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Main population indicators:

1. EN_URB_LCTY.csv = population in largest city (1960-2018)
2. SP_POP_TOTL.csv = population, total (1950-2018)
3. SP_URB_TOTL.csv = Urban Population (1950-2018)
4. SP_URB_GROW.csv = Urban population growth (annual %) (1951-2018)
5. SM_POP_NETM.csv = Net migration (1952-2017)

Additional population indicators:

6. IS_AIR_PSGR.csv = Air transport, passengers carried
7. NY_GDP_MKTP_CD.csv = GDP (current US$)
8. NY_GDP_PCAP_CD.csv = GDP per capita (current US$)
9. SH_MED_BEDS_ZS.csv = Hospital beds (per 1,000 people)
10. FP_CPI_TOTL_ZG.csv = Inflation, consumer prices (annual %)
11. IT_NET_USER_P2.csv = Internet users (per 100 people)

ANALYSES WITH SQL (APPENDIX)

M1: Countries that do not have any data for any of the indicators.

name
American Samoa
Andorra
Antigua and Barbuda
Aruba
Bahamas, The
Barbados
Belize
Bermuda
Bhutan
Botswana

There were 60 country names in the table.

M2: Countries that have data for all of the indicators.

name
Afghanistan
Albania
Algeria
Angola
Argentina
Armenia
Australia
Austria
Azerbaijan
Bahrain

There were 153 country names in the table.

M3: Indicators with the corresponding number of countries with data, sorted in the descending order of the number of countries.

code	description	countries
SP_POP_TOTL	Population, total (1950-2018)	213
SP_URB_GROW	Urban population growth (annual %)(1951-2018)	211
SP_URB_TOTL	Urban population (1950-2018)	211
SM_POP_NETM	Net migration (1952-2017)	193
EN_URB_LCTY	Population in largest city (1960-2018)	153

M4: Top 10 countries in terms of the most recent value of population total.

date	name	value
12/31/2018	China	1392730000
12/31/2018	India	1352617328
12/31/2018	United States	326687501
12/31/2018	Indonesia	267663435
12/31/2018	Pakistan	212215030
12/31/2018	Brazil	209469333
12/31/2018	Nigeria	195874740
12/31/2018	Bangladesh	161356039
12/31/2018	Russian Federation	144478050
12/31/2018	Japan	126529100

M5: Continents with the corresponding most recent average value (computed across countries with data) of population total.

date	name	avg_pop
12/31/2018	Africa	23976180.89
12/31/2018	Asia	91255786.94
12/31/2018	Australia and Oceania	2317473.39
12/31/2018	Europe	16614773.94
12/31/2018	North America	17630119.18
12/31/2018	South America	35283249.58

6 out of 7 continents have available data.

M6: All of the indicators in a table of values for the United States.

date	sp_pop_totl	sp_urb_totl	sp_urb_grow	en_urb_lcty	sm_pop_netm
12/31/1950	152271000	97686415	NULL	NULL	NULL
12/31/1951	154910120	100327539	2.667772231	NULL	NULL
12/31/1952	157594980	103024566	2.652724106	NULL	960424
12/31/1953	160326373	105775325	2.634980451	NULL	NULL
12/31/1954	163105107	108582332	2.619143634	NULL	NULL
12/31/1955	165932000	111444909	2.602167361	NULL	NULL
12/31/1956	168780321	114350355	2.573664586	NULL	NULL
12/31/1957	171677535	117308976	2.55442495	NULL	2112299
12/31/1958	174624481	120326745	2.5399643	NULL	NULL
12/31/1959	177622013	123402894	2.524364591	NULL	NULL

All indicator values are put into respective rows for each year; not all indicators have values for each year. SP_POP_TOTL (1950-2018), SP_URB_TOTL (1950-2018), SP_URB_GROW (1951-2018), EN_URB_LCTY (1960-2018), SM_POP_NETM (1952-2017).

M7: Average % population growth for each country for all years 2010 and later.

name	avg_pct_growth
Eritrea	0.09
Oman	0.07
Burundi	0.06
Uganda	0.06
Equatorial Guinea	0.06
Qatar	0.06
Mali	0.05
Mauritania	0.05
Nigeria	0.05
Tanzania	0.05

M8: Countries which have 2011 data for all indicators.

date	name	count

There are 0 country names in the table, which means every country since 2011 has a missing value for at least one of the indicators.

A1: All indicators in a table of values for Japan since the earliest record.

date	sp_pop_total	sp_urb_total	sp_urb_grow	en_urb_lcty	sm_pop_netm
12/31/1962	95832000	62428798	2.371446065	18036396	-151351
12/31/1967	100725000	70019991	2.107556755	21478943	822703
12/31/1972	107188000	78731730	2.476632701	24574388	714937
12/31/1977	113863000	86538157	1.040018646	27426678	205006
12/31/1982	118449000	90474900	0.82265258	29244389	50002
12/31/1987	122091000	93963675	0.656977705	31163888	-298339
12/31/1992	124229000	96414127	0.424917159	32990378	46286
12/31/1997	126057000	98667335	0.400657298	33934040	-100333
12/31/2002	127445000	104055019	2.28287211	34904446	164199
12/31/2007	128001000	112827761	1.288009098	36111394	277580
12/31/2012	127629000	116331281	-0.073000997	37045504	358133
12/31/2017	126785797	116053379	-0.079234712	37397437	357800

A2: Relation between the inflation rate and GDP per capita in the USA between 1960 and 2019.

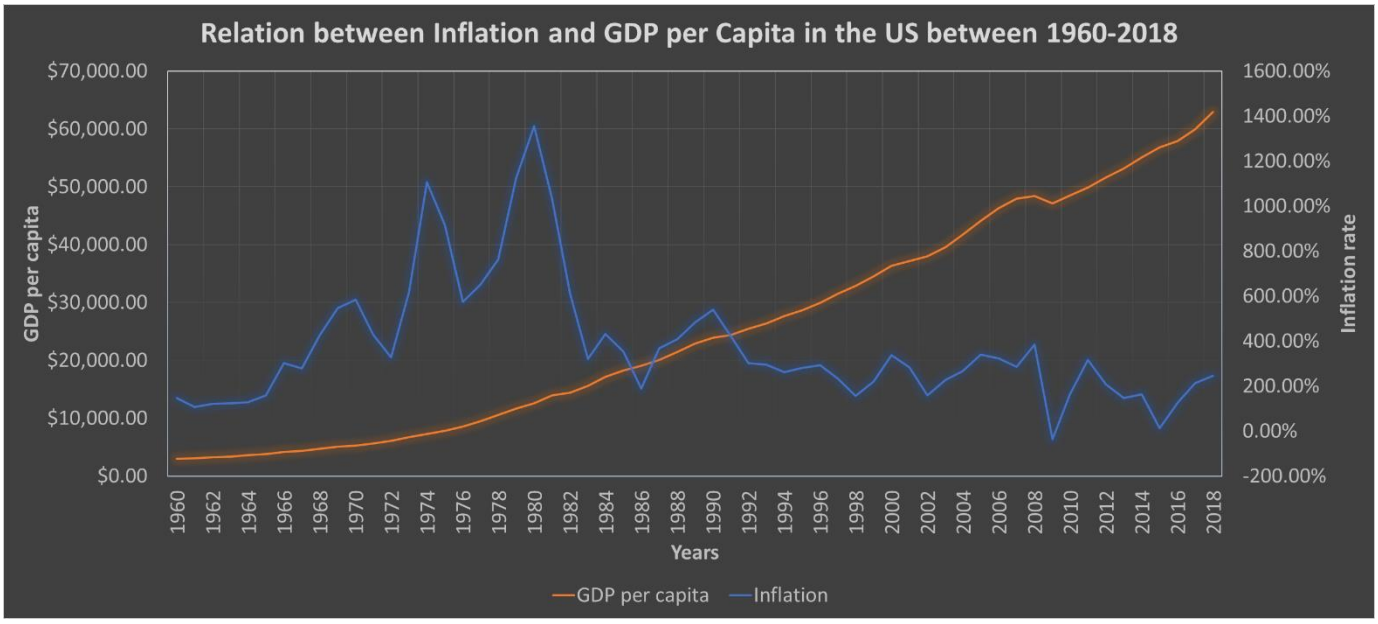
GDP per capita

date	gdp_per_c	country_code	indicator_code
12/31/1960	3007.123445	USA	NY_GDP_PCAP_CD
12/31/1961	3066.562869	USA	NY_GDP_PCAP_CD
12/31/1962	3243.843078	USA	NY_GDP_PCAP_CD
12/31/1963	3374.515171	USA	NY_GDP_PCAP_CD
12/31/1964	3573.941185	USA	NY_GDP_PCAP_CD
12/31/1965	3827.52711	USA	NY_GDP_PCAP_CD
12/31/1966	4146.316646	USA	NY_GDP_PCAP_CD
12/31/1967	4336.426587	USA	NY_GDP_PCAP_CD
12/31/1968	4695.92339	USA	NY_GDP_PCAP_CD
12/31/1969	5032.144743	USA	NY_GDP_PCAP_CD

Inflation rate

date	inflation	country_code	indicator_code
12/31/1960	1.457975986	USA	FP_CPI_TOTL_ZG
12/31/1961	1.070724148	USA	FP_CPI_TOTL_ZG
12/31/1962	1.198773348	USA	FP_CPI_TOTL_ZG
12/31/1963	1.239669421	USA	FP_CPI_TOTL_ZG
12/31/1964	1.278911565	USA	FP_CPI_TOTL_ZG
12/31/1965	1.585169264	USA	FP_CPI_TOTL_ZG
12/31/1966	3.015075377	USA	FP_CPI_TOTL_ZG

12/31/1967	2.772785623	USA	FP_CPI_TOTL_ZG
12/31/1968	4.271796153	USA	FP_CPI_TOTL_ZG
12/31/1969	5.4623862	USA	FP_CPI_TOTL_ZG



The data trends between 1960 and 2018 show a weak negative correlation between GDP and inflation. There might be other variables that could cause the fluctuation of GDP besides inflation.

A3: Total population by country in 2018, ordered top population.

name	value
China	1392730000
India	1352617328
United States	326687501
Indonesia	267663435
Pakistan	212215030
Brazil	209469333
Nigeria	195874740
Bangladesh	161356039
Russian Federation	144478050
Japan	126529100

The model shows the total population by country and the top counties by population in 2018. China, India, and the United States have the maximum populations. I created an interactive map based on the model. Information regarding each country's name, location, and population count appears by hovering over the country's location.

Business entities can use the model to identify the area and the size of the potential workforce worldwide. Governments and universities can use the model for census purposes.

A4: Net migration change in the last 17 years for every country (displaying the changes every year).

name	largest_migration	date
Afghanistan	-314602	12/31/2017
Albania	-69998	12/31/2017
Algeria	-50002	12/31/2017
Angola	32066	12/31/2017
Antigua and Barbuda	0	12/31/2017
Argentina	24000	12/31/2017
Armenia	-24989	12/31/2017
Aruba	1004	12/31/2017
Australia	791229	12/31/2017
Austria	324998	12/31/2017

A5: Average total Population in Africa between 1990 & 2000

name	total_population
Africa	4434678.305

Appendix: SQL Code

-- M1

```
CREATE VIEW M1 AS
       select name
       from (
              SELECT DISTINCT country.name
              FROM country
              WHERE country.name NOT IN (SELECT DISTINCT country.name
              FROM country LEFT JOIN country_data ON country_data.country_code = country.code
              WHERE country_data.indicator_code = 'EN_URB_LCTY')
              UNION
              SELECT DISTINCT country.name
              FROM country
              WHERE country.name NOT IN (SELECT DISTINCT country.name
              FROM country LEFT JOIN country_data ON country_data.country_code = country.code
              WHERE country_data.indicator_code = 'SP_POP_TOTL')
              UNION
              SELECT DISTINCT country.name
              FROM country
              WHERE country.name NOT IN (SELECT DISTINCT country.name
              FROM country LEFT JOIN country_data ON country_data.country_code = country.code
              WHERE country_data.indicator_code = 'SP_URB_TOTL')
              UNION
              SELECT DISTINCT country.name
              FROM country
              WHERE country.name NOT IN (SELECT DISTINCT country.name
              FROM country LEFT JOIN country_data ON country_data.country_code = country.code
              WHERE country_data.indicator_code = 'SP_URB_GROW')
              UNION
              SELECT DISTINCT country.name
              FROM country
              WHERE country.name NOT IN (SELECT DISTINCT country.name
              FROM country LEFT JOIN country_data ON country_data.country_code = country.code
              WHERE country_data.indicator_code = 'SM_POP_NETM') ) as got
              order by name;
```

--Question M2

```
CREATE VIEW M2 AS

	SELECT DISTINCT country.name
	FROM country LEFT JOIN country_data ON country_data.country_code = country.code
	WHERE country_data.indicator_code = 'EN_URB_LCTY'
	INTERSECT
	SELECT DISTINCT country.name
	FROM country LEFT JOIN country_data ON country_data.country_code = country.code
	WHERE country_data.indicator_code = 'SP_POP_TOTL'
	INTERSECT
	SELECT DISTINCT country.name
	FROM country LEFT JOIN country_data ON country_data.country_code = country.code
	WHERE country_data.indicator_code = 'SP_URB_TOTL'
	INTERSECT
	SELECT DISTINCT country.name
	FROM country LEFT JOIN country_data ON country_data.country_code = country.code
	WHERE country_data.indicator_code = 'SP_URB_GROW'
	INTERSECT
	SELECT DISTINCT country.name
	FROM country LEFT JOIN country_data ON country_data.country_code = country.code
	WHERE country_data.indicator_code = 'SM_POP_NETM'
	ORDER BY name;
```

--Question M3

```
CREATE VIEW M3 AS

	select indicator.code, indicator.description, COUNT (DISTINCT country_code) AS
countries
	FROM indicator INNER JOIN country_data ON code = country_data.indicator_code
	WHERE indicator.code IN ('EN_URB_LCTY', 'SM_POP_NETM', 'SP_POP_TOTL', 'SP_URB_GROW',
'SP_URB_TOTL')
	GROUP BY indicator.description, indicator.code

	ORDER BY countries DESC;
```

--Question M4

```
CREATE VIEW M4 AS

	SELECT date, country.name, value
	FROM country_data INNER JOIN country ON country.code = country_data.country_code
	WHERE country_data.indicator_code = 'SP_POP_TOTL' AND date = (SELECT
MAX(country_data.date) FROM country_data WHERE country_data.indicator_code = 'SP_POP_TOTL')
	GROUP BY date, country.name, value
	ORDER BY value DESC

	LIMIT 10;
```

--Question M5

```
CREATE VIEW M5 AS

      SELECT date, continent.name, round(100*AVG(country_data.value))/100 as avg_pop
      FROM continent INNER JOIN continent_country ON continent_country.continent_code =
continent.code
      INNER JOIN country ON country.code = continent_country.country_code
      INNER JOIN country_data ON country_data.country_code = country.code
      WHERE country_data.indicator_code = 'SP_POP_TOTL' AND date = (SELECT
MAX(country_data.date) FROM country_data WHERE country_data.indicator_code = 'SP_POP_TOTL')
      GROUP BY date, continent.name
      ORDER BY continent.name;
```

--Question M6

```
CREATE VIEW M6 AS
       select dat.date, dat.value as sp_pop_totl, mat.value as sp_urb_totl, cat.value as
sp_urb_grow, pat.value as en_urb_lcty, bat.value as sm_pop_netm
       from
       (select country_data.date, country_data.value from country_data where
country_data.country_code = 'USA' and country_data.indicator_code  = 'SP_POP_TOTL' group by
country_data.date, country_data.value) as dat
       full join (select country_data.date, country_data.value from country_data where
country_data.country_code = 'USA' and country_data.indicator_code  = 'SP_URB_TOTL' group by
country_data.date, country_data.value) as mat on dat.date = mat.date
       full join (select country_data.date, country_data.value from country_data where
country_data.country_code = 'USA' and country_data.indicator_code  = 'SP_URB_GROW' group by
country_data.date, country_data.value) as cat on mat.date = cat.date
       full join (select country_data.date, country_data.value from country_data where
country_data.country_code = 'USA' and country_data.indicator_code  = 'EN_URB_LCTY' group by
country_data.date, country_data.value) as pat on cat.date = pat.date
       full join (select country_data.date, country_data.value from country_data where
country_data.country_code = 'USA' and country_data.indicator_code  = 'SM_POP_NETM' group by
country_data.date, country_data.value) as bat on dat.date = bat.date

       order by dat.date;
```

--Question M7

```
CREATE VIEW M7 AS

      SELECT name, round(AVG(GROWTH.pct_growth)::numeric, 4) as
avg_pct_growth
      FROM
      (
      SELECT *, CD1.value/CD0.value-1.0 as pct_growth,
CD1.country_code cc FROM
      (SELECT *,
      (SELECT MAX(CD.date)
       FROM country_data CD
       WHERE CD.country_code=country_data.country_code AND
      CD.indicator_code=country_data.indicator_code
       AND CD.date<country_data.date
       ) prev_date
      FROM country_data) CD1
      INNER JOIN country_data CD0 ON
      CD0.country_code=CD1.country_code AND
CD0.indicator_code=CD1.indicator_code
      AND CD0.date=CD1.prev_date
      WHERE CD0.indicator_code='SP_URB_TOTL'
      AND CD1.country_code IN
      (SELECT country_code
```

--Question M8

```
CREATE VIEW M8 AS
      SELECT date, country.name, COUNT (*)
      FROM country INNER JOIN country_data ON country_data.country_code
= country.code
      WHERE EXTRACT(YEAR FROM date) = 2011 AND
country_data.indicator_code IN ('EN_URB_LCTY', 'SM_POP_NETM',
      'SP_POP_TOTL', 'SP_URB_GROW', 'SP_URB_TOTL')
      GROUP BY date, country.name

      HAVING COUNT (*) = 5;
```

-- Question A1

```
CREATE VIEW A1 AS
	select dat.date, dat.value as sp_pop_totl, mat.value as sp_urb_totl, cat.value as
sp_urb_grow, pat.value as en_urb_lcty, bat.value as sm_pop_netm
	from
	(select country_data.date, country_data.value from country_data where
country_data.country_code = 'JPN' and country_data.indicator_code  = 'SP_POP_TOTL' group
by country_data.date, country_data.value) as dat
	full join (select country_data.date, country_data.value from country_data where
country_data.country_code = 'JPN' and country_data.indicator_code  = 'SP_URB_TOTL' group
by country_data.date, country_data.value) as mat on dat.date = mat.date
	full join (select country_data.date, country_data.value from country_data where
country_data.country_code = 'JPN' and country_data.indicator_code  = 'SP_URB_GROW' group
by country_data.date, country_data.value) as cat on mat.date = cat.date
	join (select country_data.date, country_data.value from country_data where
country_data.country_code = 'JPN' and country_data.indicator_code  = 'EN_URB_LCTY' group
by country_data.date, country_data.value) as pat on cat.date = pat.date
	join (select country_data.date, country_data.value from country_data where
country_data.country_code = 'JPN' and country_data.indicator_code  = 'SM_POP_NETM' group
by country_data.date, country_data.value) as bat on dat.date = bat.date
	order by dat.date;
```

-- Question A2

```
CREATE VIEW a2inflation AS
SELECT date as date, value as inflation, country_code, indicator_code FROM country_data
      WHERE country_code = 'USA' AND date between '1960-12-31' AND '2018-12-31'
      AND country_data.indicator_code = 'FP_CPI_TOTL_ZG'
order by date;


CREATE VIEW a2GDP_per_C AS
SELECT date as DATE, value as GDP_Per_C, country_code, indicator_code FROM country_data
      WHERE country_code = 'USA' AND date between '1960-12-31' AND '2018-12-31'
      and country_data.indicator_code = 'NY_GDP_PCAP_CD'

order by date;
```

-- Question A3

```
CREATE VIEW a3 AS
SELECT DISTINCT country.name, country_data.value
	FROM country LEFT JOIN country_data ON country_data.country_code = country.code
	WHERE country_data.indicator_code = 'SP_POP_TOTL' AND
	date = '2018-12-31'
	order by country_data."value" DESC;
```

-- Question A4

```
CREATE VIEW a4 AS
	SELECT DISTINCT country.name, max(country_data.value) as Largest_Migration,
country_data.date
	FROM  country LEFT JOIN country_data ON country_data.country_code = country.code
	WHERE indicator_code ='SM_POP_NETM' AND date > '2000-01-01'
	GROUP BY country.name, country_data.date

	ORDER BY country_data.date DESC;
```

-- Question A5

```
CREATE VIEW a5 AS
	SELECT DISTINCT continent.name, avg(country_data.value) as Total_Population
	FROM continent LEFT JOIN continent_country ON continent_country.continent_code =
continent.code
	LEFT JOIN country ON country.code = continent_country.country_code
	LEFT JOIN country_data ON country_data.country_code = country.code
	WHERE continent.name ='Africa' AND country_data.date BETWEEN '1990-01-01' AND
'2000-12-31'
	AND country_data.indicator_code ='SP_URB_TOTL'

	GROUP BY continent.name;
```