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from datetime import datetime

class DentalCompany:
    def __init__(self,name):
        self.__name = name
        self.branches = []

    def getName(self):
      return self.__name


    def add_branch(self, branch):
        self.branches.append(branch)

    def get_branches(self):
        return self.branches

class Branch:
    def __init__(self, name, address, phoneNumber, manager):
        self.__name = name
        self.__address = address
        self.__phoneNumber = phoneNumber
        self.__manager = manager
        self.__services = []
        self.__patients = []
        self.__staff = []

    def setName(self, name):
        self.__name = name
    def getName(self):
        return self.__name
    # Address
    def setAddress(self, address):
        self.__address = address
    def getAddress(self):
        return self.__address
    # Phone number
    def setPhoneNumber(self, phoneNumber):
        self.__phoneNumber = phoneNumber
    def getPhoneNumber(self):
        return self.__phoneNumber
    # Manager
    def setManager(self, manager):
        self.__manager = manager
    def getManager(self):
        return self.__manager
    # Dental services
    def addService(self, Service):
        self.__services.append(Service)
    def getServices(self):
        return self.__services
    # Staff member
    def addStaff(self, staff_member):
        self.__staff.append(staff_member)
    def getStaff(self):
        return self.__staff
    # Patients
    def addPatient(self, patient):
        self.__patients.append(patient)
    def getPatients(self):
        return self.__patients




class Service:
    def __init__(self, serviceName, cost):
        self.__serviceName = serviceName
        self.__cost = cost
    # Name
    def setServiceName(self, serviceName):
        self.__serviceName = serviceName
    def getServiceName(self):
        return self.__serviceName
    # Cost
    def setCost(self, cost):
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        def setCost(self, cost):
            self.__cost = cost
        def getCost(self):
            return self.__cost

    # association betwen appontment and patient class

    class Appointment:

        def __init__(self, patient, services, appointment_time):
            self.__patient = patient
            self.__services = services
            self.__appointment_time = appointment_time

        def getTotalCost(self):
            return sum(service.getCost() for service in self.__services)

        def getServices(self):
            return self.__services

        def getAppointmentTime(self):
            return self.__appointment_time

        def setAppointmentTime(self, appointment_time):
            self.__appointment_time = appointment_time

        def getPatient(self):
            return self.__patient


    class Person:
        def __init__(self, firstName, lastName, phoneNumber):
            self.__firstName = firstName
            self.__lastName = lastName
            self.__phoneNumber = phoneNumber
        # First name
        def setFirstName(self, firstName):
            self.__firstName = firstName
        def getFirstName(self):
            return self.__firstName
        # Last name
        def setLastName(self, lastName):
            self.__lastName = lastName
        def getLastName(self):
            return self.__lastName
        # Phone number
        def setPhoneNumber(self, phoneNumber):
            self.__phoneNumber = phoneNumber
        def getPhoneNumber(self):
            return self.__phoneNumber


    class Staff(Person):
        def __init__(self, firstName, lastName, phoneNumber, employeeID):
            super().__init__(firstName, lastName, phoneNumber)
            self.__employeeID = employeeID
        # Employee ID
        def setEmployeeID(self, employee_id: str):
            self.__employeeID = employee_id
        def getEmployeeID(self):
            return self.__employeeID

    class Manager(Staff):
        pass

    class Receptionist(Staff):
        pass

    class Hygienist(Staff):
        pass

    class Dentist(Staff):
        pass

    class Patient(Person):
        def __init__(self, firstName, lastName, phoneNumber, ID):
            super().__init__(firstName, lastName, phoneNumber)
            self.__ID = ID
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            self.__appointments = []

        def getID(self):
            return self.__ID

        def setID(self, ID):
            self.__ID = ID

        def getAppointments(self):
            return self.__appointments

        def bookAppointment(self, appointment):
            self.__appointments.append(appointment)


    class Receipt:
        def __init__(self, patient, appointments,DentalCompany):
            self.__patient = patient
            self.__appointments = appointments
            self.__totalCost = sum(appointment.getTotalCost() for appointment in appointments)
            self.__DentalCompany=DentalCompany

        def getReceipt(self):
            print("Dental Company:", self.__DentalCompany.getName())
            print("Patient info:")
            print("Name:", self.__patient.getFirstName(), self.__patient.getLastName())
            print("Phone Number:", self.__patient.getPhoneNumber())
            print()

            total_cost = 0

            for appointment in self.__appointments:
                appointment_date = appointment.getAppointmentTime().strftime("%Y-%m-%d")
                print("Appointment Date:", appointment_date)
                print("Services:")

                for service in appointment.getServices():
                    service_cost = service.getCost()
                    total_cost += service_cost
                    print(f"{service.getServiceName()} ..... {service_cost:.2f} AED")

                print()

            vat = total_cost * 0.05
            grand_total = total_cost + vat
            print("Subtotal : ",(total_cost),"AED")
            print("VAT (5%): ", (vat),"AED")
            print("Total cost: ",(grand_total),"AED")




    from datetime import datetime

    def main():
        # Create dental company
        dental_company = DentalCompany('My Dental Company')

        # Create a manager
        manager = Manager("John", "Doe", "555-1234", "M01")

        # Create a branch and add it to the dental company
        branch1 = Branch("Main Branch", "123 Main St", "555-2345", manager)
        dental_company.add_branch(branch1)

        # Create services
        service1 = Service("Cleaning", 100)
        service2 = Service("Filling", 200)

        # Add services to the branch (composition relationship)
        branch1.addService(service1)
        branch1.addService(service2)

        # Create staff members (binary association relationship)
        receptionist = Receptionist("Alice", "Smith", "555-3456", "R01")
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    hygienist = Hygienist("Bob", "Johnson", "555-4567", "H01")
    dentist = Dentist("Carol", "Brown", "555-5678", "D01")

    # Add staff members to the branch (composition relationship)
    branch1.addStaff(receptionist)
    branch1.addStaff(hygienist)
    branch1.addStaff(dentist)

    # Create patients
    patient1 = Patient("David", "Miller", "555-6789", "P01")
    patient2 = Patient("Eva", "Davis", "555-7890", "P02")

    # Add patients to the branch (composition relationship)
    branch1.addPatient(patient1)
    branch1.addPatient(patient2)

    # Create appointments (association relationship)
    appointment1 = Appointment(patient1, [service1, service2], datetime(2023, 4, 15, 10, 0))
    appointment2 = Appointment(patient2, [service1], datetime(2023, 4, 15, 11, 0))

    # Add appointments to patients
    patient1.bookAppointment(appointment1)
    patient2.bookAppointment(appointment2)

    # Create a receipt
    receipt = Receipt(patient1, [appointment1], dental_company)
    receipt2 = Receipt(patient2, [appointment2], dental_company)

    # Print the receipt
    receipt.getReceipt()
    print("------------------")
    receipt2.getReceipt()

if __name__ == "__main__":
    main()
```

```
Dental Company: My Dental Company
Patient info:
Name: David Miller
Phone Number: 555-6789

Appointment Date: 2023-04-15
Services:
Cleaning ..................... 100.00 AED
Filling ...................... 200.00 AED

Subtotal :  300 AED
VAT (5%):  15.0 AED
Total cost:  315.0 AED
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Dental Company: My Dental Company
Patient info:
Name: Eva Davis
Phone Number: 555-7890

Appointment Date: 2023-04-15
Services:
Cleaning ..................... 100.00 AED

Subtotal :  100 AED
VAT (5%):  5.0 AED
Total cost:  105.0 AED
```

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