfully.

```
C:\Users\NIkhil Chhipa>mongod
{"t":{"$date":"2021-01-31T00:56:54.081+05:30"},"s":"I",  "c":"CONTROL",  "id":23285,   "ctx"
ify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2021-01-31T00:56:54.087+05:30"},"s":"W",  "c":"ASIO",      "id":22601,   "ctx"
}
{"t":{"$date":"2021-01-31T00:56:54.088+05:30"},"s":"I",  "c":"NETWORK",  "id":4648602, "ctx"
{"t":{"$date":"2021-01-31T00:56:54.090+05:30"},"s":"I",  "c":"STORAGE",  "id":4615611, "ctx"
bPath":"C:/data/db/","architecture":"64-bit","host":"DESKTOP-L9MUQ7N"}}
{"t":{"$date":"2021-01-31T00:56:54.090+05:30"},"s":"I",  "c":"CONTROL",  "id":23398,   "ctx"
rgetMinOS":"Windows 7/Windows Server 2008 R2"}}
{"t":{"$date":"2021-01-31T00:56:54.090+05:30"},"s":"I",  "c":"CONTROL",  "id":23403,   "ctx"
gitVersion":"913d6b62acfbb344dde1b116f4161360acd8fd13","modules":[],"allocator":"tcmalloc","
}}}}
{"t":{"$date":"2021-01-31T00:56:54.090+05:30"},"s":"I",  "c":"CONTROL",  "id":51765,   "ctx"
ndows 10","version":"10.0 (build 14393)"}}}
{"t":{"$date":"2021-01-31T00:56:54.090+05:30"},"s":"I",  "c":"CONTROL",  "id":21951,   "ctx"
{"t":{"$date":"2021-01-31T00:56:54.157+05:30"},"s":"I",  "c":"STORAGE",  "id":22270,   "ctx"
:{"dbpath":"C:/data/db/","storageEngine":"wiredTiger"}}
{"t":{"$date":"2021-01-31T00:56:54.158+05:30"},"s":"I",  "c":"STORAGE",  "id":22315,   "ctx"
ize=1491M,session_max=33000,eviction=(threads_min=4,threads_max=4),config_base=false,statist
le_manager=(close_idle_time=100000,close_scan_interval=10,close_handle_minimum=250),statisti
ess],"}}
{"t":{"$date":"2021-01-31T00:56:54.395+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,   "ctx"
95788][3708:140713908197088], txn-recover: [WT_VERB_RECOVERY_PROGRESS] Recovering log 20 thr
{"t":{"$date":"2021-01-31T00:56:54.631+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,   "ctx"
```

Run Mongo Shell:

Step 13: Now we are going to connect our server (mongod) with the mongo shell. So, keep that mongod window and open a new command prompt window and write **mongo.** Now, our mongo shell will successfully connect to the mongod.

Important Point: Please do not close the mongod window if you close this window your server will stop working and it will not able to connect with the mongo shell.

```
C:\Users\NIkhil Chhipa>mongo
MongoDB shell version v4.4.3
connecting to: mongodb://127.0.0.1:27017/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("96cca5da-dc9f-4a40-aabb-732ee37600c0") }
MongoDB server version: 4.4.3
---
The server generated these startup warnings when booting:
        2021-01-28T20:56:52.570+05:30: Access control is not enabled for the database. Read and write access
configuration is unrestricted
---
---
        Enable MongoDB's free cloud-based monitoring service, which will then receive and display
        metrics about your deployment (disk utilization, CPU, operation statistics, etc).

        The monitoring data will be available on a MongoDB website with a unique URL accessible to you
        and anyone you share the URL with. MongoDB may use this information to make product
        improvements and to suggest MongoDB products and deployment options to you.

        To enable free monitoring, run the following command: db.enableFreeMonitoring()
        To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
---
```

Now, you are ready to write queries in the mongo Shell.

Run MongoDB:

Now you can make a new database, collections, and documents in your shell. Below is an example of how to make a new database:

The *use Database_name* command makes a new database in the system if it does not exist, if the database exists it uses that database:

```
use gfg
```

The db.Collection_name command makes a new collection in the gfg database and the insertOne() method inserts the document in the student collection:

```
db.student.insertOne({Akshay:500})
```

```
> use gfg
switched to db gfg
> db.student.insertOne({Akshay:500})
{
        "acknowledged" : true,
        "insertedId" : ObjectId("60083bf8b7388ed4d54157c9")
}
> db.student.find().pretty()
{ "_id" : ObjectId("60083bf8b7388ed4d54157c9"), "Akshay" : 500 }
>
```

Hence MongoDB is successfully installed