Code Explanation Report

Table of Contents

1. Database and Table Creation (Code and Results Interpretation)

```
CREATE DATABASE world_bank_data;

USE world_bank_data;
```

Explanation: Creates a new database called 'world_bank_data' and sets it as the active database for subsequent operations.

```
-- Table 1 locations with location_id as the primary key

CREATE TABLE locations (

location_id INT PRIMARY KEY,

country VARCHAR(50),

countryiso3code VARCHAR(10),

region VARCHAR(50)

);
```

Explanation: This table stores information about each location (country), with location_id as the primary key. It includes columns for the country name, ISO3 code, and region. This serves as a foundational table for linking location data to other indicators.

-- Table 2 economic_indicators with indicator_id as primary key

CREATE TABLE economic_indicators (

indicator_id INT PRIMARY KEY,

location_id INT,

country VARCHAR(50),

date DATE,

gdp_usd DECIMAL(15,2),

gdp_per_capita_usd DECIMAL(15,2),

inflation_rate DECIMAL(5,2),

fdi_usd DECIMAL(15,2),

exports_gdp DECIMAL(5,2),

unemployment_rate DECIMAL(5,2),

unemployment_growth_rate DECIMAL(5,2),

gdp_growth_rate DECIMAL(5,2),

high_gdp TINYINT,

FOREIGN KEY (location_id) REFERENCES locations(location_id)

);

Explanation: Stores economic_indicators, such as GDP, inflation, FDI, and unemployment, with indicator_id as the primary key. The location_id serves as a foreign key, linking each record to the locations table.

-- Table 3 demographic_indicators with demographic_id as primary key

CREATE TABLE demographic_indicators (

demographic_id INT PRIMARY KEY,

location_id INT,

country VARCHAR(50),

date DATE,

population_total INT,

population_growth DECIMAL(5,2),

urban_population DECIMAL(5,2),

urbanization_rate_change DECIMAL(5,2),

life_expectancy DECIMAL(5,2),

child_mortality_rate DECIMAL(5,2),

primary_school_enrollment DECIMAL(5,2),

FOREIGN KEY(location_id) REFERENCES locations(location_id)

);

Explanation: Contains demographic data, including population growth, life expectancy, and urbanization rates, with demographic_id as the primary key. It's linked to locations via location_id for cross-referencing.

-- Table 4 sustainable_indicators with sustainable_id as primary key

CREATE TABLE sustainable_indicators (

sustainable_id INT PRIMARY KEY,

location_id INT,

country VARCHAR(50),

date DATE,

access_electricity DECIMAL(5,2),

renewable_energy_consumption DECIMAL(5,2),

FOREIGN KEY (location_id) REFERENCES locations(location_id)

);

Explanation: This table #4 stores data related to sustainability, such as access to electricity and renewable energy consumption, with sustainable_id as the primary key. The location_id foreign key connects it to the locations table.

-- View a Sample of Data

SELECT * FROM economic_indicators LIMIT 10;

indicator_id	location_id	country	date	gdp_usd	gdp_per_capita_u...	inflation_ra...	fdi_usd	exports_gdp	unemployment_r...	unemployment_growth_r...
▶ 2	2	Albania	1993-01-01	1185315468.46	367.28	30.85	58000000.00	15.98	19.78	-1.46
3	3	Albania	1994-01-01	1880950864.41	586.42	37.81	53000000.00	11.98	19.78	-1.46
4	4	Albania	1995-01-01	2392764853.42	750.60	40.75	70000000.00	12.64	14.61	-1.46
5	5	Albania	1996-01-01	3199640815.42	1009.98	45.94	90100000.00	11.62	13.93	-0.68
6	6	Albania	1997-01-01	2258513974.10	717.38	61.18	47500000.00	10.20	16.87	1.28
7	7	Albania	1998-01-01	2545964540.88	813.79	73.81	45010000.00	11.47	19.78	1.28
8	8	Albania	1999-01-01	3212121650.98	1033.24	74.10	41200000.00	16.84	19.78	0.79
9	9	Albania	2002-01-01	4348068242.20	1425.12	82.38	135000000.00	20.95	17.89	-1.46
10	10	Albania	2003-01-01	5611496257.14	1846.12	82.78	178036400.67	20.85	16.99	-0.91
11	11	Albania	2004-01-01	7184685781.52	2373.58	84.67	341285112.54	22.22	16.31	-0.68
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

economic_indicators 1

Apply

Explanation: Retrieves the first 10 rows from the economic_indicators table to display a sample of the data for verification and inspection purposes.

-- Countries with the Highest GDP Growth Rate

SELECT country, date, gdp_growth_rate

FROM economic_indicators

ORDER BY gdp_growth_rate DESC

LIMIT 100;

country	date	gdp_growth_r...	
Solomon Islands	2005-01-01	35.16	
Brunei Darussa...	2011-01-01	35.15	
Qatar	2004-01-01	34.84	
Nepal	2011-01-01	34.81	
Belarus	2008-01-01	34.18	
Kenya	2019-01-01	34.17	
Kyrgyz Republic	2007-01-01	34.17	
Namibia	2004-01-01	34.16	
Qatar	2011-01-01	34.09	
Estonia	2003-01-01	34.01	
Albania	1996-01-01	33.72	
El Salvador	1995-01-01	33.56	

economic_indicators 4

Explanation: This query lists the top 10 countries with the highest GDP growth rate, providing insight into the fastest-growing economies based on the data available.

-- Count the Number of Records per Country

SELECT country, COUNT(*) AS record_count

FROM economic_indicators

GROUP BY country

ORDER BY record_count DESC;

country	record_cou...
Australia	30
Austria	30
Belize	30
Brunei Darussalam	30
Bulgaria	30
Finland	30
France	30
Germany	30
Hungary	30
Iceland	30
Indonesia	30

Result 5

Interpretation: This query counts the number of records for each country in the economic_indicators table. This helps identify which countries have more data points, indicating a richer dataset for those regions.

-- Top 10 Countries with the Highest Renewable Energy Consumption

SELECT country, renewable_energy_consumption

FROM sustainable_indicators

ORDER BY renewable_energy_consumption DESC

LIMIT 10;

country	renewable_energy_consumpt...
Congo, Dem. Rep.	98.30
Congo, Dem. Rep.	97.20
Congo, Dem. Rep.	97.00
Congo, Dem. Rep.	97.00
Congo, Dem. Rep.	96.80
Congo, Dem. Rep.	96.20
Burundi	96.00
Burundi	96.00
Congo, Dem. Rep.	95.80
Congo, Dem. Rep.	95.50

sustainable_indicators 6

Interpretation: Retrieves the top 10 countries with the highest renewable energy consumption, highlighting the leaders in renewable energy usage.

-- Average Unemployment Rate by Year

SELECT YEAR(date) AS year, AVG(unemployment_rate) AS avg_unemployment

FROM economic_indicators

GROUP BY year

ORDER BY year;

year	avg_unemployme...
1992	30.574359
1993	26.849608
1994	7.985167
1995	18.776875
1996	8.299306
1997	7.830571
1998	17.247200
1999	36.509059
2000	36.037857
2001	38.930000
2002	29.865882
2003	37.050874
2004	20.148155
2005	13.045701
2006	27.054128
2007	17.685135
2008	42.378929
2009	42.060090
2010	42.640278
2011	30.509211
2012	33.242137
2013	35.913578
2014	33.056071
2015	30.081538
2016	24.776549
2017	19.390614
2018	17.996667
2019	17.914911
2020	16.913238
2021	25.806667
2022	7.352500

Result 7

Interpretation: Calculates the average unemployment rate per year across all countries. This provides a trend analysis of global unemployment rates over time, offering insights into economic stability and labor markets.

2. Economic Performance Analysis

USE world_bank_data;

-- Retrieve all data from economic_indicators table

SELECT *

FROM economic_indicators

LIMIT 10;

indicator_id	location_id	country	date	gdp_usd	gdp_per_capita_u...	inflation_ra...	fdi_usd	exports_gdp	unemployment_r...	unemployment_growth_r...
2	2	Albania	1993-01-01	1185315468.46	367.28	30.85	58000000.00	15.98	19.78	-1.46
3	3	Albania	1994-01-01	1880950864.41	586.42	37.81	53000000.00	11.98	19.78	-1.46
4	4	Albania	1995-01-01	2392764853.42	750.60	40.75	70000000.00	12.64	14.61	-1.46
5	5	Albania	1996-01-01	3199640815.42	1009.98	45.94	90100000.00	11.62	13.93	-0.68
6	6	Albania	1997-01-01	2258513974.10	717.38	61.18	47500000.00	10.20	16.87	1.28
7	7	Albania	1998-01-01	2545964540.88	813.79	73.81	45010000.00	11.47	19.78	1.28
8	8	Albania	1999-01-01	3212121650.98	1033.24	74.10	41200000.00	16.84	19.78	0.79
9	9	Albania	2002-01-01	4348068242.20	1425.12	82.38	135000000.00	20.95	17.89	-1.46
10	10	Albania	2003-01-01	5611496257.14	1846.12	82.78	178036400.67	20.85	16.99	-0.91
11	11	Albania	2004-01-01	7184685781.52	2373.58	84.67	341285112.54	22.22	16.31	-0.68
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Explanation: Retrieves the first 10 rows from the economic_indicators table to get an initial view of the data structure and sample values.

-- Retrieve GDP and GDP Growth Rate for a Specific Country

SELECT country, date, gdp_usd, gdp_growth_rate

FROM economic_indicators

WHERE country = 'Japan'

ORDER BY date;

Explanation: Fetches the GDP and GDP growth rate over time specifically for Japan, allowing us to observe economic trends for this country.

-- View for GDP and GDP Growth Rate

CREATE VIEW gdp_growth_country AS

SELECT country, date, gdp_usd, gdp_growth_rate

FROM economic_indicators

ORDER BY date;

-- Using VIEW for specific country

SELECT * FROM gdp_growth_country WHERE country = 'Australia';

country	date	gdp_usd	gdp_growth_r...
Australia	1992-01-01	325518458076.53	-0.14
Australia	1993-01-01	312128302417.09	-4.11
Australia	1994-01-01	322802490487.72	3.42
Australia	1995-01-01	368166023166.02	14.05
Australia	1996-01-01	401341880620.73	9.01
Australia	1997-01-01	435642611296.59	8.55
Australia	1998-01-01	399674421759.48	-8.26
Australia	1999-01-01	389652212056.65	-2.51
Australia	2000-01-01	416167815092.91	6.80
Australia	2001-01-01	379629301675.11	-8.78
Australia	2002-01-01	395788696012.06	4.26
Australia	2003-01-01	461747679291.71	18.18
Australia	2004-01-01	461747679291.71	31.41
Australia	2005-01-01	461747679291.71	13.18
Australia	2006-01-01	461747679291.71	7.58
Australia	2007-01-01	461747679291.71	14.24
Australia	2008-01-01	461747679291.71	23.52
Australia	2009-01-01	461747679291.71	-12.06
Australia	2010-01-01	461747679291.71	23.70
Australia	2011-01-01	461747679291.71	21.74
Australia	2012-01-01	461747679291.71	10.65
Australia	2013-01-01	461747679291.71	1.92
Australia	2014-01-01	461747679291.71	-6.89
Australia	2015-01-01	461747679291.71	-7.96
Australia	2016-01-01	461747679291.71	-10.67
Australia	2017-01-01	461747679291.71	9.88
Australia	2018-01-01	461747679291.71	7.75
Australia	2019-01-01	461747679291.71	-2.45
Australia	2020-01-01	461747679291.71	-4.61
Australia	2021-01-01	461747679291.71	17.19

gdp_growth_country 3

Explanation: Creates a view named gdp_growth_country that captures GDP and GDP growth rate data for all countries. You can query this view with filters to focus on specific countries without repeatedly writing the same query.

-- Get Average GDP by Year across all countries

SELECT YEAR(date) AS year, AVG(gdp_usd) AS avg_gdp

FROM economic_indicators

GROUP BY year

ORDER BY year;

year	avg_gdp
1992	135152450210.340513
1993	125303241817.772353
1994	119303902534.242000
1995	111994511873.600313
1996	107309549797.325972
1997	99625371812.257714
1998	95348892681.877600
1999	96343680359.910353
2000	86847761961.135476
2001	77087779919.628830
2002	75937841862.381961
2003	80753235867.164660
2004	86806681228.446893
2005	94308900384.451121
2006	104512271425.450092
2007	122095943179.655766
2008	126956972076.370357
2009	122900877569.338288
2010	128550461331.919352
2011	136471970754.180439
2012	137463209782.987265
2013	147496960407.331927
2014	148853099053.052232
2015	134665666567.798632
2016	140935993498.846814
2017	151323438409.173772
2018	157117539724.699009
2019	156347524239.016607
2020	162655170578.065238
2021	172269552181.370926
2022	7148087570.800000

Result 4

Explanation: Calculates the average GDP for each year, providing insights into global economic trends over time.

-- Average GDP Growth Rate by Region

SELECT region, AVG(gdp_growth_rate) AS avg_gdp_growth

FROM economic_indicators

JOIN locations ON economic_indicators.location_id = locations.location_id

GROUP BY region

ORDER BY avg_gdp_growth DESC;

region	avg_gdp_grow...
Asia	9.207831
Unknown	8.234010
Africa	7.457978
South America	7.097688
North America	6.564058
Europe	6.064121
Oceania	5.665081

Result 5

Explanation: Calculates the average GDP growth rate by region, allowing comparison of economic growth across different regions.

-- Inflation and FDI Trends for Japan

SELECT date, inflation_rate, fdi_usd

FROM economic_indicators

WHERE country_name = 'Japan'

ORDER BY date;

date	inflation_ra...	fdi_usd
1992-01-01	99.33	2755603980.00
1993-01-01	100.56	210435440.00
1994-01-01	101.26	888384470.00
1995-01-01	101.13	41463070.00
1996-01-01	101.27	-38203596.34
1997-01-01	103.04	2486935040.42
1998-01-01	103.72	2512021924.47
1999-01-01	103.37	10020377184.74
2013-01-01	100.02	10020377184.74
2014-01-01	102.78	10020377184.74
2015-01-01	103.59	5252218412.39
2016-01-01	103.46	10020377184.74
2017-01-01	103.96	10020377184.74
2018-01-01	104.99	10020377184.74
2019-01-01	105.48	10020377184.74
2020-01-01	105.46	10020377184.74
2021-01-01	105.21	10020377184.74

economic_indicators 6

Explanation: Retrieves the inflation rate and foreign direct investment (FDI) data for Japan over time, helping to analyze economic stability and international investment trends.

```sql
-- View for Inflation and FDI Trends

CREATE VIEW inflation_fdi_country AS

SELECT date, country, inflation_rate, fdi_usd

FROM economic_indicators

ORDER BY date;

-- Using View for inflation

SELECT * FROM inflation_fdi_country WHERE country = 'Germany';
```

inflation_fdi_country 7

Explanation: Creates a view named inflation_fdi_country to streamline retrieval of inflation and FDI data for various countries.

-- Total Exports as % of GDP by Year for Asia

SELECT YEAR(date) AS year, AVG(exports_gdp) AS avg_exports_gdp

FROM economic_indicators

JOIN locations ON economic_indicators.location_id = locations.location_id

WHERE region = 'Asia'

GROUP BY year

ORDER BY year;

year	avg_exports_g...
1992	41.072857
1993	41.262857
1994	35.230000
1995	37.845000
1996	38.347273
1997	37.314000
1998	38.730909
1999	39.236429
2000	47.354615
2001	45.582500
2002	45.000476
2003	46.076087
2004	48.705714
2005	50.586667
2006	49.098696
2007	46.420000
2008	46.520000
2009	40.837391
2010	41.809545
2011	49.842917
2012	48.929167
2013	46.924400
2014	45.507692
2015	41.079200
2016	39.251600
2017	39.978077
2018	42.654800
2019	42.180000
2020	36.967917
2021	40.646800
2022	25.790000

Result 8

Explanation: Computes the average exports as a percentage of GDP for Asia, revealing the region's dependency on international trade over time.

-- View for Total Exports as % of GDP by Year

CREATE VIEW exports_gdp_region AS

SELECT YEAR(date) AS year, region, AVG(exports_gdp) AS avg_exports_gdp

FROM economic_indicators

JOIN locations ON economic_indicators.location_id = locations.location_id

GROUP BY year, region

ORDER BY year;

-- Using View

SELECT * FROM exports_gdp_region WHERE region = 'Europe';

year	region	avg_exports_g...
1992	Europe	36.312353
1993	Europe	37.086667
1994	Europe	40.140833
1995	Europe	39.848400
1996	Europe	38.976552
1997	Europe	40.987308
1998	Europe	40.149643
1999	Europe	41.515172
2000	Europe	46.427407
2001	Europe	45.941429
2002	Europe	43.921034
2003	Europe	45.076552
2004	Europe	48.081429
2005	Europe	48.733667
2006	Europe	50.762333
2007	Europe	51.717333
2008	Europe	51.475313
2009	Europe	45.646452
2010	Europe	51.705625
2011	Europe	55.726563
2012	Europe	56.706970
2013	Europe	57.405862
2014	Europe	57.701724
2015	Europe	57.049063
2016	Europe	56.988387
2017	Europe	58.248182
2018	Europe	58.937273
2019	Europe	58.512424
2020	Europe	53.945455

exports_gdp_region 9

Explanation: Creates a view exports_gdp_region to make it easier to track exports as a percentage of GDP by region over time.

-- Stored Procedure for Top N Countries by GDP

DELIMITER //

CREATE PROCEDURE GetTopCountriesByGDP(IN top_n INT)

BEGIN

    SELECT country, gdp_usd

  FROM economic_indicators

  WHERE date = (SELECT MAX(date) FROM economic_indicators)

  ORDER BY gdp_usd DESC

  LIMIT top_n;

END //

DELIMITER ;

-- Call Stored Procedure for the top 5 countries by GDP

CALL GetTopCountriesByGDP(5);

country	gdp_usd
▶ Burkina Faso	18820219331.23
Madagascar	15302510500.05
Rwanda	13316160803.52
Chad	12396807590.17
Barbados	5840673700.00

Result 10

Explanation: Retrieves the top N countries by GDP for the most recent year. This helps to identify the largest economies based on GDP.

```sql
-- Stored Procedure for Average Inflation by Year for a specific country

DELIMITER //

CREATE PROCEDURE GetAvgInflationByCountry(IN country VARCHAR(50))

BEGIN

        SELECT YEAR(date) AS year, AVG(inflation_rate) AS avg_inflation

    FROM economic_indicators

    WHERE country = country

    GROUP BY year

    ORDER BY year;

END //

DELIMITER ;

-- Calling stored procedure

CALL GetAvgInflationByCountry('Germany');
```

year	avg_inflati…
1992	51.772821
1993	48.648627
1994	49.899333
1995	53.724063
1996	54.789028
1997	56.364286
1998	60.195067
1999	62.400118
2000	63.709405
2001	66.442234
2002	69.644902
2003	71.783204
2004	74.768835
2005	77.601589
2006	81.579450
2007	84.982072
2008	93.161339
2009	96.245946
2010	100.000000
2011	105.839123
2012	111.400085
2013	114.861284
2014	118.728839
2015	122.209915
2016	124.954248
2017	128.574737
2018	130.054414
2019	132.816429
2020	133.855810

Result 11

Explanation: Calculates the average inflation rate by year for a specified country, helping to analyze inflation trends over time.

-- Function 1: to Calculate GDP per Capita Growth Rate

DELIMITER //

CREATE FUNCTION GetGDPPerCapitaGrowthRate(country VARCHAR(50),year_val INT)

RETURNS DECIMAL(5,2)

DETERMINISTIC

```sql
BEGIN

    DECLARE gdp_curr DECIMAL(15,2);

    DECLARE gdp_prev DECIMAL(15,2);

    DECLARE growth_rate DECIMAL(5,2);


    -- Get GDP per capita for the specified yea

    SELECT gdp_per_capita_usd INTO gdp_curr

    FROM economic_indicators

    WHERE country = country AND YEAR(date) = year_val

    LIMIT 1;


    -- Get GDP per capita for the previous year

    SELECT gdp_per_capita_usd INTO gdp_prev

    FROM economic_indicators

    WHERE country = country AND YEAR(date) = year_val - 1

    LIMIT 1;


    -- Calculate growth rate

    SET growth_rate = ((gdp_curr - gdp_prev) / gdp_prev) * 100;


    RETURN growth_rate;

    END //

DELIMITER ;

-- Use this function
```

SELECT GetGDPPerCapitaGrowthRate('Australia', 2020);

Explanation: Calculates the GDP per capita growth rate for a specific country and year, useful for tracking changes in average wealth or productivity.

```
-- Function 2: to get average inflation rate for certain country

DELIMITER //

CREATE FUNCTION GetAvgInflation(country VARCHAR(50))

RETURNS DECIMAL(5,2)

DETERMINISTIC

BEGIN

        DECLARE avg_inflation DECIMAL(5,2);


    -- Calculate average inflation

    SELECT AVG(inflation_rate) INTO avg_inflation

    FROM economic_indicators

    WHERE country = country;


    RETURN avg_inflation;

END //

DELIMITER ;

-- Use this function
```

SELECT GetAvgInflation('Japan');

Explanation: Computes the average inflation rate for a specified country, helpful for understanding economic stability.

-- Function 3: to calculate year-over-year GDP growth rate

DELIMITER //

CREATE FUNCTION GetYoYGDPGrowth(country VARCHAR(50),year_val INT)

RETURNS DECIMAL(5,2)

DETERMINISTIC

BEGIN

    DECLARE gdp_curr DECIMAL(15,2);

  DECLARE gdp_prev DECIMAL(15,2);

  DECLARE growth_rate DECIMAL(5,2);

  -- Get GDP for the specified year

  SELECT gdp_usd INTO gdp_curr

  FROM economic_indicators

  WHERE country = country AND YEAR(date) = year_val

  LIMIT 1;

```
    -- Get GDP for the previous year

    SELECT gdp_usd INTO gdp_prev

    FROM economic_indicators

    WHERE country = country AND YEAR(date) = year_val - 1

    LIMIT 1;


    -- CALCULATE growth rate

    SET growth_rate = ((gdp_curr - gdp_prev) / gdp_prev) * 100;


    RETURN growth_rate;

END //

DELIMITER ;

-- Use this function

SELECT GetYoYGDPGrowth('Canada',2020);
```


Explanation: Calculates the year-over-year GDP growth rate for a specific country, indicating economic growth trends.

3. Demographic Trends Analysis

USE world_bank_data;

-- RETRIEVE Population growth by country

SELECT country, date, population_growth

FROM demographic_indicators

ORDER BY country, date;

country	date	population_gro...
Albania	1993-01-01	-0.61
Albania	1994-01-01	-0.61
Albania	1995-01-01	-0.62
Albania	1996-01-01	-0.62
Albania	1997-01-01	-0.63
Albania	1998-01-01	-0.63
Albania	1999-01-01	-0.63
Albania	2002-01-01	-0.30
Albania	2003-01-01	-0.37
Albania	2004-01-01	-0.42
Albania	2005-01-01	-0.51
Albania	2006-01-01	-0.63
Albania	2007-01-01	-0.76
Albania	2008-01-01	-0.77
Albania	2009-01-01	-0.67
Albania	2010-01-01	-0.50
Albania	2011-01-01	-0.27
Albania	2012-01-01	-0.17
Albania	2013-01-01	-0.18
Albania	2014-01-01	-0.21
Albania	2015-01-01	-0.29
Albania	2016-01-01	-0.16
Albania	2017-01-01	-0.09
Albania	2018-01-01	-0.25
Albania	2019-01-01	-0.43
Albania	2020-01-01	-0.57
Albania	2021-01-01	-0.93
Algeria	2001-01-01	1.38
Algeria	2002-01-01	1.35
Algeria	2003-01-01	1.35

demographic_indicators 1

Explanation: This query retrieves population_growth for each country ordered by country and date. It helps observe the changes in population growth over time for each country.

-- Top 10 Countries by Life Expectancy

SELECT country, life_expectancy

FROM demographic_indicators

WHERE date = (SELECT MAX(date) FROM demographic_indicators)

ORDER BY life_expectancy DESC

LIMIT 10;

country	life_expectan...
► Barbados	77.71
Samoa	72.60
Bhutan	72.23
Belize	70.96
Fiji	68.31
Rwanda	67.13
Madagascar	65.23
Gambia, The	62.91
Sierra Leone	60.41
Burkina Faso	59.77

demographic_indicators 2

Explanation: This query lists the top 10 countries with the highest life expectancy based on the most recent data available, providing insight into countries with the longest life expectancies.

-- Average Child Mortality rate by region

SELECT region, AVG(child_mortality_rate) AS avg_child_mortality

FROM demographic_indicators

JOIN locations ON demographic_indicators.location_id = locations.location_id

GROUP BY region

ORDER BY avg_child_mortality;

region	avg_child_mortal...
▶ Europe	7.291210
Oceania	17.326613
North America	24.158831
Asia	26.519831
South America	28.770968
Unknown	54.946904
Africa	78.583596

Result 3

Explanation: Calculates the average child mortality rate for each region, allowing comparison across regions. Lower values indicate better child survival rates, often reflecting better healthcare and living conditions.

-- Population trend over time for Albania

SELECT date, population_total

FROM demographic_indicators

WHERE country = 'Albania'

ORDER BY date;

date	population_to...
▶ 1993-01-01	3227287
1994-01-01	3207536
1995-01-01	3187784
1996-01-01	3168033
1997-01-01	3148281
1998-01-01	3128530
1999-01-01	3108778
2002-01-01	3051010
2003-01-01	3039616
2004-01-01	3026939
2005-01-01	3011487
2006-01-01	2992547
2007-01-01	2970017
2008-01-01	2947314
2009-01-01	2927519
2010-01-01	2913021
2011-01-01	2905195
2012-01-01	2900401
2013-01-01	2895092
2014-01-01	2889104
2015-01-01	2880703
2016-01-01	2876101
2017-01-01	2873457
2018-01-01	2866376
2019-01-01	2854191
2020-01-01	2837849
2021-01-01	2811666

demographic_indicators 4

Explanation: Retrieves population totals over time for Albania. This trend analysis shows how the population has changed, which can be useful for understanding demographic shifts within the country.

-- Countries with the highest urban population percentage

SELECT country, urban_population

FROM demographic_indicators

WHERE date = (SELECT MAX(date) FROM demographic_indicators)

ORDER BY urban_population DESC

LIMIT 10;

Explanation: Lists the top 10 countries with the highest percentage of the population living in urban areas based on the lates data. This highlights countries with high urbanization, which can correlate with industrialization and economic development.

-- View 1: for population growth by country

CREATE VIEW PopulationGrowthByCountry AS

SELECT country, date, population_growth

FROM demographic_indicators

ORDER BY country, date;

-- Query this view

SELECT * FROM PopulationGrowthByCountry WHERE country = 'Brazil';

Explanation: Creates a view for population growth by country, making it easy to access this data without rewriting the query.

-- View 2: for average life expectancy by region

CREATE VIEW AvgLifeExpectancyByRegion AS

SELECT region, AVG(life_expectancy) AS avg_life_expectancy

FROM demographic_indicators

JOIN locations ON demographic_indicators.location_id = locations.location_id

GROUP BY region;

-- Query this view

SELECT * FROM AvgLifeExpectancyByRegion;

region	avg_life_expectan...
▶ Europe	76.696986
Africa	59.862199
Asia	72.531085
Oceania	74.025887
Unknown	65.858122
North America	72.912110
South America	71.870699

AvgLifeExpectancyByRegion 7

Explanation: Averages life expectancy by region, providing insights into overall health and longevity by region.

-- View 3: child mortality by year for a specific country

CREATE VIEW ChildMortalityByCountry AS

SELECT country, YEAR(date) AS year, AVG(child_mortality_rate) AS avg_child_mortality

FROM demographic_indicators

GROUP BY country, year;

-- Query this view

SELECT * FROM ChildMortalityByCountry WHERE country = 'Chad';

country	year	avg_child_mortal...
▶ Chad	1998	115.010000
Chad	1999	115.010000
Chad	2000	115.010000
Chad	2001	115.010000
Chad	2002	115.010000
Chad	2003	115.010000
Chad	2004	115.010000
Chad	2005	115.010000
Chad	2006	115.010000
Chad	2007	115.010000
Chad	2008	115.010000
Chad	2009	115.010000
Chad	2010	115.010000
Chad	2011	115.010000
Chad	2012	115.010000
Chad	2013	115.010000
Chad	2014	115.010000
Chad	2015	115.010000
Chad	2016	115.010000
Chad	2017	115.010000
Chad	2018	115.010000
Chad	2019	113.500000
Chad	2021	106.400000
Chad	2022	102.900000

ChildMortalityByCountry 8

Explanation: This view captures average child mortality rates by year for each country, allowing for trend analysis in child mortality over time.

-- Stored Procedure 1: to retrieve life expectancy trends for a country

DELIMITER //

CREATE PROCEDURE GetLifeExpectancyByCountry(IN country_name VARCHAR(50))

BEGIN

    SELECT date, life_expectancy

  FROM demographic_indicators

  WHERE country = country_name

  ORDER BY date;

END //

DELIMITER ;

-- Call this procedure

CALL GetLifeExpectancyByCountry('India');

date	life_expectan...
▶ 1994-01-01	60.22
1995-01-01	60.60
1996-01-01	60.98
1997-01-01	61.39
1998-01-01	61.79
1999-01-01	62.21
2000-01-01	62.67
2001-01-01	63.09
2002-01-01	63.62
2003-01-01	64.09
2007-01-01	65.79
2008-01-01	66.15
2009-01-01	66.51
2010-01-01	66.91
2011-01-01	67.36
2012-01-01	67.89
2013-01-01	68.46
2014-01-01	69.07
2015-01-01	69.64
2016-01-01	70.12
2017-01-01	70.47
2018-01-01	70.71
2019-01-01	70.91
2020-01-01	70.15
2021-01-01	67.24

Result 9

Explanation: This procedure returns life expectancy trends over time for a specified country, helping analyze changes in life expectancy.

-- Stored Procedure 2: to get average population growth for a region

DELIMITER //

CREATE PROCEDURE GetAvgPopulationGrowthByRegion(IN region_name VARCHAR(50))

BEGIN

SELECT region, AVG(population_growth) AS avg_population_growth

FROM demographic_indicators

JOIN locations ON demographic_indicators.location_id = locations.location_id

WHERE region = region_name

GROUP BY region;

END //
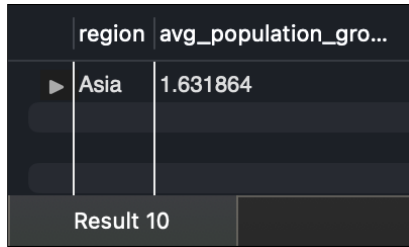
DELIMITER ;

-- Call this procedure

CALL GetAvgPopulationGrowthByRegion('Asia');

region	avg_population_gro...
► Asia	1.631864
Result 10	

Explanation: This procedure calculates the average population growth for a specified region, which is useful for understanding demographic trends by region.

-- Function 1: to calculate average life expectancy for a country

DELIMITER //

CREATE FUNCTION GetAvgLifeExpectancy(country_name VARCHAR(50))

RETURNS DECIMAL(5,2)

DETERMINISTIC

BEGIN

    DECLARE avg_life_exp DECIMAL(5,2);

  SELECT AVG(life_expectancy) INTO avg_life_exp

  FROM demographic_indicators

  WHERE country = country_name

  LIMIT 1;

  RETURN avg_life_exp;

END //
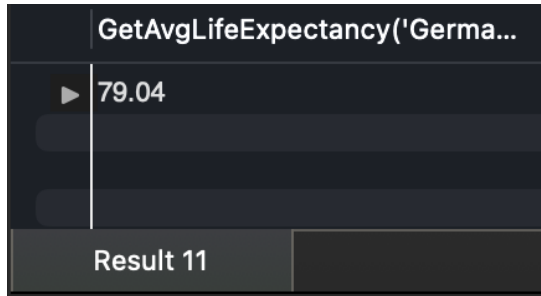
DELIMITER ;

-- Use this function

SELECT GetAvgLifeExpectancy('Germany');

GetAvgLifeExpectancy('Germa...
▶ 79.04
Result 11

Explanation: This function returns the average life expectancy for a specified country, providing a summary measure of health and longevity.

-- Function 2: to get child mortality rate for a specific year and country

DELIMITER //

CREATE FUNCTION GetChildMortality(country_name VARCHAR(50), year_val INT)

RETURNS DECIMAL(5,2)

DETERMINISTIC

BEGIN

    DECLARE mortality_rate DECIMAL(5,2);

  SELECT child_mortality_rate INTO mortality_rate

  FROM demographic_indicators

  WHERE country = country_name AND YEAR(date) = year_val

  LIMIT 1;

  RETURN mortality_rate;

END //

DELIMITER ;

-- Use this function

SELECT GetChildMortality('Burkina Faso', 2018);

Explanation: This function retrieves the child mortality rate for a specified country and year, offering insight into child survival rates for that period.

4. Sustainability Analysis

USE world_bank_data;

-- Access to Electricity Over Time by country

SELECT country, date, access_electricity

FROM sustainable_indicators

ORDER BY country, date;

country	date	access_electric...
Albania	1992-01-01	100.00
Albania	1993-01-01	100.00
Albania	1994-01-01	100.00
Albania	1995-01-01	100.00
Albania	1996-01-01	100.00
Albania	1997-01-01	100.00
Albania	1998-01-01	100.00
Albania	1999-01-01	100.00
Albania	2002-01-01	99.40
Albania	2003-01-01	99.40
Albania	2004-01-01	99.40
Albania	2005-01-01	99.40
Albania	2006-01-01	99.40
Albania	2007-01-01	99.40
Albania	2008-01-01	100.00
Albania	2009-01-01	99.60
Albania	2010-01-01	99.60
Albania	2011-01-01	99.70
Albania	2012-01-01	99.90
Albania	2013-01-01	99.90
Albania	2014-01-01	100.00
Albania	2015-01-01	100.00
Albania	2016-01-01	99.90
Albania	2017-01-01	99.90
Albania	2018-01-01	100.00
Albania	2019-01-01	100.00
Albania	2020-01-01	100.00
Albania	2021-01-01	100.00
Algeria	2000-01-01	98.60
Algeria	2001-01-01	98.60
Algeria	2002-01-01	98.60

sustainable_indicators 1

Explanation: This query retrieves access_electricity data for each country over time, ordered by country and date. It allows for an overview of changes in access to electricity across different years for each country.

```
-- Top 10 countries by renewable energy consumption

SELECT country, renewable_energy_consumption

FROM sustainable_indicators

WHERE date = (SELECT MAX(date) FROM sustainable_indicators)

ORDER BY renewable_energy_consumption DESC

LIMIT 10;
```

country	renewable_energy_consumpt...
► Madagascar	83.10
Bhutan	82.50
Rwanda	79.90
Sierra Leone	71.60
Burkina Faso	71.40
Chad	70.00
Gambia, The	47.70
Samoa	35.90
Lesotho	34.90
Belize	30.80

sustainable_indicators 2

Explanation: Retrieves the top 10 countries with the highest renewable energy consumption based on the most recent data available, identifying global leaders in renewable energy utilization.

```
-- Average access to electricity by Region

SELECT region, AVG(access_electricity) AS avg_access_electricity

FROM sustainable_indicators

JOIN locations ON sustainable_indicators.location_id = locations.location_id

GROUP BY region

ORDER BY avg_access_electricity DESC;
```

region	avg_access_electric...
Europe	99.597912
Asia	91.309353
South America	90.370825
North America	88.708193
Oceania	85.119385
Unknown	72.131408
Africa	47.980426

Result 3

Explanation: Calculates the average access to electricity for each region, allowing for a comparison of electricity accessibility across regions. Regions with higher values indicate better infrastructure and access.

-- Yearly Renewable Energy Consumption for a specific country

SELECT YEAR(date) AS year, renewable_energy_consumption

FROM sustainable_indicators

WHERE country = 'Germany'

ORDER BY year;

year	renewable_energy_consumpt...
1991	2.00
1992	2.10
1993	2.10
1994	2.30
1995	2.30
1996	2.20
1997	2.80
1998	3.00
1999	3.30
2000	3.70
2001	3.90
2002	4.40
2003	5.40
2004	6.30
2005	7.30
2006	8.60
2007	10.50
2008	10.20
2009	10.70
2010	11.60
2011	12.50
2012	13.60
2013	13.60
2014	14.00
2015	14.60
2016	14.20
2017	15.20
2018	16.00
2019	17.10
2020	18.50
2021	17.60

Result 4

Explanation: Retrieves yearly renewable energy consumption data for Germany, providing insight into the country's renewable energy usage trend over time.

-- Countries with low access to electricity (below 50%)

SELECT country, access_electricity

FROM sustainable_indicators

WHERE date = (SELECT MAX(date) FROM sustainable_indicators)

        AND access_electricity < 50

ORDER BY access_electricity ASC;

Explanation: Lists countries where access to electricity is below 50%, based on the latest data. This can highlight areas where infrastructure development may be needed.

-- View 1: for access to electricity by country

CREATE VIEW AccessElectricityByCountry AS

SELECT country, date, access_electricity

FROM sustainable_indicators

ORDER BY country, date;

-- Query this view

SELECT * FROM AccessElectricityByCountry WHERE country = 'India';

Explanation: Creates a view that captures access_electricity data by country over time. This view simplifies future queries for accessing electricity data by country.

-- View 2: for average renewable energy consumption by region

CREATE VIEW AvgRenewableEnergyByRegion AS

SELECT region, AVG(renewable_energy_consumption) AS avg_renewable_energy

FROM sustainable_indicators

JOIN locations ON sustainable_indicators.location_id = locations.location_id

GROUP BY region;

-- Use this view

SELECT * FROM AvgRenewableEnergyByRegion;

region	avg_renewable_ener...
► Europe	19.303846
Africa	56.935312
Asia	20.530421
Oceania	32.057692
Unknown	36.259709
North America	31.829907
South America	33.684536

AvgRenewableEnergyByRegion 7

Explanation: Averages renewable energy consumption by region. This view is helpful for comparing regions based on their renewable energy usage.

-- View 3: yearly renewable energy consumption for each country

CREATE VIEW RenewableEnergyByCountry AS

SELECT country, YEAR(date) AS year, AVG(renewable_energy_consumption) AS avg_renewable_energy

FROM sustainable_indicators

GROUP BY country, year;

-- Use this view

SELECT * FROM RenewableEnergyByCountry WHERE country = 'Brazil';

country	year	avg_renewable_ener...
▶ Brazil	1991	48.900000
Brazil	1992	48.700000
Brazil	1993	48.200000
Brazil	1994	48.300000
Brazil	1997	43.700000
Brazil	1999	44.000000
Brazil	2012	43.500000
Brazil	2013	42.300000
Brazil	2014	41.700000
Brazil	2015	43.700000
Brazil	2016	45.400000
Brazil	2017	45.300000
Brazil	2018	46.900000
Brazil	2019	47.500000
Brazil	2020	50.000000
Brazil	2021	46.500000

RenewableEnergyByCountry 8

Explanation: This view captures average yearly renewable energy consumption for each country, making it easy to query renewable energy trends over time.

-- Stored Procedure 1: retrieve electricity access trends for a country

DELIMITER //

CREATE PROCEDURE GetElectricityAccessByCountry(IN country_name VARCHAR(50))

BEGIN

      SELECT date, access_electricity

   FROM sustainable_indicators

   WHERE country = country_name

   ORDER BY date;

END //

DELIMITER ;

-- Call this procedure

Call GetElectricityAccessByCountry('China');

date	access_electric...
▶ 2001-01-01	97.00
2006-01-01	98.20
2007-01-01	98.50
2008-01-01	98.80
2009-01-01	99.10
2010-01-01	99.70
2011-01-01	99.90
2012-01-01	99.90
2013-01-01	100.00
2014-01-01	100.00
2015-01-01	100.00
2016-01-01	100.00
2017-01-01	100.00
2018-01-01	100.00
2019-01-01	100.00
2020-01-01	100.00
2021-01-01	100.00

Result 9

Explanation: This procedure retrieves electricity access data over time for a specified country, enabling a quick look at how access to electricity has changed.

-- Stored Procedure 2: to get average renewable energy consumption by region

DELIMITER //

CREATE PROCEDURE GetAvgRenewableEnergyByRegion(IN region_name VARCHAR(50))

BEGIN

      SELECT region, AVG(renewable_energy_consumption) AS avg_renewable_energy

   FROM sustainable_indicators

   JOIN locations ON sustainable_indicators.location_id = locations.location_id

   WHERE region = region_name

   GROUP BY region;

END //

DELIMITER ;

-- Call this procedure

Call GetAvgRenewableEnergyByRegion('Europe');

Explanation: This procedure calculates the average renewable energy consumption for a specified region, providing an insight into renewable energy adoption in that region.

-- Stored Procedure 3: to retrieve Top N countries by Access to Electricity

DELIMITER //

CREATE PROCEDURE GetTopCountriesByElectricityAccess(IN top_n INT)

BEGIN

    SELECT country, access_electricity

  FROM sustainable_indicators

  WHERE date = (SELECT MAX(date) FROM sustainable_indicators)

  ORDER BY access_electricity DESC

  LIMIT top_n;

END //

DELIMITER ;

-- Call this procedure

CALL GetTopCountriesByElectricityAccess(5);

Explanation: Retrieves the top N countries with the highest access to electricity based on the latest data. This procedure highlights countries with well-established electricity infrastructure.

-- Function 1: Calculate Average Renewable Energy Consumption for a country

DELIMITER //

CREATE FUNCTION GetAvgRenewableEnergy(country_name VARCHAR(50))

RETURNS DECIMAL(5,2)

DETERMINISTIC

BEGIN

      DECLARE avg_renewable DECIMAL(5,2);

   SELECT AVG(renewable_energy_consumption) INTO avg_renewable

   FROM sustainable_indicators

   WHERE country = country_name;
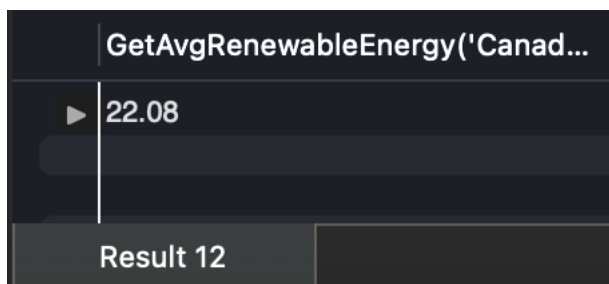

   RETURN avg_renewable;

END //

DELIMITER ;

-- Use this function

SELECT GetAvgRenewableEnergy('Canada');

Explanation: This function calculates and returns the average renewable energy consumption for a specific country, helping to summarize a country's renewable energy data.