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Due Date: Dec 2, 2022

# API Design Assignment A2: GraphQL API

# **Testing**

## 1. doctorByName

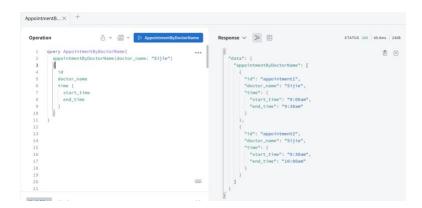
# **Happy Test**

## **Error Test**

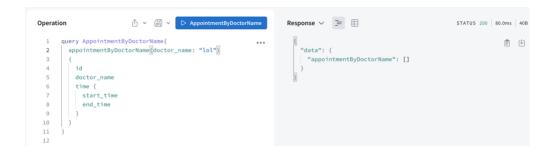


2. appointmentByDoctorName

# **Happy Test**



#### **Error Test**



#### 3. createDoctor

## **Happy Test**

```
AppointmentB...× +
 Operation
                                    ① ∨ ☐ ∨ ▷ CreateDoctor
                                                                   Response \vee \equiv \equiv
                                                                                                               STATUS 200 48.0ms 111B
       mutation CreateDoctor {
 116
                                                                                                                            117
         createDoctor(
                                                                       "data": {
 118
                  name: "Sijie Xiang",
                                                                        "createDoctor": {
  119
                    clinic_name: "Sijie's clinic",
                                                                          "id": "doctor3",
 120
                  specialty: "c")
                                                                          "name": "Sijie Xiang",
                                                                          "clinic_name": "Sijie's clinic",
 121
                                                                          "specialty": "c"
         id
 122
         name
 123
 124
          clinic_name
 125
         specialty
 126
 127
 128
```

```
{\sf AppointmentB...} \times \quad + \quad
                                      ↑ ∨ 🖺 ∨ D CreateDoctor
                                                                       Response \vee = \equiv
                                                                                                                     STATUS 200 | 75.0ms | 1.7KB
 Operation
        mutation CreateDoctor {
 116
                                                                                                                                   117
         createDoctor(
                                                                           "errors": [
                   name: "Sijie",
clinic_name: "Sijie's clinic",
 118
 119
                                                                               "message": "Doctor is already existed",
                  specialty: "c")
                                                                               "locations": [
 120
 121
         {
         id
                                                                                  "line": 117,
 122
                                                                                  "column": 3
 123
          name
 124
          clinic_name
 125
          specialty
                                                                              ],
 126
                                                                               "path": [
 127
                                                                                "createDoctor"
 128
                                                                               ],
 129
                                                                               "extensions": {
                                                                                "code": "BAD_REQUEST",
 130
 131
                                                                                "exception": {
 132
                                                                                  "message": "Doctor is already existed",
 133
                                                                                  "stacktrace": [
 134
                                                                                "GraphQLError: Doctor is already existed",
```

#### 4. createPatient

## **Happy Test**

```
AppointmentB...× +
                                       ① ∨ 🖺 ∨ D CreatePatient
                                                                        Response V 😑 🖽
 Operation
                                                                                                                         STATUS 200 56.0ms 91B
                                                                                                                                      +
        mutation CreatePatient{
                                                                             "data": {
         createPatient(name: "Mike",
                                                                               "createPatient": {
                  age: 20,
email: "Mike@cmu.edu")
                                                                                "id": "patient3",
"name": "Mike",
   18
          id
name
                                                                                "age": 20,
"email": "Mike@cmu.edu"
   19
   20
   21
           age
   24
   25
   26
```

#### **Error Test**

```
① ~ 🖺 ~ D CreatePatient
                                                                  Response V 📜 🗏
                                                                                                             STATUS 200 | 69.0ms | 1.7KB
Operation
14
                                                                                                                          mutation CreatePatient(
15
                                                                     "errors": [
      createPatient(name: "Mike",
              age: 20,
email: "Mike@cmu.edu")
17
                                                                         "message": "Patient is already existed",
                                                                         "locations": [
       id
 19
 20
                                                                            "line": 16,
        name
 21
                                                                            "column": 3
     age
email
 22
                                                                          }
                                                                         "path": [
                                                                          "createPatient"
                                                                         "extensions": {
                                                                          "code": "BAD_REQUEST",
                                                                           "exception": {
                                                                            "message": "Patient is already existed",
                                                                            "stacktrace": [
                                                                            "GraphQLError: Patient is already existed",
```

## 5. createTimeslot

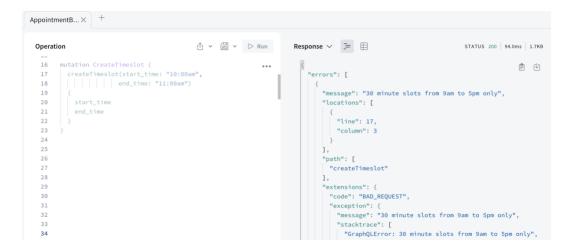
# **Happy Test**

```
① ∨ 🖁 ∨ D CreateTimeslot
                                                                           Response V 📜 🗏
Operation
                                                                                                                             STATUS 200 45.0ms 74B
       mutation CreateTimeslot {
      start_time

start_time

start_time
                                                                                                                                            *
        createTimeslot(start_time: "10:00am",
                                                                               "data": {
 17
                                                                                 "createTimeslot": {
   "start_time": "10:00am",
   "end_time": "10:30am"
 18
 19
 20
 21
          end_time
 24
 25
```

#### **Error Test**



### 6. createAppointment

# **Happy Test**

```
Response V 📜 🖽
                                     ① ∨ 🖺 ∨ D CreateAppointment
                                                                                                                                        STATUS 200 63.0ms 127B
Operation
                                                                                                                                                         1 (4)
                                                                                      "data": {
 58
       mutation CreateAppointment{
          createAppointment(doctor_name: "Sijie",
                                                                                        "createAppointment": {
                                                                                          "id": "appointment48",
"doctor_name": "Sijie",
"time": {
 61
                               start time: "2:30pm".
                                end_time: "3:00pm"
                                                                                           "start_time": "2:30pm",
"end_time": "3:00pm"
          id
 64
65
           doctor_name
           time {
   start_time
   end_time
 67
68
 71
```

```
AppointmentB...	imes +
                                  Û ∨ 🖺 ∨ 🕞 CreateAppointment
                                                                       Response \vee \equiv \equiv
                                                                                                                      STATUS 200 | 130ms | 1.7KB
 Operation
                                                                                                                                    *
                                                                           "errors": [
        mutation CreateAppointment{
        createAppointment(doctor_name: "lol",
                           time: {
                                                                               "message": "Such Doctor does not exist",
                           start_time:"2:30pm",
end_time: "3:00pm"
                                                                               "locations": [
  61
             •
  62
                                                                                  "line": 59,
         {|
id
  64
                                                                                  "column": 3
  65
           doctor_name
                                                                               "path": [
   "createAppointment"
  67
           time {
            start_time
  68
            end_time
  70
71
                                                                               "extensions": {
                                                                                 "code": "BAD_REQUEST",
  72
                                                                                   "message": "Such Doctor does not exist",
  73
                                                                                   "stacktrace": [
  74
                                                                                   "GraphQLError: Such Doctor does not exist",
```

## 7. deleteAppointment

## **Happy Test**

```
AppointmentB...×
                                    Îi ∨ 🖺 ∨ 🕞 DeleteAppointment
                                                                            Response V 📜 🖽
 Operation
                                                                                                                              STATUS 200 92.0ms 127B
       mutation DeleteAppointment {
                                                                                                                                             *
          "data": {
   "deleteAppointment": {
                              start_time:"2:30pm",
end_time: "3:00pm"
                                                                                    "id": "appointment48",
"doctor_name": "Sijie",
                                                                                    "time": {
    "start_time": "2:30pm",
         id
do/
                                                                                      "end_time": "3:00pm"
   81
            doctor_name
   82
            time {
   start_time
   end_time
   83
84
```

## **Error Test**

```
1 v 🖺 v DeleteAppointment
                                                                          Response V 📜 🗏
Operation
                                                                                                                           STATUS 200 134ms 1.7KB
                                                                                                                                          1
      mutation DeleteAppointment {
        deleteAppointment(doctor_name: "Sijie",
                                                                                  "message": "Appointment does not exist",
                            start_time:"2:30pm",
                                                                                  "locations": [
                             end_time: "3:00pm"
                                                                                      "line": 75,
          id
         doctor_name
      time { start_time end_time
                                                                                  "path": [
  "deleteAppointment"
                                                                                   "extensions": {
                                                                                    "code": "BAD_REQUEST",
"exception": {
                                                                                      "message": "Appointment does not exist",
"stacktrace": [
                                                                                        "GraphQLError: Appointment does not exist",
```

#### 8. createEvent

## **Happy Test**

```
AppointmentB...× +
                                             ① ~ □ ~ ▷ CreateEvent
                                                                                   Response V 📜 🗏
                                                                                                                                         STATUS 200 83.0ms 138B
                                                                                                                                                         ė ė
         mutation CreateEvent {
                                                                                       "data": {
           createEvent(doctor_name: "Sijie",
                                                                                           "id": "event0",
"doctor_name": "Sijie",
"patient_name": "siquan",
                  patient_name: "siquan"
time: {
   95
               | start_time:"1:00pm",
| end_time: "1:30pm"
})
                                                                                              "start_time": "1:00pm",
"end_time": "1:30pm"
   99
  101
             doctor_name
  103
              patient_name
  104
             time {
             start_time
end_time
  106
  108
```

### **Error Test**

```
AppointmentB...× +
                                                                               Response V 📜 🖽
                                           ↑ ∨ 🗒 ∨ D CreateEvent
                                                                                                                                   STATUS 200 | 106ms | 1.8KB
 Operation
         mutation CreateEvent {
          "message": "Each patient cannot book 2 different events at
                     | start_time:"1:00pm",
| end_time: "1:30pm"
|})
                                                                                    me timelsot",
"locations": [
   98
                                                                                         { "line": 94,
 100
101
102
             doctor name
  103
             patient_name
                                                                                        ],
"path": [
             time {
   start_time
 104
105
                                                                                          "createEvent"
  106
107
              end_time
                                                                                         "extensions": {
                                                                                          extensions : q"code": "BAD_REQUEST",

"exception": {

"message": "Each patient cannot book 2 different
  108
  109
  110
                                                                                 events at same timelsot",
```

### 9. deleteEvent

## **Happy Test**

```
AppointmentB...× +
                                         ☐ ∨ ☐ ∨ DeleteEvent
                                                                           Response V 📜 🖽
 Operation
                                                                                                                             STATUS 200 60.0ms 138B
                                                                                                                                            Û U
         mutation DeleteEvent {
                                                                                 "deleteEvent": {

"id": "evento",

"doctor_name": "Sijie",

"patient_name": "siquan",
         deleteEvent(patient_name: "siquan"
 114
         116
                                                                                   "time": {
    "start_time": "1:00pm",
 118
  120
           id
                                                                                      "end_time": "1:30pm"
           patient_name
           time {
   start_time
   end_time
}
  124
 126
 128
```

```
{\sf AppointmentB...} \times \quad + \quad
                                           ☐ ∨ ☐ ∨ DeleteEvent
                                                                                 Response V 📜 🖽
                                                                                                                                    STATUS 200 83.0ms 1.6KB
 Operation
                                                                                                                                                     ê 🔱
         mutation DeleteEvent {
           deleteEvent(patient_name: "siquan"
             115
116
                                                                                         "message": "Event does not exist", "locations": [
                                                                                          {
| "line": 114,
  118
  119
120
                                                                                             "column": 3
             doctor name
            patient_name
                                                                                         "path": [
"deleteEvent"
            time {
   start_time
   end_time
  123
124
  125
126
                                                                                           "code": "BAD_REQUEST",

"exception": {

"message": "Event does not exist",
  128
  129
130
                                                                                            "GraphQLError: Event does not exist",
```

# 10. updateEvent

## **Happy Test**

```
AppointmentB...	imes +
                                       ① ∨ 🖺 ∨ DpdateEvent
                                                                        Response \vee \equiv \boxplus
                                                                                                                        STATUS 200 91.0ms 140B
 Operation
 130
        mutation UpdateEvent {
                                                                                                                                      (
 131
         updateEvent(doctor_name: "Sijie"
                                                                            "data": {
                    new_patient_name: "siquan1"
 132
                                                                              "updateEvent": {
 133
                     time: {
                                                                               "id": "event82",
                                                                               "doctor_name": "Sijie",
"patient_name": "siquan1",
                              start_time:"1:00pm",
 134
 135
                             end_time: "1:30pm"
 136
                                                                               "time": {
  137
                                                                                "start_time": "1:00pm",
  138
           id
                                                                                "end_time": "1:30pm"
 139
           doctor_name
           patient_name
 140
 141
           time {
 142
            start_time
 143
             end_time
 144
  145
          }
        }
 146
  147
```

```
AppointmentB...	imes +
                                     Û ∨ ☐ ∨ DpdateEvent
                                                                    Response V 😑 🗎
 Operation
                                                                                                                 STATUS 200 | 50.0ms | 1.6KB
 130
       mutation UpdateEvent {
                                                                                                                               +
         updateEvent(doctor_name: "lol"
 131
                                                                        "errors": [
                   new_patient_name: "siquan1"
 132
 133
                    time: {
                                                                            "message": "Event does not exist",
                          start_time:"1:00pm",
 134
                                                                            "locations": [
 135
                            end_time: "1:30pm"
 136
                                                                               "line": 131,
 137
                                                                                "column": 3
 138
 139
          doctor_name
 140
          patient_name
                                                                            "path": [
 141
          time {
                                                                             "updateEvent"
 142
           start_time
 143
            end_time
                                                                            "extensions": {
 144
                                                                             "code": "BAD_REQUEST",
 145
                                                                              "exception": {
 146
                                                                               "message": "Event does not exist",
                                                                               "stacktrace": [
 147
 148
                                                                                 "GraphQLError: Event does not exist",
```

#### Reflection

1. What were some of the alternative schema and query design options you considered? Why did you choose the selected options?

I have thought about just using 3 types such as Event, Patient, and Doctor, but such design barely reflects the real situation where in large applications type Timeslot and Appointment also are extremely important. Timeslot limits the duration of event or appointment whereas appointments allow patients to see availability of doctors. Therefore, with my current design, the entire application can be easily extended and truly reflects how the real-world functions. In addition, separation of concern is a huge factor when I design those schemas for types and resources because they are fundamental to future implementation and testing steps.

- 2. Consider the case where, in future, the 'Event' structure is changed to have more fields e.g reference to patient details, consultation type (first time/follow-up etc.) and others.
  - What changes will the clients (API consumer) need to make to their existing queries (if any).

Endpoint will be kept the same. In internal schema.graphql, reference field and consultation type field will be added under type Event and client will also need to include those fields in their existing queries if they want to see the change. Again, GraphQl here gives clients the power to ask for exactly what they need and nothing more.

How will you accommodate the changes in your existing Schema and Query types?

It depends how much information that client wants to add under type Event. If just to add 2 more fields such as little reference to patient details and consultation type, the following update can work

```
type Event {
   id: ID!
   id: ID!
   doctor_name: String
   patient_name: String
   time: Timeslot
}

type Event {
   id: ID!
   doctor_name: String
   patient_name: String
   time: Timeslot
   reference: String
   consultation_type: String
}
```

However, the optimal way would be creating additional types such as Reference and Consultation in which more information can be included under those schema types. Still, they will be under type Event like the following. As for Query, we need to create new referenceInput and consultationInput to pass in as params.

```
type Event {
    id: ID!
    id: ID!
    doctor_name: String
    patient_name: String
    patient_name: String
    time: Timeslot
}
```

- 3. Describe **two** GraphQL best practices that you have incorporated in your API design.
  - Avoid writing quires name like getDoctor or getAllAppointmentsByDoctorName because queries are always used to get something. Instead, use self-explanatory queries name such as doctorByName and appointmentByDoctorName

```
type Query {
    doctorByName(name: String): Doctor
    appointmentByDoctorName(doctor_name: String): [Appointment]
}
```

 Name mutations as verbs such as createDoctor, deleteAppointment, and updateEvent

```
type Mutation {{
    createDoctor(name: String, clinic_name: String, specialty: String): Doctor
    createPatient(name: String, age: Int, email: String): Patient
    createTimeslot(start_time: String, end_time: String): Timeslot
    createAppointment(doctor_name: String, time: TimeslotInput): Appointment
    deleteAppointment(doctor_name: String, time: TimeslotInput): Appointment
    createEvent(doctor_name: String, patient_name: String, time: TimeslotInput): Event
    deleteEvent(patient_name: String, time: TimeslotInput): Event
    updateEvent(doctor_name: String, new_patient_name: String, time: TimeslotInput): Event
}
```