

CPSC332: Final Project

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OBJECTIVES:

- Establish associations between tables through various techniques including basic queries, subqueries, complex queries, and joins
- Analyze the interconnected dataset to extract valuable insights and derive conclusions
- Gather relevant and accurate data for each of the newly integrated tables
- Improve the World Database by introducing key tables like Country, CountryLanguage, and City

Original Tables:

Table: **Country**

Columns:

Code	CHAR(3)
Name	CHAR(52)
Continent	ENUM('Africa','Antartica','Asia','Europe','Oceania','North America','South America')
Region	CHAR(26)
SurfaceArea	FLOAT(10,2)
IndepYear	SMALLINT
Population	INT
LifeExpectancy	FLOAT(3,1)
GNP	FLOAT(10,2)
GNPOld	FLOAT(10,2)
LocalName	CHAR(45)
GovernmentForm	CHAR(45)
HeadOfState	CHAR(60)
Capital	INT
Code2	CHAR(2)

Table: **City**

Columns:

ID	INT
Name	CHAR(35)
CountryCode	CHAR(3)
District	CHAR(20)
Population	INT
Country_Code	CHAR(3)

Table: **CountryLanguage**

Columns:

CountryCode	CHAR(3)
Language	CHAR(30)
IsOfficial	ENUM('T' , 'F')
Percentage	FLOAT(4,1)
Country_Code	CHAR(3)

Added Tables:

Table: Military

Columns:

CountryCode	VARCHAR(3)
CountryName	CHAR(52)
ActiveDutyPersonnel	INT
ReservePersonnel	INT
MilitarySpending	INT
Tanks	INT
Aircrafts	INT
ConscriptArmy	ENUM('T','F')

Table: Economy

Columns:

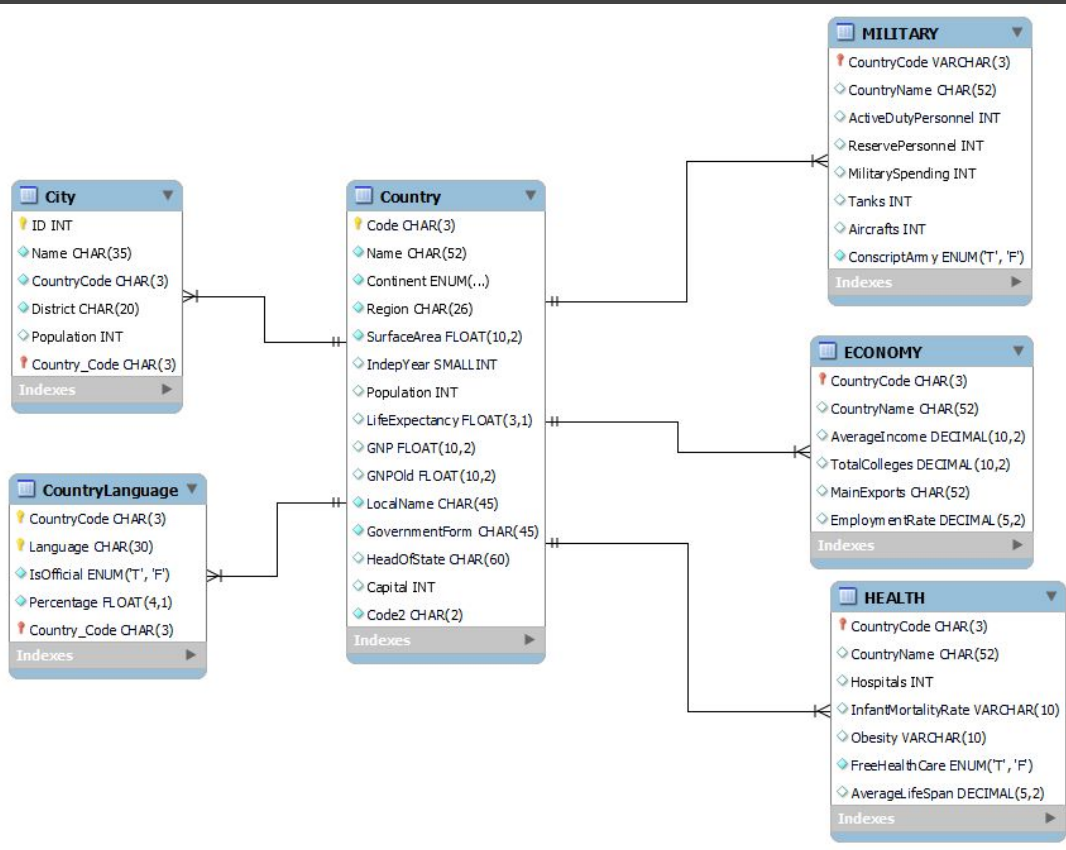
CountryCode	CHAR(3)
CountryName	CHAR(52)
AverageIncome	DECIMAL(10,2)
TotalColleges	DECIMAL(10,2)
MainExports	CHAR(52)
EmploymentRate	DECIMAL(5,2)

Table: Health

Columns:

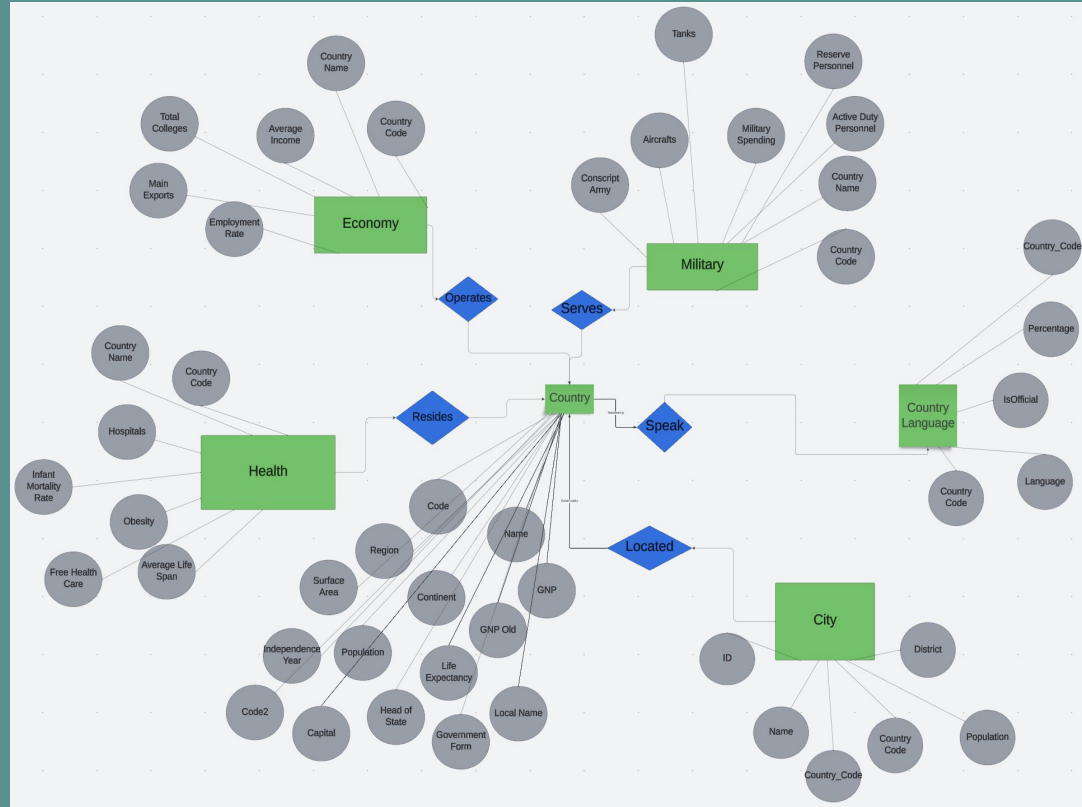
CountryCode	CHAR(3)
CountryName	CHAR(52)
Hospitals	INT
InfantMortalityRate	VARCHAR(10)
Obesity	VARCHAR(10)
FreeHealthCare	ENUM('T','F')
AverageLifeSpan	Decimal(5,2)

Physical ER Diagram

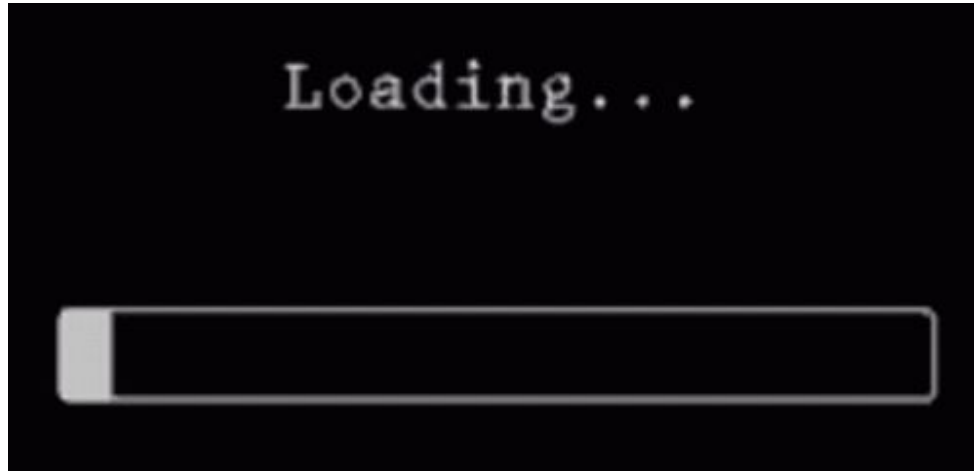


Conceptual ER Diagram:

- Diverse range of connections between entities: Many-to-One and One-to-One relationships
- Each entity has several attributes
- “Country” serves as a central point of reference for other entities
 - Implies a clear and structured connection hierarchy with “Country” as a central anchor point



Database Investigation



Basic Queries:

```
SELECT CountryCode, CountryName, AverageIncome, EmploymentRate, TotalColleges
FROM Economy
WHERE TotalColleges > 200;
```



	CountryCode	CountryName	AverageIncome	EmploymentRate	TotalColleges
	ARG	Argentina	15656.00	40.00	210.00
	BRA	Brazil	18392.00	55.00	221.00
	CHN	China	13608.00	59.00	2433.00
	DEU	Germany	47229.00	75.00	409.00
	IDN	Indonesia	4579.00	60.00	459.00
	IND	India	6151.00	50.00	3866.00
	IRN	Iran	19571.00	45.00	303.00
	JPN	Japan	42659.00	61.00	781.00
	PHL	Philippines	3317.00	60.00	217.00
	RUS	Russian Federation	10956.00	72.00	741.00
	TUR	Turkey	10193.00	55.00	206.00
	USA	United States	65215.00	62.00	5094.00
	VNM	Vietnam	2565.00	68.00	415.00

```
USE world;
SELECT c.Name AS Country, c.SurfaceArea, c.Population, (c.Population / c.SurfaceArea) AS PopulationDensity
FROM Country c
ORDER BY PopulationDensity DESC;
```



Country	SurfaceArea	Population	PopulationDensity
Macao	18.00	473000	26277.777778
Monaco	1.50	34000	22666.666667
Hong Kong	1075.00	6782000	6308.837209
Singapore	618.00	3567000	5771.844660
Gibraltar	6.00	25000	4166.666667
Holy See (Vatican City State)	0.40	1000	2499.999963
Bermuda	53.00	65000	1226.415094
Malta	316.00	380200	1203.164557
Maldives	298.00	286000	959.731544
Bangladesh	143998.00	129155000	896.922179
Bahrain	694.00	617000	889.048991
Barbados	430.00	270000	627.906977
Taiwan	36188.00	22256000	615.010501
Nauru	21.00	12000	571.428571
Mauritius	2040.00	1158000	567.647059
Aruba	193.00	103000	533.678756
Palestine	6257.00	3101000	495.604922
South Korea	99434.00	46844000	471.106463
Tuvalu	26.00	12000	461.538462
San Marino	61.00	27000	442.622951
Puerto Rico	8875.00	3869000	435.943662
Mayotte	373.00	149000	399.463807

Examples of Subquery:

```
USE world;  
SELECT Name AS Country, GNP  
FROM country  
WHERE GNP = (SELECT MAX(GNP) FROM country)  
ORDER BY GNP DESC;
```



Country	GNP
United States	8510700.00

```
SELECT CountryName, Hospitals  
FROM HEALTH  
WHERE Hospitals > (  
    SELECT AVG(Hospitals / Population)  
    FROM HEALTH AS h  
    JOIN Country AS c ON h.CountryCode = c.Code
```



CountryName	Hospitals
Argentina	1690
Austria	184
Azerbaijan	510
Burundi	224
Belgium	207
Burkina Faso	119
Bulgaria	334
Brazil	6670
Canada	1200
Switzerland	313
Chile	360
China	30000
Cameroon	189

Join Queries Examples:

```
USE world;
SELECT c.Name AS Country
FROM country c
JOIN economy e ON c.Code = e.CountryCode
WHERE e.EmploymentRate > 70;
```

Country

United Arab Emirates

Burundi

Burkina Faso

Cameroon

Germany

United Kingdom

Russian Federation

```
USE world;
SELECT c.Name AS Country, cl.Language, cl.Percentage
FROM Country c
JOIN CountryLanguage cl ON c.Code = cl.CountryCode
ORDER BY Percentage DESC;
```

Country	Language	Percentage
Cape Verde	Crioulo	100.0
Cuba	Spanish	100.0
Dominica	Creole English	100.0
Western Sahara	Arabic	100.0
Faroe Islands	Faroese	100.0
Grenada	Creole English	100.0
Haiti	Haiti Creole	100.0
Saint Kitts and Nevis	Creole English	100.0
Maldives	Dhivehi	100.0
Rwanda	Rwanda	100.0
El Salvador	Spanish	100.0
San Marino	Italian	100.0
South Korea	Korean	99.9

Summary

- Project: Developed and analyzed a comprehensive 'World' database
 - Included tables: 'Country', 'CountryLanguage', 'City', 'Military', 'Health', and 'Economy'
- Purpose: Gain insights into global demographics, health stats, militaries, and economies
- Process:
 - Determined entities and relationships, creating an **ER diagram**
 - Created tables based on entity relationships
 - Populated the database with relevant information
- Analysis:
 - Ran investigative queries to understand relationships between traits
- Conclusion: Database serves as a valuable tool for studying global trends and correlations

PROJECT DEMO