HUMBER INSTITUTE OF TECHNOLOGY AND ADVANCED LEARNING (HUMBER COLLEGE)

ASSIGNMENT: Team Assignment 2

TEAM 4

Submitted by: **Grade/Comments**

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Submitted to:
Professor Thimantha Vidanagamage

Submission Date: **Aug 14, 2023**

Table of Contents

Business : E-commerce retailer with Auto Picking System

Outline

We have considered an E-commerce organization with a centralized warehousing and distribution system and uses automatic picking of stock. The model of business and the processes has been laid out here based on few of our real life knowledge derived from our past years of experience in Supply chain functions.

Business Rules

1. One company can have many warehouses but all the warehouses of a company will be related to only that company.

   Warehouse is a physical location for storing goods which are then shipped to the customers. Multiple warehouses are normally used for efficient distribution in E-commerce business.

2. One warehouse may contain many products and one product can be kept at many warehouses.

   Warehouses are normally huge in size and stores multiple products in high numbers

3. One truck may contain many products and one product can be in many trucks.

   Trucks are used to transport the goods and hence there may be multiple products in a truck

4. One product can be ordered by many customers and one customer can order many products.

   Customers buy products through orders made through the websites in E-commerce. So the customer may have multiple products in the same order as they will be buying it at once.

5. One order can contain only one customer but one customer can make many orders

   Customers are free to make multiple orders. But one order number will be unique to a customer who makes it.

6. One supplier can give many products and one product can be supplied by many suppliers

   In the industry, most organizations maintain multiple suppliers for the same product and multi products for one supplier. This is a practice to reduce the risk from dependency on a single supplier.

7. Central Distribution Centre delivers items to many warehouses and one warehouse can receive items from the Central Distribution Centre only.

   Some big organizations use the concept of a Central DIstribution Center to make the supply chain efficient. These Central Distribution Centers collect shipments from Suppliers, store them and then distribute them to other warehouses. This is a practice to achieve logistics efficiency and avoid sales loss.

8. One warehouse may have many employees but one employee may work in only one warehouse.

   Warehouses, as mentioned earlier, have numerous products and hence need many people to handle it. Even Though we have considered the organization to be the one having automatic inventory picking, there will be people who monitors it, manage the warehouse and other supporting departments

9. One inventory location will only have one product and all products have an inventory location

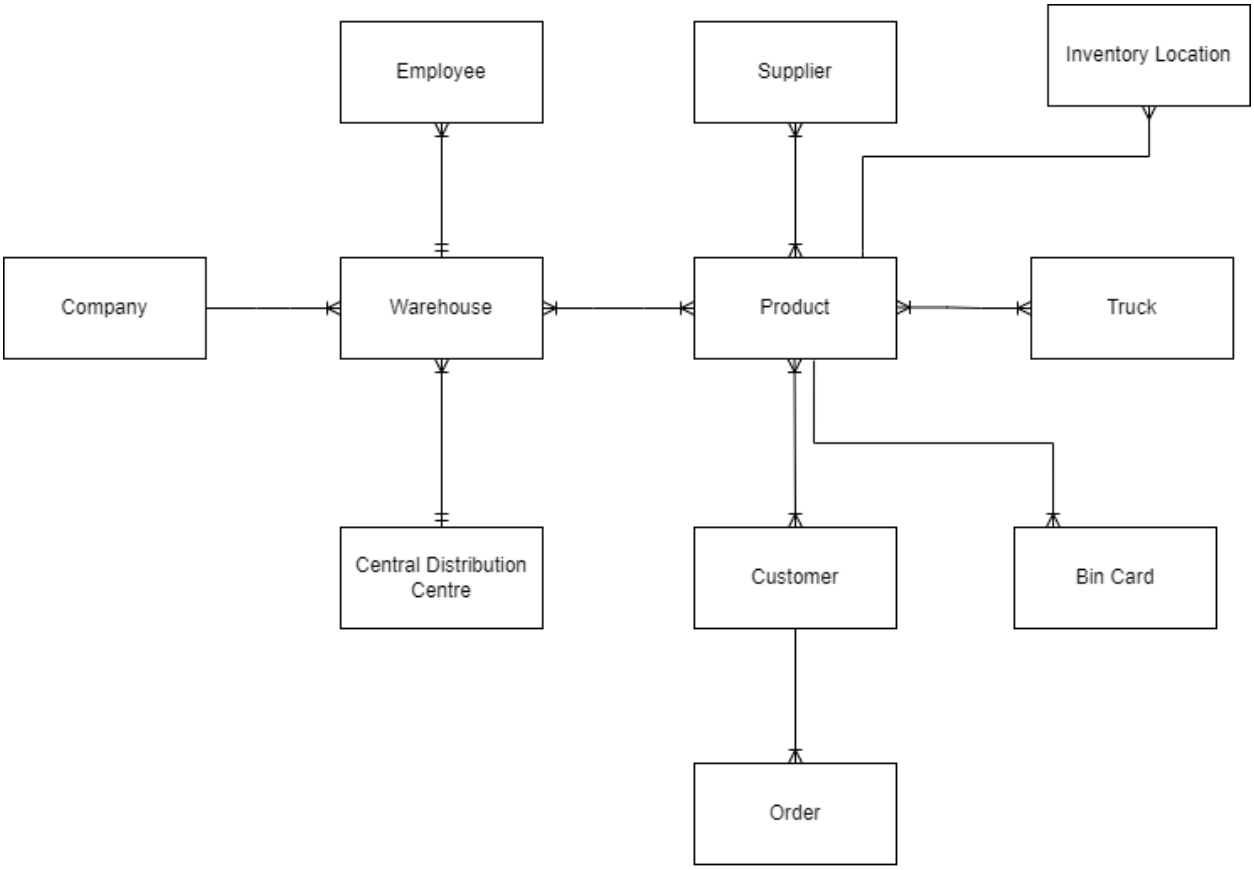
Since the automatic picking has been considered, inventory locations are always reserved to a product to ensure errorless and fast picking. A particular product will always be stored in one location.

10. One bin card can be assigned to one product but many products will have the same bin card.

Bin cards are tags used to be placed over lots to get a broad idea about the number of products and variety of products in it. In some industries they even use to refer to the purchase order number in it to identify the order against which it has been received. These tags are used for easy identification of stock, inventory counting and insurance purposes.

Entity Relationship Diagrams

Conceptual Entity Relationship Diagram



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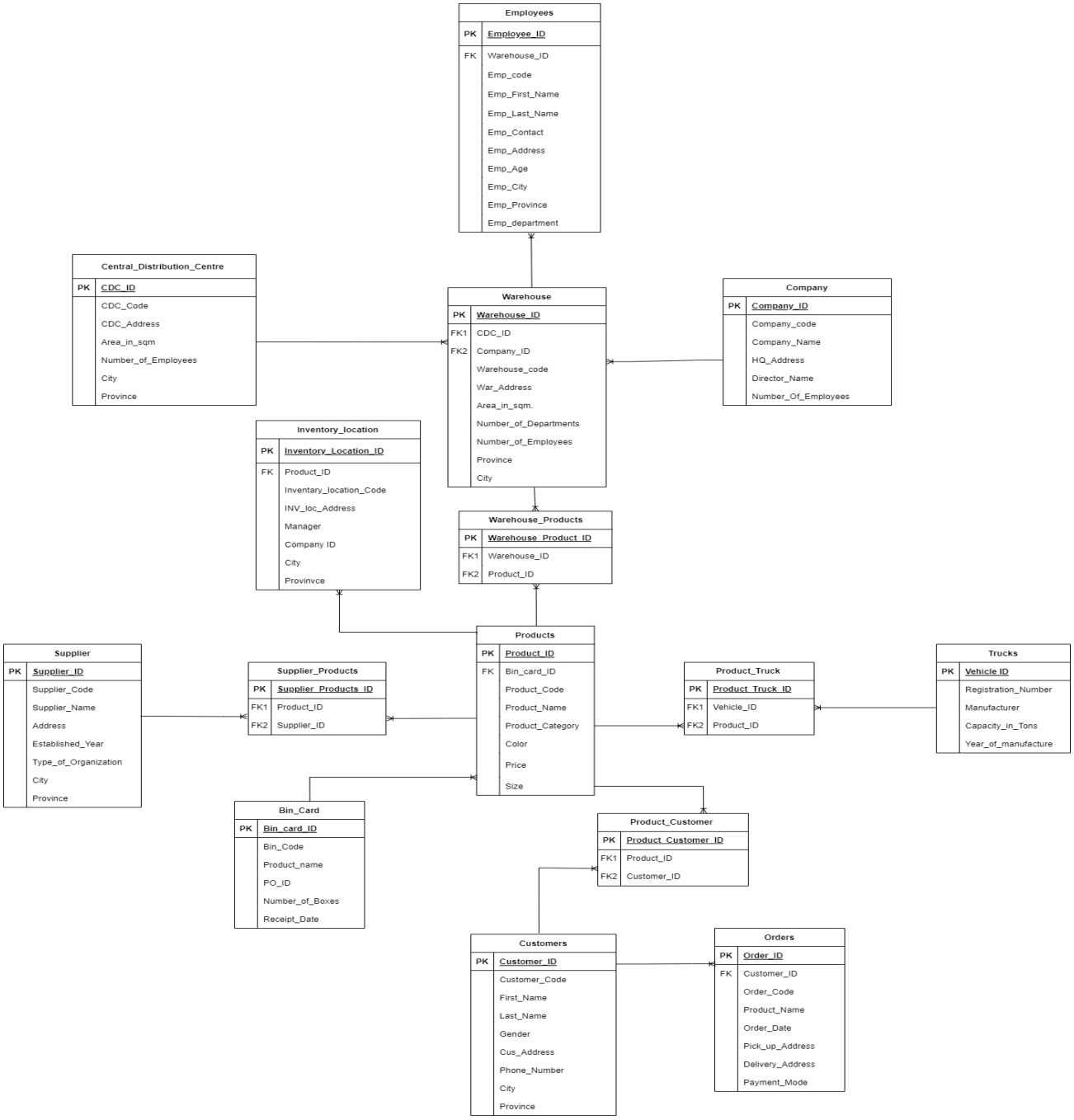
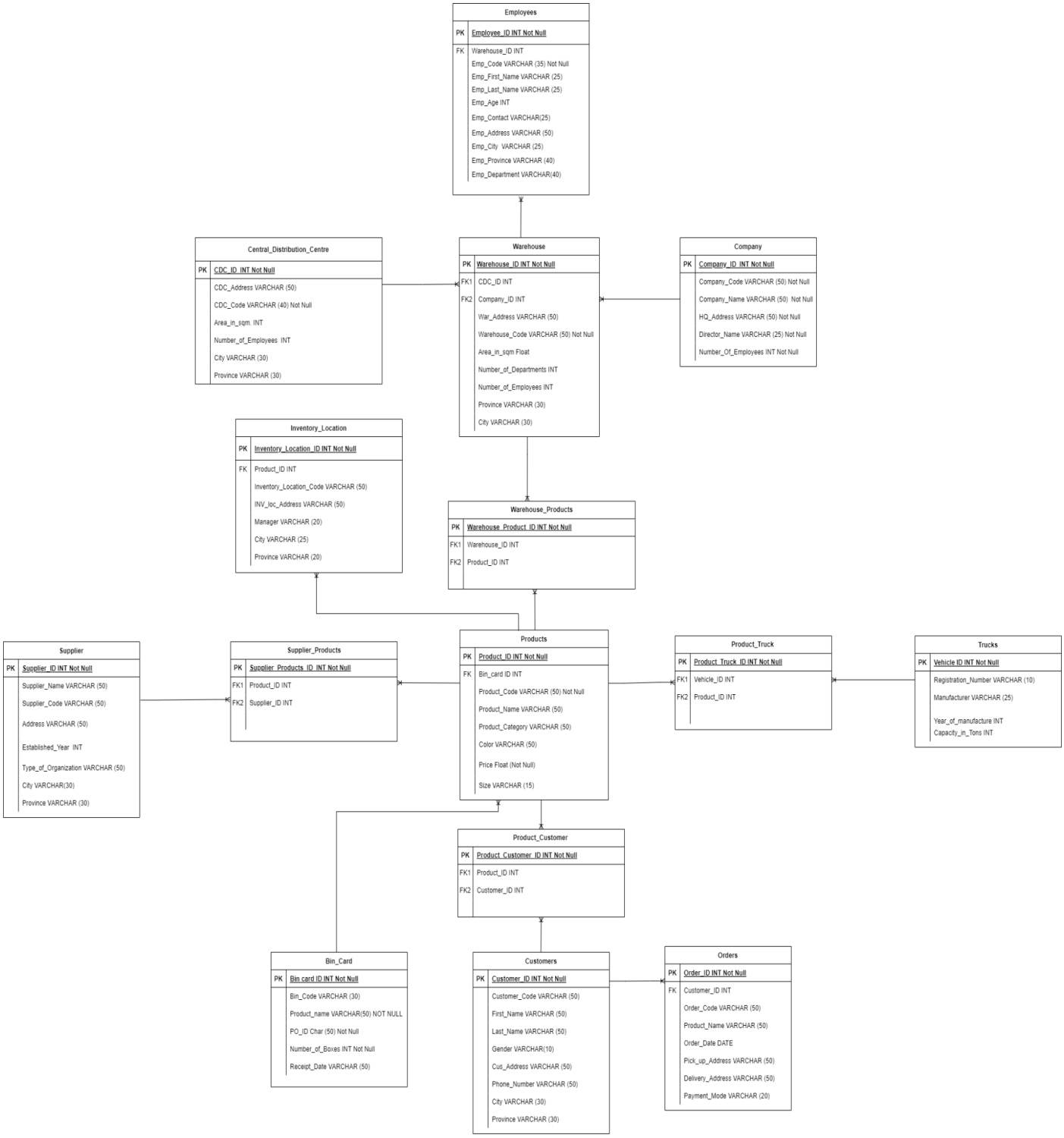
Logical Entity Relationship Diagram



Link:https://drive.google.com/file/d/1OEbSjoudNIFRWy0lW74sarr3zkPUfvFn/view?usp=sharing

Physical Entity Relationship Diagram



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SQL Server

(All queries are attached separately with submission)

Tables

Table1: Bin_card

n01597568-sqldemo...DB - dbo.Bin_Card | Populating_Tables_...DB (n01597568 (76))

Bin_card_ID	Bin_Code	PO_ID	Number_of_B...	Receipt_Date
1	BIN001	PO123 ...	50	2023-08-01
2	BIN002	PO124 ...	30	2023-08-02
3	BIN003	PO125 ...	25	2023-08-03
4	BIN004	PO126 ...	40	2023-08-04

Table2: Central_Distribution_Centre

n01597568-sqldemo....istribution_Centre | n01597568-sqldemo...DB - dbo.Bin_Card | Populating_Tables_...DB (n01597568 (76))

CDC_ID	CDC_Address	CDC_Code	Area_in_sqm	Number_of_E...	City	Province
1	123 Distribution...	CDC001	5000	50	Toronto	ON
2	456 Logistics St...	CDC002	7500	75	Vancouver	BC
3	789 Supply Lane	CDC003	6000	60	Montreal	QC
NULL	*NULL*	*NULL*	*NULL*	*NULL*	*NULL*	*NULL*

Table3: Company

n01597568-sqldem...DB - dbo.Company | n01597568-sqldemo....istribution_Centre | n01597568-sqldemo...D

Company_ID	Company_Code	Company_Na...	HQ_Address	Director_Name	Number_Of_E...
1	ABC	Acme Corporat...	123 Main Street...	John Doe	100
2	DEF	XYZ Company	456 Elm Street, ...	Jane Doe	200

Table 4: Customers

n01597568-sqldemo...B - dbo.Customers | n01597568-sqldem...DB - dbo.Company | n01597568-sqldemo....istribution_Centre | n01597568-sqldemo...DB - db

Customer_ID	Customer_Code	First_Name	Last_Name	Gender	Cus_Address	Phone_Number	City	Province
101	A111	David	Williams	Male	100 Main Street...	110-222-3333	Toronto	Ontario
102	B112	Erica	Smith	Female	200 Elm Street, ...	220-333-4444	Ottawa	Ontario
103	C113	Jason	Brown	Male	300 King Street,...	330-444-5555	Montreal	Quebec
104	D114	Sarah	Johnson	Female	400 Queen Stre...	440-555-6666	Vancouver	British Columbia
105	A221	Michael	Wilson	Male	500 Main Street...	550-666-7777	Toronto	Ontario
106	B222	Michelle	Jones	Female	600 Elm Street, ...	660-777-8888	Ottawa	Ontario
107	C223	Daniel	Brown	Male	700 King Street,...	770-888-9999	Montreal	Quebec
108	E221	Stephanie	Green	Female	800 Queen Stre...	880-999-0000	Vancouver	British Columbia
109	F222	Kevin	Adams	Male	900 Main Street...	990-000-1111	Toronto	Ontario
110	G223	Katherine	Cooper	Female	1000 Elm Street,...	1000-111-1111	Ottawa	Ontario
111	A331	Christopher	Williams	Male	1100 Main Stree...	1100-111-2222	Toronto	Ontario
112	B332	Ashley	Smith	Female	1200 Elm Street,...	1200-111-3333	Ottawa	Ontario
113	C333	Matthew	Brown	Male	1300 King Stree...	1300-111-4444	Montreal	Quebec
114	D334	Nicole	Johnson	Female	1400 Queen Str...	1400-111-5555	Vancouver	British Columbia

Table5: Employees

n01597568-sqldemo...nventory_Location | n01597568-sqldemo...B - dbo.Employees | n01597568-sqldemo...B - dbo.Customers

Inventory_Loc...	Inventory_Loc...	INV_loc_Address	Manager	City	Province	Product_ID
1	A1	100 Main Street...	John Doe	Toronto	Ontario	2
2	B2	200 Elm Street, ...	Jane Doe	Ottawa	Ontario	2
3	C3	300 King Street,...	Peter Smith	Montreal	Quebec	3
4	D4	400 Queen Stre...	Mary Johnson	Vancouver	British Columbia	4
5	A1	500 Main Street...	Mike Wilson	Toronto	Ontario	1
6	B2	600 Elm Street, ...	Sarah Jones	Ottawa	Ontario	2
7	C3	700 King Street,...	David Brown	Montreal	Quebec	3
8	D4	800 Queen Stre...	Emily Green	Vancouver	British Columbia	4

Table 6: Orders

n01597568-sqldemo...leDB - dbo.Orders | n01597568-sqldemo...nventory_Location | n01597568-sqldemo...B - dbo.Employees | n01597568-

Order_ID	Order_Code	Product_Name	Order_Date	Pick_up_Addre...	Delivery_Addr...	Payment_Mode	Customer_ID
1	A101	iPhone 14 Pro	2023-03-01	100 Main Street...	200 Elm Street, ...	Credit Card	101
2	B102	MacBook Pro M2	2023-03-02	300 King Street,...	400 Queen Stre...	Cash	101
3	C103	iPad Air 5th Gen	2023-03-03	500 Main Street...	600 Elm Street, ...	Debit Card	102
4	D104	Apple Watch Se...	2023-03-04	700 King Street,...	800 Queen Stre...	Paypal	103
5	A105	AirPods Pro	2023-03-05	900 Main Street...	1000 Elm Street,...	Credit Card	105
6	B106	Apple TV 4K	2023-03-06	1100 King Stree...	1200 Queen Str...	Cash	106
7	C107	Beats Fit Pro	2023-03-07	1300 Main Stree...	1400 Elm Street,...	Debit Card	107
8	D108	AirTag	2023-03-08	1500 King Stree...	1600 Queen Str...	Paypal	108
9	A109	Apple Magic Ke...	2023-03-09	1700 Main Stree...	1800 Elm Street,...	Credit Card	109
10	B110	Apple Magic M...	2023-03-10	1900 King Stree...	2000 Queen Str...	Cash	102
11	C111	Apple Magic Tr...	2023-03-11	2100 Main Stree...	2200 Elm Street,...	Debit Card	104
12	D112	Apple Pencil 3r...	2023-03-12	2300 King Stree...	2400 Queen Str...	Paypal	110
13	B114	AirTag Hermès	2023-03-14	2700 Main Stree...	2800 Elm Street,...	Cash	113
14	C115	Mac Studio	2023-03-15	2900 King Stree...	3000 Queen Str...	Debit Card	112
15	D116	Studio Display	2023-03-16	3100 Main Stree...	3200 Elm Street,...	Paypal	111
16	A117	iPhone 14 Pro ...	2023-03-17	3300 King Stree...	3400 Queen Str...	Credit Card	101
17	B118	iPad mini 6th G...	2023-03-18	3500 Main Stree...	3600 Elm Street,...	Cash	104
18	C119	Apple Watch SE	2023-03-19	3700 King Stree...	3800 Queen Str...	Debit Card	102
19	D120	Beats Solo3 Wir...	2023-03-20	3900 King Stree...	4000 Queen Str...	Paypal	114

Table 7: Product

n01597568-sqldemo...DB - dbo.Products | n01597568-sqldemo...dbo.Product_Truck | n01597568-sqldem....Product_Customer | n01597568-

Product_ID	Product_Code	Product_Name	Product_Categ...	Color	Price	Size	Bin_card_ID
1	A101	iPhone 14 Pro	Mobile Phone	Graphite	1099	6.1 inches	1
2	B102	MacBook Pro M2	Laptop	Silver	1299	13.3 inches	2
3	C103	iPad Air 5th Gen	Tablet	Space Gray	599	10.2 inches	3
4	D104	Apple Watch Se...	Smartwatch	Midnight	399	41mm	4
5	A105	AirPods Pro	Wireless Earbuds	White	249	One size fits all	1
6	B106	Apple TV 4K	Streaming Device	Black	179	4K	2
7	C107	Beats Fit Pro	Wireless Earbuds	White	199	One size fits all	3
8	D108	AirTag	Bluetooth Tracker	Silver	29	One size fits all	4
9	A109	Apple Magic Ke...	Keyboard	Silver	99	Full-size	1
10	B110	Apple Magic M...	Mouse	Silver	79	One size fits all	2
11	C111	Apple Magic Tr...	Trackpad	Silver	129	One size fits all	3
12	D112	Apple Pencil 3r...	Stylus	White	129	One size fits all	4
13	A113	AirPods Max	Over-ear Head...	Silver	549	One size fits all	1
14	B114	AirTag Hermès	Bluetooth Tracker	Gold	349	One size fits all	2
15	C115	Mac Studio	Desktop Comp...	Silver	1999	Tower	3
16	D116	Studio Display	Monitor	Silver	1599	27 inches	4
17	A117	iPhone 14 Pro ...	Mobile Phone	Gold	1199	6.7 inches	1
18	B118	iPad mini 6th G...	Tablet	Pink	499	8.3 inches	2
19	C119	Apple Watch SE	Smartwatch	Starlight	279	40mm	3

Table 8: Supplier

n01597568-sqldemo...eDB - dbo.Supplier | n01597568-sqldemo...DB - dbo.Products | n01597568-sqldemo...dbo.Product_Truck | n01597568-sc

Supplier_ID	Supplier_Name	Supplier_Code	Sup_Address	Established_Year	Type_of_Organ...	City	Province
1	TechCan Soluti...	TECHCAN001	123 Maple Street	2005	Corporation	Toronto	ON
2	Vancouver Elect...	VANELEC002	456 Oak Avenue	2010	LLC	Vancouver	BC
3	Montreal Innov...	MONTINNOV003	789 Elm Road	2008	Partnership	Montreal	QC
4	Calgary Gadgets	CALGADGET004	321 Pine Lane	2015	Sole Proprietors...	Calgary	AB

Table 9: Warehouse

n01597568-sqldem...B - dbo.Warehouse | n01597568-sqldemo...pleDB - dbo.Truck | n01597568-sqldemo....Supplier_Products | n01597568-sqldemo...eDB - dbo.

Warehouse_ID	War_Address	Area_in_sqm	Number_of_D...	Number_of_E...	Province	City	CDC_ID	Company_ID
1	123 Main Street...	10000	4	100	Ontario	Toronto	1	1
2	456 Elm Street, ...	8000	3	50	Ontario	Ottawa	2	1
3	789 King Street,...	6000	2	30	Quebec	Montreal	3	1
4	1010 Queen Str...	5000	1	20	British Columbia	Vancouver	1	2

Table 10: Truck

n01597568-sqldemo...pleDB - dbo.Truck | n01597568-sqldemo....Supplier_Products | n0159

Vehicle_ID	Registration_N...	Manufacturer	Year_of_manuf...	Capacity_in_To...
1	ABC123	Ford	2020	5
2	XYZ456	Chevrolet	2018	7
3	LMN789	Toyota	2019	4
4	PQR123	Nissan	2021	6
5	MNO456	Dodge	2017	8
6	JKL789	Volvo	2022	10
7	DEF123	Mercedes-Benz	2020	9
8	GHI456	Isuzu	2019	3
9	STU789	Mitsubishi	2018	7
10	VWX123	Kenworth	2021	6

Table 11: Inventory_Location

n01597568-sqldemo...nventory_Location | Creating Table Back...B (n01597568 (112)) | Constraints foriegn...B (n01597568 (113))

Inventory_Loc...	Inventory_Loc...	INV_loc_Address	Manager	City	Province	Product_ID
1	A1	100 Main Street...	John Doe	Toronto	Ontario	2
2	B2	200 Elm Street, ...	Jane Doe	Ottawa	Ontario	2
3	C3	300 King Street,...	Peter Smith	Montreal	Quebec	3
4	D4	400 Queen Stre...	Mary Johnson	Vancouver	British Columbia	4
5	A1	500 Main Street...	Mike Wilson	Toronto	Ontario	1
6	B2	600 Elm Street, ...	Sarah Jones	Ottawa	Ontario	2
7	C3	700 King Street,...	David Brown	Montreal	Quebec	3
8	D4	800 Queen Stre...	Emily Green	Vancouver	British Columbia	4

Intermediate Tables

Table 12: Warehouse_Products

n01597568-sqldemo...dbo.Product_Truck

Product_Truck...	Vehicle_ID	Product_ID
1	5	3
2	2	12
3	8	18
4	4	2
5	1	10
6	6	15
7	3	7
8	10	19
9	9	9
10	7	1
11	5	6
12	2	13
13	8	16
14	4	14
15	1	5
16	6	17
17	3	8
18	10	4
19	9	11

Table 13: Supplier_Products

n01597568-sqldemo....Supplier_Products

Supplier_Prod...	Supplier_ID	Product_ID
1	3	5
2	1	12
3	4	18
4	2	2
5	1	10
6	3	15
7	2	7
8	4	19
9	1	9
10	3	1
11	2	6
12	4	13
13	1	8
14	3	3
15	2	16
16	4	14
17	1	4
18	3	11
19	2	17

Table 14: Warehouse_Products

n01597568-sqldemo...arehouse_Products | n01597568-sqld

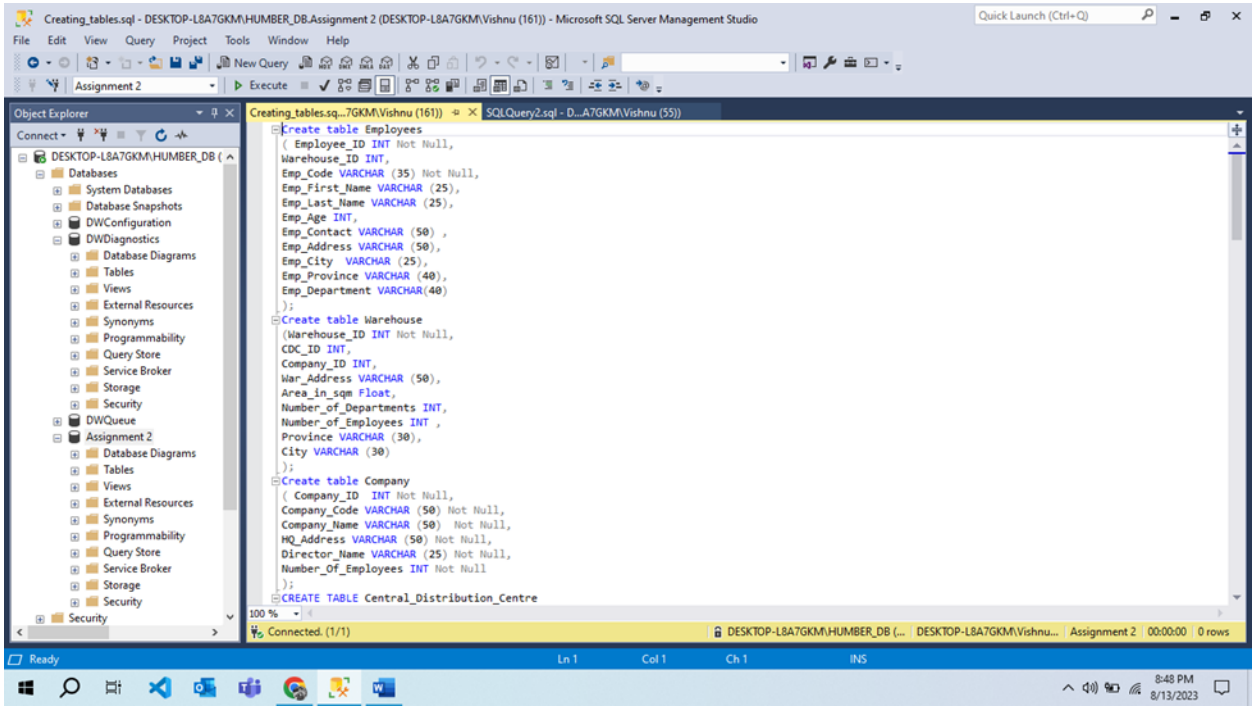
Warehouse_Pr...	Warehouse_ID	Product_ID
1	2	18
2	3	5
3	4	3
4	1	14
5	3	19
6	2	6
7	1	2
8	4	17
9	2	11
10	3	8
11	1	1
12	4	15
13	2	13
14	3	12
15	1	16
16	4	10
17	2	9
18	3	7
19	1	4

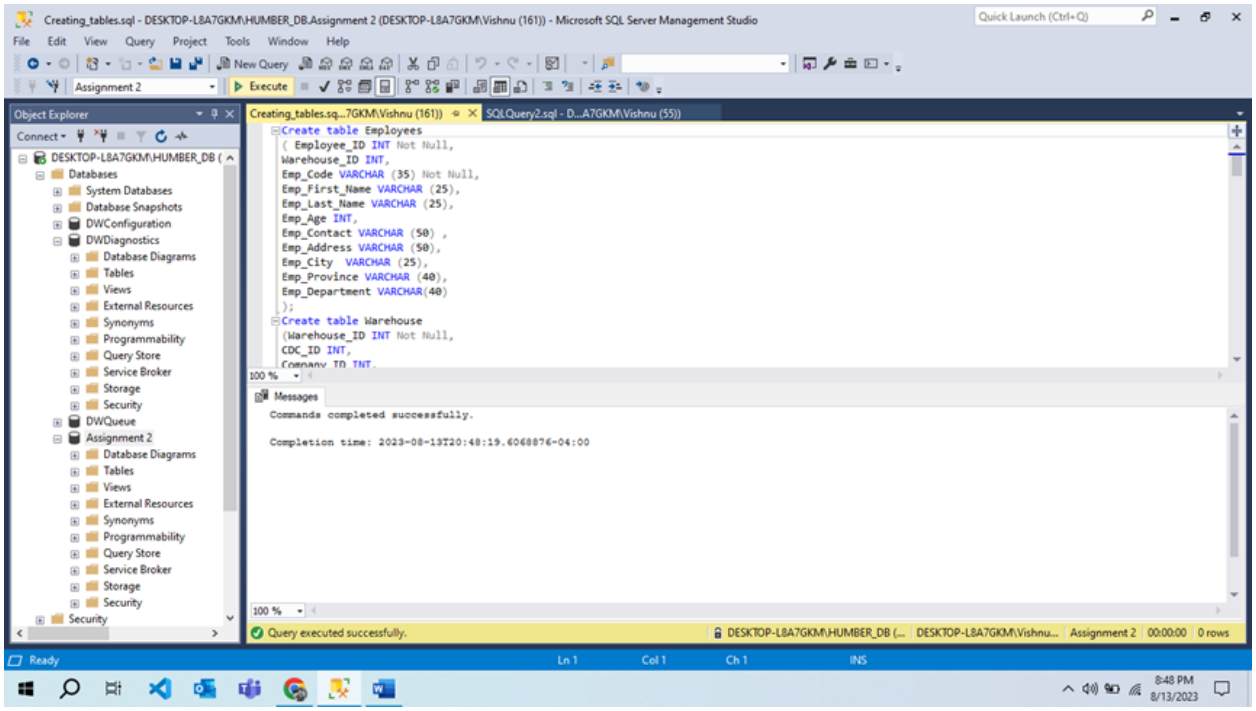
Table 15: Product_Customer

n01597568-sqldem....Product_Customer | n01597568-sqlde

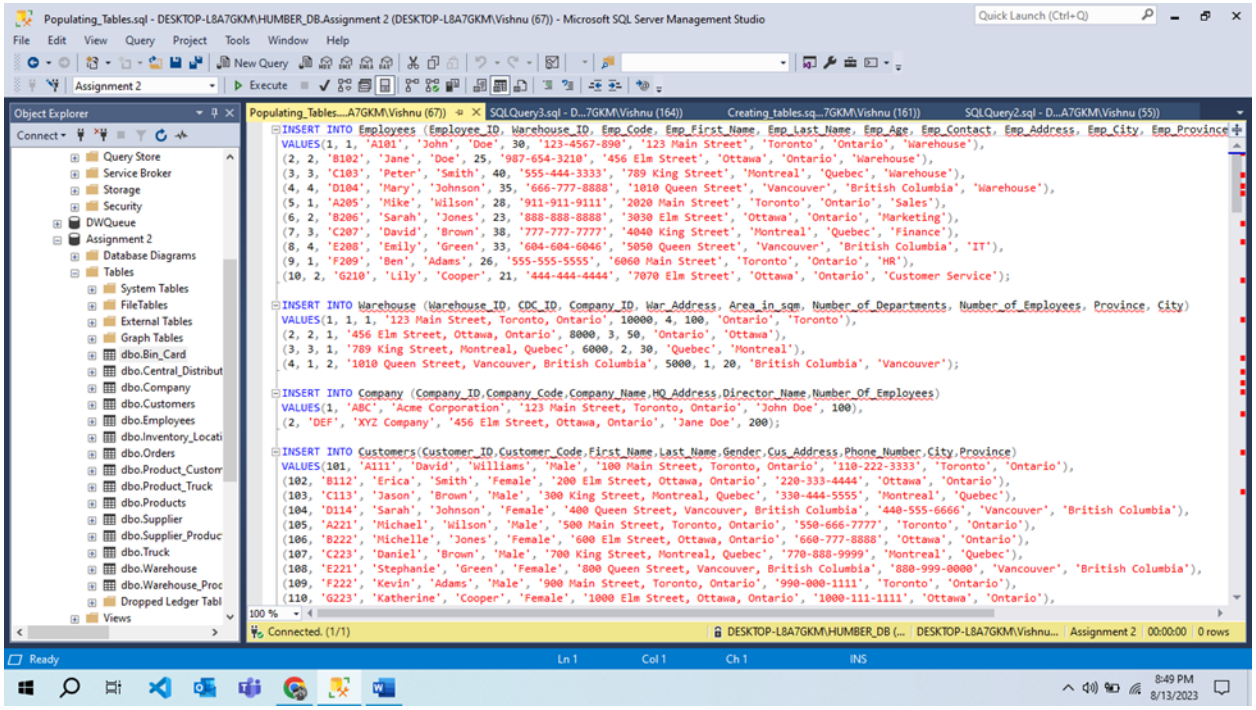
Product_Custo...	Customer_ID	Product_ID
1	101	1
2	101	2
3	102	3
4	103	4
5	105	5
6	106	6
7	107	7
8	108	8
9	109	9
10	102	10
11	104	11
12	110	12
13	113	13
14	112	14
15	111	15
16	101	16
17	104	17
18	102	18
19	114	19

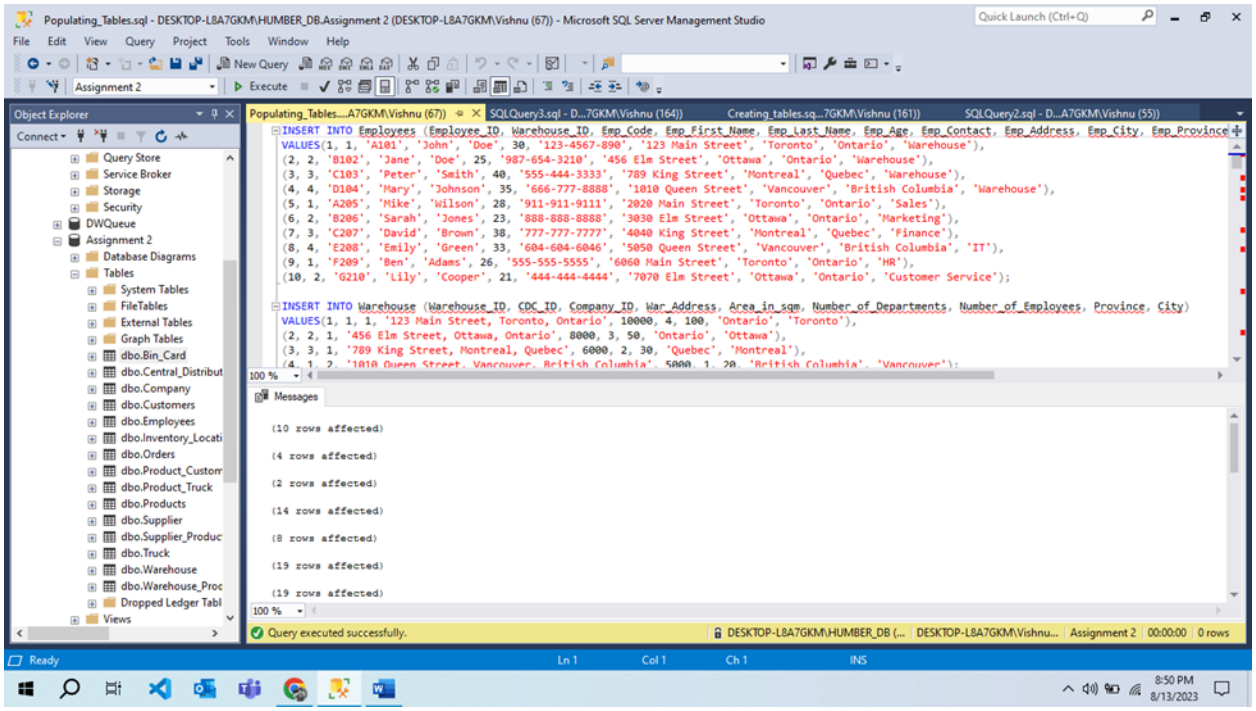
Creating Tables





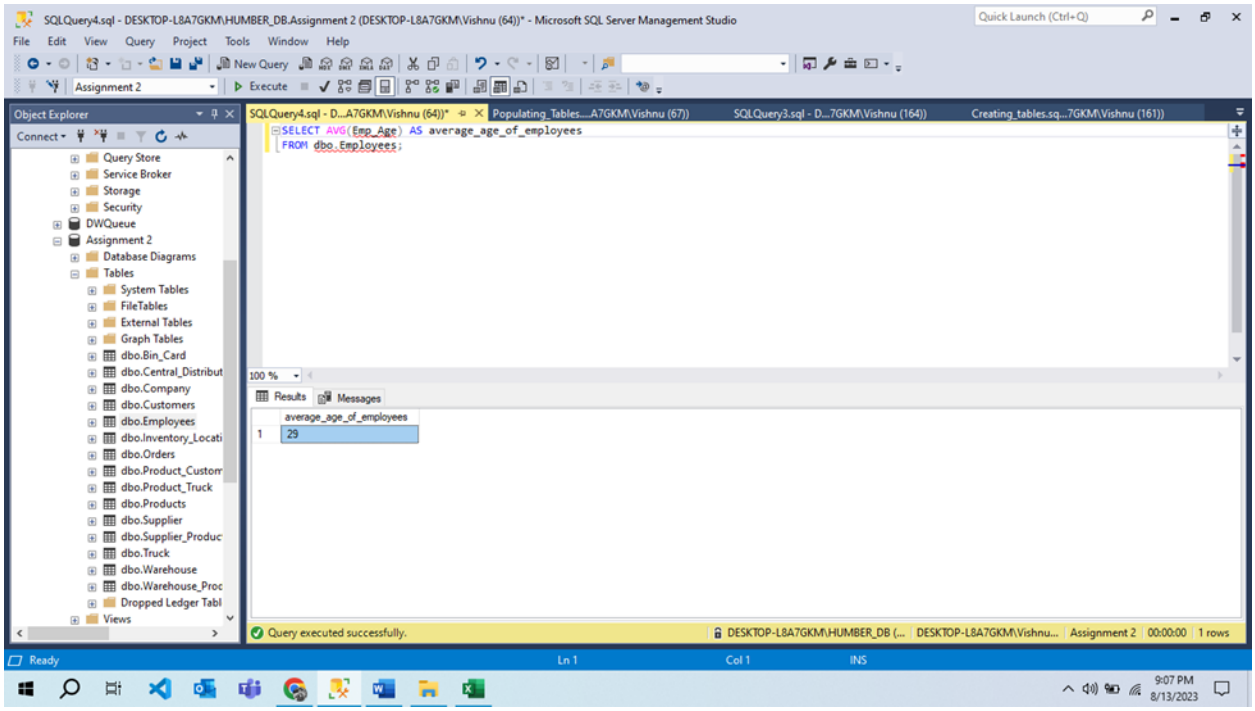
Inserting Data Into Tables



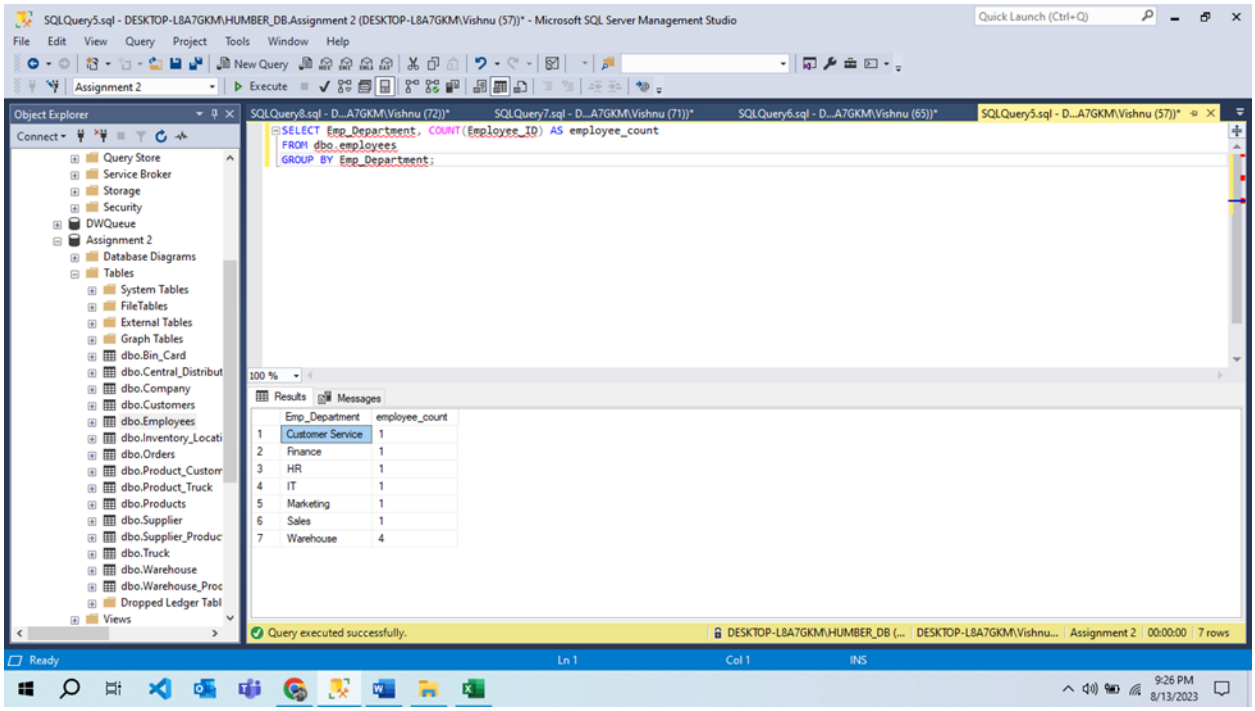


Meaningful Analytical Findings

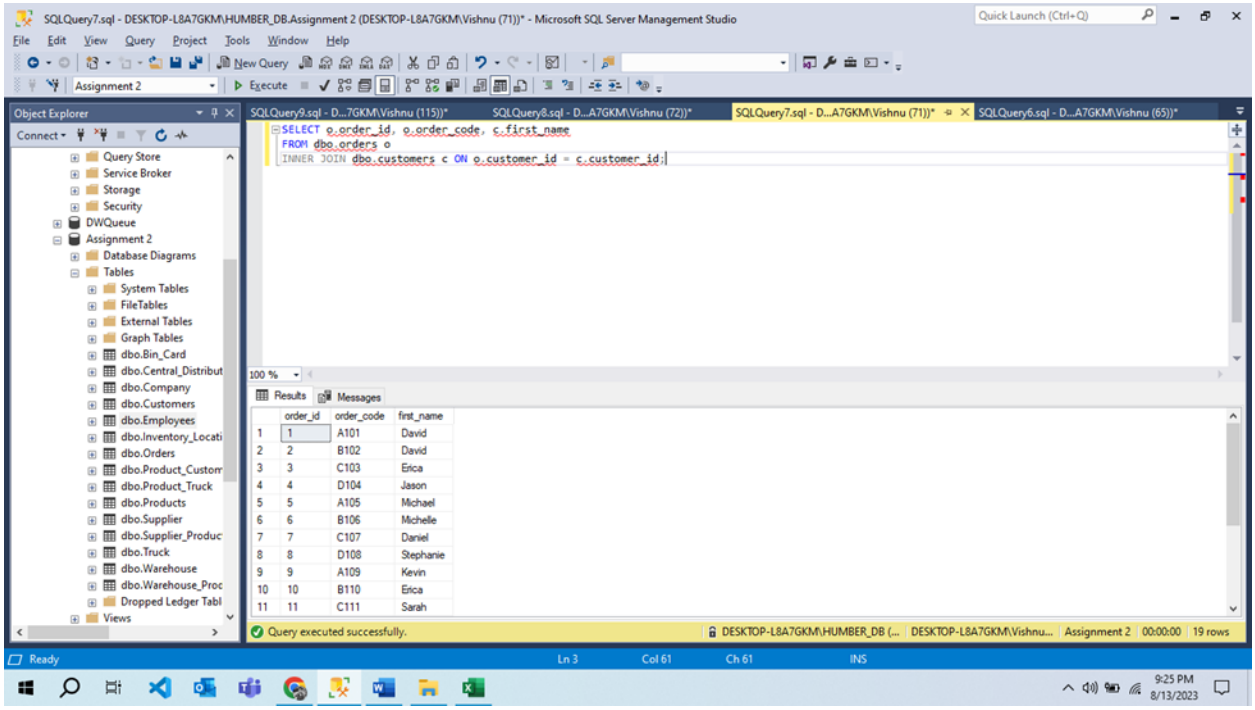
1. Average Age of Employees



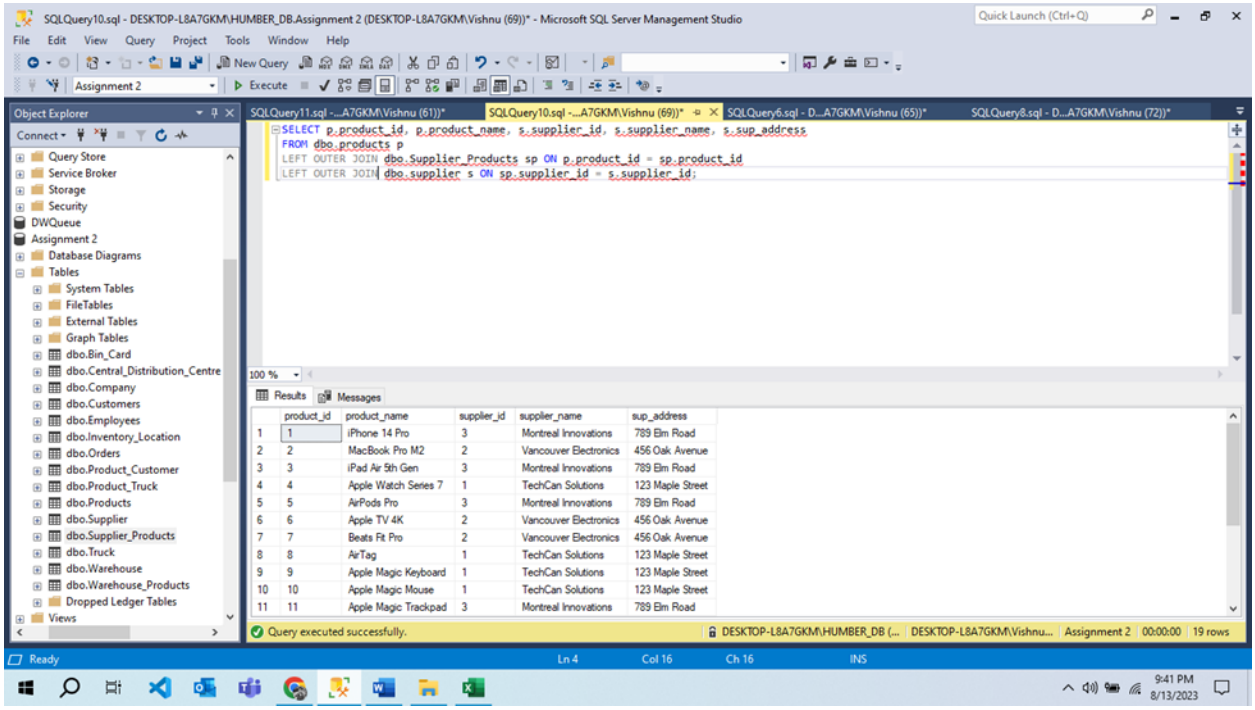
2. Number of employees per department



3. **Retrieve Order Details with Customer Information**



4. **Retrieve Products and Their Associated Suppliers**



MongoDB-NoSQl

(Word file containing mongo query attached separately in submission)

Collections

Supplychaindb Server view

Customers

Storage size:	Documents:	Avg. document size:	Indexes:	Total index size:
20.48 kB	5	203.00 B	1	36.86 kB

Employees

Storage size:	Documents:	Avg. document size:	Indexes:	Total index size:
4.10 kB	5	258.00 B	1	4.10 kB

products

Storage size:	Documents:	Avg. document size:	Indexes:	Total index size:
4.10 kB	5	171.00 B	1	4.10 kB

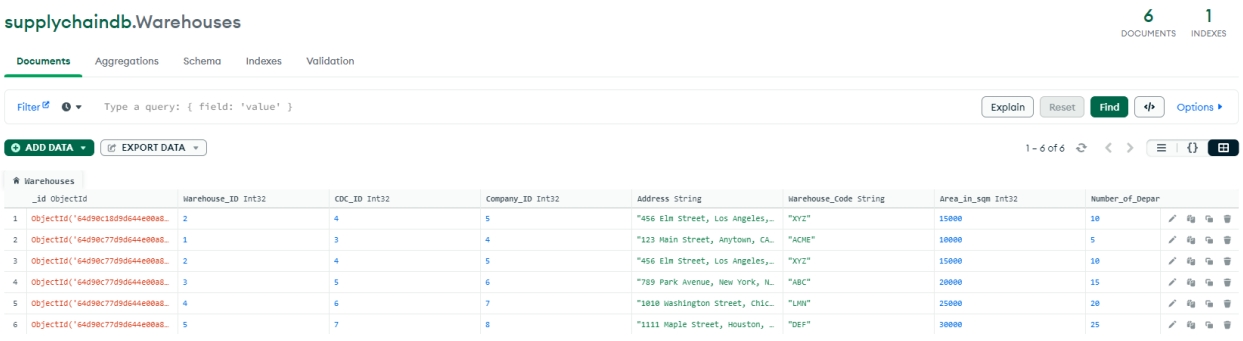
suppliers

Storage size:	Documents:	Avg. document size:	Indexes:	Total index size:
4.10 kB	5	238.00 B	1	4.10 kB

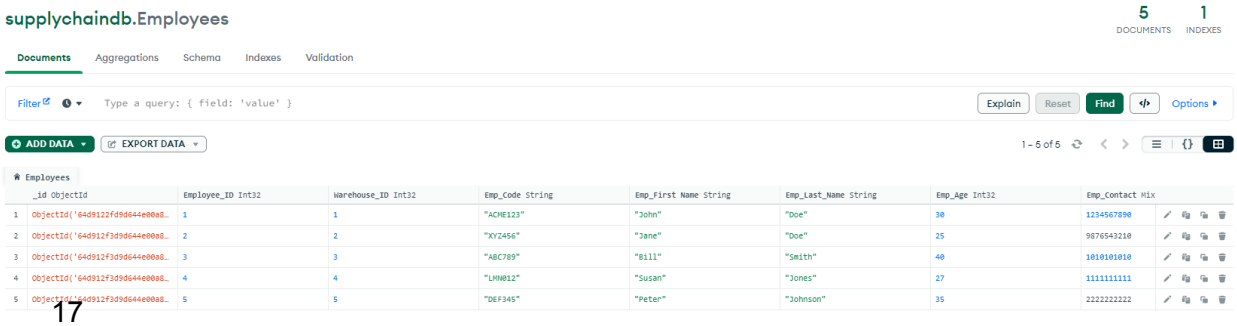
Warehouses

Storage size:	Documents:	Avg. document size:	Indexes:	Total index size:
4.10 kB	6	248.00 B	1	4.10 kB

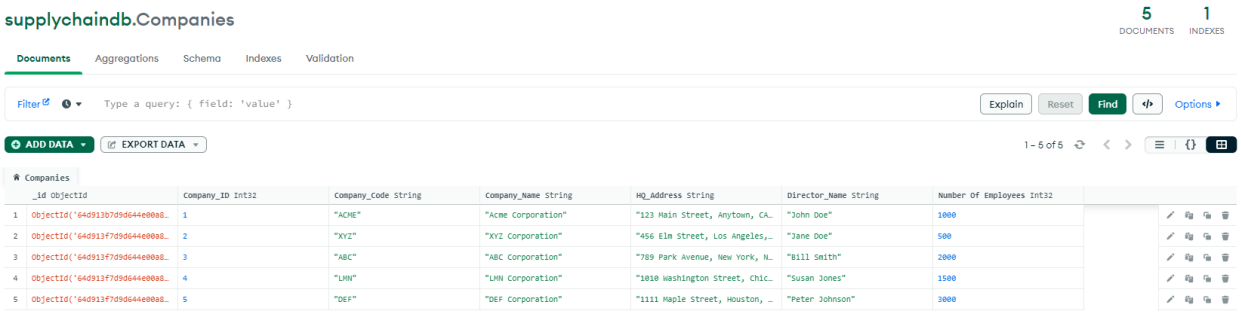
1. Warehouse Collection



2. Employees Collection



3. Companies Collection



supplychaindb.Companies

5 DOCUMENTS 1 INDEXES

Documents | Aggregations | Schema | Indexes | Validation

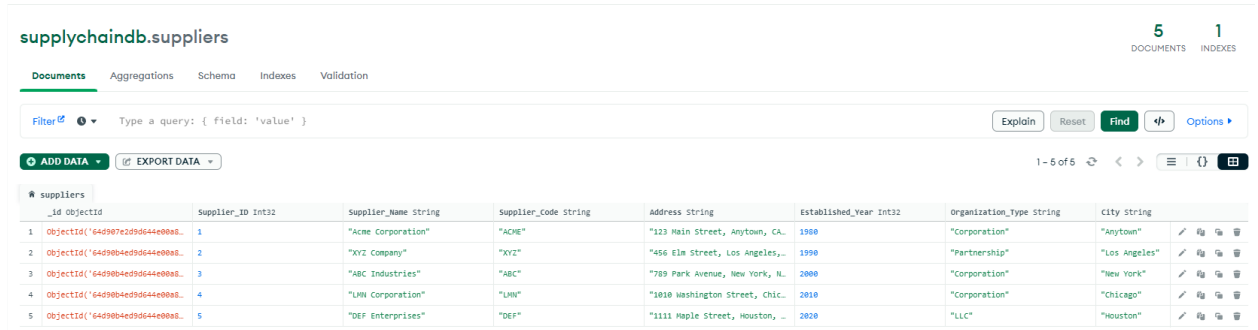
Filter | Type a query: { field: 'value' } | Explain | Reset | Find | Options

ADD DATA | EXPORT DATA | 1 - 5 of 5

Companies

	_id ObjectId	Company_ID Int32	Company_Code String	Company_Name String	HQ_Address String	Director_Name String	Number Of Employees Int32
1	ObjectId('64d913b7d9d644e00a8…	1	"ACME"	"Acme Corporation"	"123 Main Street, Anytown, CA…	"John Doe"	1000
2	ObjectId('64d913f7d9d644e00a8…	2	"XYZ"	"XYZ Corporation"	"456 Elm Street, Los Angeles,…	"Jane Doe"	500
3	ObjectId('64d913f7d9d644e00a8…	3	"ABC"	"ABC Corporation"	"789 Park Avenue, New York, N…	"Bill Smith"	2000
4	ObjectId('64d913f7d9d644e00a8…	4	"LMN"	"LMN Corporation"	"1010 Washington Street, Chic…	"Susan Jones"	1500
5	ObjectId('64d913f7d9d644e00a8…	5	"DEF"	"DEF Corporation"	"1111 Maple Street, Houston, …	"Peter Johnson"	3000

4. Suppliers Collection



supplychaindb.suppliers

5 DOCUMENTS 1 INDEXES

Documents | Aggregations | Schema | Indexes | Validation

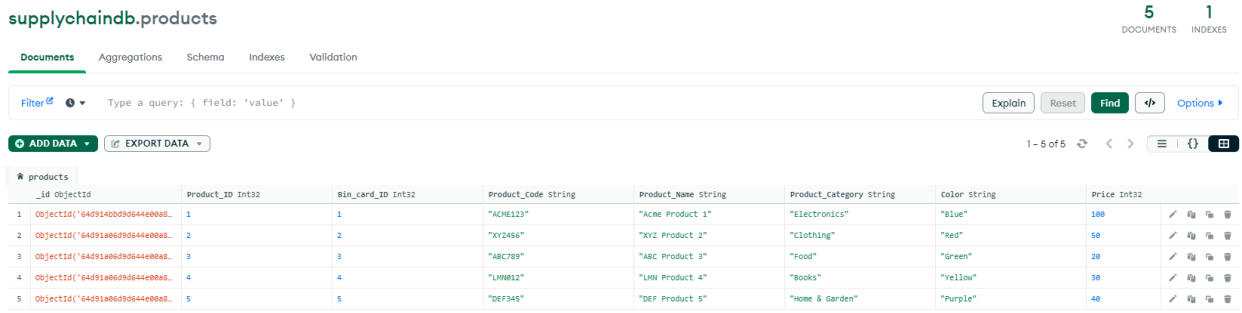
Filter | Type a query: { field: 'value' } | Explain | Reset | Find | Options

ADD DATA | EXPORT DATA | 1 - 5 of 5

suppliers

	_id ObjectId	Supplier_ID Int32	Supplier_Name String	Supplier_Code String	Address String	Established_Year Int32	Organization_Type String	City String
1	ObjectId('64d907e2d9d644e00a8…	1	"Acme Corporation"	"ACME"	"123 Main Street, Anytown, CA…	1980	"Corporation"	"Anytown"
2	ObjectId('64d90b4ed9d644e00a8…	2	"XYZ Company"	"XYZ"	"456 Elm Street, Los Angeles,…	1990	"Partnership"	"Los Angeles"
3	ObjectId('64d90b4ed9d644e00a8…	3	"ABC Industries"	"ABC"	"789 Park Avenue, New York, N…	2000	"Corporation"	"New York"
4	ObjectId('64d90b4ed9d644e00a8…	4	"LMN Corporation"	"LMN"	"1010 Washington Street, Chic…	2010	"Corporation"	"Chicago"
5	ObjectId('64d90b4ed9d644e00a8…	5	"DEF Enterprises"	"DEF"	"1111 Maple Street, Houston, …	2020	"LLC"	"Houston"

5. Products Collection



supplychaindb.products

5 DOCUMENTS 1 INDEXES

Documents | Aggregations | Schema | Indexes | Validation

Filter | Type a query: { field: 'value' } | Explain | Reset | Find | Options

ADD DATA | EXPORT DATA | 1 - 5 of 5

products

	_id ObjectId	Product_ID Int32	Bin_card_ID Int32	Product_Code String	Product_Name String	Product_Category String	Color String	Price Int32
1	ObjectId('64d914bbd9d644e00a8…	1	1	"ACME123"	"Acme Product 1"	"Electronics"	"Blue"	100
2	ObjectId('64d91a06d9d644e00a8…	2	2	"XYZ456"	"XYZ Product 2"	"Clothing"	"Red"	50
3	ObjectId('64d91a06d9d644e00a8…	3	3	"ABC789"	"ABC Product 3"	"Food"	"Green"	20
4	ObjectId('64d91a06d9d644e00a8…	4	4	"LMN012"	"LMN Product 4"	"Books"	"Yellow"	30
5	ObjectId('64d91a06d9d644e00a8…	5	5	"DEF345"	"DEF Product 5"	"Home & Garden"	"Purple"	40

Inspecting Collections in MongoDB

1. **Using find to get all the warehouses with a number of employees greater than 1000.**

```
> db.Companies.find({"Number Of Employees":{$gt:1000}})
< {
    _id: ObjectId("64d913f7d9d644e00a815c15"),
    Company_ID: 3,
    Company_Code: 'ABC',
    Company_Name: 'ABC Corporation',
    HQ_Address: '789 Park Avenue, New York, NY 10021',
    Director_Name: 'Bill Smith',
    'Number Of Employees': 2000
  }
  {
    _id: ObjectId("64d913f7d9d644e00a815c16"),
    Company_ID: 4,
    Company_Code: 'LMN',
    Company_Name: 'LMN Corporation',
    HQ_Address: '1010 Washington Street, Chicago, IL 60602',
    Director_Name: 'Susan Jones',
    'Number Of Employees': 1500
  }
  {
    _id: ObjectId("64d913f7d9d644e00a815c17"),
    Company_ID: 5,
    Company_Code: 'DEF',
    Company_Name: 'DEF Corporation',
    HQ_Address: '1111 Maple Street, Houston, TX 77002',
    Director_Name: 'Peter Johnson',
    'Number Of Employees': 3000
  }
supplychaindb>
```

2. Using find to get the suppliers from Houston.

```
>_MONGOSH
> db.suppliers.find({"City": "Houston"})
< {
    _id: ObjectId("64d90b4ed9d644e00a815c07"),
    Supplier_ID: 5,
    Supplier_Name: 'DEF Enterprises',
    Supplier_Code: 'DEF',
    Address: '1111 Maple Street, Houston, TX 77002',
    Established_Year: 2020,
    Organization_Type: 'LLC',
    City: 'Houston',
    Province: 'TX'
  }
supplychaindb>
```

3. Using projection to get only the names of the products whose prices are greater than 30.

```
> db.products.find({"Price":{$gte:30}},{ "Product_Name": 1,_id:0})
< {
    Product_Name: 'Acme Product 1'
  }
  {
    Product_Name: 'XYZ Product 2'
  }
  {
    Product_Name: 'LMN Product 4'
  }
  {
    Product_Name: 'DEF Product 5'
  }
supplychaindb>
```

4. Using find to get the employees whose ages are less than 30.

```
> db.Employees.find({"Emp_Age":{$lt:30}})
< {
    _id: ObjectId("64d912f3d9d644e00a815c0f"),
    Employee_ID: 2,
    Warehouse_ID: 2,
    Emp_Code: 'XYZ456',
    'Emp_First Name': 'Jane',
    Emp_Last_Name: 'Doe',
    Emp_Age: 25,
    Emp_Contact: 9876543210,
    Emp_Address: '456 Elm Street, Los Angeles, CA 90001',
    Emp_City: 'Los Angeles',
    Emp_Province: 'CA'
  }
  {
    _id: ObjectId("64d912f3d9d644e00a815c11"),
    Employee_ID: 4,
    Warehouse_ID: 4,
    Emp_Code: 'LMN012',
    'Emp_First Name': 'Susan',
    Emp_Last_Name: 'Jones',
    Emp_Age: 27,
    Emp_Contact: 1111111111,
    Emp_Address: '1010 Washington Street, Chicago, IL 60602',
    Emp_City: 'Chicago',
    Emp_Province: 'IL'
  }
supplychaindb>
```

5.Using find to get the warehouses with area greater than 15000 sqm and has a number of employees greater than 350 (using ‘and’ logical operator)

```
> db.Warehouses.find({$and:[{"Area_in_sqm":{$gt:15000}},{"Number_of_Employees":{$gt:350}}]})
< {
    _id: ObjectId("64d90c77d9d644e00a815c0c"),
    Warehouse_ID: 4,
    CDC_ID: 6,
    Company_ID: 7,
    Address: '1010 Washington Street, Chicago, IL 60602',
    Warehouse_Code: 'LMN',
    Area_in_sqm: 25000,
    Number_of_Departments: 20,
    Number_of_Employees: 400,
    Province: 'IL',
    City: 'Chicago'
  }
  {
    _id: ObjectId("64d90c77d9d644e00a815c0d"),
    Warehouse_ID: 5,
    CDC_ID: 7,
    Company_ID: 8,
    Address: '1111 Maple Street, Houston, TX 77002',
    Warehouse_Code: 'DEF',
    Area_in_sqm: 30000,
    Number_of_Departments: 25,
    Number_of_Employees: 500,
    Province: 'TX',
    City: 'Houston'
  }
supplychaindb>
```

Creating Collections in MongoDB

```
>_MONGOSH

> db.Employees.insertMany([
    {
      "Employee_ID": 2,
      "Warehouse_ID": 2,
      "Emp_Code": "XYZ456",
      "Emp_First Name": "Jane",
      "Emp_Last_Name": "Doe",
      "Emp_Age": 25,
      "Emp_Contact": 9876543210,
      "Emp_Address": "456 Elm Street, Los Angeles, CA 90001",
      "Emp_City": "Los Angeles",
      "Emp_Province": "CA"
    },
    {
      "Employee_ID": 3,
      "Warehouse_ID": 3,
      "Emp_Code": "ABC789",
      "Emp_First Name": "Bill",
      "Emp_Last_Name": "Smith",
      "Emp_Age": 40,
      "Emp_Contact": 1010101010,
      "Emp_Address": "789 Park Avenue, New York, NY 10021",
      "Emp_City": "New York",
      "Emp_Province": "NY"
    },
```

```
>_MONGOSH

    {
      "Employee_ID": 4,
      "Warehouse_ID": 4,
      "Emp_Code": "LMN012",
      "Emp_First Name": "Susan",
      "Emp_Last_Name": "Jones",
      "Emp_Age": 27,
      "Emp_Contact": 1111111111,
      "Emp_Address": "1010 Washington Street, Chicago, IL 60602",
      "Emp_City": "Chicago",
      "Emp_Province": "IL"
    },
    {
      "Employee_ID": 5,
      "Warehouse_ID": 5,
      "Emp_Code": "DEF345",
      "Emp_First Name": "Peter",
      "Emp_Last_Name": "Johnson",
      "Emp_Age": 35,
      "Emp_Contact": 2222222222,
      "Emp_Address": "1111 Maple Street, Houston, TX 77002",
      "Emp_City": "Houston",
      "Emp_Province": "TX"
    }
  ])
< {
    acknowledged: true,
    insertedIds: {
      '0': ObjectId("64db6b5ae96f78bbb19eb813"),
      '1': ObjectId("64db6b5ae96f78bbb19eb814"),
      '2': ObjectId("64db6b5ae96f78bbb19eb815"),
      '3': ObjectId("64db6b5ae96f78bbb19eb816")
    }
  }
supplychaindb>
```

```
> db.Products.insertMany([

    {
      "Product_ID": 2,
      "Bin_card_ID": 2,
      "Product_Code": "XYZ456",
      "Product_Name": "XYZ Product 2",
      "Product_Category": "Clothing",
      "Color": "Red",
      "Price": 50.00
    },
    {
      "Product_ID": 3,
      "Bin_card_ID": 3,
      "Product_Code": "ABC789",
      "Product_Name": "ABC Product 3",
      "Product_Category": "Food",
      "Color": "Green",
      "Price": 20.00
    },
    {
      "Product_ID": 4,
      "Bin_card_ID": 4,
      "Product_Code": "LMN012",
      "Product_Name": "LMN Product 4",
      "Product_Category": "Books",
      "Color": "Yellow",
      "Price": 30.00
    },
    {
      "Product_ID": 5,
      "Bin_card_ID": 5,
      "Product_Code": "DEF345",
      "Product_Name": "DEF Product 5",
      "Product_Category": "Home & Garden",
      "Color": "Purple",
      "Price": 40.00
    }
  ])
< {
    acknowledged: true,
    insertedIds: {
      '0': ObjectId("64db676ae96f78bbb19eb805"),
      '1': ObjectId("64db676ae96f78bbb19eb806"),
      '2': ObjectId("64db676ae96f78bbb19eb807"),
      '3': ObjectId("64db676ae96f78bbb19eb808")
    }
  }
```

```
> db.Suppliers.insertMany([

  {
    "Supplier_ID": 2,
    "Supplier_Name": "XYZ Company",
    "Supplier_Code": "XYZ",
    "Address": "456 Elm Street, Los Angeles, CA 90001",
    "Established_Year": 1990,
    "Organization_Type": "Partnership",
    "City": "Los Angeles",
    "Province": "CA"
  },
  {
    "Supplier_ID": 3,
    "Supplier_Name": "ABC Industries",
    "Supplier_Code": "ABC",
    "Address": "789 Park Avenue, New York, NY 10021",
    "Established_Year": 2000,
    "Organization_Type": "Corporation",
    "City": "New York",
    "Province": "NY"
  },
  {
    "Supplier_ID": 4,
    "Supplier_Name": "LMN Corporation",
    "Supplier_Code": "LMN",
    "Address": "1010 Washington Street, Chicago, IL 60602"
    "Established_Year": 2010,
    "Organization_Type": "Corporation",
    "City": "Chicago",
    "Province": "IL"
  },
  {
    "Supplier_ID": 5,
    "Supplier_Name": "DEF Enterprises",
    "Supplier_Code": "DEF",
    "Address": "1111 Maple Street, Houston, TX 77002",
    "Established_Year": 2020,
    "Organization_Type": "LLC",
    "City": "Houston",
    "Province": "TX"
  }
])
< {
  acknowledged: true,
  insertedIds: {
    '0': ObjectId("64db6a13e96f78bbb19eb80a"),
    '1': ObjectId("64db6a13e96f78bbb19eb80b"),
    '2': ObjectId("64db6a13e96f78bbb19eb80c"),
    '3': ObjectId("64db6a13e96f78bbb19eb80d")
  }
}
supplychaindb>
```

```
>_MONGOSH

> db.Warehouses.insertMany([
    {
      "Warehouse_ID": 1,
      "CDC_ID": 3,
      "Company_ID": 4,
      "Address": "123 Main Street, Anytown, CA 91234",
      "Warehouse_Code": "ACME",
      "Area_in_sqm": 10000,
      "Number_of_Departments": 5,
      "Number_of_Employees": 100,
      "Province": "CA",
      "City": "Anytown"
    },
    {
      "Warehouse_ID": 2,
      "CDC_ID": 4,
      "Company_ID": 5,
      "Address": "456 Elm Street, Los Angeles, CA 90001",
      "Warehouse_Code": "XYZ",
      "Area_in_sqm": 15000,
      "Number_of_Departments": 10,
      "Number_of_Employees": 200,
      "Province": "CA",
      "City": "Los Angeles"
    },
      "Warehouse_ID": 4,
      "CDC_ID": 6,
      "Company_ID": 7,
      "Address": "1010 Washington Street, Chicago, IL 60602",
      "Warehouse_Code": "LMN",
      "Area_in_sqm": 25000,
      "Number_of_Departments": 20,
      "Number_of_Employees": 400,
      "Province": "IL",
      "City": "Chicago"
    },
    {
      "Warehouse_ID": 5,
      "CDC_ID": 7,
      "Company_ID": 8,
      "Address": "1111 Maple Street, Houston, TX 77002",
      "Warehouse_Code": "DEF",
      "Area_in_sqm": 30000,
      "Number_of_Departments": 25,
      "Number_of_Employees": 500,
      "Province": "TX",
      "City": "Houston"
    }
  ])
{
  acknowledged: true,
  insertedIds: {
    '0': ObjectId("64db6aaae96f78bbb19eb80e"),
    '1': ObjectId("64db6aaae96f78bbb19eb80f"),
    '2': ObjectId("64db6aaae96f78bbb19eb810"),
    '3': ObjectId("64db6aaae96f78bbb19eb811"),
    '4': ObjectId("64db6aaae96f78bbb19eb812")
  }
}
supplychaindb>
```