Ain Shams University

Faculty of Engineering

AIN SHAMS UNIVERSITY

FACULTY OF ENGINEERING

CREDIT HOURS ENG. PROGRAM

Computer engineering and software systems

CSE346

Advanced Database Project

Hospital Database

Submitted to:

DR. Heba Ahmed

Submitted by:

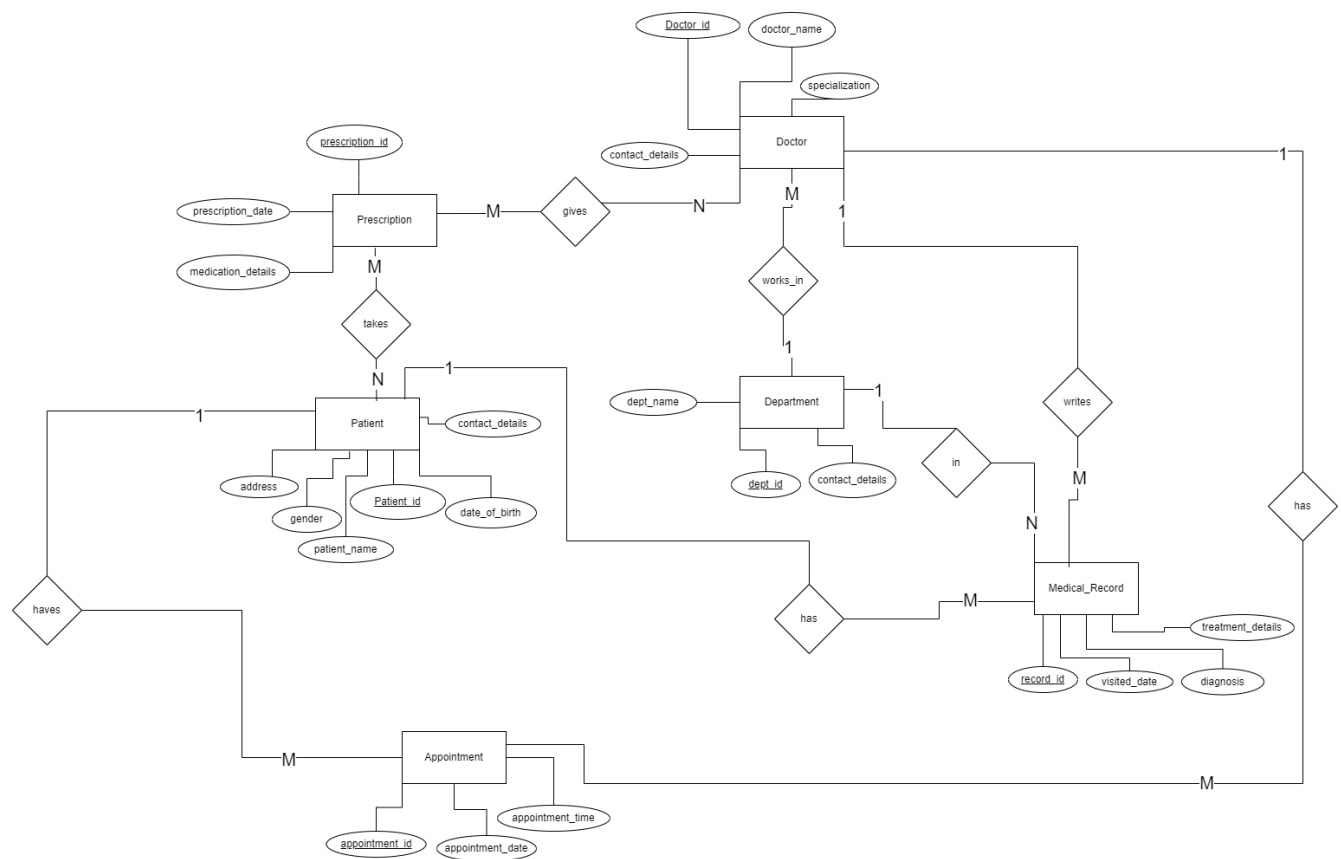|	
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Mohamed Hesham El Said Zidan	20p7579
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Contents

Relevance

How to write xml and it's XSD schema and how to query's for then using Xpath and Xquery

Abstract

The idea of the Project is to make a XML file with it's XSD schema for a Hospital than searching in this XML file using Xpath, Xquery , adding new data in the XML file

ER diagram for database

XML file implementation

```xml
<?xml version="1.0" encoding="UTF-8" standalone="no"?>

<?xml-model href="Hospital.xsd"?>
<hospital>

<Departments>

<Department dept_id = "d1">
<dept_name> Cardiology </dept_name>
<contact_details> 0112345 </contact_details>
</Department>

<Department dept_id = "d2">
<dept_name> surgeon </dept_name>
<contact_details> 0112356 </contact_details>
</Department>

<Department dept_id = "d3">
<dept_name> General Medicine</dept_name>
<contact_details> 0122345 </contact_details>
</Department>

<Department dept_id = "d4">
<dept_name> neurology </dept_name>
<contact_details> 0122356 </contact_details>
</Department>

<Department dept_id = "d5">
<dept_name> Psichiatry </dept_name>
<contact_details> 0122357 </contact_details>
</Department>

<Department dept_id = "d6">
<dept_name> Pharmacist </dept_name>
<contact_details> 0122358 </contact_details>
</Department>

<Department dept_id = "d7">
<dept_name> Haematology </dept_name>
<contact_details> 0122367 </contact_details>
</Department>
```

```xml
<Department dept_id = "d8">
<dept_name> Physiotherapy </dept_name>
<contact_details> 0122478 </contact_details>
</Department>

<Department dept_id ="d9">
<dept_name> Dietician </dept_name>
<contact_details> 0122578 </contact_details>
</Department>

<Department dept_id = "d10">
<dept_name> Emergency Department </dept_name>
<contact_details> 0123459 </contact_details>
</Department>

</Departments>

<Doctors>

<Doctor doctor_id = "d1" dept_id = "d1">
<doctor_name>
<First_name> doc1 </First_name>
<Last_name> name1 </Last_name>
 </doctor_name>
<speciality> Cardiologist </speciality>
<contact_details>
<Email> doc1@gmail.com </Email>
<phone_number>0122367 </phone_number>
 </contact_details>
</Doctor>

<Doctor doctor_id = "d2" dept_id = "d7">
<doctor_name>
<First_name> doc2 </First_name>
<Last_name> name2 </Last_name>
 </doctor_name>
<speciality> Haematologist </speciality>
<contact_details>
<Email> doc2@gmail.com </Email>
<phone_number>0122345 </phone_number>
 </contact_details>
</Doctor>

<Doctor doctor_id = "d3" dept_id = "d10">
```

```xml
<doctor_name>
<First_name> doc3 </First_name>
<Last_name> name3 </Last_name>
</doctor_name>
<speciality> Emergency </speciality>
<contact_details>
<Email> doc3@Yahoo.com </Email>
<phone_number>011234 </phone_number>
 </contact_details>
</Doctor>

<Doctor doctor_id = "d4" dept_id = "d2" Prescription_id="1">
<doctor_name>
<First_name> Seif Eldin </First_name>
<Last_name> Ashraf </Last_name>
</doctor_name>
<speciality> surgeon </speciality>
<contact_details>
<Email> Seif@gmail.com </Email>
<phone_number>01222510 </phone_number>
 </contact_details>
</Doctor>

<Doctor doctor_id = "d5" dept_id = "d6" Prescription_id="3">
<doctor_name>
<First_name> Mohamed </First_name>
<Last_name> Hesham </Last_name>
</doctor_name>
<speciality> Pharmacist </speciality>
<contact_details>
<Email> Mohamed@gmail.com </Email>
<phone_number>0121345 </phone_number>
 </contact_details>
</Doctor>

<Doctor doctor_id = "d6" dept_id = "d10" >
<doctor_name>
<First_name> Omar </First_name>
<Last_name> Magdy </Last_name>
</doctor_name>
<speciality> Emergency </speciality>
<contact_details>
<Email> Omar@Yahoo.com </Email>
<phone_number>0101345 </phone_number>
 </contact_details>
```

```xml
</Doctor>

<Doctor doctor_id = "d7" dept_id = "d10" Prescription_id="2">
<doctor_name>
<First_name> Mahmoud </First_name>
<Last_name> Talaat </Last_name>
 </doctor_name>
<speciality> Emergency </speciality>
<contact_details>
<Email> Mahmoud@Yahoo.com </Email>
<phone_number>0109345 </phone_number>
 </contact_details>
</Doctor>

<Doctor doctor_id = "d8" dept_id = "d9" Prescription_id="1 4">
<doctor_name>
<First_name> Youssef </First_name>
<Last_name> ElNagy </Last_name>
 </doctor_name>
<speciality> Dietician </speciality>
<contact_details>
<Email> Youssef1@gmail.com </Email>
<phone_number>0108345 </phone_number>
 </contact_details>
</Doctor>

<Doctor doctor_id = "d9" dept_id = "d1" >
<doctor_name>
<First_name> Youssef </First_name>
<Last_name> Mohamed </Last_name>
 </doctor_name>
<speciality> Cardiologist </speciality>
<contact_details>
<Email> Youssef2@Yahoo.com </Email>
<phone_number>0107345 </phone_number>
 </contact_details>
</Doctor>

<Doctor doctor_id = "d10" dept_id = "d8" Prescription_id="7">
<doctor_name>
<First_name> Abdelrahman </First_name>
<Last_name> Ayman </Last_name>
 </doctor_name>
<speciality> Physiotherapist </speciality>
<contact_details>
```

```xml
<Email> Abdelrahman@gmail.com </Email>
<phone_number>01117345 </phone_number>
 </contact_details>
</Doctor>


<Doctor doctor_id = "d11" dept_id = "d2" Prescription_id="2">
<doctor_name>
<First_name> Seif Eldin </First_name>
<Last_name> Mahmoud </Last_name>
 </doctor_name>
<speciality> surgeon </speciality>
<contact_details>
<Email> S@gmail.com </Email>
<phone_number>01112245 </phone_number>
 </contact_details>
</Doctor>



<Doctor doctor_id = "d12" dept_id = "d4">
<doctor_name>
<First_name> doc4 </First_name>
<Last_name> name1 </Last_name>
 </doctor_name>
<speciality> neurologist </speciality>
<contact_details>
<Email> doc4@gmail.com </Email>
<phone_number>01162245 </phone_number>
 </contact_details>
</Doctor>



<Doctor doctor_id = "d13" dept_id = "d3" Prescription_id="6">
<doctor_name>
<First_name> doc1 </First_name>
<Last_name> name6 </Last_name>
 </doctor_name>
<speciality> General Medicine </speciality>
<contact_details>
<Email> doc11@gmail.com </Email>
<phone_number>01262245 </phone_number>
 </contact_details>
</Doctor>

<Doctor doctor_id = "d14" dept_id = "d5" Prescription_id="5">
<doctor_name>
```

```xml
<First_name> Abdelrahman </First_name>
<Last_name> Ayman </Last_name>
 </doctor_name>
<speciality> Psichiatrist </speciality>
<contact_details>
<Email> Ayman@gmail.com </Email>
<phone_number>0129876 </phone_number>
 </contact_details>
</Doctor>

</Doctors>

<Patients>
    <Patient Patient_id = "1" Prescription_id="1">
        <Patient_name>
            <First_Name>Mohamed</First_Name>
            <Last_Name>Mohamed</Last_Name>
        </Patient_name>
        <gender>Male</gender>
        <date_of_birth>2000-01-25</date_of_birth>
        <address>Cairo</address>
        <contact_details>012245</contact_details>
    </Patient>

    <Patient Patient_id = "2" Prescription_id= "7">
        <Patient_name>
            <First_Name>Ahmed</First_Name>
            <Last_Name>Mohamed</Last_Name>
        </Patient_name>
        <gender>Male</gender>
        <date_of_birth>1978-01-25</date_of_birth>
        <address>Giza</address>
        <contact_details>0121145</contact_details>
    </Patient>

    <Patient Patient_id = "3" Prescription_id="2 5">
        <Patient_name>
            <First_Name>Mohamed</First_Name>
            <Last_Name>Ahmed</Last_Name>
        </Patient_name>
        <gender>Male</gender>
        <date_of_birth>2003-07-02</date_of_birth>
        <address>Cairo</address>
        <contact_details>012295</contact_details>
    </Patient>
```

```xml
<Patient Patient_id = "4" >
    <Patient_name>
        <First_Name>Patient1</First_Name>
        <Last_Name>name1</Last_Name>
    </Patient_name>
    <gender>Female</gender>
    <date_of_birth>1999-05-05</date_of_birth>
    <address>Cairo</address>
    <contact_details>011190</contact_details>
</Patient>

<Patient Patient_id = "5" Prescription_id="1">
    <Patient_name>
        <First_Name>Patient2</First_Name>
        <Last_Name>Name2</Last_Name>
    </Patient_name>
    <gender>Female</gender>
    <date_of_birth>2001-03-02</date_of_birth>
    <address>Giza</address>
    <contact_details>011245</contact_details>
</Patient>

<Patient Patient_id = "6" >
    <Patient_name>
        <First_Name>Patient3</First_Name>
        <Last_Name>Name3</Last_Name>
    </Patient_name>
    <gender>Male</gender>
    <date_of_birth>2002-09-01</date_of_birth>
    <address>Alexandria</address>
    <contact_details>019905</contact_details>
</Patient>

<Patient Patient_id = "7" Prescription_id="6">
    <Patient_name>
        <First_Name>Patient3</First_Name>
        <Last_Name>Name4</Last_Name>
    </Patient_name>
    <gender>Female</gender>
    <date_of_birth>2002-09-08</date_of_birth>
    <address>Alexandria</address>
    <contact_details>0102345</contact_details>
</Patient>
```

```xml
    <Patient Patient_id = "8" Prescription_id="3">
        <Patient_name>
            <First_Name>Patient4</First_Name>
            <Last_Name>Mohamed</Last_Name>
        </Patient_name>
        <gender>Male</gender>
        <date_of_birth>1980-03-30</date_of_birth>
        <address>Cairo</address>
        <contact_details>0122905</contact_details>
    </Patient>

    <Patient Patient_id = "9" Prescription_id = "4">
        <Patient_name>
            <First_Name>Patient5</First_Name>
            <Last_Name>Name5</Last_Name>
        </Patient_name>
        <gender>Female</gender>
        <date_of_birth>1980-03-30</date_of_birth>
        <address>Giza</address>
        <contact_details>0125905</contact_details>
    </Patient>

    <Patient Patient_id = "10" Prescription_id="2">
        <Patient_name>
            <First_Name>Patient6</First_Name>
            <Last_Name>Name6</Last_Name>
        </Patient_name>
        <gender>Female</gender>
        <date_of_birth>1990-03-30</date_of_birth>
        <address>Cairo</address>
        <contact_details>01225905</contact_details>
    </Patient>

    <Patient Patient_id = "11" Prescription_id ="3" >
        <Patient_name>
            <First_Name>Patient7</First_Name>
            <Last_Name>Name7</Last_Name>
        </Patient_name>
        <gender>Male</gender>
        <date_of_birth>1995-11-15</date_of_birth>
        <address>Cairo</address>
        <contact_details>01225935</contact_details>
    </Patient>

</Patients>
```

```xml
<Prescriptions>
    <Prescription Prescription_id = "1" Patient_id = "1 5" Doctor_id = "d4 d8">
        <Prescription_date>2024-11-12</Prescription_date>
        <medication_details>
            <name>name1</name>
            <dose>100</dose>
            <duration>50</duration>
        </medication_details>
    </Prescription>

    <Prescription Prescription_id = "2" Patient_id = "3 10" Doctor_id = "d7 d11">
        <Prescription_date>2024-01-14</Prescription_date>
        <medication_details>
            <name>name2</name>
            <dose>50</dose>
            <duration>20</duration>
        </medication_details>
    </Prescription>

    <Prescription Prescription_id = "3" Patient_id = "8 11" Doctor_id = "d5">
        <Prescription_date>2024-02-15</Prescription_date>
        <medication_details>
            <name>name3</name>
            <dose>150</dose>
            <duration>60</duration>
        </medication_details>
    </Prescription>

    <Prescription Prescription_id = "4" Patient_id = "9" Doctor_id = "d8">
        <Prescription_date>2024-07-02</Prescription_date>
        <medication_details>
            <name>name4</name>
            <dose>200</dose>
            <duration>5</duration>
        </medication_details>
    </Prescription>

    <Prescription Prescription_id = "5" Patient_id = "3" Doctor_id = "d14">
        <Prescription_date>2024-05-17</Prescription_date>
        <medication_details>
            <name>name5</name>
            <dose>250</dose>
            <duration>15</duration>
        </medication_details>
```

```xml
        </Prescription>

        <Prescription Prescription_id = "6" Patient_id = "7" Doctor_id = "d13">
            <Prescription_date>2024-06-19</Prescription_date>
            <medication_details>
                <name>name6</name>
                <dose>350</dose>
                <duration>10</duration>
            </medication_details>
        </Prescription>

        <Prescription Prescription_id = "7" Patient_id = "2" Doctor_id = "d10">
            <Prescription_date>2024-06-19</Prescription_date>
            <medication_details>
                <name>name7</name>
                <dose>150</dose>
                <duration>15</duration>
            </medication_details>
        </Prescription>

</Prescriptions>

<Medical_records>

<Medical_record Medical_record_id = "1" Patient_id = "5" Department_id = "3"
Doctor_id="d10">
<diagnosis>diagnosis1</diagnosis>
<treatment_details>treatment1</treatment_details>
<visited_date>2023-06-02</visited_date>
</Medical_record>

<Medical_record Medical_record_id = "2" Patient_id = "2" Department_id = "5"
Doctor_id="d10">
    <diagnosis>diagnosis1</diagnosis>
    <treatment_details>treatment1</treatment_details>
    <visited_date>2024-03-02</visited_date>
    </Medical_record>

    <Medical_record Medical_record_id = "3" Patient_id = "5" Department_id = "10"
Doctor_id="d13">
        <diagnosis>diagnosis2</diagnosis>
        <treatment_details>treatment2</treatment_details>
        <visited_date>2024-03-10</visited_date>
        </Medical_record>
```

```xml
        <Medical_record Medical_record_id = "4" Patient_id = "10" Department_id =
"5" Doctor_id="d2">
            <diagnosis>diagnosis3</diagnosis>
            <treatment_details>treatment3</treatment_details>
            <visited_date>2024-03-10</visited_date>
            </Medical_record>

            <Medical_record Medical_record_id = "5" Patient_id = "1"
Department_id = "8" Doctor_id="d5">
                <diagnosis>diagnosis4</diagnosis>
                <treatment_details>treatment3</treatment_details>
                <visited_date>2024-10-10</visited_date>
                </Medical_record>

                <Medical_record Medical_record_id = "6" Patient_id = "9"
Department_id = "7" Doctor_id="d14">
                <diagnosis>diagnosis4</diagnosis>
                <treatment_details>treatment4</treatment_details>
                <visited_date>2024-11-20</visited_date>
                </Medical_record>

                <Medical_record Medical_record_id = "7" Patient_id = "10"
Department_id = "2" Doctor_id="d9">
                    <diagnosis>diagnosis5</diagnosis>
                    <treatment_details>treatment5</treatment_details>
                    <visited_date>2024-09-19</visited_date>
                    </Medical_record>

</Medical_records>

<Appointments>

<Appointment Appointment_id="1" Patient_id="5" Doctor_id="d10">
<appointment_date>2024-12-09</appointment_date>
<appointment_time>9 Am</appointment_time>
</Appointment>

<Appointment Appointment_id="2" Patient_id="7" Doctor_id="d14">
    <appointment_date>2024-12-09</appointment_date>
    <appointment_time>9 Am</appointment_time>
    </Appointment>

    <Appointment Appointment_id="3" Patient_id="8" Doctor_id="d11">
        <appointment_date>2024-12-09</appointment_date>
        <appointment_time>10 Am</appointment_time>
```

```xml
        </Appointment>

        <Appointment Appointment_id="3" Patient_id="10" Doctor_id="d11">
            <appointment_date>2024-12-09</appointment_date>
            <appointment_time>12 pm</appointment_time>
        </Appointment>

        <Appointment Appointment_id="4" Patient_id="7" Doctor_id="d1">
            <appointment_date>2024-11-09</appointment_date>
            <appointment_time>1 pm</appointment_time>
        </Appointment>

        <Appointment Appointment_id="5" Patient_id="3" Doctor_id="d12">
            <appointment_date>2024-05-25</appointment_date>
            <appointment_time>6 pm</appointment_time>
        </Appointment>

        <Appointment Appointment_id="6" Patient_id="7"
Doctor_id="d14">
            <appointment_date>2024-11-09</appointment_date>
            <appointment_time>9 Am</appointment_time>
        </Appointment>

        <Appointment Appointment_id="7" Patient_id="1"
Doctor_id="d1">
            <appointment_date>2024-07-10</appointment_date>
            <appointment_time>7 pm</appointment_time>
        </Appointment>

</Appointments>

</hospital>
```

XSD schema design

```xsd
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema">
    <xsd:element name="hospital" type="HospitalType"/>
    <xsd:element name="Departments" type="DepartmentsType"/>
    <xsd:element name="Doctors" type="DoctorsType"/>
    <xsd:element name="Patients" type="PatientsType"/>
    <xsd:element name="Prescriptions" type="PrescriptionsType"/>
    <xsd:element name="Medical_records" type="Medical_recordsType"/>
    <xsd:element name="Appointments" type="AppointmentsType"/>
```

```xml
<xsd:element name ="Department">
    <xsd:complexType>
        <xsd:sequence>
            <xsd:element name = "dept_name" type = "xsd:string"/>
            <xsd:element name = "contact_details" type = "xsd:string"/>
        </xsd:sequence>
        <xsd:attribute name = "dept_id" type = "xsd:string" use = "required"/>
    </xsd:complexType>
</xsd:element>

<xsd:element name = "Doctor">
    <xsd:complexType>
        <xsd:sequence>
            <xsd:element name ="doctor_name">
                <xsd:complexType>
                    <xsd:sequence>
                        <xsd:element name="First_name" type="xsd:string"/>
                        <xsd:element name="Last_name" type="xsd:string"/>
                    </xsd:sequence>
                </xsd:complexType>
            </xsd:element>
            <xsd:element name = "speciality" type="xsd:string"/>

            <xsd:element name ="contact_details">
                <xsd:complexType>
                    <xsd:sequence>
                        <xsd:element name="Email" type="xsd:string"/>
                        <xsd:element name="phone_number" type="xsd:string"/>
                    </xsd:sequence>
                </xsd:complexType>
            </xsd:element>
        </xsd:sequence>
        <xsd:attribute name="doctor_id" type="xsd:string" use="required"/>
        <xsd:attribute name = "dept_id" type = "xsd:string" use="required"/>
        <xsd:attribute name = "Prescription_id" type="xsd:string"/>
    </xsd:complexType>
</xsd:element>

<xsd:element name = "Patient">
    <xsd:complexType>
        <xsd:sequence>
            <xsd:element name ="Patient_name">
                <xsd:complexType>
                    <xsd:sequence>
                        <xsd:element name="First_Name" type="xsd:string"/>
```

```xml
                    <xsd:element name="Last_Name" type="xsd:string"/>
                </xsd:sequence>
            </xsd:complexType>
        </xsd:element>
        <xsd:element name = "gender" type="xsd:string"/>
        <xsd:element name = "date_of_birth" type="xsd:date"/>
        <xsd:element name = "address" type="xsd:string"/>
        <xsd:element name ="contact_details" type = "xsd:string"/>
    </xsd:sequence>
    <xsd:attribute name="Patient_id" type="xsd:string" use="required"/>
    <xsd:attribute name = "Prescription_id" type="xsd:string"/>
    </xsd:complexType>
</xsd:element>

<xsd:element name ="Prescription">
    <xsd:complexType>
        <xsd:sequence>
            <xsd:element name = "Prescription_date" type = "xsd:date"/>
            <xsd:element name ="medication_details">
                <xsd:complexType>
                    <xsd:sequence>
                        <xsd:element name="name" type="xsd:string"/>
                        <xsd:element name="dose" type="xsd:integer"/>
                        <xsd:element name = "duration" type="xsd:integer"/>
                    </xsd:sequence>
                </xsd:complexType>
            </xsd:element>
        </xsd:sequence>
        <xsd:attribute name = "Prescription_id" type = "xsd:string"
use="required"/>
        <xsd:attribute name = "Patient_id" type = "xsd:string" use="required"/>
        <xsd:attribute name = "Doctor_id" type = "xsd:string" use="required"/>
    </xsd:complexType>
</xsd:element>

<xsd:element name="Medical_record">
    <xsd:complexType>
        <xsd:sequence>
            <xsd:element name="diagnosis" type = "xsd:string"/>
            <xsd:element name="treatment_details" type="xsd:string"/>
            <xsd:element name="visited_date" type="xsd:date"/>
        </xsd:sequence>
        <xsd:attribute name = "Medical_record_id" type="xsd:string"
use="required"/>
        <xsd:attribute name = "Department_id" type="xsd:string" use="required"/>
```

```xml
            <xsd:attribute name = "Patient_id" type = "xsd:string" use="required"/>
            <xsd:attribute name = "Doctor_id" type = "xsd:string" use="required"/>
        </xsd:complexType>
</xsd:element>

<xsd:element name ="Appointment">
    <xsd:complexType>
        <xsd:sequence>
            <xsd:element name = "appointment_date" type = "xsd:date"/>
            <xsd:element name = "appointment_time" type = "xsd:string"/>
        </xsd:sequence>
        <xsd:attribute name = "Appointment_id" type = "xsd:string" use =
"required"/>
        <xsd:attribute name = "Patient_id" type = "xsd:string" use="required"/>
        <xsd:attribute name = "Doctor_id" type = "xsd:string" use="required"/>
    </xsd:complexType>
</xsd:element>


    <xsd:complexType name="HospitalType">
        <xsd:sequence>
            <xsd:element ref = "Departments" />
            <xsd:element ref = "Doctors" />
            <xsd:element ref = "Patients" />
            <xsd:element ref = "Prescriptions" />
            <xsd:element ref = "Medical_records" />
            <xsd:element ref = "Appointments" />
        </xsd:sequence>
    </xsd:complexType>

    <xsd:complexType name="DepartmentsType">
        <xsd:sequence>
            <xsd:element ref = "Department"  minOccurs="1"
maxOccurs="unbounded"/>
        </xsd:sequence>
    </xsd:complexType>

    <xsd:complexType name="DoctorsType">
        <xsd:sequence>
            <xsd:element ref = "Doctor"  minOccurs="1" maxOccurs="unbounded"/>
        </xsd:sequence>
    </xsd:complexType>

    <xsd:complexType name="PatientsType">
```

```xml
        <xsd:sequence>
            <xsd:element ref = "Patient"  minOccurs="1" maxOccurs="unbounded"/>
        </xsd:sequence>
    </xsd:complexType>


    <xsd:complexType name="PrescriptionsType">
        <xsd:sequence>
            <xsd:element ref = "Prescription"  minOccurs="1"
maxOccurs="unbounded"/>
        </xsd:sequence>
    </xsd:complexType>


    <xsd:complexType name="Medical_recordsType">
        <xsd:sequence>
            <xsd:element ref = "Medical_record"  minOccurs="1"
maxOccurs="unbounded"/>
        </xsd:sequence>
    </xsd:complexType>


    <xsd:complexType name="AppointmentsType">
        <xsd:sequence>
            <xsd:element ref = "Appointment"  minOccurs="1"
maxOccurs="unbounded"/>
        </xsd:sequence>
    </xsd:complexType>

</xsd:schema>
```

Code:

```python
from xml.etree import ElementTree as ET
from lxml import etree
from xmlschema import XMLSchema


First_entry = True
ele_list = []

# Main program flow
plain_name = "Hospital"
filename = "Hospital.xml"
schema = "Hospital.xsd"
xml_tree, xml_root, lxml_tree, lxml_root = load_xml(filename)

if xml_tree is not None:
    while True:
        print("Choose the operation:")
        print("press 'd' to Delete an element from the tree" )
        print("press 'w' to Write an element in the tree")
        print("press 'q' to Query an element from the tree")
        print("press '!' to Close")

        operation = input().strip()

        if operation.lower() == 'q':
            query=str(input("please enter an xQuery or xPath for query : \n")).strip()
            query_entry(query,lxml_tree)


        # elif operation.lower() == 'd':
        #     delete_entry()

        elif operation.lower() == 'w':
            add_entry(First_entry,ele_list)

        elif operation.lower() == '!':
            break
        else:
            print("Invalid choice!")

print("Exiting...")
```

```python
def query_entry(xpath_or_xquery,xml_file):

    condition = True

    while(condition):
        try:
            if xpath_or_xquery.startswith("//") or xpath_or_xquery.startswith("/"):  # XPath
                result = xml_file.xpath(xpath_or_xquery)
            else:
                result = xml_file.xpath(xpath_or_xquery)
        except Exception:
            print("Un Valid Query!")
            return
        # print(result)
        if result:
                query_recursion(result)
                    # print(item.text)  # Access element text
        else:
            print("The query is invalid")
        print("\n")

        while(True):
            choice = input("Would you Like to query Agian [y/n]")
            if choice.lower().strip() =='y':
                xpath_or_xquery = str(input("Enter another Query Please  ")).strip()
                break
            elif choice.lower().strip() =='n':
                condition = False
                break
            else:
                print("Invalid choice!")


def query_recursion(items):

    for item in items:
        if item.text.strip() == '':
            if item.attrib:
                print(f"{item.tag} <{item.attrib}> :")
            else:
                print(f"{item.tag}:")
            query_recursion(item.findall("*"))
        else:
            print(f"{item.tag} : {item.text}")
    print("--------------")
```

```python
def add_entry(First_entry,ele_list):

    """
    """
    condition =True
    while condition:

        Element=input("Please Enter the ELement name you want to add in : ").strip()
        found_element = xml_root.find(Element)
        if found_element == None:
            print(f"The Element '{Element}' is not found!")
            continue
        else:
            recurse(found_element,-1,First_entry)
            found_element.append(ele_list[0])
            xml_tree.write(f"{plain_name}_modified.xml")
            print(f"Element has been succefully added to {Element}!\n")
            ele_list=[]
            First_entry = True

        while(True):
            choice = input("Do you Like to add another Element? [y/n]")
            if choice.lower().strip() =='y':
                break
            elif choice.lower().strip() =='n':
                condition = False
                break
            else:
                print("Invalid choice!")
```

```python
def recurse(Element,parent_indx,First_entry): #start with indx -1

    children = Element.findall("*")
    d=dict()
    l=list()

    # check if there is children
    if children:
        # print(children)
        for child in children:
            if child.tag in d:
                continue
            else:
                d[child.tag] = child  # {name of child : object}
                l.append(child.tag) # [name of child]
```

```python
for ele in l:

    if d[ele].attrib: # the return is a dictionary
        att_dic=dict()
        for key in d[ele].attrib.keys():
            att= input(f"Enter the value for the attribute: {key} = ").strip()
            att_dic[key] = att

    if d[ele].text.strip() == '':

        if (First_entry) and (len(l) == 1):

            First_entry = False
            if d[ele].attrib:
                ele_list.append(ET.Element(ele , attrib = att_dic))
            else:
                ele_list.append(ET.Element(ele))
            new_parent_indx = 0
        else:
            if d[ele].attrib:
                sub = ET.SubElement(ele_list[parent_indx], ele , attrib = att_dic)
                ele_list.append(sub)
                new_parent_indx = ele_list.index(sub)

            else:
                sub = ET.SubElement(ele_list[parent_indx], ele)
                ele_list.append(sub)
                new_parent_indx = ele_list.index(sub)


        recurse(d[ele],new_parent_indx,First_entry)
```

```python
        # dont forget that text are always the leaf nodes

    else:
        txt = input(f"Enter the value for the element {ele} = ").strip()

        if First_entry and len(l) == 1:
            print("First_entry here")
            First_entry = False

            if d[ele].attrib:
                ELE = ET.Element(ele , attrib = att_dic)
                ELE.text = txt
            else:
                ELE = ET.Element(ele)
                ELE.text = txt

        else:
            if d[ele].attrib:
                sub = ET.SubElement(ele_list[parent_indx],ele, attrib = att_dic)
                sub.text = txt
            else:
                sub = ET.SubElement(ele_list[parent_indx],ele)
                sub.text = txt
```

Query Results

Get doctor data for doctor with id d12 and dept id d4

```
/hospital/Doctors/Doctor[@doctor_id='d12' and @dept_id='d4']
```

```
Doctor <{'doctor_id': 'd12', 'dept_id': 'd4'}> :
doctor_name:
First_name :   doc4
Last_name :   name1
--------------
speciality :   neurologist
contact_details:
Email :   doc4@gmail.com
phone_number :  01162245
--------------
```

Get patient data for patient born in 1990-03-30

```
Enter another Query Please/hospital/Patients/Patient[date_of_birth = '1990-03-30']
Patient <{'Patient_id': '10', 'Prescription_id': '2'}> :
Patient_name:
First_Name : Patient6
Last_Name : Name6
-------------
gender : Female
date_of_birth : 1990-03-30
address : Cairo
contact_details : 01225905
-------------
```

Get patient data for patients with address Giza or Alexandria

```
/hospital/Patients/Patient[address = 'Giza' or address = 'Alexandria']
```

```
Patient <{'Patient_id': '2', 'Prescription_id': '7'}> :
Patient_name:
First_Name : Ahmed
Last_Name : Mohamed
-------------
gender : Male
date_of_birth : 1978-01-25
address : Giza
contact_details : 0121145
```

```
-------------
Patient <{'Patient_id': '5', 'Prescription_id': '1'}> :
Patient_name:
First_Name : Patient2
Last_Name : Name2
-------------
gender : Female
date_of_birth : 2001-03-02
address : Giza
contact_details : 011245
```

```
--------------
Patient <{'Patient_id': '6'}> :
Patient_name:
First_Name : Patient3
Last_Name : Name3
--------------
gender : Male
date_of_birth : 2002-09-01
address : Alexandria
contact_details : 019905
```

```
Patient <{'Patient_id': '7', 'Prescription_id': '6'}> :
Patient_name:
First_Name : Patient3
Last_Name : Name4
--------------
gender : Female
date_of_birth : 2002-09-08
address : Alexandria
contact_details : 0102345
--------------
```

```
--------------
Patient <{'Patient_id': '9', 'Prescription_id': '4'}> :
Patient_name:
First_Name : Patient5
Last_Name : Name5
--------------
gender : Female
date_of_birth : 1980-03-30
address : Giza
contact_details : 0125905
--------------
```

Get Medication details of medicine with dose 150 or duration 15

```
Enter another Query Please/hospital/Prescriptions/Prescription/medication_details[duration ='15'or dose = '150']
```

```
medication_details:
name : name3
dose : 150
duration : 60
```

```
medication_details:
 name : name5
 dose : 250
 duration : 15
```

```
 medication_details:
 name : name7
 dose : 150
 duration : 15
```

Get appointments for doctor with id d11.

```
Enter another Query Please/hospital/Appointments/Appointment[@Doctor_id = 'd11']
Appointment <{'Appointment_id': '3', 'Patient_id': '8', 'Doctor_id': 'd11'}> :
appointment_date : 2024-12-09
appointment_time : 10 Am
-------------
Appointment <{'Appointment_id': '3', 'Patient_id': '10', 'Doctor_id': 'd11'}> :
appointment_date : 2024-12-09
appointment_time : 12 pm
-------------
```

Adding Element Results

```
Choose the operation:
press 'd' to Delete an element from the tree
press 'w' to Write an element in the tree
press 'q' to Query an element from the tree
press '!' to Close
w
Please Enter the ELement name you want to add in : Doctors
Enter the value for the attribute: doctor_id = d15
Enter the value for the attribute: dept_id = d3
Enter the value for the element First_name = Ahmed
Enter the value for the element Last_name = Kamal
Enter the value for the element speciality = Surigion
Enter the value for the element Email = xyz@gamil.com
Enter the value for the element phone_number = 01032453442
Element has been succefully added to Doctors!

Do you Like to add another Element? [y/n]
```

```xml
<Doctor doctor_id="d15" dept_id="d3">
<doctor_name>
<First_name>Ahmed</First_name>
<Last_name>Kamal</Last_name>
</doctor_name>
<speciality>Surigion</speciality>
<contact_details>
<Email>xyz@gamil.com</Email>
<phone_number>01032453442
</phone_number></contact_details>
</Doctor>

</Doctors>
```