

Class Exercise – 12.1

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Submission: Save this Word document with your answers as a PDF file and upload the PDF file to Canvas.

Database Distribution

The following data structure and constraints exist for a magazine publishing company.

- The company publishes one regional magazine each in Florida (FL), South Carolina (SC), Georgia (GA), and Tennessee (TN).
- The company has 300,000 customers (subscribers) distributed throughout the four states listed in Part 2a.
- On the first of each month, an annual subscription INVOICE is printed and sent to each customer whose subscription is due for renewal. The INVOICE entity contains a REGION attribute to indicate the customer's state of residence (FL, SC, GA, TN):

CUSTOMER (CUS_NUM, CUS_NAME, CUS_ADDRESS, CUS_CITY, CUS_STATE, CUS_ZIP,
CUS_SUBSDATE)

INVOICE (INV_NUM, INV_REGION, CUS_NUM, INV_DATE, INV_TOTAL)

The company is aware of the problems associated with centralized management and has decided that it is time to decentralize the management of the subscriptions in its four regional subsidiaries. Each subscription site will handle its own customer and invoice data. The management at company headquarters, however, will have access to customer and invoice data to generate annual reports and to issue ad hoc queries, such as:

- List all current customers by region.
- List all new customers by region.
- Report all invoices by customer and by region.

Given the scenario and the requirements in Problem 2, answer the following questions:

1. Given these requirements, how must you partition the database?

Partition the database horizontally by state.

2. What recommendations will you make regarding the type and characteristics of the required database system?

The database is distributed in the regions (South Carolina, Georgia, Florida, and Tennessee) and needs to support distributed transparency features.

3. What type of data fragmentation is needed for each table?

The database must be horizontally partitioned using the STATE attribute for the CUSTOMER table, and for the INVOICE table it should be partitioned by REGION.

4. What must be the criteria used to partition each database?

The criteria is based on the state for the customer table.

5. Design the database fragments. Show an example with node names, location, fragment names, attribute names, and demonstration data.

Fragment C1 ; Location: Tennessee

CUS_NUM	CUS_NAME	CUS_ADDRESS	CUS_CITY	CUS_STATE	CUS_SUB_DATE
1	Bob Jones	Sample Address	Nashville	TN	1-OCT-2022

Fragment C2 – Location Georgia

CUS_NUM	CUS_NAME	CUS_ADDRESS	CUS_CITY	CUS_STATE	CUS_SUB_DATE
2	John Doe	Sample Address	Atlanta	GA	2-OCT-2022

Fragment C3 – Location - Florida

CUS_NUM	CUS_NAME	CUS_ADDRESS	CUS_CITY	CUS_STATE	CUS_SUB_DATE
3	Jane Doe	Sample Address	Tampa	FL	3-OCT-2022

Fragment C4 – Location – South Carolina

CUS_NUM	CUS_NAME	CUS_ADDRESS	CUS_CITY	CUS_STATE	CUS_SUB_DATE
4	Mike Smith	Sample Address	Charleston	SC	4-OCT-2022

Fragment I1 – Location Tennessee

INV_NUM	REGION_CODE	CUS_NUM	INV_DATE	INV_TOTAL
1	TN	1	1-OCT-2022	101.10

Fragment I2 – Location Georgia

INV_NUM	REGION_CODE	CUS_NUM	INV_DATE	INV_TOTAL
2	GA	2	2-OCT-2022	50.10

Fragment I3 – Location Florida

INV_NUM	REGION_CODE	CUS_NUM	INV_DATE	INV_TOTAL
3	FL	3	3-OCT-2022	60.10

Fragment I1 – Location South Carolina

INV_NUM	REGION_CODE	CUS_NUM	INV_DATE	INV_TOTAL
4	SC	4	4-OCT-2022	75.00