

Database Design and Implementation  
Chapter 7 Conceptual Exercises

Questions	Answers
7.1.	<p>For the <b>tblcat</b> table:</p> <ol style="list-style-type: none"> <li>1. <b>tblname</b>: The name of the table.</li> <li>2. <b>slotsize</b>: The number of bytes required for each record of the table.</li> </ol> <p>For the <b>fldcat</b> table:</p> <ol style="list-style-type: none"> <li>1. <b>tblname</b>: The name of the table.</li> <li>2. <b>fldname</b>: The name of the field.</li> <li>3. <b>type</b>: The type of the field (int, string, etc.).</li> <li>4. <b>length</b>: The length of the field.</li> <li>5. <b>offset</b>: The number of bytes between the field and the beginning of the record.</li> </ol> <p>When <b>TableMgr</b> is initialized with <b>isNew</b> as true, it creates the <b>tblcat</b> and <b>fldcat</b> tables.</p> <p>For <b>tblcat</b>:</p> <ul style="list-style-type: none"> <li>• <b>tblname</b> is "tblcat" and "fldcat".</li> <li>• <b>slotsize</b> is derived from the <b>Layout</b> object of the respective tables.</li> </ul> <p>For <b>fldcat</b>: For each field in the schema of the table (either <b>tblcat</b> or <b>fldcat</b>):</p> <ul style="list-style-type: none"> <li>• <b>tblname</b> is either "tblcat" or "fldcat".</li> <li>• <b>fldname</b>, <b>type</b>, <b>length</b>, and <b>offset</b> are set based on the field's details in the schema.</li> </ul>
7.2.a.	<ol style="list-style-type: none"> <li>1. <b>T1 -&gt; T2</b>: T1 completes before T2 starts.</li> <li>2. <b>T2 -&gt; T1</b>: T2 completes before T1 starts.</li> <li>3. <b>Interleaved</b>: Operations of T1 and T2 are mixed. For instance, T1 might start creating table X, and before it completes, T2 might start creating table Y. They could also interleave in various other combinations.</li> </ol>
7.2.b.	<p>No, T1 and T2 cannot deadlock based on the provided code. Each transaction, when creating a table, accesses the <b>tblcat</b> and <b>fldcat</b> tables sequentially and releases them after use. Since there's no cyclic wait for resources, a deadlock situation cannot occur.</p>
7.3.	<ol style="list-style-type: none"> <li>1. <b>Retrieve Table Metadata</b>: <ul style="list-style-type: none"> <li>• Use the <b>getLayout</b> method to retrieve the layout and schema of the existing table.</li> </ul> </li> <li>2. <b>Modify the Schema</b>: <ul style="list-style-type: none"> <li>• Add the new field and its details (type, length, etc.) to the retrieved schema.</li> </ul> </li> <li>3. <b>Create a Temporary Table</b>: <ul style="list-style-type: none"> <li>• Using the modified schema, create a temporary table.</li> </ul> </li> <li>4. <b>Copy Data</b>:</li> </ol>

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- For each record in the original table, copy the data to the temporary table. For the new field, initialize it with a default value or NULL.

5. **Update Metadata Tables:**

- Remove the original table's metadata from **tblcat** and **fldcat**.
- Add the metadata of the temporary table (with the original table's name) to **tblcat** and **fldcat**.

6. **Swap Tables:**

- Delete the original table.
- Rename the temporary table to the original table's name.

7. **End:**

- The original table now has the new field added.

This approach ensures the table's consistency and manages the addition of a new field without data loss.