Assignment 2: Amazone Group Report

Group: INSERT(Dad Joke)

Words: 1923 (excluding queries and appendix)

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11055357 Bimmo Wicaksono
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PARTITIONING OF TASKS

Task	Subtask	Sub Subtask	Person In Charge
1. Designing NoSQL Schema for Amazone	1.1 Designing collections in Schema	customers	Abdullah Ali Bimmo Wicaksono
		pastOrders	Abdullah Ali Bimmo Wicaksono
		products	Samit Uttarkar Sergio Chavez
		ratings	Samit Uttarkar Sergio Chavez
		suppliers	Mizuki Morishita
		dailyInventoryRecord	Mizuki Morishita
		partners	Evgeni Gatsinski Ram Prasad Singh
		partnerHistory	Evgeni Gatsinski Ram Prasad Singh

2. Implementation on MongoDB	2.1 Data Insertion	customers	Abdullah Ali
		pastOrders	Ram Prasad Singh
		products	Evgeni Gatsinski
		ratings	Samit Uttarkar
		suppliers	Sergio Chavez
		dailyInventoryRecord	Mizuki Morishita
		partners	Bimmo Wicaksono
		partnerHistory	Bimmo Wicaksono
	2.1 Querying	Query 1 (2 queries)	Bimmo Wicaksono Mizuki Morishita
		Query 2	Abdullah Ali
		Query 3 (3 queries)	Evgeni Gatsinski Sergio Chavez
		Query 4 (2 queries)	Ram Prasad Singh Samit Uttarkar
		Query 5	Bimmo Wicaksono
		Query 6	Samit Uttarkar
		Query 7	Sergio Chavez
		Query 8	Ram Prasad Singh
		Query 9	Mizuki Morishita
		Query 10	Abdullah Ali
		Query 11	Evgeni Gatsinski

DATA MODELLING

The process of designing and implementing the database was guided based on the 4 steps suggested by the official MongoDB page: (i) Gather requirements; (ii) Understand relationships between entities; (iii) identify the data structure; and (iv) Apply design patterns. The requirements and objectives (i) were obtained from the instructions, and the assumptions were decided by the group. The data structure and entity relationships (ii and iii) were addressed through a simple initial design. The last version of the model (iv) was built based on the most important functionalities identified for the operation of the business.

Evaluating Application Workload: After reading and discussing the instructions, the following tasks were identified in the database to be designed.

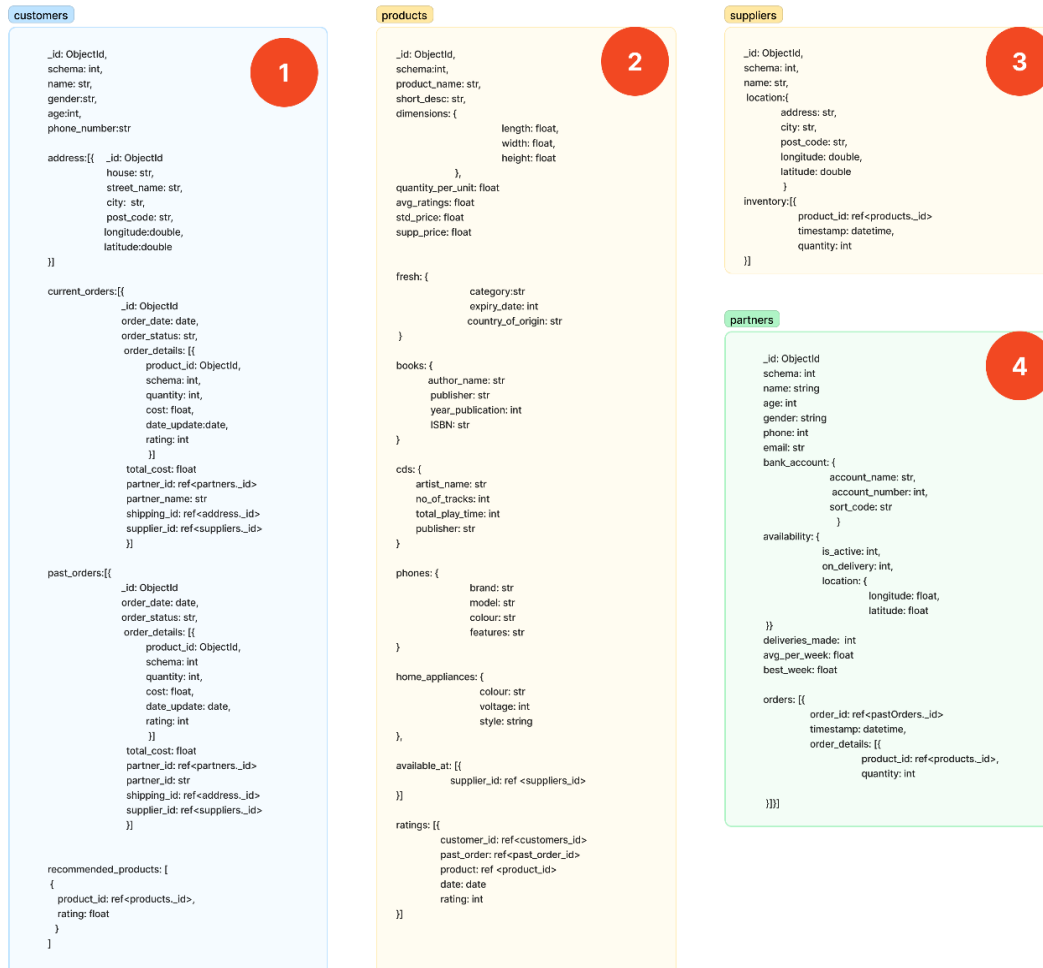| N	Task	Type	Description	Quantification	Qualification
1	**Set New Order**	Write	The customer establishes a new order	Regular	Critical
2	**Review current order**	Read	The customer/partner check the current order	Intense	Critical
3	**Assign partner to order**	Read	Based on analytics, assign pickup and delivery task	Regular	Critical
4	**Payout partner**	Read	Based on analytics, the payment of partner is calculated	Regular	Not critical
5	**Review inventory**	Read	Based on analytics, review inventory history of products	Regular	Not critical
6	**Recommend product**	Write	Based on ratings, recommend products to customers	Intense	Not critical

The tasks were classified according to the recurrence with which they will apply the queries related to them and the importance they have in the application. An intense task is one with queries constantly

performed, while a regular task is performed less frequently. On the other hand, critical tasks are those that are fundamental for the operation of the application and business. Without them, the application does not meet the user's minimum performance expectations (thus compromising reliability).

Assumptions: Based on the instructions, it was decided that the main focus of the business is to deliver all products as soon as possible. Therefore, the database design process assumed:

1. The control of the replenishment of products depends on the stores (Morrison and other suppliers). In this sense, the database is only responsible for showing the products, and delivering them as soon as possible from the closest suppliers where they are available.
2. The partner assignment criteria are location. First, the shop closest to the customer where the requested products are available is identified. Then, the closest available partner is located at that shop to make the delivery.
3. All partners can deliver fresh products or other products. In other words, there are no specific partners for certain products.
4. In the same order, fresh products and other products cannot be mixed. A partner will carry only one type of product in the same order.
5. In order, the store that has all the products will be selected. This is assumed to avoid different trips for a partner (getting the products in different stores)
6. Only one driver is assigned per point of sale. That is, if a customer buys products available in two separate places, it will require the assignment of two partners.
7. There are 6 status states of an order: added to cart, paid, on its way, shipped, delivered and delayed.
8. There is no extra cost to the consumer for delivery. Partner pay is based on a fixed overall amount and a weekly bonus for each delivery made. Therefore, the database should show what the weekly activity of the partner is to give him an idea of the bonus he would receive. In addition, it should show what has been the best historical weekly performance to encourage motivation. The bonus does not differentiate the type of product delivered to avoid selectivity of deliveries.
9. Customers can only set product ratings after using/consuming them. In this sense, the purchase date cannot be later than the rating date for each product in an order. Fresh products can only be ranked the day after the purchase and other products can be ranked up to a week after the purchase (7 days).

Simple model

customers

```
_id: ObjectId,
schema: int,
name: str,
gender:str,
age:int,
phone_number:str

address:[{   _id: ObjectId
             house: str,
             street_name: str,
             city:  str,
             post_code: str,
             longitude:double,
             latitude:double
}]

current_orders:[{
             _id: ObjectId
             order_date: date,
             order_status: str,
             order_details: [{
                    product_id: ObjectId,
                    schema: int,
                    quantity: int,
                    cost: float,
                    date_update:date,
                    rating: int
                    }]
             total_cost: float
             partner_id: ref<partners._id>
             partner_name: str
             shipping_id: ref<address._id>
             supplier_id: ref<suppliers._id>
             }]

past_orders:[{
             _id: ObjectId
             order_date: date,
             order_status: str,
             order_details: [{
                    product_id: ObjectId,
                    schema: int
                    quantity: int,
                    cost: float,
                    date_update: date,
                    rating: int
                    }]
             total_cost: float
             partner_id: ref<partners._id>
             partner_id: str
             shipping_id: ref<address._id>
             supplier_id: ref<suppliers._id>
             }]

recommended_products: [
  {
  product_id: ref<products._id>,
  rating: float
  }
]
```

(1)

products

```
_id: ObjectId,
schema:int,
product_name: str,
short_desc: str,
dimensions: {
                    length: float,
                    width: float,
                    height: float
          },
quantity_per_unit: float
avg_ratings: float
std_price: float
supp_price: float


fresh: {
                category:str
                expiry_date: int
                country_of_origin: str
  }

books: {
        author_name: str
        publisher: str
        year_publication: int
        ISBN: str
  }

cds: {
        artist_name: str
        no_of_tracks: int
        total_play_time: int
        publisher: str
  }

phones: {
                brand: str
                model: str
                colour: str
                features: str
  }

home_appliances: {
                colour: str
                voltage: int
                style: string
  },

available_at: [{
           supplier_id: ref <suppliers_id>
}]

ratings: [{
          customer_id: ref<customers_id>
          past_order: ref<past_order_id>
          product: ref <product_id>
          date: date
          rating: int
}]
```

(2)

suppliers

```
_id: ObjectId,
schema: int,
name: str,
location:{
          address: str,
          city: str,
          post_code: str,
          longitude: double,
          latitude: double
          }
inventory:[{
          product_id: ref<products._id>
          timestamp: datetime,
          quantity: int
}]
```

(3)

partners

```
_id: ObjectId
schema: int
name: string
age: int
gender: string
phone: int
email: str
bank_account: {
          account_name: str,
          account_number: int,
          sort_code: str
          }
availability: {
          is_active: int,
          on_delivery: int,
          location: {
                    longitude: float,
                    latitude: float
          }}
deliveries_made: int
avg_per_week: float
best_week: float

orders: [{
          order_id: ref<pastOrders._id>
          timestamp: datetime,
          order_details: [{
                    product_id: ref<products._id>,
                    quantity: int
          }]}]
```

(4)

Mapping-out entities and their relationships – Simple Model: Based on the assumptions, a simple model was designed with the main objective of identifying the main entities and their attributes (specified or not in the instructions). This first draft already contains some design patterns (which were difficult to avoid), but it is not the last version in the sense that it does not seek to optimise the database, only to present it.

1. The customer collection contains the user's information, and it is with this information that the user will interact with the business (place and monitor his order). It contains basic information attributes (one to one), but also embedded sub-documents such as addresses and orders. Current and past orders are embedded documents and have the same attributes. References to other collections are already used there through the Extended Reference Pattern – ERP - (id of the

delivery person and their name). Similarly, products are chosen as references, and only the quantity and then the rating are required (cost is computed and the rating is updated later). The document ends with a list of recommended products based on the average rating recorded in the product collection. This is also an extended reference to the product collection.

2. The collection of products brings together all the current offers (fresh and others). It was decided to embed a subdocument that contains all the physical features (physical_features). The avg_ratings attribute is calculated based on previous orders.

3. The suppliers collection is small and with mostly one-to-one relationships in attributes but will congregate the basic information of all dealers (not just Morrison stores, but also stores/people that offer cd's, books, home appliances and phones). With the location attribute (latitude and longitude) the distance with the customer address and potential delivery partner will be calculated. Finally, an array is included where the fluctuation of availability of all the products that the shop offers is registered.

4. The partner document contains almost all one-to-one relationships. In addition to personal information, it is crucial to know their availability and current location to match the selected shop location. Also included is an embedded array of subdocuments with historical records of their orders. Finally, statistics on their weekly performance are included to give an idea of the bonus they will receive and motivate them to deliver more.

All the collections considered have an attribute (schema: int) that identifies the versions of the documents so that the latest versions can be used without losing the historical record for potential analysis.

Optimized model
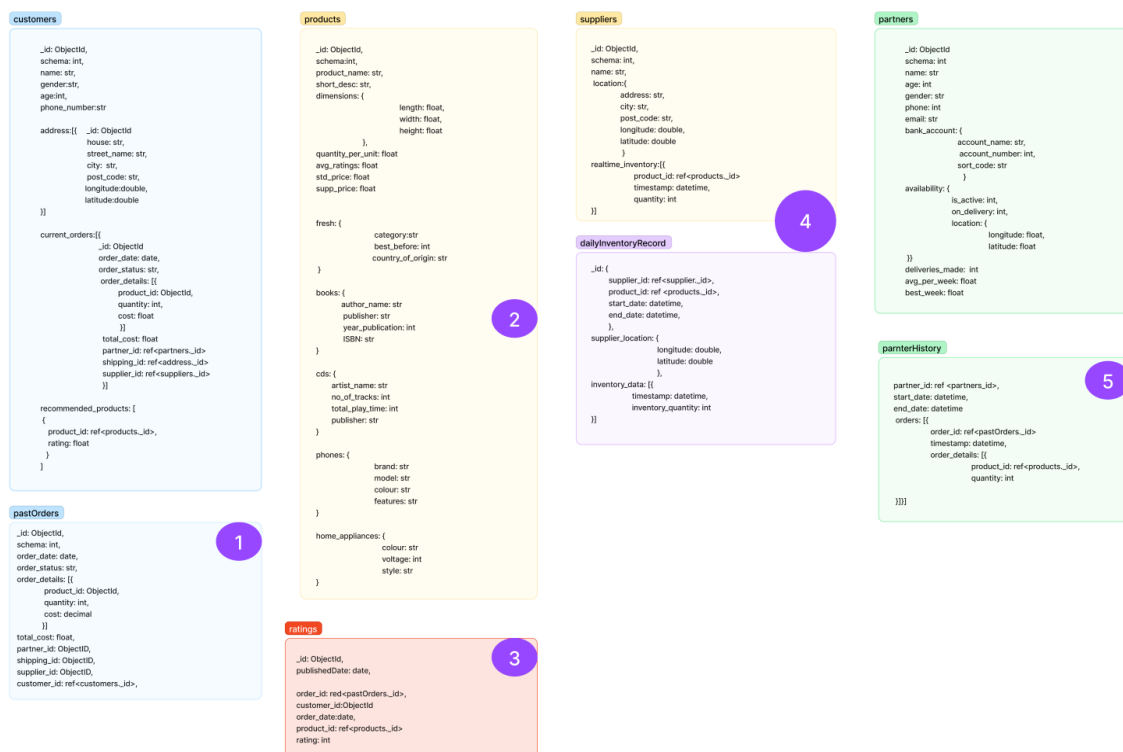
Optimization for performance:

The simple model was reviewed and optimised to comply with the core business functions established in Table 1. The main patterns and modifications were:

1. Separate the Past Orders from the Customer collection. The decision was based on 2 considerations. The instructions indicated that the orders passed by customers can be exceptionally large and that they are rarely requested. In that sense, keeping them embedded in the customer profile posed a potential danger to the storage limits, but it was unnecessary (the user does not usually request them). Therefore, it was decided to standardize this section by creating a collection linked inversely through the user id.

2. It was chosen to use the Polymorphic pattern to keep all types of products (fresh and others) in the same collection for three reasons. First, with the new design and collection there is no danger of unlimited growth of this document. A product document is short and only contains one-to-one relationships. Second, the characteristics of all products are similar and stable so including them would not require constant updates. The only exception found was the expiration date of fresh products and it was decided to change it for a more stable attribute, 'best_before,' to express how many days a customer must consume the product after the purchase. Third, keeping every product in the same collection facilitates the referencing applied in other collections. Therefore, the reading process would be more efficient.

3. A collection of ratings was created. Although the instructions point out that the product scores are quite low, as the number of customers increases, so will the scores. Therefore, keeping the format simple meant running the risk of unlimited growth of the 'ratings' array. With the separation we can have a document for each rating of an order. Also, based on this new collection we can use the computation pattern to calculate the average score here and update it in the product collection (avg_rating attribute).

4. The "Suppliers" collection has an attribute of realtime_inventory. This attribute is a list of items available for ordering and pickup, in accordance with Requirement 5. When a customer orders a product from the supplier, the quantity is deducted. Daily inventory records for the past ten years are stored in a separate collection called "dailyInventoryRecord." Every update on realtime_inventory in the Supplier collection, the original quantity and date time before the update is written in this collection. The reason for this separation of collection from real-time inventory is that daily records for ten years are very large. While real-time inventory is frequently read, past records are rarely accessed. Thus, past records should be separated from real-time inventory and stored in their own collection. The Bucket Pattern is applied to this collection because of two reasons. Firstly, it reduces the overall number of documents in this collection. If a new document is created for each order, there will be a huge number of documents. Secondly, it increases the ability to discover historical trends .In this case, it is required to make queries to check the past inventory performance in several time spans. This operation is easier if the data is encapsulated by a specific time span, such as a day. The

"dailyInventoryrecord" collection has an attribute of supplier_location to make it meet Requirement 9.

5. The "partnerHistory " collection is created to track the past performance of each partner. This is used by Amazone managers to pay them salaries based on their past performance. This collection also uses the Bucket Pattern for similar reasons to the "dailyInventoryRecord" collection. It reduces the overall number of documents in this collection and increases the ability to discover historical trends. This allows for the efficient calculation of the weekly performance of delivery partners, which are used for salary payments.

It was decided that the "location"' field in the suppliers collection should have an index created on it as it was necessary for doing the queries that require calculating the distance between two coordinates. A 2D sphere index was created, as this supports GeoJSON objects (which were used for the locations in all the collections) and will allow us to do geospatial queries.

Collections in JSON format:

The collections (in JSON format) are shown at the end of the report in the appendix.

QUERIES

Query 1: At least 2 queries which indicate a customer ordering a fresh product. The query should include the assignment of pickup and delivery tasks to a partner based on location parameters. The query should return, e.g., details of the product ordered, delivery partner location and/or ETA, and details of the delivery partner—name and ratings (if available).

➔ **1.1** Customer1 ordered 3 tarts

```python
# 1. Read the customer's data
 # Connecting to products collection
 customersCollection = myDB["customers"]
 # set customer
 customer_id = "C1"
c1_doc = customersCollection.find_one({"_id": "C1"})
 customer_coordinates = c1_doc["addresses"][-1]['location']['coordinates']

# 2. Set order details
order_datetime = datetime.datetime(2023, 1, 9, 17, 31, 00)
order_id = order_datetime.strftime("%Y%M%D%H%M%S") + customer_id
ordered_product_id = "FP1"
ordered_quantity = 3
shipping_id = c1_doc["addresses"][-1]["_id"]

# 3. Calculate total cost of the order
 # read cost of the product
 productsCollection = myDB["products"]
 ordered_product_doc = productsCollection.find_one({"_id": "FP1"})
 cost_per_product = ordered_product_doc['std_price']
 # multiply it with quantity
 total_cost = cost_per_product * ordered_quantity

# 4. Assign a Morrisons store which is nearest to the customer
 # read real-time inventory in store collection
 suppliersCollection = myDB['suppliers']
 morrisons_stores = suppliersCollection.aggregate([
     {
         "$geoNear": {
             "near": { 'type': "Point", "coordinates": customer_coordinates },
             "distanceField": "dist.calculated",
             "maxDistance": 2000,
         }
     },
     {'$unwind': '$realtime_inventory'},
    {'$match': {'realtime_inventory.product_id': ordered_product_id,
 'realtime_inventory.quantity': {'$gte': ordered_quantity}}},
     {'$sort': {"dist.calculated": 1}},
     {'$limit': 1}

    ])
```

```python
for i in morrisons_stores:
    # pprint.pprint(i)
    nearest_supplier_id = i["_id"]
    nearest_supplier_coordinates = i["location"]["coordinates"]
    assigned_supplier_inventory_timestamp = i["realtime_inventory"]["timestamp"]
    assigned_supplier_inventory_quantity = i["realtime_inventory"]["quantity"]
    dist_from_supplier_to_customer = i["dist"]["calculated"]

# 5. Assign a partner to deliver the product
 # read driver's locations
 partnersCollection = myDB['partners']
 # Find the nearest partner to the Morrison store
 partnersCollection.create_index([("availabilty.location", "2dsphere")])
 find_nearest_partner = [
     {
         "$geoNear": {
             "near": { 'type': "Point", "coordinates": nearest_supplier_coordinates },
             "distanceField": "dist.calculated",
             "maxDistance": 2000,
         }
     },
     {'$match': {'availabilty.is_active': 1, 'availabilty.on_delivery': 0}},
     {'$sort': {"dist.calculated": 1}},
     {'$limit': 1}
]

available_partners = partnersCollection.aggregate(find_nearest_partner)

for i in available_partners:
    assigned_partner_id = i["_id"]
    dist_from_partner_to_supplier = i["dist"]["calculated"]
    assigned_partner_coordinates = i["availabilty"]["location"]["coordinates"]

# 6. Update all docs (customers.currnet_order, partners.status,
suppliers_realtime_inventory, dailyInventoryRecord)
 # Update customers
new_order = {
    "_id": order_id,
    "date": order_datetime,
    "order_status": 3,
    "total_cost": total_cost,
    "partner_id": assigned_partner_id,
    "shipping_id": shipping_id,
    "supplier_id": nearest_supplier_id,
    "order_details": [{"product_id": ordered_product_id}]
 }
customersCollection.update_one(
    {"_id": customer_id},
    {"$push": {"current_orders": new_order}}
 )

# Update partners
```

```python
update_driver_status = partnersCollection.update_one({'_id':"PA2s"},{'$set':{
'availabilty.on_delivery': 0 }})

# Update dailyInventoryRecord
dailyInventoryRecordCollection = myDB["dailyInventoryRecord"]
 new_inventory_record = {
     'datetime': assigned_supplier_inventory_timestamp,
     'inventory_quantity': assigned_supplier_inventory_quantity
 }
daily_inventory_record_id = {
     'supplier_id': nearest_supplier_id,
     'product_id': ordered_product_id,
     'start_date': order_datetime.strftime("%d/%m/%Y 00:00"),
     'end_date': order_datetime.strftime("%d/%m/%Y 23:59")
 }
dailyInventoryRecordCollection.update_one(
     {"_id": daily_inventory_record_id},
     {
         "$set": {
             "supplier_location.longitude":  nearest_supplier_coordinates[0],
             "supplier_location.latitude": nearest_supplier_coordinates[1]
             },
         "$addToSet": {"inventory_data": new_inventory_record}
     },
      upsert = True
 )

# Update suppliers
updated_quantity = assigned_supplier_inventory_quantity - ordered_quantity
update_suppliers =
suppliersCollection.update_one({'_id':nearest_supplier_id,"realtime_inventory.product_id":or
dered_product_id},{'$set':{ 'realtime_inventory.$.quantity':
updated_quantity,'realtime_inventory.$.timestamp':order_datetime}})

# 7. Return
 # Read product details
product_detail =
productsCollection.find({"_id":ordered_product_id},{"_id":0,"name":1,"avg_ratings":1,"std_pr
ice":1})
for i in product_detail:
     product_name = i["name"]
     product_rating=i["avg_ratings"]
     product_price=i["std_price"]
print("Product name:",product_name,"rating:",product_rating, "price:",product_price)

# Read delivery details
product_detail =
partnersCollection.find({"_id":assigned_partner_id},{"_id":0,"name":1,"phone":1,"deliveries_
made":1})
 for i in product_detail:
     partner_name = i["name"]
     partner_phone=i["phone"]
```

```
    partner_deliveries=i["deliveries_made"]
print("Partner name:",partner_name,"phone number:",partner_phone, "number of delivery
made:",partner_deliveries)

# Calc ETA
dist_partner_drives = dist_from_partner_to_supplier + dist_from_supplier_to_customer
partner_driving_speed = 300 # metre per minute
estimated_minutes_for_driving = dist_partner_drives / partner_driving_speed
eta = order_datetime + datetime.timedelta(minutes = estimated_minutes_for_driving)
print(f'Ordered Time: {order_datetime} \nDelivery Partner\'s Location:
{assigned_partner_coordinates} \nETA: {eta}')
```

Output:

```
Product name: Tart rating: 3.6 price: 2
Partner name: Robert Chaniago phone number: 07412744098 number of delivery made: 90
Ordered Time: 2023-01-09 17:31:00
Delivery Partner's Location: [53.4680182503661, -2.25975047297267]
ETA: 2023-01-09 17:33:29.417580
```

➔ **1.2** Customer2 ordered 2 pies

```
# 1. Read the customer's data
 # Connecting to products collection
 customersCollection = myDB["customers"]
 # set customer
 customer_id = "C2"
 c2_doc = customersCollection.find_one({"_id": "C2"})
 customer_coordinates = c2_doc["addresses"][-1]['location']['coordinates']


# 2. Set order details
 order_datetime = datetime.datetime(2023, 1, 9, 18, 17, 00)
 order_id = order_datetime.strftime("%Y%M%D%H%M%S") + customer_id
ordered_product_id = "FP3"
 ordered_quantity = 2
 shipping_id = c2_doc["addresses"][-1]["_id"]


# 3. Calculate total cost of the order
 # read cost of the product
 productsCollection = myDB["products"]
 ordered_product_doc = productsCollection.find_one({"_id": "FP1"})
 cost_per_product = ordered_product_doc['std_price']
 # multiply it with quantity
 total_cost = cost_per_product * ordered_quantity
```

```python
# 4. Assign a Morrisons store which is nearest to the customer
 # read real-time inventory in store collection
 suppliersCollection = myDB['suppliers']
 morrisons_stores = suppliersCollection.aggregate([
     {
         "$geoNear": {
             "near": { 'type': "Point", "coordinates": [ 53.4702888668 , -2.26459207339 ] },
             "distanceField": "dist.calculated",
             "maxDistance": 2000,
         }
     },
     {'$unwind': '$realtime_inventory'},
     {'$match': {'realtime_inventory.product_id': ordered_product_id,
'realtime_inventory.quantity': {'$gte': ordered_quantity}}},
     {'$sort': {"dist.calculated": 1}},
     {'$limit': 1}

    ])
for i in morrisons_stores:
     # pprint.pprint(i)
     nearest_supplier_id = i["_id"]
     nearest_supplier_coordinates = i["location"]["coordinates"]
     assigned_supplier_inventory_timestamp = i["realtime_inventory"]["timestamp"]
     assigned_supplier_inventory_quantity = i["realtime_inventory"]["quantity"]
     dist_from_supplier_to_customer = i["dist"]["calculated"]


# 5. Assign a partner to deliver the product
 # read driver's locations
 partnersCollection = myDB['partners']
 # Find the nearest partner to the Morrison store
 partnersCollection.create_index([("availabilty.location", "2dsphere")])
 find_nearest_partner = [
     {
         "$geoNear": {
             "near": { 'type': "Point", "coordinates": nearest_supplier_coordinates },
             "distanceField": "dist.calculated",
             "maxDistance": 2000,
         }
     },
     {'$match': {'availabilty.is_active': 1, 'availabilty.on_delivery': 0}},
     {'$sort': {"dist.calculated": 1}},
     {'$limit': 1}
]

available_partners = partnersCollection.aggregate(find_nearest_partner)

for i in available_partners:
     assigned_partner_id = i["_id"]
     dist_from_partner_to_supplier = i["dist"]["calculated"]
     assigned_partner_coordinates = i["availabilty"]["location"]["coordinates"]
```

```python
# 6. Update all docs (customers.currnet_order, partners.status,
suppliers_realtime_inventory, dailyInventoryRecord)
 # Update customers
 new_order = {
     "_id": order_id,
     "date": order_datetime,
     "order_status": 3,
     "total_cost": total_cost,
     "partner_id": assigned_partner_id,
     "shipping_id": shipping_id,
     "supplier_id": nearest_supplier_id,
     "order_details": [{"product_id": ordered_product_id}]
 }
 customersCollection.update_one(
     {"_id": customer_id},
     {"$push": {"current_orders": new_order}}
 )


# Update partners
 update_driver_status = partnersCollection.update_one({'_id':"PA2s"},{'$set':{
'availabilty.on_delivery': 0 }})


# Update dailyInventoryRecord
dailyInventoryRecordCollection = myDB["dailyInventoryRecord"]
 new_inventory_record = {
     'datetime': assigned_supplier_inventory_timestamp,
     'inventory_quantity': assigned_supplier_inventory_quantity
 }
 daily_inventory_record_id = {
     'supplier_id': nearest_supplier_id,
     'product_id': ordered_product_id,
     'start_date': order_datetime.strftime("%d/%m/%Y 00:00"),
     'end_date': order_datetime.strftime("%d/%m/%Y 23:59")
 }
 dailyInventoryRecordCollection.update_one(
     {"_id": daily_inventory_record_id},
     {"$push": {"inventory_date": new_inventory_record} },
     upsert = True
 )


# Update suppliers
 updated_quantity = assigned_supplier_inventory_quantity - ordered_quantity
 update_suppliers =
suppliersCollection.update_one({'_id':nearest_supplier_id,"realtime_inventory.product_id":or
dered_product_id},{'$set':{ 'realtime_inventory.$.quantity':
updated_quantity,'realtime_inventory.$.timestamp':order_datetime}})


# 7. Return
 # Read product details
product_detail =
```

```python
productsCollection.find({"_id":ordered_product_id},{"_id":0,"name":1,"avg_ratings":1,"std_pr
ice":1})
 for i in product_detail:
     product_name = i["name"]
     product_rating=i["avg_ratings"]
     product_price=i["std_price"]
 print("Product name:",product_name,"rating:",product_rating, "price:",product_price)

 # Read delivery details
 product_detail =
partnersCollection.find({"_id":assigned_partner_id},{"_id":0,"name":1,"phone":1,"deliveries_
made":1})
 for i in product_detail:
     partner_name = i["name"]
     partner_phone=i["phone"]
     partner_deliveries=i["deliveries_made"]
 print("Partner name:",partner_name,"phone number:",partner_phone, "number of delivery
made:",partner_deliveries)

 # Calc ETA
 dist_partner_drives = dist_from_partner_to_supplier + dist_from_supplier_to_customer
 partner_driving_speed = 300 # meter per minute
 estimated_minutes_for_driving = dist_partner_drives / partner_driving_speed
 eta = order_datetime + datetime.timedelta(minutes = estimated_minutes_for_driving)
 print(f'Ordered Time: {order_datetime} \nDelivery Partner\'s Location:
{assigned_partner_coordinates} \nETA: {eta}')
```

Output:

```
Product name: Pie rating: 2.4 price: 2
Partner name: Robert Chaniago phone number: 07412744098 number of delivery made: 90
Ordered Time: 2023-01-09 18:17:00
Delivery Partner's Location: [53.4680182503661, -2.25975047297267]
ETA: 2023-01-09 18:19:29.417580
```

Query 2: Query indicating a user searching for available fresh products and displaying them based on the user's location.

➔ In this case, we used customer C1's location coordinates and specified nearby stores to be within 2km.

```
# Suppliers collection
suppliersCollection = myDB["suppliers"]


fresh_product_details= suppliersCollection.aggregate([
        # search for the nearest stores within 2000m of the customers (C1) address
        # 'distanceFromYou' field was created to show the customer how far the store is from
them (in metres)
        {
        "$geoNear":{
        "near":{
                "type":"Point",
                "coordinates":[
                53.4702888668,
                -2.26459207339
                ]
        },
        "distanceField":"distanceFromYou",
        "maxDistance":2000
        }
    },
        # Filter by all suppliers which are Morrisons (as only these stock the fresh
products)
    {
        "$match":{
        "name":{
                '$regex' : '.*' + 'Morrisons' + '.*'
        }
        }
    },

        # Inventory data for products is in an array of embedded documents so we need to
unwind
    {
        "$unwind":"$realtime_inventory"
    },

        # Filter for all quantities greater or equal to 1 (indicating its available)
    {
        "$match":{
        "realtime_inventory.quantity":{
                "$gte":1
        }
        }
    },
```

```
        # Get the products collection using $lookup
    {
        "$lookup":{
        "from":"products",
        "localField":"realtime_inventory.product_id",
        "foreignField":"_id",
        "as":"availableProducts"
        }
    },
    {
        "$unwind":"$availableProducts"
    },

        # Sort the documents using 'distanceFromYou', to show closest stores first
    {
        "$sort":{
        "distanceFromYou":1
        }
    },
        # Group the items back together on supplier id. availableProducts field is created
which holds info
        # from products collection
    {
        "$group":{
        "_id":"$_id",
        'name' : { '$first': '$name' },
        'address' : { '$first': '$address' },
        # Outputting the distance from the customer and rounding it to 2 decimal places
        'distanceFromYou' : { '$first': {'$round': [ '$distanceFromYou', 2 ] }} ,


        "availableProducts":{
                "$push":"$availableProducts"
        }
        }
    },
        # Project (display) the useful fields to the customer
    {
        "$project":{
        "name":1,
        "address":1,
        "distanceFromYou":1,
        "availableProducts._id":1,
        "availableProducts.name":1,
        "availableProducts.short_desc":1,
        "availableProducts.dimensions":1,
        "availableProducts.avg_ratings":1,
        "availableProducts.std_price":1
        }
    }
])
```

```
for i in fresh_product_details:
        pprint.pprint(i)
```

Output:

Store 3:

```
{'_id': 'ST3',
 'address': '333 Stretford Rd, Hulme',
 'availableProducts': [{'_id': 'FP1',
                        'avg_ratings': 3.6,
                        'dimensions': {'height': 0.4,
                                       'length': 0.3,
                                       'width': 0.4},
                        'name': 'Tart',
                        'short_desc': 'normal bread',
                        'std_price': 2},
                       {'_id': 'FP2',
                        'avg_ratings': 2,
                        'dimensions': {'height': 0.5,
                                       'length': 0.3,
                                       'width': 0.4},
                        'name': 'Croissaint',
                        'short_desc': 'normal bread',
                        'std_price': 2.7},
                       {'_id': 'FP3',
                        'avg_ratings': 2.4,
                        'dimensions': {'height': 0.6,
                                       'length': 0.3,
                                       'width': 0.4},
                                                         'name': 'Lettuce',
                                                         'short_desc': 'big lettuce',
                                                         'std_price': 2.9},
                                                        {'_id': 'FP15',
                                                         'avg_ratings': 2.4,
                                                         'dimensions': {'height': 0.7,
                                                                        'length': 0.3,
                                                                        'width': 0.3},
                                                         'name': 'Cucumber',
                                                         'short_desc': 'long cucumber',
                                                         'std_price': 2.8}],
                       'distanceFromYou': 1530.54,
                       'name': 'Morrisons Stretford'}
```

Store 5:

```
{'_id': 'ST5',
 'address': 'Unit 4, Moho Building',
 'availableProducts': [{'_id': 'FP1',
                        'avg_ratings': 3.6,
                        'dimensions': {'height': 0.4,
                                       'length': 0.3,
                                       'width': 0.4},
                        'name': 'Tart',
                        'short_desc': 'normal bread',
                        'std_price': 2},
                       {'_id': 'FP2',
                        'avg_ratings': 2,
                        'dimensions': {'height': 0.5,
                                       'length': 0.3,
                                       'width': 0.4},
                        'name': 'Croissaint',
                        'short_desc': 'normal bread',
                        'std_price': 2.7},
                       {'_id': 'FP3',
                        'avg_ratings': 2.4,
                        'dimensions': {'height': 0.6,
                                       'length': 0.3,
                                       'width': 0.4},
                        'name': 'Pie',
                        'short_desc': 'normal bread',
                        'std_price': 2},
                                                        {'_id': 'FP14',
                                                         'avg_ratings': 2.8,
                                                         'dimensions': {'height': 0.6,
                                                                        'length': 0.3,
                                                                        'width': 0.3},
                                                         'name': 'Lettuce',
                                                         'short_desc': 'big lettuce',
                                                         'std_price': 2.9},
                                                        {'_id': 'FP15',
                                                         'avg_ratings': 2.4,
                                                         'dimensions': {'height': 0.7,
                                                                        'length': 0.3,
                                                                        'width': 0.3},
                                                         'name': 'Cucumber',
                                                         'short_desc': 'long cucumber',
                                                         'std_price': 2.8}],
                       'distanceFromYou': 129.4,
                       'name': 'Morrisons Boho'}
```

Query 3: At least 2 queries that indicate a customer ordering a product, adding it to the cart and making payment.

➔ **3.1** Customer looking to buy a book written by Leonard Reyes

```
#Step 1: Customer Looking for a product:

db.products.find( { "book.author_name": "Leonard Reyes" }, { _id: 0, name: 1, avg_ratings:1,
std_price:1,"book.author_name":1} )

#Step 2: Create current order (Insert a current order in C1) and set current status to
"added to cart":

db.customers.updateOne({
    "_id":"C1"
},
{
    "$push":{
       "current_orders":
       {
                "_id":"20230104094539C1",
                "date":"2023-01-04 09:45:39",
                "order_status":1,
                "total_cost":33.98,
                "partner_id":"",
                "shipping_id":"AD1",
                "supplier_id":"W2",
                "order_details":[
                {
                        "product_id":"B8",
                        "quantity":2,
                        "cost":16.99
                }
                ]
       }

    }
});

#Step 3: Change order status to "paid":

db.customers.updateOne({
    "_id":"C1",
    "current_orders.3.order_status":1
},
{
    "$set":{
       "current_orders.3.order_status":2
    }
})
```

```
#Step 4: Deduct the quantity of items ordered

db.suppliers.updateOne({
    "_id":"W2",
    "realtime_inventory.7.quantity":14
},
{
    "$set":{
        "realtime_inventory.7.quantity":12
    }
})
```

Output:

a. Customer Looking for a product:

```
{ name: 'The Psychology of Money',
  avg_ratings: 3,
  std_price: 10.99,
  book: { author_name: 'Leonard Reyes' } }
```

b. Create a current order (Insert a current order in C1) and set the current status to "added to cart":

```
_id: "C1"
Customer: "Gunner Ferrell"
Gender: "M"
Age: 51
phone_number: 443454155475
> addresses: Array
v current_orders: Array
  > 0: Object
  > 1: Object
  > 2: Object
  v 3: Object
      _id: "20230104094539C1"
      date: "2023-01-04 09:45:39"
      order_status: 1
      total_cost: 33.98
      partner_id: ""
      shipping_id: "AD1"
      supplier_id: "W2"
    v order_details: Array
      > 0: Object
  > recommended_products: Array
```

c. Step 3: Change order status to "paid":

```
_id: "C1"
Customer: "Gunner Ferrell"
Gender: "M"
Age: 51
phone_number: 443454155475
> addresses: Array
v current_orders: Array
  > 0: Object
  > 1: Object
  > 2: Object
  v 3: Object
      _id: "20230104094539C1"
      date: "2023-01-04 09:45:39"
      order_status: 2
      total_cost: 33.98
      partner_id: ""
      shipping_id: "AD1"
      supplier_id: "W2"
    > order_details: Array
> recommended_products: Array
```

d. Deduct the quantity of items ordered:

#Previous quantity

```
_id: "W2"
name: "Amazon UK MAN2"
address: "Amazon UK Services Ltd., Omega Plot 7c, Orion Boulevard, Great Sankey"
city: "Warrington"
post_code: "WA5 3XA"
> location: Object
v realtime_inventory: Array
  > 0: Object
  > 1: Object
  > 2: Object
  > 3: Object
  > 4: Object
  > 5: Object
  > 6: Object
  v 7: Object
      product_id: "B8"
      timestamp: "2022-01-04 15:00:00"
      quantity: 14
```

#New quantity

```
_id: "W2"
name: "Amazon UK MAN2"
address: "Amazon UK Services Ltd., Omega Plot 7c, Orion Boulevard, Great Sankey"
city: "Warrington"
post_code: "WA5 3XA"
> location: Object
∨ realtime_inventory: Array
  > 0: Object
  > 1: Object
  > 2: Object
  > 3: Object
  > 4: Object
  > 5: Object
  > 6: Object
  ∨ 7: Object
      product_id: "B8"
      timestamp: "2022-01-04 15:00:00"
      quantity: 12
```

➔ **3.2** Customer looking to buy a CD by Led Zepellin

```
#Step 1: Customer Looking for a product:

db.products.find( { "cd.artist_name": "Led Zepellin" }, { _id: 0, name: 1, avg_ratings:1,
std_price:1,"cd.artist_name":1} )

#Step 2: Create current order (Insert a current order in C1) and set current status to
"added to cart":

db.customers.updateOne({
    "_id":"C3"
},
{
    "$push":{
        "current_orders":
        {
                "_id":"20230104054212C3",
                "date":new ISODate("2023-01-04T05:42:12.000+00:00"),
                "order_status":1,
                "total_cost":11.48,
                "partner_id":"",
                "shipping_id":"AD3",
                "supplier_id":"W1",
                "order_details":[
                {
                "product_id":"CD2",
                "quantity":1,
                "cost":11.48
                }
                ]
        }


    }
```

```
});

#Step 3: Change order status to "paid":

db.customers.updateOne({
    "_id":"C3",
    "current_orders.2.order_status":1
},
{
    "$set":{
        "current_orders.2.order_status":2
    }
})

#Step 4: Deduct the quantity of items ordered

db.suppliers.updateOne({
    "_id":"W1",
    "realtime_inventory.11.quantity":26
},
{
    "$set":{
        "realtime_inventory.11.quantity":25
    }
})
```

Output:

a. Customer Looking for a product:

```
{ name: 'Led Zepellin IV',
  avg_ratings: 4,
  std_price: 11.48,
  cd: { artist_name: 'Led Zepellin' } }
```

b. Create current order (Insert a current order in C1) and set current status to "added to cart":

```
_id: "C3"
Customer: "Raelynn Dodson"
Gender: "F"
Age: 44
phone_number: 443482883256
> addresses: Array
v current_orders: Array
  > 0: Object
  > 1: Object
  v 2: Object
      _id: "20230104054212C3"
      date: 2023-01-04T05:42:12.000+00:00
      order_status: 1
      total_cost: 11.48
      partner_id: ""
      shipping_id: "AD3"
      supplier_id: "W1"
    v order_details: Array
      v 0: Object
          product_id: "CD2"
          quantity: 1
          cost: 11.48
```

c. Step 3: Change order status to "paid":

```
_id: "C3"
Customer: "Raelynn Dodson"
Gender: "F"
Age: 44
phone_number: 443482883256
> addresses: Array
v current_orders: Array
  > 0: Object
  > 1: Object
  v 2: Object
      _id: "20230104054212C3"
      date: 2023-01-04T05:42:12.000+00:00
      order_status: 2
      total_cost: 11.48
      partner_id: ""
      shipping_id: "AD3"
      supplier_id: "W1"
    v order_details: Array
      v 0: Object
          product_id: "CD2"
          quantity: 1
          cost: 11.48
```

d. Step 4: Deduct the quantity of items ordered:

#Previous quantity

```
_id: "W1"
name: "Amazon UK MAN1"
address: "Manchester Airport, 6 Sunbank Ln, Altrincham"
city: "Manchester"
post_code: "M90 5DL"
> location: Object
∨ realtime_inventory: Array
  > 0: Object
  > 1: Object
  > 2: Object
  > 3: Object
  > 4: Object
  > 5: Object
  > 6: Object
  > 7: Object
  > 8: Object
  > 9: Object
  > 10: Object
  ∨ 11: Object
      product_id: "CD2"
      timestamp: "2022-01-04 15:00:00"
      quantity: 26
```

#New quantity

```
_id: "W1"
name: "Amazon UK MAN1"
address: "Manchester Airport, 6 Sunbank Ln, Altrincham"
city: "Manchester"
post_code: "M90 5DL"
> location: Object
∨ realtime_inventory: Array
  > 0: Object
  > 1: Object
  > 2: Object
  > 3: Object
  > 4: Object
  > 5: Object
  > 6: Object
  > 7: Object
  > 8: Object
  > 9: Object
  > 10: Object
  ∨ 11: Object
      product_id: "CD2"
      timestamp: "2022-01-04 15:00:00"
      quantity: 25
```

Query 4: At least 2 queries indicating a manager checking sales and inventory performance in the last week, one month or year. Where possible, the query result should be visualised using Pandas (table) or Matplotlib (charts).

→ **4.1** In this case, since we have 2 months of data on past orders the manager is visualising quantity ordered vs cost for each product being sold on Amazone for October and November.

```python
# Create dataframe for pastOrders using aggregation pipeline
df_pastOrders = pd.DataFrame(myDB.pastOrders.aggregate([{
    '$project': {
        '_id': 1,
        'order_date': '$order_date',
        'customer_id': '$customer_id',
        # Raise Sub-documents to top-level under new name
        'product_id': '$order_details.product_id',
        'quantity': '$order_details.quantity',
        'cost': '$order_details.cost',
        'total_cost': '$total_cost',
        'partner_id': '$partner_id',
        'supplier_id': '$supplier_id',
        'order_status': '$order_status'
    }
}]))

# Cleaning embedded values
lis = ['product_id','quantity','cost']
for i in lis:
    df_pastOrders[i] = df_pastOrders[i].apply(lambda x: x[0])
# Create dataframe for inventoryRecord
df_inventoryRecord = pd.DataFrame(myDB.dailyInventoryRecord.aggregate([{
    '$project': {
        '_id': 0,
        'supplier_id': '$_id.supplier_id',
        'product_id': '$_id.product_id',
        'date': '$inventory_data.datetime',
        'quantity':'$inventory_data.inventory_quantity'

    }
}]))

# Cleaning embedded values
lis = ['date','quantity']
for i in lis:
    df_inventoryRecord[i] = df_inventoryRecord[i].apply(lambda x: x[0])
# Splitting pastOrders for each month
df_October = df_pastOrders.loc[(df_pastOrders['order_date'] > '2022-10-01') &
(df_pastOrders['order_date'] <= '2022-10-31')]
df_November = df_pastOrders.loc[(df_pastOrders['order_date'] > '2022-11-01') &
(df_pastOrders['order_date'] <= '2022-11-30')]
# Create dataframe for products for referencing product names with product ID
df_products = pd.DataFrame(myDB.products.aggregate([{
```

```python
    '$project': {
        '_id': 1,
        'name': '$name',
        'category': '$category'
    }
}]))
df_products = df_products.rename(columns={"_id": "product_id"})
# Merge monthwise pastOrders with products and drop redundant columns
df_salesAnalysis_October = pd.merge(df_October,df_products,on='product_id')
df_salesAnalysis_October = df_salesAnalysis_October.drop(['_id', 'customer_id',
 'partner_id','supplier_id','order_status'], axis=1)

df_salesAnalysis_November = pd.merge(df_November,df_products,on='product_id')
df_salesAnalysis_November = df_salesAnalysis_November.drop(['_id', 'customer_id',
 'partner_id','supplier_id','order_status'], axis=1)


# Grouping records bases on quantity and cost
df_quantity_October = df_salesAnalysis_October.groupby('name')['quantity'].sum()
df_quantity_October = df_quantity_October.reset_index()
df_Cost_October = df_salesAnalysis_October.groupby('name')['cost'].mean()
df_Cost_October = df_Cost_October.reset_index()

df_quantity_November = df_salesAnalysis_November.groupby('name')['quantity'].sum()
df_quantity_November = df_quantity_November.reset_index()
df_Cost_November = df_salesAnalysis_November.groupby('name')['cost'].mean()
df_Cost_November = df_Cost_November.reset_index()
# Plot sales performance for each product in October
fig, ax1 = plt.subplots(figsize=(20,7))
ax2 = ax1.twinx()
ax1.bar(df_quantity_October['name'],df_quantity_October['quantity'], color = 'g')
ax2.plot(df_Cost_October['name'],df_Cost_October['cost'],'b-')
ax1.set_xlabel('Product Name')
ax1.set_ylabel('Quantity Ordered',color = 'g')
ax2.set_ylabel('Price',color = 'b')
ax1.set_xticklabels(df_quantity_October['name'],rotation = 90,size = 8)
plt.title('October Sales')
plt.show()
# Plot sales performance for each product in November
fig, ax1 = plt.subplots(figsize=(20,7))
ax2 = ax1.twinx()
ax1.bar(df_quantity_November['name'],df_quantity_November['quantity'], color = 'g')
ax2.plot(df_Cost_November['name'],df_Cost_November['cost'],'b-')
ax1.set_xlabel('Product Name')
ax1.set_ylabel('Quantity Ordered',color = 'g')
ax2.set_ylabel('Price',color = 'b')
ax1.set_xticklabels(df_quantity_November['name'],rotation = 90,size = 8)
plt.title('November Sales')
plt.show()
```
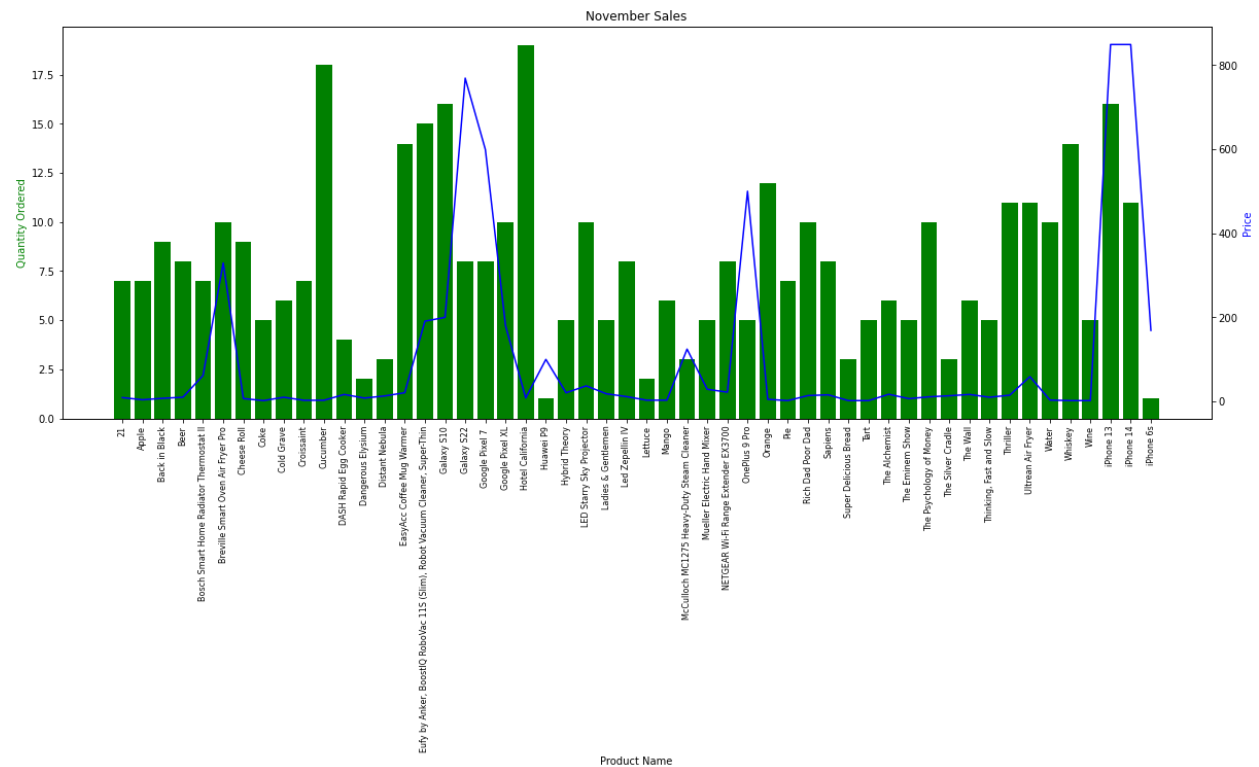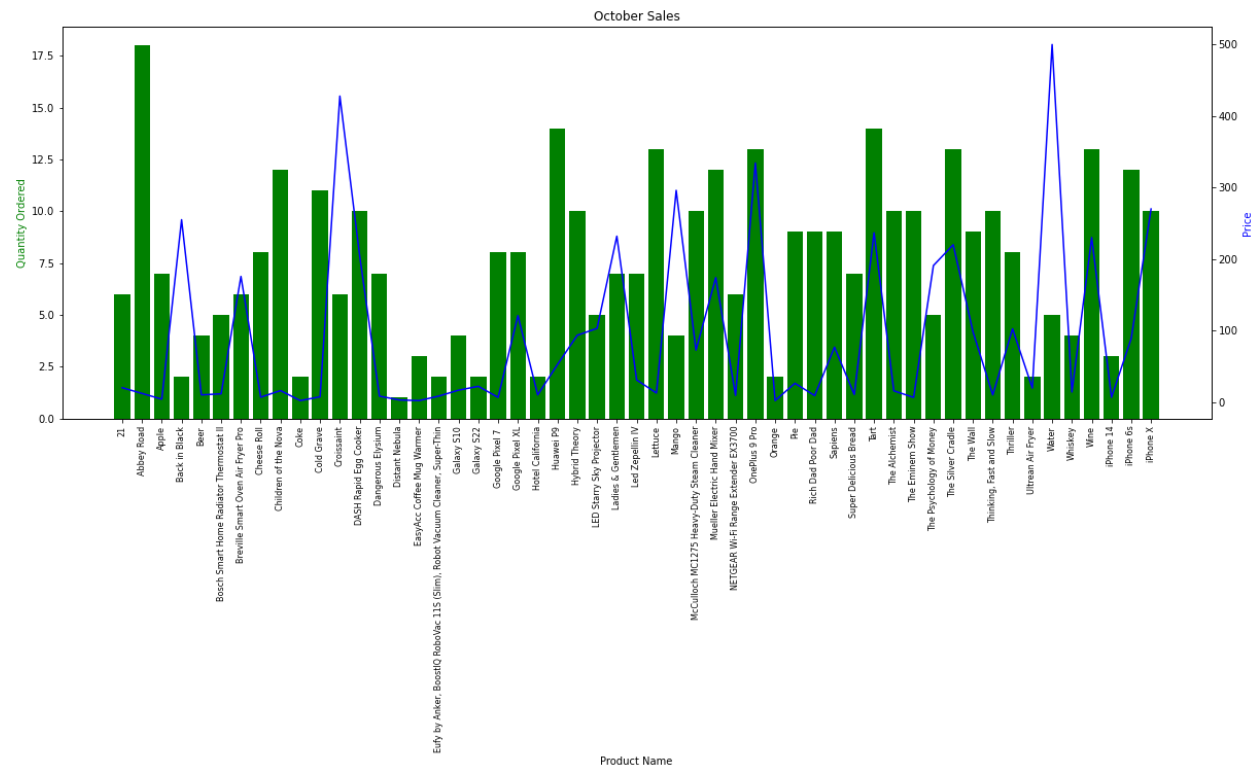
Output:

October Sales

November Sales

➔ **4.2** To get a better understanding of which days in the month are best for business the manager is visualising per day sales volume for both months.

```python
# Extracting day only from datetime for each month
df_salesAnalysis_October['order_day'] = df_salesAnalysis_October.order_date.dt.day
df_salesAnalysis_November['order_day'] = df_salesAnalysis_November.order_date.dt.day

# Grouping daily sales perfomance for each month
sales_byDay_Oct = df_salesAnalysis_October.groupby('order_day')['total_cost'].sum()
sales_byDay_Oct = sales_byDay_Oct.reset_index()

sales_byDay_Nov = df_salesAnalysis_November.groupby('order_day')['total_cost'].sum()
sales_byDay_Nov = sales_byDay_Nov.reset_index()
# Plotting daily sales performance for October
plt.figure(figsize = (20,7))
sns.barplot(x="order_day",
            y="total_cost",
            data=sales_byDay_Oct)
plt.title('Sales per day for October')
# Plotting daily sales performance for November
plt.figure(figsize = (20,7))
sns.barplot(x="order_day",
            y="total_cost",
            data=sales_byDay_Nov)
plt.title('Sales per day for November')
```
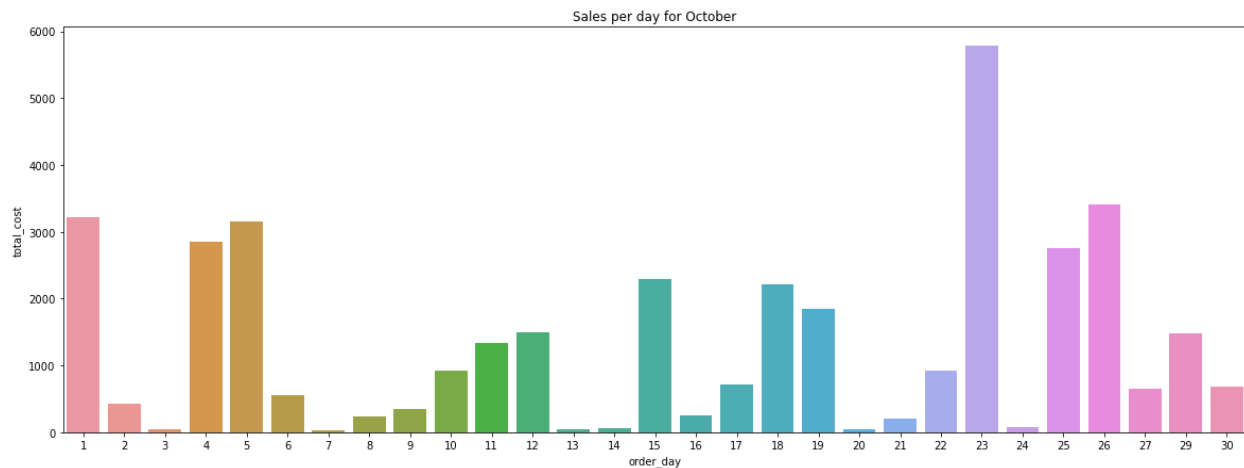
Output:

Sales per day for November
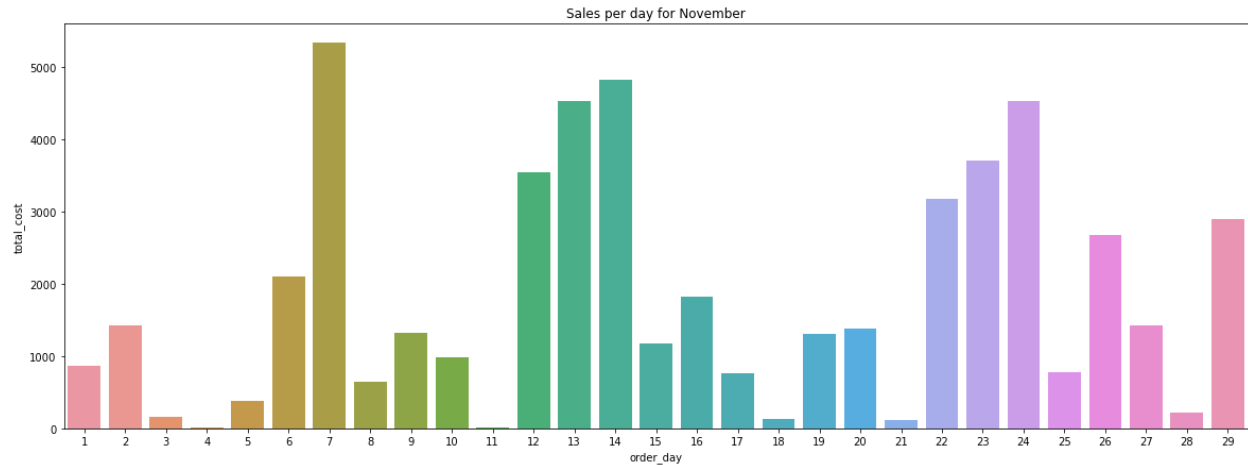
➔ **3.3** Since the database only contains 2 days of daily inventory record, no significant visualisation is possible at the moment, but the same approach as sales performance can be followed. The manager is currently checking the daily real time inventory record for each product in each warehouse/store.

```
df_inventoryRecord
```

Output:

	supplier_id	product_id	date	quantity
0	W2	HA2	2023-02-01 17:14:00	8
1	ST4	FP11	2023-03-01 08:11:00	10
2	ST2	FP10	2023-03-01 10:44:00	4
3	W2	HA5	2023-03-01 14:23:00	8
4	ST5	FP9	2023-02-01 02:10:00	5
...	...	...	...	...
255	W2	CD3	2023-02-01 06:07:00	9
256	ST2	FP12	2023-02-01 17:53:00	8
257	ST3	FP6	2023-02-01 19:00:00	9
258	W1	PH10	2023-03-01 19:19:00	4
259	W1	B9	2023-02-01 10:19:00	6

Query 5: To find the non-fresh product that has zero quantity to be restocked.

```
[
  {
      $match: {
      _id: /W/,
      },
  },
  {
      $unwind: {
      path: "$realtime_inventory",
      },
  },
  {
      $match: {
      "realtime_inventory.quantity": 0,
      },
  },
  {
      $lookup: {
      from: "products",
      localField: "realtime_inventory.product_id",
      foreignField: "_id",
      as: "product_detail",
      },
  },
  {
      $unwind: {
      path: "$product_detail",
      },
  },
  {
      $project: {
      _id: 0,
      warehouse_name: "$name",
      product_category: "$product_detail.category",
      product_name: "$product_detail.name",
      warehouse_address: "$address",
      post_code: "$post_code",
      city: "$city",
      },
  },
]
```

Note: This query is done using an aggregation pipeline in suppliers collection.

Output:

```
warehouse_name: "Amazon UK MAN1"
product_category: "CD"
product_name: "Led Zepellin IV"
warehouse_address: "Manchester Airport, 6
                    Sunbank Ln, Altrincham"
post_code: "M90 5DL"
city: "Manchester"
```

```
warehouse_name: "Amazon UK MAN2"
product_category: "CD"
product_name: "Ladies & Gentlemen"
warehouse_address: "Amazon UK Services Ltd.,
                    Omega Plot 7c, Orion
                    Boulevard, Great Sankey"
post_code: "WA5 3XA"
city: "Warrington"
```

Query 6: To find the most recommended product. Since every customer is given a custom recommendation of products to buy, this query helps us find the product that is most recommended.

```
[
  {
      "$unwind": {
      "path": "$recommended_products"
      }
  },
  {
      "$group": {
      "_id": "$recommended_products.product_id",
      "count": {
      "$sum": 1
      }
      }
  },
  {
      "$sort": {
      "count": -1
      }
  },
  {
      "$limit": 1
  }
]
```

Note: This query is done using an aggregation pipeline in customers collection.

Output:

```
_id: "FP10"
count: 8
```

Query 7: To find the most productive partner in terms of average number of deliveries per week.

```
#Check the most productive partner

db.partners.find({},{_id:0,name:1,age:1,email:1,avg_per_week:1,best_week:1,number_of_week:1}
).sort({avg_per_week:-1}).limit(1)
```

Output:

```
db.partners.find({},{_id:0,name:1,age:1,email:1,avg_per_week:1,best_week:1,number_of_week:1}).sort({avg_per_week:-1}).limit(1)
{ name: 'Mike Dean',
  age: 20,
  email: 'mike.dean@gmail.com',
  avg_per_week: 14.5,
  best_week: 20,
  number_of_week: 12 }
```

Query 8: To find the most looked at product. These are products which are added to carts by many customers but not ordered. This could help Amazone to put these products on discount to increase its sales.

```
[
  {
      "$unwind": {
      "path": "$current_orders"
      }
  },
  {
      "$match": {
      "current_orders.order_status": 1
      }
  },
```

```
    {
        "$unwind": {
        "path": "$current_orders.order_details"
        }
    },
    {
        "$group": {
        "_id": "$current_orders.order_details.product_id",
        "count": {
        "$sum": 1
        }
        }
    },
    {
        "$sort": {
        "count": -1
        }
    },
    {
        "$limit": 1
    }
]
```

Note: This query is done using an aggregation pipeline in customers collection.

Output:

Output after $limit ⬀ stage (Sample of 1 document)

```
    _id: "FP1"
    count: 2
```

Query 9: To find the highest and lowest rated products.

➔ **9.1** Highest rated product

```
# Get the highest rating
pipeline = [
        {"$sort": {"avg_ratings": -1}},
        {"$limit": 1},
        {"$project": {"_id": 0, "avg_ratings": 1}}
]
```

```
highest_rating = productsCollection.aggregate(pipeline)

for i in highest_rating:
        highest_rating_value = i["avg_ratings"]

# Print highest rated products
highest_rated_products = productsCollection.find(
        {"avg_ratings": {"$eq": highest_rating_value}}
)

for i in highest_rated_products:
        print(f"Product id: {i['_id']}, Average ratings: {i['avg_ratings']}")
```

Output:

```
Product id: B2, Average ratings: 4.2
```

➔ **3.2** Lowest rated product

```
# Get the lowest rating
pipeline = [
        {"$sort": {"avg_ratings": 1}},
        {"$limit": 1},
        {"$project": {"_id": 0, "avg_ratings": 1}}
]

lowest_rating = productsCollection.aggregate(pipeline)

for i in lowest_rating:
        lowest_rating_value = i["avg_ratings"]

# Print lowest rated products
lowest_rated_products = productsCollection.find(
        {"avg_ratings": {"$eq": lowest_rating_value}}
)

for i in lowest_rated_products:
        print(f"Product id: {i['_id']}, Average ratings: {i['avg_ratings']}")
```

Output:

```
Product id: B3, Average ratings: 1.6
```

Query 10: To find trends in product category ratings

```python
# Grouping products by category and calculating their average ratings
category_ratings = pd.DataFrame(productsCollection.aggregate(
    [
        {
        '$group':
        {
        '_id': "$category",
        'avgRating': { '$avg': "$avg_ratings" }
        }
        },
        # Outputting the average ratings to 2 decimal places
        {'$project':{'averageRating': { '$round': [ "$avgRating", 2 ] }}}
    ]
))

category_ratings


ax = sns.barplot(data=category_ratings, x="_id", y="averageRating")

#Specfiy axis labels
ax.set(xlabel='Product category',
       ylabel='Average rating',
       title='Average rating for each product category')
plt.show()
```
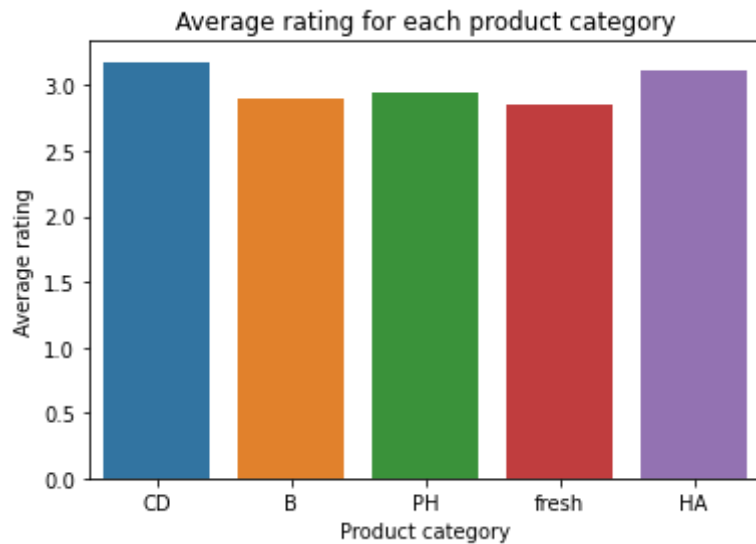
Output:

	_id	averageRating
0	CD	3.18
1	HA	3.12
2	PH	2.94
3	B	2.90
4	fresh	2.85

Query 11: To check the average distance between store addresses and shipped addresses of a specific product.

```python
# connecting to products collection
customersCollection = myDB["customers"]

# read documents of customers that have orderred product "HA9"
for x in customersCollection.find({"current_orders.order_details.product_id":"HA9"}):
    print(x)
```

→ {'_id': 'C5', 'Customer': 'Ray Mcdaniel',

→ {'_id': 'C17', 'Customer': 'Patience Valentine',

```python
# read doc of C5
c5_doc = customersCollection.find_one({"_id": "C15"})

# extract details about C5
customer_order5 = c5_doc["current_orders"][0]
print(customer_order5)
print("")

# find the shipping address coordinates
customer_coordinates5 = c5_doc["addresses"][-1]['location']['coordinates']
print(customer_coordinates5)
```

→ [53.46764284, -2.264848358]

```python
# read doc of C17
c17_doc = customersCollection.find_one({"_id": "C17"})

# extract details about C17
customer_order17 = c17_doc["current_orders"][0]
print(customer_order17)
print("")

# find the shipping address coordinates
customer_coordinates17 = c17_doc["addresses"][-1]['location']['coordinates']
print(customer_coordinates17)
```

→ [53.45466109, -2.207181547]

```python
# calculate the average of the 2 shipping coordinates
stacked_arrays = np.stack([customer_coordinates5, customer_coordinates17], axis=0)
average_shipping_address = np.mean(stacked_arrays, axis=0)
```

```python
print(average_shipping_address)
```

→ [53.46115196 -2.23601495]

```python
# connecting to the suppliers collection
suppliersCollection = myDB["suppliers"]

# read doc of W1, W2 and W3
w1_doc = suppliersCollection.find_one({"_id": "W1"})
w2_doc = suppliersCollection.find_one({"_id": "W2"})
w3_doc = suppliersCollection.find_one({"_id": "W3"})

# find the store addressess
supplier_coordinates1 = w1_doc['location']['coordinates']
print(supplier_coordinates1)

supplier_coordinates2 = w2_doc['location']['coordinates']
print(supplier_coordinates2)

supplier_coordinates3 = w3_doc['location']['coordinates']
print(supplier_coordinates3)
```

→ [53.36275842, -2.294618987]
  [53.4206283, -2.6594717]
  [53.31948, -2.65501]

```python
# calculate the average of the 3 store coordinates
stacked_arrays2 = np.stack([supplier_coordinates1, supplier_coordinates1,
supplier_coordinates1], axis=0)
average_store_address = np.mean(stacked_arrays2, axis=0)
print(average_store_address)
```

→ [53.36275842 -2.29461899]

```python
# calculating the distance between store and shipped addressess for product "HA9"
distance = distance(average_store_address, average_shipping_address).km
print(f"Distance: {distance:.2f} km")
```

Output:

Distance: 11.62 km

APPENDIX

Collections: (in JSON format) + metadata

1. **Customers:**
   - **_id:** unique identifier
   - **Name:** customer name
   - **Gender:** gender of the customer
   - **Age:** age of the customer
   - **Phone number:** contact number of the customer
   - **Addresses**
     - **_id:** unique identifier
     - **House:** house name/number
     - **Street:** street name/number
     - **City:** city
     - **Post code:** postcode of the address
     - **Location**
       - **Coordinates:** geospatial location based on longitude and latitude
     - **Current orders**
       - **_id:** unique identifier
       - **Date:** date when order was placed
       - **Order status:** Can be one of 6, 1. Added to Cart, 2. Paid, 3. Ongoing 4. Dispatched, 5. Delivered, 6. Delayed
       - **Order details**
         - **Total cost:** total cost of the order
         - **partner _id:** unique identifier of the partner making the delivery
         - **Shipping_id:** unique identifier of the shipping address
         - **Supplier_id:** unique identifier of the warehouse supplying the product
       - **Recommended products**
         - **Product_id:** unique identifier of the product being recommended
         - **Avg_rating:** average rating of the recommended product

```
[{
  "_id": "C5",
  "Customer": "Ray Mcdaniel",
  "Gender": "M",
  "Age": 28,
  "phone_number": {
       "$numberLong": "448788155481"
  },
  "addresses": [
       {
       "_id": "AD5",
```

```json
          "house": "Manhattan Apartment 302",
          "street": "38 George St",
          "city": "Manchester",
          "post_code": "M1 4HA",
          "location": {
          "type": "Point",
          "coordinates": [
          53.4810334,
          -2.239225003
          ]
          }
          }
      ],
      "current_orders": [
          {
          "_id": "20230104073820C5",
          "date": {
          "$date": {
          "$numberLong": "1672817900000"
          }
          },
          "order_status": 3,
          "order_details": [
          {
          "product_id": "HA9",
          "quantity": 1,
          "cost": 61.75
          }
          ],
          "total_cost": 61.75,
          "partner_id": "",
          "shipping_id": "AD5",
          "supplier_id": "W1"
          },
          {
          "_id": "20230104073950C5",
          "date": {
          "$date": {
          "$numberLong": "1672817990000"
          }
          },
          "order_status": 4,
          "order_details": [
          {
          "product_id": "HA3",
          "quantity": 2,
          "cost": 20.74
          }
          ],
          "total_cost": 41.48,
          "partner_id": "PA1",
          "shipping_id": "AD5",
```

```json
            "supplier_id": "W1"
        }
    ],
    "recommended_products": [
        {
        "product_id": "HA2",
        "avg_rating": 3.8
        },
        {
        "product_id": "PH4",
        "avg_rating": 3.6
        }
    ]
},{
    "_id": "C2",
    "Customer": "Lillie Costa",
    "Gender": "F",
    "Age": 30,
    "phone_number": {
        "$numberLong": "447137031760"
    },
    "addresses": [
        {
        "_id": "AD2",
        "house": "The Residence 202",
        "street": "371 Deansgate",
        "city": "Manchester",
        "post_code": "M15 4UP",
        "location": {
        "type": "Point",
        "coordinates": [
        53.47352882,
        -2.252042281
        ]
        }
        }
    ],
    "current_orders": [
        {
        "_id": "20230104032443C2",
        "date": {
        "$date": {
        "$numberLong": "1672802683000"
        }
        },
        "order_status": 4,
        "order_details": [
        {
        "product_id": "FP4",
        "quantity": 2,
        "cost": 6.8
        }
```

```json
        ],
        "total_cost": 13.6,
        "partner_id": "PA2",
        "shipping_id": "AD2",
        "supplier_id": "ST2"
        },
        {
        "_id": "20230104032814C2",
        "date": {
        "$date": {
        "$numberLong": "1672802894000"
        }
        },
        "order_status": 3,
        "order_details": [
        {
        "product_id": "FP1",
        "quantity": 1,
        "cost": 2
        }
        ],
        "total_cost": 2,
        "partner_id": "PA2",
        "shipping_id": "AD2",
        "supplier_id": "ST3"
        },
        {
        "_id": "20230109181700C2",
        "date": {
        "$date": {
        "$numberLong": "1673288220000"
        }
        },
        "order_status": 3,
        "total_cost": 4,
        "partner_id": "PA2",
        "shipping_id": "AD2",
        "supplier_id": "ST3",
        "order_details": [
        {
        "product_id": "FP3",
        "quantity": 2,
        "cost": 4
        }
        ]
        }
    ],
    "recommended_products": [
        {
        "product_id": "FP8",
        "avg_rating": 3.8
        },
```

```json
            {
            "product_id": "B2",
            "avg_rating": 4.2
            }
      ]
},{
   "_id": "C3",
   "Customer": "Raelynn Dodson",
   "Gender": "F",
   "Age": 44,
   "phone_number": {
         "$numberLong": "443482883256"
   },
   "addresses": [
            {
            "_id": "AD3",
            "house": 3,
            "street": "Dickinson St",
            "city": "Manchester",
            "post_code": "M1 4LF",
            "location": {
            "type": "Point",
            "coordinates": [
            53.47850891,
            -2.242348226
            ]
            }
            }
   ],
   "current_orders": [
            {
            "_id": "20230104035938C3",
            "date": {
            "$date": {
            "$numberLong": "1672804778000"
            }
            },
            "order_status": 2,
            "order_details": [
            {
            "product_id": "PH1",
            "quantity": 1,
            "cost": 169
            }
            ],
            "total_cost": 169,
            "partner_id": "",
            "shipping_id": "AD3",
            "supplier_id": "W1"
            },
            {
            "_id": "20230104045148C3",
```

```json
        "date": {
        "$date": {
        "$numberLong": "1672807908000"
        }
        },
        "order_status": 1,
        "order_details": [
        {
        "product_id": "FP2",
        "quantity": 1,
        "cost": 2.7
        },
        {
        "product_id": "FP1",
        "quantity": 5,
        "cost": 2
        }
        ],
        "total_cost": 210,
        "partner_id": "",
        "shipping_id": "AD3",
        "supplier_id": "ST4"
        },
        {
        "_id": "20230104054212C3",
        "date": {
        "$date": {
        "$numberLong": "1672810932000"
        }
        },
        "order_status": 2,
        "total_cost": 11.48,
        "partner_id": "",
        "shipping_id": "AD3",
        "supplier_id": "W1",
        "order_details": [
        {
        "product_id": "CD2",
        "quantity": 1,
        "cost": 11.48
        }
        ]
        }
    ],
    "recommended_products": [
        {
        "product_id": "FP10",
        "avg_rating": 3.8
        },
        {
        "product_id": "PH4",
        "avg_rating": 3.6
```

```
            }
        ]
    },{
        "_id": "C13",
        "Customer": "Rowan Fox",
        "Gender": "M",
        "Age": 58,
        "phone_number": {
            "$numberLong": "447885651241"
        },
        "addresses": [
            {
            "_id": "AD13",
            "house": "Circle Square Apartment 321",
            "street": "7 Symphony Park",
            "city": "Manchester",
            "post_code": "M1 7GB",
            "location": {
            "type": "Point",
            "coordinates": [
            53.47255984,
            -2.236631167
            ]
            }
            },
            {
            "_id": "AD14",
            "house": 42,
            "street": "City Rd E",
            "city": "Manchester",
            "post_code": "M15 4QF",
            "location": {
            "type": "Point",
            "coordinates": [
            53.47198948,
            -2.248974858
            ]
            }
            }
        ],
        "current_orders": [
            {
            "_id": "20230104164331C13",
            "date": {
            "$date": {
            "$numberLong": "1672850611000"
            }
            },
            "order_status": 4,
            "order_details": [
            {
            "product_id": "FP9",
```

```json
        "quantity": 6,
        "cost": 2
        }
        ],
        "total_cost": 12,
        "partner_id": "PA3",
        "shipping_id": "AD13",
        "supplier_id": "ST2"
        },
        {
        "_id": "20230104171338C13",
        "date": {
        "$date": {
        "$numberLong": "1672852418000"
        }
        },
        "order_status": 1,
        "order_details": [
        {
        "product_id": "FP13",
        "quantity": 2,
        "cost": 3
        }
        ],
        "total_cost": 6,
        "partner_id": "",
        "shipping_id": "AD13",
        "supplier_id": "W1"
        }
    ],
    "recommended_products": [
        {
        "product_id": "FP8",
        "avg_rating": 3.8
        },
        {
        "product_id": "PH4",
        "avg_rating": 3.6
        }
    ]
},{
    "_id": "C19",
    "Customer": "Ram Prasad",
    "Gender": "M",
    "Age": 50,
    "phone_number": {
        "$numberLong": "445866104074"
    },
    "addresses": [
        {
        "_id": "AD20",
        "house": 5,
```

```json
            "street": "Lucy St",
            "city": "Manchester",
            "post_code": "M15 4SG",
            "location": {
            "type": "Point",
            "coordinates": [
            53.46546566,
            -2.261863026
            ]
            }
            },
            {
            "_id": "AD21",
            "house": 4,
            "street": "Eyre St",
            "city": "Manchester",
            "post_code": "M15 6HD",
            "location": {
            "type": "Point",
            "coordinates": [
            53.46406425,
            -2.241031337
            ]
            }
            }
        ],
        "current_orders": [
            {
            "_id": "20230104210846C19",
            "date": {
            "$date": {
            "$numberLong": "1672866526000"
            }
            },
            "order_status": 2,
            "order_details": [
            {
            "product_id": "PH7",
            "quantity": 4,
            "cost": 599
            },
            {
            "product_id": "CD10",
            "quantity": 5,
            "cost": 8.28
            }
            ],
            "total_cost": 2437.4,
            "partner_id": "",
            "shipping_id": "AD20",
            "supplier_id": "W1"
            },
```

```json
        {
        "_id": "20230104212616C19",
        "date": {
        "$date": {
        "$numberLong": "1672867576000"
        }
        },
        "order_status": 3,
        "order_details": [
        {
        "product_id": "B6",
        "quantity": 1,
        "cost": 13.99
        },
        {
        "product_id": "PH6",
        "quantity": 1,
        "cost": 769
        }
        ],
        "total_cost": 782.99,
        "partner_id": "",
        "shipping_id": "AD21",
        "supplier_id": "W1"
        }
    ],
    "recommended_products": [
        {
        "product_id": "FP10",
        "avg_rating": 3.8
        },
        {
        "product_id": "PH4",
        "avg_rating": 3.6
        }
    ]
},{
    "_id": "C9",
    "Customer": "Kylee Wang",
    "Gender": "F",
    "Age": 30,
    "phone_number": {
        "$numberLong": "442407773507"
    },
    "addresses": [
        {
        "_id": "AD9",
        "house": 6,
        "street": "St Anns Square",
        "city": "Manchester",
        "post_code": "M2 7HN",
        "location": {
```

```json
            "type": "Point",
            "coordinates": [
            53.48164032,
            -2.245008303
            ]
            }
            }
    ],
    "current_orders": [
            {
            "_id": "20230104124723C9",
            "date": {
            "$date": {
            "$numberLong": "1672836443000"
            }
            },
            "order_status": 1,
            "order_details": [
            {
            "product_id": "CD1",
            "quantity": 1,
            "cost": 14.87
            }
            ],
            "total_cost": 14.87,
            "partner_id": "",
            "shipping_id": "AD9",
            "supplier_id": "W2"
            },
            {
            "_id": "20230104130020C9",
            "date": {
            "$date": {
            "$numberLong": "1672837220000"
            }
            },
            "order_status": 1,
            "order_details": [
            {
            "product_id": "FP4",
            "quantity": 2,
            "cost": 6.8
            }
            ],
            "total_cost": 13.6,
            "partner_id": "",
            "shipping_id": "AD9",
            "supplier_id": "ST1"
            }
    ],
    "recommended_products": [
            {
```

```json
            "product_id": "CD10",
            "avg_rating": 4
            },
            {
            "product_id": "FP10",
            "avg_rating": 3.8
            }
        ]
    },{
    "_id": "C10",
    "Customer": "Billy Ross",
    "Gender": "M",
    "Age": 45,
    "phone_number": {
        "$numberLong": "449575146991"
    },
    "addresses": [
        {
        "_id": "AD10",
        "house": 36,
        "street": "City Rd E",
        "city": "Manchester",
        "post_code": "M15 4TH",
        "location": {
        "type": "Point",
        "coordinates": [
        53.47182187,
        -2.249197681
        ]
        }
        }
    ],
    "current_orders": [
        {
        "_id": "20230104142337C10",
        "date": {
        "$date": {
        "$numberLong": "1672842217000"
        }
        },
        "order_status": 4,
        "order_details": [
        {
        "product_id": "FP5",
        "quantity": 2,
        "cost": 2
        }
        ],
        "total_cost": 4,
        "partner_id": "PA2",
        "shipping_id": "AD10",
        "supplier_id": "ST2"
```

```json
        },
        {
        "_id": "20230104142757C10",
        "date": {
        "$date": {
        "$numberLong": "1672842477000"
        }
        },
        "order_status": 2,
        "order_details": [
        {
        "product_id": "CD5",
        "quantity": 1,
        "cost": 7.46
        }
        ],
        "total_cost": 7.46,
        "partner_id": "",
        "shipping_id": "AD10",
        "supplier_id": "W1"
        }
    ],
    "recommended_products": [
        {
        "product_id": "CD1",
        "avg_rating": 3.4
        },
        {
        "product_id": "HA10",
        "avg_rating": 3.8
        }
    ]
},{
  "_id": "C11",
  "Customer": "Jairo Fitzgerald",
  "Gender": "M",
  "Age": 19,
  "phone_number": {
      "$numberLong": "445486335516"
  },
  "addresses": [
      {
      "_id": "AD11",
      "house": 1,
      "street": "Trentham St",
      "city": "Manchester",
      "post_code": "M15 4YG",
      "location": {
      "type": "Point",
      "coordinates": [
      53.47103182,
      -2.264642358
```

```
        ]
      }
    }
  ],
  "current_orders": [
    {
      "_id": "20230104145116C11",
      "date": {
        "$date": {
          "$numberLong": "1672843876000"
        }
      },
      "order_status": 3,
      "order_details": [
        {
          "product_id": "FP1",
          "quantity": 3,
          "cost": 2
        }
      ],
      "total_cost": 6,
      "partner_id": "",
      "shipping_id": "AD11",
      "supplier_id": "ST1"
    },
    {
      "_id": "20230104153802C11",
      "date": {
        "$date": {
          "$numberLong": "1672846682000"
        }
      },
      "order_status": 4,
      "order_details": [
        {
          "product_id": "FP10",
          "quantity": 5,
          "cost": 4
        }
      ],
      "total_cost": 20,
      "partner_id": "PA5",
      "shipping_id": "AD11",
      "supplier_id": "ST2"
    }
  ],
  "recommended_products": [
    {
      "product_id": "FP11",
      "avg_rating": 3.2
    },
    {
```

```json
        "product_id": "PH8",
        "avg_rating": 3
        }
    ]
},{
    "_id": "C12",
    "Customer": "Lucian Cohen",
    "Gender": "F",
    "Age": 64,
    "phone_number": {
        "$numberLong": "444694363523"
    },
    "addresses": [
        {
        "_id": "AD12",
        "house": "Downtown Apartment 405",
        "street": "7-9 Woden St",
        "city": "Manchester",
        "post_code": "M5 4YH",
        "location": {
        "type": "Point",
        "coordinates": [
        53.47379226,
        -2.266542294
        ]
        }
        }
    ],
    "current_orders": [
        {
        "_id": "20230104154828C12",
        "date": {
        "$date": {
        "$numberLong": "1672847308000"
        }
        },
        "order_status": 1,
        "order_details": [
        {
        "product_id": "FP1",
        "quantity": 3,
        "cost": 2
        }
        ],
        "total_cost": 6,
        "partner_id": "",
        "shipping_id": "AD12",
        "supplier_id": "ST1"
        },
        {
        "_id": "20230104162435C12",
        "date": {
```

```json
            "$date": {
            "$numberLong": "1672849475000"
            }
        },
        "order_status": 2,
        "partner_id": "",
        "order_details": [
        {
        "product_id": "FP10",
        "quantity": 5,
        "cost": 4
        }
        ],
        "total_cost": 20,
        "shipping_id": "AD12",
        "supplier_id": "ST2"
        }
    ],
    "recommended_products": [
        {
        "product_id": "FP10",
        "avg_rating": 3.8
        },
        {
        "product_id": "HA2",
        "avg_rating": 3.8
        }
    ]
},{
    "_id": "C15",
    "Customer": "Calvin Carlson",
    "Gender": "M",
    "Age": 66,
    "phone_number": {
        "$numberLong": "448193919245"
    },
    "addresses": [
        {
        "_id": "AD16",
        "house": "Botanica Apartment 406",
        "street": "343 Chester Road",
        "city": "Manchester",
        "post_code": "M15 4YS",
        "location": {
        "type": "Point",
        "coordinates": [
        53.46764284,
        -2.264848358
        ]
        }
        }
    ],
```

```json
"current_orders": [
    {
    "_id": "20230104183531C15",
    "date": {
    "$date": {
    "$numberLong": "1672857331000"
    }
    },
    "order_status": 1,
    "order_details": [
    {
    "product_id": "CD6",
    "quantity": 1,
    "cost": 14.92
    }
    ],
    "total_cost": 14.92,
    "partner_id": "",
    "shipping_id": "AD16",
    "supplier_id": "W1"
    },
    {
    "_id": "20230104184145C15",
    "date": {
    "$date": {
    "$numberLong": "1672857705000"
    }
    },
    "order_status": 1,
    "order_details": [
    {
    "product_id": "HA5",
    "quantity": 1,
    "cost": 29
    }
    ],
    "total_cost": 29,
    "partner_id": "",
    "shipping_id": "AD16",
    "supplier_id": "W1"
    }
],
"recommended_products": [
    {
    "product_id": "HA2",
    "avg_rating": 3.8
    },
    {
    "product_id": "B2",
    "avg_rating": 4.2
    }
]
```

```json
},{
    "_id": "C17",
    "Customer": "Patience Valentine",
    "Gender": "F",
    "Age": 38,
    "phone_number": {
        "$numberLong": "448240719966"
    },
    "addresses": [
        {
        "_id": "AD18",
        "house": 290,
        "street": "Dickenson Road",
        "city": "Manchester",
        "post_code": "M14 5HA",
        "location": {
        "type": "Point",
        "coordinates": [
        53.45466109,
        -2.207181547
        ]
        }
        }
    ],
    "current_orders": [
        {
        "_id": "20230104192023C17",
        "date": {
        "$date": {
        "$numberLong": "1672860023000"
        }
        },
        "order_status": 3,
        "order_details": [
        {
        "product_id": "HA9",
        "quantity": 1,
        "cost": 61.75
        }
        ],
        "total_cost": 61.75,
        "partner_id": "",
        "shipping_id": "AD18",
        "supplier_id": "W1"
        },
        {
        "_id": "20230104194512C17",
        "date": {
        "$date": {
        "$numberLong": "1672861512000"
        }
        },
```

```json
        "order_status": 2,
        "order_details": [
        {
        "product_id": "B7",
        "quantity": 8,
        "cost": 16.99
        }
        ],
        "total_cost": 135.92,
        "partner_id": "",
        "shipping_id": "AD18",
        "supplier_id": "W3"
        }
    ],
    "recommended_products": [
        {
        "product_id": "B2",
        "avg_rating": 4.2
        },
        {
        "product_id": "FP10",
        "avg_rating": 3.8
        }
    ]
},{
    "_id": "C20",
    "Customer": "Mark Mulldon",
    "Gender": "M",
    "Age": 59,
    "phone_number": {
        "$numberLong": "445219432797"
    },
    "addresses": [
        {
        "_id": "AD22",
        "house": 2,
        "street": "Knowles Place",
        "city": "Manchester",
        "post_code": "M15 6DA",
        "location": {
        "type": "Point",
        "coordinates": [
        53.46931183,
        -2.242109147
        ]
        }
        }
    ],
    "current_orders": [
        {
        "_id": "20230104230118C20",
        "date": {
```

```
        "$date": {
        "$numberLong": "1672873278000"
        }
        },
        "order_status": 2,
        "order_details": [
        {
        "product_id": "FP9",
        "quantity": 3,
        "cost": 2
        },
        {
        "product_id": "FP7",
        "quantity": 4,
        "cost": 2
        }
        ],
        "total_cost": 14,
        "partner_id": "",
        "shipping_id": "AD22",
        "supplier_id": "ST1"
        },
        {
        "_id": "20230104232544C20",
        "date": {
        "$date": {
        "$numberLong": "1672874744000"
        }
        },
        "order_status": 4,
        "order_details": [
        {
        "product_id": "PH9",
        "quantity": 1,
        "cost": 849
        }
        ],
        "total_cost": 849,
        "partner_id": "PA3",
        "shipping_id": "AD22",
        "supplier_id": "W3"
        }
    ],
    "recommended_products": [
        {
        "product_id": "FP1",
        "avg_rating": 3.6
        },
        {
        "product_id": "CD2",
        "avg_rating": 4
        }
```

```json
        ]
    },{
    "_id": "C1",
    "Customer": "Gunner Ferrell",
    "Gender": "M",
    "Age": 51,
    "phone_number": {
        "$numberLong": "443454155475"
    },
    "addresses": [
        {
        "_id": "AD1",
        "house": 27,
        "street": "Ellesmere St",
        "city": "Manchester",
        "post_code": "M15 4RU",
        "location": {
        "type": "Point",
        "coordinates": [
        53.4702888668,
        -2.26459207339
        ]
        }
        }
    ],
    "current_orders": [
        {
        "_id": "20230104002920C1",
        "date": {
        "$date": {
        "$numberLong": "1672792160000"
        }
        },
        "order_status": 3,
        "total_cost": 10.7,
        "partner_id": "",
        "shipping_id": "AD1",
        "supplier_id": "ST1",
        "order_details": [
        {
        "product_id": "FP1",
        "quantity": 4,
        "cost": 2
        },
        {
        "product_id": "FP2",
        "quantity": 1,
        "cost": 2.7
        }
        ]
        },
        {
```

```
            "_id": "20230104032330C1",
            "date": {
            "$date": {
            "$numberLong": "1672802610000"
            }
            },
            "order_status": 3,
            "total_cost": 4,
            "partner_id": "",
            "shipping_id": "AD1",
            "supplier_id": "ST2",
            "order_details": [
            {
            "product_id": "FP5",
            "quantity": 2,
            "cost": 2
            }
            ]
            },
            {
            "_id": "20230109181700C2",
            "date": {
            "$date": {
            "$numberLong": "1673285460000"
            }
            },
            "order_status": 3,
            "total_cost": 6,
            "partner_id": "PA2",
            "shipping_id": "AD2",
            "supplier_id": "ST3",
            "order_details": [
            {
            "product_id": "FP3",
            "quantity": 3,
            "cost": 6
            }
            ]
            }
        ],
        "recommended_products": [
            {
            "product_id": "FP10",
            "avg_rating": 3.8
            },
            {
            "product_id": "CD2",
            "ratings": 4
            }
        ]
    },{
      "_id": "C4",
```

```json
"Customer": "Yazmin Hughes",
"Gender": "F",
"Age": 43,
"phone_number": {
    "$numberLong": "446180152448"
},
"addresses": [
    {
    "_id": "AD4",
    "house": "Manchester Apartment 104",
    "street": "60 Oxford St",
    "city": "Manchester",
    "post_code": "M1 5EE",
    "location": {
    "type": "Point",
    "coordinates": [
    53.47435691,
    -2.242684794
    ]
    }
    }
],
"current_orders": [
    {
    "_id": "20230104062322C4",
    "date": {
    "$date": {
    "$numberLong": "1672813402000"
    }
    },
    "order_status": 2,
    "order_details": [
    {
    "product_id": "FP12",
    "quantity": 5,
    "cost": 5
    }
    ],
    "total_cost": 25,
    "partner_id": "",
    "shipping_id": "AD4",
    "supplier_id": "ST5"
    },
    {
    "_id": "20230104070917C4",
    "date": {
    "$date": {
    "$numberLong": "1672816157000"
    }
    },
    "order_status": 1,
    "order_details": [
```

```
                {
                "product_id": "HA1",
                "quantity": 1,
                "cost": 58.99
                }
                ],
                "total_cost": 58.99,
                "partner_id": "",
                "shipping_id": "AD4",
                "supplier_id": "W1"
                }
        ],
        "recommended_products": [
                {
                "product_id": "B10",
                "avg_rating": 3.4
                },
                {
                "product_id": "HA3",
                "avg_rating": 4
                }
        ]
},{
        "_id": "C7",
        "Customer": "Charity Dunn",
        "Gender": "F",
        "Age": 21,
        "phone_number": {
                "$numberLong": "441688180719"
        },
        "addresses": [
                {
                "_id": "AD7",
                "house": "Dream Apartment 112",
                "street": "Adelphi Wharf 1",
                "city": "Manchester",
                "post_code": "M3 6EN",
                "location": {
                "type": "Point",
                "coordinates": [
                53.48613766,
                -2.26412568
                ]
                }
                }
        ],
        "current_orders": [
                {
                "_id": "20230104085210C7",
                "date": {
                "$date": {
                "$numberLong": "1672822330000"
```

```
        }
      },
      "order_status": 4,
      "order_details": [
      {
      "product_id": "FP2",
      "quantity": 3,
      "cost": 2.7
      }
      ],
      "total_cost": 8.1,
      "partner_id": "PA5",
      "shipping_id": "AD7",
      "supplier_id": "ST1"
      },
      {
      "_id": "20230104093722C7",
      "date": {
      "$date": {
      "$numberLong": "1672825042000"
      }
      },
      "order_status": 2,
      "order_details": [
      {
      "product_id": "B9",
      "quantity": 1,
      "cost": 9.99
      }
      ],
      "total_cost": 9.99,
      "partner_id": "",
      "shipping_id": "AD7",
      "supplier_id": "W1"
      }
    ],
    "recommended_products": [
      {
      "product_id": "B2",
      "avg_rating": 4.2
      },
      {
      "product_id": "HA2",
      "avg_rating": 3.8
      }
    ]
},{
  "_id": "C14",
  "Customer": "Brice Copeland",
  "Gender": "M",
  "Age": 33,
  "phone_number": {
```

```json
        "$numberLong": "446933952521"
},
"addresses": [
        {
        "_id": "AD15",
        "house": "Thomas House 108",
        "street": "Thomas St",
        "city": "Manchester",
        "post_code": "M4 1EX",
        "location": {
        "type": "Point",
        "coordinates": [
        53.48445305,
        -2.23749638
        ]
        }
        }
],
"current_orders": [
        {
        "_id": "20230104175610C14",
        "date": {
        "$date": {
        "$numberLong": "1672854970000"
        }
        },
        "order_status": 3,
        "order_details": [
        {
        "product_id": "B3",
        "quantity": 1,
        "cost": 8
        }
        ],
        "total_cost": 8,
        "partner_id": "",
        "shipping_id": "AD15",
        "supplier_id": "W1"
        },
        {
        "_id": "20230104181037C14",
        "date": {
        "$date": {
        "$numberLong": "1672855837000"
        }
        },
        "order_status": 4,
        "order_details": [
        {
        "product_id": "CD5",
        "quantity": 1,
        "cost": 7.46
```

```
            }
        ],
        "total_cost": 7.46,
        "partner_id": "PA2",
        "shipping_id": "AD15",
        "supplier_id": "W2"
        }
    ],
    "recommended_products": [
        {
        "product_id": "B2",
        "avg_rating": 4.2
        },
        {
        "product_id": "FP10",
        "avg_rating": 3.8
        }
    ]
},{
    "_id": "C16",
    "Customer": "Alyvia Mccormick",
    "Gender": "F",
    "Age": 22,
    "phone_number": {
        "$numberLong": "442962074861"
    },
    "addresses": [
        {
        "_id": "AD17",
        "house": 83,
        "street": "Devonshire Street South",
        "city": "Manchester",
        "post_code": "M13 9DA",
        "location": {
        "type": "Point",
        "coordinates": [
        53.46565883,
        -2.218350607
        ]
        }
        }
    ],
    "current_orders": [
        {
        "_id": "20230104185709C16",
        "date": {
        "$date": {
        "$numberLong": "1672858629000"
        }
        },
        "order_status": 2,
        "order_details": [
```

```json
            {
            "product_id": "HA6",
            "quantity": 1,
            "cost": 124.25
            }
            ],
            "total_cost": 124.25,
            "partner_id": "",
            "shipping_id": "AD17",
            "supplier_id": "W1"
            },
            {
            "_id": "20230104185943C16",
            "date": {
            "$date": {
            "$numberLong": "1672858783000"
            }
            },
            "order_status": 4,
            "order_details": [
            {
            "product_id": "CD10",
            "quantity": 4,
            "cost": 8.28
            }
            ],
            "total_cost": 33.12,
            "partner_id": "PA4",
            "shipping_id": "AD17",
            "supplier_id": "W1"
            }
        ],
      "recommended_products": [
            {
            "product_id": "HA2",
            "avg_rating": 3.8
            },
            {
            "product_id": "B2",
            "avg_rating": 4.2
            }
        ]
},{
    "_id": "C18",
    "Customer": "Aubree Holland",
    "Gender": "M",
    "Age": 70,
    "phone_number": {
        "$numberLong": "448137575603"
    },
    "addresses": [
        {
```

```
    "_id": "AD19",
    "house": 144,
    "street": "Plymouth Grove",
    "city": "Manchester",
    "post_code": "M13 9LU",
    "location": {
    "type": "Point",
    "coordinates": [
    53.46303432,
    -2.218282878
    ]
    }
    }
],
"current_orders": [
    {
    "_id": "20230104195830C18",
    "date": {
    "$date": {
    "$numberLong": "1672862310000"
    }
    },
    "order_status": 2,
    "order_details": [
    {
    "product_id": "PH1",
    "quantity": 1,
    "cost": 169
    }
    ],
    "total_cost": 169,
    "partner_id": "",
    "shipping_id": "AD19",
    "supplier_id": "W1"
    },
    {
    "_id": "20230104204208C18",
    "date": {
    "$date": {
    "$numberLong": "1672864928000"
    }
    },
    "order_status": 2,
    "order_details": [
    {
    "product_id": "CD9",
    "quantity": 2,
    "cost": 18.2
    }
    ],
    "total_cost": 36.4,
    "partner_id": "",
```

```json
        "shipping_id": "AD19",
        "supplier_id": "W1"
        }
    ],
    "recommended_products": [
        {
        "product_id": "HA2",
        "avg_rating": 3.8
        },
        {
        "product_id": "FP1",
        "avg_rating": 3.6
        }
    ]
},{
    "_id": "C6",
    "Customer": "Jamarcus Montgomery",
    "Gender": "M",
    "Age": 64,
    "phone_number": {
        "$numberLong": "448832254583"
    },
    "addresses": [
        {
        "_id": "AD6",
        "house": 6,
        "street": "Minshull St",
        "city": "Manchester",
        "post_code": "M1 3ED",
        "location": {
        "type": "Point",
        "coordinates": [
        53.47999262,
        -2.236578948
        ]
        }
        }
    ],
    "current_orders": [
        {
        "_id": "20230104083607C6",
        "date": {
        "$date": {
        "$numberLong": "1672821367000"
        }
        },
        "order_status": 4,
        "order_details": [
        {
        "product_id": "FP3",
        "quantity": 5,
        "cost": 2
```

```
        }
      ],
      "total_cost": 10,
      "partner_id": "PA3",
      "shipping_id": "AD6",
      "supplier_id": "ST1"
      },
      {
      "_id": "20230104084644C6",
      "date": {
      "$date": {
      "$numberLong": "1672822004000"
      }
      },
      "order_status": 3,
      "order_details": [
      {
      "product_id": "FP5",
      "quantity": 2,
      "cost": 2
      }
      ],
      "total_cost": 4,
      "partner_id": "PA3",
      "shipping_id": "AD6",
      "supplier_id": "ST2"
      }
    ],
  "recommended_products": [
      {
      "product_id": "FP10",
      "avg_rating": 3.8
      },
      {
      "product_id": "PH4",
      "avg_rating": 3.6
      }
  ]
},{
  "_id": "C8",
  "Customer": "Kelsey Brandt",
  "Gender": "F",
  "Age": 47,
  "phone_number": {
      "$numberLong": "447531225175"
  },
  "addresses": [
      {
      "_id": "AD8",
      "house": 9,
      "street": "Whitworth St W",
      "city": "Manchester",
```

```
        "post_code": "M1 5JB",
        "location": {
        "type": "Point",
        "coordinates": [
        53.4739587,
        -2.247152235
        ]
        }
        }
    ],
    "current_orders": [
        {
        "_id": "20230104100253C8",
        "date": {
        "$date": {
        "$numberLong": "1672826573000"
        }
        },
        "order_status": 4,
        "order_details": [
        {
        "product_id": "CD8",
        "quantity": 1,
        "cost": 20.65
        }
        ],
        "total_cost": 20.65,
        "partner_id": "PA1",
        "shipping_id": "AD8",
        "supplier_id": "W1"
        },
        {
        "_id": "20230104111320C8",
        "date": {
        "$date": {
        "$numberLong": "1672830800000"
        }
        },
        "order_status": 1,
        "order_details": [
        {
        "product_id": "B4",
        "quantity": 2,
        "cost": 14
        }
        ],
        "total_cost": 28,
        "partner_id": "",
        "shipping_id": "AD8",
        "supplier_id": "W2"
        }
    ],
```

```
    "recommended_products": [
        {
        "product_id": "HA10",
        "avg_rating": 3.8
        },
        {
        "product_id": "B2",
        "avg_rating": 4.2
        }
    ]
}]
```

2. **pastOrders:**
   - **_id:** unique identifier
   - **Order_date:** date order was placed
   - **Customer_id:**
   - **Order_details**
     - **Product_id:** unique product id
     - **Quantity:** quantity ordered
     - **Cost:** unit cost of the particular product (£'s)
   - **Total_cost:** total cost, unit cost x quantity
   - **Partner_id:** unique identifier of the partner (delivery drivers)
   - **Shipping_id:** the address ID to which the order shipped to
   - **Supplier_id:** the supplier unique id
   - **Order_status:** Can be one of 6, 1. Added to Cart, 2. Paid, 3. Ongoing 4. Dispatched, 5. Delivered, 6. Delayed

```
[{
  "_id": "20221001102713C19",
  "order_date": {
        "$date": {
        "$numberLong": "1664620020000"
        }
  },
  "customer_id": "C19",
  "order_details": [
        {
        "product_id": "CD2",
        "quantity": 3,
        "cost": 16.99
        }
  ],
  "total_cost": 50.97,
  "partner_id": "PA4",
  "shipping_id": "AD21",
  "supplier_id": "W2",
  "order_status": 5
},{
  "_id": "20221002010327C4",
  "order_date": {
        "$date": {
```

```json
            "$numberLong": "1664672580000"
        }
    },
    "customer_id": "C4",
    "order_details": [
        {
        "product_id": "B5",
        "quantity": 5,
        "cost": 4
        }
    ],
    "total_cost": 20,
    "partner_id": "PA5",
    "shipping_id": "AD4",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221001214036C16",
    "order_date": {
        "$date": {
        "$numberLong": "1664660400000"
        }
    },
    "customer_id": "C16",
    "order_details": [
        {
        "product_id": "HA6",
        "quantity": 5,
        "cost": 200
        }
    ],
    "total_cost": 1000,
    "partner_id": "PA3",
    "shipping_id": "AD17",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221001221901C7",
    "order_date": {
        "$date": {
        "$numberLong": "1664662740000"
        }
    },
    "customer_id": "C7",
    "order_details": [
        {
        "product_id": "CD8",
        "quantity": 4,
        "cost": 329.39
        }
    ],
    "total_cost": 1317.56,
```

```json
        "partner_id": "PA1",
        "shipping_id": "AD7",
        "supplier_id": "W1",
        "order_status": 5
},{
        "_id": "20221001224411C6",
        "order_date": {
                "$date": {
                "$numberLong": "1664664240000"
                }
        },
        "customer_id": "C6",
        "order_details": [
                {
                "product_id": "FP13",
                "quantity": 1,
                "cost": 849
                }
        ],
        "total_cost": 849,
        "partner_id": "PA5",
        "shipping_id": "AD6",
        "supplier_id": "ST3",
        "order_status": 5
},{
        "_id": "20221002034149C2",
        "order_date": {
                "$date": {
                "$numberLong": "1664682060000"
                }
        },
        "customer_id": "C2",
        "order_details": [
                {
                "product_id": "CD8",
                "quantity": 2,
                "cost": 2.8
                }
        ],
        "total_cost": 5.6,
        "partner_id": "PA3",
        "shipping_id": "AD2",
        "supplier_id": "W1",
        "order_status": 5
},{
        "_id": "20221002143729C6",
        "order_date": {
                "$date": {
                "$numberLong": "1664721420000"
                }
        },
        "customer_id": "C6",
```

```json
      "order_details": [
            {
            "product_id": "PH4",
            "quantity": 3,
            "cost": 37.04
            }
      ],
      "total_cost": 111.12,
      "partner_id": "PA2",
      "shipping_id": "AD6",
      "supplier_id": "W2",
      "order_status": 5
},{
      "_id": "20221002161655C17",
      "order_date": {
            "$date": {
            "$numberLong": "1664727360000"
            }
      },
      "customer_id": "C17",
      "order_details": [
            {
            "product_id": "B8",
            "quantity": 1,
            "cost": 190.85
            }
      ],
      "total_cost": 190.85,
      "partner_id": "PA4",
      "shipping_id": "AD18",
      "supplier_id": "W2",
      "order_status": 5
},{
      "_id": "20221002165122C14",
      "order_date": {
            "$date": {
            "$numberLong": "1664729460000"
            }
      },
      "customer_id": "C14",
      "order_details": [
            {
            "product_id": "B7",
            "quantity": 3,
            "cost": 16.58
            }
      ],
      "total_cost": 49.74,
      "partner_id": "PA3",
      "shipping_id": "AD15",
      "supplier_id": "W1",
      "order_status": 5
```

```
},{
    "_id": "20221006200951C1",
    "order_date": {
        "$date": {
        "$numberLong": "1665086940000"
        }
    },
    "customer_id": "C1",
    "order_details": [
        {
        "product_id": "CD7",
        "quantity": 2,
        "cost": 2.8
        }
    ],
    "total_cost": 5.6,
    "partner_id": "PA5",
    "shipping_id": "AD1",
    "supplier_id": "W1",
    "order_status": 5
},{
    "_id": "20221007083631C3",
    "order_date": {
        "$date": {
        "$numberLong": "1665131760000"
        }
    },
    "customer_id": "C3",
    "order_details": [
        {
        "product_id": "CD7",
        "quantity": 3,
        "cost": 9.99
        }
    ],
    "total_cost": 29.97,
    "partner_id": "PA1",
    "shipping_id": "AD3",
    "supplier_id": "W1",
    "order_status": 5
},{
    "_id": "20221008211056C2",
    "order_date": {
        "$date": {
        "$numberLong": "1665263400000"
        }
    },
    "customer_id": "C2",
    "order_details": [
        {
        "product_id": "B6",
        "quantity": 4,
```

```json
            "cost": 12.99
            }
    ],
    "total_cost": 51.96,
    "partner_id": "PA4",
    "shipping_id": "AD2",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221009152937C15",
    "order_date": {
            "$date": {
            "$numberLong": "1665329340000"
            }
    },
    "customer_id": "C15",
    "order_details": [
            {
            "product_id": "HA6",
            "quantity": 3,
            "cost": 2
            }
    ],
    "total_cost": 6,
    "partner_id": "PA4",
    "shipping_id": "AD16",
    "supplier_id": "W1",
    "order_status": 5
},{
    "_id": "20221010014752C14",
    "order_date": {
            "$date": {
            "$numberLong": "1665366420000"
            }
    },
    "customer_id": "C14",
    "order_details": [
            {
            "product_id": "B9",
            "quantity": 5,
            "cost": 9.99
            }
    ],
    "total_cost": 49.95,
    "partner_id": "PA3",
    "shipping_id": "AD15",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221012013602C3",
    "order_date": {
            "$date": {
```

```json
                "$numberLong": "1665538560000"
                }
        },
        "customer_id": "C3",
        "order_details": [
                {
                "product_id": "CD1",
                "quantity": 3,
                "cost": 190.85
                }
        ],
        "total_cost": 572.55,
        "partner_id": "PA3",
        "shipping_id": "AD3",
        "supplier_id": "W3",
        "order_status": 5
},{
        "_id": "20221012025232C12",
        "order_date": {
                "$date": {
                "$numberLong": "1665543120000"
                }
        },
        "customer_id": "C12",
        "order_details": [
                {
                "product_id": "CD5",
                "quantity": 1,
                "cost": 10
                }
        ],
        "total_cost": 10,
        "partner_id": "PA5",
        "shipping_id": "AD12",
        "supplier_id": "W3",
        "order_status": 5
},{
        "_id": "20221013052926C8",
        "order_date": {
                "$date": {
                "$numberLong": "1665638940000"
                }
        },
        "customer_id": "C8",
        "order_details": [
                {
                "product_id": "PH9",
                "quantity": 2,
                "cost": 3.2
                }
        ],
        "total_cost": 6.4,
```

```json
            "partner_id": "PA5",
            "shipping_id": "AD8",
            "supplier_id": "W3",
            "order_status": 5
     },{
            "_id": "20221013120905C13",
            "order_date": {
                  "$date": {
                  "$numberLong": "1665662940000"
                  }
            },
            "customer_id": "C13",
            "order_details": [
                  {
                  "product_id": "PH8",
                  "quantity": 4,
                  "cost": 3
                  }
            ],
            "total_cost": 12,
            "partner_id": "PA4",
            "shipping_id": "AD13",
            "supplier_id": "W3",
            "order_status": 5
     },{
            "_id": "20221015025337C2",
            "order_date": {
                  "$date": {
                  "$numberLong": "1665802380000"
                  }
            },
            "customer_id": "C2",
            "order_details": [
                  {
                  "product_id": "HA7",
                  "quantity": 4,
                  "cost": 329.39
                  }
            ],
            "total_cost": 1317.56,
            "partner_id": "PA5",
            "shipping_id": "AD2",
            "supplier_id": "W3",
            "order_status": 5
     },{
            "_id": "20221015030109C6",
            "order_date": {
                  "$date": {
                  "$numberLong": "1665802860000"
                  }
            },
            "customer_id": "C6",
```

```json
    "order_details": [
        {
        "product_id": "FP4",
        "quantity": 1,
        "cost": 2
        }
    ],
    "total_cost": 2,
    "partner_id": "PA2",
    "shipping_id": "AD6",
    "supplier_id": "ST1",
    "order_status": 5
},{
    "_id": "20221017051826C11",
    "order_date": {
        "$date": {
        "$numberLong": "1665983880000"
        }
    },
    "customer_id": "C11",
    "order_details": [
        {
        "product_id": "FP14",
        "quantity": 3,
        "cost": 21.97
        }
    ],
    "total_cost": 65.91,
    "partner_id": "PA1",
    "shipping_id": "AD11",
    "supplier_id": "ST4",
    "order_status": 5
},{
    "_id": "20221021075505C18",
    "order_date": {
        "$date": {
        "$numberLong": "1666338900000"
        }
    },
    "customer_id": "C18",
    "order_details": [
        {
        "product_id": "PH7",
        "quantity": 3,
        "cost": 2
        }
    ],
    "total_cost": 6,
    "partner_id": "PA2",
    "shipping_id": "AD19",
    "supplier_id": "W1",
    "order_status": 5
```

```json
},{
    "_id": "20221021163046C1",
    "order_date": {
        "$date": {
        "$numberLong": "1666369800000"
        }
    },
    "customer_id": "C1",
    "order_details": [
        {
        "product_id": "CD6",
        "quantity": 1,
        "cost": 20.74
        }
    ],
    "total_cost": 20.74,
    "partner_id": "PA3",
    "shipping_id": "AD1",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221022010010C7",
    "order_date": {
        "$date": {
        "$numberLong": "1666400400000"
        }
    },
    "customer_id": "C7",
    "order_details": [
        {
        "product_id": "HA3",
        "quantity": 2,
        "cost": 2
        }
    ],
    "total_cost": 4,
    "partner_id": "PA3",
    "shipping_id": "AD7",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221022065353C19",
    "order_date": {
        "$date": {
        "$numberLong": "1666421580000"
        }
    },
    "customer_id": "C19",
    "order_details": [
        {
        "product_id": "FP9",
        "quantity": 1,
```

```
            "cost": 849
            }
    ],
    "total_cost": 849,
    "partner_id": "PA5",
    "shipping_id": "AD21",
    "supplier_id": "ST1",
    "order_status": 5
},{
    "_id": "20221022115940C18",
    "order_date": {
        "$date": {
        "$numberLong": "1666439940000"
        }
    },
    "customer_id": "C18",
    "order_details": [
        {
        "product_id": "CD9",
        "quantity": 3,
        "cost": 14.87
        }
    ],
    "total_cost": 44.61,
    "partner_id": "PA1",
    "shipping_id": "AD19",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221023130623C6",
    "order_date": {
        "$date": {
        "$numberLong": "1666530360000"
        }
    },
    "customer_id": "C6",
    "order_details": [
        {
        "product_id": "CD2",
        "quantity": 1,
        "cost": 13.99
        }
    ],
    "total_cost": 13.99,
    "partner_id": "PA1",
    "shipping_id": "AD6",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221025001948C16",
    "order_date": {
        "$date": {
```

```json
                "$numberLong": "1666657140000"
            }
        },
        "customer_id": "C16",
        "order_details": [
            {
            "product_id": "CD8",
            "quantity": 3,
            "cost": 20.65
            }
        ],
        "total_cost": 61.95,
        "partner_id": "PA3",
        "shipping_id": "AD17",
        "supplier_id": "W1",
        "order_status": 5
},{
        "_id": "20221025131537C2",
        "order_date": {
            "$date": {
            "$numberLong": "1666703700000"
            }
        },
        "customer_id": "C2",
        "order_details": [
            {
            "product_id": "B3",
            "quantity": 2,
            "cost": 8
            }
        ],
        "total_cost": 16,
        "partner_id": "PA3",
        "shipping_id": "AD2",
        "supplier_id": "W3",
        "order_status": 5
},{
        "_id": "20221025232946C9",
        "order_date": {
            "$date": {
            "$numberLong": "1666740540000"
            }
        },
        "customer_id": "C9",
        "order_details": [
            {
            "product_id": "FP7",
            "quantity": 2,
            "cost": 2
            }
        ],
        "total_cost": 4,
```

```
    "partner_id": "PA1",
    "shipping_id": "AD9",
    "supplier_id": "ST2",
    "order_status": 5
},{
    "_id": "20221026074627C14",
    "order_date": {
        "$date": {
        "$numberLong": "1666770360000"
        }
    },
    "customer_id": "C14",
    "order_details": [
        {
        "product_id": "FP8",
        "quantity": 2,
        "cost": 10
        }
    ],
    "total_cost": 20,
    "partner_id": "PA2",
    "shipping_id": "AD15",
    "supplier_id": "ST2",
    "order_status": 5
},{
    "_id": "20221026224655C17",
    "order_date": {
        "$date": {
        "$numberLong": "1666824360000"
        }
    },
    "customer_id": "C17",
    "order_details": [
        {
        "product_id": "HA10",
        "quantity": 1,
        "cost": 37.04
        }
    ],
    "total_cost": 37.04,
    "partner_id": "PA5",
    "shipping_id": "AD18",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221029211331C1",
    "order_date": {
        "$date": {
        "$numberLong": "1667077980000"
        }
    },
    "customer_id": "C1",
```

```json
      "order_details": [
            {
            "product_id": "PH4",
            "quantity": 3,
            "cost": 100
            }
      ],
      "total_cost": 300,
      "partner_id": "PA3",
      "shipping_id": "AD1",
      "supplier_id": "W3",
      "order_status": 5
},{
      "_id": "20221030004810C3",
      "order_date": {
            "$date": {
            "$numberLong": "1667090880000"
            }
      },
      "customer_id": "C3",
      "order_details": [
            {
            "product_id": "PH1",
            "quantity": 3,
            "cost": 169
            }
      ],
      "total_cost": 507,
      "partner_id": "PA5",
      "shipping_id": "AD3",
      "supplier_id": "W2",
      "order_status": 5
},{
      "_id": "20221030010453C3",
      "order_date": {
            "$date": {
            "$numberLong": "1667091840000"
            }
      },
      "customer_id": "C3",
      "order_details": [
            {
            "product_id": "FP4",
            "quantity": 5,
            "cost": 6.8
            }
      ],
      "total_cost": 34,
      "partner_id": "PA3",
      "shipping_id": "AD3",
      "supplier_id": "ST3",
      "order_status": 5
```

```json
},{
    "_id": "20221030130005C19",
    "order_date": {
        "$date": {
        "$numberLong": "1667134800000"
        }
    },
    "customer_id": "C19",
    "order_details": [
        {
        "product_id": "FP1",
        "quantity": 4,
        "cost": 2
        }
    ],
    "total_cost": 8,
    "partner_id": "PA4",
    "shipping_id": "AD20",
    "supplier_id": "ST2",
    "order_status": 5
},{
    "_id": "20221030144555C15",
    "order_date": {
        "$date": {
        "$numberLong": "1667141100000"
        }
    },
    "customer_id": "C15",
    "order_details": [
        {
        "product_id": "FP8",
        "quantity": 2,
        "cost": 10
        }
    ],
    "total_cost": 20,
    "partner_id": "PA1",
    "shipping_id": "AD16",
    "supplier_id": "ST4",
    "order_status": 5
},{
    "_id": "20221031211614C17",
    "order_date": {
        "$date": {
        "$numberLong": "1667250960000"
        }
    },
    "customer_id": "C17",
    "order_details": [
        {
        "product_id": "B1",
        "quantity": 2,
```

```json
            "cost": 12.99
            }
    ],
    "total_cost": 25.98,
    "partner_id": "PA1",
    "shipping_id": "AD18",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221101180049C18",
    "order_date": {
            "$date": {
            "$numberLong": "1667325600000"
            }
    },
    "customer_id": "C18",
    "order_details": [
            {
            "product_id": "FP3",
            "quantity": 2,
            "cost": 2
            }
    ],
    "total_cost": 4,
    "partner_id": "PA3",
    "shipping_id": "AD19",
    "supplier_id": "ST3",
    "order_status": 5
},{
    "_id": "20221102032613C5",
    "order_date": {
            "$date": {
            "$numberLong": "1667359560000"
            }
    },
    "customer_id": "C5",
    "order_details": [
            {
            "product_id": "PH4",
            "quantity": 1,
            "cost": 100
            }
    ],
    "total_cost": 100,
    "partner_id": "PA3",
    "shipping_id": "AD5",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221103221132C14",
    "order_date": {
            "$date": {
```

```
                "$numberLong": "1667513460000"
            }
        },
        "customer_id": "C14",
        "order_details": [
                {
                "product_id": "CD10",
                "quantity": 5,
                "cost": 8.28
                }
        ],
        "total_cost": 41.4,
        "partner_id": "PA1",
        "shipping_id": "AD15",
        "supplier_id": "W1",
        "order_status": 5
},{
        "_id": "20221103234001C20",
        "order_date": {
                "$date": {
                "$numberLong": "1667518800000"
                }
        },
        "customer_id": "C20",
        "order_details": [
                {
                "product_id": "HA4",
                "quantity": 3,
                "cost": 16.59
                }
        ],
        "total_cost": 49.77,
        "partner_id": "PA2",
        "shipping_id": "AD22",
        "supplier_id": "W3",
        "order_status": 5
},{
        "_id": "20221105035806C4",
        "order_date": {
                "$date": {
                "$numberLong": "1667620680000"
                }
        },
        "customer_id": "C4",
        "order_details": [
                {
                "product_id": "HA1",
                "quantity": 2,
                "cost": 58.99
                }
        ],
        "total_cost": 117.98,
```

```
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        "quantity": 4,
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        "quantity": 5,
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        "quantity": 2,
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            "quantity": 2,
            "cost": 2.7
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            "quantity": 5,
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            "quantity": 1,
            "cost": 29.01
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            "quantity": 3,
            "cost": 200
            }
    ],
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    "order_details": [
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            "product_id": "CD10",
            "quantity": 5,
            "cost": 8.28
            }
    ],
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                "quantity": 2,
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        "product_id": "FP7",
        "quantity": 2,
        "cost": 2
        }
    ],
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        "product_id": "PH6",
        "quantity": 1,
        "cost": 769
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        "product_id": "FP6",
        "quantity": 3,
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    "customer_id": "C18",
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        "quantity": 3,
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    ],
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        "cost": 13.5
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    ],
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        "quantity": 4,
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    ],
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    "order_details": [
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        "product_id": "CD6",
        "quantity": 3,
        "cost": 9.99
        }
    ],
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            "product_id": "FP12",
            "quantity": 2,
            "cost": 2
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      "supplier_id": "ST5",
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            "product_id": "FP1",
            "quantity": 4,
            "cost": 769
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      "supplier_id": "ST2",
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      "shipping_id": "AD21",
      "supplier_id": "W3",
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      },
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            "product_id": "CD5",
            "quantity": 1,
            "cost": 500
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      },
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            "quantity": 3,
            "cost": 14.92
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      "supplier_id": "ST5",
      "order_status": 5
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        "product_id": "PH10",
        "quantity": 3,
        "cost": 2
        }
    ],
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    "partner_id": "PA5",
    "shipping_id": "AD3",
    "supplier_id": "W1",
    "order_status": 5
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    },
    "customer_id": "C3",
    "order_details": [
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        "product_id": "PH9",
        "quantity": 1,
        "cost": 9.99
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    ],
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    "shipping_id": "AD3",
    "supplier_id": "W3",
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    },
    "customer_id": "C19",
    "order_details": [
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        "product_id": "FP9",
        "quantity": 5,
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```json
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    "supplier_id": "ST3",
    "order_status": 5
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        }
    },
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    "order_details": [
        {
        "product_id": "CD3",
        "quantity": 1,
        "cost": 37.04
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    ],
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    "shipping_id": "AD16",
    "supplier_id": "W1",
    "order_status": 5
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        }
    },
    "customer_id": "C13",
    "order_details": [
        {
        "product_id": "PH1",
        "quantity": 2,
        "cost": 15.75
        }
    ],
    "total_cost": 31.5,
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    "shipping_id": "AD14",
    "supplier_id": "W2",
    "order_status": 5
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```json
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        },
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                {
                "product_id": "HA9",
                "quantity": 4,
                "cost": 11.48
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        ],
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        "shipping_id": "AD7",
        "supplier_id": "W3",
        "order_status": 5
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        "order_details": [
                {
                "product_id": "FP13",
                "quantity": 2,
                "cost": 2
                }
        ],
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        "shipping_id": "AD3",
        "supplier_id": "ST4",
        "order_status": 5
},{
        "_id": "20221015034759C2",
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                "$numberLong": "1665805620000"
                }
        },
        "customer_id": "C2",
        "order_details": [
                {
                "product_id": "CD4",
                "quantity": 5,
                "cost": 179.99
                }
        ],
        "total_cost": 899.95,
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        "shipping_id": "AD2",
        "supplier_id": "W1",
        "order_status": 5
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                }
        },
        "customer_id": "C8",
        "order_details": [
                {
                "product_id": "B1",
                "quantity": 1,
                "cost": 2.9
                }
        ],
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        "shipping_id": "AD8",
        "supplier_id": "W3",
        "order_status": 5
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                }
        },
        "customer_id": "C20",
        "order_details": [
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                "product_id": "CD10",
                "quantity": 2,
                "cost": 9.99
                }
        ],
        "total_cost": 19.98,
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        "shipping_id": "AD22",
        "supplier_id": "W2",
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                }
        },
        "customer_id": "C10",

```json
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        "product_id": "HA7",
        "quantity": 2,
        "cost": 21.97
        }
    ],
    "total_cost": 43.94,
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    "shipping_id": "AD10",
    "supplier_id": "W1",
    "order_status": 5
},{
    "_id": "20221019211001C16",
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        "$numberLong": "1666213800000"
        }
    },
    "customer_id": "C16",
    "order_details": [
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        "product_id": "CD9",
        "quantity": 4,
        "cost": 449
        }
    ],
    "total_cost": 1796,
    "partner_id": "PA5",
    "shipping_id": "AD17",
    "supplier_id": "W3",
    "order_status": 5
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        "$numberLong": "1666261260000"
        }
    },
    "customer_id": "C9",
    "order_details": [
        {
        "product_id": "PH1",
        "quantity": 3,
        "cost": 2.8
        }
    ],
    "total_cost": 8.4,
    "partner_id": "PA2",
    "shipping_id": "AD9",
    "supplier_id": "W1",
    "order_status": 5
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},{
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        "$numberLong": "1666355340000"
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        "quantity": 5,
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    ],
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        "product_id": "B2",
        "quantity": 4,
        "cost": 2
        }
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    "shipping_id": "AD9",
    "supplier_id": "W1",
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    },
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        "product_id": "B4",
        "quantity": 5,
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    "order_status": 5
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        "quantity": 3,
        "cost": 9.99
        }
    ],
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    "order_details": [
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        "product_id": "PH10",
        "quantity": 1,
        "cost": 449
        }
    ],
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    "shipping_id": "AD16",
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    "order_status": 5
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            "cost": 6.61
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    "supplier_id": "W3",
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    },
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            "quantity": 5,
            "cost": 4
            }
    ],
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    "shipping_id": "AD2",
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    "order_status": 5
},{
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    },
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            "product_id": "FP7",
            "quantity": 1,
            "cost": 2
            }
    ],
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          }
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     "order_status": 5
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          }
     },
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          "quantity": 4,
          "cost": 329.39
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     ],
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          }
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        "shipping_id": "AD4",
        "supplier_id": "ST2",
        "order_status": 5
},{
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                "$numberLong": "1667660280000"
                }
        },
        "customer_id": "C8",
        "order_details": [
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                "product_id": "B1",
                "quantity": 1,
                "cost": 12.99
                }
        ],
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        },
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                "product_id": "FP6",
                "quantity": 3,
                "cost": 3.2
                }
        ],
        "total_cost": 9.6,
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        "shipping_id": "AD2",
        "supplier_id": "ST5",
        "order_status": 5
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    },
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        "product_id": "PH9",
        "quantity": 5,
        "cost": 849
        }
    ],
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    "shipping_id": "AD6",
    "supplier_id": "W1",
    "order_status": 5
},{
    "_id": "20221107012415C2",
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    },
    "customer_id": "C2",
    "order_details": [
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        "product_id": "CD3",
        "quantity": 1,
        "cost": 9.12
        }
    ],
    "total_cost": 9.12,
    "partner_id": "PA1",
    "shipping_id": "AD2",
    "supplier_id": "W2",
    "order_status": 5
},{
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        }
    },
    "customer_id": "C8",
    "order_details": [
        {
        "product_id": "HA2",
        "quantity": 5,
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```
                "cost": 190.85
                }
        ],
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        "shipping_id": "AD8",
        "supplier_id": "W1",
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        },
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                "quantity": 3,
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        },
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                "product_id": "FP12",
                "quantity": 2,
                "cost": 5
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        ],
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```json
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    ],
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},{
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    },
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    "order_details": [
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          "quantity": 2,
          "cost": 10
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    ],
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    "shipping_id": "AD8",
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    },
    "customer_id": "C6",
    "order_details": [
          {
          "product_id": "PH6",
          "quantity": 2,
          "cost": 769
          }
    ],
    "total_cost": 1538,
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        "order_status": 5
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        },
        "customer_id": "C14",
        "order_details": [
              {
              "product_id": "B6",
              "quantity": 5,
              "cost": 13.99
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        ],
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        "shipping_id": "AD15",
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        },
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              "cost": 3
              }
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              }
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        "quantity": 1,
        "cost": 8
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    ],
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    "shipping_id": "AD16",
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    "order_status": 5
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        "$numberLong": "1668421380000"
        }
    },
    "customer_id": "C9",
    "order_details": [
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        "quantity": 3,
        "cost": 179.99
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    ],
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    "shipping_id": "AD9",
    "supplier_id": "W2",
    "order_status": 5
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    },
    "customer_id": "C17",
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        "product_id": "FP6",
        "quantity": 1,
        "cost": 3.2
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    ],
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    "shipping_id": "AD18",
    "supplier_id": "ST5",
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    "order_details": [
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        "product_id": "CD9",
        "quantity": 1,
        "cost": 18.2
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    ],
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    "shipping_id": "AD9",
    "supplier_id": "W2",
    "order_status": 5
},{
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    },
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        "product_id": "CD5",
        "quantity": 2,
        "cost": 7.46
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    ],
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    "shipping_id": "AD18",
    "supplier_id": "W3",
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    },
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        "product_id": "B2",
        "quantity": 4,
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```json
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    "shipping_id": "AD11",
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},{
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    },
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            "product_id": "CD1",
            "quantity": 5,
            "cost": 14.87
            }
    ],
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    "supplier_id": "W3",
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    },
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    "order_details": [
            {
            "product_id": "HA2",
            "quantity": 5,
            "cost": 190.85
            }
    ],
    "total_cost": 954.25,
    "partner_id": "PA3",
    "shipping_id": "AD1",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221121064437C3",
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```json
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    },
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        "quantity": 5,
        "cost": 21.97
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    ],
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    "shipping_id": "AD3",
    "supplier_id": "W2",
    "order_status": 5
},{
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    },
    "customer_id": "C2",
    "order_details": [
        {
        "product_id": "CD3",
        "quantity": 3,
        "cost": 9.12
        }
    ],
    "total_cost": 27.36,
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    "shipping_id": "AD2",
    "supplier_id": "W3",
    "order_status": 5
},{
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        }
    },
    "customer_id": "C15",
    "order_details": [
        {
        "product_id": "CD2",
        "quantity": 5,
        "cost": 11.48
        }
    ],
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```json
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    "supplier_id": "W3",
    "order_status": 5
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        }
    },
    "customer_id": "C15",
    "order_details": [
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        "product_id": "HA6",
        "quantity": 2,
        "cost": 124.45
        }
    ],
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    "partner_id": "PA4",
    "shipping_id": "AD16",
    "supplier_id": "W1",
    "order_status": 5
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    },
    "customer_id": "C14",
    "order_details": [
        {
        "product_id": "FP3",
        "quantity": 5,
        "cost": 2
        }
    ],
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    "shipping_id": "AD15",
    "supplier_id": "ST1",
    "order_status": 5
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        }
    },
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```json
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        "product_id": "FP15",
        "quantity": 5,
        "cost": 2.8
        }
    ],
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    "shipping_id": "AD3",
    "supplier_id": "ST1",
    "order_status": 5
},{
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        "$numberLong": "1669356120000"
        }
    },
    "customer_id": "C13",
    "order_details": [
        {
        "product_id": "HA9",
        "quantity": 1,
        "cost": 61.75
        }
    ],
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    "partner_id": "PA2",
    "shipping_id": "AD13",
    "supplier_id": "W1",
    "order_status": 5
},{
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    "order_date": {
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        "$numberLong": "1669453980000"
        }
    },
    "customer_id": "C7",
    "order_details": [
        {
        "product_id": "FP14",
        "quantity": 2,
        "cost": 2.9
        }
    ],
    "total_cost": 5.8,
    "partner_id": "PA4",
    "shipping_id": "AD7",
    "supplier_id": "ST2",
    "order_status": 5
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```json
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        }
    },
    "customer_id": "C7",
    "order_details": [
        {
        "product_id": "PH6",
        "quantity": 1,
        "cost": 769
        }
    ],
    "total_cost": 769,
    "partner_id": "PA1",
    "shipping_id": "AD7",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221129063833C8",
    "order_date": {
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        "$numberLong": "1669703880000"
        }
    },
    "customer_id": "C8",
    "order_details": [
        {
        "product_id": "FP4",
        "quantity": 5,
        "cost": 6.8
        }
    ],
    "total_cost": 34,
    "partner_id": "PA2",
    "shipping_id": "AD8",
    "supplier_id": "ST5",
    "order_status": 5
},{
    "_id": "20221129203826C11",
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        "$numberLong": "1669754280000"
        }
    },
    "customer_id": "C11",
    "order_details": [
        {
        "product_id": "FP8",
        "quantity": 2,
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```json
          "cost": 10
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    ],
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    "partner_id": "PA5",
    "shipping_id": "AD11",
    "supplier_id": "ST5",
    "order_status": 5
},{
    "_id": "20221124024113C5",
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          "$date": {
          "$numberLong": "1669257660000"
          }
    },
    "customer_id": "C5",
    "order_details": [
          {
          "product_id": "PH9",
          "quantity": 5,
          "cost": 849
          }
    ],
    "total_cost": 4245,
    "partner_id": "PA3",
    "shipping_id": "AD5",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221124103446C10",
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          }
    },
    "customer_id": "C10",
    "order_details": [
          {
          "product_id": "CD4",
          "quantity": 4,
          "cost": 16.58
          }
    ],
    "total_cost": 66.32,
    "partner_id": "PA4",
    "shipping_id": "AD10",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221125024728C14",
    "order_date": {
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```json
            "$numberLong": "1669344420000"
        }
    },
    "customer_id": "C14",
    "order_details": [
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        "product_id": "HA1",
        "quantity": 5,
        "cost": 58.99
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    ],
    "total_cost": 294.95,
    "partner_id": "PA3",
    "shipping_id": "AD15",
    "supplier_id": "W1",
    "order_status": 5
},{
    "_id": "20221125201234C16",
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        "$numberLong": "1669407120000"
        }
    },
    "customer_id": "C16",
    "order_details": [
        {
        "product_id": "HA5",
        "quantity": 4,
        "cost": 29.01
        }
    ],
    "total_cost": 116.04,
    "partner_id": "PA1",
    "shipping_id": "AD17",
    "supplier_id": "W1",
    "order_status": 5
},{
    "_id": "20221126063618C4",
    "order_date": {
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        "$numberLong": "1669444560000"
        }
    },
    "customer_id": "C4",
    "order_details": [
        {
        "product_id": "PH5",
        "quantity": 3,
        "cost": 849
        }
    ],
    "total_cost": 2547,
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```json
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        "shipping_id": "AD4",
        "supplier_id": "W1",
        "order_status": 5
},{
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        "order_date": {
                "$date": {
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                }
        },
        "customer_id": "C3",
        "order_details": [
                {
                "product_id": "FP9",
                "quantity": 5,
                "cost": 2
                }
        ],
        "total_cost": 10,
        "partner_id": "PA2",
        "shipping_id": "AD3",
        "supplier_id": "ST3",
        "order_status": 5
},{
        "_id": "20221127195511C16",
        "order_date": {
                "$date": {
                "$numberLong": "1669578900000"
                }
        },
        "customer_id": "C16",
        "order_details": [
                {
                "product_id": "B10",
                "quantity": 1,
                "cost": 15.75
                }
        ],
        "total_cost": 15.75,
        "partner_id": "PA4",
        "shipping_id": "AD17",
        "supplier_id": "W2",
        "order_status": 5
},{
        "_id": "20221127230915C7",
        "order_date": {
                "$date": {
                "$numberLong": "1669590540000"
                }
        },
        "customer_id": "C7",
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```json
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            {
            "product_id": "HA7",
            "quantity": 4,
            "cost": 329.39
            }
        ],
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        "partner_id": "PA3",
        "shipping_id": "AD7",
        "supplier_id": "W3",
        "order_status": 5
},{
        "_id": "20221128045203C2",
        "order_date": {
            "$date": {
            "$numberLong": "1669611120000"
            }
        },
        "customer_id": "C2",
        "order_details": [
            {
            "product_id": "FP11",
            "quantity": 2,
            "cost": 4
            }
        ],
        "total_cost": 8,
        "partner_id": "PA3",
        "shipping_id": "AD2",
        "supplier_id": "ST1",
        "order_status": 5
},{
        "_id": "20221129073144C10",
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            "$numberLong": "1669707060000"
            }
        },
        "customer_id": "C10",
        "order_details": [
            {
            "product_id": "CD2",
            "quantity": 3,
            "cost": 11.48
            }
        ],
        "total_cost": 34.44,
        "partner_id": "PA4",
        "shipping_id": "AD10",
        "supplier_id": "W3",
        "order_status": 5
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```json
},{
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      }
  },
  "customer_id": "C10",
  "order_details": [
      {
      "product_id": "CD10",
      "quantity": 5,
      "cost": 8.28
      }
  ],
  "total_cost": 41.4,
  "partner_id": "PA4",
  "shipping_id": "AD10",
  "supplier_id": "W1",
  "order_status": 5
},{
  "_id": "20221130055917C11",
  "order_date": {
      "$date": {
      "$numberLong": "1669787940000"
      }
  },
  "customer_id": "C11",
  "order_details": [
      {
      "product_id": "FP2",
      "quantity": 5,
      "cost": 2.7
      }
  ],
  "total_cost": 13.5,
  "partner_id": "PA1",
  "shipping_id": "AD11",
  "supplier_id": "ST2",
  "order_status": 5
},{
  "_id": "20221130120552C13",
  "order_date": {
      "$date": {
      "$numberLong": "1669809900000"
      }
  },
  "customer_id": "C13",
  "order_details": [
      {
      "product_id": "CD4",
      "quantity": 2,
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```json
            "cost": 16.58
            }
    ],
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    "shipping_id": "AD13",
    "supplier_id": "W1",
    "order_status": 5
},{
    "_id": "20221001050939C4",
    "order_date": {
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            "$numberLong": "1664600940000"
            }
    },
    "customer_id": "C4",
    "order_details": [
            {
            "product_id": "B3",
            "quantity": 2,
            "cost": 3.2
            }
    ],
    "total_cost": 6.4,
    "partner_id": "PA1",
    "shipping_id": "AD4",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221002153455C9",
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            "$numberLong": "1664724840000"
            }
    },
    "customer_id": "C9",
    "order_details": [
            {
            "product_id": "CD3",
            "quantity": 5,
            "cost": 3
            }
    ],
    "total_cost": 15,
    "partner_id": "PA4",
    "shipping_id": "AD9",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221008143028C10",
    "order_date": {
            "$date": {
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                "$numberLong": "1665239400000"
                }
        },
        "customer_id": "C10",
        "order_details": [
                {
                "product_id": "PH7",
                "quantity": 5,
                "cost": 10.99
                }
        ],
        "total_cost": 54.95,
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        "shipping_id": "AD10",
        "supplier_id": "W1",
        "order_status": 5
},{
        "_id": "20221008223518C15",
        "order_date": {
                "$date": {
                "$numberLong": "1665268500000"
                }
        },
        "customer_id": "C15",
        "order_details": [
                {
                "product_id": "B10",
                "quantity": 4,
                "cost": 29.01
                }
        ],
        "total_cost": 116.04,
        "partner_id": "PA4",
        "shipping_id": "AD16",
        "supplier_id": "W1",
        "order_status": 5
},{
        "_id": "20221009202521C20",
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                "$numberLong": "1665347100000"
                }
        },
        "customer_id": "C20",
        "order_details": [
                {
                "product_id": "FP4",
                "quantity": 2,
                "cost": 11.48
                }
        ],
        "total_cost": 22.96,
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            "shipping_id": "AD22",
            "supplier_id": "ST2",
            "order_status": 5
    },{
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                    "$numberLong": "1665502500000"
                    }
            },
            "customer_id": "C5",
            "order_details": [
                    {
                    "product_id": "HA6",
                    "quantity": 2,
                    "cost": 15.75
                    }
            ],
            "total_cost": 31.5,
            "partner_id": "PA1",
            "shipping_id": "AD5",
            "supplier_id": "W3",
            "order_status": 5
    },{
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            "order_date": {
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                    "$numberLong": "1665553980000"
                    }
            },
            "customer_id": "C20",
            "order_details": [
                    {
                    "product_id": "PH2",
                    "quantity": 4,
                    "cost": 16.59
                    }
            ],
            "total_cost": 66.36,
            "partner_id": "PA1",
            "shipping_id": "AD22",
            "supplier_id": "W1",
            "order_status": 5
    },{
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            "order_date": {
                    "$date": {
                    "$numberLong": "1665564000000"
                    }
            },
            "customer_id": "C10",
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```json
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        "product_id": "FP14",
        "quantity": 5,
        "cost": 2.8
        }
    ],
    "total_cost": 14,
    "partner_id": "PA1",
    "shipping_id": "AD10",
    "supplier_id": "ST3",
    "order_status": 5
},{
    "_id": "20221012154704C16",
    "order_date": {
        "$date": {
        "$numberLong": "1665589620000"
        }
    },
    "customer_id": "C16",
    "order_details": [
        {
        "product_id": "HA8",
        "quantity": 1,
        "cost": 2.9
        }
    ],
    "total_cost": 2.9,
    "partner_id": "PA1",
    "shipping_id": "AD17",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221013152205C12",
    "order_date": {
        "$date": {
        "$numberLong": "1665674520000"
        }
    },
    "customer_id": "C12",
    "order_details": [
        {
        "product_id": "HA5",
        "quantity": 3,
        "cost": 8
        }
    ],
    "total_cost": 24,
    "partner_id": "PA4",
    "shipping_id": "AD12",
    "supplier_id": "W2",
    "order_status": 5
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},{
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        "$numberLong": "1665714900000"
        }
    },
    "customer_id": "C16",
    "order_details": [
        {
        "product_id": "FP13",
        "quantity": 1,
        "cost": 37.04
        }
    ],
    "total_cost": 37.04,
    "partner_id": "PA3",
    "shipping_id": "AD17",
    "supplier_id": "ST2",
    "order_status": 5
},{
    "_id": "20221015234446C8",
    "order_date": {
        "$date": {
        "$numberLong": "1665877440000"
        }
    },
    "customer_id": "C8",
    "order_details": [
        {
        "product_id": "CD1",
        "quantity": 5,
        "cost": 14
        }
    ],
    "total_cost": 70,
    "partner_id": "PA4",
    "shipping_id": "AD8",
    "supplier_id": "W1",
    "order_status": 5
},{
    "_id": "20221016184745C10",
    "order_date": {
        "$date": {
        "$numberLong": "1665946020000"
        }
    },
    "customer_id": "C10",
    "order_details": [
        {
        "product_id": "HA1",
        "quantity": 1,
```

```json
        "cost": 29.01
        }
    ],
    "total_cost": 29.01,
    "partner_id": "PA1",
    "shipping_id": "AD10",
    "supplier_id": "W1",
    "order_status": 5
},{
    "_id": "20221016225942C11",
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        "$numberLong": "1665961140000"
        }
    },
    "customer_id": "C11",
    "order_details": [
        {
        "product_id": "FP2",
        "quantity": 3,
        "cost": 6.8
        }
    ],
    "total_cost": 20.4,
    "partner_id": "PA4",
    "shipping_id": "AD11",
    "supplier_id": "ST5",
    "order_status": 5
},{
    "_id": "20221017153704C13",
    "order_date": {
        "$date": {
        "$numberLong": "1666021020000"
        }
    },
    "customer_id": "C13",
    "order_details": [
        {
        "product_id": "CD6",
        "quantity": 4,
        "cost": 10
        }
    ],
    "total_cost": 40,
    "partner_id": "PA3",
    "shipping_id": "AD14",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221018151526C9",
    "order_date": {
        "$date": {
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```json
            "$numberLong": "1666106100000"
            }
      },
      "customer_id": "C9",
      "order_details": [
            {
            "product_id": "B5",
            "quantity": 2,
            "cost": 849
            }
      ],
      "total_cost": 1698,
      "partner_id": "PA4",
      "shipping_id": "AD9",
      "supplier_id": "W1",
      "order_status": 5
},{
      "_id": "20221018175921C5",
      "order_date": {
            "$date": {
            "$numberLong": "1666115940000"
            }
      },
      "customer_id": "C5",
      "order_details": [
            {
            "product_id": "PH3",
            "quantity": 5,
            "cost": 61.75
            }
      ],
      "total_cost": 308.75,
      "partner_id": "PA4",
      "shipping_id": "AD5",
      "supplier_id": "W2",
      "order_status": 5
},{
      "_id": "20221021014650C16",
      "order_date": {
            "$date": {
            "$numberLong": "1666316760000"
            }
      },
      "customer_id": "C16",
      "order_details": [
            {
            "product_id": "HA5",
            "quantity": 4,
            "cost": 13.99
            }
      ],
      "total_cost": 55.96,
```

```json
        "partner_id": "PA2",
        "shipping_id": "AD17",
        "supplier_id": "W3",
        "order_status": 5
},{
        "_id": "20221021163004C6",
        "order_date": {
              "$date": {
              "$numberLong": "1666369800000"
              }
        },
        "customer_id": "C6",
        "order_details": [
              {
              "product_id": "PH4",
              "quantity": 4,
              "cost": 14.92
              }
        ],
        "total_cost": 59.68,
        "partner_id": "PA3",
        "shipping_id": "AD6",
        "supplier_id": "W1",
        "order_status": 5
},{
        "_id": "20221022104750C5",
        "order_date": {
              "$date": {
              "$numberLong": "1666435620000"
              }
        },
        "customer_id": "C5",
        "order_details": [
              {
              "product_id": "FP5",
              "quantity": 1,
              "cost": 2
              }
        ],
        "total_cost": 2,
        "partner_id": "PA3",
        "shipping_id": "AD5",
        "supplier_id": "ST2",
        "order_status": 5
},{
        "_id": "20221023003930C15",
        "order_date": {
              "$date": {
              "$numberLong": "1666485540000"
              }
        },
        "customer_id": "C15",
```

```json
    "order_details": [
        {
        "product_id": "FP6",
        "quantity": 5,
        "cost": 500
        }
    ],
    "total_cost": 2500,
    "partner_id": "PA4",
    "shipping_id": "AD16",
    "supplier_id": "ST2",
    "order_status": 5
},{
    "_id": "20221024090553C17",
    "order_date": {
        "$date": {
        "$numberLong": "1666602300000"
        }
    },
    "customer_id": "C17",
    "order_details": [
        {
        "product_id": "FP3",
        "quantity": 3,
        "cost": 2
        }
    ],
    "total_cost": 6,
    "partner_id": "PA1",
    "shipping_id": "AD18",
    "supplier_id": "ST2",
    "order_status": 5
},{
    "_id": "20221024182331C19",
    "order_date": {
        "$date": {
        "$numberLong": "1666635780000"
        }
    },
    "customer_id": "C19",
    "order_details": [
        {
        "product_id": "B2",
        "quantity": 3,
        "cost": 9.99
        }
    ],
    "total_cost": 29.97,
    "partner_id": "PA4",
    "shipping_id": "AD20",
    "supplier_id": "W3",
    "order_status": 5
```

```json
},{
    "_id": "20221025132349C13",
    "order_date": {
        "$date": {
        "$numberLong": "1666704180000"
        }
    },
    "customer_id": "C13",
    "order_details": [
        {
        "product_id": "B9",
        "quantity": 2,
        "cost": 9.99
        }
    ],
    "total_cost": 19.98,
    "partner_id": "PA5",
    "shipping_id": "AD13",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221026035755C17",
    "order_date": {
        "$date": {
        "$numberLong": "1666756620000"
        }
    },
    "customer_id": "C17",
    "order_details": [
        {
        "product_id": "PH10",
        "quantity": 3,
        "cost": 449
        }
    ],
    "total_cost": 1347,
    "partner_id": "PA1",
    "shipping_id": "AD18",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221027070944C12",
    "order_date": {
        "$date": {
        "$numberLong": "1666854540000"
        }
    },
    "customer_id": "C12",
    "order_details": [
        {
        "product_id": "PH3",
        "quantity": 3,
```

```json
            "cost": 179.99
            }
    ],
    "total_cost": 539.97,
    "partner_id": "PA4",
    "shipping_id": "AD12",
    "supplier_id": "W1",
    "order_status": 5
},{
    "_id": "20221027120833C20",
    "order_date": {
            "$date": {
            "$numberLong": "1666872480000"
            }
    },
    "customer_id": "C20",
    "order_details": [
            {
            "product_id": "B4",
            "quantity": 2,
            "cost": 14
            }
    ],
    "total_cost": 28,
    "partner_id": "PA1",
    "shipping_id": "AD22",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221027162456C17",
    "order_date": {
            "$date": {
            "$numberLong": "1666887840000"
            }
    },
    "customer_id": "C17",
    "order_details": [
            {
            "product_id": "CD4",
            "quantity": 4,
            "cost": 16.58
            }
    ],
    "total_cost": 66.32,
    "partner_id": "PA4",
    "shipping_id": "AD18",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221029220352C3",
    "order_date": {
            "$date": {
```

```json
            "$numberLong": "1667080980000"
            }
    },
    "customer_id": "C3",
    "order_details": [
            {
            "product_id": "B7",
            "quantity": 3,
            "cost": 16.99
            }
    ],
    "total_cost": 50.97,
    "partner_id": "PA3",
    "shipping_id": "AD3",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221031221035C14",
    "order_date": {
            "$date": {
            "$numberLong": "1667254200000"
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    },
    "customer_id": "C14",
    "order_details": [
            {
            "product_id": "B9",
            "quantity": 1,
            "cost": 9.99
            }
    ],
    "total_cost": 9.99,
    "partner_id": "PA2",
    "shipping_id": "AD15",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221103155112C3",
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            "$numberLong": "1667490660000"
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    },
    "customer_id": "C3",
    "order_details": [
            {
            "product_id": "FP8",
            "quantity": 4,
            "cost": 10
            }
    ],
    "total_cost": 40,
```

```json
        "partner_id": "PA3",
        "shipping_id": "AD3",
        "supplier_id": "ST3",
        "order_status": 5
},{
        "_id": "20221104070635C10",
        "order_date": {
                "$date": {
                "$numberLong": "1667545560000"
                }
        },
        "customer_id": "C10",
        "order_details": [
                {
                "product_id": "FP5",
                "quantity": 2,
                "cost": 2
                }
        ],
        "total_cost": 4,
        "partner_id": "PA4",
        "shipping_id": "AD10",
        "supplier_id": "ST4",
        "order_status": 5
},{
        "_id": "20221104093944C13",
        "order_date": {
                "$date": {
                "$numberLong": "1667554740000"
                }
        },
        "customer_id": "C13",
        "order_details": [
                {
                "product_id": "FP10",
                "quantity": 4,
                "cost": 2
                }
        ],
        "total_cost": 8,
        "partner_id": "PA1",
        "shipping_id": "AD13",
        "supplier_id": "ST3",
        "order_status": 5
},{
        "_id": "20221105035332C16",
        "order_date": {
                "$date": {
                "$numberLong": "1667620380000"
                }
        },
        "customer_id": "C16",
```

```json
        "order_details": [
                {
                "product_id": "B8",
                "quantity": 3,
                "cost": 10.99
                }
        ],
        "total_cost": 32.97,
        "partner_id": "PA4",
        "shipping_id": "AD17",
        "supplier_id": "W3",
        "order_status": 5
},{
        "_id": "20221105232657C13",
        "order_date": {
                "$date": {
                "$numberLong": "1667690760000"
                }
        },
        "customer_id": "C13",
        "order_details": [
                {
                "product_id": "FP6",
                "quantity": 3,
                "cost": 3.2
                }
        ],
        "total_cost": 9.6,
        "partner_id": "PA3",
        "shipping_id": "AD13",
        "supplier_id": "ST4",
        "order_status": 5
},{
        "_id": "20221106132848C16",
        "order_date": {
                "$date": {
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                }
        },
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                "quantity": 5,
                "cost": 200
                }
        ],
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        "shipping_id": "AD17",
        "supplier_id": "W1",
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```json
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    },
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        {
        "product_id": "HA2",
        "quantity": 2,
        "cost": 190.85
        }
    ],
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    "shipping_id": "AD7",
    "supplier_id": "W3",
    "order_status": 5
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    },
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        {
        "product_id": "B1",
        "quantity": 2,
        "cost": 12.99
        }
    ],
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    "shipping_id": "AD7",
    "supplier_id": "W2",
    "order_status": 5
},{
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    "order_date": {
        "$date": {
        "$numberLong": "1668027540000"
        }
    },
    "customer_id": "C13",
    "order_details": [
        {
        "product_id": "CD7",
        "quantity": 4,
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```json
            "cost": 6.61
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    ],
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    "shipping_id": "AD13",
    "supplier_id": "W1",
    "order_status": 5
},{
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            }
    },
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    "order_details": [
            {
            "product_id": "FP7",
            "quantity": 2,
            "cost": 2
            }
    ],
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    "shipping_id": "AD13",
    "supplier_id": "ST5",
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    },
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    "order_details": [
            {
            "product_id": "B8",
            "quantity": 5,
            "cost": 10.99
            }
    ],
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    "shipping_id": "AD9",
    "supplier_id": "W2",
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```json
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            "quantity": 1,
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        "shipping_id": "AD1",
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        },
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            "quantity": 5,
            "cost": 179.99
            }
        ],
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        "shipping_id": "AD5",
        "supplier_id": "W2",
        "order_status": 5
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            "$numberLong": "1668195420000"
            }
        },
        "customer_id": "C2",
        "order_details": [
            {
            "product_id": "B6",
            "quantity": 1,
            "cost": 13.99
            }
        ],
        "total_cost": 13.99,
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        "shipping_id": "AD2",
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                "$numberLong": "1668264780000"
                }
        },
        "customer_id": "C18",
        "order_details": [
                {
                "product_id": "CD4",
                "quantity": 2,
                "cost": 16.58
                }
        ],
        "total_cost": 33.16,
        "partner_id": "PA4",
        "shipping_id": "AD19",
        "supplier_id": "W2",
        "order_status": 5
},{
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                "$numberLong": "1668316860000"
                }
        },
        "customer_id": "C9",
        "order_details": [
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                "product_id": "CD5",
                "quantity": 2,
                "cost": 7.46
                }
        ],
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        "shipping_id": "AD9",
        "supplier_id": "W1",
        "order_status": 5
},{
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                }
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```json
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                "product_id": "PH5",
                "quantity": 4,
                "cost": 849
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        ],
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        "shipping_id": "AD20",
        "supplier_id": "W3",
        "order_status": 5
},{
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                "$numberLong": "1668449100000"
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        },
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                {
                "product_id": "PH5",
                "quantity": 5,
                "cost": 849
                }
        ],
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        "shipping_id": "AD20",
        "supplier_id": "W1",
        "order_status": 5
},{
        "_id": "20221115153148C4",
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                }
        },
        "customer_id": "C4",
        "order_details": [
                {
                "product_id": "HA2",
                "quantity": 3,
                "cost": 190.85
                }
        ],
        "total_cost": 572.55,
        "partner_id": "PA4",
        "shipping_id": "AD4",
        "supplier_id": "W3",
        "order_status": 5
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},{
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        }
    },
    "customer_id": "C14",
    "order_details": [
        {
        "product_id": "B7",
        "quantity": 2,
        "cost": 16.99
        }
    ],
    "total_cost": 33.98,
    "partner_id": "PA1",
    "shipping_id": "AD15",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221118112601C17",
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        "$numberLong": "1668770760000"
        }
    },
    "customer_id": "C17",
    "order_details": [
        {
        "product_id": "FP10",
        "quantity": 4,
        "cost": 2
        }
    ],
    "total_cost": 8,
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    "shipping_id": "AD18",
    "supplier_id": "ST4",
    "order_status": 5
},{
    "_id": "20221119031708C20",
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        }
    },
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    "order_details": [
        {
        "product_id": "FP12",
        "quantity": 3,
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```json
            "cost": 5
            }
    ],
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    "shipping_id": "AD22",
    "supplier_id": "ST1",
    "order_status": 5
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    "_id": "20221119203740C15",
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            }
    },
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    "order_details": [
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            "product_id": "FP5",
            "quantity": 1,
            "cost": 2
            }
    ],
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    "shipping_id": "AD16",
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    "order_status": 5
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            }
    },
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    "order_details": [
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            "product_id": "PH6",
            "quantity": 4,
            "cost": 769
            }
    ],
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    "shipping_id": "AD3",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221123145615C14",
    "order_date": {
            "$date": {
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            "$numberLong": "1669215360000"
        }
    },
    "customer_id": "C14",
    "order_details": [
        {
        "product_id": "PH7",
        "quantity": 5,
        "cost": 599
        }
    ],
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    "shipping_id": "AD15",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221123181823C20",
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        }
    },
    "customer_id": "C20",
    "order_details": [
        {
        "product_id": "CD1",
        "quantity": 2,
        "cost": 14.87
        }
    ],
    "total_cost": 29.74,
    "partner_id": "PA3",
    "shipping_id": "AD22",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221124172303C18",
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        "$numberLong": "1669310580000"
        }
    },
    "customer_id": "C18",
    "order_details": [
        {
        "product_id": "HA10",
        "quantity": 3,
        "cost": 37.04
        }
    ],
    "total_cost": 111.12,
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```json
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    "shipping_id": "AD19",
    "supplier_id": "W1",
    "order_status": 5
},{
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        "$numberLong": "1669330320000"
        }
    },
    "customer_id": "C12",
    "order_details": [
        {
        "product_id": "HA3",
        "quantity": 5,
        "cost": 20.74
        }
    ],
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    "partner_id": "PA5",
    "shipping_id": "AD12",
    "supplier_id": "W1",
    "order_status": 5
},{
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        "$numberLong": "1669367820000"
        }
    },
    "customer_id": "C4",
    "order_details": [
        {
        "product_id": "CD9",
        "quantity": 3,
        "cost": 18.2
        }
    ],
    "total_cost": 54.6,
    "partner_id": "PA4",
    "shipping_id": "AD4",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221126172111C8",
    "order_date": {
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        }
    },
    "customer_id": "C8",
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```json
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        "product_id": "CD8",
        "quantity": 5,
        "cost": 20.65
        }
    ],
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    "partner_id": "PA1",
    "shipping_id": "AD8",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221126215357C13",
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        "$numberLong": "1669499580000"
        }
    },
    "customer_id": "C13",
    "order_details": [
        {
        "product_id": "FP11",
        "quantity": 2,
        "cost": 4
        }
    ],
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    "partner_id": "PA4",
    "shipping_id": "AD13",
    "supplier_id": "ST4",
    "order_status": 5
},{
    "_id": "20221127134611C8",
    "order_date": {
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        "$numberLong": "1669556760000"
        }
    },
    "customer_id": "C8",
    "order_details": [
        {
        "product_id": "B7",
        "quantity": 4,
        "cost": 16.99
        }
    ],
    "total_cost": 67.96,
    "partner_id": "PA3",
    "shipping_id": "AD8",
    "supplier_id": "W3",
    "order_status": 5
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```json
},{
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        "$numberLong": "1669631460000"
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    },
    "customer_id": "C2",
    "order_details": [
        {
        "product_id": "HA3",
        "quantity": 4,
        "cost": 20.74
        }
    ],
    "total_cost": 82.96,
    "partner_id": "PA3",
    "shipping_id": "AD2",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221129165530C20",
    "order_date": {
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        "$numberLong": "1669740900000"
        }
    },
    "customer_id": "C20",
    "order_details": [
        {
        "product_id": "PH8",
        "quantity": 4,
        "cost": 500
        }
    ],
    "total_cost": 2000,
    "partner_id": "PA1",
    "shipping_id": "AD22",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221130065526C4",
    "order_date": {
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        "$numberLong": "1669791300000"
        }
    },
    "customer_id": "C4",
    "order_details": [
        {
        "product_id": "FP14",
        "quantity": 4,
```

```json
            "cost": 2.9
            }
    ],
    "total_cost": 11.6,
    "partner_id": "PA2",
    "shipping_id": "AD4",
    "supplier_id": "ST2",
    "order_status": 5
},{
    "_id": "20221002091717C13",
    "order_date": {
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            "$numberLong": "1664702220000"
            }
    },
    "customer_id": "C13",
    "order_details": [
            {
            "product_id": "B4",
            "quantity": 2,
            "cost": 21.97
            }
    ],
    "total_cost": 43.94,
    "partner_id": "PA2",
    "shipping_id": "AD13",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221004100456C17",
    "order_date": {
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            "$numberLong": "1664877840000"
            }
    },
    "customer_id": "C17",
    "order_details": [
            {
            "product_id": "B3",
            "quantity": 3,
            "cost": 13.5
            }
    ],
    "total_cost": 40.5,
    "partner_id": "PA4",
    "shipping_id": "AD18",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221004165233C20",
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```json
            "$numberLong": "1664902320000"
            }
        },
        "customer_id": "C20",
        "order_details": [
            {
            "product_id": "FP2",
            "quantity": 3,
            "cost": 849
            }
        ],
        "total_cost": 2547,
        "partner_id": "PA2",
        "shipping_id": "AD22",
        "supplier_id": "ST1",
        "order_status": 5
},{
        "_id": "20221010004914C17",
        "order_date": {
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            "$numberLong": "1665362940000"
            }
        },
        "customer_id": "C17",
        "order_details": [
            {
            "product_id": "B10",
            "quantity": 5,
            "cost": 124.45
            }
        ],
        "total_cost": 622.25,
        "partner_id": "PA4",
        "shipping_id": "AD18",
        "supplier_id": "W2",
        "order_status": 5
},{
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        "order_date": {
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            "$numberLong": "1665365340000"
            }
        },
        "customer_id": "C14",
        "order_details": [
            {
            "product_id": "FP1",
            "quantity": 1,
            "cost": 169
            }
        ],
        "total_cost": 169,
```

```json
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    "shipping_id": "AD15",
    "supplier_id": "ST2",
    "order_status": 5
},{
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        "$numberLong": "1665434040000"
        }
    },
    "customer_id": "C18",
    "order_details": [
        {
        "product_id": "HA9",
        "quantity": 1,
        "cost": 11.48
        }
    ],
    "total_cost": 11.48,
    "partner_id": "PA1",
    "shipping_id": "AD19",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221010223150C18",
    "order_date": {
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        "$numberLong": "1665441060000"
        }
    },
    "customer_id": "C18",
    "order_details": [
        {
        "product_id": "FP14",
        "quantity": 5,
        "cost": 12.99
        }
    ],
    "total_cost": 64.95,
    "partner_id": "PA2",
    "shipping_id": "AD19",
    "supplier_id": "ST3",
    "order_status": 5
},{
    "_id": "20221011145150C20",
    "order_date": {
        "$date": {
        "$numberLong": "1665499860000"
        }
    },
    "customer_id": "C20",
```

```json
    "order_details": [
        {
        "product_id": "FP10",
        "quantity": 4,
        "cost": 13.99
        }
    ],
    "total_cost": 55.96,
    "partner_id": "PA5",
    "shipping_id": "AD22",
    "supplier_id": "ST2",
    "order_status": 5
},{
    "_id": "20221011160014C10",
    "order_date": {
        "$date": {
        "$numberLong": "1665504000000"
        }
    },
    "customer_id": "C10",
    "order_details": [
        {
        "product_id": "FP9",
        "quantity": 5,
        "cost": 10.99
        }
    ],
    "total_cost": 54.95,
    "partner_id": "PA3",
    "shipping_id": "AD10",
    "supplier_id": "ST3",
    "order_status": 5
},{
    "_id": "20221011165811C18",
    "order_date": {
        "$date": {
        "$numberLong": "1665507480000"
        }
    },
    "customer_id": "C18",
    "order_details": [
        {
        "product_id": "HA4",
        "quantity": 2,
        "cost": 599
        }
    ],
    "total_cost": 1198,
    "partner_id": "PA3",
    "shipping_id": "AD19",
    "supplier_id": "W3",
    "order_status": 5
```

```json
},{
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    "order_date": {
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        "$numberLong": "1665550800000"
        }
    },
    "customer_id": "C14",
    "order_details": [
        {
        "product_id": "HA10",
        "quantity": 4,
        "cost": 169
        }
    ],
    "total_cost": 676,
    "partner_id": "PA1",
    "shipping_id": "AD15",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221012135929C4",
    "order_date": {
        "$date": {
        "$numberLong": "1665583140000"
        }
    },
    "customer_id": "C4",
    "order_details": [
        {
        "product_id": "FP5",
        "quantity": 4,
        "cost": 15.75
        }
    ],
    "total_cost": 63,
    "partner_id": "PA1",
    "shipping_id": "AD4",
    "supplier_id": "ST2",
    "order_status": 5
},{
    "_id": "20221012181236C4",
    "order_date": {
        "$date": {
        "$numberLong": "1665598320000"
        }
    },
    "customer_id": "C4",
    "order_details": [
        {
        "product_id": "HA2",
        "quantity": 2,
```

```json
        "cost": 8.28
        }
    ],
    "total_cost": 16.56,
    "partner_id": "PA4",
    "shipping_id": "AD4",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221013164424C8",
    "order_date": {
        "$date": {
        "$numberLong": "1665679440000"
        }
    },
    "customer_id": "C8",
    "order_details": [
        {
        "product_id": "HA3",
        "quantity": 1,
        "cost": 2
        }
    ],
    "total_cost": 2,
    "partner_id": "PA2",
    "shipping_id": "AD8",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221014034807C7",
    "order_date": {
        "$date": {
        "$numberLong": "1665719280000"
        }
    },
    "customer_id": "C7",
    "order_details": [
        {
        "product_id": "B6",
        "quantity": 5,
        "cost": 5
        }
    ],
    "total_cost": 25,
    "partner_id": "PA5",
    "shipping_id": "AD7",
    "supplier_id": "W1",
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    "shipping_id": "AD4",
    "supplier_id": "W2",
    "order_status": 5
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            "quantity": 5,
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            "quantity": 3,
            "cost": 61.75
            }
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        }
    ],
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      "quantity": 2,
      "cost": 14
      }
  ],
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  "shipping_id": "AD15",
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      "quantity": 1,
      "cost": 10
      }
  ],
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  "shipping_id": "AD11",
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      }
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  "customer_id": "C1",
  "order_details": [
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      "product_id": "HA4",
      "quantity": 5,
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            "quantity": 4,
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            "quantity": 5,
            "cost": 500
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    ],
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    "shipping_id": "AD7",
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},{
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    },
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            "product_id": "B5",
            "quantity": 4,
            "cost": 13.5
            }
    ],
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    },
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        "quantity": 2,
        "cost": 2
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    ],
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},{
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    },
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        "quantity": 4,
        "cost": 500
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    "supplier_id": "W1",
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},{
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    },
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        "quantity": 2,
        "cost": 4
        }
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    },
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    "order_details": [
        {
        "product_id": "PH1",
        "quantity": 4,
        "cost": 169
        }
    ],
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        "product_id": "HA8",
        "quantity": 1,
        "cost": 21.97
        }
    ],
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    "shipping_id": "AD16",
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    },
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    },
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        "product_id": "FP7",
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    },
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            "quantity": 1,
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    ],
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    },
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            "product_id": "FP10",
            "quantity": 4,
            "cost": 2
            }
    ],
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    ],
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    },
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        "product_id": "PH1",
        "quantity": 1,
        "cost": 169
        }
    ],
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    "shipping_id": "AD3",
    "supplier_id": "W2",
    "order_status": 5
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        }
    },
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    "order_details": [
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        "product_id": "HA7",
        "quantity": 2,
        "cost": 329.39
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    ],
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            "product_id": "B6",
            "quantity": 4,
            "cost": 13.99
            }
    ],
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    },
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            "product_id": "FP12",
            "quantity": 2,
            "cost": 5
            }
    ],
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```json
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        "quantity": 2,
        "cost": 599
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    ],
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    "supplier_id": "W2",
    "order_status": 5
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    },
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        "product_id": "B9",
        "quantity": 5,
        "cost": 9.99
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    "shipping_id": "AD17",
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    "order_status": 5
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        "$numberLong": "1668247980000"
        }
    },
    "customer_id": "C9",
    "order_details": [
        {
        "product_id": "FP11",
        "quantity": 3,
        "cost": 4
        }
    ],
    "total_cost": 12,
    "partner_id": "PA4",
    "shipping_id": "AD9",
    "supplier_id": "ST4",
    "order_status": 5
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},{
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    },
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    "order_details": [
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        "product_id": "HA10",
        "quantity": 4,
        "cost": 37.04
        }
    ],
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    "partner_id": "PA5",
    "shipping_id": "AD17",
    "supplier_id": "W1",
    "order_status": 5
},{
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        "$numberLong": "1668309360000"
        }
    },
    "customer_id": "C7",
    "order_details": [
        {
        "product_id": "HA4",
        "quantity": 1,
        "cost": 16.59
        }
    ],
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    "shipping_id": "AD7",
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},{
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        }
    },
    "customer_id": "C16",
    "order_details": [
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        "product_id": "PH5",
        "quantity": 2,
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```json
            "cost": 849
            }
    ],
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        }
    },
    "customer_id": "C7",
    "order_details": [
        {
        "product_id": "B10",
        "quantity": 5,
        "cost": 15.75
        }
    ],
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    "partner_id": "PA4",
    "shipping_id": "AD7",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221117002013C4",
    "order_date": {
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        "$numberLong": "1668644400000"
        }
    },
    "customer_id": "C4",
    "order_details": [
        {
        "product_id": "HA9",
        "quantity": 2,
        "cost": 61.75
        }
    ],
    "total_cost": 123.5,
    "partner_id": "PA3",
    "shipping_id": "AD4",
    "supplier_id": "W1",
    "order_status": 5
},{
    "_id": "20221117013359C2",
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        "$date": {
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            "$numberLong": "1668648780000"
        }
    },
    "customer_id": "C2",
    "order_details": [
        {
        "product_id": "B3",
        "quantity": 1,
        "cost": 8
        }
    ],
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    "shipping_id": "AD2",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221119011459C12",
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        }
    },
    "customer_id": "C12",
    "order_details": [
        {
        "product_id": "PH8",
        "quantity": 1,
        "cost": 500
        }
    ],
    "total_cost": 500,
    "partner_id": "PA1",
    "shipping_id": "AD12",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221122094143C10",
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        }
    },
    "customer_id": "C10",
    "order_details": [
        {
        "product_id": "FP2",
        "quantity": 5,
        "cost": 2.7
        }
    ],
    "total_cost": 13.5,
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```json
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        "order_status": 5
},{
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            }
    },
    "customer_id": "C19",
    "order_details": [
            {
            "product_id": "HA6",
            "quantity": 1,
            "cost": 124.45
            }
    ],
    "total_cost": 124.45,
    "partner_id": "PA1",
    "shipping_id": "AD20",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221123022153C15",
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            "$numberLong": "1669170060000"
            }
    },
    "customer_id": "C15",
    "order_details": [
            {
            "product_id": "HA1",
            "quantity": 4,
            "cost": 58.99
            }
    ],
    "total_cost": 235.96,
    "partner_id": "PA2",
    "shipping_id": "AD16",
    "supplier_id": "W1",
    "order_status": 5
},{
    "_id": "20221123123804C17",
    "order_date": {
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            "$numberLong": "1669207080000"
            }
    },
    "customer_id": "C17",
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```json
      "order_details": [
            {
            "product_id": "FP15",
            "quantity": 4,
            "cost": 2.8
            }
      ],
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      "partner_id": "PA5",
      "shipping_id": "AD18",
      "supplier_id": "ST3",
      "order_status": 5
},{
      "_id": "20221125033627C20",
      "order_date": {
            "$date": {
            "$numberLong": "1669347360000"
            }
      },
      "customer_id": "C20",
      "order_details": [
            {
            "product_id": "HA9",
            "quantity": 4,
            "cost": 61.75
            }
      ],
      "total_cost": 247,
      "partner_id": "PA1",
      "shipping_id": "AD22",
      "supplier_id": "W2",
      "order_status": 5
},{
      "_id": "20221125053427C10",
      "order_date": {
            "$date": {
            "$numberLong": "1669354440000"
            }
      },
      "customer_id": "C10",
      "order_details": [
            {
            "product_id": "FP10",
            "quantity": 2,
            "cost": 2
            }
      ],
      "total_cost": 4,
      "partner_id": "PA1",
      "shipping_id": "AD10",
      "supplier_id": "ST2",
      "order_status": 5
```

```json
},{
    "_id": "20221127072508C12",
    "order_date": {
        "$date": {
        "$numberLong": "1669533900000"
        }
    },
    "customer_id": "C12",
    "order_details": [
        {
        "product_id": "FP12",
        "quantity": 5,
        "cost": 5
        }
    ],
    "total_cost": 25,
    "partner_id": "PA3",
    "shipping_id": "AD12",
    "supplier_id": "ST2",
    "order_status": 5
},{
    "_id": "20221128101456C6",
    "order_date": {
        "$date": {
        "$numberLong": "1669630440000"
        }
    },
    "customer_id": "C6",
    "order_details": [
        {
        "product_id": "HA10",
        "quantity": 3,
        "cost": 37.04
        }
    ],
    "total_cost": 111.12,
    "partner_id": "PA5",
    "shipping_id": "AD6",
    "supplier_id": "W2",
    "order_status": 5
},{
    "_id": "20221128150213C8",
    "order_date": {
        "$date": {
        "$numberLong": "1669647720000"
        }
    },
    "customer_id": "C8",
    "order_details": [
        {
        "product_id": "FP1",
        "quantity": 5,
```

```json
            "cost": 2
            }
    ],
    "total_cost": 10,
    "partner_id": "PA1",
    "shipping_id": "AD8",
    "supplier_id": "ST2",
    "order_status": 5
},{
    "_id": "20221130134756C5",
    "order_date": {
            "$date": {
            "$numberLong": "1669816020000"
            }
    },
    "customer_id": "C5",
    "order_details": [
            {
            "product_id": "B4",
            "quantity": 3,
            "cost": 14
            }
    ],
    "total_cost": 42,
    "partner_id": "PA3",
    "shipping_id": "AD5",
    "supplier_id": "W3",
    "order_status": 5
},{
    "_id": "20221130201421C8",
    "order_date": {
            "$date": {
            "$numberLong": "1669839240000"
            }
    },
    "customer_id": "C8",
    "order_details": [
            {
            "product_id": "PH10",
            "quantity": 3,
            "cost": 449
            }
    ],
    "total_cost": 1347,
    "partner_id": "PA3",
    "shipping_id": "AD8",
    "supplier_id": "W1",
    "order_status": 5
},{
    "_id": "20221130221856C13",
    "order_date": {
            "$date": {
```

```
        "$numberLong": "1669846680000"
        }
    },
    "customer_id": "C13",
    "order_details": [
        {
        "product_id": "B1",
        "quantity": 3,
        "cost": 12.99
        }
    ],
    "total_cost": 38.97,
    "partner_id": "PA4",
    "shipping_id": "AD13",
    "supplier_id": "W2",
    "order_status": 5
}]
```

3. **products:**
   - **_id:** unique identifier
   - **Product_name:** name of the product
   - **Short_desc:** short description of the product
   - **Dimensions**
     - **Length:** in cm
     - **Width:** in cm
     - **Height:** in cm
   - **Quantity_per_unit:** kilograms or litres (based on the product)
   - **Avg_ratings:** the average rating of the product (based off all customer ratings)
   - **Std_price:** standard price of the product
   - **Supp_price:** price that the suppliers charges
   - **Category:** product type
   - **Fresh**
     - **Category:** either one of bakery, drinks or fruits & vegetables
     - **Best_before:** number of days until product expires
     - **Country_of_origin:** what country product is from
   - **Books**
     - **Author_name:** name of the author
     - **Publisher:** publisher name
     - **Year_publication:** year it was published
     - **ISBN:** 13-digit code which identifies a specific edition of a book title from a publisher
   - **CDs**
     - **Artist_name:** full name of the artist
     - **No_of_tracks:** number of tracks
     - **Total_play_time:** total play time in minutes
     - **Publisher:** publisher of cd
   - **Phones**

- ○ **Brand:** brand of the phone
  - ○ **Model:** model of the phone
  - ○ **Colour:** phone colour
  - ○ **Features:** list of features comma separated
- **Home_appliances**
  - ○ **Colour:** home appliance colour
  - ○ **Voltage:** in volts
  - ○ **Style:** style of home appliance

```
[{
  "_id": "PH3",
  "name": "Google Pixel XL",
  "short_desc": "A brand of portable consumer electronic devices developed by Google that
run either ChromeOS or the Android operating system",
  "dimensions": {
      "length": 15.47,
      "width": 7.57,
      "height": 0.85
  },
  "quantity_per_unit": 0.17,
  "avg_ratings": 3,
  "std_price": 179.99,
  "supp_price": 79.99,
  "mobile_phone": {
      "brand": "Google",
      "model": "Pixel XL",
      "colour": "Obsidian",
      "features": "Gorilla Glass 4, Fingerprint Sensor, AMOLED display"
  },
  "category": "PH"
},{
  "_id": "CD2",
  "name": "Led Zepellin IV",
  "short_desc": "The informal setting at Headley Grange inspired the band, allowing them to
try different arrangements of material and create songs in various styles",
  "dimensions": {
      "length": 12,
      "width": 12,
      "height": 1
  },
  "quantity_per_unit": 0.9,
  "avg_ratings": 4,
  "std_price": 11.48,
  "supp_price": 5,
  "cd": {
      "artist_name": "Led Zepellin",
      "no_of_tracks": 8,
      "total_play_time_in_mins": 42,
      "publisher": "Rodale Books"
  },
  "category": "CD"
},{
```

```json
    "_id": "CD4",
    "name": "The Wall",
    "short_desc": "It is a rock opera that explores Pink, a jaded rock star whose eventual
self-imposed isolation from society forms a figurative wall. ",
    "dimensions": {
        "length": 14,
        "width": 12,
        "height": 1
    },
    "quantity_per_unit": 0.6,
    "avg_ratings": 3,
    "std_price": 16.58,
    "supp_price": 9,
    "cd": {
        "artist_name": "Pink Floyd",
        "no_of_tracks": 26,
        "total_play_time_in_mins": 80,
        "publisher": "Alan Marshall"
    },
    "category": "CD"
},{
    "_id": "CD7",
    "name": "The Eminem Show",
    "short_desc": "The album incorporates a heavier use of rap rock than Eminem's previous
albums, and its themes are predominantly based on Eminem's prominence in hip hop culture, as
well as his ambivalent thoughts of fame.",
    "dimensions": {
        "length": 14,
        "width": 12,
        "height": 1
    },
    "quantity_per_unit": 0.8,
    "avg_ratings": 2.8,
    "std_price": 6.61,
    "supp_price": 5,
    "cd": {
        "artist_name": "Eminem",
        "no_of_tracks": 20,
        "total_play_time_in_mins": 77,
        "publisher": "Ensign Music Corp"
    },
    "category": "CD"
},{
    "_id": "CD9",
    "name": "Ladies & Gentlemen",
    "short_desc": "The collection of 29 songs is separated into two-halves, with each CD of
the double set containing music of a particular theme and mood. ",
    "dimensions": {
        "length": 12,
        "width": 12,
        "height": 3
    },
```

```json
      "quantity_per_unit": 0.4,
      "avg_ratings": 3,
      "std_price": 18.2,
      "supp_price": 9.9,
      "cd": {
            "artist_name": "George Michael",
            "no_of_tracks": 29,
            "total_play_time_in_mins": 136,
            "publisher": "Warner Chappell Music Ltd."
      },
      "category": "CD"
},{
      "_id": "PH1",
      "name": "iPhone 6s",
      "short_desc": "Powered by the Apple A9 system-on-chip, which the company stated is up to
70% faster than Apple A8, and has up to 90% better graphics performance",
      "dimensions": {
            "length": 15.82,
            "width": 7.71,
            "height": 0.7
      },
      "quantity_per_unit": 0.14,
      "avg_ratings": 2,
      "std_price": 169,
      "supp_price": 96,
      "mobile_phone": {
            "brand": "Apple",
            "model": "iPhone 6s",
            "colour": "Space Grey",
            "features": "Retina HD display, Widescreen LCD, Multi-Touch display with IPS
technology"
      },
      "category": "PH"
},{
      "_id": "PH5",
      "name": "iPhone 13",
      "short_desc": "A flat chassis analogous to that of contemporaneous Apple products, some
differences such as the rear cameras being larger and arranged diagonally.",
      "dimensions": {
            "length": 13.15,
            "width": 6.42,
            "height": 0.76
      },
      "quantity_per_unit": 0.14,
      "avg_ratings": 3.4,
      "std_price": 849,
      "supp_price": 769,
      "mobile_phone": {
            "brand": "Apple",
            "model": "iPhone 14",
            "colour": "Starlight",
            "features": "A15 Bionic chip, Face ID, Water and Dust Resistant"
```

```
    },
    "category": "PH"
},{
    "_id": "PH8",
    "name": "OnePlus 9 Pro",
    "short_desc": "Your best shot. The phones feature upgraded cameras developed in
partnership with Hasselblad.",
    "dimensions": {
        "length": 16,
        "width": 7.42,
        "height": 0.87
    },
    "quantity_per_unit": 0.19,
    "avg_ratings": 3,
    "std_price": 500,
    "supp_price": 421,
    "mobile_phone": {
        "brand": "OnePlus",
        "model": "9 Pro",
        "colour": "Pine Green",
        "features": "120 Hz Fluid Display, Hasselblad Camera, Warp Charge 65T"
    },
    "category": "PH"
},{
    "_id": "B2",
    "name": "Cold Grave",
    "short_desc": "Cold Grave is a moody and atmospheric horror tale set in an old graveyard.
Set in the days following a zombie apocalypse, you play as a group of survivors who are
trying to keep their sanity and stay alive.",
    "dimensions": {
        "length": 2.5,
        "width": 3,
        "height": 3
    },
    "quantity_per_unit": 1,
    "avg_ratings": 4.2,
    "std_price": 9.99,
    "supp_price": 4.99,
    "book": {
        "author_name": "Paris Blake",
        "publisher": "Lit Publications",
        "year_of_publication": 2006,
        "ISBN": "978-1-3890-1813-8"
    },
    "category": "B"
},{
    "_id": "B7",
    "name": "The Alchemist",
    "short_desc": "The Alchemist is a classic novel in which a boy named Santiago embarks on a
journey seeking treasure in the Egyptian pyramids after having a recurring dream about it
and on the way meets mentors, falls in love, and most importantly, learns the true
importance of who he is and how to improve himself",
```

```json
    "dimensions": {
        "length": 2.5,
        "width": 3,
        "height": 8
    },
    "quantity_per_unit": 0.6,
    "avg_ratings": 2.6,
    "std_price": 16.99,
    "supp_price": 12.99,
    "book": {
        "author_name": "Miles Gibson",
        "publisher": "HarperCollins Publishers",
        "year_of_publication": 1988,
        "ISBN": "978-5-9546-3550-8"
    },
    "category": "B"
},{
    "_id": "HA5",
    "name": "Mueller Electric Hand Mixer",
    "short_desc": "It is the perfect solution for the busy baker with a 5-speed dial and extra turbo function letting you choose the optimum mixing speed for any recipe.",
    "dimensions": {
        "length": 20.29,
        "width": 9.39,
        "height": 20.49
    },
    "quantity_per_unit": "1.39",
    "avg_ratings": 3.2,
    "std_price": 29.01,
    "supp_price": 12.01,
    "home_appliance": {
        "colour": "white",
        "voltage": 120,
        "style": "Hands Mixer"
    },
    "category": "HA"
},{
    "_id": "HA7",
    "name": "Breville Smart Oven Air Fryer Pro",
    "short_desc": "With 360Â° hot air circulation and high power of 1700 watts, the air fryer oven can easily make the delicious food as you wish",
    "dimensions": {
        "length": 40,
        "width": 42,
        "height": 38.2
    },
    "quantity_per_unit": 13.95,
    "avg_ratings": 2.2,
    "std_price": 329.39,
    "supp_price": 206,
    "home_appliance": {
        "colour": "silver",
```

```json
        "voltage": 110,
        "style": "New"
  },
  "category": "HA"
},{
  "_id": "FP3",
  "name": "Pie",
  "short_desc": "normal bread",
  "dimensions": {
        "length": 0.3,
        "width": 0.4,
        "height": 0.6
  },
  "quantity_per_unit": 0.5,
  "avg_ratings": 2.4,
  "std_price": 2,
  "supp_price": 1.2,
  "fresh": {
        "category": "Bakery",
        "best_before": 5,
        "country_of_origin": "UK"
  },
  "category": "fresh"
},{
  "_id": "FP5",
  "name": "Super Delicious Bread",
  "short_desc": "amazing bread",
  "dimensions": {
        "length": 0.3,
        "width": 0.4,
        "height": 0.8
  },
  "quantity_per_unit": 0.5,
  "avg_ratings": 2.8,
  "std_price": 2,
  "supp_price": 1.4,
  "fresh": {
        "category": "Bakery",
        "best_before": 5,
        "country_of_origin": "UK"
  },
  "category": "fresh"
},{
  "_id": "PH6",
  "name": "Galaxy S22",
  "short_desc": "There are numerous critical upgrades the phones possess over the previous
models, in addition to improved specifications, an enhanced camera system supporting 8K
video recording (7680Ã--4320) at 24 frames per second",
  "dimensions": {
        "length": 14.6,
        "width": 7.06,
        "height": 0.76
```

```json
      },
      "quantity_per_unit": 0.17,
      "avg_ratings": 3,
      "std_price": 769,
      "supp_price": 694,
      "mobile_phone": {
            "brand": "Samsung",
            "model": "Galaxy S22",
            "colour": "Phantom Black",
            "features": "Dual Nano SIM, Dynamic AMOLED 2X, Fingerprint Sensor"
      },
      "category": "PH"
},{
   "_id": "PH7",
   "name": "Google Pixel 7 ",
   "short_desc": "Powered by the second-generation Google Tensor chip, shipped with Android 13.",
   "dimensions": {
         "length": 15.5,
         "width": 7.4,
         "height": 0.76
   },
   "quantity_per_unit": 0.2,
   "avg_ratings": 3,
   "std_price": 599,
   "supp_price": 517,
   "mobile_phone": {
         "brand": "Google",
         "model": "Pixel 7",
         "colour": "Snow",
         "features": "Corning Gorilla Glass, Always-on display, Dual-LED flash"
   },
   "category": "PH"
},{
   "_id": "PH10",
   "name": "iPhone X",
   "short_desc": "The first iPhone to use an OLED screen.",
   "dimensions": {
         "length": 14.36,
         "width": 7.09,
         "height": 0.77
   },
   "quantity_per_unit": 0.17,
   "avg_ratings": 3,
   "std_price": 449,
   "supp_price": 352,
   "mobile_phone": {
         "brand": "Apple",
         "model": "iPhone X",
         "colour": "Silver",
         "features": "A11 Bionic chip, 3D Touch, Super Retina HD display"
   },
```

```json
    "category": "PH"
},{
    "_id": "B3",
    "name": "Dangerous Elysium",
    "short_desc": "Dangerous Elysium is a story of a man who is thrown into a world of surreal
and hazardous circumstances. As the game progresses, your choices will determine not just
who you are, but who you can be.",
    "dimensions": {
        "length": 2.5,
        "width": 3,
        "height": 4
    },
    "quantity_per_unit": 0.5,
    "avg_ratings": 1.6,
    "std_price": 8,
    "supp_price": 2,
    "book": {
        "author_name": "Victoria Orr",
        "publisher": "Hauthor",
        "year_of_publication": 2013,
        "ISBN": "978-7-6839-0684-3"
    },
    "category": "B"
},{
    "_id": "B4",
    "name": "Children of the Nova",
    "short_desc": "Children of the Nova formed in San Diego, California in 2007 and
incorporates several diffent styles into their brand of progressive rock, inlcuding heavy
metal, alternative, punk and jazz.",
    "dimensions": {
        "length": 2.5,
        "width": 3,
        "height": 5
    },
    "quantity_per_unit": 0.48,
    "avg_ratings": 2.6,
    "std_price": 14,
    "supp_price": 9,
    "book": {
        "author_name": "Shawn Paul",
        "publisher": "E-NET WEB PUBLISHING",
        "year_of_publication": 2002,
        "ISBN": "978-4-2851-1362-4"
    },
    "category": "B"
},{
    "_id": "B5",
    "name": "The Silver Cradle",
    "short_desc": "The Silver Cradle is the story of a year in the life of the Mexican
American people of San Antonio, Texas",
    "dimensions": {
        "length": 2.5,
```

```json
        "width": 3,
        "height": 6
    },
    "quantity_per_unit": 0.6,
    "avg_ratings": 2.2,
    "std_price": 13.5,
    "supp_price": 5.5,
    "book": {
        "author_name": "Addyson Gutierrez",
        "publisher": "Such Media Inc",
        "year_of_publication": 2017,
        "ISBN": "978-5-4046-0497-9"
    },
    "category": "B"
},{
    "_id": "B10",
    "name": "Sapiens",
    "short_desc": "Why are we so smart? Why are we so dangerous? Why are we Sapiens? The
world's foremost historian and thinker, Yuval Noah Harari, questions what we believe to be
true about humanity. Earth has existed for 4.5 billion years. It has been conquered by one
species among many others in a little portion of that time: humans. Yuval Noah Harari
examines our identities, origins, and future in this audacious and thought-provoking book.",
    "dimensions": {
        "length": 2.5,
        "width": 3,
        "height": 11
    },
    "quantity_per_unit": 0.7,
    "avg_ratings": 3.4,
    "std_price": 15.75,
    "supp_price": 7.75,
    "book": {
        "author_name": "Miracle Hogan",
        "publisher": "Dvir Publishing House Ltd.",
        "year_of_publication": 2011,
        "ISBN": "978-9-5106-7102-3"
    },
    "category": "B"
},{
    "_id": "HA2",
    "name": "Eufy by Anker, BoostIQ RoboVac 11S (Slim), Robot Vacuum Cleaner, Super-Thin",
    "short_desc": "All-New RoboVac: Re-engineered to be the slimmer RoboVac (2.85 inch) but
with quiet operation and increased suction power at 1300Pa.",
    "dimensions": {
        "length": 32.5,
        "width": 32.5,
        "height": 7.2
    },
    "quantity_per_unit": 2.6,
    "avg_ratings": 3.8,
    "std_price": 190.85,
    "supp_price": 100,
```

        "home_appliance": {
            "colour": "black",
            "voltage": 120,
            "style": "11S"
    },
    "category": "HA"
},{
    "_id": "HA9",
    "name": "Bosch Smart Home Radiator Thermostat II",
    "short_desc": "With the radiator thermostat you can heat your home efficiently by controlling the temperature in each room at specific times",
    "dimensions": {
            "length": 10.3,
            "width": 4.8,
            "height": 5.7
    },
    "quantity_per_unit": 0.38,
    "avg_ratings": 2.8,
    "std_price": 61.75,
    "supp_price": 47.75,
    "home_appliance": {
            "colour": "white",
            "voltage": 230,
            "style": "Radiator Thermostat II"
    },
    "category": "HA"
},{
    "_id": "CD1",
    "name": "Thriller",
    "short_desc": "Thriller foreshadows the contradictory themes of Jackson's personal life, as he began using a motif of paranoia and darker themes.",
    "dimensions": {
            "length": 14,
            "width": 12,
            "height": 1
    },
    "quantity_per_unit": 0.6,
    "avg_ratings": 3.4,
    "std_price": 14.87,
    "supp_price": 9,
    "cd": {
            "artist_name": "Michael Jackson",
            "no_of_tracks": 9,
            "total_play_time_in_mins": 42,
            "publisher": "Epic Records"
    },
    "category": "CD"
},{
    "_id": "FP1",
    "name": "Tart",
    "short_desc": "normal bread",
    "dimensions": {

```json
        "length": 0.3,
        "width": 0.4,
        "height": 0.4
    },
    "quantity_per_unit": 0.5,
    "avg_ratings": 3.6,
    "std_price": 2,
    "supp_price": 1,
    "fresh": {
        "category": "Bakery",
        "best_before": 5,
        "country_of_origin": "UK"
    },
    "category": "fresh"
},{
    "_id": "FP4",
    "name": "Cheese Roll",
    "short_desc": "normal bread",
    "dimensions": {
        "length": 0.3,
        "width": 0.4,
        "height": 0.7
    },
    "quantity_per_unit": 0.5,
    "avg_ratings": 3.4,
    "std_price": 6.8,
    "supp_price": 1.3,
    "fresh": {
        "category": "Bakery",
        "best_before": 5,
        "country_of_origin": "UK"
    },
    "category": "fresh"
},{
    "_id": "FP6",
    "name": "Water",
    "short_desc": "normal drink",
    "dimensions": {
        "length": 0.2,
        "width": 0.2,
        "height": 0.5
    },
    "quantity_per_unit": 1,
    "avg_ratings": 2.4,
    "std_price": 3.2,
    "supp_price": 1.5,
    "fresh": {
        "category": "Drinks",
        "best_before": 100,
        "country_of_origin": "UK"
    },
    "category": "fresh"
```

```json
},{
    "_id": "FP10",
    "name": "Whiskey",
    "short_desc": "normal drink",
    "dimensions": {
        "length": 0.2,
        "width": 0.2,
        "height": 0.9
    },
    "quantity_per_unit": 1.2,
    "avg_ratings": 3.8,
    "std_price": 2,
    "supp_price": 1.9,
    "fresh": {
        "category": "Drinks",
        "best_before": 100,
        "country_of_origin": "UK"
    },
    "category": "fresh"
},{
    "_id": "FP12",
    "name": "Orange",
    "short_desc": "sweet orange",
    "dimensions": {
        "length": 0.3,
        "width": 0.3,
        "height": 0.4
    },
    "quantity_per_unit": 0.5,
    "avg_ratings": 2.4,
    "std_price": 5,
    "supp_price": 2.1,
    "fresh": {
        "category": "Fruits and Vegetables",
        "best_before": 3,
        "country_of_origin": "UK"
    },
    "category": "fresh"
},{
    "_id": "FP14",
    "name": "Lettuce",
    "short_desc": "big lettuce",
    "dimensions": {
        "length": 0.3,
        "width": 0.3,
        "height": 0.6
    },
    "quantity_per_unit": 0.5,
    "avg_ratings": 2.8,
    "std_price": 2.9,
    "supp_price": 2.3,
    "fresh": {
```

```
            "category": "Fruits and Vegetables",
            "best_before": 3,
            "country_of_origin": "UK"
    },
    "category": "fresh"
},{
    "_id": "CD5",
    "name": "Back in Black",
    "short_desc": "The seventh studio album by Australian rock band AC/DC. It was released on
25 July 1980 by Albert Productions and Atlantic Records.",
    "dimensions": {
            "length": 14,
            "width": 12,
            "height": 1
    },
    "quantity_per_unit": 0.5,
    "avg_ratings": 3.4,
    "std_price": 7.46,
    "supp_price": 9,
    "cd": {
            "artist_name": "AC/DC",
            "no_of_tracks": 10,
            "total_play_time_in_mins": 42,
            "publisher": "Robert John Mutt Lange"
    },
    "category": "CD"
},{
    "_id": "CD8",
    "name": "Hybrid Theory",
    "short_desc": "The album's lyrical themes deal with problems lead vocalist Chester
Bennington experienced during his adolescence, including drug abuse and the constant
fighting and divorce of his parents.",
    "dimensions": {
            "length": 12,
            "width": 12,
            "height": 1
    },
    "quantity_per_unit": 0.8,
    "avg_ratings": 2.4,
    "std_price": 20.65,
    "supp_price": 10.85,
    "cd": {
            "artist_name": "Linkin Park",
            "no_of_tracks": 12,
            "total_play_time_in_mins": 37,
            "publisher": "Warner Bros Records"
    },
    "category": "CD"
},{
    "_id": "B1",
    "name": "Distant Nebula",
    "short_desc": "The image of a distant nebula, in the constellation Orion, photographed by
```

```json
    the Hubble Space Telescope. The nebula is about 1,500 light-years across, and is about 1,500
    light-years from Earth. For comparison, the distance to the Andromeda Galaxy is 2.5 kilop",
      "dimensions": {
          "length": 2.5,
          "width": 3,
          "height": 2
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      "quantity_per_unit": 0.8,
      "avg_ratings": 2.6,
      "std_price": 12.99,
      "supp_price": 10.99,
      "book": {
          "author_name": "Amari Stevenson",
          "publisher": "Sprite Pages",
          "year_of_publication": 2009,
          "ISBN": "978-3-2041-4086-4"
      },
      "category": "B"
},{
      "_id": "B8",
      "name": "The Psychology of Money",
      "short_desc": "In this book, Morgan Housel addresses the often-neglected fact that we are
    irrational, emotional beings, not ROI-optimizing machines. Your financial success depends
    more on your soft skills (how you manage your psychology and emotional impulses) than your
    technical skills on financial analyses, market rules/laws",
      "dimensions": {
          "length": 2.5,
          "width": 3,
          "height": 9
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      "quantity_per_unit": 0.4,
      "avg_ratings": 3,
      "std_price": 10.99,
      "supp_price": 6.99,
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          "author_name": "Leonard Reyes",
          "publisher": "Cve Inc",
          "year_of_publication": 2020,
          "ISBN": "978-1-0628-6609-4"
      },
      "category": "B"
},{
      "_id": "B9",
      "name": "Thinking, Fast and Slow",
      "short_desc": "Our brain is composed of systems, just like a computer. Fast, intuitive,
    and emotive describe System 1. In his book, Daniel Kahneman exhorts us to stop depending on
    this system. The most frequent cause of errors and stagnation is System 1. System 2 is a
    slower, more careful, and rational mental process in comparison. Kahneman advises making
    more frequent use of this system. Kahneman offers suggestions on how and why we make
    decisions in addition to this.",
      "dimensions": {
          "length": 2.5,
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```json
            "width": 3,
            "height": 10
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    "quantity_per_unit": 0.5,
    "avg_ratings": 3.8,
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    "supp_price": 7.99,
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            "author_name": "Alisson Campos",
            "publisher": "Warner Books",
            "year_of_publication": 2011,
            "ISBN": "978-8-2853-3424-9"
    },
    "category": "B"
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    "_id": "HA3",
    "name": "EasyAcc Coffee Mug Warmer",
    "short_desc": "Coffee Cup Warmer 8h Auto Shut Off: Electric Cup Warmer's auto-shut off
function prevents any possible safety hazard caused by forgetting to shut down.",
    "dimensions": {
            "length": 12,
            "width": 12,
            "height": 1.3
    },
    "quantity_per_unit": 0.22,
    "avg_ratings": 4,
    "std_price": 20.74,
    "supp_price": 0.74,
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            "voltage": 110,
            "style": "Middle-Black"
    },
    "category": "HA"
},{
    "_id": "HA4",
    "name": "DASH Rapid Egg Cooker",
    "short_desc": "Allows you to cook eggs in less time than it takes to boil water on a
stove",
    "dimensions": {
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            "width": 15.24,
            "height": 15.24
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    "quantity_per_unit": 0.45,
    "avg_ratings": 2.8,
    "std_price": 16.59,
    "supp_price": 10,
    "home_appliance": {
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            "voltage": 100,
            "style": "Cooker"
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```json
    },
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    "name": "Coke",
    "short_desc": "normal drink",
    "dimensions": {
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        "width": 0.2,
        "height": 0.6
    },
    "quantity_per_unit": 1,
    "avg_ratings": 2.4,
    "std_price": 2,
    "supp_price": 1.6,
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        "best_before": 100,
        "country_of_origin": "UK"
    },
    "category": "fresh"
},{
    "_id": "FP8",
    "name": "Beer",
    "short_desc": "normal drink",
    "dimensions": {
        "length": 0.2,
        "width": 0.2,
        "height": 0.7
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    "quantity_per_unit": 1,
    "avg_ratings": 3.8,
    "std_price": 10,
    "supp_price": 1.7,
    "fresh": {
        "category": "Drinks",
        "best_before": 100,
        "country_of_origin": "UK"
    },
    "category": "fresh"
},{
    "_id": "FP9",
    "name": "Wine",
    "short_desc": "normal drink",
    "dimensions": {
        "length": 0.2,
        "width": 0.2,
        "height": 0.8
    },
    "quantity_per_unit": 1.2,
    "avg_ratings": 2.4,
    "std_price": 2,
```

```json
    "supp_price": 1.8,
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        "category": "Drinks",
        "best_before": 100,
        "country_of_origin": "France"
    },
    "category": "fresh"
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  "_id": "FP15",
  "name": "Cucumber",
  "short_desc": "long cucumber",
  "dimensions": {
        "length": 0.3,
        "width": 0.3,
        "height": 0.7
  },
  "quantity_per_unit": 0.5,
  "avg_ratings": 2.4,
  "std_price": 2.8,
  "supp_price": 2.4,
  "fresh": {
        "category": "Fruits and Vegetables",
        "best_before": 3,
        "country_of_origin": "UK"
  },
  "category": "fresh"
},{
  "_id": "CD3",
  "name": "21",
  "short_desc": "Composed in the aftermath of the singer's separation from her then partner,
the album explores themes of heartbreak, healing, introspection, and forgiveness.",
  "dimensions": {
        "length": 13,
        "width": 12,
        "height": 1
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  "quantity_per_unit": 0.4,
  "avg_ratings": 2.6,
  "std_price": 9.12,
  "supp_price": 3,
  "cd": {
        "artist_name": "Adele",
        "no_of_tracks": 11,
        "total_play_time_in_mins": 48,
        "publisher": "XL Recordings"
  },
  "category": "CD"
},{
  "_id": "CD6",
  "name": "Abbey Road",
  "short_desc": "Abbey Road incorporates styles such as rock, pop, blues, singer-songwriter,
and progressive rock, and makes prominent use of the Moog synthesizer and guitar played
```

```json
through a Leslie speaker unit.",
  "dimensions": {
       "length": 14,
       "width": 14,
       "height": 3
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  "quantity_per_unit": 0.9,
  "avg_ratings": 3.2,
  "std_price": 14.92,
  "supp_price": 8,
  "cd": {
       "artist_name": "The Beatles",
       "no_of_tracks": 17,
       "total_play_time_in_mins": 47,
       "publisher": "George Martin"
  },
  "category": "CD"
},{
  "_id": "CD10",
  "name": "Hotel California",
  "short_desc": "Released on December 8, 1976, by Asylum Records, Hotel California was
recorded by Bill Szymczyk at the Criteria and Record Plant studios between March and October
1976. ",
  "dimensions": {
       "length": 12,
       "width": 12,
       "height": 2
  },
  "quantity_per_unit": 0.4,
  "avg_ratings": 4,
  "std_price": 8.28,
  "supp_price": 6,
  "cd": {
       "artist_name": "Eagles",
       "no_of_tracks": 9,
       "total_play_time_in_mins": 43,
       "publisher": "Warner Bros Records"
  },
  "category": "CD"
},{
  "_id": "PH2",
  "name": "Galaxy S10",
  "short_desc": "The tenth generation of the Samsung Galaxy S, its flagship line of phones
next to the Note models, which is also the 10th anniversary of the Galaxy S",
  "dimensions": {
       "length": 14.99,
       "width": 7.04,
       "height": 0.78
  },
  "quantity_per_unit": 0.15,
  "avg_ratings": 2.4,
  "std_price": 200,
```

```
    "supp_price": 113,
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        "model": "S10",
        "colour": "Black",
        "features": "Dual-sim, Fingerprint Sensor, Gyro Sensor"
    },
    "category": "PH"
},{
    "_id": "PH4",
    "name": "Huawei P9",
    "short_desc": "A 5.2-inch Full HD IPS-NEO LCD display and runs on Android 6.0 Marshmallow
OS",
    "dimensions": {
        "length": 14.5,
        "width": 7.09,
        "height": 0.7
    },
    "quantity_per_unit": 0.14,
    "avg_ratings": 3.6,
    "std_price": 100,
    "supp_price": 55,
    "mobile_phone": {
        "brand": "Huawei",
        "model": "P9",
        "colour": "Ceramic White",
        "features": "IPS-NEO LCD display, Quad-core 2.5 GHz, Fingerprint Sensor"
    },
    "category": "PH"
},{
    "_id": "PH9",
    "name": "iPhone 14",
    "short_desc": "Equipped with new Emergency SOS via satellite service",
    "dimensions": {
        "length": 14.67,
        "width": 7.15,
        "height": 0.78
    },
    "quantity_per_unit": 0.17,
    "avg_ratings": 3,
    "std_price": 849,
    "supp_price": 600,
    "mobile_phone": {
        "brand": "Apple",
        "model": "iPhone 14",
        "colour": "Midnight",
        "features": "A15 Bionic chip, Face ID, Water and Dust Resistant"
    },
    "category": "PH"
},{
    "_id": "B6",
    "name": "Rich Dad Poor Dad",
```

    "short_desc": "Rich Dad Poor Dad is Robert's story of growing up with two dads â€" his real father and the father of his best friend, his rich dad â€" and the ways in which both men shaped his thoughts about money and investing. The book explodes the myth that you need to earn a high income to be rich and explains the difference between working for money and having your money work for you.",
    "dimensions": {
        "length": 2.5,
        "width": 3,
        "height": 7
    },
    "quantity_per_unit": 0.3,
    "avg_ratings": 3,
    "std_price": 13.99,
    "supp_price": 7.99,
    "book": {
        "author_name": "Robert Kiyosaki",
        "publisher": "Warner Books",
        "year_of_publication": "1997",
        "ISBN": "978-6-5034-0281-7"
    },
    "category": "B"
},{
    "_id": "HA1",
    "name": "Ultrean Air Fryer",
    "short_desc": "A multifunction cooker that saves your time and money - aside from air frying you can also grill, roast and bake your favorite food with its innovative heating system rapid air technology.",
    "dimensions": {
        "length": 28.6,
        "width": 33.55,
        "height": 31.55
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    "quantity_per_unit": 4.52,
    "avg_ratings": 2.4,
    "std_price": 58.99,
    "supp_price": 39.99,
    "home_appliance": {
        "colour": "blue",
        "voltage": 120,
        "style": "air fryer"
    },
    "category": "HA"
},{
    "_id": "HA6",
    "name": "McCulloch MC1275 Heavy-Duty Steam Cleaner",
    "short_desc": "Perfect solution to reduce all dust in your house",
    "dimensions": {
        "length": 43.69,
        "width": 26.67,
        "height": 34.29
    },
    "quantity_per_unit": 5.44,

        "avg_ratings": 3,
        "std_price": 124.45,
        "supp_price": 105.45,
        "home_appliance": {
            "colour": "black",
            "voltage": 120,
            "style": "Mop"
        },
        "category": "HA"
},{
        "_id": "HA8",
        "name": "NETGEAR Wi-Fi Range Extender EX3700",
        "short_desc": "Adds Wi-Fi range coverage up to 1000 sq ft, and connects up to 15 devices
such as laptops, smartphones, speakers, IP cameras, tablets, IoT devices, and more.",
        "dimensions": {
            "length": 5.52,
            "width": 6.72,
            "height": 3.9
        },
        "quantity_per_unit": 0.13,
        "avg_ratings": 3.2,
        "std_price": 21.97,
        "supp_price": 5.97,
        "home_appliance": {
            "colour": "white",
            "voltage": 240,
            "style": "WiFi Extender AC750"
        },
        "category": "HA"
},{
        "_id": "HA10",
        "name": "LED Starry Sky Projector",
        "short_desc": "The starlight would help to develop children's imagination and creativity,
inspiring them to discover the endless charm of the universe.",
        "dimensions": {
            "length": 12.1,
            "width": 15,
            "height": 15.5
        },
        "quantity_per_unit": 0.47,
        "avg_ratings": 3.8,
        "std_price": 37.04,
        "supp_price": 23.04,
        "home_appliance": {
            "colour": "white",
            "voltage": 5,
            "style": "Modern"
        },
        "category": "HA"
},{
        "_id": "FP2",
        "name": "Croissaint",

```
        "short_desc": "normal bread",
        "dimensions": {
              "length": 0.3,
              "width": 0.4,
              "height": 0.5
        },
        "quantity_per_unit": 0.5,
        "avg_ratings": 2,
        "std_price": 2.7,
        "supp_price": 1.1,
        "fresh": {
              "category": "Bakery",
              "best_before": 5,
              "country_of_origin": "UK"
        },
        "category": "fresh"
},{
        "_id": "FP11",
        "name": "Apple",
        "short_desc": "fresh apple",
        "dimensions": {
              "length": 0.3,
              "width": 0.3,
              "height": 0.3
        },
        "quantity_per_unit": 0.5,
        "avg_ratings": 3.2,
        "std_price": 4,
        "supp_price": 2,
        "fresh": {
              "category": "Fruits and Vegetables",
              "best_before": 3,
              "country_of_origin": "UK"
        },
        "category": "fresh"
},{
        "_id": "FP13",
        "name": "Mango",
        "short_desc": "good mango",
        "dimensions": {
              "length": 0.3,
              "width": 0.3,
              "height": 0.5
        },
        "quantity_per_unit": 0.5,
        "avg_ratings": 3,
        "std_price": 3,
        "supp_price": 2.2,
        "fresh": {
              "category": "Fruits and Vegetables",
              "best_before": 3,
              "country_of_origin": "UK"
```

```
    },
    "category": "fresh"
}]
```

4. **ratings:**
   - **_id**: unique identifier
   - **PublishDate:** date the rating is published
   - **Order_id:** unique order id
   - **Customer_id:** unique customer id
   - **Order_date:** date the order was placed
   - **Product_id;** unique product id
   - **Rating:** rating given to the product out of 5

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        }
    },
    "published_date": {
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        "$numberLong": "1665001924000"
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    },
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},{
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    "order_date": {
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        }
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```json
        },
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        "rating": 4
    },{
        "_id": "RA14",
        "order_date": {
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            "$numberLong": "1664724895000"
            }
        },
        "published_date": {
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            "$numberLong": "1665329695000"
            }
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            }
        },
        "published_date": {
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```

```
            }
        },
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        "order_id": "20221009202521C20",
        "rating": 4
},{
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            }
        },
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            "$numberLong": "1665480039000"
            }
        },
        "product_id": "PH4",
        "customer_id": "C11",
        "order_id": "20221004092039C11",
        "rating": 5
},{
        "_id": "RA23",
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            "$numberLong": "1664897211000"
            }
        },
        "published_date": {
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            "$numberLong": "1665502011000"
            }
        },
        "product_id": "CD6",
        "customer_id": "C12",
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```json
      "order_id": "20221004152651C12",
      "rating": 1
},{
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            "$numberLong": "1665499910000"
            }
      },
      "published_date": {
            "$date": {
            "$numberLong": "1665586310000"
            }
      },
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      "customer_id": "C20",
      "order_id": "20221011145150C20",
      "rating": 1
},{
      "_id": "RA28",
      "order_date": {
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            "$numberLong": "1665564020000"
            }
      },
      "published_date": {
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            "$numberLong": "1665650420000"
            }
      },
      "product_id": "FP14",
      "customer_id": "C10",
      "order_id": "20221012084020C10",
      "rating": 1
},{
      "_id": "RA31",
      "order_date": {
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            "$numberLong": "1665086991000"
            }
      },
      "published_date": {
            "$date": {
            "$numberLong": "1665691791000"
            }
      },
      "product_id": "CD7",
      "customer_id": "C1",
      "order_id": "20221006200951C1",
      "rating": 4
},{
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        "order_date": {
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            }
    },
    "published_date": {
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            "$numberLong": "1665713373000"
            }
    },
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    "order_id": "20221007020933C3",
    "rating": 4
},{
    "_id": "RA33",
    "order_date": {
            "$date": {
            "$numberLong": "1665131791000"
            }
    },
    "published_date": {
            "$date": {
            "$numberLong": "1665736591000"
            }
    },
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    "customer_id": "C3",
    "order_id": "20221007083631C3",
    "rating": 2
},{
    "_id": "RA36",
    "order_date": {
            "$date": {
            "$numberLong": "1665206265000"
            }
    },
    "published_date": {
            "$date": {
            "$numberLong": "1665811065000"
            }
    },
    "product_id": "PH9",
    "customer_id": "C3",
    "order_id": "20221008051745C3",
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        "_id": "RA202",
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        "customer_id": "C6",
        "order_id": "20221114085119C6",
        "rating": 4
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        "_id": "RA206",
        "order_date": {
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                "$numberLong": "1668551876000"
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        },
        "published_date": {
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                "$numberLong": "1669156676000"
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        "customer_id": "C19",
        "order_id": "20221115223756C19",
        "rating": 2
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        "_id": "RA211",
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    "customer_id": "C4",
    "order_id": "20221117002013C4",
    "rating": 4
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```json
            }
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    "_id": "RA268",

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        }
    },
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        "$numberLong": "1670302695000"
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    "rating": 3
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    "_id": "RA269",
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    "order_id": "20221129073144C10",
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    "_id": "RA270",
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        "$numberLong": "1669740930000"
        }
    },
    "published_date": {
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        "$numberLong": "1670345730000"
        }
    },
    "product_id": "PH8",
    "customer_id": "C20",
    "order_id": "20221129165530C20",
    "rating": 2
}]
```

5. **Suppliers:**
   - **_id**: unique identifier
   - **Name:** Supplier's name

- **Address:** supplier's address
- **City:** supplier's city
- **Post_code:** supplier's postcode
- **Location**
  - **Coordinates:** geospatial location based on longitude and latitude
- **Realtime_inventory**
  - **Product_id:** unique product identifier
  - **Timestamp:** time when the product was supplied
  - **Quantity:** number of products

```
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  "_id": "W2",
  "name": "Amazon UK MAN2",
  "address": "Amazon UK Services Ltd., Omega Plot 7c, Orion Boulevard, Great Sankey",
  "city": "Warrington",
  "post_code": "WA5 3XA",
  "location": {
      "type": "Point",
      "coordinates": [
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      -2.6594717
      ]
  },
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      {
      "product_id": "B2",
      "timestamp": "2022-01-04 15:00:00",
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      {
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      "timestamp": "2022-01-04 15:00:00",
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      {
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      "timestamp": "2022-01-04 15:00:00",
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      {
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      "timestamp": "2022-01-04 15:00:00",
      "quantity": 12
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      {
      "product_id": "B6",
```

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      "product_id": "B7",
      "timestamp": "2022-01-04 15:00:00",
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    {
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    {
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      "quantity": 14
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    {
      "product_id": "CD6",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 9

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    {
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      "timestamp": "2022-01-04 15:00:00",
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      "timestamp": "2022-01-04 15:00:00",
      "quantity": 5
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    {
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      "timestamp": "2022-01-04 15:00:00",
      "quantity": 10
    },
    {
      "product_id": "PH5",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 9
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    {
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      "timestamp": "2022-01-04 15:00:00",
      "quantity": 8
    },
    {

        "product_id": "PH7",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 14
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    {
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        "timestamp": "2022-01-04 15:00:00",
        "quantity": 13
    },
    {
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        "timestamp": "2022-01-04 15:00:00",
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    },
    {
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        "timestamp": "2022-01-04 15:00:00",
        "quantity": 10
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        "timestamp": "2022-01-04 15:00:00",
        "quantity": 10
    },
    {
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        "timestamp": "2022-01-04 15:00:00",
        "quantity": 4
    },
    {
        "product_id": "HA3",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 5
    },
    {
        "product_id": "HA4",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 6
    },
    {
        "product_id": "HA5",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 7
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    {
        "product_id": "HA6",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 9
    },
    {
        "product_id": "HA7",
        "timestamp": "2022-01-04 15:00:00",

```json
      "quantity": 10
      },
      {
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      "timestamp": "2022-01-04 15:00:00",
      "quantity": 14
      },
      {
      "product_id": "HA9",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 11
      },
      {
      "product_id": "HA10",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 8
      }
  ]
},{
  "_id": "W1",
  "name": "Amazon UK MAN1",
  "address": "Manchester Airport, 6 Sunbank Ln, Altrincham",
  "city": "Manchester",
  "post_code": "M90 5DL",
  "location": {
      "type": "Point",
      "coordinates": [
      53.36275842,
      -2.294618987
      ]
  },
  "realtime_inventory": [
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      {
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      "timestamp": "2022-01-04 15:00:00",
      "quantity": 20
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      {
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      "timestamp": "2022-01-04 15:00:00",
      "quantity": 16
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```

```json
    {
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    "timestamp": "2022-01-04 15:00:00",
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    {
    "product_id": "B7",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 14
    },
    {
    "product_id": "B8",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 24
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    {
    "product_id": "B9",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 14
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    {
    "product_id": "B10",
    "timestamp": "2022-01-04 15:00:00",
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    "timestamp": "2022-01-04 15:00:00",
    "quantity": 27
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    "timestamp": "2022-01-04 15:00:00",
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    {
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    "timestamp": "2022-01-04 15:00:00",
    "quantity": 25
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    {
    "product_id": "CD4",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 18
    },
    {
    "product_id": "CD5",
```

```
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    {
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        "timestamp": "2022-01-04 15:00:00",
        "quantity": 14
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        "timestamp": "2022-01-04 15:00:00",
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        "quantity": 18
    },
    {
        "product_id": "PH1",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 14
    },
    {
        "product_id": "PH2",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 29
    },
    {
        "product_id": "PH3",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 21
    },
    {
        "product_id": "PH4",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 16
    },
    {
        "product_id": "PH5",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 22
```

```json
    },
    {
    "product_id": "PH6",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 17
    },
    {
    "product_id": "PH7",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 14
    },
    {
    "product_id": "PH8",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 24
    },
    {
    "product_id": "PH9",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 14
    },
    {
    "product_id": "PH10",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 20
    },
    {
    "product_id": "HA1",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 14
    },
    {
    "product_id": "HA2",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 29
    },
    {
    "product_id": "HA3",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 21
    },
    {
    "product_id": "HA4",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 16
    },
    {
    "product_id": "HA5",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 21
    },
    {
```

```
        "product_id": "HA6",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 18
        },
        {
        "product_id": "HA7",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 14
        },
        {
        "product_id": "HA8",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 24
        },
        {
        "product_id": "HA9",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 15
        },
        {
        "product_id": "HA10",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 20
        }
    ]
},{
    "_id": "ST5",
    "name": "Morrisons Boho",
    "address": "Unit 4, Moho Building",
    "city": "Manchester",
    "post_code": "M15 4JY",
    "location": {
        "type": "Point",
        "coordinates": [
        53.4713735246263,
        -2.26417194876941
        ]
    },
    "realtime_inventory": [
        {
        "product_id": "FP1",
        "timestamp": {
        "$date": {
        "$numberLong": "1673285460000"
        }
        },
        "quantity": 14
        },
        {
        "product_id": "FP2",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 15
```

```json
    },
    {
    "product_id": "FP3",
    "timestamp": {
    "$date": {
    "$numberLong": "1673288220000"
    }
    },
    "quantity": 18
    },
    {
    "product_id": "FP4",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 25
    },
    {
    "product_id": "FP5",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 10
    },
    {
    "product_id": "FP6",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 20
    },
    {
    "product_id": "FP7",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 40
    },
    {
    "product_id": "FP8",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 40
    },
    {
    "product_id": "FP9",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 40
    },
    {
    "product_id": "FP10",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 45
    },
    {
    "product_id": "FP11",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 25
    },
    {
    "product_id": "FP12",
```

```json
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 50
        },
        {
        "product_id": "FP13",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 45
        },
        {
        "product_id": "FP14",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 50
        },
        {
        "product_id": "FP15",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 25
        }
    ]
},{
    "_id": "ST3",
    "name": "Morrisons Stretford",
    "address": "333 Stretford Rd, Hulme",
    "city": "Manchester",
    "post_code": "M15 4AY",
    "location": {
        "type": "Point",
        "coordinates": [
        53.4666895236066,
        -2.2513216579917
        ]
    },
    "realtime_inventory": [
        {
        "product_id": "FP1",
        "timestamp": "2023-01-09T23:26:55.617905",
        "quantity": 5
        },
        {
        "product_id": "FP2",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 19
        },
        {
        "product_id": "FP3",
        "timestamp": {
        "$date": {
        "$numberLong": "1673288220000"
        }
        },
        "quantity": 18
        },
```

```json
        {
        "product_id": "FP4",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 15
        },
        {
        "product_id": "FP5",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 12
        },
        {
        "product_id": "FP6",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 30
        },
        {
        "product_id": "FP7",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 40
        },
        {
        "product_id": "FP8",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 33
        },
        {
        "product_id": "FP9",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 22
        },
        {
        "product_id": "FP10",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 45
        },
        {
        "product_id": "FP11",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 15
        },
        {
        "product_id": "FP12",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 20
        },
        {
        "product_id": "FP13",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 24
        },
        {
        "product_id": "FP14",
```

```json
          "timestamp": "2022-01-04 15:00:00",
          "quantity": 40
          },
          {
          "product_id": "FP15",
          "timestamp": "2022-01-04 15:00:00",
          "quantity": 25
          }
      ]
},{
   "_id": "ST4",
   "name": "Morrisons Ducie",
   "address": "22 Ducie St",
   "city": "Manchester",
   "post_code": "M1 2DP",
   "location": {
        "type": "Point",
        "coordinates": [
        53.4796395264272,
        -2.22947498022072
        ]
   },
   "realtime_inventory": [
        {
        "product_id": "FP1",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 25
        },
        {
        "product_id": "FP2",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 11
        },
        {
        "product_id": "FP3",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 25
        },
        {
        "product_id": "FP4",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 20
        },
        {
        "product_id": "FP5",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 15
        },
        {
        "product_id": "FP6",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 25
```

```json
        },
        {
        "product_id": "FP7",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 45
        },
        {
        "product_id": "FP8",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 35
        },
        {
        "product_id": "FP9",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 25
        },
        {
        "product_id": "FP10",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 44
        },
        {
        "product_id": "FP11",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 20
        },
        {
        "product_id": "FP12",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 5
        },
        {
        "product_id": "FP13",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 40
        },
        {
        "product_id": "FP14",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 45
        },
        {
        "product_id": "FP15",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 20
        }
    ]
},{
  "_id": "ST2",
  "name": "Morrisons Oxford",
  "address": "Off Grafton St, Oxford Rd",
  "city": "Manchester",
```

```
    "post_code": "M13 9NU",
    "location": {
        "type": "Point",
        "coordinates": [
        53.463585307919,
        -2.23002894909324
        ]
},
"realtime_inventory": [
        {
        "product_id": "FP1",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 2
        },
        {
        "product_id": "FP2",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 22
        },
        {
        "product_id": "FP3",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 24
        },
        {
        "product_id": "FP4",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 15
        },
        {
        "product_id": "FP5",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 10
        },
        {
        "product_id": "FP6",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 20
        },
        {
        "product_id": "FP7",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 25
        },
        {
        "product_id": "FP8",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 30
        },
        {
        "product_id": "FP9",
        "timestamp": "2022-01-04 15:00:00",
```

```json
          "quantity": 20
        },
        {
        "product_id": "FP10",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 40
        },
        {
        "product_id": "FP11",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 20
        },
        {
        "product_id": "FP12",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 12
        },
        {
        "product_id": "FP13",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 14
        },
        {
        "product_id": "FP14",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 20
        },
        {
        "product_id": "FP15",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 20
        }
    ]
},{
    "_id": "ST6",
    "name": "Morrisons Wilbraham",
    "address": "418B Wilbraham Rd, Chorlton-cum-Hardy",
    "city": "Manchester",
    "post_code": "M21 0UA",
    "location": {
        "type": "Point",
        "coordinates": [
        53.4426805360709,
        -2.27429698166463
        ]
    },
    "realtime_inventory": [
        {
        "product_id": "FP1",
        "timestamp": "2022-01-04 15:00:00",
        "quantity": 25
        },
```

```json
    {
    "product_id": "FP2",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 12
    },
    {
    "product_id": "FP3",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 25
    },
    {
    "product_id": "FP4",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 20
    },
    {
    "product_id": "FP5",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 15
    },
    {
    "product_id": "FP6",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 25
    },
    {
    "product_id": "FP7",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 45
    },
    {
    "product_id": "FP8",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 20
    },
    {
    "product_id": "FP9",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 20
    },
    {
    "product_id": "FP10",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 20
    },
    {
    "product_id": "FP11",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 22
    },
    {
    "product_id": "FP12",
```

```json
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 45
            },
            {
            "product_id": "FP13",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 40
            },
            {
            "product_id": "FP14",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 34
            },
            {
            "product_id": "FP15",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 15
            }
        ]
    },{
        "_id": "W3",
        "name": "Amazom UK XUKA",
        "address": "DHL Preston Brook (XUKA), Aston Lane North, Whitehouse Industrial Estate",
        "city": "Runcorn",
        "post_code": "WA7 3BN",
        "location": {
            "type": "Point",
            "coordinates": [
            53.31948,
            -2.65501
            ]
        },
        "realtime_inventory": [
            {
            "product_id": "B1",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 8
            },
            {
            "product_id": "B2",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 3
            },
            {
            "product_id": "B3",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 4
            },
            {
            "product_id": "B4",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 7
```

```json
    },
    {
    "product_id": "B5",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 5
    },
    {
    "product_id": "B6",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 8
    },
    {
    "product_id": "B7",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 9
    },
    {
    "product_id": "B8",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 5
    },
    {
    "product_id": "B9",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 8
    },
    {
    "product_id": "B10",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 9
    },
    {
    "product_id": "CD1",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 7
    },
    {
    "product_id": "CD2",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 9
    },
    {
    "product_id": "CD3",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 5
    },
    {
    "product_id": "CD4",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 3
    },
    {
```

```
            "product_id": "CD5",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 6
        },
        {
            "product_id": "CD6",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 7
        },
        {
            "product_id": "CD7",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 5
        },
        {
            "product_id": "CD8",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 6
        },
        {
            "product_id": "CD9",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 8
        },
        {
            "product_id": "CD10",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 5
        },
        {
            "product_id": "PH1",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 5
        },
        {
            "product_id": "PH2",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 3
        },
        {
            "product_id": "PH3",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 2
        },
        {
            "product_id": "PH4",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 1
        },
        {
            "product_id": "PH5",
            "timestamp": "2022-01-04 15:00:00",
```

```json
      "quantity": 7
    },
    {
    "product_id": "PH6",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 3
    },
    {
    "product_id": "PH7",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 5
    },
    {
    "product_id": "PH8",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 4
    },
    {
    "product_id": "PH9",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 9
    },
    {
    "product_id": "PH10",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 4
    },
    {
    "product_id": "HA1",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 6
    },
    {
    "product_id": "HA2",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 9
    },
    {
    "product_id": "HA3",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 6
    },
    {
    "product_id": "HA4",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 4
    },
    {
    "product_id": "HA5",
    "timestamp": "2022-01-04 15:00:00",
    "quantity": 7
    },
```

```json
            {
            "product_id": "HA6",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 8
            },
            {
            "product_id": "HA7",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 6
            },
            {
            "product_id": "HA8",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 1
            },
            {
            "product_id": "HA9",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 4
            },
            {
            "product_id": "HA10",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 3
            }
        ]
    },{
        "_id": "ST1",
        "name": "Morrisons Piccadilly",
        "address": "19-25 Piccadilly",
        "city": "Manchester",
        "post_code": "M1 1LU",
        "location": {
            "type": "Point",
            "coordinates": [
            53.4808056053302,
            -2.23495401192835
            ]
        },
        "realtime_inventory": [
            {
            "product_id": "FP1",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 1
            },
            {
            "product_id": "FP2",
            "timestamp": "2022-01-04 15:00:00",
            "quantity": 19
            },
            {
            "product_id": "FP3",
```

```json
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 12
    },
    {
      "product_id": "FP4",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 12
    },
    {
      "product_id": "FP5",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 21
    },
    {
      "product_id": "FP6",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 21
    },
    {
      "product_id": "FP7",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 34
    },
    {
      "product_id": "FP8",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 7
    },
    {
      "product_id": "FP9",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 60
    },
    {
      "product_id": "FP10",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 15
    },
    {
      "product_id": "FP11",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 30
    },
    {
      "product_id": "FP12",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 22
    },
    {
      "product_id": "FP13",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 40
```

```
      },
      {
      "product_id": "FP14",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 35
      },
      {
      "product_id": "FP15",
      "timestamp": "2022-01-04 15:00:00",
      "quantity": 40
      }
  ]
}]
```

6. **dailyInventoryRecord**: inventory records for a product in a supplier in a day for past 10 years
   - **_id**: unique identifier
     - **Supplier_id**: supplier identifier
     - **Product_id**: product identifier
     - **Start_date**: the starting datetime of this document (00:00 of the day)
     - **End_date**: the ending datetime of this document (23:59 of the day)
   - **Supplier_location**
     - **Coordinates**: geospatial location based on longitude and latitude
   - **Inventory_data**: list of inventory record within the day
     - **Datetime**: datetime when the inventory quantity was recorded
     - **Inventory_quantity**: inventory quantity at the datetime

```
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      "product_id": "HA2",
      "start_date": "02/01/2023 00:00",
      "end_date": "02/01/2023 23:59"
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      "latitude": "-2.6594717"
  },
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      "$numberLong": "1675271640000"
      }
      },
      "inventory_quantity": "8"
      }
  ]
},{
  "_id": {
      "supplier_id": "ST4",
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        },
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        "latitude": "-2.230028949"
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        "$numberLong": "1677667440000"
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        "inventory_quantity": "4"
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},{
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        "product_id": "HA5",
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        "end_date": "03/01/2023 23:59"
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        "latitude": "-2.274296982"
    },
    "inventory_data": [
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```json
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            },
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},{
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            "product_id": "FP9",
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            "product_id": "FP13",
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            "end_date": "03/01/2023 23:59"
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            "product_id": "FP15",
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        }
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},{
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        "product_id": "FP9",
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        "end_date": "02/01/2023 23:59"
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        }
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        "product_id": "FP8",
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        "latitude": "-2.264171949"
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},{
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```json
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            },
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            "latitude": "-2.22947498"
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            },
            "inventory_quantity": "10"
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            "product_id": "FP12",
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            "end_date": "02/01/2023 23:59"
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```json
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        "_id": {
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            "product_id": "CD9",
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    },{
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            "product_id": "CD1",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
        },
        "supplier_location": {
            "longitude": "53.44268054",
            "latitude": "-2.274296982"
        },
        "inventory_data": [
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            "datetime": {
            "$date": {
            "$numberLong": "1677705480000"
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            },
            "inventory_quantity": "7"
            }
        ]
```

```
},{
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        "product_id": "FP8",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
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```json
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            },
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            "product_id": "CD5",
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            "latitude": "-2.274296982"
        },
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                                },
                                "inventory_quantity": "10"
                                }
                ]
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                        "product_id": "FP13",
                        "start_date": "03/01/2023 00:00",
                        "end_date": "03/01/2023 23:59"
                },
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                },
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                            },
                            "inventory_quantity": "4"
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        },{
            "_id": {
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        },{
```

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```
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        },
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},{
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```json
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```json
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},{
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```json
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        },
        "inventory_quantity": "7"
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},{
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        "product_id": "FP14",
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        "end_date": "02/01/2023 23:59"
    },
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        "latitude": "-2.274296982"
    },
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        "$numberLong": "1675294140000"
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        },
        "inventory_quantity": "3"
        }
    ]
},{
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        "product_id": "FP5",
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    },
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        "latitude": "-2.230028949"
    },
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```json
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                },
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                "product_id": "FP12",
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        },
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                "inventory_quantity": "9"
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```
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            "end_date": "03/01/2023 23:59"
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            "latitude": "-2.274296982"
    },
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            },
            "inventory_quantity": "2"
            }
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},{
    "_id": {
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            "product_id": "FP2",
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            "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
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            "latitude": "-2.274296982"
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            },
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        "latitude": "-2.274296982"
    },
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        }
        },
        "inventory_quantity": "9"
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    ]
},{
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        "inventory_quantity": "7"
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},{
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                },
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},{
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                "end_date": "02/01/2023 23:59"
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                },
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},{
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                "product_id": "B10",
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                "latitude": "-2.274296982"
        },
        "inventory_data": [
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```json
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            }
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            "product_id": "B3",
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            },
            "inventory_quantity": "5"
            }
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},{
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            "product_id": "FP12",
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            "end_date": "02/01/2023 23:59"
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            "latitude": "-2.22947498"
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            },
            "inventory_quantity": "8"
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    ]
},{
```

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        "end_date": "03/01/2023 23:59"
    },
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        "latitude": "-2.264171949"
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    "_id": {
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        "product_id": "PH5",
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        "end_date": "02/01/2023 23:59"
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        "latitude": "-2.6594717"
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        "$numberLong": "1675238100000"
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        },
        "inventory_quantity": "4"
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    ]
},{
    "_id": {
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        "product_id": "FP9",
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        "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
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        "latitude": "-2.274296982"
    },
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        },
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        }
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},{
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        "product_id": "HA6",
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        "datetime": {
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        "$numberLong": "1677650340000"
        }
        },
        "inventory_quantity": "4"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST5",
        "product_id": "FP7",
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        "end_date": "02/01/2023 23:59"
    },
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        "latitude": "-2.264171949"
    },
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        "inventory_quantity": "10"
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```json
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  },
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      "latitude": "-2.234954012"
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      "$numberLong": "1675247520000"
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      },
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      }
  ]
},{
  "_id": {
      "supplier_id": "ST6",
      "product_id": "FP9",
      "start_date": "02/01/2023 00:00",
      "end_date": "02/01/2023 23:59"
  },
  "supplier_location": {
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      "latitude": "-2.274296982"
  },
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      "$numberLong": "1675250400000"
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      },
      "inventory_quantity": "5"
      }
  ]
},{
  "_id": {
      "supplier_id": "ST2",
      "product_id": "FP2",
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      "end_date": "03/01/2023 23:59"
  },
  "supplier_location": {
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      "latitude": "-2.230028949"
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```json
        },
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            },
            "inventory_quantity": "9"
            }
    ]
},{
    "_id": {
            "supplier_id": "ST4",
            "product_id": "FP1",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
            "longitude": "53.47963953",
            "latitude": "-2.22947498"
    },
    "inventory_data": [
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            "datetime": {
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            "$numberLong": "1677676080000"
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            },
            "inventory_quantity": "7"
            }
    ]
},{
    "_id": {
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            "product_id": "FP4",
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            "end_date": "03/01/2023 23:59"
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    },
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            }
            },
            "inventory_quantity": "2"
            }
```

```json
    ]
},{
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    },
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        "latitude": "-2.22947498"
    },
    "inventory_data": [
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        "datetime": {
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        "$numberLong": "1677702720000"
        }
        },
        "inventory_quantity": "8"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST5",
        "product_id": "FP6",
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        "end_date": "03/01/2023 23:59"
    },
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        },
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        }
    ]
},{
    "_id": {
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        "product_id": "FP6",
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```json
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            },
            "inventory_quantity": "10"
            }
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},{
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            "product_id": "B4",
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            "end_date": "03/01/2023 23:59"
        },
    "supplier_location": {
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            "latitude": "-2.274296982"
        },
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            "datetime": {
            "$date": {
            "$numberLong": "1677644580000"
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            },
            "inventory_quantity": "6"
            }
    ]
},{
    "_id": {
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            "product_id": "FP12",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
        },
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    "inventory_data": [
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            }
            },
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```json
            }
        ]
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            "product_id": "FP4",
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            "end_date": "02/01/2023 23:59"
        },
        "supplier_location": {
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            "latitude": "-2.234954012"
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            },
            "inventory_quantity": "10"
            }
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    },{
        "_id": {
            "supplier_id": "W2",
            "product_id": "HA8",
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            "end_date": "02/01/2023 23:59"
        },
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            "$numberLong": "1675286700000"
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            },
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            }
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    },{
        "_id": {
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            "product_id": "FP5",
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            "end_date": "02/01/2023 23:59"
        },
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```json
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        },
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        }
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},{
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        "product_id": "B6",
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        "end_date": "02/01/2023 23:59"
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        "latitude": "-2.294618987"
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        "inventory_quantity": "4"
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        "end_date": "03/01/2023 23:59"
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        "latitude": "-2.234954012"
    },
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```json
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            }
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    },{
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            "product_id": "FP12",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
        },
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            "latitude": "-2.264171949"
        },
        "inventory_data": [
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            }
            },
            "inventory_quantity": "7"
            }
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    },{
        "_id": {
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            "product_id": "FP7",
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            "end_date": "02/01/2023 23:59"
        },
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            "latitude": "-2.234954012"
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            }
            },
            "inventory_quantity": "7"
            }
        ]
    },{
        "_id": {
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            "product_id": "FP3",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
        },
```

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            },
            "inventory_quantity": "2"
            }
      ]
},{
      "_id": {
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            "product_id": "FP9",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
      },
      "supplier_location": {
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            "latitude": "-2.22947498"
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            "$numberLong": "1677643140000"
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            },
            "inventory_quantity": "6"
            }
      ]
},{
      "_id": {
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            "product_id": "FP10",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
      },
      "supplier_location": {
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            "latitude": "-2.230028949"
      },
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            "$numberLong": "1675210680000"
            }
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```json
        },
        "inventory_quantity": "9"
        }
    ]
},{
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        "end_date": "02/01/2023 23:59"
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    },
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        "$numberLong": "1675257780000"
        }
        },
        "inventory_quantity": "6"
        }
    ]
},{
    "_id": {
        "supplier_id": "W3",
        "product_id": "PH6",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
    },
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        "latitude": "-2.274296982"
    },
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        "$numberLong": "1677654900000"
        }
        },
        "inventory_quantity": "7"
        }
    ]
},{
    "_id": {
        "supplier_id": "W2",
        "product_id": "CD3",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
```

```
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    },
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        }
        },
        "inventory_quantity": "8"
        }
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},{
    "_id": {
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        "product_id": "FP6",
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        "end_date": "03/01/2023 23:59"
    },
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        "latitude": "-2.274296982"
    },
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        }
        },
        "inventory_quantity": "7"
        }
    ]
},{
    "_id": {
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        "product_id": "PH7",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
    },
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        "latitude": "-2.274296982"
    },
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        "$numberLong": "1677692460000"
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```json
                }
            },
            "inventory_quantity": "4"
        },
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            "$numberLong": "1677640740000"
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        },
            "inventory_quantity": "4"
        },
        {
            "datetime": {
            "$date": {
            "$numberLong": "1677696840000"
            }
        },
            "inventory_quantity": "3"
        }
    ]
},{
    "_id": {
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            "product_id": "FP3",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
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            "latitude": "-2.22947498"
    },
    "inventory_data": [
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            "$date": {
            "$numberLong": "1677636180000"
            }
        },
            "inventory_quantity": "3"
        },
        {
            "datetime": {
            "$date": {
            "$numberLong": "1677670860000"
            }
        },
            "inventory_quantity": "2"
        }
    ]
},{
    "_id": {
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```
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            "product_id": "FP4",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
            "longitude": "53.48080561",
            "latitude": "-2.234954012"
    },
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            "$date": {
            "$numberLong": "1677688560000"
            }
            },
            "inventory_quantity": "3"
            }
    ]
},{
    "_id": {
            "supplier_id": "ST6",
            "product_id": "FP13",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
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            "latitude": "-2.274296982"
    },
    "inventory_data": [
            {
            "datetime": {
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            "$numberLong": "1675282260000"
            }
            },
            "inventory_quantity": "5"
            }
    ]
},{
    "_id": {
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            "product_id": "FP11",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
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            "latitude": "-2.230028949"
    },
    "inventory_data": [
```

```
            {
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            }
            },
            "inventory_quantity": "4"
            }
      ]
},{
    "_id": {
            "supplier_id": "ST5",
            "product_id": "FP7",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
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            "latitude": "-2.264171949"
    },
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            }
            },
            "inventory_quantity": "10"
            }
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},{
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            "product_id": "FP11",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
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            "latitude": "-2.274296982"
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    "inventory_data": [
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            },
            "inventory_quantity": "8"
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      ]
},{
```

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        "end_date": "03/01/2023 23:59"
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        "latitude": "-2.230028949"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1677697020000"
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        },
        "inventory_quantity": "8"
        }
    ]
},{
    "_id": {
        "supplier_id": "W1",
        "product_id": "PH4",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
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        "latitude": "-2.274296982"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1677644160000"
        }
        },
        "inventory_quantity": "2"
        }
    ]
},{
    "_id": {
        "supplier_id": "W3",
        "product_id": "CD7",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.31488963",
        "latitude": "-2.6509071"
    },
```

```json
    "inventory_data": [
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        }
        },
        "inventory_quantity": "8"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST3",
        "product_id": "FP14",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.46668952",
        "latitude": "-2.251321658"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1677645960000"
        }
        },
        "inventory_quantity": "4"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST4",
        "product_id": "FP10",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.47963953",
        "latitude": "-2.22947498"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675231500000"
        }
        },
        "inventory_quantity": "6"
        }
    ]
```

```json
},{
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        "product_id": "HA3",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.44268054",
        "latitude": "-2.274296982"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1677710340000"
        }
        },
        "inventory_quantity": "4"
        }
    ]
},{
    "_id": {
        "supplier_id": "W1",
        "product_id": "PH10",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.36275842",
        "latitude": "-2.294618987"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675217580000"
        }
        },
        "inventory_quantity": "10"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST1",
        "product_id": "FP10",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.48080561",
        "latitude": "-2.234954012"
```

```json
        },
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                "$numberLong": "1675239600000"
                }
                },
                "inventory_quantity": "3"
                }
        ]
},{
        "_id": {
                "supplier_id": "ST3",
                "product_id": "FP8",
                "start_date": "03/01/2023 00:00",
                "end_date": "03/01/2023 23:59"
        },
        "supplier_location": {
                "longitude": "53.46668952",
                "latitude": "-2.251321658"
        },
        "inventory_data": [
                {
                "datetime": {
                "$date": {
                "$numberLong": "1677647040000"
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                },
                "inventory_quantity": "7"
                }
        ]
},{
        "_id": {
                "supplier_id": "W1",
                "product_id": "B3",
                "start_date": "03/01/2023 00:00",
                "end_date": "03/01/2023 23:59"
        },
        "supplier_location": {
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                "latitude": "-2.274296982"
        },
        "inventory_data": [
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                "datetime": {
                "$date": {
                "$numberLong": "1677696000000"
                }
                },
                "inventory_quantity": "1"
                }
```

```
        ]
    },{
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            "product_id": "FP2",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
        },
        "supplier_location": {
            "longitude": "53.47963953",
            "latitude": "-2.22947498"
        },
        "inventory_data": [
            {
            "datetime": {
            "$date": {
            "$numberLong": "1677652560000"
            }
            },
            "inventory_quantity": "4"
            }
        ]
    },{
        "_id": {
            "supplier_id": "ST5",
            "product_id": "FP5",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
        },
        "supplier_location": {
            "longitude": "53.47137352",
            "latitude": "-2.264171949"
        },
        "inventory_data": [
            {
            "datetime": {
            "$date": {
            "$numberLong": "1675288800000"
            }
            },
            "inventory_quantity": "7"
            }
        ]
    },{
        "_id": {
            "supplier_id": "W1",
            "product_id": "HA10",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
        },
        "supplier_location": {
            "longitude": "53.36275842",
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```json
                "latitude": "-2.294618987"
        },
        "inventory_data": [
            {
            "datetime": {
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            "$numberLong": "1675266840000"
            }
            },
            "inventory_quantity": "1"
            }
        ]
},{
    "_id": {
            "supplier_id": "W1",
            "product_id": "HA10",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
        },
        "supplier_location": {
            "longitude": "53.44268054",
            "latitude": "-2.274296982"
        },
        "inventory_data": [
            {
            "datetime": {
            "$date": {
            "$numberLong": "1677670560000"
            }
            },
            "inventory_quantity": "4"
            }
        ]
},{
    "_id": {
            "supplier_id": "ST6",
            "product_id": "FP2",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
        },
        "supplier_location": {
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            "latitude": "-2.274296982"
        },
        "inventory_data": [
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            "datetime": {
            "$date": {
            "$numberLong": "1677630900000"
            }
            },
            "inventory_quantity": "7"
```

```json
      },
      {
      "datetime": {
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      "$numberLong": "1677646140000"
      }
      },
      "inventory_quantity": "6"
      },
      {
      "datetime": {
      "$date": {
      "$numberLong": "1677649560000"
      }
      },
      "inventory_quantity": "5"
      }
   ]
},{
   "_id": {
      "supplier_id": "W3",
      "product_id": "HA6",
      "start_date": "02/01/2023 00:00",
      "end_date": "02/01/2023 23:59"
   },
   "supplier_location": {
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      "latitude": "-2.6509071"
   },
   "inventory_data": [
      {
      "datetime": {
      "$date": {
      "$numberLong": "1675232940000"
      }
      },
      "inventory_quantity": "10"
      }
   ]
},{
   "_id": {
      "supplier_id": "W2",
      "product_id": "PH8",
      "start_date": "02/01/2023 00:00",
      "end_date": "02/01/2023 23:59"
   },
   "supplier_location": {
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      "latitude": "-2.6594717"
   },
   "inventory_data": [
      {
```

```json
            "datetime": {
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            "$numberLong": "1675240560000"
            }
            },
            "inventory_quantity": "6"
            }
    ]
},{
    "_id": {
            "supplier_id": "ST1",
            "product_id": "FP11",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
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            "latitude": "-2.234954012"
    },
    "inventory_data": [
            {
            "datetime": {
            "$date": {
            "$numberLong": "1677702600000"
            }
            },
            "inventory_quantity": "8"
            }
    ]
},{
    "_id": {
            "supplier_id": "ST2",
            "product_id": "FP4",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
            "longitude": "53.46358531",
            "latitude": "-2.230028949"
    },
    "inventory_data": [
            {
            "datetime": {
            "$date": {
            "$numberLong": "1675236000000"
            }
            },
            "inventory_quantity": "1"
            }
    ]
},{
    "_id": {
```

```json
        "supplier_id": "ST1",
        "product_id": "FP1",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.48080561",
        "latitude": "-2.234954012"
    },
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        "$numberLong": "1675219800000"
        }
        },
        "inventory_quantity": "5"
        },
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675276800000"
        }
        },
        "inventory_quantity": "4"
        },
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675283460000"
        }
        },
        "inventory_quantity": "3"
        },
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675291980000"
        }
        },
        "inventory_quantity": "1"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST1",
        "product_id": "FP7",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.48080561",
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```json
            "latitude": "-2.234954012"
        },
    "inventory_data": [
            {
            "datetime": {
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            "$numberLong": "1677710460000"
            }
            },
            "inventory_quantity": "8"
            }
    ]
},{
    "_id": {
            "supplier_id": "W1",
            "product_id": "PH7",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
        },
    "supplier_location": {
            "longitude": "53.36275842",
            "latitude": "-2.294618987"
        },
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            {
            "datetime": {
            "$date": {
            "$numberLong": "1675218780000"
            }
            },
            "inventory_quantity": "8"
            }
    ]
},{
    "_id": {
            "supplier_id": "W2",
            "product_id": "B10",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
        },
    "supplier_location": {
            "longitude": "53.4206283",
            "latitude": "-2.6594717"
        },
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            "datetime": {
            "$date": {
            "$numberLong": "1675244220000"
            }
            },
            "inventory_quantity": "1"
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```
            }
        ]
    },{
        "_id": {
            "supplier_id": "W3",
            "product_id": "PH9",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
        },
        "supplier_location": {
            "longitude": "53.44268054",
            "latitude": "-2.274296982"
        },
        "inventory_data": [
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            "datetime": {
            "$date": {
            "$numberLong": "1677696240000"
            }
            },
            "inventory_quantity": "7"
            }
        ]
    },{
        "_id": {
            "supplier_id": "W1",
            "product_id": "CD5",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
        },
        "supplier_location": {
            "longitude": "53.36275842",
            "latitude": "-2.294618987"
        },
        "inventory_data": [
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            "datetime": {
            "$date": {
            "$numberLong": "1675221540000"
            }
            },
            "inventory_quantity": "1"
            }
        ]
    },{
        "_id": {
            "supplier_id": "ST6",
            "product_id": "FP7",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
        },
        "supplier_location": {
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```json
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      "latitude": "-2.274296982"
  },
  "inventory_data": [
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      "datetime": {
      "$date": {
      "$numberLong": "1675291500000"
      }
      },
      "inventory_quantity": "1"
      }
  ]
},{
  "_id": {
      "supplier_id": "W1",
      "product_id": "B9",
      "start_date": "03/01/2023 00:00",
      "end_date": "03/01/2023 23:59"
  },
  "supplier_location": {
      "longitude": "53.44268054",
      "latitude": "-2.274296982"
  },
  "inventory_data": [
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      "datetime": {
      "$date": {
      "$numberLong": "1677654120000"
      }
      },
      "inventory_quantity": "4"
      }
  ]
},{
  "_id": {
      "supplier_id": "ST3",
      "product_id": "FP7",
      "start_date": "03/01/2023 00:00",
      "end_date": "03/01/2023 23:59"
  },
  "supplier_location": {
      "longitude": "53.46668952",
      "latitude": "-2.251321658"
  },
  "inventory_data": [
      {
      "datetime": {
      "$date": {
      "$numberLong": "1677695700000"
      }
      },
```

```json
        "inventory_quantity": "9"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST5",
        "product_id": "FP14",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.47137352",
        "latitude": "-2.264171949"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1677653340000"
        }
        },
        "inventory_quantity": "1"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST1",
        "product_id": "FP15",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.48080561",
        "latitude": "-2.234954012"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675223580000"
        }
        },
        "inventory_quantity": "1"
        }
    ]
},{
    "_id": {
        "supplier_id": "W2",
        "product_id": "HA2",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
    },
```

```json
        "supplier_location": {
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            "latitude": "-2.274296982"
    },
    "inventory_data": [
            {
            "datetime": {
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            "$numberLong": "1677702420000"
            }
            },
            "inventory_quantity": "9"
            }
    ]
},{
    "_id": {
            "supplier_id": "W1",
            "product_id": "HA7",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
            "longitude": "53.44268054",
            "latitude": "-2.274296982"
    },
    "inventory_data": [
            {
            "datetime": {
            "$date": {
            "$numberLong": "1677708960000"
            }
            },
            "inventory_quantity": "7"
            }
    ]
},{
    "_id": {
            "supplier_id": "ST4",
            "product_id": "FP7",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
            "longitude": "53.47963953",
            "latitude": "-2.22947498"
    },
    "inventory_data": [
            {
            "datetime": {
            "$date": {
            "$numberLong": "1677653340000"
            }
```

```json
        },
        "inventory_quantity": "5"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST1",
        "product_id": "FP6",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.48080561",
        "latitude": "-2.234954012"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675237500000"
        }
        },
        "inventory_quantity": "6"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST5",
        "product_id": "FP11",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.47137352",
        "latitude": "-2.264171949"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675225020000"
        }
        },
        "inventory_quantity": "2"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST3",
        "product_id": "FP15",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
```

```json
        },
        "supplier_location": {
            "longitude": "53.46668952",
            "latitude": "-2.251321658"
        },
        "inventory_data": [
            {
            "datetime": {
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            "$numberLong": "1677703920000"
            }
            },
            "inventory_quantity": "1"
            }
        ]
    },{
        "_id": {
            "supplier_id": "ST5",
            "product_id": "FP13",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
        },
        "supplier_location": {
            "longitude": "53.47137352",
            "latitude": "-2.264171949"
        },
        "inventory_data": [
            {
            "datetime": {
            "$date": {
            "$numberLong": "1677652320000"
            }
            },
            "inventory_quantity": "4"
            }
        ]
    },{
        "_id": {
            "supplier_id": "ST4",
            "product_id": "FP1",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
        },
        "supplier_location": {
            "longitude": "53.47963953",
            "latitude": "-2.22947498"
        },
        "inventory_data": [
            {
            "datetime": {
            "$date": {
            "$numberLong": "1675219800000"
```

```
        }
      },
      "inventory_quantity": "5"
    },
    {
      "datetime": {
      "$date": {
      "$numberLong": "1675276800000"
      }
    },
      "inventory_quantity": "4"
    },
    {
      "datetime": {
      "$date": {
      "$numberLong": "1675283460000"
      }
    },
      "inventory_quantity": "3"
    },
    {
      "datetime": {
      "$date": {
      "$numberLong": "1675291980000"
      }
    },
      "inventory_quantity": "1"
      }
    ]
  },{
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            "product_id": "FP2",
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                "product_id": "FP4",
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            "latitude": "-2.22947498"
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    "inventory_data": [
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            "$date": {
            "$numberLong": "1677638100000"
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            "product_id": "FP15",
            "start_date": "02/01/2023 00:00",
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        },
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            "inventory_quantity": "10"
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            "product_id": "PH3",
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            "product_id": "FP14",
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            "product_id": "HA7",
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        },
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            "product_id": "FP8",
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            "product_id": "FP13",
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        "inventory_quantity": "5"
        }
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        "product_id": "FP14",
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        "product_id": "CD10",
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        "end_date": "02/01/2023 23:59"
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        "latitude": "-2.6509071"
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        "datetime": {
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        }
        },
        "inventory_quantity": "5"
        },
        {
        "datetime": {
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        "$numberLong": "1675275540000"
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},{
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        "product_id": "FP4",
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        "end_date": "02/01/2023 23:59"
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        "inventory_quantity": "7"
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    "_id": {
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        "product_id": "FP3",
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            "product_id": "FP13",
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            "end_date": "02/01/2023 23:59"
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    "_id": {
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            "product_id": "FP10",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
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    "supplier_location": {
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            "latitude": "-2.251321658"
    },
    "inventory_data": [
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            "datetime": {
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            "inventory_quantity": "1"
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            "product_id": "FP6",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
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            "latitude": "-2.230028949"
    },
    "inventory_data": [
            {
            "datetime": {
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            "$numberLong": "1675282800000"
            }
            },
            "inventory_quantity": "1"
            }
      ]
},{
    "_id": {
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            "product_id": "HA1",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
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            "latitude": "-2.274296982"
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            }
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            "end_date": "03/01/2023 23:59"
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            "latitude": "-2.274296982"
        },
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            "$numberLong": "1677659160000"
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            "inventory_quantity": "10"
            }
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    },{
        "_id": {
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            "product_id": "CD1",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
        },
        "supplier_location": {
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            "latitude": "-2.6509071"
        },
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            "$numberLong": "1675209840000"
            }
            },
            "inventory_quantity": "6"
            }
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    },{
        "_id": {
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            "product_id": "FP7",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
        },
        "supplier_location": {
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            "latitude": "-2.230028949"
        },
        "inventory_data": [
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},{
    "_id": {
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            "product_id": "FP3",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
    },
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            "latitude": "-2.274296982"
    },
    "inventory_data": [
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            "datetime": {
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            "$numberLong": "1675281180000"
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            },
            "inventory_quantity": "4"
            }
    ]
},{
    "_id": {
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            "product_id": "FP15",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
            "longitude": "53.47963953",
            "latitude": "-2.22947498"
    },
    "inventory_data": [
            {
            "datetime": {
            "$date": {
            "$numberLong": "1677662640000"
            }
            },
            "inventory_quantity": "9"
            }
    ]
},{
    "_id": {
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        "product_id": "CD6",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.44268054",
        "latitude": "-2.274296982"
    },
    "inventory_data": [
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        "datetime": {
        "$date": {
        "$numberLong": "1677661560000"
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        },
        "inventory_quantity": "4"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST6",
        "product_id": "FP15",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.44268054",
        "latitude": "-2.274296982"
    },
    "inventory_data": [
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        "$numberLong": "1677689580000"
        }
        },
        "inventory_quantity": "4"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST1",
        "product_id": "FP10",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
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        "latitude": "-2.234954012"
    },
    "inventory_data": [
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```json
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          }
          },
          "inventory_quantity": "3"
          }
      ]
  },{
      "_id": {
          "supplier_id": "ST2",
          "product_id": "FP7",
          "start_date": "02/01/2023 00:00",
          "end_date": "02/01/2023 23:59"
      },
      "supplier_location": {
          "longitude": "53.46358531",
          "latitude": "-2.230028949"
      },
      "inventory_data": [
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          "$numberLong": "1675263840000"
          }
          },
          "inventory_quantity": "5"
          }
      ]
  },{
      "_id": {
          "supplier_id": "ST5",
          "product_id": "FP4",
          "start_date": "02/01/2023 00:00",
          "end_date": "02/01/2023 23:59"
      },
      "supplier_location": {
          "longitude": "53.47137352",
          "latitude": "-2.264171949"
      },
      "inventory_data": [
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          "datetime": {
          "$date": {
          "$numberLong": "1675279320000"
          }
          },
          "inventory_quantity": "7"
          }
      ]
  },{
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            "product_id": "FP6",
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            "end_date": "02/01/2023 23:59"
        },
        "supplier_location": {
            "longitude": "53.44268054",
            "latitude": "-2.274296982"
        },
        "inventory_data": [
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            "datetime": {
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            "$numberLong": "1675237980000"
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            "inventory_quantity": "9"
            }
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    },{
      "_id": {
            "supplier_id": "W3",
            "product_id": "B8",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
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            "latitude": "-2.274296982"
        },
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            "end_date": "03/01/2023 23:59"
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            "product_id": "FP11",
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```json
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            "product_id": "FP12",
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```json
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},{
    "_id": {
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```json
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```json
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        "latitude": "-2.274296982"
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        "product_id": "FP4",
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```json
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},{
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        "latitude": "-2.274296982"
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},{
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        "product_id": "FP13",
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```

```json
      },
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      }
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      "product_id": "FP8",
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      },
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},{
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      "product_id": "FP6",
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      "inventory_quantity": "9"
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      "product_id": "FP15",
      "start_date": "02/01/2023 00:00",
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```json
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        "product_id": "FP5",
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        },
        "inventory_quantity": "2"
        }
    ]
},{
    "_id": {
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        "product_id": "PH1",
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        "end_date": "03/01/2023 23:59"
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        "latitude": "-2.274296982"
    },
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```json
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        },
        "inventory_quantity": "6"
        }
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},{
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        },
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```json
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    "_id": {
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        "product_id": "FP2",
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        "end_date": "02/01/2023 23:59"
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```json
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```json
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},{
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            "product_id": "FP15",
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    "_id": {
            "supplier_id": "ST3",
```

```
        "product_id": "FP5",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.46668952",
        "latitude": "-2.251321658"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675273020000"
        }
        },
        "inventory_quantity": "4"
        }
    ]
},{
    "_id": {
        "supplier_id": "W1",
        "product_id": "B6",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.44268054",
        "latitude": "-2.274296982"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1677676080000"
        }
        },
        "inventory_quantity": "10"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST2",
        "product_id": "FP13",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.46358531",
        "latitude": "-2.230028949"
    },
    "inventory_data": [
        {
```

```json
            "datetime": {
            "$date": {
            "$numberLong": "1677665340000"
            }
            },
            "inventory_quantity": "4"
            }
        ]
    },{
        "_id": {
            "supplier_id": "ST2",
            "product_id": "FP5",
            "start_date": "02/01/2023 00:00",
            "end_date": "02/01/2023 23:59"
        },
        "supplier_location": {
            "longitude": "53.46358531",
            "latitude": "-2.230028949"
        },
        "inventory_data": [
            {
            "datetime": {
            "$date": {
            "$numberLong": "1675270080000"
            }
            },
            "inventory_quantity": "8"
            }
        ]
    },{
        "_id": {
            "supplier_id": "ST5",
            "product_id": "FP9",
            "start_date": "03/01/2023 00:00",
            "end_date": "03/01/2023 23:59"
        },
        "supplier_location": {
            "longitude": "53.47137352",
            "latitude": "-2.264171949"
        },
        "inventory_data": [
            {
            "datetime": {
            "$date": {
            "$numberLong": "1677653760000"
            }
            },
            "inventory_quantity": "2"
            }
        ]
    },{
        "_id": {
```

```
        "supplier_id": "W3",
        "product_id": "B5",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.31488963",
        "latitude": "-2.6509071"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675253520000"
        }
        },
        "inventory_quantity": "8"
        }
    ]
},{
    "_id": {
        "supplier_id": "W2",
        "product_id": "CD6",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.4206283",
        "latitude": "-2.6594717"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675289580000"
        }
        },
        "inventory_quantity": "5"
        }
    ]
},{
    "_id": {
        "supplier_id": "W3",
        "product_id": "HA9",
        "start_date": "03/01/2023 00:00",
        "end_date": "03/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.44268054",
        "latitude": "-2.274296982"
    },
    "inventory_data": [
```

```
                {
                "datetime": {
                "$date": {
                "$numberLong": "1677637320000"
                }
                },
                "inventory_quantity": "8"
                }
    ]
},{
    "_id": {
                "supplier_id": "ST5",
                "product_id": "FP15",
                "start_date": "02/01/2023 00:00",
                "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
                "longitude": "53.47137352",
                "latitude": "-2.264171949"
    },
    "inventory_data": [
                {
                "datetime": {
                "$date": {
                "$numberLong": "1675293960000"
                }
                },
                "inventory_quantity": "10"
                }
    ]
},{
    "_id": {
                "supplier_id": "ST4",
                "product_id": "FP11",
                "start_date": "02/01/2023 00:00",
                "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
                "longitude": "53.47963953",
                "latitude": "-2.22947498"
    },
    "inventory_data": [
                {
                "datetime": {
                "$date": {
                "$numberLong": "1675224960000"
                }
                },
                "inventory_quantity": "9"
                }
    ]
},{
```

```
    "_id": {
        "supplier_id": "W1",
        "product_id": "PH1",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.36275842",
        "latitude": "-2.294618987"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675253280000"
        }
        },
        "inventory_quantity": "9"
        },
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675287900000"
        }
        },
        "inventory_quantity": "5"
        },
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675293900000"
        }
        },
        "inventory_quantity": "2"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST2",
        "product_id": "FP11",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.46358531",
        "latitude": "-2.230028949"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675263720000"
```

```json
        }
      },
      "inventory_quantity": "1"
    }
  ]
},{
  "_id": {
      "supplier_id": "W2",
      "product_id": "B1",
      "start_date": "02/01/2023 00:00",
      "end_date": "02/01/2023 23:59"
  },
  "supplier_location": {
      "longitude": "53.4206283",
      "latitude": "-2.6594717"
  },
  "inventory_data": [
      {
      "datetime": {
      "$date": {
      "$numberLong": "1675267320000"
      }
      },
      "inventory_quantity": "5"
      }
  ]
},{
  "_id": {
      "supplier_id": "ST2",
      "product_id": "FP9",
      "start_date": "02/01/2023 00:00",
      "end_date": "02/01/2023 23:59"
  },
  "supplier_location": {
      "longitude": "53.46358531",
      "latitude": "-2.230028949"
  },
  "inventory_data": [
      {
      "datetime": {
      "$date": {
      "$numberLong": "1675254660000"
      }
      },
      "inventory_quantity": "8"
      }
  ]
},{
  "_id": {
      "supplier_id": "W2",
      "product_id": "CD3",
      "start_date": "02/01/2023 00:00",
```

```json
            "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.4206283",
        "latitude": "-2.6594717"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675231620000"
        }
        },
        "inventory_quantity": "9"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST2",
        "product_id": "FP12",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.46358531",
        "latitude": "-2.230028949"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
        "$numberLong": "1675273980000"
        }
        },
        "inventory_quantity": "8"
        }
    ]
},{
    "_id": {
        "supplier_id": "ST3",
        "product_id": "FP6",
        "start_date": "02/01/2023 00:00",
        "end_date": "02/01/2023 23:59"
    },
    "supplier_location": {
        "longitude": "53.46668952",
        "latitude": "-2.251321658"
    },
    "inventory_data": [
        {
        "datetime": {
        "$date": {
```

```
      "$numberLong": "1675278000000"
      }
    },
    "inventory_quantity": "9"
      }
  ]
},{
  "_id": {
      "supplier_id": "W1",
      "product_id": "PH10",
      "start_date": "03/01/2023 00:00",
      "end_date": "03/01/2023 23:59"
  },
  "supplier_location": {
      "longitude": "53.44268054",
      "latitude": "-2.274296982"
  },
  "inventory_data": [
      {
      "datetime": {
      "$date": {
      "$numberLong": "1677698340000"
      }
      },
      "inventory_quantity": "4"
      }
  ]
},{
  "_id": {
      "supplier_id": "W1",
      "product_id": "B9",
      "start_date": "02/01/2023 00:00",
      "end_date": "02/01/2023 23:59"
  },
  "supplier_location": {
      "longitude": "53.36275842",
      "latitude": "-2.294618987"
  },
  "inventory_data": [
      {
      "datetime": {
      "$date": {
      "$numberLong": "1675246740000"
      }
      },
      "inventory_quantity": "6"
      }
  ]
}]
```

7. **partners:**
   - **_id:** Unique Identifier
   - **name:** partner's name

- **Age:** partner's age
- **Gender:** gender of the partner
- **Phone:** phone number of the partner
- **Email:** partner email
- **Bank_account:**
  - **Account_name:** partner's name on bank account
  - **Account_number:** partner's bank account number
  - **Sort_code:** 6 digit number which identifies the bank
- **Availability:**
  - **Is_active:** binary field. 1 indicates partner is active, 0 indicates not active
  - **On_delivery:** binary field. 1 indicates partner is on a delivery, 0 indicates not on a delivery
  - **Location:**
    - **type**
    - **coordinates**
- **Deliveries_made:** total number of historical deliveries
- **Avg_per_week:** average weekly deliveries historical
- **Best_week:** best historical weekly average
- **Number_of_week:** current number of deliveries in the week

```
[{
  "_id": "PA2",
  "name": "Robert Chaniago",
  "age": 23,
  "gender": "M",
  "phone": "07412744098",
  "email": "robert.chan@gmail.com",
  "bank_account": {
       "account_name": "Robert Chaniago",
       "account_number": 90375895,
       "sort_code": "040067"
  },
  "availabilty": {
       "is_active": 1,
       "on_delivery": 0,
       "location": {
       "type": "Point",
       "coordinates": [
       53.4680182503661,
       -2.25975047297267
       ]
       }
  },
  "deliveries_made": 90,
  "avg_per_week": 10,
  "best_week": 15,
  "number_of_week": 9
},{
  "_id": "PA4",
```

```json
    "name": "Sebastian Kanu",
    "age": 45,
    "gender": "M",
    "phone": "07316371076",
    "email": "se.kanu@gmail.com",
    "bank_account": {
        "account_name": "Sebastian Kanu",
        "account_number": 90379876,
        "sort_code": "040069"
    },
    "availabilty": {
        "is_active": 1,
        "on_delivery": 0,
        "location": {
        "type": "Point",
        "coordinates": [
        53.4790061833328,
        -2.24166613179563
        ]
        }
    },
    "deliveries_made": 125,
    "avg_per_week": 12.5,
    "best_week": 20,
    "number_of_week": 10
},{
    "_id": "PA1",
    "name": "Mike Dean",
    "age": 20,
    "gender": "M",
    "phone": "07618259974",
    "email": "mike.dean@gmail.com",
    "bank_account": {
        "account_name": "Mike Dean",
        "account_number": 90375644,
        "sort_code": "040066"
    },
    "availabilty": {
        "is_active": 1,
        "on_delivery": 1,
        "location": {
        "type": "Point",
        "coordinates": [
        53.4677271663732,
        -2.2644175798471
        ]
        }
    },
    "deliveries_made": 150,
    "avg_per_week": 14.5,
    "best_week": 20,
    "number_of_week": 12
```

```
},{
    "_id": "PA3",
    "name": "Hashim Ridwan",
    "age": 34,
    "gender": "M",
    "phone": "07212327676",
    "email": "hashim.ridwan@gmail.com",
    "bank_account": {
        "account_name": "Hashim Ridwan",
        "account_number": 90375949,
        "sort_code": "040068"
    },
    "availabilty": {
        "is_active": 1,
        "on_delivery": 1,
        "location": {
        "type": "Point",
        "coordinates": [
        53.4776969799554,
        -2.24981381392062
        ]
        }
    },
    "deliveries_made": 140,
    "avg_per_week": 6,
    "best_week": 18,
    "number_of_week": 5
},{
    "_id": "PA5",
    "name": "Alan Smith",
    "age": 29,
    "gender": "M",
    "phone": "07518346320",
    "email": "alan.smith@gmail.com",
    "bank_account": {
        "account_name": "Alan Smith",
        "account_number": 90370873,
        "sort_code": "040070"
    },
    "availabilty": {
        "is_active": 1,
        "on_delivery": 0,
        "location": {
        "type": "Point",
        "coordinates": [
        53.4670279483458,
        -2.23420195516825
        ]
        }
    },
    "deliveries_made": 120,
    "avg_per_week": 10,
```

```
    "best_week": 15,
    "number_of_week": 12
}]
```

8. **partnerHistory:**
   - **_id:** ObjectId
   - **Partner_id:** Unique partner ID
   - **Start_date:** starting datetime for the partners shift period
   - **End_date:** ending datetime for the partners shift period
   - **Orders**
     - **Order_id:** unique order identifier
     - **Timestamp**
     - **Order_details**
       - **Product_id:** unique product identifier
       - **Quantity:** quantity of a product

```
[{
  "_id": {
      "$oid": "63b852b6a7fc6363d52e5cbe"
  },
  "partner_id": "PA1",
  "start_date": {
      "$date": {
      "$numberLong": "1672617600000"
      }
  },
  "end_date": {
      "$date": {
      "$numberLong": "1672703999000"
      }
  },
  "orders": [
      {
      "order_id": "20230102100909C1",
      "timestamp": {
      "$date": {
      "$numberLong": "1672654149000"
      }
      },
      "order_details": [
      {
      "product_id": "FP1",
      "quantity": 1
      },
      {
      "product_id": "FP2",
      "quantity": 2
      }
      ]
```

```json
        },
        {
        "order_id": "20230102220059C20",
        "timestamp": {
        "$date": {
        "$numberLong": "1672696859000"
        }
        },
        "order_details": {
        "product_id": "FP15",
        "quantity": 3
        }
        }
    ]
},{
    "_id": {
        "$oid": "63b854d4a7fc6363d52e5cc0"
    },
    "partner_id": "PA2",
    "start_date": {
        "$date": {
        "$numberLong": "1672617600000"
        }
    },
    "end_date": {
        "$date": {
        "$numberLong": "1672703999000"
        }
    },
    "orders": [
        {
        "order_id": "20230102135959C2",
        "timestamp": {
        "$date": {
        "$numberLong": "1672667999000"
        }
        },
        "order_details": {
        "product_id": "FP3",
        "quantity": 7
        }
        },
        {
        "order_id": "20230102155908C13",
        "timestamp": {
        "$date": {
        "$numberLong": "1672675148000"
        }
        },
        "order_details": {
        "product_id": "FP10",
        "quantity": 1
```

```
          }
        },
        {
        "order_id": "20230102175908C3",
        "timestamp": {
        "$date": {
        "$numberLong": "1672682348000"
        }
        },
        "order_details": {
        "product_id": "FP12",
        "quantity": 2
        }
        }
    ]
},{
    "_id": {
        "$oid": "63b8558ba7fc6363d52e5cc2"
    },
    "partner_id": "PA3",
    "start_date": {
        "$date": {
        "$numberLong": "1672617600000"
        }
    },
    "end_date": {
        "$date": {
        "$numberLong": "1672703999000"
        }
    },
    "orders": [
        {
        "order_id": "20230102120108C15",
        "timestamp": {
        "$date": {
        "$numberLong": "1672660868000"
        }
        },
        "order_details": {
        "product_id": "FP1",
        "quantity": 1
        }
        },
        {
        "order_id": "20230102135908C13",
        "timestamp": {
        "$date": {
        "$numberLong": "1672667948000"
        }
        },
        "order_details": {
        "product_id": "FP3",
```

```
                "quantity": 1
            }
        },
        {
            "order_id": "20230102161908C4",
            "timestamp": {
            "$date": {
            "$numberLong": "1672676348000"
            }
        },
            "order_details": {
            "product_id": "FP14",
            "quantity": 2
            }
        }
    ]
},{
    "_id": {
        "$oid": "63b855fba7fc6363d52e5cc4"
    },
    "partner_id": "PA3",
    "start_date": {
        "$date": {
        "$numberLong": "1672617600000"
        }
    },
    "end_date": {
        "$date": {
        "$numberLong": "1672703999000"
        }
    },
    "orders": [
        {
        "order_id": "20230102125030C4",
        "timestamp": {
        "$date": {
        "$numberLong": "1672663830000"
        }
        },
        "order_details": {
        "product_id": "FP1",
        "quantity": 2
        }
        },
        {
        "order_id": "20230102135939C5",
        "timestamp": {
        "$date": {
        "$numberLong": "1672667979000"
        }
        },
        "order_details": {
```

```json
      "product_id": "FP2",
      "quantity": 3
      }
      },
      {
      "order_id": "20230102215908C6",
      "timestamp": {
      "$date": {
      "$numberLong": "1672696748000"
      }
      },
      "order_details": {
      "product_id": "FP8",
      "quantity": 1
      }
      }
  ]
},{
    "_id": {
        "$oid": "63b85681a7fc6363d52e5cc6"
    },
    "partner_id": "PA3",
    "start_date": {
        "$date": {
        "$numberLong": "1672617600000"
        }
    },
    "end_date": {
        "$date": {
        "$numberLong": "1672703999000"
        }
    },
    "orders": [
        {
        "order_id": "20230102123908C4",
        "timestamp": {
        "$date": {
        "$numberLong": "1672663148000"
        }
        },
        "order_details": {
        "product_id": "FP7",
        "quantity": 1
        }
        },
        {
        "order_id": "20230102175908C8",
        "timestamp": {
        "$date": {
        "$numberLong": "1672682348000"
        }
        },
```

```
        "order_details": {
        "product_id": "FP9",
        "quantity": 2
        }
        },
        {
        "order_id": "20230102191918C5",
        "timestamp": {
        "$date": {
        "$numberLong": "1672687158000"
        }
        },
        "order_details": {
        "product_id": "FP10",
        "quantity": 1
        }
        }
    ]
}]
```