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Streamline Access to Census Data

Executive Summary

This database system is designed to streamline access to census data, making it easier for users to obtain and analyze information such as demographic statistics, the names, and the occupations of different census users. The system will address the challenges of obtaining and maintaining large amounts of data, ensuring efficient data retrieval and analysis for various groups requiring the data, such as researchers, policymakers, analysts, and statisticians.

Design Documents

Analysis

Using a design such as the Database Life Cycle is of the utmost importance in database development. The Database Life Cycle provides a systematic approach to planning, maintaining, and creating the database, ensuring it is stable and reliable and performs as needed when obtaining data. To develop a database, there is a plethora of requirements and stages of development, such as design, implementation, testing, and maintenance, each contributing to reducing errors, improving data integrity, and future-proofing the database.

User Requirements

The purpose of user requirements documentation is to capture the needs and expectations of end users. It ensures that the final system is built to meet the needs of users, whether they are interested in demographic patterns, population statistics, or other census-related data. This documentation guides developers to create a database that aligns with user objectives.

Conceptual Design

Definition

The conceptual design refers to the structures of the data without actually delving into the data; it sort of refers to the blueprints and idea of the data structure without going into detail about the construction and details of the database

The purpose of conceptual data is to develop a clear and high-level representation of the database's structure, and to create a high-level, abstract representation of an organization's data requirements, focusing on the key business concepts and their relationships

An ERD is a visual representation of the database structure, showing entities, their attributes, and the relationships between them. An example ERD would show entities such as 'Individuals', 'Households', and 'Regions', with relationships connecting individuals to their households and households to specific regions that can also include demographics of specific census takers

```
CREATE TABLE Demographics (  
    Person_ID INT PRIMARY KEY,  
    FirstName VARCHAR(50),  
    LastName VARCHAR(50),  
    Age INT,  
    Gender CHAR(1),  
    Household_ID INT,  
    Region_ID INT,  
);
```

```
INSERT INTO Demographics (Person_ID, FirstName, LastName, Age,  
Gender, Household_ID, Region_ID)  
VALUES  
(1, 'Kevin', 'Johnson', 34, 'M', 101, 1),  
(2, 'Bob', 'Smith', 45, 'M', 102, 1),  
(3, 'Carol', 'Davis', 29, 'F', 103, 2),  
(4, 'David', 'Lee', 36, 'M', 104, 3),  
(5, 'Jane', 'Doe', 28, 'F', 105, 2),
```

Critical Analysis

In building the database, I mainly kept true to the original design of the database; however, some adjustments were needed to format the database so that it would work in tandem with obtaining census data. Additionally, I increased the size of some fields (like `LastName`) after realizing that certain entries were longer than anticipated. These changes ensured the database's flexibility and accuracy when handling real-world data

Application (User Interface)

One of the forms will display data from the “Demographics table,” which includes the person’s ID, first name, last name, age, gender, household ID, and region ID. Another form displays data from the “Household table,” which displays the householder’s information

Both forms are designed with usability in mind, using clear labels and ensuring a logical flow of information. The interface is designed to be accessible to all user groups, including older adults, with considerations such as larger font sizes and simplified navigation, and other users who aren’t as tech-savvy, making navigation as easy as possible

Queries

Joining 2 or more tables

qryHouseholdMembers allows you to view all members of the household

```
SELECT d.FirstName, d.LastName, h.Household_Address
FROM Demographics d
JOIN Households h ON d.Household_ID = h.Household_ID;
```

Aggregate Function

qryPopulationRegion allows you to view the population by region

```
SELECT r.Region_Name, COUNT(d.Person_ID) AS Population
FROM Demographics d
JOIN Regions r ON d.Region_ID = r.Region_ID
GROUP BY r.Region_Name;
```

Group by Statement

qryAverageAgeRegion allows you to view the average age per region

```
SELECT r.Region_Name, AVG(d.Age) AS Average_Age
FROM Demographics d
JOIN Regions r ON d.Region_ID = r.Region_ID
GROUP BY r.Region_Name;
```

Sort Data

qrySortDemoLastName allows you to sort the demographic data by last name

```
SELECT *
FROM Demographics
ORDER BY LastName ASC;
```

Query Results

qryHouseholdMembers

First Name	Last Name	Household_Address
Kevin	Johnson	123 Maple St.
Bob	Smith	456 Oak St.
Carol	Davis	789 Pine St.
David	Lee	101 Birch St.
Jane	Doe	202 Cane St.

qryPopulationRegion

Region_Name	Population
Region 1	2
Region 2	2
Region 3	1

qryAverageAgeRegion

Region_Name	Average_Age
Region 1	56.5
Region 2	43
Region 3	36

qrySortDemoLastName

Person_ID	FirstName	LastName	Age	Gender	Household	Region_ID
3	Carol	Davis	29	F	103	2
5	Jane	Doe	28	F	105	2
1	Kevin	Johnson	34	M	101	1
4	David	Lee	36	M	104	3
2	Bob	Smith	45	M	102	1

Conclusion

In this project, a database system was designed and implemented to address the need for easy access to census data. The system facilitates the storage, retrieval, and analysis of demographic information, making it valuable for users such as researchers and policymakers. The design process followed the Database Life Cycle, ensuring that the database was built to meet user requirements and maintain data integrity.

The database structure, represented by an ERD, successfully captured key entities such as individuals, households, and regions, and the relationships between them. Though the initial design was largely followed, some adjustments were made during the build, such as modifying field sizes and adding foreign keys to improve data linkage.

In conclusion, the project met its goals of organizing census data in a structured and accessible way. The design process, from conceptualization to implementation, highlighted the importance of flexibility and user-focused design in building a practical and effective database system. Future enhancements may involve optimizing performance as data volumes grow and further refining the interface for specific user needs.