ENTERPRISE APPLICATION DEVELOPMENT – LAB 3

C15478448

ENTERPRISE APPLICATION DEVELOPMENT

COURSE: DT228/4

Lab 3

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Folder Structure

Prisma-GraphQL – Contains All Parts (1-5)

Tutorial – Contains the tutorial for Prisma GraphQL

Document – This Document in .docx and .pdf

Screenshots – Screenshots for all outputs

Note:

- To run this project you must enter in the following command in the **Prisma-GraphQL** folder: *npm install*

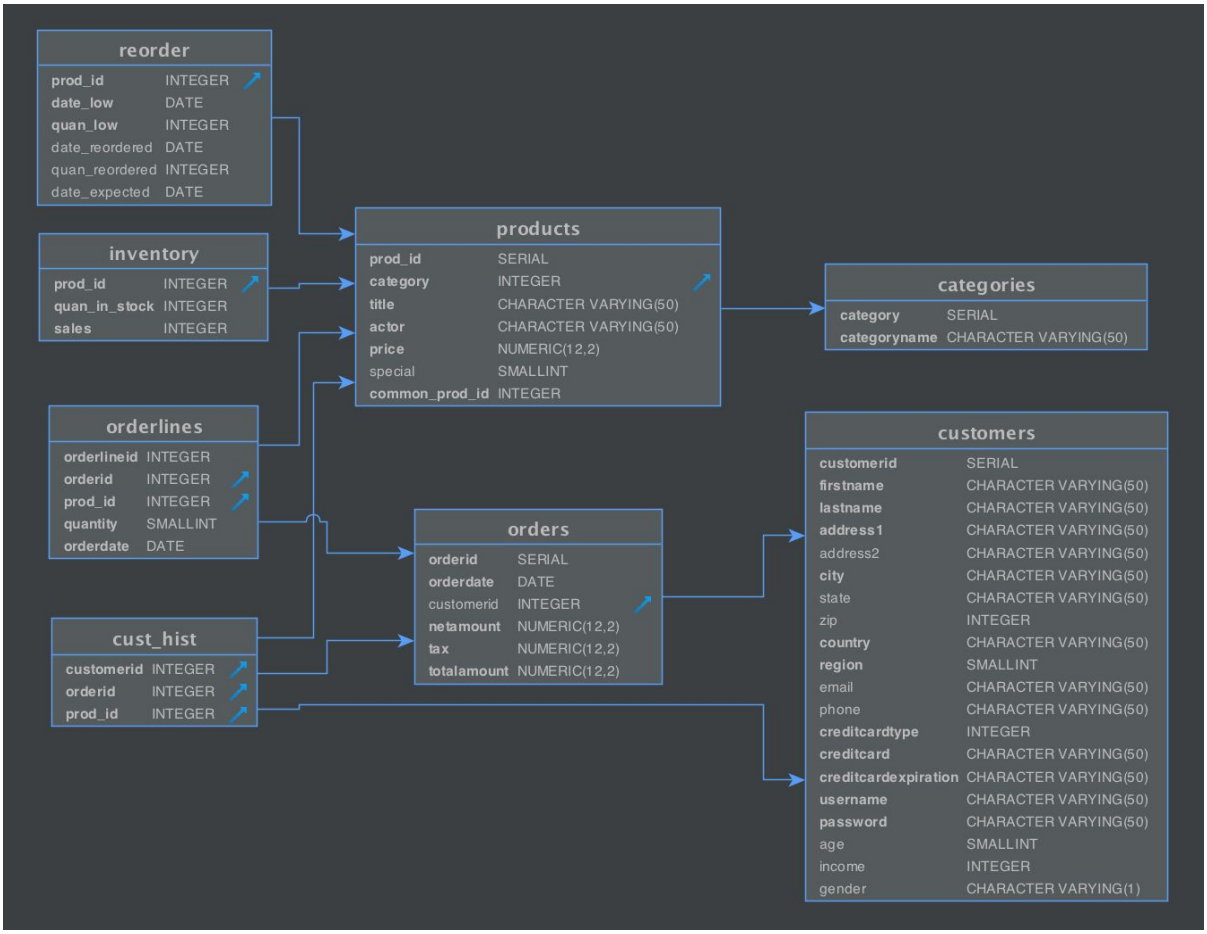
- After installing the required modules based on the package, run the following command: *node index.js*

- Enter: *localhost:4000* into a browser for relevant links to showcase each part.

Problem Sets

Part 1 – GraphQL Schema

Using graphql-yoga and the ERD below, construct a graphql schema using any four relations of your choice having the relationships depicted.



Upon starting, a new folder must be created which in my case I made a folder and named it **Prisma-GraphQL**, upon doing so I then created a **Docker Compose** file, this is to launch Prisma on my machine, it's important to have this file as it configures Prisma and specifies the database it can connect to.

Inside the file named **docker-compose.yml** I added relevant code to add Prisma and the database docker images. I picked **PostgreSQL** as my database.

I launched Prisma and the connected database with the following command**: docker-compose up -d**.

I then configured my Prisma API as I needed to bootstrap the configurations files for my Prisma client, I did so with the following command: **prisma init --endpoint** **http://localhost:4466**.

The **prisma init** command created my minimal setup that I need to deploy my Prisma datamodel with the following files: **prisma.yml** and **datamodel.prisma**.

The file named **datamodel.prisma** is where the schema for the above image from the question will be created in. I created all eight tables with the appropriate relations for each table.

```
# Customers Table
type Customers {
  id: ID! @unique
  firstname: String!
  lastname: String!
  address1: String!
  address2: String
  city: String!
  state: String!
  zip: String
  country: String!
  region: String
  email: String! @unique
  phone: String
  creditcardtype: String
  creditcard: String
  creditcardexpiration: String
  username: String! @unique
  password: String!
  age: Int!
  income: Float
  gender: String!
}

# Orders Table
```

```
type Orders {
  id: ID! @unique
  orderdate: DateTime!
  netamount: Float!
  tax: Float!
  totalamount: Float!
  customers: Customers
}

# Categories Table
type Categories {
  id: ID! @unique
  categoryname: String!
}

# Products Table
type Products {
  id: ID! @unique
  title: String
  actor: String
  price: Float
  special: Boolean
  common_prod_id: Int
  categories: Categories
  inventory: Inventory
}

# Re-order Table
type Reorder {
  id: ID! @unique
  date_low: DateTime!
  quan_low: Int
  date_reordered: DateTime!
  quan_reordered: Int
  date_expected: String
  products: Products
}

# Inventory Table
type Inventory {
  id: ID! @unique
  quan_in_stock: Int
  sales: Int
  products: Products
}

# Order Lines Table
type Orderlines {
```

```
  id: ID! @unique
  quantity: Int
  orderdate: DateTime!
  orders: Orders
  products: Products
}

# Customer History Table
type Cust_hist {
  id: ID! @unique
  customers: Customers
  orders: Orders
  products: Products
}
```

Then, I ran the following command: **prisma deploy** to finish the setup for my database schema, this is needed for the Prisma client to talk to my database from code.

Whenever the **datamodel.prisma** file is changed (aside from adding comments) you must always deploy it as it will need to generate updates.

Now that the datamodel is complete, I needed to deifine a GraphQL schema for my GraphQL server in other words I had to define my GraphQL API.

In the **schema.graphql** file I specified the **Query** type in my GraphQL Schema.

```
###
# QUERY
###

# Querying the Database
type Query {

  # Customers
  allCustomers: [Customers!]!                          # Retrieve all Customers
  specificCustomers(customersId: ID!): [Customers!]!   # Retrieve Specific
Customer by ID

  # Orders
  allOrders: [Orders!]!                                # Retrieve all Orders
```

```
  specificOrders(ordersId: ID!): [Orders!]!                # Retrieve Specific Order
by ID

  # Categories
  allCategories: [Categories!]!                            # Retrieve all Categories
  specificCategories(categoriesId: ID!): [Categories!]!    # Retrieve Specific
Category by ID

  # Products
  allProducts: [Products!]!                                # Retrieve all Products
  specificProducts(productsId: ID!): [Products!]!          # Retrieve Specific
Product by ID

  # Reorder
  allReorders: [Reorder!]!                                 # Retrieve all Reorders
  specificReorders(reordersId: ID!): [Reorder!]!           # Retrieve Specific
Reorder by ID

  # Inventory
  allInventory: [Inventory!]!                              # Retrieve all Inventory
  specificInventory(inventoryId: ID!): [Inventory!]!       # Retrieve Specific
Inventory by ID

  # Orderlines
  allOrderLines: [Orderlines!]!                            # Retrieve all Order Lines
  specificOrderLines(orderlinesId: ID!): [Orderlines!]!    # Retrieve Specific Order
Line by ID

  # Cust_hist
  allCustomerHistory: [Cust_hist!]!                        # Retrieve all Customer
History
  specificCustomerHistory(cust_histId: ID!): [Cust_hist!]!  # Retrieve Specific
Customer History by ID

}
```

It's in the name, calling these methods will retrieve the relevant information, for example, **allCustomers** will return every single Customer in the **Customers** table. The **specificCustomers** will return only the specified customer by providing the ID to the method.

Then, the **Mutation** type was specified in this file, this creates the methods that will manipulate the database.

```
###
# MUTATION
###

# Adding to Database
type Mutation {

  # Create Customer
  createCustomer(
    firstname: String!,
    lastname: String!,
    address1: String!,
    address2: String,
    city: String!,
    state: String!,
    zip: String,
    country: String!,
    region: String,
    email: String!,
    phone: String,
    creditcardtype: String,
    creditcard: String,
    creditcardexpiration: String,
    username: String!,
    password: String!,
    age: Int!,
    income: Float,
    gender: String!
  ) : Customers

  # Create Order
  createOrder(
    orderdate: DateTime!,
    netamount: Float!,
    tax: Float!,
    totalamount: Float!,
    customersId: ID!
  ) : Orders

  # Create Category
  createCategory(
    categoryname: String!
  ) : Categories

  # Create Product
  createProduct(
    title: String,
    actor: String,
```

```
    price: Float,
    special: Boolean,
    common_prod_id: Int,
    # categoriesId: ID,
    categoryname: String,
    quan_in_stock: Int
  ) : Products

  # Create Re-order
  createReorders(
    date_low: DateTime!,
    quan_low: Int,
    date_reordered: DateTime!,
    quan_reordered: Int,
    date_expected: String,
    productsId: ID!,
  ) : Reorder

  # Create Inventory
  createInventory(
    quan_in_stock: Int,
    sales: Int,
    productsId: ID!
  ) : Inventory

  # Create Order Line
  createOrderline(
    quantity: Int,
    orderdate: DateTime!,
    ordersId: ID!,
    productsId: ID!
  ) : Orderlines

  # Create Customer History
  createCustomerHistory(
    customersId: ID!,
    ordersId: ID!,
    productsId: ID
  ) : Cust_hist
}
```

Lastly, the **types** were defined, these are straightforward re-definiations of the models specified in **datamodel.prisma**, except that the Prisma-specific directives have been removed.

```
###
# TYPES
###

# Customers Table
type Customers {
  id: ID!
  firstname: String!
  lastname: String!
  address1: String!
  address2: String
  city: String!
  state: String!
  zip: String
  country: String!
  region: String
  email: String!
  phone: Int
  creditcardtype: String
  creditcard: String
  creditcardexpiration: String
  username: String!
  password: String!
  age: Int!
  income: Float
  gender: String!
}

# Orders Table
type Orders {
  id: ID!
  orderdate: DateTime!
  netamount: Float!
  tax: Float!
  totalamount: Float!
  customers: Customers
}

# Categories Table
type Categories {
  id: ID!
  categoryname: String!
}

# Products Table
type Products {
  id: ID!
  title: String
```

```
  actor: String
  price: Float
  special: Boolean
  common_prod_id: Int
  categories: Categories
  inventory: Inventory
}

# Re-order Table
type Reorder {
  id: ID!
  date_low: DateTime!
  quan_low: Int
  date_reordered: DateTime!
  quan_reordered: Int
  date_expected: String
  products: Products
}

# Inventory Table
type Inventory {
  id: ID!
  quan_in_stock: Int
  sales: Int
  products: Products
}

# Order Lines Table
type Orderlines {
  id: ID!
  quantity: Int
  orderdate: DateTime!
  orders: Orders
  products: Products
}

# Customer History Table
type Cust_hist {
  id: ID!
  customers: Customers
  orders: Orders
  products: Products
}
```

Part 2 – GraphQL Query Resolver

Build a GraphQL query resolver which returns some set of the attributes from a single database relation.

For this part I had to return attributes from a table, I picked **Customers**, although I have all of the queries to return data from all of the tables for this lab.

```
const resolvers = {

    /***
     * Question (2)
     *
     * Build a GraphQL query resolver which returns some set
     * of the the attributes from a single database relation.
     *
     * Customers    - No Relation
     * Categories   - No Relation
     * Products     - 1 Relation
     * Reorder      - 1 Relation
     * Orders       - 1 Relation
     * Inventory    - 2 Relations
     * Orderlines   - 2 Relations
     * Cust_hist    - 3 Relations - Question (3)
     */
    Query: {

        /***
         * CUSTOMERS
         ***/

        /* Retreive all Customers */
        allCustomers(root, args, context) {
            return context.prisma.customerses()
        },

        /* Retrieve a Customer with a Specific ID */
        specificCustomers(root, args, context) {
            return context.prisma.customerses({
                where: {
                    id: args.customersId
                }
            })
        },
```

As displayed in the code above, the **allCustomers** which is defined in the **schema.graphql** will return all of the customers and their attributes. It's important to mention that the method called **customerses()** is a generated method, it looks at the table name which is **Customers** and tries to make it plural, if it cannot make it plural then it will add the "es" at the end of the table name.

In order to complete this question, I created sample data to enter into the **Customers** table with the following query which was entered in the **Playground**.

```
###
#
# Creating a Customer
#
###
mutation {
	createCustomer(
		firstname: "Gabriel"
		lastname: "Grimberg"
		address1: "Address 1"
		address2: "Address 2"
		city: "Some City"
		state: "Some State"
		zip: "zip1010"
		country: "Ireland"
		region: "Some Region"
		email: "email2@email.com"
		phone: "0833333333"
		creditcardtype: "CC Type"
		creditcard: "CC"
		creditcardexpiration:"08/19"
		username: "eadlab3"
		password: "e3kj4rewdnergjkn"
		age: 21
		income: 100000.00
		gender: "Male"
	) {
		id
```

```
            firstname
            lastname
            address1
            address2
            city
            state
            zip
            country
            region
            email
            phone
            creditcardtype
            creditcard
            creditcardexpiration
            username
            password
            age
            income
            gender
        }
}
```

Then, I queried the database to display back to me all of the **Customers**.

```
###
#
# View All Customers
#
###
query {
        allCustomers {
            id
            firstname
            lastname
            username
            email
        }
}
```

I also created a query as mentioned to display a specific **Customer**, all I have to do is supply the ID.

```
###
#
# View a Specific Customer by ID
#
###
query {
  specificCustomers(customersId: "cjtexggou00m00771s954gjbb") {
                id
                firstname
                lastname
                address1
                address2
                city
                state
                zip
                country
                region
                email
                phone
                creditcardtype
                creditcard
                creditcardexpiration
                username
                password
                age
                income
                gender
  }
}
```

It's important to note that you do not have to specify all of the fields to be returned, you can query to return for example just the ID and the username.

Part 3 – Three Joined Database Relations

Build a GraphQL query resolver which returns the attributes from 3 joined database relations having 2 levels of nesting in the resultant output

Briefly, describe an application of the query you have chosen to write as a comment in your resolver code

For this part, I had to use a table which had three relations the only table which I picked was the **Cust_hist** table as it had three relations to it. Customers, Orders and Products.

Similar to the question above, I had to return the results.

```
/***
         * CUST_HIST
         ***/

        /***
         * Question (3)
         *
         * Build a GraphQL query resolver which returns the attributes from 3 joined
database relations
         * having 2 levels of nesting in the resultant output.
         *
         * Joined Tables:
         * - Customers
         * - Orders
         * - Products
         *
         * Description:
         * - A method to display all the customer's history and a method
         *   to display a specific customer history with the given ID.
         *
         * - Customer History is like a receipt, it will have it's own unique ID
         *   and it will include the customer, order and product details.
         *
         * - This has 3 joined database relations and 2 levels of nesting in the
output.
         */
        /* Retrieve all Customer History */
        allCustomerHistory(root, args, context) {
            return context.prisma.cust_hists()
```

```
        },

        /* Retrieve a Customer History with a Specific ID */
        specificCustomerHistory(root, args, context) {
            return context.prisma.cust_hists({
                where: {
                    id: args.cust_histId
                }
            })
        }

    }, // End Query
```

To make the connections between these tables I did the following:

```
    /***
     * Question (4)
     *
     * This links the following tables: Customers, Orders and Products
     * with the Cust_hist table.
     */
    /* The link for Customer History, Customers, Orders and Products */
    Cust_hist: {

        customers(root, args, context) {

            return context.prisma.cust_hist({
                id: root.id
            }).customers()
        },

        orders(root, args, context) {

            return context.prisma.cust_hist({
                id: root.id
            }).orders()
        },

        products(root, args, context) {

            return context.prisma.cust_hist({
                id: root.id
            }).products()
        }
    }

} // End Resolvers
```

Part 4 – Mutation Resolver

Create a mutation resolver to add data the database. Your mutation should update at least two relations (of your choice). Briefly, describe an application of the query you have chosen to write as a comment in your resolver code

I used the **createProduct(…)** as an example to solve this question.

Upon creating a new **Product** a new **Inventory** and **Category** (if applicable) will be creating alongside this solves the problem of updating at least two relations.

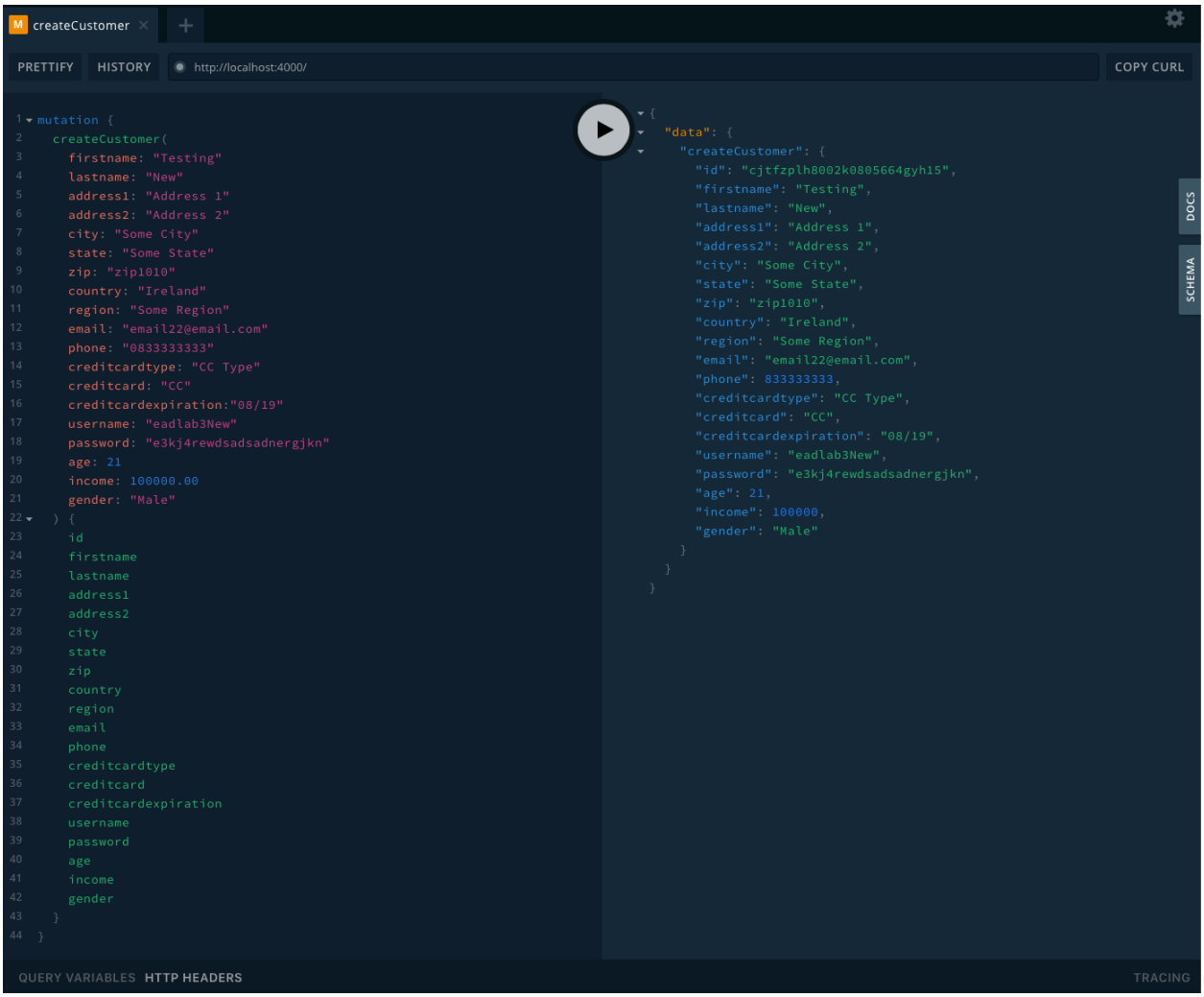
```
        /**
         * Question (4)
         *
         * Create a mutation resolver to add data the database.
         * Your mutation should update at least two relations (of your choice)
         *
         * Description:
         * - Upon creating a new Product, a new Inventory will be created for it.
         * - Alongside this, Category can also be created and linked with this
Product.
         *
         * Relations Updated:
         * - Categories
         * - Inventory
         */
        /* Creating a Product */
        createProduct(root, args, context) {

            return context.prisma.createProducts({
                title: args.title,
                actor: args.actor,
                price: args.price,
                special: args.special,
                common_prod_id: args.common_prod_id,
                categories: {
                    // connect: { id: args.categoriesId },
                    create: { categoryname: args.categoryname }
                },
                inventory: {
                    create: { quan_in_stock: args.quan_in_stock, sales: 0 }
                }
            },)
        },
```

Part 5 – GraphQL Server and Test

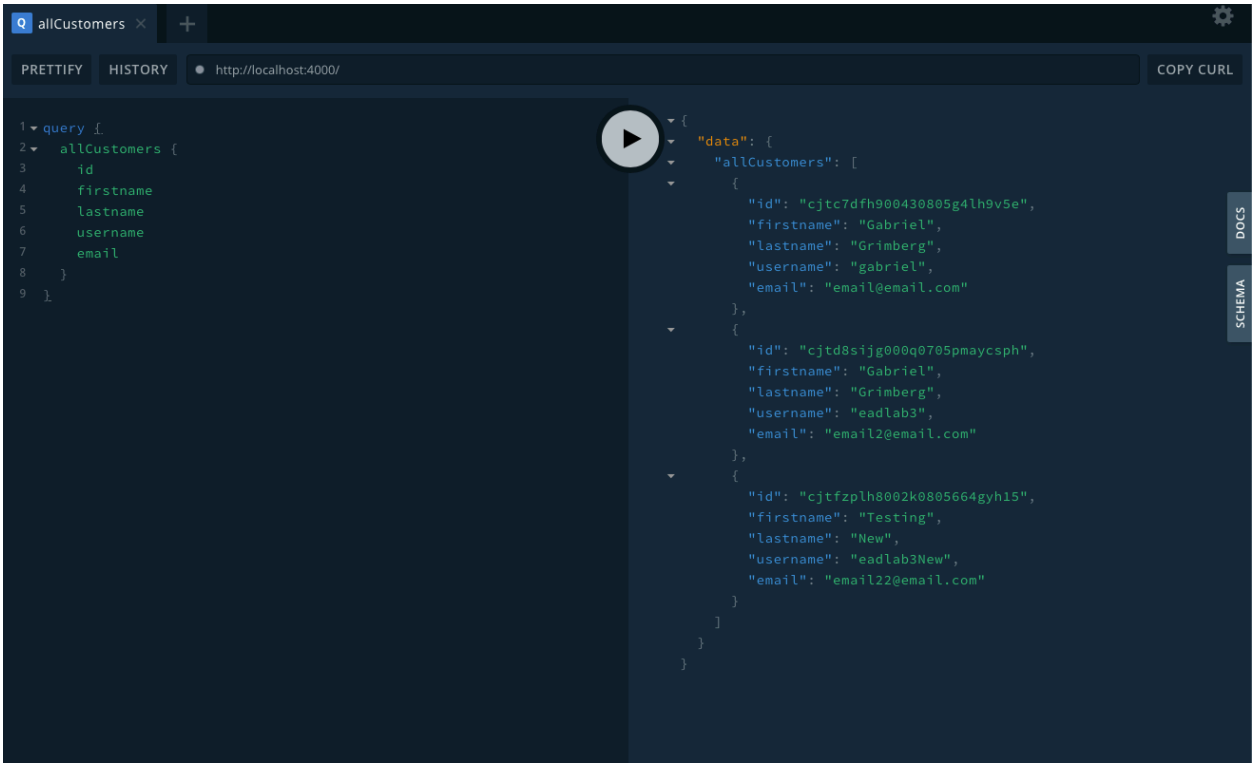
Set up a running GraphQLServer from the graphql-yoga library to test and demonstrate your resolver queries and mutations you implemented in sections 2-4 above

This last part involves setting up the server successfully where you have a **Playground** to test your queries and mutations.

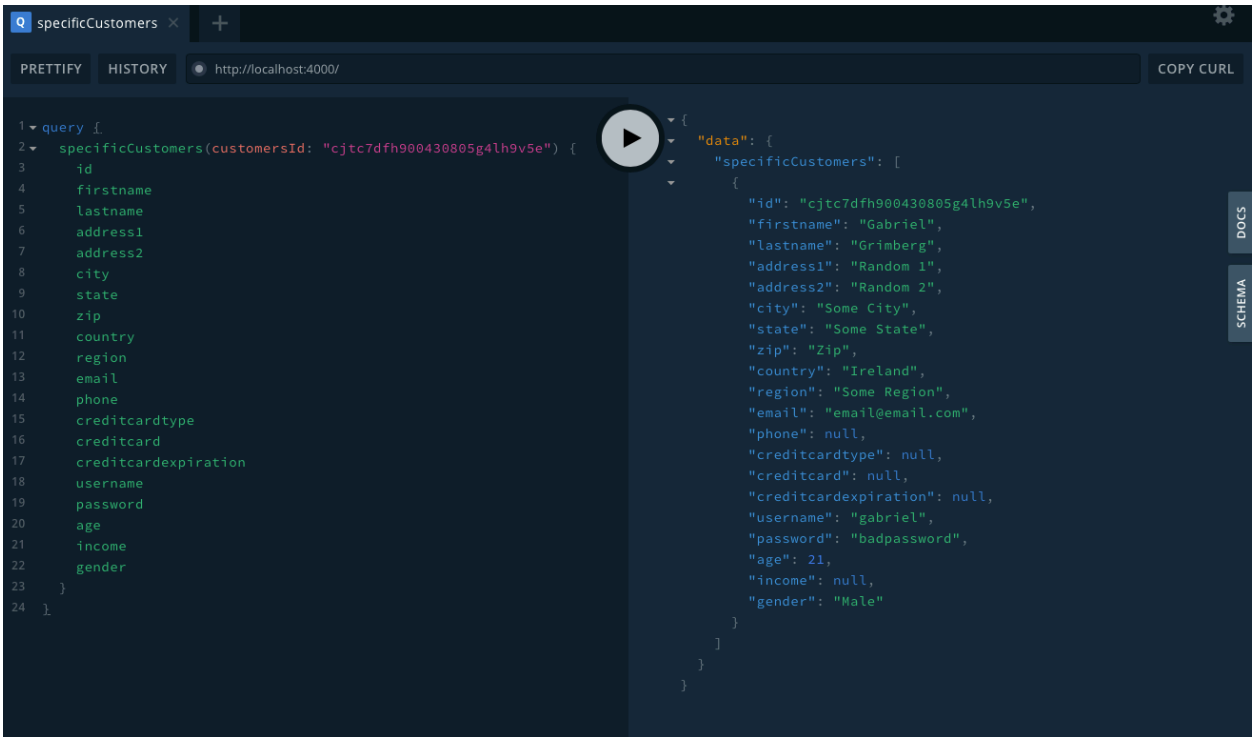
Part 2 – Creating Customer



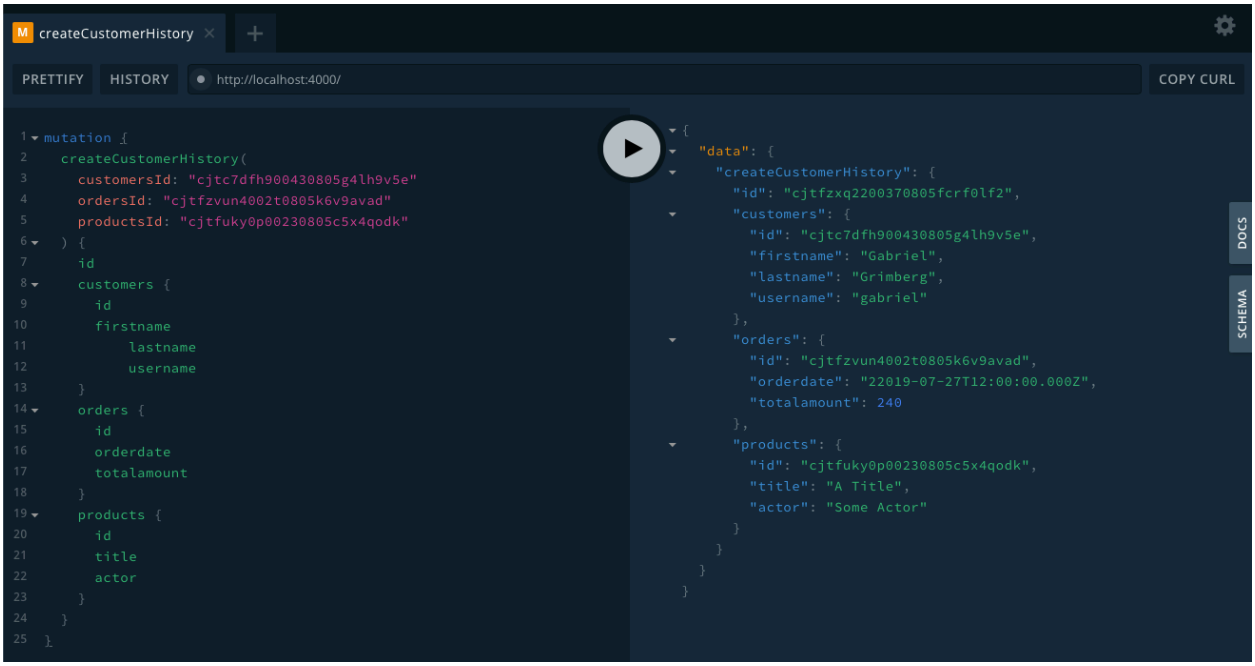
Part 2 – View All Customers



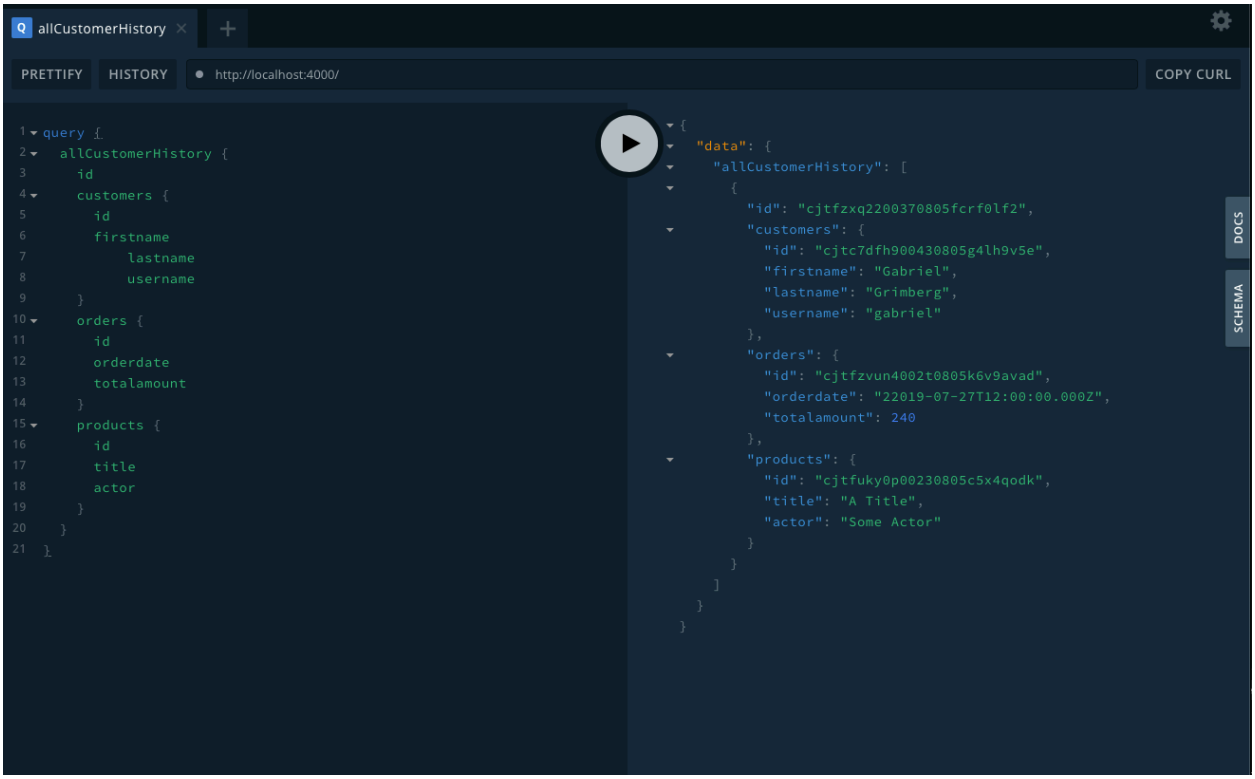
Part 2 – View Specific Customer



Part 3 – Create Customer History (3 Relations + 2 Levels Nesting)



Part 3 – View Customer History (3 Relations + 2 Levels Nesting)



Part 4 – Create Product (Update 2 Relations)