

untitled

September 25, 2024

```
[1]: import pandas as pd
import sqlite3 as sql
```

```
[2]: db = 'factbook.db'
```

```
[3]: conn = sql.connect(db)
```

```
[4]: conn
```

```
[4]: <sqlite3.Connection at 0x2190285cd60>
```

```
[5]: def read_q(q):
    return pd.read_sql_query(q, conn)
```

```
[6]: q = 'select * from sqlite_master'

read_q(q)
```

```
[6]:      type      name      tbl_name  rootpage  \
0  table  sqlite_sequence  sqlite_sequence      3
1  table      facts      facts      47
2  table      cities      cities      2
```

```
                                sql
0      CREATE TABLE sqlite_sequence(name,seq)
1  CREATE TABLE "facts" ("id" INTEGER PRIMARY KEY...
2  CREATE TABLE cities (\n      id integer prim...
```

```
[7]: read_q('' SELECT *
          FROM facts
        ''')
```

```
[7]:      id code      name      area  area_land  area_water  population  \
0      1  af  Afghanistan  652230.0  652230.0      0.0  3.256434e+07
1      2  al    Albania   28748.0   27398.0    1350.0  3.029278e+06
2      3  ag    Algeria  2381741.0  2381741.0      0.0  3.954217e+07
3      4  an    Andorra    468.0     468.0      0.0  8.558000e+04
```

| | | | | | | | |
|-----|-----|-----|----------------|-----------|-----------|-----|--------------|
| 4 | 5 | ao | Angola | 1246700.0 | 1246700.0 | 0.0 | 1.962535e+07 |
| .. | ... | ... | ... | ... | ... | ... | ... |
| 256 | 257 | zh | Atlantic Ocean | NaN | NaN | NaN | NaN |
| 257 | 258 | xo | Indian Ocean | NaN | NaN | NaN | NaN |
| 258 | 259 | zn | Pacific Ocean | NaN | NaN | NaN | NaN |
| 259 | 260 | oo | Southern Ocean | NaN | NaN | NaN | NaN |
| 260 | 261 | xx | World | NaN | NaN | NaN | 7.256490e+09 |

| | population_growth | birth_rate | death_rate | migration_rate |
|-----|-------------------|------------|------------|----------------|
| 0 | 2.32 | 38.57 | 13.89 | 1.51 |
| 1 | 0.30 | 12.92 | 6.58 | 3.30 |
| 2 | 1.84 | 23.67 | 4.31 | 0.92 |
| 3 | 0.12 | 8.13 | 6.96 | 0.00 |
| 4 | 2.78 | 38.78 | 11.49 | 0.46 |
| .. | ... | ... | ... | ... |
| 256 | NaN | NaN | NaN | NaN |
| 257 | NaN | NaN | NaN | NaN |
| 258 | NaN | NaN | NaN | NaN |
| 259 | NaN | NaN | NaN | NaN |
| 260 | 1.08 | 18.60 | 7.80 | NaN |

[261 rows x 11 columns]

```
[8]: read_q('' SELECT *
           FROM cities
           '' )
```

| | id | name | population | capital | facts_id |
|-----|-----|--------------|------------|---------|----------|
| 0 | 1 | Oranjestad | 37000 | 1 | 216 |
| 1 | 2 | Saint John'S | 27000 | 1 | 6 |
| 2 | 3 | Abu Dhabi | 942000 | 1 | 184 |
| 3 | 4 | Dubai | 1978000 | 0 | 184 |
| 4 | 5 | Sharjah | 983000 | 0 | 184 |
| .. | ... | ... | ... | ... | ... |
| 392 | 393 | Mbabane | 66000 | 1 | 167 |
| 393 | 394 | Sanaa | 2419000 | 1 | 193 |
| 394 | 395 | Aden | 784000 | 0 | 193 |
| 395 | 396 | Lusaka | 1802000 | 1 | 194 |
| 396 | 397 | Harare | 1542000 | 1 | 195 |

[397 rows x 5 columns]

0.0.1 TASK - 1

- Find Pakistan in the facts table
- Find the cities of Pakistan in the cities table

```
[9]: read_q(''' SELECT *
            FROM facts
            WHERE name = "Pakistan"
            ''')
```

```
[9]:      id code      name      area  area_land  area_water  population \
0  132  pk  Pakistan  796095    770875    25220    199085847

      population_growth  birth_rate  death_rate  migration_rate
0                    1.46      22.58      6.49      1.54
```

```
[10]: read_q(''' SELECT *
              FROM cities
              WHERE facts_id = "132"
              ''')
```

```
[10]:      id      name  population  capital  facts_id
0  273    Karachi  13876000      0      132
1  274     Lahore   7566000      0      132
2  275 Faisalabad   3038000      0      132
3  276 Rawalpindi   2164000      0      132
4  277     Multan   1775000      0      132
5  278  Islamabad    919000      1      132
```

0.0.2 JOINS

0.0.3 Inner Join

```
[30]: read_q(''' SELECT f.name AS Country, c.name AS City
              FROM facts f INNER JOIN
              cities c ON
              f.id = c.facts_id
              LIMIT 6
              ''')
```

```
[30]:      Country      City
0      Aruba    Oranjestad
1  Antigua and Barbuda  Saint John'S
2  United Arab Emirates    Abu Dhabi
3  United Arab Emirates      Dubai
4  United Arab Emirates    Sharjah
5      Afghanistan      Kabul
```

0.0.4 Where Cities belongs to Pakistan

```
[12]: read_q(''' SELECT f.name, c.name
              FROM facts f Inner Join
              cities c on
              f.id = c.facts_id
              Where f.id = 132
            ''')
```

```
[12]:      name      name
0  Pakistan  Karachi
1  Pakistan   Lahore
2  Pakistan Faisalabad
3  Pakistan Rawalpindi
4  Pakistan   Multan
5  Pakistan Islamabad
```

0.1 Task -2

Return every country and its capital

```
[34]: read_q(''' SELECT f.name Country, c.name City
              FROM facts f INNER JOIN
              cities c on
              f.id = c.facts_id
              Where capital = 1
              ORDER BY Country
            ''')
```

```
[34]:      Country      City
0      Afghanistan  Kabul
1          Albania  Tirana
2          Algeria  Algiers
3  American Samoa  Pago Pago
4          Andorra  Andorra La Vella
..          ...      ...
203  Virgin Islands  Charlotte Amalie
204  Wallis and Futuna  Mata-Utu
205          Yemen  Sanaa
206          Zambia  Lusaka
207          Zimbabwe  Harare
```

[208 rows x 2 columns]

```
[14]: read_q(''' SELECT f.name Country, c.name City, c.population Population
              FROM facts f Inner Join
              cities c ON
              f.id = c.facts_id
              WHERE c.population > 10000000
              ORDER BY City
              ''')
```

```
[14]:
```

| | Country | City | Population |
|----|---------------|----------------------------------|------------|
| 0 | China | Beijing | 15594000 |
| 1 | Argentina | Buenos Aires | 13528000 |
| 2 | Egypt | Cairo | 11169000 |
| 3 | Bangladesh | Dhaka | 15391000 |
| 4 | China | Guangzhou | 10849000 |
| 5 | Turkey | Istanbul | 11253000 |
| 6 | Pakistan | Karachi | 13876000 |
| 7 | India | Kolkata | 14402000 |
| 8 | Nigeria | Lagos | 11223000 |
| 9 | United States | Los Angeles-Long Beach-Santa Ana | 13395000 |
| 10 | Philippines | Manila | 11862000 |
| 11 | France | Marseille-Aix-en-Provence | 14890100 |
| 12 | Mexico | Mexico City | 20446000 |
| 13 | Russia | Moscow | 11621000 |
| 14 | India | Mumbai | 19744000 |
| 15 | India | New Delhi | 22654000 |
| 16 | United States | New York-Newark | 20352000 |
| 17 | Japan | Osaka-Kobe | 11494000 |
| 18 | Brazil | Sao Paulo | 19924000 |
| 19 | China | Shanghai | 20208000 |
| 20 | Japan | Tokyo | 37217000 |

0.1.1 Task - 4

- Country Name, Total Population, Urban Areas Population

```
[24]: read_q(''' SELECT f.name AS Country, f.population AS Total_Population, SUM(c.
              ↪population) AS Urban_Population
              FROM facts f INNER JOIN cities c
              ON f.id = c.facts_id
              GROUP BY f.name
              ORDER BY Urban_Population DESC
              ''')
```

```
[24]:
```

| | Country | Total_Population | \ |
|---|---------------|------------------|---|
| 0 | India | 1251695584 | |
| 1 | China | 1367485388 | |
| 2 | United States | 321368864 | |

| | | |
|-----|---|-----------|
| 3 | Japan | 126919659 |
| 4 | Brazil | 204259812 |
| .. | ... | ... |
| 205 | Falkland Islands (Islas Malvinas) | 3361 |
| 206 | Anguilla | 16418 |
| 207 | Wallis and Futuna | 15613 |
| 208 | Saint Helena, Ascension, and Tristan da Cunha | 7795 |
| 209 | Palau | 21265 |

| | Urban_Population |
|-----|------------------|
| 0 | 82035000 |
| 1 | 66849000 |
| 2 | 60116000 |
| 3 | 60077000 |
| 4 | 38086000 |
| .. | ... |
| 205 | 2000 |
| 206 | 2000 |
| 207 | 1000 |
| 208 | 1000 |
| 209 | 1000 |

[210 rows x 3 columns]

0.1.2 Task - 5

- Find out the Percentage of Urban to Total Population

```
[27]: read_q(''' SELECT f.name AS Country, f.population AS Total_Population, SUM(c.
    ↪population) AS Urban_Population,
    ROUND(SUM(c.population)/CAST(f.population AS FLOAT) * 100,2) AS_
    ↪Urban_Percentage
    FROM facts f INNER JOIN cities c
    ON f.id = c.facts_id
    GROUP BY f.name
    ORDER BY Urban_Population DESC
    ''')
```

| | Country | Total_Population | \ |
|-----|-----------------------------------|------------------|---|
| 0 | India | 1251695584 | |
| 1 | China | 1367485388 | |
| 2 | United States | 321368864 | |
| 3 | Japan | 126919659 | |
| 4 | Brazil | 204259812 | |
| .. | ... | ... | |
| 205 | Falkland Islands (Islas Malvinas) | 3361 | |
| 206 | Anguilla | 16418 | |

| | | |
|-----|---|-------|
| 207 | Wallis and Futuna | 15613 |
| 208 | Saint Helena, Ascension, and Tristan da Cunha | 7795 |
| 209 | Palau | 21265 |

| | Urban_Population | Urban_Percentage |
|-----|------------------|------------------|
| 0 | 82035000 | 6.55 |
| 1 | 66849000 | 4.89 |
| 2 | 60116000 | 18.71 |
| 3 | 60077000 | 47.33 |
| 4 | 38086000 | 18.65 |
| .. | ... | ... |
| 205 | 2000 | 59.51 |
| 206 | 2000 | 12.18 |
| 207 | 1000 | 6.40 |
| 208 | 1000 | 12.83 |
| 209 | 1000 | 4.70 |

[210 rows x 4 columns]

[]: =