This homework assignment has 3 problems, for a total of 80 points.

1. This problem deals with architectures.
   (a) (8 points) Identify which of the following statements about three-tier architecture are true
       A. The main payoff of three-tier architectures is in improving system development and management
       B. Three-tier architectures separate presentation, business logic, and data access from each other
       C. Three-tier architectures make no sense unless you have installed DBMSs from at least two vendors
       D. When mobile computing becomes more prevalent in enterprises, three-tier architectures will need to be replaced by four-tier architectures
   (b) (8 points) Message-oriented middleware (mark all that are true)
       A. Guarantees reliable delivery of messages
       B. Can only be implemented via a minimum of three routers to route messages from a sender to a receiver
       C. Guarantees reliable delivery of messages or a failure notification to the sender
       D. Enables one receiver to subscribe to more than one topic
   (c) (8 points) Of the following statements, identify all that are true about open or closed environments:
       A. When implementing a large system, it is often advisable to treat a open environment as closed
       B. When implementing a large system, it is often advisable to treat a closed environment as open
       C. The set of components in an open environment can change (almost) arbitrarily
       D. Open environments presuppose the use of message-oriented middleware over which XML documents are exchanged
   (d) (4 points) The main ingredients of an architecture are
       A. Components and environments
       B. Components, organizations, and environments
       C. Interconnections, separations, and environments
       D. Components and interconnections
   (e) (12 points) Give an example for each of the following (enterprise) architecture modules.
      i. Example applications module:
      ii. Example systems module:
      iii. Example infrastructure module:
2. (10 points) List any three of the main uses of XML (in about 15 words total).

List 1: Unique songs nested in unique singers

```xml
<songs>
  <sgr name="Eagles" genre="rock">
    <song lg="en">Hotel California</song>
    <song lg="en">Seven Bridges Road</song>
  </sgr>
  <sgr name="H\text{\footnotesize{}\textregistered}Belafonte" genre="reggae">
    <song lg="cpe">Day O</song>
    <song lg="en">Jamaica Farewell</song>
  </sgr>
</songs>
```

Mark the appropriate choices to complete the following XML Schema snippets for Listing 1. Ignore the missing components and ignore namespaces.

```
xsd:element name="Songs" type="SongsT"/>

<xsd:complexType name="SongsT">
  <xsd:sequence>
    <xsd:element name="Sgr" type="SgrT" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>

<element name="Sgr" type="SgrT"/>

<complexType name="SgrT"> <!-- PART (a) --></complexType>

<complexType name="SongT"> <!-- PART (b) --></complexType>

(a) (15 points) The definition of SgrT should be

A. 
  <sequence>
    <element name="Song" type="SongT"/>
  </sequence>
  <attribute name="name" type="string"/>

B. 
  <sequence>
```
<element name="Song" type="SongT" maxOccurs="unbounded"/>
</sequence>
<attribute name="name" type="string"/>

C.
<sequence>
  <element ref="Song" type="SongT" maxOccurs="unbounded"/>
  <attribute name="name" type="string"/>
</sequence>

D.
<sequence>
  <element ref="Song" type="SongT" maxOccurs="unbounded"/>
  <attribute name="name" type="string"/>
</sequence>

(b) (15 points) The definition of SongT should be

E.
<sequence>
  <attribute name="lg" type="lgT"/>
</sequence>

F.
<sequence>
</sequence>
<attribute name="lg" type="lgT"/>

G.
<simpleContent>
  <attribute name="lg" type="lgT"/>
</simpleContent>

H.
<simpleContent>
  <extension base="string">
    <attribute name="lg" type="lgT"/>
  </extension>
</simpleContent>