

Mongodb Lab 2 Exercise

1. Perform the following DB operations using MongoDB.

1. Create a collection by name Customers with the following attributes.

Cust_id, Acc_Bal, Acc_Type

2. Insert at least 5 values into the table

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Customers.insertMany([
...   { Cust_id: 1, Acc_Bal: 1500, Acc_Type: 'Z' },
...   { Cust_id: 2, Acc_Bal: 1100, Acc_Type: 'Z' },
...   { Cust_id: 3, Acc_Bal: 2000, Acc_Type: 'X' },
...   { Cust_id: 4, Acc_Bal: 3000, Acc_Type: 'Z' },
...   { Cust_id: 5, Acc_Bal: 1800, Acc_Type: 'Z' }
... ]);
{
  acknowledged: true,
  insertedIds: {
    '0': ObjectId('67cff661b9683e22f4fa4214'),
    '1': ObjectId('67cff661b9683e22f4fa4215'),
    '2': ObjectId('67cff661b9683e22f4fa4216'),
    '3': ObjectId('67cff661b9683e22f4fa4217'),
    '4': ObjectId('67cff661b9683e22f4fa4218')
  }
}
```

3. Write a query to display those records whose total account balance is greater than 1200 of account type 'Z' for each customer_id.

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Customers.find({
...   Acc_Bal: { $gt: 1200 },
...   Acc_Type: 'Z'
... });
[
  {
    _id: ObjectId('67cff661b9683e22f4fa4214'),
    Cust_id: 1,
    Acc_Bal: 1500,
    Acc_Type: 'Z'
  },
  {
    _id: ObjectId('67cff661b9683e22f4fa4217'),
    Cust_id: 4,
    Acc_Bal: 3000,
    Acc_Type: 'Z'
  },
  {
    _id: ObjectId('67cff661b9683e22f4fa4218'),
    Cust_id: 5,
    Acc_Bal: 1800,
    Acc_Type: 'Z'
  }
]
```

4. Determine Minimum and Maximum account balance for each customer_id

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Customers.aggregate([
...   {
...     $group: {
...       _id: "$Cust_id",           // Group by Cust_id
...       min_balance: { $min: "$Acc_Bal" }, // Minimum balance
...       max_balance: { $max: "$Acc_Bal" }  // Maximum balance
...     }
...   }
... ]);
[
  { _id: 2, min_balance: 1100, max_balance: 1100 },
  { _id: 3, min_balance: 2000, max_balance: 2000 },
  { _id: 4, min_balance: 3000, max_balance: 3000 },
  { _id: 5, min_balance: 1800, max_balance: 1800 },
  { _id: 1, min_balance: 1500, max_balance: 1500 }
]
Atlas atlas-9myyh8-shard-0 [primary] test>
```

2. You are developing an e-commerce platform where users can browse and purchase products. Each product has a unique identifier, a name, a category, a price, and available quantity. Additionally, users can add products to their cart and place orders. Design a MongoDB schema to efficiently handle product information, user carts, and orders.

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Products.insertMany([
...   { product_id: "P001", name: "Smartphone XYZ", category: "Electronics", price: 599.99, quantity: 50 },
...   { product_id: "P002", name: "Laptop ABC", category: "Electronics", price: 999.99, quantity: 30 },
...   { product_id: "P003", name: "Wireless Headphones", category: "Electronics", price: 150.0, quantity: 100 },
...   { product_id: "P004", name: "Air Fryer", category: "Home Appliances", price: 89.99, quantity: 60 },
...   { product_id: "P005", name: "Gaming Chair", category: "Furniture", price: 199.99, quantity: 25 }
... ]);
{ acknowledged: true,
  insertedIds: {
    '0': ObjectId('67cffa4b9683e22f4fa4219'),
    '1': ObjectId('67cffa4b9683e22f4fa421a'),
    '2': ObjectId('67cffa4b9683e22f4fa421b'),
    '3': ObjectId('67cffa4b9683e22f4fa421c'),
    '4': ObjectId('67cffa4b9683e22f4fa421d')
  }
}
Atlas atlas-9myyh8-shard-0 [primary] test> db.Carts.insertMany([
...   { user_id: "789ghi123", products: [{ product_id: "P001", quantity: 2 }, { product_id: "P003", quantity: 1 }] },
...   { user_id: "456def456", products: [{ product_id: "P002", quantity: 1 }, { product_id: "P004", quantity: 3 }] },
...   { user_id: "123abc789", products: [{ product_id: "P005", quantity: 1 }] }
... ]);
{ acknowledged: true,
  insertedIds: {
    '0': ObjectId('67cffb26b9683e22f4fa421e'),
    '1': ObjectId('67cffb26b9683e22f4fa421f'),
    '2': ObjectId('67cffb26b9683e22f4fa4220')
  }
}
Atlas atlas-9myyh8-shard-0 [primary] test> db.Orders.insertMany([
...   { user_id: "789ghi123", products: [{ product_id: "P001", quantity: 2, price: 599.99 }, { product_id: "P003", quantity: 1, price: 150.0 }], total_price: 1349.98, order_date: ISODate("2025-03-10T15:30:00Z") },
...   { user_id: "456def456", products: [{ product_id: "P002", quantity: 1, price: 999.99 }, { product_id: "P004", quantity: 3, price: 89.99 }], total_price: 1368.95, order_date: ISODate("2025-03-09T12:00:00Z") },
...   { user_id: "123abc789", products: [{ product_id: "P005", quantity: 1, price: 199.99 }], total_price: 199.99, order_date: ISODate("2025-03-08T10:00:00Z") }
... ]);
{ acknowledged: true,
  insertedIds: {
    '0': ObjectId('67cffb44b9683e22f4fa4221'),
    '1': ObjectId('67cffb44b9683e22f4fa4222'),
    '2': ObjectId('67cffb44b9683e22f4fa4223')
  }
}
```

Query to

Retrieve All Products.

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Products.find();
[
  {
    _id: ObjectId('67cffa4b9683e22f4fa4219'),
    product_id: 'P001',
    name: 'Smartphone XYZ',
    category: 'Electronics',
    price: 599.99,
    quantity: 50
  },
  {
    _id: ObjectId('67cffa4b9683e22f4fa421a'),
    product_id: 'P002',
    name: 'Laptop ABC',
    category: 'Electronics',
    price: 999.99,
    quantity: 30
  },
  {
    _id: ObjectId('67cffa4b9683e22f4fa421b'),
    product_id: 'P003',
    name: 'Wireless Headphones',
    category: 'Electronics',
    price: 150,
    quantity: 100
  },
  {
    _id: ObjectId('67cffa4b9683e22f4fa421c'),
    product_id: 'P004',
    name: 'Air Fryer',
    category: 'Home Appliances',
    price: 89.99,
    quantity: 60
  },
  {
    _id: ObjectId('67cffa4b9683e22f4fa421d'),
    product_id: 'P005',
    name: 'Gaming Chair',
    category: 'Furniture',
    price: 199.99,
    quantity: 25
  }
]
```

Retrieve Products in a Specific Category (e.g., Electronics).

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Products.find({ category: "Electronics" });
[
  {
    _id: ObjectId('67cffaafab9683e22f4fa4219'),
    product_id: 'P001',
    name: 'Smartphone XYZ',
    category: 'Electronics',
    price: 599.99,
    quantity: 50
  },
  {
    _id: ObjectId('67cffaafab9683e22f4fa421a'),
    product_id: 'P002',
    name: 'Laptop ABC',
    category: 'Electronics',
    price: 999.99,
    quantity: 30
  },
  {
    _id: ObjectId('67cffaafab9683e22f4fa421b'),
    product_id: 'P003',
    name: 'Wireless Headphones',
    category: 'Electronics',
    price: 150,
    quantity: 100
  }
]
```

Retrieve Products with Quantity Greater Than 0.

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Products.find({ quantity: { $gt: 0 } });
[
  {
    _id: ObjectId('67cffaafab9683e22f4fa4219'),
    product_id: 'P001',
    name: 'Smartphone XYZ',
    category: 'Electronics',
    price: 599.99,
    quantity: 50
  },
  {
    _id: ObjectId('67cffaafab9683e22f4fa421a'),
    product_id: 'P002',
    name: 'Laptop ABC',
    category: 'Electronics',
    price: 999.99,
    quantity: 30
  },
  {
    _id: ObjectId('67cffaafab9683e22f4fa421b'),
    product_id: 'P003',
    name: 'Wireless Headphones',
    category: 'Electronics',
    price: 150,
    quantity: 100
  },
  {
    _id: ObjectId('67cffaafab9683e22f4fa421c'),
    product_id: 'P004',
    name: 'Air Fryer',
    category: 'Home Appliances',
    price: 89.99,
    quantity: 60
  },
  {
    _id: ObjectId('67cffaafab9683e22f4fa421d'),
    product_id: 'P005',
    name: 'Gaming Chair',
    category: 'Furniture',
    price: 199.99,
    quantity: 25
  }
]
```

Retrieve Products Sorted by Price in Ascending Order.

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Products.find().sort({ price: 1 });
[
  {
    _id: ObjectId('67cffa4fab9683e22f4fa421c'),
    product_id: 'P004',
    name: 'Air Fryer',
    category: 'Home Appliances',
    price: 89.99,
    quantity: 60
  },
  {
    _id: ObjectId('67cffa4fab9683e22f4fa421b'),
    product_id: 'P003',
    name: 'Wireless Headphones',
    category: 'Electronics',
    price: 150,
    quantity: 100
  },
  {
    _id: ObjectId('67cffa4fab9683e22f4fa421d'),
    product_id: 'P005',
    name: 'Gaming Chair',
    category: 'Furniture',
    price: 199.99,
    quantity: 25
  },
  {
    _id: ObjectId('67cffa4fab9683e22f4fa4219'),
    product_id: 'P001',
    name: 'Smartphone XYZ',
    category: 'Electronics',
    price: 599.99,
    quantity: 50
  },
  {
    _id: ObjectId('67cffa4fab9683e22f4fa421a'),
    product_id: 'P002',
    name: 'Laptop ABC',
    category: 'Electronics',
    price: 999.99,
    quantity: 30
  }
]
```

Retrieve Products with Price Less Than or Equal to \$100.

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Products.find({ price: { $lte: 100 } });
[
  {
    _id: ObjectId('67cffa4fab9683e22f4fa421c'),
    product_id: 'P004',
    name: 'Air Fryer',
    category: 'Home Appliances',
    price: 89.99,
    quantity: 60
  }
]
```

Retrieve Products Added to a User's Cart (User with ID "789ghi...")

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Carts.findOne({ user_id: "789ghi123" }, { products: 1 });
{
  _id: ObjectId('67cffb26b9683e22f4fa421e'),
  products: [
    { product_id: 'P001', quantity: 2 },
    { product_id: 'P003', quantity: 1 }
  ]
}
```

Retrieve Orders Placed by a User (User with ID "123abc...")

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Orders.find({ user_id: "123abc789" });
[
  {
    _id: ObjectId('67cffb44b9683e22f4fa4223'),
    user_id: '123abc789',
    products: [ { product_id: 'P005', quantity: 1, price: 199.99 } ],
    total_price: 199.99,
    order_date: ISODate('2025-03-08T10:00:00.000Z')
  }
]
```

Retrieve Total Price of Orders Placed by a User (User with ID "123abc...")

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Orders.aggregate([ { $match: { user_id: "123abc789" } }, { $group: { _id: "$user_id", total_order_price: { $sum: "$total_price" } } } ])
```

Additional Aggregation queries based on Assignment-3 design:

1 .Calculate Total Number of Products in Each Category.

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Products.aggregate([
...   { $group: { _id: "$category", total_products: { $sum: 1 } } }
... ]);
[
  { _id: 'Electronics', total_products: 3 },
  { _id: 'Home Appliances', total_products: 1 },
  { _id: 'Furniture', total_products: 1 }
]
```

2. Calculate Total Price of Products in Each Category.

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Products.aggregate([
...   { $group: { _id: "$category", total_price: { $sum: { $multiply: [ "$price", "$quantity" ] } } } }
... ]);
[
  { _id: 'Furniture', total_price: 4999.75 },
  { _id: 'Electronics', total_price: 74999.2 },
  { _id: 'Home Appliances', total_price: 5399.4 }
]
```

3. Find Average Price of Products.

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Products.aggregate([
...   { $group: { _id: null, average_price: { $avg: "$price" } } }
... ]);
[ { _id: null, average_price: 407.992 } ]
```

4. Find Products with Quantity Less Than 10.

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Products.find({ quantity: { $lt: 10 } });
```

5. Sort Products by Price in Descending Order.

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Products.find().sort({ price: -1 });
[
  {
    _id: ObjectId('67cffa9ab9683e22f4fa421a'),
    product_id: 'P002',
    name: 'Laptop ABC',
    category: 'Electronics',
    price: 999.99,
    quantity: 30
  },
  {
    _id: ObjectId('67cffa9ab9683e22f4fa4219'),
    product_id: 'P001',
    name: 'Smartphone XYZ',
    category: 'Electronics',
    price: 599.99,
    quantity: 50
  },
  {
    _id: ObjectId('67cffa9ab9683e22f4fa421d'),
    product_id: 'P005',
    name: 'Gaming Chair',
    category: 'Furniture',
    price: 199.99,
    quantity: 25
  },
  {
    _id: ObjectId('67cffa9ab9683e22f4fa421b'),
    product_id: 'P003',
    name: 'Wireless Headphones',
    category: 'Electronics',
    price: 150,
    quantity: 100
  },
  {
    _id: ObjectId('67cffa9ab9683e22f4fa421c'),
    product_id: 'P004',
    name: 'Air Fryer',
    category: 'Home Appliances',
    price: 89.99,
    quantity: 60
  }
]
```

6. Calculate Total Price of Orders Placed by Each User.

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Orders.aggregate([
...   { $group: { _id: "$user_id", total_order_price: { $sum: "$total_price" } } },
...   { $limit: 3 }
... ]);
[
  { _id: '123abc789', total_order_price: 199.99 },
  { _id: '789ghi123', total_order_price: 1349.98 },
  { _id: '456def456', total_order_price: 1368.95 }
]
```

7. Find Users with the Highest Total Price of Orders.

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Orders.aggregate([
...   { $group: { _id: "$user_id", total_order_price: { $sum: "$total_price" } } },
...   { $sort: { total_order_price: -1 } },
...   { $limit: 1 }
... ]);
[ { _id: '456def456', total_order_price: 1368.95 } ]
```

8. Find Average Total Price of Orders.

```
Atlas atlas-9myyh8-shard-0 [primary] test> db.Orders.aggregate([
...   { $group: { _id: null, average_order_price: { $avg: "$total_price" } } }
... ]);
[ { _id: null, average_order_price: 972.9733333333334 } ]
```