A Report on Implementing Relation Table in Python

Relational Databases:
Relational databases store data in different tables and each table contains multiple records. These tables are connected using one or more relations.

Data Structure:
A relational schema is a set of relational tables and associated items that are related to one another. All of the base tables, views, indexes, domains, user roles, stored modules, and other items that a user creates to fulfill the data needs of a particular enterprise or set of applications belong to one schema.

Relation Table:
The RelationalTable class is designed to represent a table in a database. It has four attributes:

src - This attribute stores the source of the data, which can be either a file path or a dictionary. This indicates where the data for the table is coming from.

relations - This attribute stores the relationships between tables. In a relational database, tables can have relationships with other tables through keys, such as foreign keys. This attribute can be used to define and manage such relationships.

data - This attribute stores the actual data in the table. It could be a collection of rows and columns that represent the records and fields of the table. This attribute is used to store and manipulate the data in the table.

primary_key - This attribute stores the primary key for the table. A primary key is a unique identifier for each record in a table, and it is used to uniquely identify each row in the table.

The constructor method, **init()**, is responsible for initializing the attributes of the Relational Table class. If the source (i.e., the data) is provided as a file path or a string, the method reads the data from that file. Otherwise, if the source is a variable, it is used directly as the data for the table. The method also initializes the relations and data attributes of the table, which can be used to define relationships between tables and store the actual data in the table, respectively.

First Subtask : Storing and querying the data

Q>The table for the relational database must have the following properties:

1. It should have a PRIMARY KEY.
2. We can query data using multiple different types of keys.
3. We can see what tables it has relations with.

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_set() method:
The _set method is a private method within the Relational Table class.It is intended to initialize the data attribute of the class with data from the src attribute, which can be a dictionary containing row labels and column data. The function is used for indexing the rows and columns of given dataset and raise the error if duplicate primary keys present.

query() method:
The query method in the RelationalTable class is used to retrieve data from the table based on the specified query method. The method takes two arguments - key, which represents the key or index to query, and method, which specifies the method to use for querying the data.

The method parameter has four possible values: "key-row", "row-col", "row", and "col".

If method is set to "key-row", the key parameter is expected to be a tuple containing two values: the row key and the column key. The method retrieves the data at the specified row and column using dictionary indexing and prints the result.

If method is set to "row-col", the key parameter is expected to be a tuple containing two values: the row key and the column index. The method retrieves the data at the specified row and column index using list indexing and prints the result.

If method is set to "row", the key parameter is expected to be an integer representing the row index. The method retrieves the data at the specified row index using dictionary indexing and prints the result.

If method is set to "col", the key parameter can be either an integer or a string representing the column index or the column label, respectively. The method retrieves the data at the specified column using either list indexing (if key is an integer) or dictionary indexing (if key is a string) and prints the result.

Second Subtask: Building Relation b/w two Tables

Q> Create an Imaginary data which contains at least one set of datapoints which can be related to the data provided. Create another table and relate it with the first one.
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Relate() Method:
This method is used to merge the data of the current table with another table based on a common key. It first initializes the data of other table using the _set() method. Then, it iterates over the data of both tables, comparing the values of the specified key. If the values match, it merges the items from both tables and updates the data attribute of the current table with the merged data.

Conclusion:
The code implements a class called "RelationalTable" which is used to create and manage relational tables from data stored in dictionaries. By using Methods implemented building Query's for the Table and Relations b/w one Table to Another.