

Homework 3 for CSC 513: E-Commerce Technologies

Collaborative Work

You may form teams of 1–4 members (of students in this class) to cooperate on this problem set. After discussing the problem, please write up your answers individually. Indicate the names of the other members in your team, if any.

1 XML Keys

- 1.1. (15 points) Write an XML key constraint to specify that songs of a given title can have at most entry for each singer (but allow that the same title may be sung by multiple singers).

2 XML and Relational Databases

- 2.1. (10 points) Show a relational schema corresponding to Listing 2 under the shallow representation approach. Identify the columns of each relation that you propose along with the keys of each relation.
- 2.2. (15 points) Write an SQL/XML query in the Oracle 9i style (as discussed in class) to answer the request:

Find the genres of all the singers who sung a song called 'Day O'.

3 XQuery

General remark. Don't over-do the use of fancy constructs. You should be able to get a lot done with FLWOR expressions and element and attribute constructors. It may help to use distinct-values for some of the queries. It is a good idea to define local functions to improve the readability of your query.

Consider the XML document in Listing 1.

Listing 1: XML input

```
<?xml version="1.0"?>
<!-- Sgr, lg, and ti abbreviate Singer, -->
<!-- language, and title, respectively. -->
<!-- The standard (ISO 639) codes for -->
<!-- English and Punjabi are en and pa, -->
<!-- respectively. -->
<Songs>
  <Sgr name='Eagles' genre='rock'>
```

```
<Song lg='en' ti='Hotel_California' />
<Song lg='en' ti='Seven_Bridges_Road' />
</Sgr>
<Sgr name='H_Belafonte' genre='reggae'>
  <Song lg='cpe' ti='Day_O' />
  <Song lg='en' ti='Jamaica_Farewell' />
</Sgr>
<Sgr name='J_Prasad' genre='classical'>
  <Song lg='him' ti='Ajahoon_Na_Bhejiho' />
  <Song lg='pa' ti='Mera_Dil_Darda' />
  <Song lg='en' ti='Never_a_Result' />
</Sgr>
</Songs>
```

- 3.1. (25 points) Write an XQuery query stylesheet that reads in Listing 1) and produces a list of songs in which Sgr is a subelement of Song and certain attributes are converted to text (see Listing 2). Document your answer.

Listing 2: XML output for Problem 3.1

```
<?xml version="1.0"?>
<SongList>
  <Song lg='en'>
    Hotel California
    <Sgr name='Eagles' genre='rock' />
  </Song>
  <Song lg='en'>
    Seven Bridges Road
    <Sgr name='Eagles' genre='rock' />
  </Song>
  <Song lg='cpe'>
    Day O
    <Sgr name='H_Belafonte' genre='reggae' />
  </Song>
  <Song lg='en'>
    Jamaica Farewell
    <Sgr name='H_Belafonte' genre='reggae' />
  </Song>
  <Song lg='him'>
    Ajahoon Na Bhejiho
    <Sgr name='J_Prasad' genre='classical' />
  </Song>
  <Song lg='pa'>
    Mera Dil Darda
    <Sgr name='J_Prasad' genre='classical' />
  </Song>
  <Song lg='en'>
    Never a Result
    <Sgr name='J_Prasad' genre='classical' />
  </Song>
</SongList>
```

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Independent Work

You must solve this problem set individually without any assistance from anyone.

4 XML Keys

- 4.1. (15 points) Write an XML key constraint to specify that songs of a given title can have at most entry for each singer and each genre (but allow that the same title may be sung by multiple singers). For example, Harry Belafonte may sing *Jamaica Farewell* in each of the genres of *reggae*, *a cappella*, and *madrigal*, but no more than once in any genre.

5 XML and Relational Databases

- 5.1. (15 points) Write an SQL/XML query in the Oracle 9i style (as discussed in class) to answer the request:

Find the genres of all the singers whose convictions include freedom.

6 XQuery

- 6.1. (25 points) Write an XQuery query that reads in Listing 1) and produces a list of songs in which Sgr is a subelement of Song and the genre attribute of Sgr are placed as an attribute on Song (see Listing 3). Document your answer.

Listing 3: XML output for Problem 6.1

```

<?xml version="1.0"?>
<SongList>
  <Song lg='en' genre='rock'>
    <Sgr name='Eagles' />
    Hotel California
  </Song>
  <Song lg='en' genre='rock'>
    <Sgr name='Eagles' />
    Seven Bridges Road
  </Song>
  <Song lg='cpe' genre='reggae'>Day O
    <Sgr name='H_Belafonte' />
  </Song>
  <Song lg='en' genre='reggae'>
    <Sgr name='H_Belafonte' />
    Jamaica Farewell
  </Song>
  <Song lg='him' genre='classical'>
    <Sgr name='J_Prasad' />
    Ajahoon Na Bhejiho
  </Song>
  <Song lg='pa' genre='classical'>
    <Sgr name='J_Prasad' />
    Mera Dil Darda
  </Song>
  <Song lg='en' genre='classical'>
    <Sgr name='J_Prasad' />
    Never a Result
  </Song>
</SongList>

```