

Question 1

Use the file q1.accdb for this question. Write queries for each part. Save your queries in the file, and include the file in your zip.

- A. Write a parameter query that lets the user input a STORM_NAME. The output of the query should include the STORM_START and the STORM_END.

```
SELECT STORM_START, STORM_END
FROM STORM
WHERE STORM_NAME = [Enter storm name];
```

- B. Write a query to output the INTERN_NAME, INTERN_DOB, and the RECORDER_NAME for all interns. Include the INTERN_NAME and the INTERN_DOB even if there is no RECORDER_ID for that intern. Note that the RECORDER_NAME output should be for that intern's RECORDER_ID.

```
SELECT INTERN_NAME, INTERN_DOB, RECORDER_NAME
FROM INTERN LEFT JOIN RECORDER ON INTERN.RECORDER_ID = RECORDER.RECORDER_ID;
```

- C. Write a query to output the STATION_ID and the STORM_ID for the report with the largest SNOW_TOTAL.

```
SELECT STATION_ID, STORM_ID
FROM REPORT
WHERE SNOW_TOTAL IN
(SELECT max(SNOW_TOTAL) FROM REPORT);
```

- D. Write a query to output the STATION_ID and the STORM_ID for the report with a SNOW_TOTAL that was greater than the average SNOW_TOTAL.

```
SELECT STATION_ID, STORM_ID
FROM REPORT
WHERE SNOW_TOTAL >
(SELECT avg(SNOW_TOTAL) FROM REPORT);
```

- E. Write a query to output the name of all storms that do not have a report .

```
SELECT STORM_NAME
FROM STORM
WHERE STORM_ID NOT IN
(SELECT STORM_ID FROM REPORT);
```

Question 2

Use the file q2.xml and q2.dtd for this question. Modify q2.dtd in the ways listed below. Include both q2.xml and the revised q2.dtd in your zip. Make sure you test your work – you'll need to modify the q2.xml file to do this.

- A RECORDER can have more than one RECORDER_PHONE.
- The COLLEGE of an INTERN is optional.
- The number of STORM nodes in a STORMS node is 0 or more.
- The storm_id attribute in STORM, the recorder_id attribute in RECORDER, the station_id attribute in STATION, and the intern_id attribute in INTERN are all primary keys.
- The supervisor_id attribute in RECORDER, the recorder_id attribute in INTERN, the recorder_id attribute in REPORT, and the storm_id attribute in REPORT are all foreign keys.

```
<?xml version="1.0" encoding="UTF-8"?>
<!ELEMENT STORM_START (#PCDATA)>
<!ELEMENT STORM_NAME (#PCDATA)>
<!ELEMENT STORM_END (#PCDATA)>
<!ELEMENT STORMS (STORM*)>
<!ELEMENT STORM (STORM_NAME, STORM_START, STORM_END)>
<!--ATTLIST STORM
    storm_id ID #REQUIRED
-->
<!ELEMENT STATION_STATE (#PCDATA)>
<!ELEMENT STATION_NAME (#PCDATA)>
<!ELEMENT STATION_CITY (#PCDATA)>
<!ELEMENT STATIONS (STATION+)>
<!ELEMENT STATION (STATION_NAME, STATION_CITY, STATION_STATE, REPORT*)>
<!--ATTLIST STATION
    station_id ID #REQUIRED
-->
<!ELEMENT SNOW_TOTAL (#PCDATA)>
<!ELEMENT REPORT_DATE (#PCDATA)>
<!ELEMENT REPORT (REPORT_DATE, SNOW_TOTAL)>
<!--ATTLIST REPORT
    recorder_id IDREF #REQUIRED
    storm_id IDREF #REQUIRED
-->
<!ELEMENT RECORDER_PHONE (#PCDATA)>
<!ELEMENT RECORDER_NAME (#PCDATA)>
<!ELEMENT RECORDER_EMAIL (#PCDATA)>
<!ELEMENT RECORDER_DOB (#PCDATA)>
<!ELEMENT RECORDERS (RECORDER+)>
<!ELEMENT RECORDER (RECORDER_NAME, RECORDER_DOB, RECORDER_PHONE+,
RECORDER_EMAIL)>
<!--ATTLIST RECORDER
    recorder_id ID #REQUIRED
    supervisor_id IDREF #IMPLIED
-->
<!ELEMENT INTERN_NAME (#PCDATA)>
```

```
<!ELEMENT INTERN_ID (#PCDATA)>
<!ELEMENT INTERN_DOB (#PCDATA)>
<!ELEMENT INTERNS (INTERN+)>
<!ELEMENT INTERN (INTERN_NAME, INTERN_DOB, COLLEGE?)>
<!ATTLIST INTERN
    intern_id ID #REQUIRED
    recorder_id IDREF #IMPLIED
>
<!ELEMENT DATA (STORMS, RECORDERS, INTERNS, STATIONS)>
<!ELEMENT COLLEGE (#PCDATA)>
```

Question 3

Use the files q3.xml and q3.xsd for this question. Include these files in your zip when you turn in this test.

Modify the file q3.xsd in the following ways:

- All RECORDER_EMAIL nodes consist of letters followed by a "@" character followed by letters followed by a "." followed by exactly three letters.
- All STORM_START and STORM_END nodes are between November 1, 2013 and May 1, 2014.
- The value of SNOW_TOTAL should be between 1 and 36, inclusive.
- All COLLEGES are either Saint Rose or RPI.
- The COLLEGE of an INTERN is optional.
- A RECORDER can have one or two RECORDER_PHONE nodes.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:simpleType name="StormDate">
    <xs:restriction base="xs:date">
      <xs:minInclusive value="2013-11-01"/>
      <xs:maxInclusive value="2014-05-01"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:element name="SUPERVISOR_ID" type="xs:integer"/>
  <xs:element name="STORM_START" type="StormDate"/>
  <xs:element name="STORM_NAME" type="xs:string"/>
  <xs:element name="STORM_ID" type="xs:integer"/>
  <xs:element name="STORM_END" type="StormDate"/>
  <xs:element name="STORMS">
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="STORM" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:element name="STORM">
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="STORM_ID"/>
        <xs:element ref="STORM_NAME"/>
        <xs:element ref="STORM_START"/>
        <xs:element ref="STORM_END"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:element name="STATION_STATE" type="xs:string"/>
  <xs:element name="STATION_NAME" type="xs:string"/>
  <xs:element name="STATION_ID" type="xs:integer"/>
  <xs:element name="STATION_CITY" type="xs:string"/>
  <xs:element name="STATIONS">
```

```

    <xs:complexType>
      <xs:sequence>
        <xs:element ref="STATION" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:element name="STATION">
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="STATION_ID"/>
        <xs:element ref="STATION_NAME"/>
        <xs:element ref="STATION_CITY"/>
        <xs:element ref="STATION_STATE"/>
        <xs:element ref="REPORT" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:element name="SNOW_TOTAL">
    <xs:simpleType>
      <xs:restriction base="xs:integer">
        <xs:minInclusive value="1"/>
        <xs:maxInclusive value="36"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:element>
  <xs:element name="REPORT_DATE" type="xs:date"/>
  <xs:element name="REPORT">
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="REPORT_DATE"/>
        <xs:element ref="RECORDER_ID"/>
        <xs:element ref="STORM_ID"/>
        <xs:element ref="SNOW_TOTAL"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:element name="RECORDER_PHONE" type="xs:string"/>
  <xs:element name="RECORDER_NAME" type="xs:string"/>
  <xs:element name="RECORDER_ID" type="xs:integer"/>
  <xs:element name="RECORDER_EMAIL">
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:pattern value="[a-zA-Z]+@[a-zA-Z]+[.][a-zA-Z]{3}"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:element>
  <xs:element name="RECORDER_DOB" type="xs:date"/>
  <xs:element name="RECORDERS">
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="RECORDER" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:element name="RECORDER">
    <xs:complexType>

```

```

        <xs:sequence>
            <xs:element ref="RECORDER_ID"/>
            <xs:element ref="RECORDER_NAME"/>
            <xs:element ref="RECORDER_DOB"/>
            <xs:element ref="RECORDER_PHONE" minOccurs="1" maxOccurs="2"/>
            <xs:element ref="SUPERVISOR_ID" minOccurs="0"/>
            <xs:element ref="RECORDER_EMAIL"/>
        </xs:sequence>
    </xs:complexType>
</xs:element>
<xs:element name="INTERN_NAME" type="xs:string"/>
<xs:element name="INTERN_ID" type="xs:integer"/>
<xs:element name="INTERN_DOB" type="xs:date"/>
<xs:element name="INTERNS">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="INTERN" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
</xs:element>
<xs:element name="INTERN">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="INTERN_ID"/>
            <xs:element ref="INTERN_NAME"/>
            <xs:element ref="INTERN_DOB"/>
            <xs:element ref="COLLEGE" minOccurs="0"/>
            <xs:element ref="RECORDER_ID" minOccurs="0"/>
        </xs:sequence>
    </xs:complexType>
</xs:element>
<xs:element name="DATA">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="STORMS"/>
            <xs:element ref="RECORDERS"/>
            <xs:element ref="INTERNS"/>
            <xs:element ref="STATIONS"/>
        </xs:sequence>
    </xs:complexType>
</xs:element>
<xs:element name="COLLEGE">
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="Saint Rose"/>
            <xs:enumeration value="RPI"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>
</xs:schema>

```

Question 4

Use the files q4.xml and q4.xsd for this question. Include these files in your zip when you turn in this test.

Modify the file q4.xsd in the following ways:

- The STORM_ID of a STORM within STORMS within DATA is a key.
- The RECORDER_ID of a RECORDER within RECORDERS within DATA is a key.
- The INTERN_ID of a INTERN within INTERNS within DATA is a key.
- The STATION_ID of a STATION within STATIONS within DATA is a key.
- The SUPERVISOR_ID of a RECORDER within RECORDERS within DATA is a keyref that matches the key defined in RECORDER.
- The RECORDER_ID of an INTERN within INTERNS within DATA is a keyref that matches the key defined in RECORDER.
- The RECORDER_ID of a REPORT within STATION WITHIN STATIONS within DATA is a keyref that matches the key defined in RECORDER.
- The STORM_ID of a REPORT within STATION WITHIN STATIONS within DATA is a keyref that matches the key defined in STORM.

```
<xs:element name="DATA">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="STORMS"/>
      <xs:element ref="RECORDERS"/>
      <xs:element ref="INTERNS"/>
      <xs:element ref="STATIONS"/>
    </xs:sequence>
  </xs:complexType>
  <xs:key name="STORMPK">
    <xs:selector xpath="STORMS/STORM"/>
    <xs:field xpath="STORM_ID"/>
  </xs:key>
  <xs:key name="RECORDERPK">
    <xs:selector xpath="RECORDERS/RECORDER"/>
    <xs:field xpath="RECORDER_ID"/>
  </xs:key>
  <xs:key name="INTERNPCK">
    <xs:selector xpath="INTERNS/INTERN"/>
    <xs:field xpath="INTERN_ID"/>
  </xs:key>
  <xs:key name="STATIONPK">
    <xs:selector xpath="STATIONS/STATION"/>
    <xs:field xpath="STATION_ID"/>
  </xs:key>
  <xs:keyref name="SUPERVISORFK" refer="RECORDERPK">
    <xs:selector xpath="RECORDERS/RECORDER"/>
    <xs:field xpath="SUPERVISOR_ID"/>
  </xs:keyref>
</xs:element>
```

```
</xs:keyref>
<xs:keyref name="RECORDERFK" refer="RECORDERPK">
  <xs:selector xpath="INTERNS/INTERN"/>
  <xs:field xpath="RECORDER_ID"/>
</xs:keyref>
<xs:keyref name="RECORDERFK2" refer="RECORDERPK">
  <xs:selector xpath="STATIONS/STATION/REPORT"/>
  <xs:field xpath="RECORDER_ID"/>
</xs:keyref>
<xs:keyref name="STORMFK" refer="STORMPK">
  <xs:selector xpath="STATIONS/STATION/REPORT"/>
  <xs:field xpath="STORM_ID"/>
</xs:keyref>
</xs:element>
```