Group No. 1\_\_\_\_\_\_12\_\_\_\_\_\_\_\_\_\_

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CSX3006 Database Systems: Worksheet 2

1. **Part I’s Instruction: Type your answers in Blue. Use tables in Fig. 1 in pages no. 2-3 to answer the following questions (1-13).**
2. There are \_\_14\_\_\_ *tuples* in the **CaseSummary** relation.
3. There are \_\_\_3\_\_\_ *relations* in the **COVID19** database.
4. There are \_\_\_4\_\_\_ *attributes* in the **Country** relation.
5. Suppose that there is a new log record of Peru on 7/28/2020 that there are 16,432 new cases, new 500 new deaths, and 1000 new recovered cases, write the record (*use comma to separate attribute values*) that must be added to the **DailyCase** relation.

* (2020-07-28, Peru, 16432, 500, 1000)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What is the *physical* *level* *domain* of the attribute ‘Population’ in the **Country** relation?

\_\_\_\_\_Non-Negative Integer\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What is the *logical* *level* *domain* of the attribute ‘Population’ in the **Country** relation?

\_\_\_\_\_The number of citizens currently living in the respective country \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What is the *relation schema* of the **Country** relation?

* Country (Country, Continent, WHORegion, Population)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. If all countries with the total deaths below fifthy thousand are removed from the database, write the relation instance of the **CaseSummary** relation after removal.

The New **CaseSummary** relation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Country** | **TotalCase** | **TotalDeath** | **TotalRecovered** | **TotalTest** |
| USA | 5032179 | 162804 | 2576668 | 63139605 |
| Brazil | 2917562 | 98644 | 2047660 | 13206188 |
| Mexico | 462690 | 50517 | 308848 | 1056915 |

1. \_\_\_\_\_\_\_\_\_\_\_ {CurrentDate, Country}, {CurrentDate, Country, NewCase}, {CurrentDate, Country, NewDeath}, {CurrentDate, Country, NewRecovered} \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is/are the *super key(s)* of the **DailyCase** relation.
2. \_\_\_\_\_\_\_\_\_\_\_\_{Country}, {CurrentDate}\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is/are the *candidate key(s)* of the **DailyCase** relation.
3. \_\_\_\_\_\_\_\_\_\_ {CurrentDate, Country} \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is/are the *primary key(s)* of the **DailyCase** relation.
4. ­­­­­­­­­­­\_\_\_\_\_\_Country­\_\_\_\_\_\_ is/are the *foreign key(s)* in the **DailyCase** relation.
5. What is the *Referential Integrity* that is held in the **DailyCase** relation?

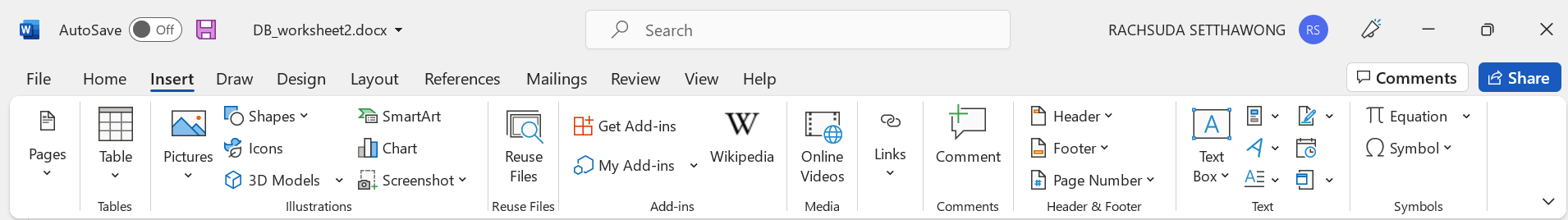
\_\_\_\_\_\_\_\_\_\_\_DailyCase relation helps in regularly updating the CaseSummary relation accurately by redundantly storing the case data \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| The **DailyCase** relation   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **CurrentDate** | **Country** | **NewCase** | **NewDeath** | **NewRecovered** | | 2020-07-26 | Belgium | 299 | 0 | 13 | | 2020-07-26 | Brazil | 24578 | 555 | 27554 | | 2020-07-26 | Canada | 319 | 5 | 0 | | 2020-07-26 | Chile | 2198 | 92 | 1926 | | 2020-07-26 | Colombia | 0 | 0 | 0 | | 2020-07-26 | France | 0 | 0 | 0 | | 2020-07-26 | Germany | 389 | 0 | 136 | | 2020-07-26 | India | 49981 | 711 | 31995 | | 2020-07-26 | Iran | 2333 | 216 | 1894 | | 2020-07-26 | Italy | 254 | 5 | 126 | | 2020-07-26 | Mexico | 5480 | 1035 | 6403 | | 2020-07-26 | Peru | 0 | 0 | 8427 | | 2020-07-26 | Russia | 5741 | 77 | 3108 | | 2020-07-26 | South Africa | 11233 | 114 | 2023 | | 2020-07-26 | USA | 54953 | 470 | 18449 | | 2020-07-27 | Belgium | 402 | 1 | 14 | | 2020-07-27 | Brazil | 23284 | 614 | 33728 | | 2020-07-27 | Canada | 682 | 11 | 0 | | 2020-07-27 | Chile | 2133 | 75 | 1859 | | 2020-07-27 | Colombia | 16306 | 508 | 11494 | | 2020-07-27 | France | 2551 | 17 | 267 | | 2020-07-27 | Germany | 445 | 1 | 259 | | 2020-07-27 | India | 44457 | 637 | 33598 | | 2020-07-27 | Iran | 2434 | 212 | 1931 | | 2020-07-27 | Italy | 168 | 5 | 147 | | 2020-07-27 | Mexico | 4973 | 342 | 8588 | | 2020-07-27 | Peru | 13756 | 575 | 4697 | | 2020-07-27 | Russia | 5607 | 85 | 3077 | | 2020-07-27 | South Africa | 7096 | 298 | 9848 | | 2020-07-27 | USA | 56336 | 1076 | 27941 |   The **CaseSummary** relation   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Country** | **TotalCase** | **TotalDeath** | **TotalRecovered** | **TotalTest** | | USA | 5032179 | 162804 | 2576668 | 63139605 | | Brazil | 2917562 | 98644 | 2047660 | 13206188 | | Mexico | 462690 | 50517 | 308848 | 1056915 | | India | 2025409 | 41638 | 1377384 | 22149351 | | Italy | 249204 | 35187 | 201323 | 7099713 | | France | 195633 | 30312 | 82460 | 3992206 | | Peru | 455409 | 20424 | 310337 | 2493429 | | Iran | 320117 | 17976 | 277463 | 2612763 | | Russia | 871894 | 14606 | 676357 | 29716907 | | Colombia | 357710 | 11939 | 192355 | 1801835 | | Chile | 366671 | 9889 | 340168 | 1760615 | | Belgium | 71158 | 9859 | 17661 | 1767120 | | South Africa | 538184 | 9604 | 387316 | 3149807 | | Canada | 118561 | 8966 | 103106 | 4319172 |   The **Country** relation   |  |  |  |  | | --- | --- | --- | --- | | **Country** | **Continent** | **WHORegion** | **Population** | | Belgium | Europe | Europe | 331198130 | | Brazil | South America | Americas | 212710692 | | Canada | North America | Americas | 129066160 | | Chile | South America | Americas | 1381344997 | | Colombia | South America | Americas | 60452568 | | France | Europe | Europe | 65288306 | | Germany | Europe | Europe | 33016319 | | India | Asia | South-East Asia | 84097623 | | Iran | Asia | Eastern Mediterranean | 145940924 | | Italy | Europe | Europe | 50936262 | | Mexico | North America | Americas | 19132514 | | Peru | South America | Americas | 11594739 | | Russia | Europe | Europe | 59381566 | | South Africa | Africa | Africa | 83811260 | | USA | North America | Americas | 37775022 | |

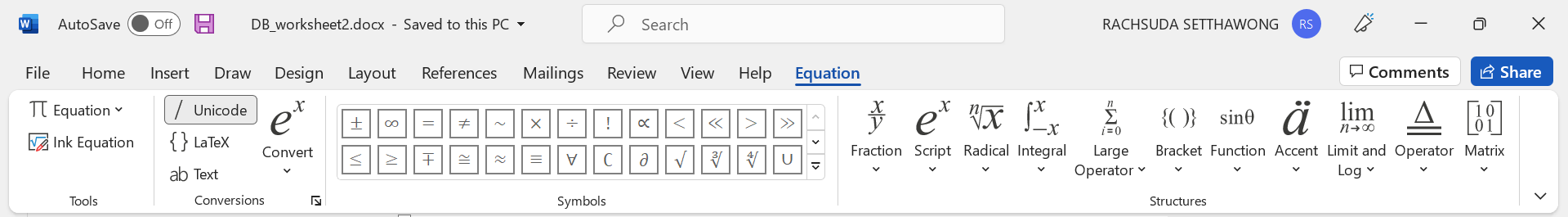
Fig. 1. The COVID19 Database (top 15 countries data on 26-27/7/2020)

**Part II’s Instruction: refer to the DogSalon Database in this worksheet and write relational algebra expressions of the following 7 queries.**

***Hint: you can use Equation in MS Word to write a relational algebra expression.***







1. Retrieve all Countries’ name from the database.

**Output:**

**A screenshot of a phone

Description automatically generated**



**ANSWER: Π Country (Country)**

1. Retrieve all countries’ name and population in Europe from the database.

**Output:**

**A screenshot of a computer

Description automatically generated**



1. **ANSWER: Π country, population ( σ WHORegion= “Europe” (Country) )**Retrieve all countries’ name and population in Europe whose population is greater than 60 million from the database.

**Output:**

**A screenshot of a computer

Description automatically generated**



**ANSWER: Π country, population (σ population > 60 million ^ WHORegion = “Europe” (Country))**

1. Retrieve all countries’ name in Europe having neither new cases nor new death’s case on July 26, 2020 from the database.

**Output:**

**A screenshot of a computer

Description automatically generated**



**ANSWER: Π Country ( σ new cases = 0 ^ new death’s case = 0 ^ CurrentDate = “2020-07-26" (Country))**

1. Retrieve all countries’ name and number of new cases greater than ten thousand but less than twenty thousand on July 26, 2020 from the database.

**Output:**

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**ANSWER: Π country (σ new\_case > 10,000 ^ new\_case < 20,000 ^ current\_date = “2020-07-26"(DailyCase))**

1. Using Union operator to retrieve all countries’ name having either no new case or no new death’s case (or both) on July 26, 2020 from the database.

**Output:**

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**ANSWER: Π country (σ new case = 0 ∪ σ new death = 0 (σ current date = “2020-07-26”)) (DailyCase)**

1. Using Set Difference and Cartesian operators to retrieve all countries’ name and population whose new case and new death are daily recorded but not in CaseSummary from the database.

**Output:**

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**ANSWER: Π Country.Country, Country.Population (σ Country.Country = σ DailyCase.county((Π Country(DailyCase) – Π Country(CaseSummary)) )(Country x DailyCase)**