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Expectations of Originality

This form sets out the requirements for originality for work submitted by students in the Faculty of Engineering and Computer Science. Submissions such as assignments, lab reports, project reports, computer programs and take-home exams must conform to the requirements stated on this form and to the Academic Code of Conduct. The course outline may stipulate additional requirements for the course.

1. Your submissions must be your own original work. Group submissions must be the original work of the students in the group.
2. Direct quotations must not exceed 5% of the content of a report, must be enclosed in quotation marks, and must be attributed to the source by a numerical reference citation[1]. Note that engineering reports rarely contain direct quotations.
3. Material paraphrased or taken from a source must be attributed to the source by a numerical reference citation.
4. Text that is inserted from a web site must be enclosed in quotation marks and attributed to the web site by numerical reference citation.
5. Drawings, diagrams, photos, maps or other visual material taken from a source must be attributed to that source by a numerical reference citation.
6. No part of any assignment, lab report or project report submitted for this course can be submitted for any other course.
7. In preparing your submissions, the work of other past or present students cannot be consulted, used, copied, paraphrased or relied upon in any manner whatsoever.
8. Your submissions must consist entirely of your own or your group's ideas, observations, calculations, information and conclusions, except for statements attributed to sources by numerical citation.
9. Your submissions cannot be edited or revised by any other student.
10. For lab reports, the data must be obtained from your own or your lab group's experimental work.
11. For software, the code must be composed by you or by the group submitting the work, except for code that is attributed to its sources by numerical reference.

You must write one of the following statements on each piece of work that you submit:

For individual work: **"I certify that this submission is my original work and meets the Faculty's Expectations of Originality",** with your signature, I.D. #, and the date.

For group work: **"We certify that this submission is the original work of members of the group and meets the Faculty's Expectations of Originality",** with the signatures and I.D. #s of all the team members and the date.

A signed copy of this form must be submitted to the instructor at the beginning of the semester in each course.

I certify that I have read the requirements set out on this form, and that I am aware of these requirements. I certify that all the work I will submit for this course will comply with these requirements and with additional requirements stated in the course outline.

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Signature: _Ben_ _Pablo_   Date: 16/07/2022

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[1] Rules for reference citation can be found in "Form and Style" by Patrich MacDonagh and Jack Bordan, fourth edition, May, 2000, available at http://www.encs.concordia.ca/scs/Forms/Form&Style.pdf.

Approved by the ENCS Faculty Council February 10, 2012

COMP 353 CC
Final Project Report

A Simple database Application System for the COVID-19 Non-Profit Health Organization

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1. Introduction

This database system is an extension of the database system developed for the previous Warm Up Project.

1.1 Summary of the system

The system is composed of six regions, which each have their own set of countries. Each country has its own set of provinces, states, or territories (which will all be referred to as ProStaTer for simplicity). Instead of being linked to a country, Covid-19 and vaccine statistics are linked to the country's ProStaTers. Vaccine statistics are separated based on the vaccine type, and are linked to a general Covid-19 statistic.

Government agencies may use the system to upload statistics related to vaccination and Covid-19. Researchers and organizations (through organization delegates) may publish articles to the system, as well as edit or delete (remove) them after they have been posted. Administrative users may add, edit or delete (suspend) users of the system. Regular users may view statistics and articles, as well as subscribe to email notifications about authors and articles.

2. Conceptual DB Design (E/R)

2.1 Assumptions about the system

In reference to organizations, it is assumed that each organization will have one organization delegate user who represents the organization. For this reason, the organization delegate is linked to the organization through the organization relation, as opposed to organization delegates being linked to an organization through the orgDel relation.

Another assumption about the system is that user privileges would be handled at the website level. For example, a user would only be able to suspend another user if they are logged in to the website with an administrator account.

2.1 Initial E/R diagram

Based on the initial analysis of the requirements provided in the project description, the E/R diagram shown below was created.

Figure 1. E/R diagram (a full size version is attached in the Appendix)

2.2 Updated E/R diagram

The E/R diagram below was generated using the reverse engineer feature in MySQL Workbench, after converting the initial E/R diagram into Relations (shown in the following section).
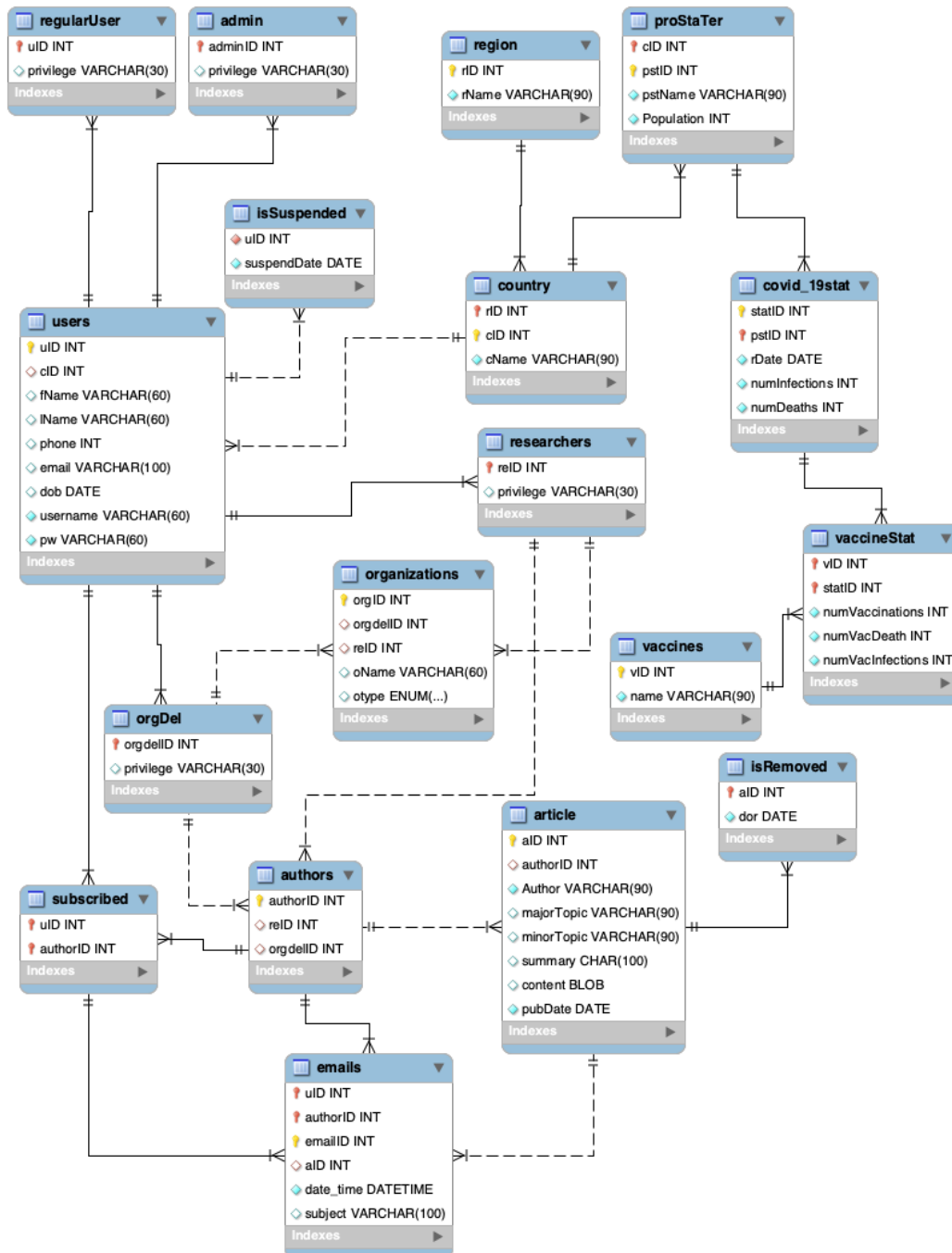

Figure 2. Updated E/R diagram (a full size version is attached in the Appendix)

3. E/R to Relations Conversion

The E/R diagram was converted to the following relations (underlined attribute(s) signifies primary key, * indicates foreign key):

Region(<u>rID</u>, rName)

Country(<u>rID*</u>, <u>cID</u>, cName)
- Foreign key rID references Region(rID)

ProStaTer(<u>cID*</u>, <u>pstID</u>, pstName, Population)
- Foreign key cID references Country(cID)

Covid19Stat(<u>statID</u>, <u>pstID*</u>, rDate, numInfections, numDeaths)
- Foreign key pstID references ProStaTer(pstID)

Vaccines(<u>vID</u>, name)

VaccineStat(<u>vID</u>, <u>statID*</u>, numVaccinations, numVacDeath, numInfections)
- Foreign key statID references Covid19Stat(statID)

Users(<u>uID</u>, cID*, fName, lName, phone, email, dob, username, pw)
- Foreign key cID references Country(cID)

IsSuspended(<u>uID*</u>, suspendDate)
- Foreign key uID references Users(uID)

Researchers(<u>reID*</u>, privilege)
- Foreign key reID references Users(uID)

orgDel(<u>orgdelID*</u>, privilege)
- Foreign key orgdelID references Users(uID)

regularUser(<u>uID*</u>, privilege)
- Foreign key uID references Users(uID)

Administrator(<u>adminID*</u>, privilege)
- Foreign key adminID references Users(uID)

Organizations(<u>orgID</u>, orgdelID*, oName, oType)
- Foreign key orgdelID references orgDel(orgDelID)

Authors(<u>authorID</u>, reID*, orgdelID*)
- Foreign key reID references Researchers(reID)
- Foreign key orgdelID references orgDel(orgdelID)

Article(<u>aID</u>, authorID*, Author, majorTopic, minorTopic, Summary, Content, PubDate)
- Foreign key authorID references Authors(authorID)

Subscribed(<u>uID*</u>, <u>authorID*</u>)
- Foreign key uID references Users(uID)
- Foreign key authorID references Authors(authorID)

Emails(<u>uID*</u>, <u>authorID*</u>, <u>emailID</u>, aID*, dateTime, subject)
- Foreign key uID references Users(uID)
- Foreign key authorID references Authors(authorID)
- Foreign key aID references Article(articleID)

IsRemoved(<u>aID*</u>, removalDate)
- Foreign key aID references Article(aID)

3.1 Functional Dependencies and BCNF

The Boyce-Codd Normal Form is defined by the following property:
- "A relation R is in BCNF <-> all nontrivial FD's in the relation contain a superkey in the left hand side".

The relations obtained from the E/R Diagram have the following functional dependencies:

Region(rID, rName)

FDs: rID → rName, rName -> rID

rID+ = {rID, rName}

rID, rName are superkeys for the Region relation.

Country(rID*, cID, cName)

FDs: cID -> {rID, cName}

{cID}+ = { cID, cName,rID}

{cID} is a superkey for the Country relation.

ProStaTer(cID*, pstID, pstName, Population)

FDs: {cID, pstID} → {pstName, Population}

{cID, pstID}+ = {cID, pstID, pstName, Population}

{cID, pstID} is a superkey for the ProStaTer relation.

Covid19Stat(statID, pstID*, rDate, numInfections, numDeaths)

FDs:

{statID} → {pstID,rDate, numInfections, numDeaths}

{pstID} → {statID,rDate, numInfections, numDeaths}

{statID, pstID} → {rDate, numInfections, numDeaths}

{statID}+ = {statID, pstID, rDate, numInfections, numDeaths}

{pstID}+ = {pstID, statID, rDate, numInfections, numDeaths}

{statID, pstID}+ = {statID, pstID, rDate, numInfections, numDeaths}

{statID, pstID}, {statID}, {pstID} are superkeys for the Covid19Stat relation.

Therefore BCNF

Vaccines(vID, name)

FDs: vID → vName

vID+ = {vID, vName}

vID is a superkey for the Vaccines relation.

VaccineStat(vID, statID*, numVaccinations, numVacDeath, numInfections)

> FDs:
>
> > {vID} → {statID,numVaccinations, numVacDeath, numInfections}
> >
> > {statID} → {vID,statID,numVaccinations, numVacDeath, numInfections}
> >
> > {vID, statID} → {numVaccinations, numVacDeath, numInfections}
> >
> > {vID, statID}+ = {vID, statID, numVaccinations, numVacDeath, numInfections}
> >
> > {vID, statID}, {statID}, {vID} are superkeys for the VaccineStat relation.

Users(uID, cID*, fName, lName, phone, email, dob, username, pw)

> FDs:
>
> > uID → {cID, fName, lName, phone, email, dob, username, pw}
> >
> > {fName,lName} -> {uID, cID, phone, email, dob, username, pw}
> >
> > {username, pw} -> {uID,cID, fName, lName, phone, email, dob}
> >
> > uID, {fName, lName}, {username, pw} are superkeys for the Users relation.

IsSuspended(uID*, suspendDate)

> FDs: uID → suspendDate
>
> uID+ = {uID, suspendDate}
>
> uID is a superkey for the IsSuspended relation.

Researchers(reID*, privilege)

> FDs: reID → privilege
>
> reID+ = {reID, privilege}
>
> reID is a superkey for the Researchers relation.

orgDel(orgdelID*, privilege)

> FDs: orgdelID → privilege
>
> orgdelID+ = {orgdelID, privilege}
>
> orgdelID is a superkey for the orgDel relation.

regularUser(uID*, privilege)

> FDs: uID → privilege
>
> uID+ = {uID, privilege}
>
> uID is a superkey for the regularUser relation.

Administrator(adminID*, privilege)

> FDs: adminID → privilege
>
> adminID+ = {adminID, privilege}
>
> adminID is a superkey for the Administrator relation.

Organizations(<u>orgID</u>, orgdelID*, oName, oType)

      FDs: orgID → {orgdelID, oName, oType}

      orgID+ = {orgID, orgdelID, oName, oType}

      orgID is a superkey for the Organizations relation.

Authors(<u>authorID</u>, reID*, orgdelID*)

      FDs: authorID → {reID, orgdelID}

      authorID+ = {authorID, reID, orgdelID}

      authorID is a superkey for the Authors relation.

Subscribed(<u>uID*</u>, <u>authorID*</u>)

      FDs: {uID, authorID} → {uID, authorID}

      {uID, authorID}+ = {uID, authorID}

      {uID, authorID} is a superkey for the Subscribed relation.

Article(<u>aID</u>, authorID*, Author, majorTopic, minorTopic, Summary, Content, PubDate)

      FDs: aID → {authorID, Author, majorTopic, minorTopic, Summary, Content, PubDate}

      aID+ = {aID, authorID, Author, majorTopic, minorTopic, Summary, Content, PubDate}

      aID is a superkey for the Article relation.

Emails(<u>uID*</u>, <u>authorID*</u>, <u>emailID*</u>, aID*, dateTime, subject)

      FDs: {uID, authorID, emailID} → {aID, dateTime, subject}

      {uID, authorID, emailID}+ = {uID, authorID, emailID, aID, dateTime, subject}

      {uID, authorID, emailID} is a superkey for the Emails relation.

4. Normalization Process Details

The normalization process in this project was relatively minimal as there was a heavy emphasis on avoiding data redundancy during the initial design phase. The process of translating from an E/R diagram to relations led to a series of relations that were each in BCNF and which minimized data redundancy. For example, the population of a country used to be an attribute in the country relation but with the introduction of ProStaTer, which included the population of each ProState, the decision was made to remove the population attribute from country in order to reduce data redundancy.

One of the key reasons that the team was able to produce a set of relations that were already in BCNF is because the core of the relation functionality was implemented in the initial warm-up project and during that process the relations were optimized/normalized during implementation as we observed data redundancy.

There are a few relations that under different design decisions may be considered to increase data redundancy. For example, there is arguably data redundancy created by the decision to represent a region both numerically and by name. This is because both the rID and rName functionally determine each other, however, we decided on a numerical ID in the end as a design decision.

5. Implemented Functionalities

In order to satisfy the GUI requirements, as well as the limitations of the ENCS web servers, we developed a HTML/PHP GUI.

We used HTML forms to take input from users, and then used PHP PDO objects to connect to the MySQL server.

The general structure of each insertion looks like this:

```
try{
     $pdo = new PDO("config file info (dsn,user,pw,etc)")
}catch (PDOException $e){
     "Display a message"
}


try{
     $sql = "SQL query containing the parameters from the form"
     $stmnt = $pdo->prepare($sql)
     $stmnt->bindParam("some param", $_REQUEST['param']);
     Do that for each param
     $stmnt->execute();
}catch(PDOException $e){
     "Display a message"
}
```

For the queries, it is slightly different in the second try/catch block

```
try{
     $sql = "SELECT something from somewhere"
     $data = $pdo->query($sql)
}catch (PDOException $e){"display a message}
Create an html table and then populate it using
foreach($data as $d){echo $d['attribute']} in a table cell
```

6. SQL Scripts

The SQL scripts used to generate the database tables and express the required queries and transactions are shown below.

6.1 Creating database tables

```
CREATE TABLE region (
    rID INT UNSIGNED NOT NULL PRIMARY KEY,
    rName VARCHAR(90) NOT NULL
);

CREATE TABLE country (
    rID INT UNSIGNED,
        FOREIGN KEY (rID) REFERENCES region (rID),
    cID INT UNSIGNED AUTO_INCREMENT,
    PRIMARY KEY (cID , rID),
    cName VARCHAR(90) NOT NULL
);

CREATE TABLE proStaTer (
    cID INT UNSIGNED,
        FOREIGN KEY (cID) REFERENCES country (cID),
    pstID INT UNSIGNED AUTO_INCREMENT UNIQUE,
    PRIMARY KEY (cID, pstID),
    pstName VARCHAR(90) NOT NULL,
    Population INT UNSIGNED NOT NULL
);

CREATE TABLE covid_19stat (
    statID INT UNSIGNED AUTO_INCREMENT,
    pstID INT UNSIGNED,
        FOREIGN KEY (pstID) REFERENCES  proStaTer(pstID),
    rDate DATE NOT NULL,
    PRIMARY KEY(statID, pstID),
    numInfections INT UNSIGNED DEFAULT 0 NOT NULL,
    numDeaths INT UNSIGNED DEFAULT 0 NOT NULL
);
```

```sql
CREATE TABLE vaccines(
    vID INT UNSIGNED AUTO_INCREMENT PRIMARY KEY,
    name VARCHAR (90) NOT NULL
);

CREATE TABLE vaccineStat (
    vID INT UNSIGNED,
        FOREIGN KEY (vID) REFERENCES vaccines (vID),
    statID INT UNSIGNED,
        FOREIGN KEY (statID) REFERENCES covid_19stat (statID),
    PRIMARY KEY(vID,statID),
    numVaccinations INT UNSIGNED DEFAULT 0 NOT NULL,
    numVacDeath INT UNSIGNED DEFAULT 0 NOT NULL,
    numVacInfections INT UNSIGNED DEFAULT 0 NOT NULL
);

CREATE TABLE users(
    uID INT UNSIGNED AUTO_INCREMENT NOT NULL,
    PRIMARY KEY (uID),
    cID INT UNSIGNED,
        FOREIGN KEY (cID)REFERENCES country (cID),
    fName VARCHAR(60) DEFAULT 'N/A',
    lName VARCHAR(60) DEFAULT 'N/A',
    phone BIGINT UNSIGNED,
    email VARCHAR(100) DEFAULT 'empty',
    dob DATE,
    username VARCHAR(60) NOT NULL,
    pw VARCHAR(60) NOT NULL
);

CREATE TABLE isSuspended(
    uID INT UNSIGNED NOT NULL,
        FOREIGN KEY (uID) REFERENCES users (uID),
    suspendDate DATE NOT NULL
);

CREATE TABLE researchers (
    reID INT UNSIGNED PRIMARY KEY,
        FOREIGN KEY (reID) REFERENCES users (uID),
    privilege VARCHAR(30) DEFAULT 'Researcher'

);
```

```
CREATE TABLE orgDel (
    orgdelID INT UNSIGNED PRIMARY KEY,
        FOREIGN KEY (orgdelID) REFERENCES users (uID),
    privilege VARCHAR(30) DEFAULT 'Organization Delegate'

);

CREATE TABLE regularUser (
    uID INT UNSIGNED PRIMARY KEY,
        FOREIGN KEY (uID) REFERENCES users (uID),
    privilege VARCHAR(30) DEFAULT 'Regular'
);

CREATE TABLE administrator (
    adminID INT UNSIGNED PRIMARY KEY,
        FOREIGN KEY (adminID) REFERENCES users (uID),
    privilege VARCHAR(30) DEFAULT 'Administrator'
);

CREATE TABLE organizations (
    orgID INT UNSIGNED AUTO_INCREMENT NOT NULL PRIMARY KEY,
    orgdelID INT UNSIGNED,
        FOREIGN KEY (orgdelID) REFERENCES orgDel (orgdelID),
    oName VARCHAR(60),
    otype ENUM('Government','Research Center','Company')
);

CREATE TABLE authors (
    authorID INT UNSIGNED AUTO_INCREMENT PRIMARY KEY,
    reID INT UNSIGNED,
        FOREIGN KEY (reID) REFERENCES researchers (reID),
    orgdelID INT UNSIGNED,
        FOREIGN KEY (orgdelID) REFERENCES orgDel (orgdelID)
);
```

```
CREATE TABLE article (
    aID INT UNSIGNED AUTO_INCREMENT NOT NULL PRIMARY KEY,
    authorID int Unsigned,
        FOREIGN KEY (authorID) REFERENCES authors (authorID),
    Author VARCHAR(90) NOT NULL,
    majorTopic VARCHAR(90) DEFAULT 'N/A',
    minorTopic VARCHAR(90) DEFAULT 'N/A',
    summary CHAR(100) DEFAULT 'empty',
    content BLOB,
    pubDate DATE NOT NULL
);

CREATE TABLE subscribed (
    uID INT UNSIGNED NOT NULL,
        FOREIGN KEY (uID) REFERENCES users (uID),
    authorID INT UNSIGNED NOT NULL,
        FOREIGN KEY (authorID) REFERENCES authors (authorID),
    PRIMARY KEY (uID, authorID)
);

CREATE TABLE emails (
    uID INT UNSIGNED NOT NULL,
        FOREIGN KEY (uID) REFERENCES subscribed (uID),
    authorID INT UNSIGNED,
        FOREIGN KEY (authorID) REFERENCES authors (authorID),
    emailID INT UNSIGNED AUTO_INCREMENT UNIQUE,
    aID INT UNSIGNED,
        FOREIGN KEY (aID) REFERENCES article (aID),
    PRIMARY KEY (uID, emailID, authorID),
    dateTime DATETIME NOT NULL,
    subject VARCHAR(100)
);

CREATE TABLE isRemoved (
    aID INT UNSIGNED PRIMARY KEY,
        FOREIGN KEY (aID) REFERENCES article (aID),
    removalDate DATE NOT NULL
);
```

6.2 Required queries and transactions

10.
```
(SELECT admin.privilege, cName AS Citizenship, fName, lName, email, phone, dob
FROM (users INNER JOIN admin ON users.uID = admin.adminID)
        INNER JOIN country on users.cID = country.cID)
UNION
(SELECT regularUser.privilege, cName AS Citizenship, fName, lName, email,
phone, dob
FROM (users INNER JOIN regularUser ON users.uID = regularUser.uID)
        INNER JOIN country on users.cID = country.cID)
UNION
(SELECT researchers.privilege, cName AS Citizenship, fName, lName, email,
phone, dob
FROM (users INNER JOIN researchers ON users.uID = researchers.reID)
        INNER JOIN country on users.cID = country.cID)
UNION
(SELECT orgDel.privilege, cName AS Citizenship, fName, lName, email, phone,
dob
FROM (users INNER JOIN orgDel ON users.uID = orgDel.orgdelID)
        INNER JOIN country on users.cID = country.cID)
ORDER BY privilege ASC, Citizenship ASC;
```

11.
```
SELECT Author, majorTopic, minorTopic, summary, pubDate, cName AS Citizenship
FROM ((article
        INNER JOIN authors ON article.authorID = authors.authorID)
        INNER JOIN users
            ON (authors.reID = users.uID OR authors.orgdelID = users.uID))
        INNER JOIN country ON users.cID = country.cID
ORDER BY Citizenship ASC, Author ASC, pubDate ASC;
```

12.
```
SELECT cName AS Citizenship, removalDate, Author, majorTopic, minorTopic,
        summary, pubDate
FROM ((((article
        INNER JOIN authors ON article.authorID = authors.authorID)
        INNER JOIN users
            ON (authors.reID = users.uID OR authors.orgdelID = users.uID))
        INNER JOIN country ON users.cID = country.cID)
        INNER JOIN isRemoved ON article.aID = isRemoved.aID)
ORDER BY Citizenship ASC, removalDate ASC;
```

13.
```
(SELECT admin.privilege, username, fName, lName,
        cName AS Citizenship, email, phone, dob, suspendDate
FROM ((users INNER JOIN admin ON users.uID = admin.adminID)
            INNER JOIN country ON users.cID = country.cID)
            INNER JOIN isSuspended ON users.uID = isSuspended.uID)
UNION
(SELECT regularUser.privilege, username, fName, lName,
        cName AS Citizenship, email, phone, dob, suspendDate
FROM ((users INNER JOIN regularUser ON users.uID = regularUser.uID)
            INNER JOIN country ON users.cID = country.cID)
            INNER JOIN isSuspended ON users.uID = isSuspended.uID)
UNION
(SELECT researchers.privilege, username, fName, lName,
        cName AS Citizenship, email, phone, dob, suspendDate
FROM ((users INNER JOIN researchers ON users.uID = researchers.reID)
             INNER JOIN country ON users.cID = country.cID)
             INNER JOIN isSuspended ON users.uID = isSuspended.uID)
UNION
(SELECT orgDel.privilege, username, fName, lName,
        cName AS Citizenship, email, phone, dob, suspendDate
FROM ((users INNER JOIN orgDel ON users.uID = orgDel.orgdelID)
            INNER JOIN country ON users.cID = country.cID)
            INNER JOIN isSuspended ON users.uID = isSuspended.uID)
ORDER BY suspendDate ASC;
```

14.
```
SELECT pubDate, author, majorTopic, minorTopic, summary, content
FROM article
WHERE author = "-- given author name --"
ORDER BY pubDate ASC;
```

15.
```
SELECT Author, cName AS Citizenship, COUNT(article.authorID) AS
NumPublications
FROM ((article
        INNER JOIN authors ON article.authorID = authors.authorID)
        INNER JOIN users
            ON (authors.reID = users.uID OR authors.orgdelID = users.uID))
        INNER JOIN country ON users.cID = country.cID
GROUP BY article.authorID
ORDER BY NumPublications DESC;
```

16.
```
SELECT rName, cName, COUNT(DISTINCT users.uID) AS NumAuthors,
        COUNT(aID) AS NumPublications
FROM (((authors
      INNER JOIN users
            ON (authors.reID = users.uID OR authors.orgdelID = users.uID))
      INNER JOIN article ON article.authorID = authors.authorID)
      INNER JOIN country ON users.cID = country.cID)
      INNER JOIN region ON country.rID = region.rID
GROUP BY country.cID
ORDER BY rName ASC, NumPublications DESC;
```

17.
```
SELECT
    rName,
    cName,
    SUM(DISTINCT A.population),
    SUM(totVaccines),
    SUM(totVacDead)
FROM
    (SELECT
        rName,
            cName,
            Population,
            SUM(numVaccinations) AS totVaccines,
            SUM(numVacDeath) AS totVacDead
    FROM
        region
    INNER JOIN country ON country.rID = region.rID
    INNER JOIN prostater ON prostater.cID = country.cID
    INNER JOIN covid_19stat ON covid_19stat.pstID = prostater.pstID
    INNER JOIN vaccinestat ON vaccinestat.statID = covid_19stat.statID
    GROUP BY covid_19stat.statID) AS A
GROUP BY cName;
```

18.
```
SELECT DATE(dateTime), users.email AS Receiver, subject
FROM emails INNER JOIN users ON emails.uID = users.uID
WHERE dateTime BETWEEN date1 AND date2  -- user inputs start date and end date
ORDER BY dateTime ASC;
```

19.

```
SELECT
    totalPopulation,
    rDate,
    SUM(numVaccinations),
    SUM(numInfections),
    SUM(numVaccinations),
    SUM(numVacDeath),
    vaccines.name
FROM
    country
        INNER JOIN prostater ON country.cID = prostater.cID
        INNER JOIN covid_19stat ON covid_19stat.pstID = prostater.pstID
        INNER JOIN vaccinestat ON vaccinestat.statID = covid_19stat.statID
        INNER JOIN vaccines ON vaccinestat.vID = vaccines.vID
        INNER JOIN
    (SELECT
        prostater.cID AS cID, SUM(Population) AS totalPopulation
    FROM country
        INNER JOIN prostater ON country.cID = prostater.cID
    GROUP BY prostater.cID) AS A ON A.cID = prostater.cID
WHERE
    cName = 'givencountryName'        -- user inputs country name
GROUP BY vaccines.name
ORDER BY rDate;
```

20.
```
SELECT
      A.authID AS authID,
      A.AuthorName AS AuthorName,
      A.Citizenship AS Citizenship,
      A.NumSubscribers AS NumSubscribers
FROM
((SELECT
    authors.authorID AS authID,
    CONCAT(fName, ' ', lName) AS AuthorName,
    cName AS Citizenship,
    COUNT(subscribed.uID) AS NumSubscribers
FROM
    (((AUTHORS
    INNER JOIN subscribed ON subscribed.authorID = authors.authorID)
    INNER JOIN users
        ON (authors.reID = users.uID OR authors.orgdelID = users.uID))
    INNER JOIN country ON users.cID = country.cID)
    LEFT JOIN organizations ON authors.orgdelID = organizations.orgdelID
WHERE
    oName IS NULL
GROUP BY subscribed.authorID)
UNION
(SELECT
    authors.authorID AS authID,
    oName AS AuthorName,
    cName AS Citizenship,
    COUNT(subscribed.uID) AS NumSubscribers
FROM
    (((authors
    INNER JOIN subscribed ON subscribed.authorID = authors.authorID)
    INNER JOIN users
        ON (authors.reID = users.uID OR authors.orgdelID = users.uID))
    INNER JOIN country ON users.cID = country.cID)
    LEFT JOIN organizations ON authors.orgdelID = organizations.orgdelID
WHERE
    oName IS NOT NULL
GROUP BY subscribed.authorID)) AS A
ORDER BY NumSubscribers DESC;
```

7. Sample Test Data

The full test data used can be found at the project repository on GitHub. A selection of the tuples used to populate each table is shown below.

```
INSERT INTO region VALUES
 (1,'Africa'),
 (2,'Americas'),
(3,'Eastern Mediterranean'),
(4,'Europe'),
(5,'South-East Asia'),
(6,'Western Pacific');

INSERT INTO country VALUES
(1,NULL,'Djibouti'),
(1,NULL,'Seychelles'),
(1,NULL,'DR Congo'),
(1,NULL,'Sierra Leone'),
(1,NULL,'South Africa'),
(1,NULL,'Egypt'),
(2,NULL,'United States'),
(2,NULL,'Canada'),
(2,NULL,'Mexico'),
(2,NULL,'Bolivia'),
(2,NULL,'Colombia'),
... ;

INSERT INTO proStaTer VALUES
(1,NULL,'province0',9702932),
(1,NULL,'province1',9702932),
(1,NULL,'province2',9702932),
(1,NULL,'province3',9702932),
(1,NULL,'province4',9702932),
(1,NULL,'province5',9702932),
(1,NULL,'province6',9702932),
(1,NULL,'province7',9702932),
(1,NULL,'province8',9702932),
(1,NULL,'province9',9702932),
(2,NULL,'province0',77328035),
(2,NULL,'province1',77328035),
(2,NULL,'province2',77328035),
...;
```

```
INSERT INTO covid_19stat VALUES
(NULL,1,'2022-01-04',24615,1964),
(NULL,2,'2020-12-14',38082,8537),
(NULL,3,'2021-03-13',36057,26670),
(NULL,4,'2020-08-18',33975,19436),
(NULL,5,'2020-10-26',28733,42997),
(NULL,6,'2020-07-09',136897,23935),
(NULL,7,'2022-02-25',100178,228),
(NULL,8,'2021-07-25',20763,7840),
(NULL,9,'2022-01-01',43158,17274),
(NULL,10,'2022-06-20',141396,60064),
(NULL,11,'2022-08-28',116891,1644),
(NULL,12,'2020-05-24',122865,60807),
(NULL,13,'2022-09-28',104216,46454),
(NULL,14,'2020-02-20',63739,4674),
(NULL,15,'2021-11-07',123269,1834),
...;

INSERT INTO vaccines VALUES
(NULL,'Pfizer'),
(NULL,'Moderna'),
(NULL,'AstraZeneca'),
(NULL,'Johnson & Johnson');

INSERT INTO vaccinestat VALUES
(1,1,57681268,7509,5438511),
(2,2,441361778,308796,88563637),
(3,3,335951418,270652,95052789),
(1,4,113973221,223214,37952231),
(4,5,171803001,191834,56792564),
(4,6,22148700,45377,8284170),
(3,7,262632256,557144,81010130),
(1,8,178341076,8524,2295032),
(1,9,41219044,29820,9048262),
(2,10,119427845,38337,10096871),
(1,11,73143336,73169,20616678),
(2,12,286919930,438212,80621676),
(4,13,60971741,39269,7678367),
(1,14,115631211,36451,6217968),
(4,15,280276642,236827,107056198),
...;
```

```
INSERT INTO users VALUES
(NULL,2,'Joe','Smith',95684,'joesmith@gmail.com','1971-01-21','JoeSmith','7879
2776'),
(NULL,62,'Maanav','Schwager',87782,'MaanavSchwager@gmail.com','1972-05-23','Ma
anavSchwager','30165370'),
(NULL,35,'Aryn','Davis',69135,'ArynDavis@gmail.com','2010-10-10','ArynDavis','
92895300'),
(NULL,93,'Fyfe','Knutson',25234,'FyfeKnutson@gmail.com','1990-09-04','FyfeKnut
son','95281284'),
(NULL,65,'Jordi','Reardon',17061,'JordiReardon@gmail.com','1992-10-24','JordiR
eardon','39085118'),
(NULL,7,'Yu','Reamer',63718,'YuReamer@gmail.com','1982-09-15','YuReamer','7736
0367'),
(NULL,83,'Finnlay','Woo',67914,'FinnlayWoo@gmail.com','1985-06-10','FinnlayWoo
','81524620'),
(NULL,56,'Boab','Napier',69311,'BoabNapier@gmail.com','2001-05-12','BoabNapier
','98231037'),
(NULL,44,'Abel','Hancock',85657,'AbelHancock@gmail.com','1983-04-01','AbelHanc
ock','42165104'),
(NULL,88,'Cephas','Chambers',30248,'CephasChambers@gmail.com','1993-12-05','Ce
phasChambers','83776808'),
(NULL,41,'Bret','Cannon',94968,'BretCannon@gmail.com','1977-03-21','BretCannon
','87062586'),
(NULL,11,'Tristain','Upson',81769,'TristainUpson@gmail.com','2006-01-24','Tris
tainUpson','60372573'),
(NULL,74,'Daniil','Soukup',80009,'DaniilSoukup@gmail.com','2007-11-06','Daniil
Soukup','34211668'),
(NULL,76,'Kelum','Lawless',42625,'KelumLawless@gmail.com','2004-07-12','KelumL
awless','85046513'),
(NULL,78,'Oban','Lulloff',11601,'ObanLulloff@gmail.com','1993-02-01','ObanLull
off','92568808'),
...;

INSERT INTO isSuspended VALUES
(96, '2021-08-25'),
(81, '2021-11-16'),
(63, '2021-09-24'),
(42, '2020-01-01'),
(90, '2022-04-12'),
(15, '2021-05-09'),
(2, '2020-12-12'),
...;
```

```
INSERT INTO researchers VALUES
(63, DEFAULT),
(64, DEFAULT),
(59, DEFAULT),
(58, DEFAULT),
(31, DEFAULT),
(50, DEFAULT),
(47, DEFAULT),
(86, DEFAULT),
(77, DEFAULT),
(80, DEFAULT),
...;

INSERT INTO orgdel VALUES
(75, DEFAULT),
(20, DEFAULT),
(45, DEFAULT),
(62, DEFAULT),
(87, DEFAULT),
(23, DEFAULT),
(95, DEFAULT),
(27, DEFAULT),
(66, DEFAULT),
...;

INSERT INTO admin VALUES
(8, DEFAULT),
(65, DEFAULT),
(94, DEFAULT),
(39, DEFAULT);

INSERT INTO regularUser VALUES
(1, DEFAULT),
(2, DEFAULT),
(3, DEFAULT),
(4, DEFAULT),
(5, DEFAULT),
(6, DEFAULT),
(9, DEFAULT),
(10, DEFAULT),
(11, DEFAULT),
...;
```

```
INSERT INTO organizations VALUES
(1,'75',NULL,'Company Incorporated','Company'),
(2,'20',NULL,'Company Incorporated','Company'),
(3,'45',NULL,'Company Incorporated','Company'),
(4,'62',NULL,'Company Incorporated','Company'),
(5,'87',NULL,'Company Incorporated','Company'),
(6,'23',NULL,'Company Incorporated','Company'),
(7,'95',NULL,'Company Incorporated','Company'),
(8,'27',NULL,'Company Incorporated','Company'),
(9,'66',NULL,'National Government Agency','Government'),
(10,'72',NULL,'National Government Agency','Government'),
(11,'21',NULL,'Company Incorporated','Company'),
(12,'56',NULL,'Company Incorporated','Company'),
(13,'49',NULL,'Company Incorporated','Company'),
(14,'40',NULL,'National Government Agency','Government'),
(15,'69',NULL,'National Government Agency','Government'),
...;

INSERT INTO authors  VALUES
(NULL,NULL,7),
(NULL,NULL,16),
(NULL,NULL,17),
(NULL,NULL,20),
(NULL,NULL,27),
(NULL,28,NULL),
(NULL,30,NULL),
(NULL,31,NULL),
(NULL,33,NULL),
(NULL,46,NULL),
(NULL,47,NULL),
(NULL,NULL,49),
...;

INSERT INTO subscribed VALUES
(1, 4),
(6, 25),
(22, 7),
(23, 14),
(26, 14),
(33, 3),
(34, 8),
...;
```

```
INSERT INTO article VALUES
(NULL,15,'Joe Smith','MajorTop','MinorTop','This is a summary','This is the
content of the article','2020-06-21'),
(NULL,6,'Ayan Schiebel','MajorTop','MinorTop','This is a summary','This is the
content of the article','2020-06-25'),
(NULL,27,'Hyden Pak','MajorTop','MinorTop','This is a summary','This is the
content of the article','2021-02-07'),
(NULL,11,'Dex Soukup','MajorTop','MinorTop','This is a summary','This is the
content of the article','2020-12-05'),
(NULL,15,'Kaileb Yates','MajorTop','MinorTop','This is a summary','This is the
content of the article','2020-11-12'),
(NULL,27,'Hyden Pak','MajorTop','MinorTop','This is a summary','This is the
content of the article','2022-04-04'),
(NULL,26,'Tanner Weiss','MajorTop','MinorTop','This is a summary','This is the
content of the article','2021-09-11'),
(NULL,22,'Kai Sagar','MajorTop','MinorTop','This is a summary','This is the
content of the article','2020-07-04'),
(NULL,22,'Kai Sagar','MajorTop','MinorTop','This is a summary','This is the
content of the article','2021-09-21'),
(NULL,10,'Wei Bowers','MajorTop','MinorTop','This is a summary','This is the
content of the article','2020-04-12'),
(NULL,27,'Hyden Pak','MajorTop','MinorTop','This is a summary','This is the
content of the article','2022-11-21'),
(NULL,26,'Tanner Weiss','MajorTop','MinorTop','This is a summary','This is the
content of the article','2020-11-19'),
(NULL,23,'Reegan Fletcher','MajorTop','MinorTop','This is a summary','This is
the content of the article','2020-04-18'),
(NULL,17,'Muhamadjavad Hydinger','MajorTop','MinorTop','This is a
summary','This is the content of the article','2020-08-09'),
(NULL,27,'Hyden Pak','MajorTop','MinorTop','This is a summary','This is the
content of the article','2021-06-25'),
(NULL,15,'Kaileb Yates','MajorTop','MinorTop','This is a summary','This is the
content of the article','2021-04-21'),
...;

INSERT INTO isRemoved VALUES
(3, '2020-03-20'),
(4, '2021-03-02'),
(5, '2022-07-02'),
(8, '2021-10-04'),
(12, '2022-11-15'),
...;
```

```
INSERT INTO emails VALUES
(1, 4, NULL, 5,'2021-05-07','Subject of the email' ),
(6, 25, NULL, 24,'2020-02-25','Subject of the email' ),
(22, 7, NULL, 57,'2021-06-28','Subject of the email' ),
(23, 14, NULL, 47,'2022-09-04','Subject of the email' ),
(26, 14, NULL, 80,'2021-05-27','Subject of the email' ),
(33, 3, NULL, 98,'2020-01-18','Subject of the email' ),
(34, 8, NULL, 70,'2022-12-25','Subject of the email' ),
(35, 4, NULL, 34,'2020-06-03','Subject of the email' ),
(45, 23, NULL, 34,'2021-09-04','Subject of the email' ),
(48, 26, NULL, 75,'2021-04-15','Subject of the email' ),
...;
```

8. Contributions

Pablo Arevalo Escobar (40081955)	- requirements analysis - E/R diagram to relations conversion - formulation of queries - Data generation
Sam Mojaverian (40174101)	- requirements analysis - E/R diagram to relations conversion - formulation of queries - GUI HTML and PHP
Benjamin Pizarro (27644914)	- requirements analysis - E/R diagram to relations conversion - formulation of queries - GUI HTML and PHP
Zachary Bruce (40136585)	- requirements analysis - E/R diagram to relations conversion - formulation of queries - report formatting

APPENDIX: Query results

10.

```
+----------------------+------------------------+---------------+-------------+-------------------------------------+-------+------------+
| privilege            | Citizenship            | fName         | lName       | email                               | phone | dob        |
+----------------------+------------------------+---------------+-------------+-------------------------------------+-------+------------+
| Administrator        | Cambodia               | Cruz          | Olson       | CruzOlson@gmail.com                 | 46054 | 1988-01-13 |
| Administrator        | Germany                | Norrie        | Tandy       | NorrieTandy@gmail.com               | 91948 | 2009-10-08 |
| Administrator        | Italy                  | Bradan        | Sawyer      | BradanSawyer@gmail.com              | 65388 | 1992-02-24 |
| Administrator        | Montenegro             | Boab          | Napier      | BoabNapier@gmail.com                | 69311 | 2001-05-12 |
| Organization Delegate | Brazil                | Ala           | Pak         | AlaPak@gmail.com                    | 45640 | 1999-06-10 |
| Organization Delegate | Croatia               | Robbie        | Celedon     | RobbieCeledon@gmail.com             | 38777 | 2001-06-14 |
| Organization Delegate | Cyprus                | Lukmaan       | Hesch       | LukmaanHesch@gmail.com              | 59880 | 2004-07-05 |
| Organization Delegate | Estonia               | Isaac         | Moore       | IsaacMoore@gmail.com                | 80995 | 2007-12-19 |
| Organization Delegate | Jordan                | Rhyan         | Eastman     | RhyanEastman@gmail.com              | 91296 | 2000-04-25 |
| Organization Delegate | Kuwait                | Aidy          | Jagtap      | AidyJagtap@gmail.com                | 57005 | 2004-04-07 |
| Organization Delegate | Laos                  | Keith         | Hylan       | KeithHylan@gmail.com                | 67751 | 1983-08-20 |
| Organization Delegate | Lithuania             | Lex           | Van Zandt   | LexVan Zandt@gmail.com              | 27793 | 2005-12-14 |
| Organization Delegate | Monaco                | Felix         | Casal       | FelixCasal@gmail.com                | 83457 | 1995-03-17 |
| Organization Delegate | Montenegro            | Aaron-James   | Sweeney     | Aaron-JamesSweeney@gmail.com        | 90643 | 1971-10-06 |
| Organization Delegate | Portugal              | Fares         | Ventotla    | FaresVentotla@gmail.com             | 84496 | 2010-11-21 |
| Organization Delegate | Serbia                | Dillan        | Trebil      | DillanTrebil@gmail.com              | 48799 | 2010-09-16 |
| Organization Delegate | Singapore             | Hamad         | Deitz       | HamadDeitz@gmail.com                | 39916 | 1975-04-01 |
| Organization Delegate | Turkey                | Quinn         | Soulis      | QuinnSoulis@gmail.com               | 80819 | 1989-10-09 |
| Organization Delegate | UAE                   | Beau          | Knutson     | BeauKnutson@gmail.com               | 66431 | 1975-07-09 |
| Organization Delegate | Ukraine               | McKade        | Sandstrom   | McKadeSandstrom@gmail.com           | 17946 | 1991-08-26 |
| Organization Delegate | United States         | Kye           | Bateman     | KyeBateman@gmail.com                | 32978 | 1996-03-02 |
| Organization Delegate | Vietnam               | Nyah          | Trebil      | NyahTrebil@gmail.com                | 49673 | 1989-01-04 |
| Organization Delegate | Vietnam               | Finnlay       | Woo         | FinnlayWoo@gmail.com                | 67914 | 1985-06-10 |
| Regular              | Afghanistan            | Joash         | Hylan       | JoashHylan@gmail.com                | 34022 | 1976-06-21 |
| Regular              | Afghanistan            | Michael-James | Christensen | Michael-JamesChristensen@gmail.com  | 64126 | 2004-01-07 |
| Regular              | Armenia                | Oscar         | Jagtap      | OscarJagtap@gmail.com               | 89212 | 1983-06-24 |
| Regular              | Belarus                | Yago          | Lulloff     | YagoLulloff@gmail.com               | 94814 | 1985-06-07 |
| Regular              | Belarus                | Kaidyn        | Hylan       | KaidynHylan@gmail.com               | 89744 | 2007-09-02 |
| Regular              | Bosnia and Herzegovina | Damien        | Ostrander   | DamienOstrander@gmail.com           | 50978 | 2006-03-11 |
| Regular              | Cambodia               | Oban          | Lulloff     | ObanLulloff@gmail.com               | 11601 | 1993-02-01 |
| Regular              | Cambodia               | Babur         | Dinkins     | BaburDinkins@gmail.com              | 72039 | 1970-02-15 |
| Regular              | Canada                 | Qirui         | Myers       | QiruiMyers@gmail.com                | 31353 | 2005-05-08 |
| Regular              | China                  | Fyfe          | Knutson     | FyfeKnutson@gmail.com               | 25234 | 1990-09-04 |
| Regular              | Colombia               | Tristain      | Upson       | TristainUpson@gmail.com             | 81769 | 2006-01-24 |
| Regular              | Colombia               | Dillon        | Haworth     | DillonHaworth@gmail.com             | 18827 | 2001-12-14 |
| Regular              | Cuba                   | Ardal         | Roberts     | ArdalRoberts@gmail.com              | 61797 | 1976-04-03 |
| Regular              | Cuba                   | Darren        | Napier      | DarrenNapier@gmail.com              | 48740 | 1972-03-15 |
| Regular              | Cyprus                 | Corben        | Tisler      | CorbenTisler@gmail.com              | 83723 | 1997-06-15 |
| Regular              | Czech Republic         | Aryn          | Davis       | ArynDavis@gmail.com                 | 69135 | 2010-10-10 |
| Regular              | Czech Republic         | Tobey         | Valente     | TobeyValente@gmail.com              | 32934 | 1980-04-06 |
| Regular              | Czech Republic         | Taylor        | Bongard     | TaylorBongard@gmail.com             | 60130 | 2009-03-03 |
| Regular              | Czech Republic         | Dennys        | Reardon     | DennysReardon@gmail.com             | 84618 | 1993-01-28 |
| Regular              | Djibouti               | Travis        | Christensen | TravisChristensen@gmail.com         | 70311 | 1998-06-25 |
| Regular              | Estonia                | Reese         | Chapman     | ReeseChapman@gmail.com              | 99280 | 1973-08-04 |
| Regular              | Estonia                | Remo          | Shaffer     | RemoShaffer@gmail.com               | 40659 | 2006-02-06 |
| Regular              | Finland                | Rhuairidh     | Frick       | RhuairidhFrick@gmail.com            | 70238 | 1974-12-27 |
| Regular              | Germany                | Lennon        | Wakefield   | LennonWakefield@gmail.com           | 88126 | 1991-07-02 |
| Regular              | Germany                | Bret          | Cannon      | BretCannon@gmail.com                | 94968 | 1977-03-21 |
| Regular              | Greece                 | Justan        | Schlicht    | JustanSchlicht@gmail.com            | 72818 | 1995-08-03 |
| Regular              | Hungary                | Hussan        | Hylan       | HussanHylan@gmail.com               | 67402 | 2000-08-26 |
| Regular              | Hungary                | Zacharius     | Vader       | ZachariusVader@gmail.com            | 62651 | 2007-12-21 |
| Regular              | Iceland                | Amani         | Eastman     | AmaniEastman@gmail.com              | 52591 | 1990-01-08 |
| Regular              | Iceland                | Abel          | Hancock     | AbelHancock@gmail.com               | 85657 | 1983-04-01 |
| Regular              | Indonesia              | Moyes         | Weiss       | MoyesWeiss@gmail.com                | 67255 | 1982-06-25 |
| Regular              | Indonesia              | Kiyonari      | Johnson     | KiyonariJohnson@gmail.com           | 89922 | 2007-05-27 |
| Regular              | Iran                   | Rhuairidh     | Sagar       | RhuairidhSagar@gmail.com            | 41218 | 1970-02-26 |
| Regular              | Ireland                | Lyall         | Tapia       | LyallTapia@gmail.com                | 48091 | 1974-03-20 |
| Regular              | Italy                  | Ronnie        | Jenson      | RonnieJenson@gmail.com              | 31090 | 1976-07-21 |
| Regular              | Jordan                 | Ezekiel       | Bateman     | EzekielBateman@gmail.com            | 99133 | 1977-09-27 |
| Regular              | Liechtenstein          | Jamal         | Tisler      | JamalTisler@gmail.com               | 26876 | 1981-04-15 |
| Regular              | Malaysia               | Cephas        | Chambers    | CephasChambers@gmail.com            | 30248 | 1993-12-05 |
| Regular              | Mexico                 | Philip        | Sweeney     | PhilipSweeney@gmail.com             | 44725 | 1996-05-02 |
| Regular              | Myanmar                | Sukhpal       | Ramachandran | SukhpalRamachandran@gmail.com      | 52186 | 1996-10-23 |
| Regular              | Russia                 | Maanav        | Schwager    | MaanavSchwager@gmail.com            | 87782 | 1972-05-23 |
```

Regular	Russia	Rafi	Orwig	RafiOrwig@gmail.com	61485	1983-12-24
Regular	Seychelles	Joe	Smith	joesmith@gmail.com	95684	1971-01-21
Regular	Seychelles	Elias	Bauer	EliasBauer@gmail.com	27851	2002-02-23
Regular	Slovakia	Jordi	Reardon	JordiReardon@gmail.com	17061	1992-10-24
Regular	Slovenia	Kiya	Nugent	KiyaNugent@gmail.com	62503	1984-09-12
Regular	Slovenia	Grady	Miller	GradyMiller@gmail.com	17436	1992-07-06
Regular	Suriname	Jaydyn	DeLorenzo	JaydynDeLorenzo@gmail.com	90872	1999-09-25
Regular	Suriname	Sahaib	Ostrander	SahaibOstrander@gmail.com	11542	1985-10-04
Regular	Thailand	Kelum	Lawless	KelumLawless@gmail.com	42625	2004-07-12
Regular	Turkey	Jayhan	Hancock	JayhanHancock@gmail.com	71116	1970-06-06
Regular	Ukraine	Lennox	Pettigrew	LennoxPettigrew@gmail.com	47073	2005-02-23
Regular	United States	Yu	Reamer	YuReamer@gmail.com	63718	1982-09-15
Regular	Vatican City	Daniel-James	Doran	Daniel-JamesDoran@gmail.com	72777	2008-11-04
Regular	Vietnam	Reice	Boyd	ReiceBoyd@gmail.com	59438	1994-10-12
Regular	Vietnam	Daniil	Soukup	DaniilSoukup@gmail.com	80009	2007-11-06
Researcher	Austria	Braeden	Yang	BraedenYang@gmail.com	23020	1970-08-23
Researcher	Bolivia	Keayn	Ripka	KeaynRipka@gmail.com	41839	2007-06-17
Researcher	Bulgaria	Lucien	Deitz	LucienDeitz@gmail.com	53410	2002-09-27
Researcher	Cambodia	Reegan	Fletcher	ReeganFletcher@gmail.com	27592	1985-01-22
Researcher	Chile	Muhamadjavad	Hydinger	MuhamadjavadHydinger@gmail.com	25259	2001-02-24
Researcher	Chile	Ayan	Schiebel	AyanSchiebel@gmail.com	13318	2000-10-22
Researcher	Finland	Kenzo	Sweeney	KenzoSweeney@gmail.com	82068	1987-10-02
Researcher	France	Wynn	Trusela	WynnTrusela@gmail.com	90137	1985-03-14
Researcher	Germany	Mykie	Johnson	MykieJohnson@gmail.com	41973	1975-09-02
Researcher	Indonesia	Hyden	Pak	HydenPak@gmail.com	48214	1984-03-27
Researcher	Italy	Wei	Bowers	WeiBowers@gmail.com	47389	1983-08-25
Researcher	Latvia	Malakhy	DeLorenzo	MalakhyDeLorenzo@gmail.com	95950	1980-02-07
Researcher	Lithuania	Danar	Boyd	DanarBoyd@gmail.com	70594	1995-12-21
Researcher	Malta	Dex	Soukup	DexSoukup@gmail.com	43899	1971-11-08
Researcher	Philippines	Hadji	Linde	HadjiLinde@gmail.com	51608	1995-07-04
Researcher	Philippines	Kai	Sagar	KaiSagar@gmail.com	61993	2006-06-10
Researcher	Switzerland	Kaileb	Yates	KailebYates@gmail.com	61834	1970-08-01
Researcher	The Netherlands	Tanner	Weiss	TannerWeiss@gmail.com	49727	1982-04-28
Researcher	United States	Leithen	Sellon	LeithenSellon@gmail.com	69851	2000-12-17
Researcher	Vietnam	Alvin	Schlicht	AlvinSchlicht@gmail.com	55277	2004-02-10

11.

Author	majorTopic	minorTopic	summary	pubDate	Citizenship
Braeden Yang	MajorTop	MinorTop	This is a summary	2021-02-10	Austria
Braeden Yang	MajorTop	MinorTop	This is a summary	2021-06-18	Austria
Braeden Yang	MajorTop	MinorTop	This is a summary	2022-01-18	Austria
Braeden Yang	MajorTop	MinorTop	This is a summary	2022-08-19	Austria
Argentina Government Agency	MajorTop	MinorTop	This is a summary	2021-10-15	Brazil
Argentina Government Agency	MajorTop	MinorTop	This is a summary	2022-02-13	Brazil
Argentina Government Agency	MajorTop	MinorTop	This is a summary	2022-05-15	Brazil
Argentina Government Agency	MajorTop	MinorTop	This is a summary	2022-12-09	Brazil
Reegan Fletcher	MajorTop	MinorTop	This is a summary	2020-01-17	Cambodia
Reegan Fletcher	MajorTop	MinorTop	This is a summary	2020-03-17	Cambodia
Reegan Fletcher	MajorTop	MinorTop	This is a summary	2020-04-18	Cambodia
Reegan Fletcher	MajorTop	MinorTop	This is a summary	2020-05-16	Cambodia
Reegan Fletcher	MajorTop	MinorTop	This is a summary	2022-08-16	Cambodia
Ayan Schiebel	MajorTop	MinorTop	This is a summary	2020-06-25	Chile
Ayan Schiebel	MajorTop	MinorTop	This is a summary	2022-03-03	Chile
Muhamadjavad Hydinger	MajorTop	MinorTop	This is a summary	2020-08-09	Chile
Muhamadjavad Hydinger	MajorTop	MinorTop	This is a summary	2020-09-13	Chile
Muhamadjavad Hydinger	MajorTop	MinorTop	This is a summary	2021-04-18	Chile
Muhamadjavad Hydinger	MajorTop	MinorTop	This is a summary	2021-12-08	Chile
Muhamadjavad Hydinger	MajorTop	MinorTop	This is a summary	2022-11-04	Chile
Georgia Government Agency	MajorTop	MinorTop	This is a summary	2021-10-17	Croatia
Georgia Government Agency	MajorTop	MinorTop	This is a summary	2022-07-01	Croatia
Iceland Government Agency	MajorTop	MinorTop	This is a summary	2021-03-08	Estonia
Iceland Government Agency	MajorTop	MinorTop	This is a summary	2022-07-06	Estonia
Kenzo Sweeney	MajorTop	MinorTop	This is a summary	2020-02-02	Finland

Hyden Pak	MajorTop	MinorTop	This is a summary	2020-05-20	Indonesia
Hyden Pak	MajorTop	MinorTop	This is a summary	2021-02-07	Indonesia
Hyden Pak	MajorTop	MinorTop	This is a summary	2021-06-25	Indonesia
Hyden Pak	MajorTop	MinorTop	This is a summary	2021-07-05	Indonesia
Hyden Pak	MajorTop	MinorTop	This is a summary	2021-10-12	Indonesia
Hyden Pak	MajorTop	MinorTop	This is a summary	2021-10-21	Indonesia
Hyden Pak	MajorTop	MinorTop	This is a summary	2022-04-04	Indonesia
Hyden Pak	MajorTop	MinorTop	This is a summary	2022-11-21	Indonesia
Wei Bowers	MajorTop	MinorTop	This is a summary	2020-04-12	Italy
Wei Bowers	MajorTop	MinorTop	This is a summary	2021-03-06	Italy
Wei Bowers	MajorTop	MinorTop	This is a summary	2021-09-10	Italy
Wei Bowers	MajorTop	MinorTop	This is a summary	2021-12-14	Italy
Wei Bowers	MajorTop	MinorTop	This is a summary	2022-03-02	Italy
Azerbaijan Government Agency	MajorTop	MinorTop	This is a summary	2020-04-07	Kuwait
Azerbaijan Government Agency	MajorTop	MinorTop	This is a summary	2021-06-18	Kuwait
Azerbaijan Government Agency	MajorTop	MinorTop	This is a summary	2022-04-05	Kuwait
Cambodia Government Agency	MajorTop	MinorTop	This is a summary	2020-10-19	Laos
Cambodia Government Agency	MajorTop	MinorTop	This is a summary	2021-10-05	Laos
Malakhy DeLorenzo	MajorTop	MinorTop	This is a summary	2020-03-26	Latvia
Malakhy DeLorenzo	MajorTop	MinorTop	This is a summary	2020-09-27	Latvia
Malakhy DeLorenzo	MajorTop	MinorTop	This is a summary	2021-06-26	Latvia
Malakhy DeLorenzo	MajorTop	MinorTop	This is a summary	2022-04-12	Latvia
Malakhy DeLorenzo	MajorTop	MinorTop	This is a summary	2022-04-26	Latvia
The Netherlands Government Agency	MajorTop	MinorTop	This is a summary	2020-04-13	Lithuania
The Netherlands Government Agency	MajorTop	MinorTop	This is a summary	2021-03-22	Lithuania
The Netherlands Government Agency	MajorTop	MinorTop	This is a summary	2021-06-16	Lithuania
The Netherlands Government Agency	MajorTop	MinorTop	This is a summary	2022-03-12	Lithuania
The Netherlands Government Agency	MajorTop	MinorTop	This is a summary	2022-07-05	Lithuania
Dex Soukup	MajorTop	MinorTop	This is a summary	2020-07-04	Malta
Dex Soukup	MajorTop	MinorTop	This is a summary	2020-08-18	Malta
Dex Soukup	MajorTop	MinorTop	This is a summary	2020-12-05	Malta
Dex Soukup	MajorTop	MinorTop	This is a summary	2021-01-25	Malta
Dex Soukup	MajorTop	MinorTop	This is a summary	2022-11-28	Malta
Russia Government Agency	MajorTop	MinorTop	This is a summary	2020-04-11	Monaco
Russia Government Agency	MajorTop	MinorTop	This is a summary	2020-04-17	Monaco
Russia Government Agency	MajorTop	MinorTop	This is a summary	2020-11-01	Monaco
Russia Government Agency	MajorTop	MinorTop	This is a summary	2021-01-11	Monaco
Russia Government Agency	MajorTop	MinorTop	This is a summary	2021-07-15	Monaco
Hadji Linde	MajorTop	MinorTop	This is a summary	2021-10-18	Philippines
Hadji Linde	MajorTop	MinorTop	This is a summary	2021-11-28	Philippines
Kai Sagar	MajorTop	MinorTop	This is a summary	2020-07-04	Philippines
Kai Sagar	MajorTop	MinorTop	This is a summary	2020-12-17	Philippines
Kai Sagar	MajorTop	MinorTop	This is a summary	2021-09-21	Philippines
Kai Sagar	MajorTop	MinorTop	This is a summary	2021-11-03	Philippines
Kai Sagar	MajorTop	MinorTop	This is a summary	2021-11-06	Philippines
Kai Sagar	MajorTop	MinorTop	This is a summary	2022-06-20	Philippines
Kai Sagar	MajorTop	MinorTop	This is a summary	2022-12-01	Philippines
Ukraine Government Agency	MajorTop	MinorTop	This is a summary	2020-08-05	Serbia
Ukraine Government Agency	MajorTop	MinorTop	This is a summary	2021-03-22	Serbia
Ukraine Government Agency	MajorTop	MinorTop	This is a summary	2021-11-18	Serbia
Ukraine Government Agency	MajorTop	MinorTop	This is a summary	2022-04-17	Serbia
Philippines Government Agency	MajorTop	MinorTop	This is a summary	2020-03-03	Singapore
Philippines Government Agency	MajorTop	MinorTop	This is a summary	2020-11-23	Singapore
Philippines Government Agency	MajorTop	MinorTop	This is a summary	2021-06-24	Singapore
Philippines Government Agency	MajorTop	MinorTop	This is a summary	2022-06-01	Singapore
Joe Smith	MajorTop	MinorTop	This is a summary	2020-06-21	Switzerland
Kaileb Yates	MajorTop	MinorTop	This is a summary	2020-11-12	Switzerland
Kaileb Yates	MajorTop	MinorTop	This is a summary	2021-02-22	Switzerland
Kaileb Yates	MajorTop	MinorTop	This is a summary	2021-03-18	Switzerland
Kaileb Yates	MajorTop	MinorTop	This is a summary	2021-04-21	Switzerland
Kaileb Yates	MajorTop	MinorTop	This is a summary	2022-05-27	Switzerland

Tanner Weiss	MajorTop	MinorTop	This is a summary	2020-04-22	The Netherlands
Tanner Weiss	MajorTop	MinorTop	This is a summary	2020-11-19	The Netherlands
Tanner Weiss	MajorTop	MinorTop	This is a summary	2021-08-18	The Netherlands
Tanner Weiss	MajorTop	MinorTop	This is a summary	2021-09-11	The Netherlands
Belarus Government Agency	MajorTop	MinorTop	This is a summary	2021-12-22	UAE
Belarus Government Agency	MajorTop	MinorTop	This is a summary	2022-06-05	UAE
Cambodia Government Agency	MajorTop	MinorTop	This is a summary	2020-05-22	Ukraine
Cambodia Government Agency	MajorTop	MinorTop	This is a summary	2022-04-03	Ukraine
Cambodia Government Agency	MajorTop	MinorTop	This is a summary	2022-07-20	Ukraine
Canada Government Agency	MajorTop	MinorTop	This is a summary	2021-11-09	United States
Canada Government Agency	MajorTop	MinorTop	This is a summary	2022-02-11	United States
Canada Government Agency	MajorTop	MinorTop	This is a summary	2022-04-01	United States
Alvin Schlicht	MajorTop	MinorTop	This is a summary	2020-06-21	Vietnam
Alvin Schlicht	MajorTop	MinorTop	This is a summary	2021-03-12	Vietnam

12.

Citizenship	removalDate	Author	majorTopic	minorTopic	summary	pubDate
Austria	2021-06-21	Braeden Yang	MajorTop	MinorTop	This is a summary	2022-01-18
Austria	2021-08-12	Braeden Yang	MajorTop	MinorTop	This is a summary	2021-02-10
Brazil	2020-06-26	Argentina Government Agency	MajorTop	MinorTop	This is a summary	2022-02-13
Brazil	2022-09-25	Argentina Government Agency	MajorTop	MinorTop	This is a summary	2022-12-09
Cambodia	2020-02-13	Reegan Fletcher	MajorTop	MinorTop	This is a summary	2020-03-17
Chile	2020-01-01	Muhamadjavad Hydinger	MajorTop	MinorTop	This is a summary	2020-09-13
Chile	2020-06-25	Ayan Schiebel	MajorTop	MinorTop	This is a summary	2022-03-03
Chile	2020-10-11	Muhamadjavad Hydinger	MajorTop	MinorTop	This is a summary	2021-12-08
Indonesia	2020-03-20	Hyden Pak	MajorTop	MinorTop	This is a summary	2021-02-07
Laos	2020-09-11	Cambodia Government Agency	MajorTop	MinorTop	This is a summary	2020-10-19
Latvia	2020-05-12	Malakhy DeLorenzo	MajorTop	MinorTop	This is a summary	2022-04-12
Lithuania	2020-03-26	The Netherlands Government Agency	MajorTop	MinorTop	This is a summary	2022-07-05
Lithuania	2022-09-03	The Netherlands Government Agency	MajorTop	MinorTop	This is a summary	2021-03-22
Malta	2020-04-02	Dex Soukup	MajorTop	MinorTop	This is a summary	2022-11-28
Malta	2021-03-02	Dex Soukup	MajorTop	MinorTop	This is a summary	2020-12-05
Philippines	2021-10-04	Kai Sagar	MajorTop	MinorTop	This is a summary	2020-07-04
Philippines	2022-03-21	Kai Sagar	MajorTop	MinorTop	This is a summary	2021-11-06
Singapore	2021-10-21	Philippines Government Agency	MajorTop	MinorTop	This is a summary	2021-06-24
Switzerland	2020-03-11	Kaileb Yates	MajorTop	MinorTop	This is a summary	2021-04-21
Switzerland	2022-07-02	Kaileb Yates	MajorTop	MinorTop	This is a summary	2020-11-12
The Netherlands	2022-11-15	Tanner Weiss	MajorTop	MinorTop	This is a summary	2020-11-19

13.

privilege	username	fName	lName	Citizenship	email	phone	dob	suspendDate
Regular	KiyonariJohnson	Kiyonari	Johnson	Indonesia	KiyonariJohnson@gmail.com	89922	2007-05-27	2020-01-01
Organization Delegate	FelixCasal	Felix	Casal	Monaco	FelixCasal@gmail.com	83457	1995-03-17	2020-07-16
Organization Delegate	AidyJagtap	Aidy	Jagtap	Kuwait	AidyJagtap@gmail.com	57005	2004-04-07	2020-10-08
Regular	EliasBauer	Elias	Bauer	Seychelles	EliasBauer@gmail.com	27851	2002-02-23	2020-11-11
Regular	MaanavSchwager	Maanav	Schwager	Russia	MaanavSchwager@gmail.com	87782	1972-05-23	2020-12-12
Researcher	LeithenSellon	Leithen	Sellon	United States	LeithenSellon@gmail.com	69851	2000-12-17	2021-02-14
Regular	ObanLulloff	Oban	Lulloff	Cambodia	ObanLulloff@gmail.com	11601	1993-02-01	2021-05-09
Organization Delegate	QuinnSoulis	Quinn	Soulis	Turkey	QuinnSoulis@gmail.com	80819	1989-10-09	2021-05-23
Researcher	LucienDeitz	Lucien	Deitz	Bulgaria	LucienDeitz@gmail.com	53410	2002-09-27	2021-08-25
Researcher	MuhamadjavadHydinger	Muhamadjavad	Hydinger	Chile	MuhamadjavadHydinger@gmail.com	25259	2001-02-24	2021-09-24
Researcher	TannerWeiss	Tanner	Weiss	The Netherlands	TannerWeiss@gmail.com	49727	1982-04-28	2021-11-16
Regular	SukhpalRamachandran	Sukhpal	Ramachandran	Myanmar	SukhpalRamachandran@gmail.com	52186	1996-10-23	2021-11-20
Regular	DillonHaworth	Dillon	Haworth	Colombia	DillonHaworth@gmail.com	18827	2001-12-14	2022-04-12
Regular	BaburDinkins	Babur	Dinkins	Cambodia	BaburDinkins@gmail.com	72039	1970-02-15	2022-04-13
Regular	ZachariusVader	Zacharius	Vader	Hungary	ZachariusVader@gmail.com	62651	2007-12-21	2022-05-08
Researcher	DanarBoyd	Danar	Boyd	Lithuania	DanarBoyd@gmail.com	70594	1995-12-21	2022-07-01
Regular	EzekielBateman	Ezekiel	Bateman	Jordan	EzekielBateman@gmail.com	99133	1977-09-27	2022-07-02
Regular	DamienOstrander	Damien	Ostrander	Bosnia and Herzegovina	DamienOstrander@gmail.com	50978	2006-03-11	2022-10-02
Regular	ReeseChapman	Reese	Chapman	Estonia	ReeseChapman@gmail.com	99280	1973-08-04	2022-11-28
Organization Delegate	KeithHylan	Keith	Hylan	Laos	KeithHylan@gmail.com	67751	1983-08-20	2022-12-23

14.
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+------------+-----------+------------+-----------+------------------+-------------------------------+
| pubDate    | author    | majorTopic | minorTopic | summary         | content                       |
+------------+-----------+------------+-----------+------------------+-------------------------------+
| 2020-07-04 | Kai Sagar | MajorTop   | MinorTop   | This is a summary | This is the content of the article |
| 2020-12-17 | Kai Sagar | MajorTop   | MinorTop   | This is a summary | This is the content of the article |
| 2021-09-21 | Kai Sagar | MajorTop   | MinorTop   | This is a summary | This is the content of the article |
| 2021-11-03 | Kai Sagar | MajorTop   | MinorTop   | This is a summary | This is the content of the article |
| 2021-11-06 | Kai Sagar | MajorTop   | MinorTop   | This is a summary | This is the content of the article |
| 2022-06-20 | Kai Sagar | MajorTop   | MinorTop   | This is a summary | This is the content of the article |
| 2022-12-01 | Kai Sagar | MajorTop   | MinorTop   | This is a summary | This is the content of the article |
+------------+-----------+------------+-----------+------------------+-------------------------------+
```

15.
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+----------------------------------+-----------------+-----------------+
| Author                           | Citizenship     | NumPublications |
+----------------------------------+-----------------+-----------------+
| Hyden Pak                        | Indonesia       |               8 |
| Kai Sagar                        | Philippines     |               7 |
| Joe Smith                        | Switzerland     |               6 |
| Muhamadjavad Hydinger            | Chile           |               5 |
| Wei Bowers                       | Italy           |               5 |
| Malakhy DeLorenzo                | Latvia          |               5 |
| The Netherlands Government Agency | Lithuania      |               5 |
| Dex Soukup                       | Malta           |               5 |
| Russia Government Agency         | Monaco          |               5 |
| Reegan Fletcher                  | Cambodia        |               5 |
| Argentina Government Agency      | Brazil          |               4 |
| Braeden Yang                     | Austria         |               4 |
| Tanner Weiss                     | The Netherlands |               4 |
| Ukraine Government Agency        | Serbia          |               4 |
| Philippines Government Agency    | Singapore       |               4 |
| Canada Government Agency         | United States   |               3 |
| Azerbaijan Government Agency     | Kuwait          |               3 |
| Cambodia Government Agency       | Ukraine         |               3 |
| Ayan Schiebel                    | Chile           |               2 |
| Belarus Government Agency        | UAE             |               2 |
| Georgia Government Agency        | Croatia         |               2 |
| Iceland Government Agency        | Estonia         |               2 |
| Alvin Schlicht                   | Vietnam         |               2 |
| Cambodia Government Agency       | Laos            |               2 |
| Hadji Linde                      | Philippines     |               2 |
| Kenzo Sweeney                    | Finland         |               1 |
+----------------------------------+-----------------+-----------------+
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16.
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+----------------------+---------------+------------+-----------------+
| rName                | cName         | NumAuthors | NumPublications |
+----------------------+---------------+------------+-----------------+
| Americas             | Chile         |          2 |               7 |
| Americas             | Brazil        |          1 |               4 |
| Americas             | United States |          1 |               3 |
| Eastern Mediterranean | Kuwait       |          1 |               3 |
| Eastern Mediterranean | UAE          |          1 |               2 |
```

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| Europe             | Indonesia       |           1 |              8 |
| Europe             | Philippines     |           1 |              7 |
| Europe             | Switzerland     |           1 |              6 |
| Europe             | Italy           |           1 |              5 |
| Europe             | Latvia          |           1 |              5 |
| Europe             | Lithuania       |           1 |              5 |
| Europe             | Malta           |           1 |              5 |
| Europe             | Monaco          |           1 |              5 |
| Europe             | Austria         |           1 |              4 |
| Europe             | The Netherlands |           1 |              4 |
| Europe             | Serbia          |           1 |              4 |
| Europe             | Ukraine         |           1 |              3 |
| Europe             | Croatia         |           1 |              2 |
| Europe             | Estonia         |           1 |              2 |
| Europe             | Finland         |           1 |              1 |
| South-East Asia    | Cambodia        |           1 |              5 |
| South-East Asia    | Singapore       |           1 |              4 |
| South-East Asia    | Vietnam         |           1 |              2 |
| South-East Asia    | Laos            |           1 |              2 |
| South-East Asia    | Philippines     |           1 |              2 |
+--------------------+-----------------+-------------+----------------+
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17.

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+----------------------+------------------------+-------------------------+-----------------+-----------------+
| rName                | cName                  | SUM(DISTINCT A.population) | SUM(totVaccines) | SUM(totVacDead) |
+----------------------+------------------------+-------------------------+-----------------+-----------------+
| Eastern Mediterranean | Afghanistan           |                56945524 |      2539496466 |         2172725 |
| Europe               | Albania                |                20724588 |      2081179025 |         1257686 |
| Europe               | Andorra                |                85340943 |      1662250307 |         1450627 |
| Americas             | Argentina              |                85020844 |      3331166301 |         3430340 |
| Europe               | Armenia                |                22471717 |      1456136377 |         1763520 |
| Western Pacific      | Australia              |                71824228 |      1754515826 |         1394517 |
| Europe               | Austria                |                76569688 |      2669888545 |         1515752 |
| Europe               | Azerbaijan             |                 1173044 |      2178605569 |         2194724 |
| Europe               | Belarus                |                76889996 |      1761915659 |         1858957 |
| Europe               | Belgium                |                54880143 |      1540466682 |         2089934 |
| Americas             | Bolivia                |                17460449 |      2714954369 |         2306548 |
| Europe               | Bosnia and Herzegovina |                71034969 |      1975996710 |         1691614 |
| Americas             | Brazil                 |                24329022 |      2181649800 |         1623690 |
| Europe               | Bulgaria               |                13676208 |      1757538148 |         1757669 |
| Europe               | Cambodia               |                51530125 |      2245032909 |         1039686 |
| Americas             | Canada                 |                26657340 |      2922134005 |         2028464 |
| Americas             | Chile                  |                35961997 |      1266180451 |         1318759 |
| Western Pacific      | China                  |                60929002 |      1492742543 |         1308621 |
| Americas             | Colombia               |                46393517 |      1580218674 |         1861443 |
| Europe               | Croatia                |                 9302208 |      3158708699 |         1728961 |
| Americas             | Cuba                   |                85707014 |      2769361308 |         2143480 |
| Europe               | Cyprus                 |                 5923015 |      1504244794 |          766273 |
| Europe               | Czech Republic         |                60111056 |      2527924534 |         2982559 |
| Europe               | Denmark                |                76952946 |      1719969193 |          759274 |
| Africa               | Djibouti               |                 9702932 |      1744539607 |         1681207 |
| Africa               | DR Congo               |                45606804 |      2760399378 |         1865159 |
| Africa               | Egypt                  |                 7031001 |      1890708162 |          890106 |
| Europe               | Estonia                |                34708077 |      2278561332 |         2277983 |
| Europe               | Finland                |                19462366 |      2235708929 |         1142350 |
| Europe               | France                 |                69850472 |      1998061092 |         2384715 |
| Europe               | Georgia                |                60332110 |      1740967908 |         1755544 |
| Europe               | Germany                |                88470092 |      2474784405 |         2731674 |
+----------------------+------------------------+-------------------------+-----------------+-----------------+
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Europe	Greece		87318260	1664987458	736066
Europe	Hungary		79970606	3002621570	2311428
Europe	Iceland		63485141	2297823159	2494670
Europe	Indonesia		50977527	2234977010	1760007
Eastern Mediterranean	Iran		86867751	1658992885	1465417
Europe	Ireland		71917850	1701035528	1164395
Europe	Italy		16213714	2900856451	1873425
Western Pacific	Japan		7959165	2471654977	2014677
Eastern Mediterranean	Jordan		18857502	1828559547	1822026
Europe	Kosovo		21295684	1857246083	1603371
Eastern Mediterranean	Kuwait		67433735	2505595500	1961238
Europe	Laos		87407033	1890227375	2373406
Europe	Latvia		16040761	3065476790	3169854
Eastern Mediterranean	Lebanon		41559157	1522120485	1828871
Europe	Liechtenstein		7815771	1785119986	1651338
Europe	Lithuania		80993505	3165517208	2871021
Europe	Luxembourg		52498813	2248301066	2845847
Europe	Macedonia		5899819	4029308913	3219488
Europe	Malaysia		81721377	2417268520	2215721
Europe	Malta		23052226	2010472550	2137635
Americas	Mexico		25545218	2035746832	1800066
Europe	Moldova		77690733	2630446410	1443239
Europe	Monaco		7938642	2017270229	1385808
Europe	Montenegro		49023055	2622444052	2128432
Europe	Myanmar		43383328	5557270586	4048657
Western Pacific	New Zealand		29111211	2982179960	2640806
Europe	Norway		45901404	1998744504	1023882
Americas	Peru		33313152	2855517431	3828602
Europe	Philippines		50439341	2167656874	2525243
Europe	Poland		69748871	2347498487	1636974
Europe	Portugal		76144180	2137131353	1817341
Europe	Romania		37872432	2004156667	1570923
Europe	Russia		38185778	2082006223	1374513
Europe	San Marino		12837548	2213887779	2013755
Europe	Serbia		22765455	1159325648	907747
Africa	Seychelles		77328035	2008237280	2221970
Africa	Sierra Leone		38543689	2666610783	3834741
Europe	Singapore		9691054	2192358640	2419359
Europe	Slovakia		64695371	2148543579	1749872
Europe	Slovenia		13472865	2563235101	2605440
Africa	South Africa		72675008	2877032478	2299286
Europe	Spain		8543301	2369655231	1879380
Americas	Suriname		67976531	1011275557	691282
Europe	Sweden		56182281	2609144905	1778183
Europe	Switzerland		54067090	6312070327	6448550
Europe	Thailand		82422870	3661845871	3932200
Europe	The Netherlands		32831195	2429643921	1791469
Europe	Turkey		14154337	4387064509	3320132
Eastern Mediterranean	UAE		13893254	1968813847	2173338
Europe	Ukraine		60930652	6829780779	4768066
Europe	United Kingdom		38390905	3456809480	2425374
Americas	United States		32510625	1865503164	1620858
Europe	Vatican City		10437583	5633687307	4340504
Europe	Vietnam		54175236	2956042291	1458812

18.

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+-----------------+-------------------------------+----------------------+
| DATE(date_time) | Receiver                      | SUBJECT              |
+-----------------+-------------------------------+----------------------+
| 2020-01-12      | DarrenNapier@gmail.com        | Subject of the email |
| 2020-01-18      | AlvinSchlicht@gmail.com       | Subject of the email |
| 2020-02-25      | YuReamer@gmail.com            | Subject of the email |
| 2020-06-03      | JustanSchlicht@gmail.com      | Subject of the email |
| 2020-08-19      | YagoLulloff@gmail.com         | Subject of the email |
| 2020-11-21      | KaidynHylan@gmail.com         | Subject of the email |
| 2020-12-12      | MuhamadjavadHydinger@gmail.com| Subject of the email |
| 2021-01-03      | RhuairidhSagar@gmail.com      | Subject of the email |
| 2021-04-15      | LennonWakefield@gmail.com     | Subject of the email |
| 2021-05-07      | joesmith@gmail.com            | Subject of the email |
| 2021-05-27      | JoashHylan@gmail.com          | Subject of the email |
| 2021-06-28      | ReiceBoyd@gmail.com           | Subject of the email |
| 2021-09-04      | RhyanEastman@gmail.com        | Subject of the email |
| 2021-10-17      | LeithenSellon@gmail.com       | Subject of the email |
| 2021-11-20      | LyallTapia@gmail.com          | Subject of the email |
| 2022-02-09      | FaresVentotla@gmail.com       | Subject of the email |
| 2022-03-18      | DamienOstrander@gmail.com     | Subject of the email |
| 2022-04-23      | IsaacMoore@gmail.com          | Subject of the email |
| 2022-04-28      | HussanHylan@gmail.com         | Subject of the email |
| 2022-06-01      | CorbenTisler@gmail.com        | Subject of the email |
| 2022-09-04      | Aaron-JamesSweeney@gmail.com  | Subject of the email |
| 2022-12-23      | RemoShaffer@gmail.com         | Subject of the email |
| 2022-12-23      | CruzOlson@gmail.com           | Subject of the email |
| 2022-12-25      | GradyMiller@gmail.com         | Subject of the email |
+-----------------+-------------------------------+----------------------+
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19.

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+-----------------+------------+-------------------+-----------------+-------------------+------------------+-------------------+
| totalPopulation | rDate      | SUM(numVaccinations) | SUM(numInfections) | SUM(numVaccinations) | SUM(numVacDeath) | name              |
+-----------------+------------+-------------------+-----------------+-------------------+------------------+-------------------+
|       243290220 | 2020-05-03 |          77994314 |          150498 |          77994314 |            62201 | Moderna           |
|       243290220 | 2022-03-01 |          37540765 |          246854 |          37540765 |            12204 | Johnson & Johnson |
|       243290220 | 2022-09-01 |        1443266790 |          191056 |        1443266790 |          1327686 | Pfizer            |
|       243290220 | 2022-11-09 |         622847931 |          290888 |         622847931 |           221599 | AstraZeneca       |
+-----------------+------------+-------------------+-----------------+-------------------+------------------+-------------------+
```

20.

```
+----------+---------------------------+-----------------+---------------+
| authorID | AuthorName                | Citizenship     | NumSubscribers |
+----------+---------------------------+-----------------+---------------+
|        3 | National Government Agency | Singapore      |             3 |
|       11 | Dex Soukup                | Malta           |             2 |
|       13 | Malakhy DeLorenzo         | Latvia          |             2 |
|       23 | Reegan Fletcher           | Cambodia        |             2 |
|        4 | Company Incorporated      | Serbia          |             2 |
|       14 | Company Incorporated      | Laos            |             2 |
|        7 | Braeden Yang              | Austria         |             1 |
|        8 | Kenzo Sweeney             | Finland         |             1 |
|       17 | Muhamadjavad Hydinger     | Chile           |             1 |
|       25 | Hadji Linde               | Philippines     |             1 |
|       26 | Tanner Weiss              | The Netherlands |             1 |
|       27 | Hyden Pak                 | Indonesia       |             1 |
|       28 | Company Incorporated      | United States   |             1 |
|        2 | National Government Agency | Brazil         |             1 |
|       16 | Company Incorporated      | Kuwait          |             1 |
|        5 | Company Incorporated      | Croatia         |             1 |
|       21 | Company Incorporated      | Lithuania       |             1 |
+----------+---------------------------+-----------------+---------------+
```

APPENDIX: E/R Diagrams

regularUser
- uID INT
- privilege VARCHAR(30)
- Indexes

admin
- adminID INT
- privilege VARCHAR(30)
- Indexes

region
- rID INT
- rName VARCHAR(90)
- Indexes

proStaTer
- cID INT
- pstID INT
- pstName VARCHAR(90)
- Population INT
- Indexes

isSuspended
- uID INT
- suspendDate DATE
- Indexes

country
- rID INT
- cID INT
- cName VARCHAR(90)
- Indexes

covid_19stat
- statID INT
- pstID INT
- rDate DATE
- numInfections INT
- numDeaths INT
- Indexes

users
- uID INT
- cID INT
- fName VARCHAR(60)
- lName VARCHAR(60)
- phone INT
- email VARCHAR(100)
- dob DATE
- username VARCHAR(60)
- pw VARCHAR(60)
- Indexes

researchers
- reID INT
- privilege VARCHAR(30)
- Indexes

vaccineStat
- vID INT
- statID INT
- numVaccinations INT
- numVacDeath INT
- numVacInfections INT
- Indexes

organizations
- orgID INT
- orgdelID INT
- reID INT
- oName VARCHAR(60)
- otype ENUM(...)
- Indexes

vaccines
- vID INT
- name VARCHAR(90)
- Indexes

orgDel
- orgdelID INT
- privilege VARCHAR(30)
- Indexes

isRemoved
- aID INT
- dor DATE
- Indexes

article
- aID INT
- authorID INT
- Author VARCHAR(90)
- majorTopic VARCHAR(90)
- minorTopic VARCHAR(90)
- summary CHAR(100)
- content BLOB
- pubDate DATE
- Indexes

authors
- authorID INT
- reID INT
- orgdelID INT
- Indexes

subscribed
- uID INT
- authorID INT
- Indexes

emails
- uID INT
- authorID INT
- emailID INT
- aID INT
- date_time DATETIME
- subject VARCHAR(100)
- Indexes