CODING CHALLENGE

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Topic: Insurance Management System

Problem Statement:

1: Create a SQL schema from the following classes; use the class attributes for table column names.

```
CREATE DATABASE InsuranceManageDB;
USE InsuranceManageDB;
GO
-- Create Users table
CREATE TABLE Users (
  userId INT PRIMARY KEY identity (101,1),
  username NVARCHAR (50) NOT NULL,
  password NVARCHAR (50) NOT NULL,
  role NVARCHAR (50) NOT NULL
);
INSERT INTO Users (username, password, role) VALUES
('megha', 'meghaSecure01', 'admin'),
('rahul', 'rahulAgent99', 'agent'),
('kavita', 'kavita@2024', 'customer'),
('arjun', 'arjun$789', 'customer');
-- Create Clients table
CREATE TABLE Clients (
   clientId INT PRIMARY KEY identity (201,1),
   clientName NVARCHAR(100) NOT NULL,
   contactInfo NVARCHAR (100) NOT NULL,
  policy NVARCHAR (100) NOT NULL
);
INSERT INTO Clients (clientName, contactInfo, policy) VALUES
('Amit Sharma', 'amit.sharma@email.com', 'Life Insurance'),
('Priya Kapoor', 'priya.kapoor@email.com', 'Auto Insurance'),
('Ravi Iyer', '+91 9876543210', 'Health Insurance'),
('Sunita Patel', 'sunita.patel@email.com', 'Home Insurance');
-- Create Claims table
```

```
CREATE TABLE Claims (
   claimId INT PRIMARY KEY identity (301,1),
   claimNumber NVARCHAR (100) NOT NULL,
   dateFiled DATE NOT NULL,
   claimAmount DECIMAL(10, 2) NOT NULL,
   status NVARCHAR (50) NOT NULL,
   clientId INT,
   policy NVARCHAR (100),
   FOREIGN KEY (clientId) REFERENCES Clients(clientId)
);
INSERT INTO Claims (claimNumber, dateFiled, claimAmount, status, policy, clientId)
VALUES
('CLM2024005', '2024-10-15', 1800.00, 'Approved', 'Health Insurance', 201),
('CLM2024006', '2024-10-18', 3200.00, 'Pending', 'Vehicle Insurance', 202),
('CLM2024007', '2024-10-20', 500.00, 'Rejected', 'Home Insurance', 203),
('CLM2024008', '2024-10-25', 3900.00, 'Approved', 'Life Insurance', 204);
-- Create Payments table
CREATE TABLE Payments (
   paymentId INT PRIMARY KEY identity (401,1),
   paymentDate DATE NOT NULL,
   paymentAmount DECIMAL(10, 2) NOT NULL,
   clientId INT,
   FOREIGN KEY (clientId) REFERENCES Clients (clientId)
);
INSERT INTO Payments (paymentDate, paymentAmount, clientId) VALUES
('2024-10-05', 1800.00, 201), -- Payment for Amit Sharma
('2024-10-06', 2700.00, 202), -- Payment for Priya Kapoor
('2024-10-07', 400.00, 203), -- Payment for Ravi Iyer
('2024-10-08', 4500.00, 204); -- Payment for Sunita Patel
-- Create Policies table
CREATE TABLE Policies (
  policyId INT PRIMARY KEY IDENTITY (1,1),
  policyName NVARCHAR(100) NOT NULL,
  policyDescription NVARCHAR (255) NOT NULL
);
```

- 1. Create the following model/entity classes within package entity with variables declared private, constructors (default and parametrized, getters, setters and toString())
- 2. Implement the following for all model classes. Write default constructors and overload the constructor with parameters, getters and setters, and a method to print all the member variables and values.
- 1. Define the User' class with the following confidential attributes:
- a. userld;
- b. username;
- c. password;
- d. Role;

Code for this part entity/User.py

```
class User:
    def __init__(self, userId=None, username=None, password=None, role=None):
        self.__userId = userId
        self.__username = username
        self.__password = password
        self.__role = role

# Getters and Setters functions
def get_userId(self):
```

```
return self.__userId
   def set_userId(self, userId):
      self.__userId = userId
   def get_username(self):
       return self.__username
   def set_username(self, username):
      self.__username = username
   def get password(self):
       return self. password
   def set_password(self, password):
      self.__password = password
   def get role(self):
      return self.__role
   def set_role(self, role):
      self. role = role
   def __str__(self):
      return f"User [userId={self._userId}, username={self._username},
role={self.__role}]"
```

- 2. Define Client* class with the following confidential attributes:
- a. clientid;
- b. clientName;
- c. contactinfo;
- d. policy;//Represents the policy associated with the client

Code for this part

entity/Client.py

```
class Client:
   def __init__(self, clientId=None, clientName=None, contactInfo=None, policy=None):
      self.__clientId = clientId
      self. clientName = clientName
      self. contactInfo = contactInfo
      self. policy = policy
   # Getters and Setters functions
   def get clientId(self):
      return self.__clientId
   def set_clientId(self, clientId):
      self. clientId = clientId
   def get_clientName(self):
      return self. clientName
   def set clientName(self, clientName):
      self. clientName = clientName
   def get contactInfo(self):
      return self.__contactInfo
   def set_contactInfo(self, contactInfo):
      self. contactInfo = contactInfo
   def get_policy(self):
      return self. policy
   def set_policy(self, policy):
      self. policy = policy
```

```
def __str__(self):
       return f"Client [clientId={self. clientId}, clientName={self. clientName},
contactInfo={self. contactInfo}, policy={self. policy}]"
3. Define 'Claim class with the following confidential attributes:
a. claimld;
b. claimNumber;
c. dateFiled;
d. claimAmount;
e. status;
f. policy;//Represents the policy associated with the claim
g. client; // Represents the client associated with the claim
Code for this
entity/Claim.py
# entity/Claim.py
class Claim:
   def __init__(self, claimId=None, claimNumber=None, dateFiled=None,
claimAmount=None, status=None, policy=None, clientId=None):
       self. claimId = claimId
       self. claimNumber = claimNumber
       self. dateFiled = dateFiled
       self. claimAmount = claimAmount
       self. status = status
       self.__policy = policy
       self. client = clientId
   # Getters and Setters functions
   def get_claimId(self):
       return self.__claimId
   def set_claimId(self, claimId):
       self.__claimId = claimId
   def get claimNumber(self):
       return self.__claimNumber
```

```
def set_claimNumber(self, claimNumber):
       self. claimNumber = claimNumber
   def get_dateFiled(self):
       return self. dateFiled
   def set dateFiled(self, dateFiled):
       self. dateFiled = dateFiled
   def get_claimAmount(self):
       return self.__claimAmount
   def set claimAmount(self, claimAmount):
       self.__claimAmount = claimAmount
   def get_status(self):
       return self. status
   def set_status(self, status):
       self.__status = status
   def get policy(self):
       return self. policy
   def set_policy(self, policy):
       self.__policy = policy
   def get_client(self):
       return self.__client
   def set client(self, clientId):
       self. client = clientId
   # String representation
   def __str__(self):
       return (f"Claim [claimId={self. claimId}, claimNumber={self. claimNumber},
dateFiled={self.__dateFiled}, "
               f"claimAmount={self.__claimAmount}, status={self.__status},
policy={self.__policy}, client={self.__client}]")
```

- 4. Define `payment `class with the following confidential attributes:
- a. paymentld;
- b. paymentDate;
- c. paymentAmount;
- d. client;// Represents the client associated with the payment

Code for this

```
entity/Payment.py
```

```
# entity/Payment.py
class Payment:
   def init (self, paymentId=None, paymentDate=None, paymentAmount=None,
client=None):
      self. paymentId = paymentId
      self. paymentDate = paymentDate
      self. paymentAmount = paymentAmount
      self.__client = client
   # Getters and Setters
   def get_paymentId(self):
      return self.__paymentId
   def set paymentId(self, paymentId):
      self. paymentId = paymentId
   def get_paymentDate(self):
      return self. paymentDate
   def set paymentDate(self, paymentDate):
       self._paymentDate = paymentDate
   def get paymentAmount(self):
      return self. paymentAmount
   def set paymentAmount(self, paymentAmount):
      self. paymentAmount = paymentAmount
   def get client(self):
      return self.__client
   def set client(self, client):
```

3. Define IPolicyService interface/abstract class with following methodsto interact with database Keep the interfaces and implementation classes in package dao

```
a. createPolicy()
```

I. parameters: Policy Object

II. return type: Boolean

b. getPolicy()

I. parameters: policyld

II. return type: Policy Object

c. getAllPolicies()

I. parameters: none

II. return type: Collection of Policy Objects

d. updatePolicy()

I. parameters: Policy Object

II. return type: boolean

e. deletePolicy()

I. parameters: Policyld II. return type: boolean

Code for that

dao/IPolicyService.py

```
from abc import ABC, abstractmethod

class IPolicyService(ABC):
    @abstractmethod
    def createPolicy(self, policy):
```

```
@abstractmethod
def getPolicy(self, policyId):
    pass
@abstractmethod
def getAllPolicies(self):
    pass
@abstractmethod
def updatePolicy(self, policy):
    pass
@abstractmethod
def deletePolicy(self, policyId):
    pass
```

6. Define InsuranceServiceImpl class and implement all the methods InsuranceServiceImpl Code:

dao/PolicyServiceImpl.py

```
import pyodbc
from src.dao.IPolicyService import IPolicyService
from src.entity.Policy import Policy
from src.exception.PolicyNotFoundException import PolicyNotFoundException
from src.util.DBconnection import DBconnection
class PolicyServiceImpl(IPolicyService):
   def __init__(self):
       self.conn = DBconnection.get connection()
   def createPolicy(self, policy):
       cursor = self.conn.cursor()
       query = "INSERT INTO Policies (policyName, policyDescription) VALUES (?, ?)"
       cursor.execute(query, policy.get policyName(), policy.get policyDescription())
       self.conn.commit()
       return True
   def getPolicy(self, policyId):
       cursor = self.conn.cursor()
       query = "SELECT * FROM Policies WHERE policyId = ?"
```

```
cursor.execute(query, policyId)
       result = cursor.fetchone()
       if result:
           return Policy(policyId=result.policyId, policyName=result.policyName,
policyDescription=result.policyDescription)
       else:
           raise PolicyNotFoundException(f"Policy with ID {policyId} not found.")
   def getAllPolicies(self):
       cursor = self.conn.cursor()
       query = "SELECT * FROM Policies"
       cursor.execute(query)
       policies = []
       for row in cursor.fetchall():
           policy = Policy(policyId=row.policyId, policyName=row.policyName,
policyDescription=row.policyDescription)
           policies.append(policy)
       return policies
   def updatePolicy(self, policy):
       cursor = self.conn.cursor()
       query = "UPDATE Policies SET policyName = ?, policyDescription = ? WHERE
policyId = ?"
       cursor.execute(query, policy.get_policyName(), policy.get_policyDescription(),
policy.get_policyId())
       self.conn.commit()
       return True
   def deletePolicy(self, policyId):
       cursor = self.conn.cursor()
       query = "DELETE FROM Policies WHERE policyId = ?"
       cursor.execute(query, policyId)
       self.conn.commit()
       return True
```

OUTPUTS:

1) Create Policy

```
Enter your choice: 1
Enter policy name: Travel Insurance
Enter policy description: Covers various risks associated with traveling, including trip cancellations, lost luggage, and medical emergencies
```

DB Before

	policyId 🗸	policyName ~	policyDescription
1	1	Health Insurance	Offers coverage for medical costs, hospitalizations,
2	2	Life Insurance	Ensures financial protection for your family in case
3	3	Vehicle Insurance	Provides coverage for vehicle damages and third-part…
4	4	Home Insurance	Protects your home from damages due to accidents or

DB After

	policyId 🗸	policyName 🗸	policyDescription
1	1	Health Insurance	Offers coverage for medical costs, hospitalizations,
2	2	Life Insurance	Ensures financial protection for your family in case
3	3	Vehicle Insurance	Provides coverage for vehicle damages and third-part…
4	4	Home Insurance	Protects your home from damages due to accidents or
5	6	Travel Insurance	Covers various risks associated with traveling, incl

2) Get Policy ID

```
Enter your choice: 2
Enter policy ID: 3
Policy [policyId=3, policyName=Auto Insurance, policyDescription=Covers damages to your car and third—party liability]
```

3) Get All Policy Output

```
Enter your choice: 3
Policy [policyId=1, policyName=Health Insurance, policyDescription=Covers medical expenses including hospital stays and treatments]
Policy [policyId=2, policyName=Life Insurance, policyDescription=Provides financial security to your family in case of your death]
Policy [policyId=3, policyName=Auto Insurance, policyDescription=Covers damages to your car and third-party liability]
Policy [policyId=5, policyName=Health insurance, policyDescription=Covers damages to your home and belongings]
Policy [policyId=5, policyName=Health insurance, policyDescription=Covers medical expenses including hospital stays and treatments]
Policy [policyId=6, policyName=Education, policyDescription=Help poor for education]
Policy [policyId=7, policyName=Education, policyDescription=Helps Poor People]
Policy [policyId=8, policyName=6, policyDescription=sad]
Policy [policyId=9, policyName=Travel Insurance, policyDescription=Covers various risks associated with traveling, including trip cancellations, lost luggage, and medi]
Policy [policyId=10, policyName=Travel Policy, policyDescription=Covers various risks associated with traveling, including trip cancellations, lost luggage, and medical emergencies abroad.]
```

4) Update Policy

```
Enter your choice: 4
Enter policy ID: 2
Enter new policy name: Pet Insurance:
Enter new policy description: Covers veterinary expenses for pets, including accidents and illnesses.
Policy updated successfully!
```

DB before updating policy

	policyId 🗸	policyName 🗸	policyDescription ~
1	1	Health Insurance	Offers coverage for medical costs, hospitalizations,
2	2	Life Insurance	Ensures financial protection for your family in case
3	3	Vehicle Insurance	Provides coverage for vehicle damages and third-part
4	4	Home Insurance	Protects your home from damages due to accidents or
5	6	Travel Insurance	Covers various risks associated with traveling, incl

5) Delete Policy

Enter your choice: 5
Enter policy ID: 6
Policy deleted successfully!

DB Before Deletion

	policyId 🗸	policyName 🗸	policyDescription
1	1	Health Insurance	Offers coverage for medical costs, hospitalizations,
2	2	Life Insurance	Ensures financial protection for your family in case
3	3	Vehicle Insurance	Provides coverage for vehicle damages and third-part
4	4	Home Insurance	Protects your home from damages due to accidents or
5	6	Travel Insurance	Covers various risks associated with traveling, incl

DB After Deletion of policy (Policyid 6 deleted Travel Insurance)

	policyId 🗸	policyName 🗸	policyDescription ~
1	1	Health Insurance	Offers coverage for medical costs, hospitalizations,
2	2	Life Insurance	Ensures financial protection for your family in case
3	3	Vehicle Insurance	Provides coverage for vehicle damages and third-part
4	4	Home Insurance	Protects your home from damages due to accidents or
			Results grid

7. Create a utility class DBConnection in a package util with a static variable connection of Type Connection and a static method getConnection() which returns connection. Connection properties supplied in the connection string should be read from a property file. Create a utility class PropertyUtil which contains a static method named getPropertyString() which reads a property fie containing connection details like hostname, dbname, username, password, port number and returns a connection string.

```
# src/util/db connection.py
import pyodbc
class db connection:
   @staticmethod
   def get connection():
       connection string = (
           "DRIVER={ODBC Driver 18 for SQL Server};"
           "SERVER=localhost;"
           "DATABASE=InsuranceManagementDB;"
           "TrustServerCertificate=yes;"
           "UID=sa;"
           "PWD=Raman63@;"
       )
       return pyodbc.connect(connection string)
# Example usage
try:
   conn = db_connection.get_connection()
```

```
print("Connection successful")
except Exception as e:
   print("Error connecting to the database:", e)
finally:
   if 'conn' in locals():
      conn.close()
```

8. Create the exceptions in package myexceptions Define the following custom exceptions and throw them in methods whenever needed. Handle all the exceptions in main method, 1. PolicyNotFoundException: throw this exception when user enters an invalid patient number which doesn't exist in db

```
# exception/PolicyNotFoundException.py
class PolicyNotFoundException(Exception):
    def __init__(self, message):
        super().__init__(message)
```

9. Create class named MainModule with main method in package mainmod. Trigger all the methods in service implementation class.

```
import sys
import os

path_to_insurance_management = os.path.abspath(os.path.join(os.path.dirname(__file__),
'...', '...'))
print("Path to InsuranceManagement:", path_to_insurance_management)

sys.path.append(path_to_insurance_management)

print(sys.path)

from src.dao.PolicyServiceImpl import PolicyServiceImpl

from src.dao.ClientServiceImpl import ClientServiceImpl

from src.dao.ClaimServiceImpl import ClaimServiceImpl

from src.dao.UserServiceImpl import UserServiceImpl

from src.dao.PaymentServiceImpl import PaymentServiceImpl

from src.entity.Policy import Policy
from src.entity.Client import Client
```

```
from src.entity.Claim import Claim
from src.entity.User import User
from src.entity.Payment import Payment
from src.exception.PolicyNotFoundException import PolicyNotFoundException
if __name__ == "__main__":
   # Create instances of service classes
  policy service = PolicyServiceImpl()
   client service = ClientServiceImpl()
  claim_service = ClaimServiceImpl()
  user service = UserServiceImpl()
  payment_service = PaymentServiceImpl()
   while True:
      print("\nInsurance Management System\n")
       print("1. Create Policy")
      print("2. Get Policy")
      print("3. Get All Policies")
      print("4. Update Policy")
      print("5. Delete Policy")
      print("6. Create Client")
      print("7. Create User")
      print("8. Get User")
      print("9. Get All Users")
      print("10. Update User")
      print("11. Delete User")
      print("12. Create Claim")
      print("13. Get Claim")
      print("14. Get All Claims")
      print("15. Create Payment")
       print("16. Get Payment")
      print("17. Exit")
       choice = input("Enter your choice: ")
       if choice == '1': # Create Policy
           policyName = input("Enter policy name: ")
           policyDescription = input("Enter policy description: ")
          policy = Policy(policyName=policyName, policyDescription=policyDescription)
          policy service.createPolicy(policy)
           print("Policy created successfully!")
```

```
elif choice == '2': # Get Policy
           policyId = int(input("Enter policy ID: "))
           try:
               policy = policy service.getPolicy(policyId)
               print(policy)
           except PolicyNotFoundException as e:
               print(e)
       elif choice == '3': # Get All Policies
          policies = policy service.getAllPolicies()
           for policy in policies:
               print(policy)
       elif choice == '4': # Update Policy
           policyId = int(input("Enter policy ID: "))
           policyName = input("Enter new policy name: ")
           policyDescription = input("Enter new policy description: ")
           policy = Policy(policyId=policyId, policyName=policyName,
policyDescription=policyDescription)
          policy service.updatePolicy(policy)
           print("Policy updated successfully!")
       elif choice == '5': # Delete Policy
           policyId = int(input("Enter policy ID: "))
           policy_service.deletePolicy(policyId)
           print("Policy deleted successfully!")
       elif choice == '6': # Create Client
           clientName = input("Enter client name: ")
           contactInfo = input("Enter contact info: ")
           policy = input("Enter policy: ")
           client = Client(clientName=clientName, contactInfo=contactInfo,
policy=policy)
           client service.createClient(client)
           print("Client created successfully!")
       elif choice == '7': # Create User
           username = input("Enter username: ")
          password = input("Enter password: ")
           role = input("Enter role (admin/user): ")
           user = User(username=username, password=password, role=role)
           user service.createUser(user)
```

```
elif choice == '8': # Get User
          userId = int(input("Enter user ID: "))
          user = user_service.getUser(userId)
           if user:
              print(user)
           else:
              print("User not found.")
       elif choice == '9': # Get All Users
           users = user service.getAllUsers()
           for user in users:
               print(user)
       elif choice == '10': # Update User
          userId = int(input("Enter user ID: "))
           username = input("Enter new username: ")
          password = input("Enter new password: ")
           role = input("Enter new role (admin/user): ")
          user = User(userId=userId, username=username, password=password, role=role)
          user service.updateUser(user)
          print("User updated successfully!")
       elif choice == '11': # Delete User
           userId = int(input("Enter user ID: "))
           user service.deleteUser(userId)
           print("User deleted successfully!")
       elif choice == '12': # Create Claim
           claimNumber = input("Enter claim number: ")
           dateFiled = input("Enter date filed (YYYY-MM-DD): ")
           claimAmount = float(input("Enter claim amount: "))
           status = input("Enter status: ")
           policy = input("Enter associated policy: ")
           clientId = input("Enter associated client: ")
           claim = Claim(claimNumber=claimNumber, dateFiled=dateFiled,
claimAmount=claimAmount, status=status,
                         policy=policy, clientId=clientId)
           claim service.createClaim(claim)
          print("Claim created successfully!")
```

print("User created successfully!")

```
elif choice == '13': # Get Claim
           claimId = int(input("Enter claim ID: "))
           claim = claim service.getClaim(claimId)
           if claim:
               print(claim)
           else:
               print("Claim not found.")
       elif choice == '14': # Get All Claims
           claims = claim_service.getAllClaims()
           for claim in claims:
               print(claim)
       elif choice == '15': # Create Payment
          paymentDate = input("Enter payment date (YYYY-MM-DD): ")
           paymentAmount = float(input("Enter payment amount: "))
           client = input("Enter associated client: ")
          payment = Payment(paymentDate=paymentDate, paymentAmount=paymentAmount,
client=client)
          payment_service.createPayment(payment)
          print("Payment created successfully!")
       elif choice == '16': # Get Payment
          paymentId = int(input("Enter payment ID: "))
          payment = payment service.getPayment(paymentId)
           if payment:
              print(payment)
           else:
              print("Payment not found.")
       elif choice == '17': # Exit
          print("Exiting...")
          break
       else:
          print("Invalid choice! Please try again.")
```

ENTIRE DATABSE

