HOSPITALMANAGEMENTSYSTEM MANAGEMENT – PYTHON CODING CHALLENGE:

By

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1. Create SQL Schema from the following classes class, use the class attributes for table column names.

```sql
CREATE DATABASE HospitalManagementSystem;
USE HospitalManagementSystem;

CREATE TABLE Patient (
    patientId INT PRIMARY KEY IDENTITY,
    firstName VARCHAR(255),
    lastName VARCHAR(255),
    dateOfBirth DATE,
    gender VARCHAR(1),
    contactNumber VARCHAR(15),
    address VARCHAR(255)
);

CREATE TABLE Doctor (
    doctorId INT PRIMARY KEY IDENTITY,
    firstName VARCHAR(255),
    lastName VARCHAR(255),
    specialization VARCHAR(255),
    contactNumber VARCHAR(15)
);

CREATE TABLE Appointment (
    appointmentId INT PRIMARY KEY IDENTITY,
    patientId INT,
    doctorId INT,
    appointmentDate DATETIME,
    description TEXT,
    FOREIGN KEY (patientId) REFERENCES Patient(patientId),
    FOREIGN KEY (doctorId) REFERENCES Doctor(doctorId)
);
SET IDENTITY_INSERT patient ON;

INSERT INTO Patient (patientId, firstName, lastName, dateOfBirth, gender, contactNumber, address)
VALUES
    (11, 'John', 'Doe', '1980-01-01', 'M', '1234567890', '123 Main St'),
    (12, 'Jane', 'Smith', '1985-05-15', 'F', '9876543210', '456 Elm St'),
    (13, 'Michael', 'Johnson', '1976-09-22', 'M', '5551234567', '789 Oak Ave'),
    (14, 'Emily', 'Brown', '1990-03-10', 'F', '5559876543', '101 Maple St'),
    (15, 'William', 'Wilson', '1982-07-08', 'M', '5552223333', '222 Pine St'),
    (16, 'Amanda', 'Taylor', '1988-11-30', 'F', '5554445555', '333 Cedar St'),
    (17, 'James', 'Anderson', '1975-04-18', 'M', '5556667777', '444 Birch St'),
    (18, 'Sarah', 'Martinez', '1995-06-25', 'F', '5558889999', '555 Willow St'),
    (19, 'Matthew', 'Hernandez', '1983-02-14', 'M', '5551112222', '666 Oak St'),
    (20, 'Jennifer', 'Garcia', '1978-08-20', 'F', '5553334444', '777 Elm St');
    SET IDENTITY_INSERT patient OFF;

SET IDENTITY_INSERT Doctor ON;

INSERT INTO Doctor (doctorId, firstName, lastName, specialization, contactNumber)
VALUES
    (11, 'Dr. Smith', 'Smithson', 'Cardiologist', '5551234567'),
    (12, 'Dr. Johnson', 'Johnsonson', 'Neurologist', '5559876543'),
    (13, 'Dr. Williams', 'Williamson', 'Dermatologist', '5551112222'),
    (14, 'Dr. Brown', 'Browner', 'Endocrinologist', '5553334444'),
    (15, 'Dr. Jones', 'Joneson', 'Gastroenterologist', '5555556666'),
    (16, 'Dr. Davis', 'Davison', 'Hematologist', '5557778888'),
    (17, 'Dr. Miller', 'Millerson', 'Nephrologist', '5559990000'),
    (18, 'Dr. Wilson', 'Wilsonson', 'Oncologist', '5552223333'),
    (24, 'Dr. Moore', 'Moorer', 'Ophthalmologist', '5554445555'),
    (25, 'Dr. Taylor', 'Taylorson', 'Orthopedic Surgeon', '5556667777');
    SET IDENTITY_INSERT Doctor OFF;

SET IDENTITY_INSERT Appointment ON;
INSERT INTO Appointment (appointmentId, patientId, doctorId, appointmentDate, description)
VALUES
    (11, 11, 11, '2024-03-20 09:00:00', 'Routine checkup'),
    (12, 12, 12, '2024-03-21 10:00:00', 'Follow-up appointment'),
    (13, 13, 13, '2024-03-22 11:00:00', 'Annual physical exam'),
    (14, 14, 14, '2024-04-03 11:00:00', 'Diabetes consultation'),
    (15, 15, 15, '2024-03-24 13:00:00', 'Arthiritis treatment'),
    (16, 16, 16, '2024-09-27 14:00:00', 'Hemodialysis'),
    (17, 17, 17, '2024-04-05 13:00:00', 'Allergy testing'),
    (18, 18, 18, '2024-03-27 16:00:00', 'Chemotherapy session'),
    (19, 19, 24, '2024-03-28 17:00:00', 'Eye surgery'),
    (20, 20, 25, '2024-04-13 09:00:00', 'Hemodialysis');
SET IDENTITY_INSERT Appointment OFF;
```

#Define `Patient` class with the following confidential attributes:

```python
class Patient:

   def __init__(self, patientId=None, firstName=None, lastName=None, dateOfBirth=None,
gender=None, contactNumber=None, address=None):

      self.patientId = patientId

      self.firstName = firstName

      self.lastName = lastName

      self.dateOfBirth = dateOfBirth

      self.gender = gender

      self.contactNumber = contactNumber

      self.address = address

   def getPatientId(self):

      return self.patientId

   def setPatientId(self, patientId):

      self.patientId = patientId



   def getFirstName(self):

      return self.firstName

   def setFirstName(self, firstName):

      self.firstName = firstName

   def getLastName(self):
        return self.lastName

    def setLastName(self, lastName):

        self.lastName = lastName

    def getDateOfBirth(self):

        return self.dateOfBirth

    def setDateOfBirth(self, dateOfBirth):

        self.dateOfBirth = dateOfBirth

    def getGender(self):

        return self.gender

    def setGender(self, gender):

        self.gender = gender

    def getContactNumber(self):

        return self.contactNumber

    def setContactNumber(self, contactNumber):

        self.contactNumber = contactNumber

    def getAddress(self):

        return self.address

    def setAddress(self, address):

        self.address = address

    def __str__(self):

return f"Patient ID: {self.patientId}, Name: {self.firstName} {self.lastName}, DOB:
{self.dateOfBirth}, Gender: {self.gender}, Contact: {self.contactNumber}, Address:
{self.address}"
```

#Define 'Doctor` class with the following confidential attributes:

```
class Doctor:

    def __init__(self, doctorId=None, firstName=None, lastName=None,
specialization=None, contactNumber=None):

        self.doctorId = doctorId

        self.firstName = firstName
        self.lastName = lastName
        self.specialization = specialization
        self.contactNumber = contactNumber
    def getDoctorId(self):
        return self.doctorId
    def setDoctorId(self, doctorId):
        self.doctorId = doctorId
    def getFirstName(self):
        return self.firstName
    def setFirstName(self, firstName):
        self.firstName = firstName
    def getLastName(self):
        return self.lastName
    def setLastName(self, lastName):
        self.lastName = lastName
    def getSpecialization(self):
        return self.specialization
    def setSpecialization(self, specialization):
        self.specialization = specialization
    def getContactNumber(self):
        return self.__contactNumber
    def setContactNumber(self, contactNumber):
        self.contactNumber = contactNumber
    def __str__(self):
        return f"Doctor ID: {self.doctorId}, Name: {self.firstName} {self.lastName},
Specialization: {self.specialization}, Contact: {self.contactNumber}"
```

#Appointment Class:

```
class Appointment:
    def __init__(self, appointmentId, patientId, doctorId, appointmentDate,
description):
        self.appointmentId = appointmentId
        self.patientId = patientId
        self.doctorId = doctorId
        self.appointmentDate = appointmentDate
        self.description = description
    def get_appointment_id(self):
        return self.appointmentId
    def set_appointment_id(self, appointmentId):
        self.__appointment_id = appointmentId

    def get_patient_id(self):
        return self.patientId
    def set_patient_id(self, patientId):
        self.patientId = patientId
    def get_doctor_id(self):
        return self.doctorId
    def set_doctor_id(self, doctorId):
        self.doctorId = doctorId
    def get_appointment_date(self):
        return self.appointmentDate
    def set_appointment_date(self, appointmentDate):
        self.appointmentDate = appointmentDate
    def get_description(self):
        return self.description
    def set_description(self, description):
        self.__description = description
    def __str__(self):
        return f"Appointment ID: {self.appointmentId}, Patient ID: {self.patientId}, 
Doctor ID: {self.doctorId}, Date: {self.appointmentDate}, Description: 
{self.description}"
```

#Define IHospitalManagementSystemService interface/abstract class with following #methods to interact with database Keep the interfaces and implementation classes in #package dao

#HOSPITALMANAGEMENTSYSTEM_SERVICEIMPL.

```
import pyodbc
import sys
import os
# Add parent directory of 'dao' to Python path
sys.path.append(os.path.abspath(os.path.join(os.path.dirname(__file__), '..')))
from dao.HospitalManagementSystem_service import IHospitalManagementSystemService
class HospitalManagementSystemServiceImpl(IHospitalManagementSystemService):
    def __init__(self):
        self.connection_string = self.get_connection_string()
        self.connection = pyodbc.connect(self.connection_string)
        self.cursor = self.connection.cursor()
    def get_connection_string(self):
        server_name = "SRIDHAR/LOCALHOST"
        database_name = "HospitalManagementSystem_Management"
        trusted_connection = "yes"
        return f'Driver={{SQL 
Server}};Server={server_name};Database={database_name};Trusted_Connection={trusted_c
onnection};'
    def getAppointmentById(self, appointmentId):
        self.cursor.execute("SELECT * FROM Appointment WHERE appointmentId = ?",
(appointmentId,))
        appointment = self.cursor.fetchone()
        return appointment
    def getAppointmentsForPatient(self, patientId):
        self.cursor.execute("SELECT * FROM Appointment WHERE patientId = ?", (patientId,))
        appointments = self.cursor.fetchall()
        return appointments

    def getAppointmentsForDoctor(self, doctorId):
        self.cursor.execute("SELECT * FROM Appointment WHERE doctorId = ?", (doctorId,))
        appointments = self.cursor.fetchall()
        return appointments
    def scheduleAppointment(self, appointment):
        self.cursor.execute("INSERT INTO Appointment (patientId, doctorId, appointmentDate,
description) VALUES (?, ?, ?, ?)",
                            (appointment.patientId, appointment.doctorId,
appointment.appointmentDate, appointment.description))
        self.connection.commit()
        return True
    def updateAppointment(self, appointment):
        self.cursor.execute("UPDATE Appointment SET patientId = ?, doctorId = ?,
appointmentDate = ?, description = ? WHERE appointmentId = ?",
                            (appointment.patientId, appointment.doctorId,
appointment.appointmentDate, appointment.description, appointment.appointmentId))
        self.connection.commit()
        return True

    def cancelAppointment(self, appointmentId):
        self.cursor.execute("DELETE FROM Appointment WHERE appointmentId = ?",
(appointmentId,))
```

```
        self.connection.commit()
        return True
    def __del__(self):
        # Close database connection when the object is destroyed
        if hasattr(self, 'cursor'):
            self.cursor.close()
        if hasattr(self, 'connection'):
            self.connection.close()
```

#HOSPITALMANAGEMENTSYSTEM _SERVICE:

```
import sys
import os
# Add parent directory of 'dao' to Python path
sys.path.append(os.path.abspath(os.path.join(os.path.dirname(__file__), '..')))
from abc import ABC, abstractmethod
from models.Appointment import Appointment
from typing import List
class IHospitalManagementSystemService(ABC):
    @abstractmethod
    def getAppointmentById(self, appointment_id):
        pass
    @abstractmethod
    def getAppointmentsForPatient(self, patient_id):
        pass
    @abstractmethod
    def getAppointmentsForDoctor(self, doctor_id):
        pass
    @abstractmethod
    def scheduleAppointment(self, appointment):
        pass
    @abstractmethod
    def updateAppointment(self, appointment):
        pass
    @abstractmethod
    def cancelAppointment(self, appointment_id):
        pass
```

#PATIENTS_EXCEPTION:

```
class PatientNumberNotFoundException(Exception):
    pass
```

#UTIL:

Db_connection:

```
import pyodbc
try:
    conn = pyodbc.connect('Driver={SQL Server};'
                          'Server=SRIDHAR/LOCALHOST;'
                          'Database=HospitalManagementSystem;'
                          'Trusted_Connection=yes;')
    print("Connected Successfully")
except pyodbc.Error as e:
    print("Connection failed:", e)
    exit()
c = conn.cursor()
# Adjust your SQL query to select data from a table
sql_query = "SELECT * FROM doctor"  # Replace YourTableName with the actual table name
c.execute(sql_query)
data = c.fetchall()
for row in data:
    print(row[0], " ", row[1], " ", row[3])
```

```
c.close()
conn.close()
```

propertyutil:

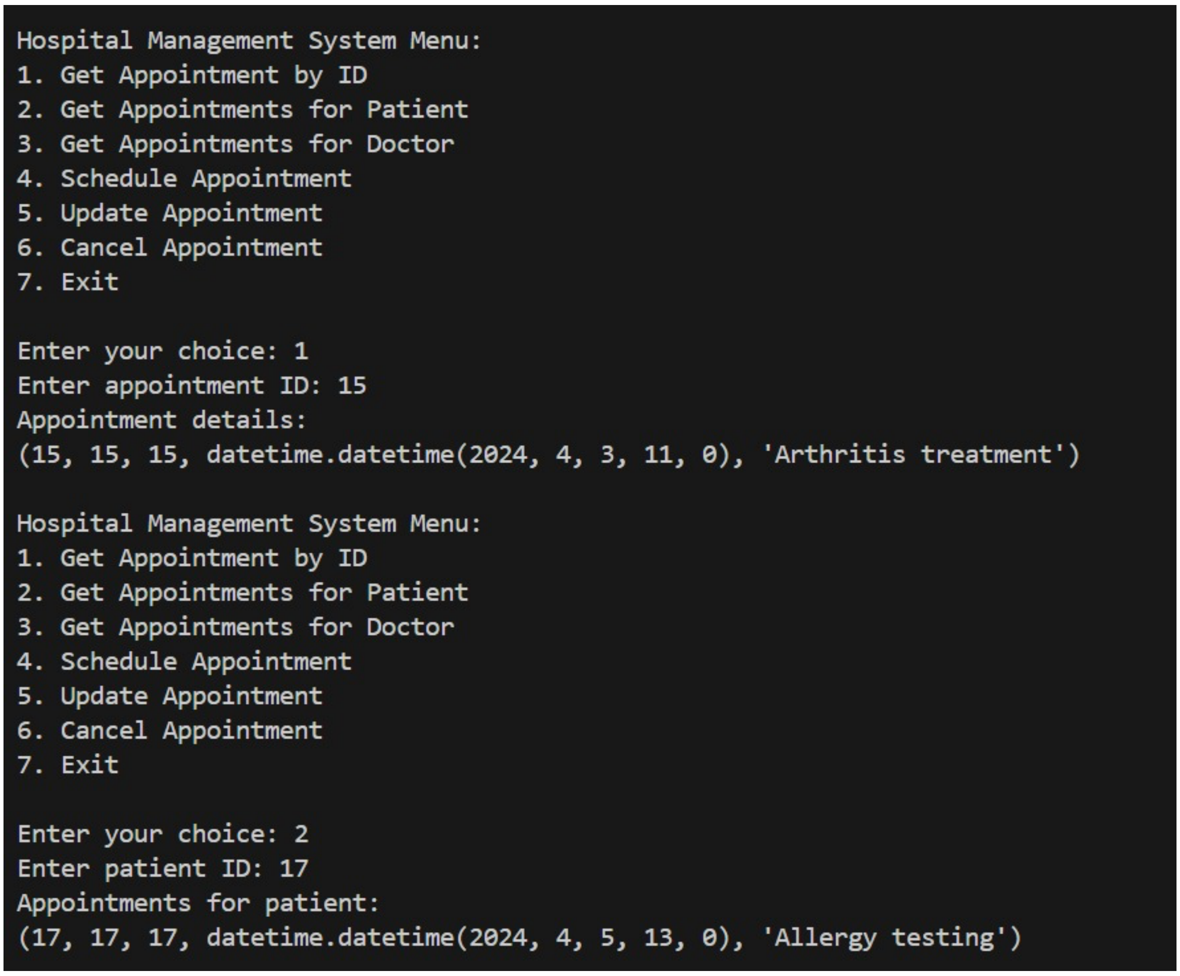
```
import sys
import os
# Add parent directory of 'dao' to Python path
sys.path.append(os.path.abspath(os.path.join(os.path.dirname(__file__), '..')))
import pyodbc
class PropertyUtil:
    @staticmethod
    def getPropertyString(self):
        server_name = "SRIDHAR/LOCALHOST"
        database_name = "HospitalManagementSystem"
        trusted_connection = "yes"
        self.cursor = self.connection.cursor()
        return f"Driver={{SQL Server}};Server={server_name};Database={database_name};Trusted_Connection={trusted_connection};"
```

#MAIN:

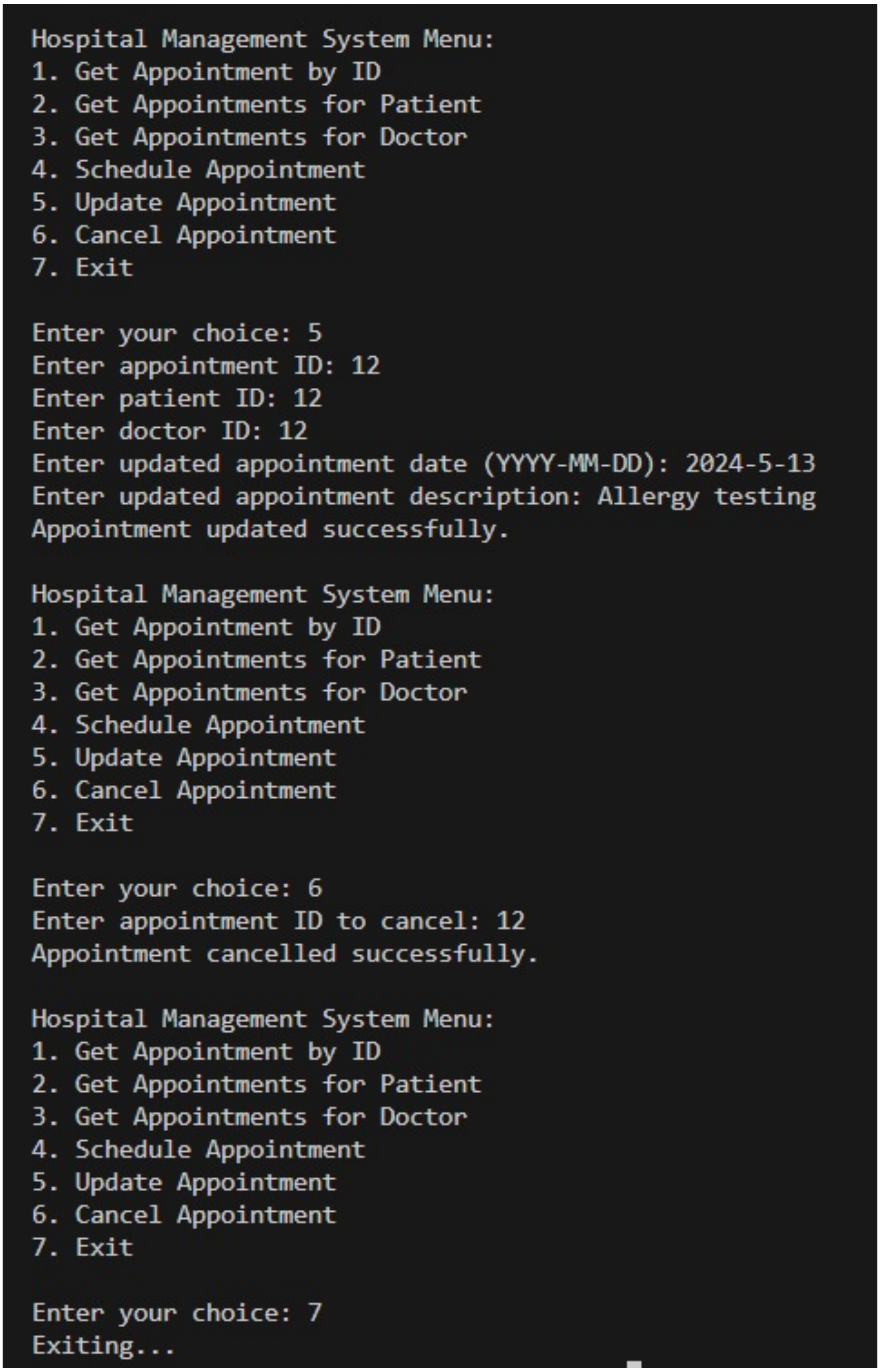
```
import sys
import os
# Add parent directory of 'dao' to Python path
sys.path.append(os.path.abspath(os.path.join(os.path.dirname(__file__), '..')))
# Now you should be able to import 'dao'
from entity.HospitalManagementSystem_service_impl import HospitalManagementSystemServiceImpl
from entity.patientException import PatientNumberNotFoundException
from entity.Appointment import Appointment
class MainModule:
    def __init__(self):
        self.HospitalManagementSystem_service = HospitalManagementSystemServiceImpl()
    def display_menu(self):
        print("\nHospitalManagementSystem Management System Menu:")
        print("1. Get Appointment by ID")
        print("2. Get Appointments for Patient")
        print("3. Get Appointments for Doctor")
        print("4. Schedule Appointment")
        print("5. Update Appointment")
        print("6. Cancel Appointment")
        print("7. Exit")
    def get_input(self, prompt):
        return input(prompt)
    def main(self):
        try:
            while True:
                self.display_menu()
                choice = int(self.get_input("\nEnter your choice: "))

                if choice == 1:
                    appointment_id = int(self.get_input("Enter appointment ID: "))
                    appointment =
self.HospitalManagementSystem_service.getAppointmentById(appointment_id)
                    print("Appointment details:")
                    print(appointment)
                elif choice == 2:
                    patient_id = int(self.get_input("Enter patient ID: "))
                    appointments =
self.HospitalManagementSystem_service.getAppointmentsForPatient(patient_id)
                    print("Appointments for patient:")
                    for appointment in appointments:
```

```
                print(appointment)


            elif choice == 3:
                doctor_id = int(self.get_input("Enter doctor ID: "))
                appointments =
self.HospitalManagementSystem_service.getAppointmentsForDoctor(doctor_id)
                print("Appointments for doctor:")
                for appointment in appointments:
                    print(appointment)


            elif choice == 4:
                appointment_id = int(self.get_input("Enter appointment ID: "))
                patient_id = int(self.get_input("Enter patient ID: "))
                doctor_id = int(self.get_input("Enter doctor ID: "))
                appointment_date = self.get_input("Enter appointment date (YYYY-MM-DD): ")
                description = self.get_input("Enter appointment description: ")
                new_appointment = Appointment(appointment_id, patient_id, doctor_id,
appointment_date, description)
                success =
self.HospitalManagementSystem_service.scheduleAppointment(new_appointment)
                if success:
                    print("Appointment scheduled successfully.")
                else:
                    print("Failed to schedule appointment.")
            elif choice == 5:
                appointment_id = int(self.get_input("Enter appointment ID: "))
                patient_id = int(self.get_input("Enter patient ID: "))
                doctor_id = int(self.get_input("Enter doctor ID: "))
                appointment_date = self.get_input("Enter updated appointment date (YYYY-
MM-DD): ")
```

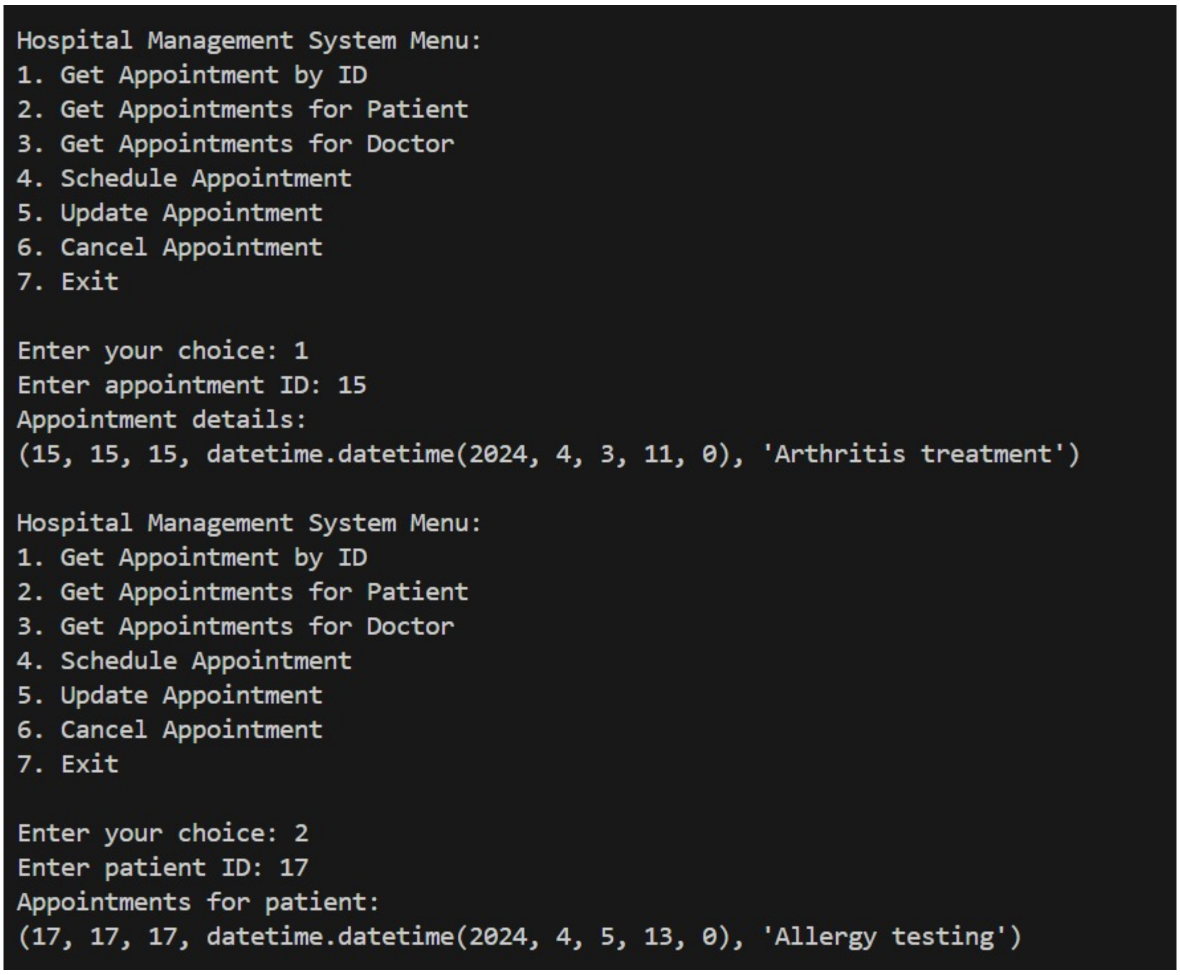
```
                description = self.get_input("Enter updated appointment description: ")
                updated_appointment = Appointment(appointment_id, patient_id, doctor_id, 
appointment_date, description)
                success = 
self.HospitalManagementSystem_service.updateAppointment(updated_appointment)
                if success:
                    print("Appointment updated successfully.")
                else:
                    print("Failed to update appointment.")
            elif choice == 6:
                appointment_id = int(self.get_input("Enter appointment ID to cancel: "))
                success = 
self.HospitalManagementSystem_service.cancelAppointment(appointment_id)
                if success:
                    print("Appointment cancelled successfully.")
                else:
                    print("Failed to cancel appointment.")
            elif choice == 7:
                print("Exiting...")
                break
            else:
                print("Invalid choice. Please enter a number between 1 and 7.")
        except PatientNumberNotFoundException as e:
            print("Patient number not found in the database:", e)
    def new_method(self):
        return HospitalManagementSystemServiceImpl()
if __name__ == "__main__":
    main_module = MainModule()
    main_module.main()
```



```
Hospital Management System Menu:
1. Get Appointment by ID
2. Get Appointments for Patient
3. Get Appointments for Doctor
4. Schedule Appointment
5. Update Appointment
6. Cancel Appointment
7. Exit

Enter your choice: 1
Enter appointment ID: 15
Appointment details:
(15, 15, 15, datetime.datetime(2024, 4, 3, 11, 0), 'Arthritis treatment')

Hospital Management System Menu:
1. Get Appointment by ID
2. Get Appointments for Patient
3. Get Appointments for Doctor
4. Schedule Appointment
5. Update Appointment
6. Cancel Appointment
7. Exit

Enter your choice: 2
Enter patient ID: 17
Appointments for patient:
(17, 17, 17, datetime.datetime(2024, 4, 5, 13, 0), 'Allergy testing')
```



```
Hospital Management System Menu:
1. Get Appointment by ID
2. Get Appointments for Patient
3. Get Appointments for Doctor
4. Schedule Appointment
5. Update Appointment
6. Cancel Appointment
7. Exit

Enter your choice: 5
Enter appointment ID: 12
Enter patient ID: 12
Enter doctor ID: 12
Enter updated appointment date (YYYY-MM-DD): 2024-5-13
Enter updated appointment description: Allergy testing
Appointment updated successfully.

Hospital Management System Menu:
1. Get Appointment by ID
2. Get Appointments for Patient
3. Get Appointments for Doctor
4. Schedule Appointment
5. Update Appointment
6. Cancel Appointment
7. Exit

Enter your choice: 6
Enter appointment ID to cancel: 12
Appointment cancelled successfully.

Hospital Management System Menu:
1. Get Appointment by ID
2. Get Appointments for Patient
3. Get Appointments for Doctor
4. Schedule Appointment
5. Update Appointment
6. Cancel Appointment
7. Exit

Enter your choice: 7
Exiting...
```



```
Hospital Management System Menu:
1. Get Appointment by ID
2. Get Appointments for Patient
3. Get Appointments for Doctor
4. Schedule Appointment
5. Update Appointment
6. Cancel Appointment
7. Exit

Enter your choice: 1
Enter appointment ID: 15
Appointment details:
(15, 15, 15, datetime.datetime(2024, 4, 3, 11, 0), 'Arthritis treatment')

Hospital Management System Menu:
1. Get Appointment by ID
2. Get Appointments for Patient
3. Get Appointments for Doctor
4. Schedule Appointment
5. Update Appointment
6. Cancel Appointment
7. Exit

Enter your choice: 2
Enter patient ID: 17
Appointments for patient:
(17, 17, 17, datetime.datetime(2024, 4, 5, 13, 0), 'Allergy testing')
```