1) Создание базы данных и добавление данных

```
db.users.insertMany([
  {
    _id: UUID("550e8400-e29b-41d4-a716-446655440000"),
    email: "john.doe@example.com",
    password_hash: "hashed_password_1",
    first_name: "John",
    last_name: "Doe",
    gender: "male",
    birth_date: ISODate("1980-01-01T00:00:00Z"),
    phone_number: "1234567890",
    delivery_address: "123 Main St, City",
    avatar_url: "https://example.com/john_avatar.jpg",
    registered: ISODate()
  },
  {
    _id: UUID("550e8400-e29b-41d4-a716-446655440001"),
    email: "jane.doe@example.com",
    password_hash: "hashed_password_2",
    first_name: "Jane",
    last_name: "Doe",
    gender: "female",
    birth_date: ISODate("1990-02-02T00:00:00Z"),
    phone_number: "0987654321",
    delivery_address: "456 Elm St, City",
    avatar_url: "https://example.com/jane_avatar.jpg",
    registered: ISODate()
  },
  {
    _id: UUID("550e8400-e29b-41d4-a716-446655440002"),
    email: "alice.smith@example.com",
    password_hash: "hashed_password_3",
    first_name: "Alice",
    last_name: "Smith",
    gender: "female",
    birth_date: ISODate("1985-03-03T00:00:00Z"),
    phone_number: "1122334455",
    delivery_address: "789 Oak St, City",
    avatar_url: "https://example.com/alice_avatar.jpg",
    registered: ISODate()
  },
  {
    _id: UUID("550e8400-e29b-41d4-a716-446655440003"),
    email: "bob.jones@example.com",
    password_hash: "hashed_password_4",
    first_name: "Bob",
    last_name: "Jones",
    gender: "male",
    birth_date: ISODate("2000-04-04T00:00:00Z"),
    phone_number: "5544332211",
    delivery_address: "321 Pine St, City",
    avatar_url: "https://example.com/bob_avatar.jpg",
    registered: ISODate()
  }
]);
```

```javascript
db.categories.insertMany([
  { _id: UUID("550e8400-e29b-41d4-a716-446655440010"), name: "Electronics" },
  { _id: UUID("550e8400-e29b-41d4-a716-446655440011"), name: "Clothing"    },
  { _id: UUID("550e8400-e29b-41d4-a716-446655440012"), name: "Furniture"   },
  { _id: UUID("550e8400-e29b-41d4-a716-446655440013"), name: "Food"        }
]);
```

```javascript
db.products.insertMany([
  {
    _id: UUID("550e8400-e29b-41d4-a716-446655440100"),
    name: "Smartphone",
    category_id: UUID("550e8400-e29b-41d4-a716-446655440010"),
    description: "Latest model",
    price: 69999,
    rating: 4.5,
    image_url: "https://example.com/smartphone.jpg",
    stock: 50
  },
  {
    _id: UUID("550e8400-e29b-41d4-a716-446655440101"),
    name: "Laptop",
    category_id: UUID("550e8400-e29b-41d4-a716-446655440010"),
    description: "High performance laptop",
    price: 129999,
    rating: 4.7,
    image_url: "https://example.com/laptop.jpg",
    stock: 30
  },
  {
    _id: UUID("550e8400-e29b-41d4-a716-446655440102"),
    name: "T-shirt",
    category_id: UUID("550e8400-e29b-41d4-a716-446655440011"),
    description: "Cotton t-shirt",
    price: 1999,
    rating: 4.0,
    image_url: "https://example.com/tshirt.jpg",
    stock: 100
  },
  {
    _id: UUID("550e8400-e29b-41d4-a716-446655440103"),
    name: "Sofa",
    category_id: UUID("550e8400-e29b-41d4-a716-446655440012"),
    description: "Leather sofa",
    price: 89999,
    rating: 4.2,
    image_url: "https://example.com/sofa.jpg",
    stock: 10
  },
  {
    _id: UUID("550e8400-e29b-41d4-a716-446655440104"),
    name: "Coffee",
    category_id: UUID("550e8400-e29b-41d4-a716-446655440013"),
    description: "Ground coffee 1kg",
    price: 999,
    rating: 4.3,
    image_url: "https://example.com/coffee.jpg",
    stock: 0
  }
]);
```

```javascript
db.orders.insertMany([
  {
    _id: UUID("550e8400-e29b-41d4-a716-446655440200"),
    user_id: UUID("550e8400-e29b-41d4-a716-446655440000"),
    customer_email: "john.doe@example.com",
    status: "received",
    total_price: 70998,
    created: ISODate("2025-04-25T12:00:00Z"),
    items: [
      {
        product_id: UUID("550e8400-e29b-41d4-a716-446655440100"),
        quantity: 1,
        price_at_order: 69999
      },
      {
        product_id: UUID("550e8400-e29b-41d4-a716-446655440102"),
        quantity: 5,
        price_at_order: 1999
      }
    ]
  },
  {
    _id: UUID("550e8400-e29b-41d4-a716-446655440201"),
    user_id: UUID("550e8400-e29b-41d4-a716-446655440001"),
    customer_email: "jane.doe@example.com",
    status: "packing",
    total_price: 131998,
    created: ISODate("2025-04-25T12:30:00Z"),
    items: [
      {
        product_id: UUID("550e8400-e29b-41d4-a716-446655440101"),
        quantity: 1,
        price_at_order: 129999
      },
      {
        product_id: UUID("550e8400-e29b-41d4-a716-446655440104"),
        quantity: 1,
        price_at_order: 999
      }
    ]
  },
  {
    _id: UUID("550e8400-e29b-41d4-a716-446655440202"),
    user_id: UUID("550e8400-e29b-41d4-a716-446655440002"),
    customer_email: "alice.smith@example.com",
    status: "in_delivery",
    total_price: 1999,
    created: ISODate("2025-04-25T13:00:00Z"),
    items: [
      {
        product_id: UUID("550e8400-e29b-41d4-a716-446655440102"),
        quantity: 1,
        price_at_order: 1999
      }
    ]
  },
  {
    _id: UUID("550e8400-e29b-41d4-a716-446655440203"),
    user_id: UUID("550e8400-e29b-41d4-a716-446655440003"),
    customer_email: "bob.jones@example.com",
    status: "cancelled",
    total_price: 89999,
    created: ISODate("2025-04-25T14:00:00Z"),
    items: [
      {
        product_id: UUID("550e8400-e29b-41d4-a716-446655440103"),
        quantity: 1,
        price_at_order: 89999
      }
    ]
  }
]);
```

2) Запросы
- Нахождение всех товаров дороже 50 000 рублей

```
db.products.find(
  { price: { $gt: 50000 } },
  { name: 1, price: 1, stock: 1, _id: 0 }
)
```

```
{
  name: 'Smartphone',
  price: 69999,
  stock: 50
}
{
  name: 'Laptop',
  price: 129999,
  stock: 30
}
{
  name: 'Sofa',
  price: 89999,
  stock: 10
}
```

- Обновление цены товара по названию

```
db.products.updateOne(
  { name: "Sofa" },
  { $set: { price: 95000 } }
)
```

```
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
```

- Удаление товара с количеством 0

```
db.products.deleteOne(
  { stock: 0 }
)
```

```
{
  acknowledged: true,
  deletedCount: 1
}
```

3) Агрегации
- Подсчет средней цены товаров в каждой категории

```
db.products.aggregate([
  {
    $lookup: {
      from:        "categories",
      localField: "category_id",
      foreignField: "_id",
      as:          "category_docs"
    }
  },
  { $unwind: "$category_docs" },
  {
    $group: {
      _id: "$category_docs.name",
      avgPrice: { $avg: "$price" },
      count:    { $sum: 1 }
    }
  },
  {
    $project: {
      _id:       0,
      category: "$_id",
      avgPrice: 1,
      count:    1
    }
  }
])
```

```
{
  avgPrice: 1999,
  count: 1,
  category: 'Clothing'
}
{
  avgPrice: 95000,
  count: 1,
  category: 'Furniture'
}
{
  avgPrice: 99999,
  count: 2,
  category: 'Electronics'
}
```

- Нахождение топ-3 самых дорогих товаров с их категориями

```
db.products.aggregate([
  {
    $lookup: {
      from:        "categories",
      localField: "category_id",
      foreignField: "_id",
      as:          "category_docs"
    }
  },
  { $unwind: "$category_docs" },
  {
    $project: {
      _id:      0,
      name:     1,
      price:    1,
      category: "$category_docs.name"
    }
  },
  { $sort: { price: -1 } },
  { $limit: 3 }
])
```

```
{
  name: 'Laptop',
  price: 129999,
  category: 'Electronics'
}
{
  name: 'Sofa',
  price: 95000,
  category: 'Furniture'
}
{
  name: 'Smartphone',
  price: 69999,
  category: 'Electronics'
}
```

- Подсчет общей стоимости всех товаров на складе (цена × количество)

```
db.products.aggregate([
  {
    $project: {
      _id:          0,
      value: { $multiply: ["$price", "$stock"] }
    }
  },
  {
    $group: {
      _id:      null,
      total: { $sum: "$value" }
    }
  },
  {
    $project: {
      _id:   0,
      total: 1
    }
  }
])
```

```
{
  total: 8549820
}
```

- Нахождение категории, где средняя цена товаров больше 30 000 рублей

```
db.products.aggregate([
  {
    $lookup: {
      from:        "categories",
      localField: "category_id",
      foreignField: "_id",
      as:          "category_docs"
    }
  },
  { $unwind: "$category_docs" },
  {
    $group: {
      _id:      "$category_docs.name",
      avgPrice: { $avg: "$price" }
    }
  },
  { $match: { avgPrice: { $gt: 30000 } } },
  {
    $project: {
      _id:      0,
      category: "$_id",
      avgPrice: 1
    }
  }
])
```

```
{
  avgPrice: 95000,
  category: 'Furniture'
}
{
  avgPrice: 99999,
  category: 'Electronics'
}
```

- Подсчет суммы всех заказов

```
db.orders.aggregate([
  {
    $group: {
      _id: null,
      sumAll: { $sum: "$total_price" }
    }
  },
  {
    $project: {
      _id:   0,
      sumAll: 1
    }
  }
])
```

```
{
  sumAll: 294994
}
```

- Подсчет суммы всех заказов по customer_email и сортировка по убыванию общей суммы

```
db.orders.aggregate([
  {
    $group: {
      _id:        "$customer_email",
      totalByEmail: { $sum: "$total_price" }
    }
  },
  { $sort: { totalByEmail: -1 } },
  {
    $project: {
      _id:            0,
      customer_email: "$_id",
      totalByEmail:  1
    }
  }
])
```

```
{
  totalByEmail: 131998,
  customer_email: 'jane.doe@example.com'
}
{
  totalByEmail: 89999,
  customer_email: 'bob.jones@example.com'
}
{
  totalByEmail: 70998,
  customer_email: 'john.doe@example.com'
}
{
  totalByEmail: 1999,
  customer_email: 'alice.smith@example.com'
}
```

- Нахождение топ-3 самых продаваемых товаров

```
db.orders.aggregate([
  { $unwind: "$items" },
  {
    $group: {
      _id: { product_id: "$items.product_id" },
      totalSold: { $sum: "$items.quantity" }
    }
  },
  {
    $lookup: {
      from:          "products",
      localField:    "_id.product_id",
      foreignField:  "_id",
      as:            "prod_docs"
    }
  },
  { $unwind: "$prod_docs" },
  {
    $project: {
      _id:         0,
      product_id:  "$_id.product_id",
      name:        "$prod_docs.name",
      totalSold:   1
    }
  },
  { $sort: { totalSold: -1 } },
  { $limit: 3 }
])
```

```
{
  totalSold: 6,
  product_id: UUID('550e8400-e29b-41d4-a716-446655440102'),
  name: 'T-shirt'
}
{
  totalSold: 1,
  product_id: UUID('550e8400-e29b-41d4-a716-446655440101'),
  name: 'Laptop'
}
{
  totalSold: 1,
  product_id: UUID('550e8400-e29b-41d4-a716-446655440103'),
  name: 'Sofa'
}
```