1. Design an EER schema (in the style of those found in Chapter 4 of Elmasri & Navathe) for the following set of requirements pertaining to a CHILDREN-SPORTS-LEAGUE database application. I admit that a few of the requirements may be a little contrived, but the intent was to provide you with the opportunity to make use of concepts introduced in Chapter 4, including specialization/generalization and categorization/union. Also, look for an opportunity to employ a ternary relationship type.

Note that a player cannot be a coach, parent, or driver, but a member of any of the last three can be a member of either (or both) of the others.

Each coach:

- has a name that uniquely identifies her/him
- has a telephone number, mailing address, and e-mail address
- coaches exactly one team

Each player:

- has a birth date
- plays on one team
- has a name that, in combination with the team on which (s)he plays, uniquely identifies her/him
- has one or more parents
- has a telephone number

Each parent:

- has a name that uniquely identifies her/him
- has a telephone number, mailing address, and e-mail address
- is the parent of one or more players

Each driver (i.e., someone able to transport players and/or coaches to games):

- has a name that uniquely identifies her/him
- has a telephone number, mailing address, and e-mail address
• can transport at most a certain number of players/coaches at a time

Each team:

• has a name that uniquely identifies it
• has one or more coaches
• has a set of players who play for it
• is involved in games against other teams

Each piece of equipment (e.g., bat, glove, ball, helmet):

• is owned by either a team, player, coach, or parent
• has a description that, in combination with who owns it, uniquely identifies it

Each game:

• was either played (in the past) or is scheduled to be played (in the future)
• was played on (or is scheduled to be played on) some calendar date
• involves two teams, one playing the role of the home team and the other playing the role of the away team
• is uniquely identified by the above two items (i.e., teams and date)

Each played game:

• has a final score (consisting of some number of points for each of the two teams)

Each scheduled game:

• is scheduled to be played on some particular field.

Each field:

• has a name that uniquely identifies it
• has a location
2. For each of the following "update" operations, indicate (by placing marks in the appropriate boxes) which relational constraints would be violated if the operation were applied to the COMPANY database snapshot illustrated in Figure 5.6 (page 137) of Elmasri & Navathe (4th edition) (or Figure 7.6, page 205, 3rd edition). (Assume that no tuple other than the one mentioned is modified in any way.)

For each delete operation, identify all tuples (other than the one mentioned) that would be removed from the database assuming that the cascade option were in effect. (See page 142 of E&N (4th ed.) or page 210 (3rd ed.).)

<table>
<thead>
<tr>
<th>Operation #</th>
<th>Domain</th>
<th>Key</th>
<th>Entity Integrity</th>
<th>Referential Integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Insert</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Insert</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Insert</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Insert</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) Delete</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) Delete</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g) Change</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(h) Change</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


(b) Insert (‘ProductA’, 4, ‘Scranton’, 2) into PROJECT.

(c) Insert (‘Production’, 4, ‘913775543’, ‘1998-02-30’) into DEPARTMENT.

(d) Insert (‘333445555’, null, 40.0) into WORKS_ON.

(e) Delete the tuple with key (‘333445555’, 2) from WORKS_ON.

(f) Delete the tuple with key (‘888665555’) from EMPLOYEE.

(g) Change the PName attribute of the PROJECT tuple with key 20 to ‘Disorganization’.

(h) Change the DNum attribute of the PROJECT tuple with key 20 to 2.