DMM Mini Project

Online Healthcare Service

Document Model & Graph Model

Group 8:
Mr. Min Khant Soe   122277
Ms. Pranpreya Samasutthi   122602
Mr. Pyae Sone   122645
Mr. Tanapat Samakit   122146
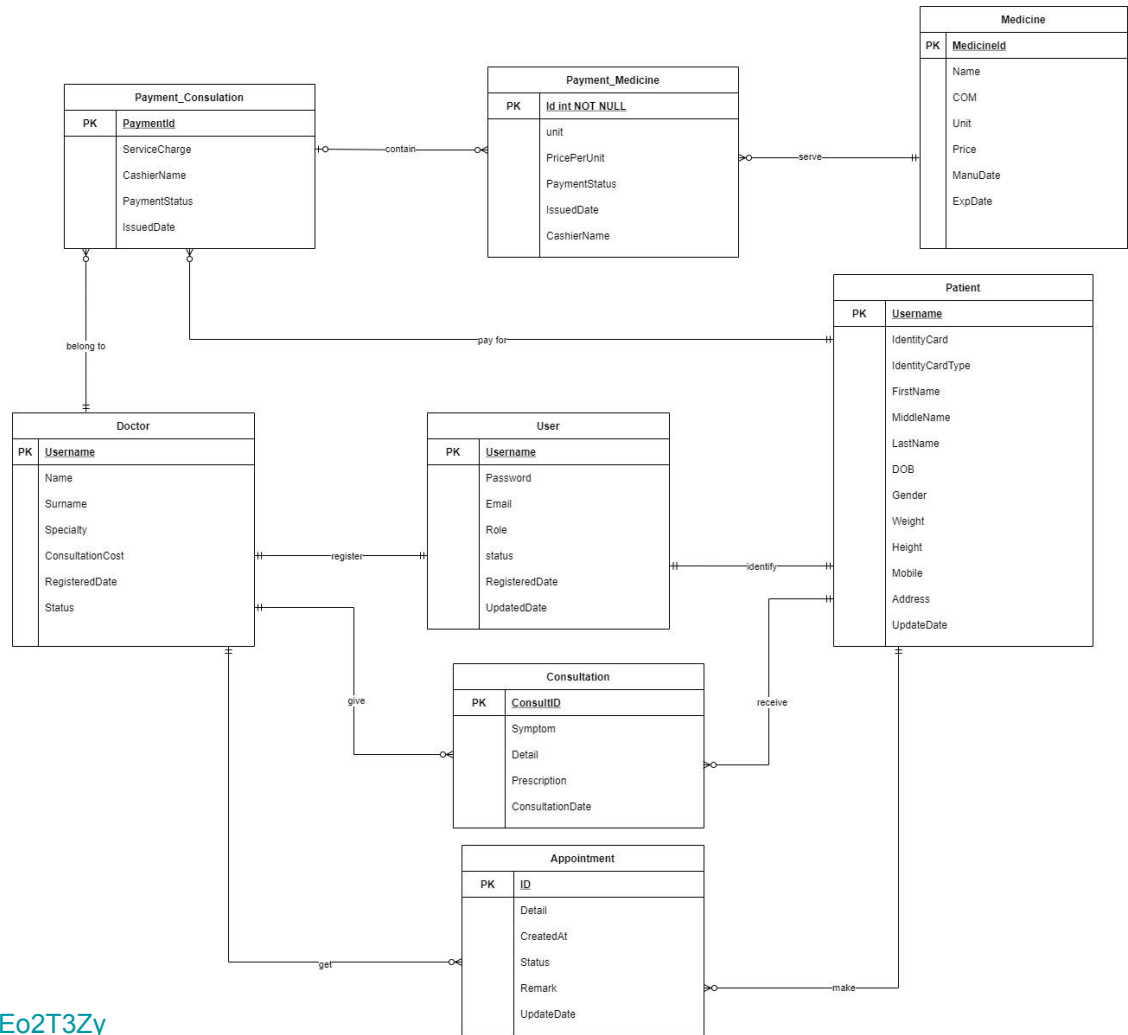Ms. Saima Ashraf   122571

Project Description

Due to Covid-19 crisis, many patients can't go to the hospital to consult their symptoms or receive medication followed by an appointment. Therefore, online service for health care is able to decrease this inconvenience.

Online healthcare service is the platform that provides many fundamental services to support patients. They can appoint the doctor for consulting online, receiving treatment advice, getting medication, and paying for treatment on the same platform.
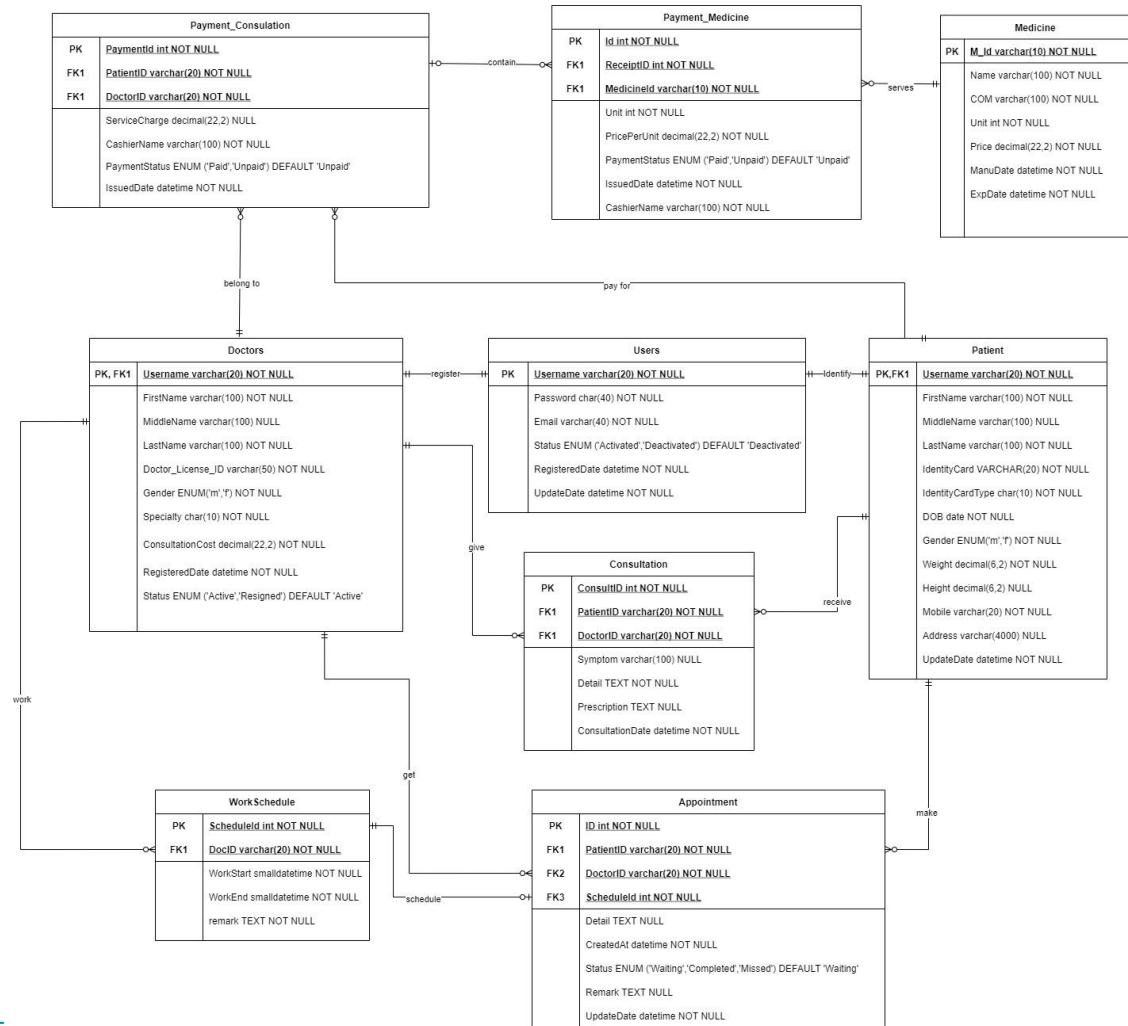
Business Rules

1. Each user can register to online healthcare services for 1 time.
2. Patients can check the time schedule of the specific doctor before making an appointment .
3. Patients can make many appointments to consult with the doctor.
4. Patients can select an available time of doctor for an appointment and get the confirmation from the application.
5. Patients can view the consultation receipt for checking service charge rate.
6. Patients can view the medicine receipt for checking the unit of each medicine and price per unit.
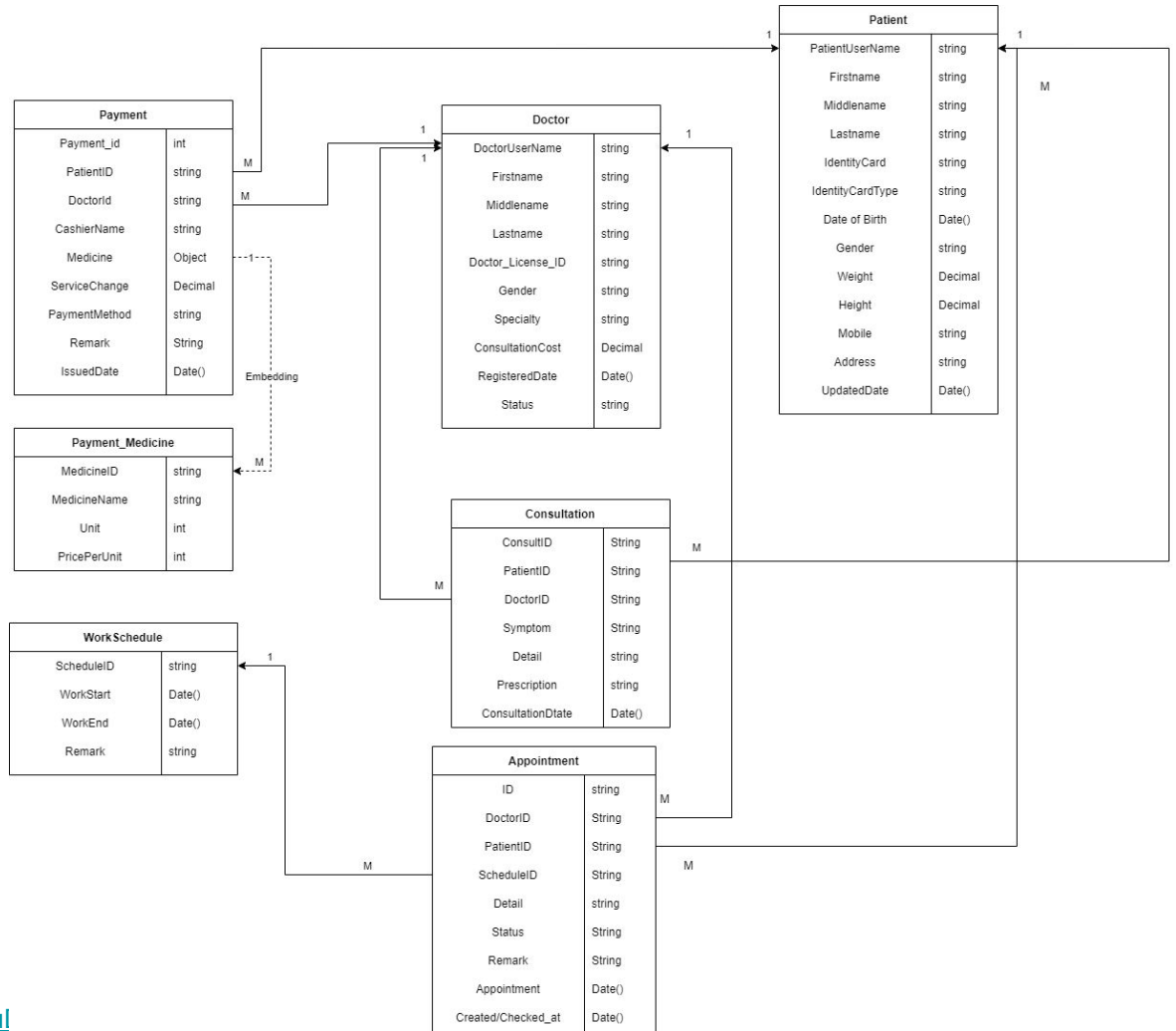7. Doctors can make the consultation summary after giving consultation to the patient

Conceptual Design

Logical Design

Payment_Consulation

PK	PaymentId int NOT NULL
FK1	PatientID varchar(20) NOT NULL
FK1	DoctorID varchar(20) NOT NULL

ServiceCharge decimal(22,2) NULL
CashierName varchar(100) NOT NULL
PaymentStatus ENUM ('Paid','Unpaid') DEFAULT 'Unpaid'
IssuedDate datetime NOT NULL

Payment_Medicine

PK	Id int NOT NULL
FK1	ReceiptID int NOT NULL
FK1	MedicineId varchar(10) NOT NULL

Unit int NOT NULL
PricePerUnit decimal(22,2) NOT NULL
PaymentStatus ENUM ('Paid','Unpaid') DEFAULT 'Unpaid'
IssuedDate datetime NOT NULL
CashierName varchar(100) NOT NULL

Medicine

PK	M_Id varchar(10) NOT NULL

Name varchar(100) NOT NULL
COM varchar(100) NOT NULL
Unit int NOT NULL
Price decimal(22,2) NOT NULL
ManuDate datetime NOT NULL
ExpDate datetime NOT NULL

Doctors

PK, FK1	Username varchar(20) NOT NULL

FirstName varchar(100) NOT NULL
MiddleName varchar(100) NULL
LastName varchar(100) NOT NULL
Doctor_License_ID varchar(50) NOT NULL
Gender ENUM('m','f') NOT NULL
Specialty char(10) NOT NULL
ConsultationCost decimal(22,2) NOT NULL
RegisteredDate datetime NOT NULL
Status ENUM ('Active','Resigned') DEFAULT 'Active'

Users

PK	Username varchar(20) NOT NULL

Password char(40) NOT NULL
Email varchar(40) NOT NULL
Status ENUM ('Activated','Deactivated') DEFAULT 'Deactivated'
RegisteredDate datetime NOT NULL
UpdateDate datetime NOT NULL

Patient

PK,FK1	Username varchar(20) NOT NULL

FirstName varchar(100) NOT NULL
MiddleName varchar(100) NULL
LastName varchar(100) NOT NULL
IdentityCard VARCHAR(20) NOT NULL
IdentityCardType char(10) NOT NULL
DOB date NOT NULL
Gender ENUM('m','f') NOT NULL
Weight decimal(6,2) NOT NULL
Height decimal(6,2) NULL
Mobile varchar(20) NOT NULL
Address varchar(4000) NULL
UpdateDate datetime NOT NULL

Consultation

PK	ConsultID int NOT NULL
FK1	PatientID varchar(20) NOT NULL
FK1	DoctorID varchar(20) NOT NULL

Symptom varchar(100) NULL
Detail TEXT NOT NULL
Prescription TEXT NULL
ConsultationDate datetime NOT NULL

WorkSchedule

PK	ScheduleId int NOT NULL
FK1	DocID varchar(20) NOT NULL

WorkStart smalldatetime NOT NULL
WorkEnd smalldatetime NOT NULL
remark TEXT NOT NULL

Appointment

PK	ID int NOT NULL
FK1	PatientID varchar(20) NOT NULL
FK2	DoctorID varchar(20) NOT NULL
FK3	ScheduleId int NOT NULL

Detail TEXT NULL
CreatedAt datetime NOT NULL
Status ENUM ('Waiting','Completed','Missed') DEFAULT 'Waiting'
Remark TEXT NULL
UpdateDate datetime NOT NULL

Document Model Design

Payment

Payment_id	int
PatientID	string
DoctorId	string
CashierName	string
Medicine	Object
ServiceChange	Decimal
PaymentMethod	string
Remark	String
IssuedDate	Date()

Payment_Medicine

MedicineID	string
MedicineName	string
Unit	int
PricePerUnit	int

WorkSchedule

ScheduleID	string
WorkStart	Date()
WorkEnd	Date()
Remark	string

Doctor

DoctorUserName	string
Firstname	string
Middlename	string
Lastname	string
Doctor_License_ID	string
Gender	string
Specialty	string
ConsultationCost	Decimal
RegisteredDate	Date()
Status	string

Consultation

ConsultID	String
PatientID	String
DoctorID	String
Symptom	String
Detail	string
Prescription	string
ConsultationDtate	Date()

Appointment

ID	string
DoctorID	String
PatientID	String
ScheduleID	String
Detail	string
Status	String
Remark	String
Appointment	Date()
Created/Checked_at	Date()

Patient

PatientUserName	string
Firstname	string
Middlename	string
Lastname	string
IdentityCard	string
IdentityCardType	string
Date of Birth	Date()
Gender	string
Weight	Decimal
Height	Decimal
Mobile	string
Address	string
UpdatedDate	Date()

Maintained Data & Data Constraints

1. **Patient's Information:** Patient Username, First Name, Middle Name, LastName, Identity Card, Identity Card Type, Date of Birth (DOB), Gender, Weight, Height, Mobile, Address, Updated Date

2. **Doctor's Information**: Doctor Username, First Name, Middle Name, Last Name, Doctor-License ID, Gender, Specialty, Consultation Cost, Registered Date, Status

3. **Work Schedule (of doctors):** Schedule ID, Doctor ID, Work Start, Work End, Remark

4. **Appointment's Information:** Appointment ID, Patient ID, Doctor ID, ScheduleId, Detail, Created Date, Status, Remark, Updated Date

5. **Consultation Information:** ConsultID, PatientID, DoctorID, Symptom, Detail, Prescription, ConsultationDate

6. **Payments Information:** Receipt ID, Patient ID, Doctor ID, remark, Service Charge, Cashier Name, Payment Method, Issued Date, MedicineId, Name, Unit, Price per unit

Operations & Transactions

Registration

- Insert a new doctor
- Update consultation cost of a doctor
- Update doctor's username
- Update the status of a doctor when the doctor resigned
- Insert a new Patient
- Update weight of a patient
- Update a patient's address
- Update patient's mobile number
- Update patient's username

Appointment

- Insert new appointment
- Update status of an appointment after the appointment done
- Remove missed appointments which have no update in 2021
- Update remarks of an Appointment.
- Update appointment date.
- Update content in detail description of appointment.

Operations & Transactions

Work Schedule

- Insert new work Schedule.
- Delete the work schedule of a specific doctor when he /she has resigned.
- Update workEnd

Consultation

- Insert new consultation

Payment

- Insert new payment

Important data inquiries & reports

1. Generate Gender Ratio of current Patients
2. Check Number of Medicines that served the most(Excluding no medicine served)
3. Total Income for each month
4. Number of Doctors in each specialty
5. Check How many Doctors are still on Duty
6. Average weight and height of patient followed by gender
7. Name of patients who have higher risk to sick from abnormal weight
8. All consultation details that each doctor (who is 'Active') took care of
9. Total cost from each payment method
10. Number of patients who registered in each month in 2021
11. Number of doctors who specialized in General
12. Sorting patients with gender
13. Finding patients with identity card type as passport
14. Number of appointments on the first week of September
15. Prescribed patients

Important data inquiries & reports

16. Name, age, gender and symptom of patients who are consulted in August 2021
17. Contact Information of foreigners registered as patients in 2021
18. The information of the doctors who resigned if their work_schedule is recorded with a future date
19. Total number of consultation of each doctor and their speciality and fee of them starting from January 2021
20. Name and units of medicine bought, total cost and payment method by a patient
21. Total number of appointments by the doctor's gender who is active on duty.
22. Price per Unit of each medicine
23. Top 3 doctors who has done highest number of consultation in 2021
24. Total number of Appointments group by month
25. Information about doctors who registered in 2021

Operation Results (Min Khant Soe)

1. Update consultation cost of a doctor

```
db.Doctor.updateOne({"_id":"ddjokovich"}, {$set: {"ConsultationCost":"750"}})
{ acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0 }
```

```
_id: "ddjokovich"
DoctorUserName: "ddjokovich"
FirstName: "Clarita"
MiddleName: null
LastName: "Treweek"
Doctor_License_ID: "99-033-7026"
Gender: "m"
Specialty: "General"
ConsultationCost: "600"
RegisteredDate: 2021-01-18T00:00:00.000+00:00
Status: "Active"
```

Consultation Cost is updated

→

```
_id: "ddjokovich"
DoctorUserName: "ddjokovich"
FirstName: "Clarita"
MiddleName: null
LastName: "Treweek"
Doctor_License_ID: "99-033-7026"
Gender: "m"
Specialty: "General"
ConsultationCost: "750"
RegisteredDate: 2021-01-18T00:00:00.000+00:00
Status: "Active"
```

Operation Results (Min Khant Soe)

2. Update the status of a doctor when the doctor resigned

```
db.Doctor.updateOne({"_id":"kusheng"}, {$set: {"Status":"Resigned"}})
{ acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0 }
```

```
_id: "kusheng"
DoctorUserName: "kusheng"
FirstName: "Kusheng"
MiddleName: null
LastName: "Naing"
Doctor_License_ID: "99-999-2196"
Gender: "m"
Specialty: "General"
ConsultationCost: 500.00
RegisteredDate: 2021-10-08T00:00:00.000+00:00
Status: "Active"
```

Status is updated →

```
_id: "kusheng"
DoctorUserName: "kusheng"
FirstName: "Kusheng"
MiddleName: null
LastName: "Naing"
Doctor_License_ID: "99-999-2196"
Gender: "m"
Specialty: "General"
ConsultationCost: 500.00
RegisteredDate: 2021-10-08T00:00:00.000+00:00
Status: "Resigned"
```

Operation Results (Min Khant Soe)

3. Delete the work schedule of a specific doctor when he /she has resigned.

```
db.Work_schedule.deleteMany({DoctorID: "kusheng"})
{ acknowledged: true, deletedCount: 1 }
```

Displaying documents **141 - 151** of 151 `<` `>`

Work Schedule is deleted

Displaying documents **141 - 150** of 150 `<` `>`

Work Schedule Document before deleting:

```
_id: 151
ScheduleId: 151
DoctorID: "kusheng"
WorkStart: 2021-10-10T10:00:00.000+00:00
WorkEnd: 2021-10-10T12:00:00.000+00:00
Remark: null
```

Operation Results (Min Khant Soe)

4. Insert new consultation

```
db.Consultation.insertOne({"_id":101,"ConsultID":101,"PatientID":"bterren1w","DoctorID":"ddjokovich",
"Symptom":"Flexion deformity","Detail":"Occlusion of Left Vas Deferens, Percutaneous Approach",
"Prescription":"Metaxalone","ConsultationDate": ISODate("2021-10-31T01:39:30.000Z")})
{ acknowledged: true, insertedId: 101 }
```

New consultation document after inserting

```
_id: 101
ConsultID: 101
PatientID: "bterren1w"
DoctorID: "ddjokovich"
Symptom: "Flexion deformity"
Detail: "Occlusion of Left Vas Deferens, Percutaneous Approach"
Prescription: "Metaxalone"
ConsultationDate: 2021-10-31T01:39:30.000+00:00
```

Query Results (Min Khant Soe)

1. Total number of consultation of each doctor and their speciality and fee of them starting from January 2021

```
db.Consultation.aggregate([{ $match : {
"ConsultationDate": {"$gte":
ISODate("2021-01-01T00:00:00.000Z")} } },
{ $group : {
        "_id" : "$DoctorID",
        "Doctor_ID": {$first: "$DoctorID"},
        "Total_Consultation_Done" : { $sum : 1 }
 } },
{$lookup: {from: "Doctor", localField: "Doctor_ID",
foreignField:"DoctorUserName",
as: "Doctor.info"}},
{$unwind: "$Doctor.info"},
{$project: {"Doctor.info.Specialty": 1,
"Doctor.info.ConsultationCost": 1,
"Total_Consultation_Done" : 1, "Email" : 1,
"Doctor_ID":1}
}
])
```

```
{ _id: 'kgrococka',
  Doctor_ID: 'kgrococka',
  Total_Consultation_Done: 3,
  Doctor:
   { info:
      { Specialty: 'General',
        ConsultationCost: Decimal128("1862.00") } } }
{ _id: 'cfloweth3',
  Doctor_ID: 'cfloweth3',
  Total_Consultation_Done: 1,
  Doctor:
   { info:
      { Specialty: 'Pediatrics',
        ConsultationCost: Decimal128("1051.00") } } }
```

Query Results (Min Khant Soe)

2. Name and units of medicine bought, total cost and payment method by a patient

```
db.Payment.aggregate([
      { $match : { "PatientID": "rmarconic" } },
      {$unwind: "$medicine"},
      {$lookup: {from: "Doctor", localField: "DoctorID",
      foreignField:"DoctorUserName",
      as: "Doctor.info"}},
      {$unwind: "$Doctor.info"},
      {$addFields:{
      "Total_cost_medicine": { $multiply: [ "$medicine.Unit", "$medicine.PricePerUnit" ] },
      "Total_cost": { $sum: ["$ServiceCharge", { $multiply: [ "$medicine.Unit",
"$medicine.PricePerUnit" ] }, "$Doctor.info.ConsultationCost"] } } },
      { $project: { "Id":1, "PatientID": 1, "medicine.Name":1, "medicine.Unit":1,
"medicine.PricePerUnit":1,
      "Total_cost_medicine": 1,"ServiceCharge": 1, "Doctor.info.DoctorUserName": 1,
"Doctor.info.ConsultationCost": 1, "Total_cost": 1, "PaymentMethod": 1} }
      ])
```

Query Results (Min Khant Soe)

2. Name and units of medicine bought, total cost and payment method by a patient

```
{ _id: 86,
  Id: 86,
  PatientID: 'rmarconic',
  medicine: { Name: 'TSH CORD', Unit: 3, PricePerUnit: Decimal128("54.00") },
  ServiceCharge: Decimal128("100.00"),
  PaymentMethod: 'Bank Transfer',
  Doctor:
   { info:
      { DoctorUserName: 'cfloweth3',
        ConsultationCost: Decimal128("1051.00") } },
  Total_cost_medicine: Decimal128("162.00"),
  Total_cost: Decimal128("1313.00") }
```

Query Results (Min Khant Soe)

3. Patients' names, age, gender and their symptom that are consulted in August 2021

```
db.Consultation.aggregate([{ $match : { "ConsultationDate": {"$gte":
ISODate("2021-08-01T00:00:00.000Z"), "$lte": ISODate("2021-08-31T23:59:59.000Z")} } },
      {$lookup: {from: "Patient", localField: "PatientID",
      foreignField:"PatientUserName",
      as: "Patient.info"}},
      {$unwind: "$Patient.info"},
      { $project: { "ConsultID":1, "Patient.info.FirstName": 1, "Patient.info.LastName": 1,
      "Patient.info.Gender": 1, "Patient_Symptom": "$Symptom", "ConsultationDate" : 1,
      "Patient_Age": {$toInt: {$divide: [{$divide: [{ $subtract: [ ISODate(), "$Patient.info.DOB" ] },
3600000  ] } , 8760 ]}}
} }
])
```

Query Results (Min Khant Soe)

3. Patients' names, age, gender and their symptom that are consulted in August 2021

```
{ _id: 90,
  ConsultID: 90,
  ConsultationDate: 2021-08-10T00:00:00.000Z,
  Patient: { info: { FirstName: 'Rochell', LastName: 'Roels', Gender: 'm' } },
  Patient_Symptom: 'Flexion deformity',
  Patient_Age: 42 }
{ _id: 97,
  ConsultID: 97,
  ConsultationDate: 2021-08-03T00:00:00.000Z,
  Patient: { info: { FirstName: 'Halli', LastName: 'Arno', Gender: 'f' } },
  Patient_Symptom: 'Chronic lymphocytic leuk of B-cell type not achieve remis',
  Patient_Age: 29 }
```

Query Results (Min Khant Soe)

4. Contact Information of foreigners registered as patients in 2021

```
db.Patient.aggregate([{ $match : {
"UpdatedDate": {"$gte":
ISODate("2021-01-01T00:00:00.000Z"),
"$lte":
ISODate("2021-12-31T23:59:59.000Z")} ,
    "IdentityCardType": "Passport"} },
    { $project: {"PatientUserName": 1,
"FirstName": 1, "LastName": 1, "Mobile" :
1, "Address": 1, "IdentityCardType": 1,
    "Registered_date": "$UpdatedDate"
} }
])
```

```
{ _id: ObjectId("617b729f4ca0b047596e9e31"),
  PatientUserName: 'klonghorne21',
  FirstName: 'Enriqueta',
  LastName: 'Winny',
  IdentityCardType: 'Passport',
  Mobile: '160-595-9002',
  Address: '746 Wayridge Place',
  Registered_date: 2021-04-27T00:00:00.000Z }
{ _id: ObjectId("617b729f4ca0b047596e9e36"),
  PatientUserName: 'lfendt2o',
  FirstName: 'Shoshanna',
  LastName: 'Copcote',
  IdentityCardType: 'Passport',
  Mobile: '289-666-0309',
  Address: '6977 6th Terrace',
  Registered_date: 2021-02-15T00:00:00.000Z }
```

Query Results (Min Khant Soe)

5. The information of the doctors who resigned if their work_schedule is recorded with a future date.

```
db.Doctor.aggregate([ {$match : {"Status": "Resigned"} },
      {$lookup: {from: "Work_schedule", localField:
"_id",
      foreignField:"DoctorID",
      as: "Work_schedule.info"}},
      {$unwind: "$Work_schedule.info"},
      { $match : { "Work_schedule.info.WorkStart":
{"$gte": ISODate()} } },
      { $project: {"DoctorUserName": 1, "FirstName": 1,
"MiddleName": 1, "LastName": 1, "Specialty": 1,"Status":
1,
      "Work_schedule.info.ScheduleId" : 1,
"Work_schedule_date":
"$Work_schedule.info.WorkStart"} }
])
```

```
{ _id: 'dfurtado1',
  DoctorUserName: 'dfurtado1',
  FirstName: 'Terrell',
  MiddleName: 'Skell',
  LastName: 'Klarzynski',
  Specialty: 'Pediatrics',
  Status: 'Resigned',
  Work_schedule: { info: { ScheduleId: 153 } },
  Work_schedule_date: 2021-12-16T09:00:00.000Z }
{ _id: 'kusheng',
  DoctorUserName: 'kusheng',
  FirstName: 'Kusheng',
  MiddleName: null,
  LastName: 'Naing',
  Specialty: 'General',
  Status: 'Resigned',
  Work_schedule: { info: { ScheduleId: 152 } },
  Work_schedule_date: 2021-12-02T10:00:00.000Z }
```

Operation Results (Pranpreya Samasutthi)

1. Insert new a doctor

```
> db.Doctor.insertOne(
  {
      "_id": "test1234",
      "DoctorUserName": "test1234",
      "FirstName": "Ann",
      "MiddleName": "Lee",
      "LastName": "Bruce",
      "Doctor_License_ID": "85-123-5985",
      "Gender": "f",
      "Specialty": "Heart Disease",
      "ConsultationCost": NumberDecimal("1500.00"),
      "RegisteredDate": ISODate("2021-11-01T00:00:00.000Z"),
      "Status": "Active"
   }
 );
< { acknowledged: true, insertedId: 'test1234' }
```

```
_id: "test1234"
DoctorUserName: "test1234"
FirstName: "Ann"
MiddleName: "Lee"
LastName: "Bruce"
Doctor_License_ID: "85-123-5985"
Gender: "f"
Specialty: "Heart Disease"
ConsultationCost: 1500.00
RegisteredDate: 2021-11-01T00:00:00.000+00:00
Status: "Active"
```

2. Insert new an appointment

```
> db.Appointment.insertOne(
    {
        "_id": 141,
        "ID": 141,
        "PatientID": "dbladesmithf",
        "DoctorID": "arosencwaigi",
        "ScheduleId": 19,
        "Detail": "In congue. Etiam justo.",
        "Status": "Missed",
        "Remark": null,
        "AppoitmentDate": ISODate("2021-10-03T00:00:00.000Z"),
        "Created/Changed_At": ISODate("2021-10-04T00:00:00.000Z")
    }
  );
< { acknowledged: true, insertedId: 141 }
```

```
_id: 141
ID: 141
PatientID: "dbladesmithf"
DoctorID: "arosencwaigi"
ScheduleId: 19
Detail: "In congue. Etiam justo."
Status: "Missed"
Remark: null
AppoitmentDate: 2021-10-03T00:00:00.000+00:00
Created/Changed_At: 2021-10-04T00:00:00.000+00:00
```

Operation Results (Pranpreya Samasutthi)

3. Update address of a patient

```
> db.Patient.updateOne(
    {PatientUserName: "dscoffins1h"},
    {$set: {Address: "BKK, Thailand"}}
);
< { acknowledged: true,
    insertedId: null,
    matchedCount: 1,
    modifiedCount: 1,
    upsertedCount: 0 }
```

```
_id: ObjectId("617b729f4ca0b047596e9e0e")
PatientUserName: "dscoffins1h"
FirstName: "Ginelle"
MiddleName: null
LastName: "Klemz"
IdentityCard: "223-68-6823"
IdentityCardType: "National ID"
DOB: 1967-06-05T17:00:00.000+00:00
Gender: "m"
Weight: 38.15
Height: 214.48
Mobile: "709-994-1332"
Address: "BKK, Thailand"
UpdatedDate: 2021-06-07T00:00:00.000+00:00
```

4. Update workEnd in work_schedule

```
> db.Work_schedule.updateOne(
    {_id:1},
    {$set: {WorkEnd: ISODate("2021-10-01T11:30:00.000Z")}}
);
< { acknowledged: true,
    insertedId: null,
    matchedCount: 1,
    modifiedCount: 1,
    upsertedCount: 0 }
```

```
_id: 1
ScheduleId: 1
DoctorID: "mmolines0"
WorkStart: 2021-10-01T08:00:00.000+00:00
WorkEnd: 2021-10-01T11:30:00.000+00:00
Remark: null
```

Query Results (Pranpreya Samasutthi)

1. Average weight and height of patient followed by gender

```
< { _id: 'f',
    avg_weight: Decimal128("63.41363636363636363636363636363636"),
    avg_height: Decimal128("175.69181818181818181818181818182") }
  { _id: 'm',
    avg_weight: Decimal128("68.57973684210526315789473684210526"),
    avg_height: Decimal128("178.02842105263157894736842105263316") }
```

2. Name and mobile of patients who have higher risk to sick from abnormal weight

```
< { FirstName: 'Lonnie',
    LastName: 'Worsalls',
    Mobile: '189-600-0546' }
  { FirstName: 'Jerry', LastName: 'Earpe', Mobile: '319-386-8866' }
  { FirstName: 'Grenville',
    LastName: 'Clausen',
    Mobile: '806-900-5913' }
```

Query Results (Pranpreya Samasutthi)

3. All consultation details that each doctor, who is 'Active', take care

```
< { _id: 'arace4',
    consultation_detail: [ 'Transfer Buttock Subcutaneous Tissue and Fascia with Skin and Subcutaneous Tissue, Percutaneous Approach' ] }
  { _id: 'arosencwaigi',
    consultation_detail:
    [ 'Replacement of Left Lower Femur with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach',
      'Transfer Right Lower Arm and Wrist Muscle with Skin, Open Approach',
      'Replacement of Pulmonary Trunk with Nonautologous Tissue Substitute, Open Approach',
      'Reposition Right Auditory Ossicle, Open Approach',
      'Fusion of Left Tarsal Joint with Autologous Tissue Substitute, Open Approach',
      'Repair Thoracolumbar Vertebral Joint, External Approach' ] }
```

4. Total cost from each payment method

```
< { _id: 'QR scan',
    ServiceCharge: Decimal128("4900.00"),
    MedicineCost: Decimal128("19302.00"),
    DoctorCost: Decimal128("62864.00"),
    TotalCost: Decimal128("87066.00") }
  { _id: 'Bank Transfer',
    ServiceCharge: Decimal128("5100.00"),
    MedicineCost: Decimal128("11182.00"),
    DoctorCost: Decimal128("63088.00"),
    TotalCost: Decimal128("79370.00") }
```

Query Results (Pranpreya Samasutthi)

5.   Number of patients who registered in each month in 2021

```
< { _id: { year: 2021, month: 1 }, NoOfPatient: 11 }
  { _id: { year: 2021, month: 2 }, NoOfPatient: 7 }
  { _id: { year: 2021, month: 3 }, NoOfPatient: 9 }
  { _id: { year: 2021, month: 4 }, NoOfPatient: 8 }
  { _id: { year: 2021, month: 5 }, NoOfPatient: 8 }
  { _id: { year: 2021, month: 6 }, NoOfPatient: 8 }
  { _id: { year: 2021, month: 7 }, NoOfPatient: 9 }
  { _id: { year: 2021, month: 8 }, NoOfPatient: 12 }
  { _id: { year: 2021, month: 9 }, NoOfPatient: 3 }
  { _id: { year: 2021, month: 11 }, NoOfPatient: 1 }
```

Operation Results (Pyae Sone)

1. Update Doctor username

```
> db.Doctor.updateOne(
    {DoctorUserName: "arace4"},
    {$set: {DoctorUserName: "drqwerty"}}
);
< { acknowledged: true,
    insertedId: null,
    matchedCount: 1,
    modifiedCount: 1,
    upsertedCount: 0 }
```

```
_id: "arace4"
DoctorUserName: "drqwerty"
FirstName: "Garrett"
MiddleName: null
LastName: "Wyatt"
Doctor_License_ID: "98-144-2196"
Gender: "f"
Specialty: "General"
ConsultationCost: 1682.00
RegisteredDate: 2021-05-08T00:00:00.000+00:00
Status: "Active"
```

2. Update content in detail description of appointment

```
> db.Appointment.updateOne(
    {ID: 2},
    {$set: {Detail: "High Fever"}}
);
< { acknowledged: true,
    insertedId: null,
    matchedCount: 1,
    modifiedCount: 1,
    upsertedCount: 0 }
```

```
_id: 2
ID: 2
PatientID: "hreddinh"
DoctorID: "dfurtado1"
ScheduleId: 2
Detail: "High Fever"
Status: "Missed"
Remark: null
AppoimentDate: 2021-09-04T00:32:18.000+00:00
Created/Changed_At: 2021-08-30T17:32:52.000+00:00
```

Operation Results (Pyae Sone)

3. Update patient's username

```
> db.Patient.updateOne(
    {PatientUserName: "aacland2"},
    {$set: {PatientUserName: "qwertyasd"}}
);
< { acknowledged: true,
    insertedId: null,
    matchedCount: 1,
    modifiedCount: 1,
    upsertedCount: 0 }
```

```
_id: ObjectId("617b729f4ca0b047596e9dfb")
PatientUserName: "qwertyasd"
FirstName: "Warner"
MiddleName: null
LastName: "Ambrose"
IdentityCard: "842-27-5779"
IdentityCardType: "National ID"
DOB: 1987-12-10T17:00:00.000+00:00
Gender: null
Weight: 47
Height: 164.13
Mobile: "0999294979"
Address: "201 Kensington Park"
UpdatedDate: 2021-01-02T00:00:00.000+00:00
```

4. Update Appointment date

```
> db.Appointment.updateOne(
    {ID: 1},
    {$set: {AppoitmentDate: ISODate("2021-10-01T11:30:00.000Z")}},
    {$set: {Changed_At:ISODate("2021-09-01T11:30:00.000Z")}}
);
< { acknowledged: true,
    insertedId: null,
    matchedCount: 1,
    modifiedCount: 1,
    upsertedCount: 0 }
```

```
_id: 1
ID: 1
PatientID: "thornungb"
DoctorID: "mmolines0"
ScheduleId: 1
Detail: "In congue. Etiam justo."
Status: "Waiting"
Remark: null
AppoitmentDate: 2021-10-01T11:30:00.000+00:00
Created/Changed_At: 2021-08-30T17:25:14.000+00:00
```

Query Results (Pyae Sone)

1. Finding Doctors who specialize in General ⟶

2. Sorting patients with gender

```
< { _id: null, totalPatients: 19 }
  { _id: 'f', totalPatients: 44 }
  { _id: 'm', totalPatients: 39 }
```

```
{ _id: 'arace4',
  DoctorUserName: 'arace4',
  FirstName: 'Garrett',
  MiddleName: null,
  LastName: 'Wyatt',
  Doctor_License_ID: '98-144-2196',
  Gender: 'f',
  Specialty: 'General',
  ConsultationCost: Decimal128("1682.00"),
  RegisteredDate: 2021-05-08T00:00:00.000Z,
  Status: 'Active' }
{ _id: 'arosencwaigi',
  DoctorUserName: 'arosencwaigi',
  FirstName: 'Rici',
  MiddleName: null,
  LastName: 'Braam',
  Doctor_License_ID: '47-070-7222',
  Gender: 'f',
  Specialty: 'General',
  ConsultationCost: Decimal128("314.00"),
  RegisteredDate: 2021-05-14T00:00:00.000Z,
  Status: 'Active' }
```

Query Results (Pyae Sone)

3. Finding number of patients registered with Passport

```
< { _id: 'Passport', PatientsList: 49 }
```

4. Number of appointments on the first week of September

```
{ _id: { Date: 2021-09-01T08:51:14.000Z }, NumOfPatients: 1 }
{ _id: { Date: 2021-09-01T17:03:10.000Z }, NumOfPatients: 1 }
{ _id: { Date: 2021-09-01T19:45:14.000Z }, NumOfPatients: 1 }
```

5. Number of prescribed patients in each month

```
{ _id: { month: 1 }, PrescribedPatients: 9 }
{ _id: { month: 2 }, PrescribedPatients: 3 }
{ _id: { month: 3 }, PrescribedPatients: 9 }
```

Operation Results (Tanapat Samakit)

1. Update Status of an appointment after the appointment have been done

```
db.Appointment.update({A ID: "A0004"},{ $set: {Status:"Done"}})
```

```
_id: ObjectId("616f8a0a30e098a0f02162f9")
A_ID: "A0004"
D_ID: "arace4"
P_ID: "dfairleigh2i"
> Detail_Remarks: Array
CreatedAt: "2021-08-15"
UpdatedAt: "2021-08-17"
A_Date: "2021-08-25"
Status: "Done"
```

2. Update Patient weight and Height

```
db.Patient.update({PatientUserName: "aacland2"},{ $set: {Height:164.13, Weight:47.0}})
```

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

Operation Results (Tanapat Samakit)

3. Insert new Patient into the "Patient" collection

```
_id: ObjectId("61809f9c63b2db701aaddcbd")
PatientUserName: "IamPatient"
FirstName: "PatientMan"
MiddleName: null
LastName: "Sukserm"
IdentityCard: "117-55874-55"
IdentityCardType: "National ID"
DOB: 1996-10-10T00:00:00.000+00:00
Gender: "m"
Weight: 85
Height: 180
Mobile: "090-555-4251"
Address: "Home"
UpdatedDate: 2021-11-02T02:17:00.297+00:00
```

```
db.Patient.insertOne({{
    "PatientUserName": "IamPatient",
    "FirstName": "PatientMan",
    "MiddleName": null,
    "LastName": "Sukserm",
    "IdentityCard": "117-55874-55",
    "IdentityCardType": "National ID",
    "DOB": new Date('1996-10-10'),
    "Gender": "m",
    "Weight": 85,
    "Height": 180,
    "Mobile": "090-555-4251",
    "Address": "Home",
    "UpdatedDate": new Date()
}})
```

4. Remove Missed Appointments which have no update within 2021

```
db.Appointment.remove({Status:"Missed", UpdateDate:{$lt:ISODate('2021-01-01')}})
```

```
{ acknowledged: true, deletedCount: 0 }
```

Query Results (Tanapat Samakit)

1. Patients' genders Ratio Report

```
{ total: 102,
  total_m: 39,
  total_f: 44,
  Ratio_m: 38.23529411764706,
  Ratio_fm: 43.13725490196079 }
```

2. Check Number of Medicines that served the most(Excluding no medicine served)

```
< { _id: 'ANTIBACTERIAL WIPES Fresh Aloe', NumberOfPayment: 4 }
  { _id: 'Cinnamon Spice Antibacterial Foaming Hand Wash',
    NumberOfPayment: 4 }
  { _id: 'COUGH AND COLD NIGHTTIME FORMULA KIDS RELIEF',
    NumberOfPayment: 3 }
  { _id: 'HYZAAR', NumberOfPayment: 3 }
  { _id: 'Triadine', NumberOfPayment: 3 }
  { _id: 'Hydrocodone Bitartrate and Acetaminophen',
```

3. Number of Doctors in each specialty

```
{ _id: 'Pediatrics', NumberOfDoctor: 8 }
{ _id: 'General', NumberOfDoctor: 12 }
```

4. Number of Doctors who are still on duty

```
{ _id: 'Active', NumberOfDoctor: 10 }
```

Query Results (Tanapat Samakit)

5. Total Income for each month

{ _id: { year: 2021, month: 9 },
  ToalMedPrice: Decimal128("162.00"),
  ServiceCharge: Decimal128("200.00"),
  TotalIncome: Decimal128("362.00") }
{ _id: { year: 2021, month: 8 },
  ToalMedPrice: Decimal128("1041.00"),
  ServiceCharge: Decimal128("500.00"),
  TotalIncome: Decimal128("1541.00") }
{ _id: { year: 2021, month: 7 },
  ToalMedPrice: Decimal128("4060.00"),
  ServiceCharge: Decimal128("900.00"),
  TotalIncome: Decimal128("4960.00") }
{ _id: { year: 2021, month: 6 },
  ToalMedPrice: Decimal128("2921.00"),
  ServiceCharge: Decimal128("900.00"),
  TotalIncome: Decimal128("3821.00") }
{ _id: { year: 2021, month: 5 },
  ToalMedPrice: Decimal128("2456.00"),
  ServiceCharge: Decimal128("1100.00"),
  TotalIncome: Decimal128("3556.00") }
{ _id: { year: 2021, month: 4 },
  ToalMedPrice: Decimal128("2946.00"),
  ServiceCharge: Decimal128("700.00"),
  TotalIncome: Decimal128("3646.00") }

Operation Results (Saima Ashraf)

1. Insert new work schedule

```
> db.Work_schedule.insertOne({"_id":151,"ScheduleId":151,"DoctorID":"kusheng",
  "WorkStart":ISODate("2021-10-10T10:00:00.000Z"),
  "WorkEnd":ISODate("2021-10-10T12:00:00.000Z"),"Remark":null});
< { acknowledged: true, insertedId: 151 }
```

```
_id: 151
ScheduleId: 151
DoctorID: "kusheng"
WorkStart: 2021-10-10T10:00:00.000+00:00
WorkEnd: 2021-10-10T12:00:00.000+00:00
Remark: null
```

2. Insert new payment

```
> db.Payment.insertOne({"_id":101,"Id":101,"PatientID":"bterren1w",
  "DoctorID":"ddjokovich","CashierName":"Nott",
  "medicine":{"MedicineId":NumberDecimal("10"),"Name":"ANTIBACTERIAL WIPES Fresh Aloe",
  "Unit":5,"PricePerUnit":NumberDecimal("50.00")},"ServiceCharge":NumberDecimal("100.00"),
  "PaymentMethod":"QR scan","Remark":null,"IssuedDate":ISODate("2020-10-26T00:00:00.000Z")
  });
< { acknowledged: true, insertedId: 101 }
```

```
_id: 101
Id: 101
PatientID: "bterren1w"
DoctorID: "ddjokovich"
CashierName: "Nott"
medicine: Object
   MedicineId: 10
   Name: "ANTIBACTERIAL WIPES Fresh Aloe"
   Unit: 5
   PricePerUnit: 50.00
ServiceCharge: 100.00
PaymentMethod: "QR scan"
Remark: null
IssuedDate: 2020-10-26T00:00:00.000+00:00
```

Operation Results (Saima Ashraf)

3. Update appointment status and remarks

```
> db.Appointment.updateOne({"_id" : 24},
{$set : {"Remark" : "Urgent meeting of Doctor" , "Status" : "Cancelled"}}
);
< { acknowledged: true,
    insertedId: null,
    matchedCount: 1,
    modifiedCount: 1,
    upsertedCount: 0 }
```

```
_id: 24
ID: 24
PatientID: "gedlestonek"
DoctorID: "cfloweth3"
ScheduleId: 24
Detail: null
Status: "Cancelled"
Remark: "Urgent meeting of Doctor"
AppoitmentDate: 2021-09-05T13:58:34.000+00:00
Created/Changed_At: 2021-08-29T06:40:19.000+00:00
```

4. Update patient's mobile number

```
> db.Patient.updateOne(
    {"PatientUserName" : "iglencorses" },
    {
    $set: {
      Mobile: "333-496-2152"
    }}
);
< { acknowledged: true,
    insertedId: null,
    matchedCount: 1,
    modifiedCount: 1,
    upsertedCount: 0 }
```

```
_id: ObjectId("617b729f4ca0b047596e9e24")
PatientUserName: "iglencorses"
FirstName: "Brandy"
MiddleName: null
LastName: "Wanell"
IdentityCard: "226-22-9726"
IdentityCardType: "Passport"
DOB: 1970-08-13T17:00:00.000+00:00
Gender: "f"
Weight: 96.70
Height: 144.79
Mobile: "333-496-2152"
Address: "72181 Morning Drive"
UpdatedDate: 2021-02-13T00:00:00.000+00:00
```

Query Results (Saima Ashraf)

1. Total number of appointments by the doctor's gender who is active on duty.

```
< { _id: 'f', totalAppointment: 5 }
  { _id: 'm', totalAppointment: 6 }
```
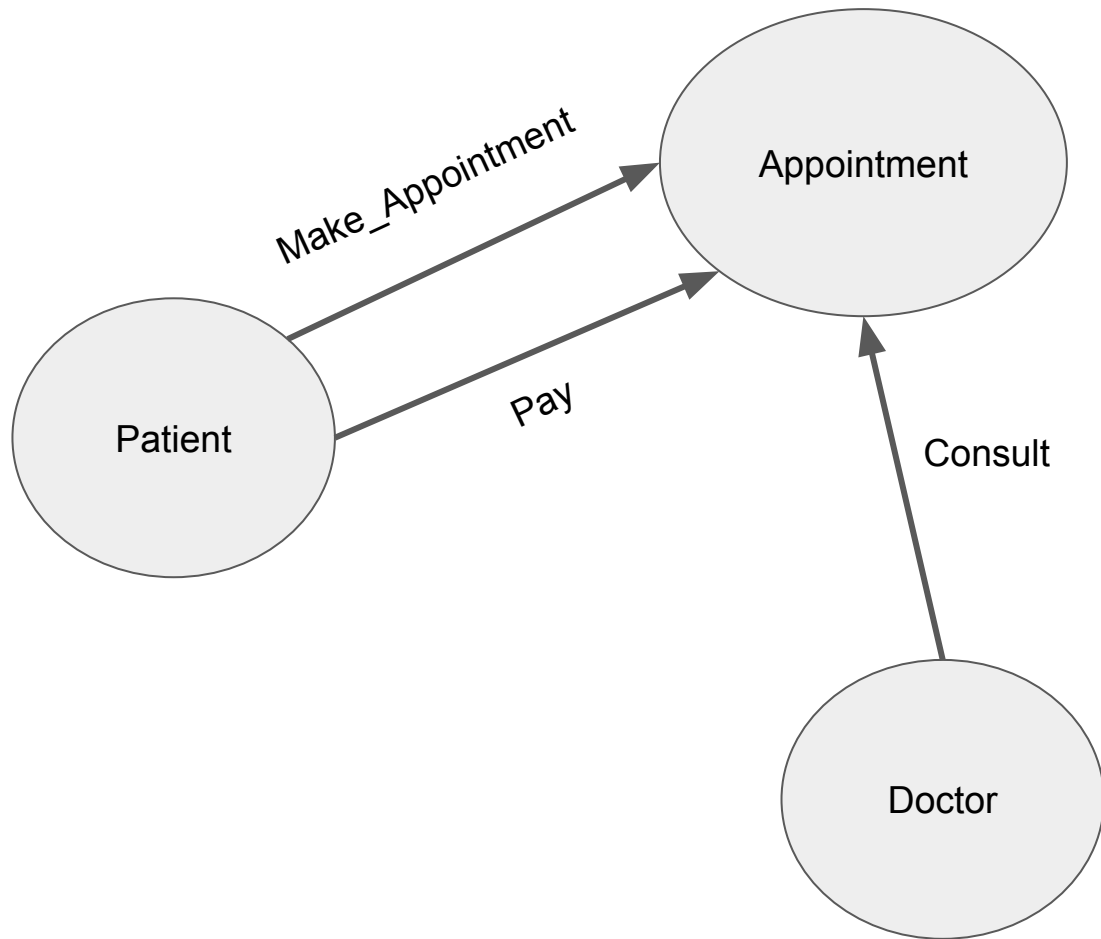
2. Price per Unit of each medicine

```
{ _id: 'HEADACHE/MIGRAINE RELIEF', Price: Decimal128("44.00") }
{ _id: 'HYZAAR', Price: Decimal128("117.00") }
{ _id: 'Lobelia Inflata', Price: Decimal128("1.00") }
{ _id: 'Oxygen', Price: Decimal128("89.00") }
{ _id: 'Metoprolol Tartrate', Price: Decimal128("198.00") }
```

3. Top 3 doctors who has done highest number of consultation in 2021

```
{ _id: 'mmolines0', Total_Consultation_Done: 8 }
{ _id: 'ecraig2', Total_Consultation_Done: 7 }
{ _id: 'jhenrych6', Total_Consultation_Done: 5 }
```

5. Information about doctors who registered in 2021

```
{ _id: 'mtomashov8',
  DoctorUserName: 'mtomashov8',
  FirstName: 'Sandro',
  LastName: 'Evered',
  Doctor_License_ID: '63-163-1928',
  Gender: 'm',
  ConsultationCost: Decimal128("1643.00"),
  RegisteredDate: 2021-05-25T00:00:00.000Z }
{ _id: 'tingerfieldj',
  DoctorUserName: 'tingerfieldj',
  FirstName: 'Mommy',
  LastName: 'Keyzman',
  Doctor_License_ID: '97-911-6105',
  Gender: 'm',
  ConsultationCost: Decimal128("1226.00"),
  RegisteredDate: 2021-04-03T00:00:00.000Z }
```

4. Total number of Appointments group by month

```
{ _id: 8, totalAppointment: 12 }
{ _id: 9, totalAppointment: 127 }
{ _id: 10, totalAppointment: 2 }
```

Graph Model Design

Maintained Data & Data Constraints

Node:
1. **Patient information:** Patient Username, First Name, LastName, Identity Card, Identity Card Type, Date of Birth (DOB), Gender, Weight, Height, Mobile, Address, Updated Date
2. **Doctor information:** Doctor Username, First Name, LastName, Doctor-License ID, Gender, Specialty, Consultation Cost, Registered Date, Status
3. **Appointment: A_ID,** PatientID, DoctorID, Status, Appointment date, Appointment Detail

Relations to Appointment Node:
1. **Consult (from Doctor to Appointment):** ConsultID, Symptom, Consultation Detail, Prescription, ConsultationDate
2. **Pay (from Patient to Appointment)**: PaymentID, Consultation Fee, Service Charge, Medicine Name, Unit, Price per unit, Payment Method, Cashier Name, IssuedDate
3. **Make_Appointment (from Patient to Appointment):** Created Date

Operations & Transactions

Registration

- Insert new doctor
- Insert new Patient
- Update the status of a doctor when the doctor resigned
- Update the last name (surname) of a female doctor who is still active.
- Update speciality of a doctor
- Update DoctorUserName
- Update PatientUserName
- Update weight of a Patient
- Update Height of patient
- Update patient's mobile number

Operations & Transactions

Appointment

- Create new node of an appointment
- Create new make_appointment relation between an appointment and patient nodes.
- Update content in detail description of appointment
- Update Appointment date
- Update Status of an appointment after the appointment done
- Remove Missed Appointments which made before 2021
- Update appointment status

Consultation

- Update consultation cost of a doctor
- Create new consult edge between an appointment and doctor

Payment

- Insert new payment

Important data inquiries & reports

1. Total number of consultation of each doctor and their speciality and fee of them
2. Name and units of medicine bought, total cost and payment method by a patient
3. Patients' names, age, gender and their symptom that are consulted after August 2021
4. Contact Information of foreigners registered as patients
5. The information of the doctors who resigned.
6. Average weight and height of patient followed by gender
7. Patients who have higher risk to sick from abnormal weight (weight < 40 or weight > 95)
8. Number of patients who update their profile in each month in 2021
9. All appointment that each doctor, who is 'Active', took care of
10. Total cost from each payment method
11. Finding doctors who specialize in General
12. Sorting patients with gender
13. Finding number of patients registered with ID type
14. Number of appointments on the first week
15. List of prescribed medications

Important data inquiries & reports

16. Number of Doctors in each specialty
17. Generate Gender Ratio of current Patients
18. Check How many Doctors are still on Duty
19. Total Income for each month
20. Check Number of Medicines that served the most(Excluding no medicine served)
21. Total number of appointments by the doctor's gender who is active on duty.
22. Total number of Appointments group by month
23. Price Per Unit of each Medicine
24. Information about doctors who registered in 2021

Operation Results (Min Khant Soe)

1. **Update consultation cost of a doctor**

```
MATCH (d:Doctor {DoctorUserName: "arace4"})
SET d.ConsultationCost = "2000"
RETURN d
```

Before

```
 "properties": {
"Specialty": "General",
"Status": "Active",
"DoctorUserName": "arace4",
"FirstName": "Garrett",
"Doctor_License_ID": "98-144-2196",
"RegisteredDate": "2021-05-08T00:00:00Z",
"Gender": "f",
"LastName": "Wyatt",
"ConsultationCost": 1682.0
```

After

```
   "properties": {
 "Specialty": "General",
 "Status": "Active",
 "DoctorUserName": "arace4",
 "FirstName": "Garrett",
 "Doctor_License_ID": "98-144-2196",
 "RegisteredDate": "2021-05-08T00:00:00Z"
 "Gender": "f",
 "LastName": "Wyatt",
 "ConsultationCost": "2000"
```

Operation Results (Min Khant Soe)

2. Update the status of a doctor when the doctor resigned

```
MATCH (d:Doctor {DoctorUserName: "arace4"})
SET d.Status = "Resigned"
RETURN d
```

Before

```
  "properties": {
"Specialty": "General",
"Status": "Active",
"DoctorUserName": "arace4",
"FirstName": "Garrett",
"Doctor_License_ID": "98-144-2196",
"RegisteredDate": "2021-05-08T00:00:00Z",
"Gender": "f",
"LastName": "Wyatt",
"ConsultationCost": "2000"
```

After

```
  "properties": {
"Status": "Resigned",
"Specialty": "General",
"DoctorUserName": "arace4",
"FirstName": "Garrett",
"Doctor_License_ID": "98-144-2196",
"RegisteredDate": "2021-05-08T00:00:00Z",
"Gender": "f",
"LastName": "Wyatt",
"ConsultationCost": "2000"
  }
```

Operation Results (Min Khant Soe)

3. Update the last name (surname) of a female doctor who is still active.

```
MATCH (d:Doctor {DoctorUserName: 'arosencwaigi'})
SET d.LastName = "Johnson"
RETURN d
```

Before

  "properties": {
"Specialty": "General",
"Status": "Active",
"DoctorUserName": "arosencwaigi",
"FirstName": "Rici",
"Doctor_License_ID": "47-070-7222",
"RegisteredDate": "2021-05-14T00:00:00Z",
"LastName": "Braam",
"Gender": "f",
"ConsultationCost": 314.0
  }

After

  "properties": {
"Specialty": "General",
"Status": "Active",
"DoctorUserName": "arosencwaigi",
"FirstName": "Rici",
"Doctor_License_ID": "47-070-7222",
"LastName": "Johnson",
"RegisteredDate": "2021-05-14T00:00:00Z",
"Gender": "f",
"ConsultationCost": 314.0
  }

Operation Results (Min Khant Soe)

4. Create new make_appointment relation between an appointment and patient nodes

```
MATCH (a:Appointment), (p:Patient)
Where a.A_ID = "144" AND a.PatientID = "hhuc1t" AND a.DoctorID = "cfloweth3" AND
p.PatientUserName = "hhuc1t"
create (p)-[ma:make_appointment {A_Date: datetime(a.A_Date)}]->(a)
return p, a
```

Query Results (Min Khant Soe)

1. **Total number of consultation of each doctor and their speciality and fee of them**

match (d)-[c : consult]->(a)
where a.DoctorID = d.DoctorUserName
return d.DoctorUserName , d.Specialty, d.ConsultationCost, count(*)

d.DoctorUserName	d.Specialty	d.ConsultationCost	count(*)
"kgrococka"	"General"	1862.0	1
"mlawleee"	"General"	1796.0	1
"sbiddiss9"	"Pediatrics"	1613.0	1

Query Results (Min Khant Soe)

2. Name and units of medicine bought, total cost and payment method by a patient

```
match (p)-[mp : pay]->(a), (d:Doctor)
where p.PatientUserName = 'gmoffattr' AND p.PatientUserName = a.PatientID AND
d.DoctorUserName = a.DoctorID
return p.PatientUserName, mp.MedicineName, mp.PaymentMethod,
apoc.convert.toInteger(mp.MedicinePricePerUnit)*apoc.convert.toInteger(mp.MedicineUnit) +
apoc.convert.toInteger(d.ConsultationCost) + apoc.convert.toInteger(mp.ServiceCharge) as
Total_amount_of_Payment
```

p.PatientUserName	mp.MedicineName	mp.PaymentMethod	Total_amount_of_Payment
"gmoffattr"	"Ropinirole Hydrochloride"	"Bank Transfer"	996

Query Results (Min Khant Soe)

3. Patients' names, age, gender and their symptom that are consulted after August 2021

match (d)-[c : consult]->(a), (p:Patient)
where p.PatientUserName = a.PatientID AND d.DoctorUserName = a.DoctorID AND
datetime(c.ConsultationDate) >= datetime('2021-08-01T00:00:00Z')
return d,c,a
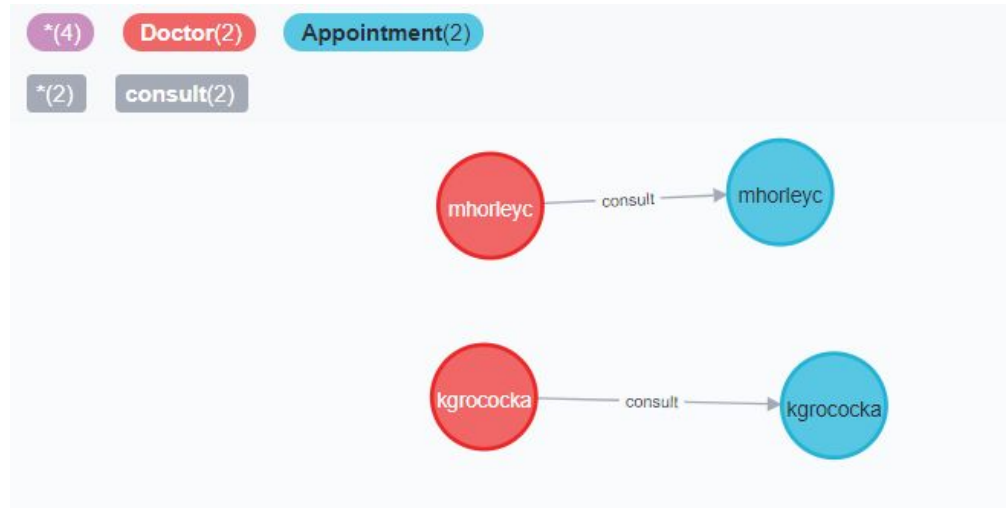
Query Results (Min Khant Soe)

4. Contact Information of foreigners registered as patients

match (p:Patient)
where p.IdentityCardType = 'Passport'
return p.PatientUserName,p.FirstName, p.LastName, p.IdentityCardType, p.IdentityCard, p.Mobile, p.Address

p.PatientUserName	p.FirstName	p.LastName	p.IdentityCardType	p.IdentityCard	p.Mobile	p.Address
"amccurdy1f"	"Norris"	"Texton"	"Passport"	"139-70-8797"	"392-538-2610"	"789 Bunting Lane"
"aschulze24"	"Lonnie"	"Worsalls"	"Passport"	"654-30-0953"	"189-600-0546"	"9 Lakeland Road"
"avaissierev"	"Jerry"	"Earpe"	"Passport"	"829-49-4022"	"319-386-8866"	"18931 Michigan Hill"

Query Results (Min Khant Soe)

5. The information of the doctors who resigned.

match (d:Doctor)
where d.Status = 'Resigned'
return d.DoctorUserName, d.FirstName, d.LastName, d.Specialty, d.Doctor_License_ID, d.Status

d.DoctorUserName	d.FirstName	d.LastName	d.Specialty	d.Doctor_License_ID	d.Status
"cathersmithf"	"Maribel"	"Devin"	"General"	"58-084-6617"	"Resigned"
"cfloweth3"	"Aymer"	"McCreedy"	"Pediatrics"	"64-746-1848"	"Resigned"
"dfurtado1"	"Terrell"	"Klarzynski"	"Pediatrics"	"09-574-9880"	"Resigned"
"ecraig2"	"Griffith"	"Secombe"	"Pediatrics"	"99-511-6650"	"Resigned"

Operation Results (Pranpreya Samasutthi)

1. Create new doctor

```
CREATE (d:Doctor {DoctorUserName:
"Captain1234", FirstName: "Captain",
MiddleName: null, LastName: "America",
Doctor_License_ID: "85-456-891", Gender:
"m", Specialty: "General", ConsultationCost:
toFloat('500.00'), Status: "Active",
RegisteredDate: datetime()})

return d;
```
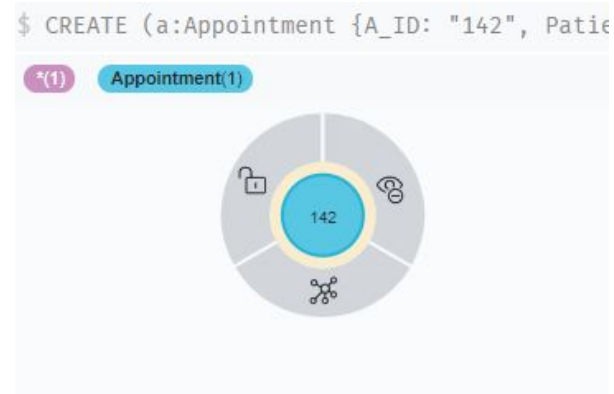

2. Create new node of an appointment

```
CREATE (a:Appointment {A_ID: "142", PatientID:
"thornungb", DoctorID: "mhorleyc", Symptom:
"Headache", A_Detail: "Quisque erat eros, viverra
eget, congue eget, semper rutrum, nulla. Nunc
purus. Phasellus in felis.", A_Date: datetime(),
A_status: "Waiting"})

return a;
```
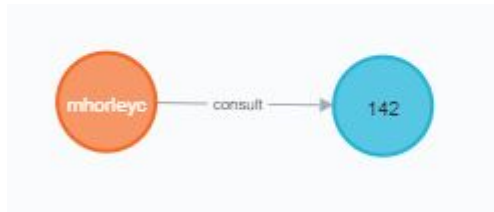
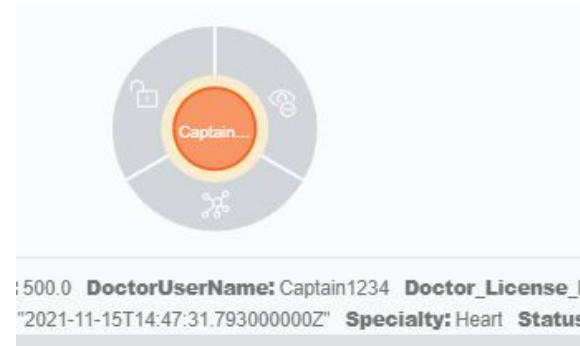# Operation Results (Pranpreya Samasutthi)

3. Create new consult edge between an appointment and doctor

```
MATCH (a:Appointment),(d:Doctor)
Where a.PatientID = "thornungb" AND a.DoctorID =
"mhorleyc" AND d.DoctorUserName = "mhorleyc"
CREATE (d)-[c : consult {ConsultID: "103",
ConsultationDetail: "Replacement of Left Lower
Femur with Nonautologous Tissue Substitute,
Percutaneous Endoscopic Approach", Prescription:
"Allegra Cooling Relief Anti-Itch",
ConsultationDate: datetime()}]->(a)
return a,d;
```


4. Update speciality of a doctor

```
MATCH (d:Doctor {DoctorUserName: "Captain1234"})
SET d.Specialty = "Heart"
RETURN d
```


: 500.0 **DoctorUserName:** Captain1234 **Doctor_License_**
"2021-11-15T14:47:31.793000000Z" **Specialty:** Heart **Status**

Query Results (Pranpreya Samasutthi)

1. Average weight and height of patient followed by gender

```
MATCH (p:Patient)
RETURN CASE p.Gender
 WHEN 'm'  THEN 'Male'
 WHEN 'f' THEN 'Female'
 ELSE 'Unknown'
END  AS Gender,avg(p.Weight) AS Weight, avg(p.Height) AS Height
```

MATCH (p:Patient) RETURN CASE p.Gender WHEN 'm' THEN 'Male' WHEN 'f' THEN 'Female' ELSE 'Unknown' END AS Gender,avg(p.Weight) AS Weight, avg(p.He

Gender	Weight	Height
"Male"	68.98358974358973	178.0020512820513
"Unknown"	70.67842105263156	176.02947368421053
"Female"	63.83372093023261	176.05372093023257

2. Patients who have higher risk to sick from abnormal weight (weight < 40 or weight > 95)

```
MATCH (p:Patient)
Where p.Weight < 40 or p.Weight > 95
RETURN p.PatientUserName, p.Weight
```
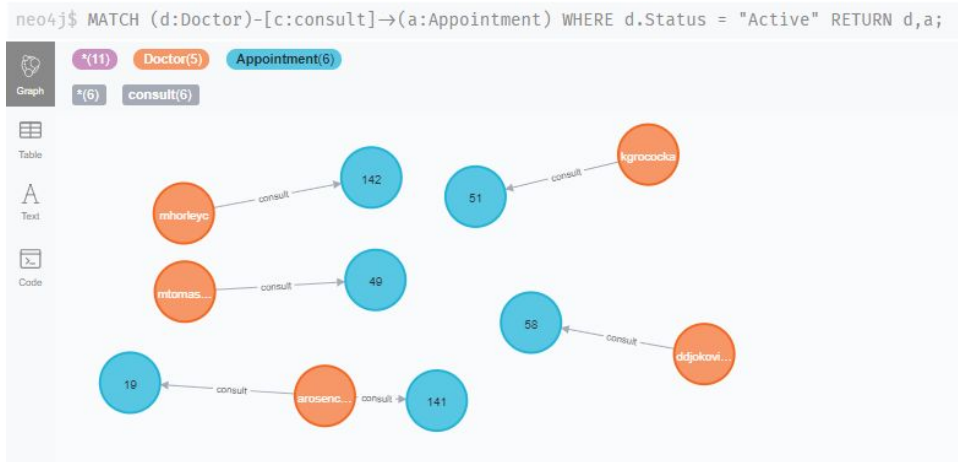
neo4j$ MATCH (p:Patient) Where p.Weight < 40 or p.Weight > 95 RETURN p.PatientUserName, p.Weight

	p.PatientUserName	p.Weight
1	"aschulze24"	95.53
2	"avaissierev"	37.52
3	"bgelletlyq"	97.0

Query Results (Pranpreya Samasutthi)

3. **All appointment that each doctor, who is 'Active', took care of**

```
MATCH (d:Doctor)-[c:consult]->(a:Appointment)
WHERE d.Status = "Active"
RETURN d,a;
```

Query Results (Pranpreya Samasutthi)

4. **Number of patients who update their profile in each month in 2021**

```
MATCH (p:Patient)
WHERE p.UpdatedDate >= datetime("2021-01-01") AND p.UpdatedDate <= datetime("2021-12-31")
RETURN apoc.temporal.format(p.UpdatedDate, "MMMM") AS Month, count(p.PatientUserName) AS
NoOfPatient
```

neo4j$ MATCH (p:Patient) WHERE p.UpdatedDate ≥ datetime("2021-01-01") AND p.UpdatedDate ≤ datetime("2021-12-31") RETURN apo

Month	NoOfPatient
"January"	10
"May"	8
"August"	12

Query Results (Pranpreya Samasutthi)

5.   Total cost from each payment method

```
MATCH (p:Patient)-[pa:pay]->(a:Appointment)
 RETURN CASE pa.PaymentMethod
 WHEN 'QR scan'  THEN 'QR scan'
 WHEN 'Bank Transfer' THEN 'Bank Transfer'
END AS
PaymentMethod,sum((toFloat(pa.MedicinePricePerUnit)*toFloat(pa.MedicineUnit
))+toFloat(pa.ServiceCharge)) as totalCost
```

neo4j$ MATCH (p:Patient)-[pa:pay]→(a:Appointment) RETURN CASE pa.PaymentMethod WHEN 'QR scan' THEN 'QR scan' WHEN 'Bank Transfer' TH

	PaymentMethod	totalCost
1	"QR scan"	3864.0
2	"Bank Transfer"	1582.0

Operation Results (Pyae Sone)

1. Update DoctorUserName

```
MATCH (d:Doctor {FirstName: "Bowie"})

SET d.DoctorUserName = "qwertydmm"

RETURN d
```


Doctor **<id>:** 556 **ConsultationCost:** 725.0 **DoctorUserName:** qwertydmm **Doctor_License_ID:** 50-230-2478 **FirstName:** Bowie **Specialty:** General **Status:** Resigned

2. Update PatientUserName

```
MATCH (d:Doctor {FirstName: "Bowie"})

SET d.DoctorUserName = "qwertydmm"

RETURN d
```


Patient **<id>:** 457 **Address:** 839 Arkansas Court **DOB:** "1990-01-20" **FirstName:** De **Mobile:** 484-272-8607 **PatientUserName:** dedeqee **UpdatedDate:** "2021-08-31T00:00

Operation Results (Pyae Sone)

3. Update content in detail description of appointment

```
MATCH (n:Appointment {A_ID:"26"})

SET n.A Detail = 'fjdskgfdsjkeuih
```


Appointment **<id>:** 4 **A_Date:** "2021-09-07T03:42:00Z" **A_Detail:** fjdskgfdsjkeuih fhdsjkfhds gwovcjpds **A_ID:** 26
Symptom: Left temporomandibular joint disorder, unspecified

4. Update Appointment date

```
MATCH (n:Appointment {A_ID:"26"})

SET n.A_Date = '2021-10-07T03:42:00Z'

RETURN n
```


Appointment **<id>:** 4 **A_Date:** 2021-10-07T03:42:00Z **A_Detail:** fjdskgfdsjkfhds fhdsjkfhds gwo

Query Results (Pyae Sone)

1. Finding doctors who specialize in General

```
MATCH (d:Doctor)

where d.Specialty = "General"

RETURN d.DoctorUserName
```

MATCH (d:Doctor) where d.Specialty = "General" RETURN d.DoctorUserName

d.DoctorUserName"
arace4"
arosencwaigi"
bcantero5"
cathersmithf"
ddjokovich"
jhenrych6"
kgrococka"
mlawleee"
qwertydmm"
mtomashov8"
sfeaviourb"
tingerfieldj"

Query Results (Pyae Sone)

2. Sorting patients with gender

```
Match (p:Patient)
Return Case p.Gender
When 'm' Then 'Male'
When 'f' Then 'Female'
End As Gender, count(p) As No
```

"Gender"	"No"
"Male"	39
null	19
"Female"	43

3. Finding number of patients registered with ID type

```
MATCH (p:Patient)
RETURN p.IdentityCardType,count(p)
```

"p.IdentityCardType"	"count(p)"
"National ID"	52
"Passport"	49

Query Results (Pyae Sone)

4. Number of appointments on the first week of October

```
MATCH (a:Appointment)

Where a.A_Date = '2021-10-01T03:42:00Z'

or a.A_Date = '2021-10-07T03:42:00Z'

RETURN a.A_ID, count(a) As No
```

"a.A_ID"	"No"
"26"	1

Query Results (Pyae Sone)

5. List of prescribed medications

```
MATCH (n) WHERE EXISTS(n.Prescription)

RETURN DISTINCT "node" as entity,
n.Prescription AS Prescription LIMIT 25 UNION
ALL

MATCH ()-[r]-() WHERE EXISTS(r.Prescription)

RETURN DISTINCT "prescribed" AS entity,
r.Prescription AS Prescription LIMIT 25
```

"entity"	"Prescription"
"prescribed"	"Quflora Pediatric"
"prescribed"	"Lactated Ringers"
"prescribed"	"Platinum for Men"
"prescribed"	"Fresh Soy Moisturizing SPF 20"
"prescribed"	"Vermocks"
"prescribed"	"Ropinirole Hydrochloride"
"prescribed"	"Allegra Cooling Relief Anti-Itch"
"prescribed"	"Conquest"
"prescribed"	"Meloxicam"

Operation Results (Tanapat Samakit)

1. Update Status of an appointment after the appointment done

```
MATCH (n:Appointment {A_ID:"130"}) SET n.A_status =
'Completed'
RETURN n
```


vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae, t
sapien non mi. Integer ac neque. Duis bibendum.

A_ID: 130 **A_status:** Completed **DoctorID:** sbiddiss9 **PatientID:** iglencorses

Operation Results (Tanapat Samakit)

2. Insert new Patient

```
CREATE (p:Patient {PatientUserName: 'IamTester',
FirstName: 'Testing', MiddleName: null, LastName:
'Surname', IdentityCard:
'125-666-15152',IdentityCardType: 'National ID',
DOB: date('1996-08-09'), Gender: 'm', Weight:
toFloat('83.2'), Height:toFloat('177'), Mobile:
'090-999-8697', Address: 'Home', UpdatedDate:
datetime() })
```
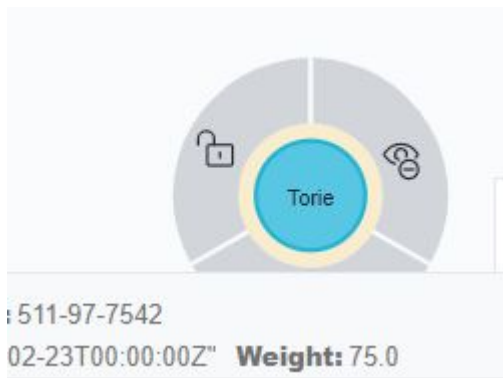
Operation Results (Tanapat Samakit)

3. Update weight of a Patient

```
MATCH (n:Patient {PatientUserName:'dbladesmithf'})
SET n.Weight = toFloat('75')
RETURN n
```



```
511-97-7542
02-23T00:00:00Z"  Weight: 75.0
```

4. Remove Missed Appointments which made before 2021

```
MATCH (n:Appointment {A_status:'Missed'} )
WHERE date(n.A_Date)<date('2021-01-01')
DETACH DELETE n
```

Deleted 1 node, deleted 1 relationship, completed after 8 ms.

Query Results (Tanapat Samakit)

1. **Number of Doctors in each specialty**

```
MATCH (n:Doctor) RETURN n.Specialty,count(n)
```

"n.Specialty"	"count(n)"
"Heart"	1
"General"	12
"Pediatrics"	8

2. **Generate Gender Ratio of current Patients**

```
MATCH (n:Patient) RETURN CASE n.Gender
  WHEN 'm'  THEN 'Male'
  WHEN 'f' THEN 'Female'
  ELSE 'Unknown'
END  AS Gender,count(n) AS NumberOfPatients
ORDER BY Gender
```

"Gender"	"NumberOfPatients"
"Female"	43
"Male"	39
"Unknown"	19

Query Results (Tanapat Samakit)

3.   Check How many Doctors are still on Duty

```
MATCH (n:Doctor) RETURN n.Specialty,count(n)
```

"Status"	"count(n)"
"Active"	11
"Resigned"	10

4.   Total Income for each month

```
MATCH p=()-[r:pay]->() RETURN r.P_IssuedDate.year AS Year,
r.P_IssuedDate.month AS Month,sum(toFloat(r.ServiceCharge)+
(toFloat(r.MedicinePricePerUnit)*toFloat(r.MedicineUnit))) AS TotalIncome
ORDER BY Year DESC, Month DESC
```

"Year"	"Month"	"TotalIncome"
2021	9	802.0
2021	7	256.0
2021	5	514.0
2021	1	520.0
2020	12	1060.0
2020	11	1232.0
2020	10	380.0
2020	9	682.0

Query Results (Tanapat Samakit)

5.   Check Number of Medicines that served the most(Excluding no medicine served)

```
MATCH p=()-[r:pay]->() RETURN r.MedicineName AS MedicineName ,
sum(toInteger(r.MedicineUnit)) AS NumberOfMedicine
ORDER BY NumberOfMedicine DESC
```

"MedicineName"	"NumberOfMedicine"
"Lactated Ringers"	20
"Platinum for Men"	15
"Quflora Pediatric"	15
"Conquest"	14
"Paracetamol 10 Units"	13
"Vermocks"	12
"Ropinirole Hydrochloride"	6
"Meloxicam"	6
"Fresh Soy Moisturizing SPF 20"	3

Operation Results (Saima Ashraf)

1. **Update Height of patient**

```
MATCH (n:Patient
{PatientUserName:'bfarlambe4'}) SET
n.Height = toFloat('185')
RETURN n
```

Operation Results (Saima Ashraf)

2. Update appointment status

MATCH (n:Appointment {A_ID:"24"})

SET n.A_status = 'Cancelled'

RETURN n

Appointment **<id>:** 2 **A_Date:** "2021-09-05T13:58:00Z" **A_ID:** 24 **A_status:** Cancelled **DoctorID:** cfloweth3
PatientID: gedlestonek **Symptom:** Oth extrartic fracture of lower end of left radius, init

3. Update patient's mobile numb

MATCH (n:Patient
{PatientUserName:"iglencorses"})

SET n.Mobile = '333-496-2152'

RETURN n

Patient **<id>:** 484 **Address:** 72181 Morning Drive **DOB:** "1970-08-14" **FirstName:** Brandy **Gender:** f **Height:** 144.79
IdentityCard: 226-22-9726 **IdentityCardType:** Passport **LastName:** Wanell **Mobile:** 333-496-2152
PatientUserName: iglencorses **UpdatedDate:** "2021-02-13T00:00:00Z" **Weight:** 96.7
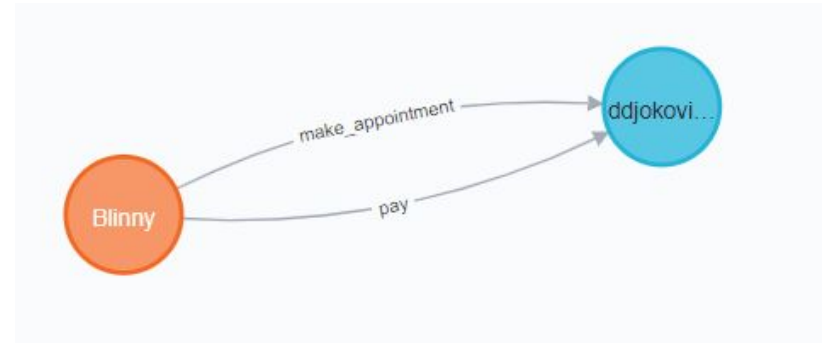
Operation Results (Saima Ashraf)

4. Insert new payment

Match (p:Patient), (a:Appointment), (d:Doctor)
where a.PatientID ="lmaddern1n" AND a.DoctorID = 'ddjokovich' AND a.PatientID = p.PatientUserName AND a.DoctorID = d.DoctorUserName AND a.A_ID = "18"

create (p)-[mp : pay {PaymentID: "130", ServiceCharge: "100", MedicineName: "Panadol", MedicineUnit: "7", MedicinePricePerUnit: "50", PaymentMethod: "QR Scan", CashierName: "Nott",P_IssuedDate: datetime('2021-09-09T02:09:00Z')}]->(a)

Return p, a;

Query Results (Saima Ashraf)

1. **Total number of appointments by the doctor's gender who is active on duty.**

Match (n:Doctor) where n.Status = 'Active'
Return Case n.Gender
When 'm' Then 'Male'
When 'f' Then 'Female'
End As Gender, count(n) As NoOfAppointments

"Gender"	"NoOfAppointments"
"Male"	7
"Female"	4

2. **Total number of Appointments group by month**

Match (n:Appointment)
return n.A_Date.month As Month, count(n) As TotalAppointments
Order by Month Asc

"Month"	"TotalAppointments"
8	12
9	128
11	1

Query Results (Saima Ashraf)

3. Price Per Unit of each Medicine

Match p=()-[r:pay]-> ()

Return r.MedicineName As MedicineName,
r.MedicinePricePerUnit As PricePerUnit

order by PricePerUnit Desc

"MedicineName"	"PricePerUnit"
"Ropinirole Hydrochloride"	"97"
"Meloxicam"	"69"
"Fresh Soy Moisturizing SPF 20"	"64"
"Platinum for Men"	"64"
"Paracetamol 10 Units"	"54"
"Lactated Ringers"	"42"
"Quflora Pediatric"	"28"
"Conquest"	"20"
"Vermocks"	"13"

Query Results (Saima Ashraf)

4. Information about doctors who registered in 2021

Match (n:Doctor) where n.RegisteredDate >=datetime("2021-01-01")

return n.DoctorUserName As DoctorName,n.Doctor_License_ID As LicenseID,

n.ConsultationCost As ConsultationCost, n.Status As Status,

n.RegisteredDate.Year As Year

"DoctorName"	"LicenseID"	"ConsultationCost"	"Status"	"Year"
"Captain1234"	"85-456-891"	500.0	"Active"	2021
"arace4"	"98-144-2196"	1682.0	"Active"	2021
"arosencwaigi"	"47-070-7222"	314.0	"Active"	2021
"bcantero5"	"78-052-3286"	1673.0	"Active"	2021
"cathersmithf"	"58-084-6617"	1376.0	"Resigned"	2021
"cfloweth3"	"64-746-1848"	1051.0	"Resigned"	2021
"ddjokovich"	"99-033-7026"	558.0	"Active"	2021
"dfurtado1"	"09-574-9880"	624.0	"Resigned"	2021

Query Results (Saima Ashraf)

5. Find the quantity of each Medicine bought by patients

Match p=()-[r:pay]-> ()
Return r.MedicineName As
MedicineName,count(r) As Qty

"MedicineName"	"Qty"
"Lactated Ringers"	1
"Vermocks"	1
"Fresh Soy Moisturizing SPF 20"	1
"Platinum for Men"	1
"Quflora Pediatric"	1
"Ropinirole Hydrochloride"	1
"Conquest"	1
"Meloxicam"	1
"Paracetamol 10 Units"	1
"Panadol"	2

Conclusion

Our project is best suited for Relational Database Management System since we have a well defined structured database. Comparing between Document and Graph models, Document model is a better choice for our project because Graph model have more limitations on the data management of our project.