University of British Columbia, Vancouver
Department of Computer Science

CPSC 304 Project Cover Page

Milestone #: 4

Date: Nov. 23, 2022

Group Number: 20

Name	Student Number	CS Alias (Userid)	Preferred E-mail Address
Ding Ma	69680510	n3q8v	dingthema@gmail.com
Phuoc Dat, Nguyen	52301215	b7e6r	alex.ng0976@gmail.com
Hadrian Ho	63531909	d3e2b	wowhead25s@gmail.com

By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address, and then let us assign you to a TA for your project supervisor.)

In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia

Project Description:

Repo link: https://github.students.cs.ubc.ca/CPSC304-2022W-T1/project_b7e6r_d3e2b_n3q8v

The final project initializes a database according to the schema provided in earlier milestones and is populated with mostly real, sample data, which are epidemiological information of viruses. We've implemented a multi-page web application that uses our database. The app, through a GUI, is capable of running queries that modify the database (deleting, inserting, and updating entries). Also, it can show the result of queries that filter the data through projection and selection, joins data from two tables, and runs division and aggregation queries that reveal new information about the data. Most functionalities also allow for user input, apart from division and aggregation.

Most of the schema submitted earlier remains the same in the final project. Although, as Oracle does not support assertions, certain participation constraints are not enforced. These are indicated by a comment in the initialization script (initialization.sql in the root folder).

A copy of the schema can be found in schema.sql in the "Documents" folder, which contains only create table statements from the initialization script.

Screenshots of the data:

Virus1

FAMILY	STRANDEDNESS
Coronaviridae	Single
Poxviridae	Double
Retroviridae	Single
Orthomyxoviridae	Single
Picornaviridae	Single
Secoviridae	Single
Herpesviridae	Double
Microviridae	Single
Filoviridae	Single
Paramyxoviridae	Single
Hepadnaviridae	Double
Papillomaviridae	Double

Virus2

GENUS	FAMILY
Betacoronavirus	Coronaviridae
Orthopoxvirus	Poxviridae
Lentivirus	Retroviridae
Alphainfluenzavirus	Orthomyxoviridae
Enterovirus	Picornaviridae
Comovirus	Secoviridae
Simplexvirus	Herpesviridae
Sinsheimervirus	Microviridae
Ebolavirus	Filoviridae
Morbillivirus	Paramyxoviridae
Orthohepadnavirus	Hepadnaviridae
Chipapillomavirus	Papillomaviridae

Virus3

VIRUSCOMMONNAME	GENUS	STATUS	TRANSMISSIONTYPE
SARS-CoV	Betacoronavirus	Active	Respiratory Droplets
Variola Virus	Orthopoxvirus	Eradicated	Airborne Particles
Human Immunodeficiency Virus	Lentivirus	Active	Bodily Fluids
Monkeypox Virus	Orthopoxvirus	Active	Direct Contact
Influenza A Virus	Alphainfluenzavirus	Active	Respiratory Droplets
Poliovirus	Enterovirus	Active	Fecal-oral
Vaccinia Virus	Orthopoxvirus	Active	Direct Contact
Cowpea Mosaic Virus	Comovirus	Active	Insects
Herpes Simplex Virus	Simplexvirus	Active	Bodily Fluids
Phi X 174	Sinsheimervirus	Active	Bacterial
Zaire Ebolavirus	Ebolavirus	Active	Bodily Fluids
Rinderpest morbillivirus	Morbillivirus	Eradicated	Direct Contact
Hepatitis B Virus	Orthohepadnavirus	Active	Bodily Fluids
Human Papillomavirus	Chipapillomavirus	Active	Direct Contact

RNAVirus

VIRUSCOMMONNAME	SENSE
SARS-CoV	Positive
Human Immunodeficiency Virus	Positive
Influenza A Virus	Negative
Poliovirus	Positive
Cowpea Mosaic Virus	Positive
Zaire Ebolavirus	Negative
Rinderpest morbillivirus	Negative

DNAVirus

VIRUSCOMMONNAME	GENOMESHAPE
Variola Virus	Linear
Monkeypox Virus	Linear
Vaccinia Virus	Linear
Herpes Simplex Virus	Linear
Phi X 174	Circular
Hepatitis B Virus	Linear
Human Papillomavirus	Circular

VaccineAgainst1

TYPE	IMMUNOCOMPROMISESAFETY
Attenuated	Unsafe
Inactivated	Safe
Subunit	Safe
mRNA	Safe
Viral Vector	Safe

VaccineAgainst2

VIRUSCOMMONNAME	TYPE	MANUFACTURE	VALENCE	DELIVERYMODE	YEAR
Zaire Ebolavirus	Viral Vector	Merck & Co.	1	Injection	2014
SARS-CoV	mRNA	Pfizer	2	Injection	2021
Hepatitis B Virus	Subunit	Merck & Co.	5	Injection	2019
SARS-CoV	Inactivated	Sinovac Biotech	1	Injection	2021
Poliovirus	Attenuated	Cantacuzino Institute of Bucharest	1	Oral	1961
Human Papillomavirus	Subunit	Merck & Co.	9	Injection	2014

Host

HOSTCOMMONNAME	TYPE
Human	Mammal
E. coli	Bacteria
Cowpea	Plant
Deer	Mammal
Buffalo	Mammal

Infects

HOSTCOMMONNAME	VIRUSCOMMONNAME
Buffalo	Rinderpest morbillivirus
Buffalo	Vaccinia Virus
Buffalo	Variola Virus
Cowpea	Cowpea Mosaic Virus
Cowpea	Vaccinia Virus
Cowpea	Variola Virus
Deer	Rinderpest morbillivirus
Deer	Vaccinia Virus
Deer	Variola Virus
E. coli	Phi X 174
E. coli	Vaccinia Virus
E. coli	Variola Virus
Human	Hepatitis B Virus
Human	Herpes Simplex Virus
Human	Human Immunodeficiency Virus
Human	Human Papillomavirus
Human	Influenza A Virus
Human	Monkeypox Virus
Human	Poliovirus
Human	SARS-CoV
Human	Vaccinia Virus
Human	Variola Virus
Human	Zaire Ebolavirus

Receptor

RECEPTORNAME	CELLTYPE	TISSUETYPE
ACE2	Enterocytes	Epithelia
MARCO	Keratinocytes	Epidermis
CCR5	Immune Cells	All
GAG	Keratinocytes	Epidermis
Sialic Acid	All	All
CD155	Immune Cells	All

Targets

RECEPTORNAME	VIRUSCOMMONNAME
ACE2	SARS-CoV
CCR5	Human Immunodeficiency Virus
CD155	Poliovirus
GAG	Monkeypox Virus
GAG	Vaccinia Virus
MARCO	Variola Virus
Sialic Acid	Influenza A Virus

ViralDisease

DISEASENAME	DISEASETYPE
Smallpox	Acute
AIDS	Chronic
Hepatitis	Acute
Herpes Labialis	Dormant
Influenza	Acute

Causes

DISEASENAME	VIRUSCOMMONNAME
AIDS	Human Immunodeficiency Virus
Hepatitis	Hepatitis B Virus
Herpes Labialis	Herpes Simplex Virus
Influenza	Influenza A Virus
Smallpox	Variola Virus

Symptom

SYMPTOMNAME	SPECIFICITY
Blisters	Non-specific
Vomit	Non-specific
Diarrhea	Non-specific
Lymphadenopathy	Specific
Macules	Specific

Has

DISEASENAME	SYMPTOMNAME	SEVERITY
Herpes Labialis	Blisters	Mild
Hepatitis	Vomit	Mild
Hepatitis	Diarrhea	Mild
AIDS	Lymphadenopathy	Severe
Smallpox	Macules	Severe

Country

COUNTRYNAME	POPULATIONDENSITY	CONTINENT	STATUS
United States	36	North America	Developed
China	153	Asia	Developing
Mexico	66	North America	Developing
South Africa	25	Africa	Developed
Japan	338.2	Asia	Developed
Congo	16	Africa	Underdeveloped
Canada	4	North America	Developed

Outbreak

COUNTRYNAME	VIRUSCOMMONNAME	OUTBREAKSIZE	CASUALTY	YEAR	ORIGIN
United States	Influenza A Virus	Pandemic	100000000	1346	Spain
China	SARS-CoV	Pandemic	25000000	2019	China
Mexico	Variola Virus	Epidemic	8000000	1519	Mexico
Japan	Variola Virus	Epidemic	2000000	735	Japan
Congo	Zaire Ebolavirus	Epidemic	55	2020	Congo
China	Influenza A Virus	Pandemic	4000000	1968	Hong Kong
Canada	Human Immunodeficiency Virus	Pandemic	40100000	1981	Central Africa

EndemicTo

COUNTRYNAME	VIRUSCOMMONNAME
Canada	Hepatitis B Virus
China	Influenza A Virus
Congo	Human Immunodeficiency Virus
South Africa	Human Immunodeficiency Virus
United States	Influenza A Virus

Application

APPLICATIONNAME	USAGE
Weapon	Biological Warfare
Synthetic Virus	Research
Nanotechnology	Research
Virotherapy	Medicine
Vaccine	Medicine

UsedIn

APPLICATIONNAME	VIRUSCOMMONNAME
Nanotechnology	Cowpea Mosaic Virus
Synthetic Virus	Poliovirus
Vaccine	Poliovirus
Virotherapy	Herpes Simplex Virus
Weapon	Vaccinia Virus

List of queries:

** "[]" indicates user input.*

INSERT INTO Virus1 (Family, Strandedness) []

INSERT INTO Virus2 (Genus, Family) []

INSERT INTO Virus3 (virusCommonName, Genus, Status, TransmissionType) []

INSERT INTO RNAVirus (virusCommonName, Sense) []

INSERT INTO DNAVirus (virusCommonName, genomeShape) []

DELETE FROM Virus3

    WHERE virusCommonName = []

UPDATE RNAVirus SET Sense = []

    WHERE virusCommonName = []

UPDATE DNAVirus SET genomeShape = []

    WHERE virusCommonName = []

UPDATE RNAVirus SET Status = [], Genus = [], TransmissionType = []

    WHERE virusCommonName = []

** all insert, delete, and update queries can be found in insert,delete,update.php*

SELECT *

    FROM []

    WHERE []

SELECT []

    FROM []

** selection and projection queries can be found in select-project.php*

SELECT DNAVirus.virusCommonName, Genus, Status, TransmissionType, GenomeShape

    FROM DNAVirus, Virus3

    WHERE DNAVirus.virusCommonName = Virus3.virusCommonName AND []

SELECT RNAVirus.virusCommonName, Genus, Status, TransmissionType, Sense

    FROM RNAVirus, Virus3

    WHERE RNAVirus.virusCommonName = Virus3.virusCommonName AND []

SELECT DISTINCT D.virusCommonName

```
        FROM DNAVirus D
        WHERE NOT EXISTS ((SELECT ho.hostCommonName
                           FROM Host ho)
                           MINUS
                           (SELECT I.hostCommonName
                           FROM Infects I
                           WHERE D.virusCommonName = I.virusCommonName))
```

** all join and divide queries can be found in join-div.php*

```
SELECT virusCommonName AS Virus, AVG(Casualty) AS Average_Deaths
        FROM Outbreak
        WHERE Casualty > 1000000
        GROUP BY virusCommonName
        HAVING COUNT(*) > 1
        ORDER BY Average_Deaths DESC
SELECT TransmissionType AS Transmission, COUNT(*) AS Viruses_Count
        FROM Virus3
        GROUP BY TransmissionType
        ORDER BY Viruses_Count DESC
SELECT c.diseaseName AS Disease, SUM(o.Casualty) AS Death_Count
        FROM Causes c, Outbreak o
        WHERE c.virusCommonName = o.virusCommonName AND c.diseaseName IN
                                  (SELECT v.diseaseName
                                  FROM ViralDisease v
                                  WHERE v.diseaseType = 'Acute')
        GROUP BY c.diseaseName
        ORDER BY Death_Count DESC
```

** all aggregation queries can be found in aggregations.php*

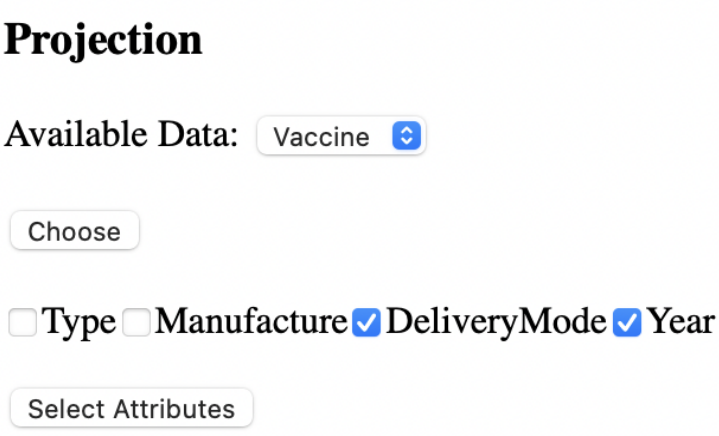
Graphical User Interface Screenshots:

1. Selection and Projection Queries:

a. Users' inputs and initial database:

Table used: Virus3

VIRUSCOMMONNAME	GENUS	STATUS	TRANSMISSIONTYPE
SARS-CoV	Betacoronavirus	Active	Respiratory Droplets
Variola Virus	Orthopoxvirus	Eradicated	Airborne Particles
Human Immunodeficiency Virus	Lentivirus	Active	Bodily Fluids
Monkeypox Virus	Orthopoxvirus	Active	Direct Contact
Influenza A Virus	Alphainfluenzavirus	Active	Respiratory Droplets
Poliovirus	Enterovirus	Active	Fecal-oral
Vaccinia Virus	Orthopoxvirus	Active	Direct Contact
Cowpea Mosaic Virus	Comovirus	Active	Insects
Herpes Simplex Virus	Simplexvirus	Active	Bodily Fluids
Phi X 174	Sinsheimervirus	Active	Bacterial
Zaire Ebolavirus	Ebolavirus	Active	Bodily Fluids
Rinderpest morbillivirus	Morbillivirus	Eradicated	Direct Contact
Hepatitis B Virus	Orthohepadnavirus	Active	Bodily Fluids
Human Papillomavirus	Chipapillomavirus	Active	Direct Contact



Selection

Avaiable data: Vaccine

Number of constraints: 2

Create conditions

DeliveryMode = Injection

OR Year = 2021

Use The Condition

Submit

b. Results:

Selection:

VIRUSCOMMONNAME	TYPE	MANUFACTURE	VALENCE	DELIVERYMODE	YEAR
Zaire Ebolavirus	Viral Vector	Merck & Co.	1	Injection	2014
SARS-CoV	mRNA	Pfizer	2	Injection	2021
Hepatitis B Virus	Subunit	Merck & Co.	5	Injection	2019
SARS-CoV	Inactivated	Sinovac Biotech	1	Injection	2021
Human Papillomavirus	Subunit	Merck & Co.	9	Injection	2014

Projection:

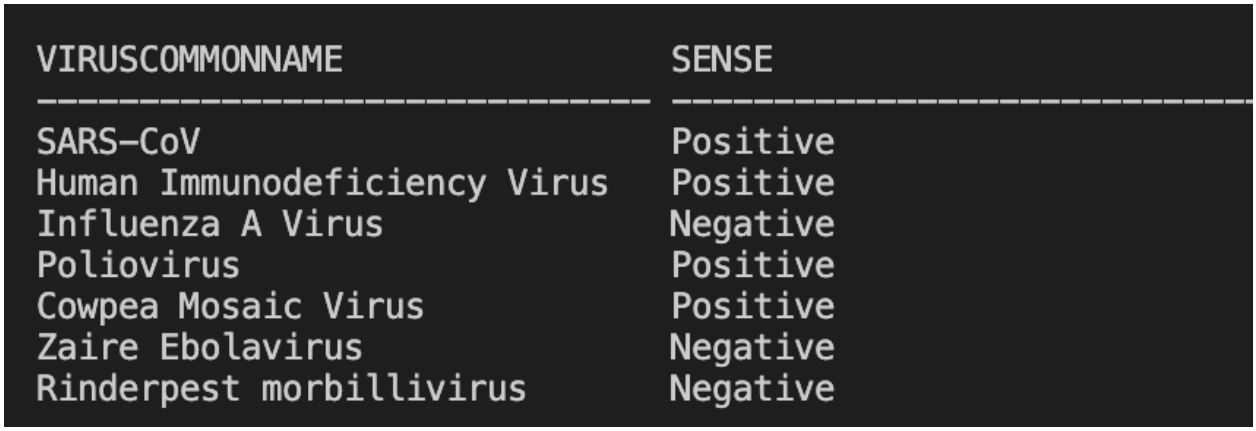
TYPE	MANUFACTURE
Attenuated	Cantacuzino Institute of Bucharest
Inactivated	Sinovac Biotech
Subunit	Merck & Co.
Subunit	Merck & Co.
Viral Vector	Merck & Co.
mRNA	Pfizer

2. Join and Divide Queries:

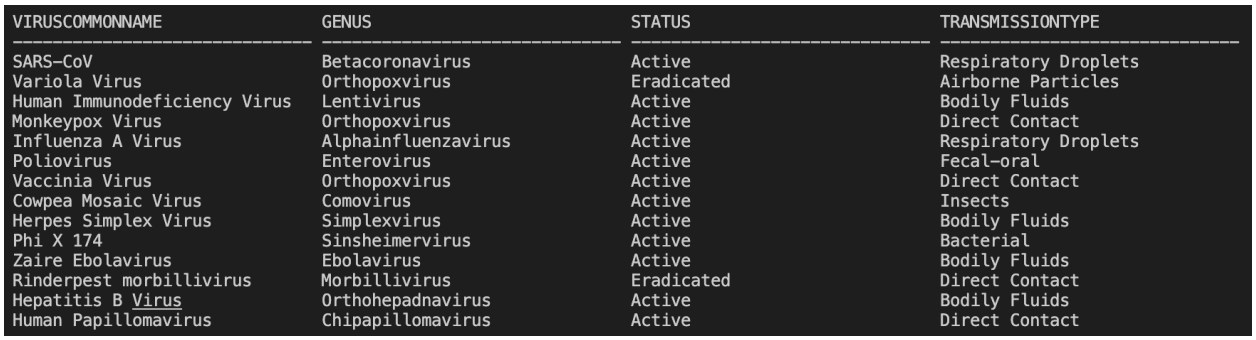
a. Users Inputs:

Join:

Tabled used: RNAVirus, Virus3



VIRUSCOMMONNAME	SENSE
SARS-CoV	Positive
Human Immunodeficiency Virus	Positive
Influenza A Virus	Negative
Poliovirus	Positive
Cowpea Mosaic Virus	Positive
Zaire Ebolavirus	Negative
Rinderpest morbillivirus	Negative



VIRUSCOMMONNAME	GENUS	STATUS	TRANSMISSIONTYPE
SARS-CoV	Betacoronavirus	Active	Respiratory Droplets
Variola Virus	Orthopoxvirus	Eradicated	Airborne Particles
Human Immunodeficiency Virus	Lentivirus	Active	Bodily Fluids
Monkeypox Virus	Orthopoxvirus	Active	Direct Contact
Influenza A Virus	Alphainfluenzavirus	Active	Respiratory Droplets
Poliovirus	Enterovirus	Active	Fecal-oral
Vaccinia Virus	Orthopoxvirus	Active	Direct Contact
Cowpea Mosaic Virus	Comovirus	Active	Insects
Herpes Simplex Virus	Simplexvirus	Active	Bodily Fluids
Phi X 174	Sinsheimervirus	Active	Bacterial
Zaire Ebolavirus	Ebolavirus	Active	Bodily Fluids
Rinderpest morbillivirus	Morbillivirus	Eradicated	Direct Contact
Hepatitis B Virus	Orthohepadnavirus	Active	Bodily Fluids
Human Papillomavirus	Chipapillomavirus	Active	Direct Contact

RNA Virus And DNA Virus

Number of constraints: 2

Find The Information: RNA Virus

Status = Active

AND Sense <> Negative

Use The Condition

Submit

Divide:

```
SQL> select * from DNAvirus;

VIRUSCOMMONNAME                GENOMESHAPE
------------------------------ ------------------------------
Variola Virus                  Linear
Monkeypox Virus                Linear
Vaccinia Virus                 Linear
Herpes Simplex Virus           Linear
Phi X 174                      Circular
Hepatitis B Virus              Linear
Human Papillomavirus           Circular
Example Virus                  Updated Genome Shape

8 rows selected.
```

HOSTCOMMONNAME	TYPE
Human	Mammal
E. coli	Bacteria
Cowpea	Plant
Deer	Mammal
Buffalo	Mammal

HOSTCOMMONNAME	VIRUSCOMMONNAME
Buffalo	Rinderpest morbillivirus
Buffalo	Vaccinia Virus
Buffalo	Variola Virus
Cowpea	Cowpea Mosaic Virus
Cowpea	Vaccinia Virus
Cowpea	Variola Virus
Deer	Rinderpest morbillivirus
Deer	Vaccinia Virus
Deer	Variola Virus
E. coli	Phi X 174
E. coli	Vaccinia Virus

HOSTCOMMONNAME	VIRUSCOMMONNAME
E. coli	Variola Virus
Human	Hepatitis B Virus
Human	Herpes Simplex Virus
Human	Human Immunodeficiency Virus
Human	Human Papillomavirus
Human	Influenza A Virus
Human	Monkeypox Virus
Human	Poliovirus
Human	SARS-CoV
Human	Vaccinia Virus
Human	Variola Virus

HOSTCOMMONNAME	VIRUSCOMMONNAME
Human	Zaire Ebolavirus

Find DNA Viruses infect all hosts Submit

b. Results:

Join:

VIRUSCOMMONNAME	GENUS	STATUS	TRANSMISSIONTYPE	SENSE
Cowpea Mosaic Virus	Comovirus	Active	Insects	Positive
Human Immunodeficiency Virus	Lentivirus	Active	Bodily Fluids	Positive
Poliovirus	Enterovirus	Active	Fecal-oral	Positive
SARS-CoV	Betacoronavirus	Active	Respiratory Droplets	Positive

Divide:

Find DNA Viruses infect all hosts

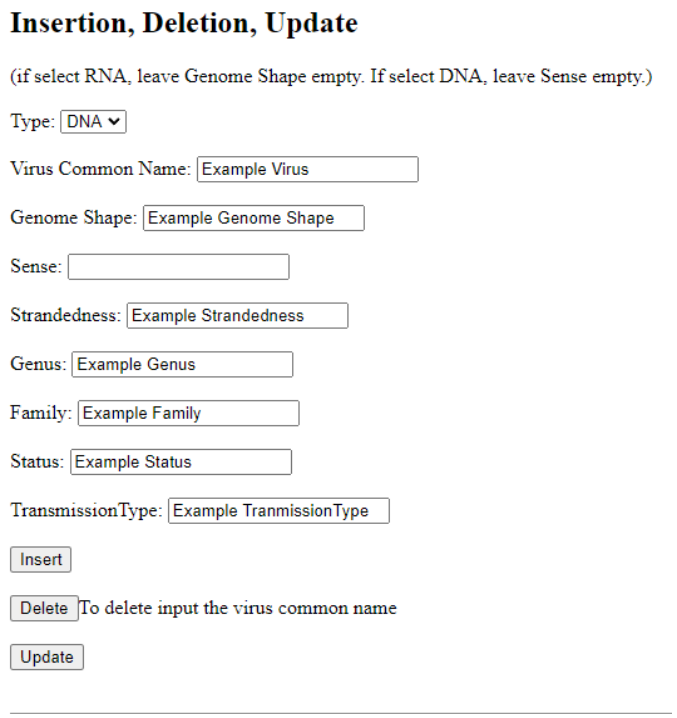
VIRUSCOMMONNAME
Vaccinia Virus
Variola Virus

3. Insert, Delete, Update Queries:

initial database:

```
VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
SARS-CoV                      Betacoronavirus
Active                        Respiratory Droplets

Variola Virus                 Orthopoxvirus
Eradicated                    Airborne Particles

Human Immunodeficiency Virus  Lentivirus
Active                        Bodily Fluids


VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
Monkeypox Virus               Orthopoxvirus
Active                        Direct Contact

Influenza A Virus             Alphainfluenzavirus
Active                        Respiratory Droplets

Poliovirus                    Enterovirus
Active                        Fecal-oral


VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
Vaccinia Virus                Orthopoxvirus
Active                        Direct Contact

Cowpea Mosaic Virus           Comovirus
Active                        Insects

Herpes Simplex Virus          Simplexvirus
Active                        Bodily Fluids


VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
Phi X 174                     Sinsheimervirus
Active                        Bacterial

Zaire Ebolavirus              Ebolavirus
Active                        Bodily Fluids

Rinderpest morbillivirus      Morbillivirus
Eradicated                    Direct Contact


VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
Hepatitis B Virus             Orthohepadnavirus
```

Insert input and results:



```
VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
Monkeypox Virus               Orthopoxvirus
Active                        Direct Contact

Influenza A Virus             Alphainfluenzavirus
Active                        Respiratory Droplets

Poliovirus                    Enterovirus
Active                        Fecal-oral


VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
Vaccinia Virus                Orthopoxvirus
Active                        Direct Contact

Cowpea Mosaic Virus           Comovirus
Active                        Insects

Herpes Simplex Virus          Simplexvirus
Active                        Bodily Fluids


VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
Phi X 174                     Sinsheimervirus
Active                        Bacterial

Zaire Ebolavirus              Ebolavirus
Active                        Bodily Fluids

Rinderpest morbillivirus      Morbillivirus
Eradicated                    Direct Contact


VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
Hepatitis B Virus             Orthohepadnavirus
Active                        Bodily Fluids

Human Papillomavirus          Chipapillomavirus
Active                        Direct Contact

Example Virus                 Example Genus
Example Status                Example TranmissionType
```

```
SQL> select* from virus2;

GENUS                         FAMILY
----------------------------- -----------------------------
Betacoronavirus               Coronaviridae
Orthopoxvirus                 Poxviridae
Lentivirus                    Retroviridae
Alphainfluenzavirus           Orthomyxoviridae
Enterovirus                   Picornaviridae
Comovirus                     Secoviridae
Simplexvirus                  Herpesviridae
Sinsheimervirus               Microviridae
Ebolavirus                    Filoviridae
Morbillivirus                 Paramyxoviridae
Orthohepadnavirus             Hepadnaviridae

GENUS                         FAMILY
----------------------------- -----------------------------
Chipapillomavirus             Papillomaviridae
Example Genus                 Example Family

13 rows selected.
```

```
SQL> select * from DNAvirus;

VIRUSCOMMONNAME               GENOMESHAPE
----------------------------- -----------------------------
Variola Virus                 Linear
Monkeypox Virus               Linear
Vaccinia Virus                Linear
Herpes Simplex Virus          Linear
Phi X 174                     Circular
Hepatitis B Virus             Linear
Human Papillomavirus          Circular
Example Virus                 Example Genome Shape
```

```
SQL> select * from virus1;

FAMILY                        STRANDEDNESS
----------------------------- -----------------------------
Coronaviridae                 Single
Poxviridae                    Double
Retroviridae                  Single
Orthomyxoviridae              Single
Picornaviridae                Single
Secoviridae                   Single
Herpesviridae                 Double
Microviridae                  Single
Filoviridae                   Single
Paramyxoviridae               Single
Hepadnaviridae                Double

FAMILY                        STRANDEDNESS
----------------------------- -----------------------------
Papillomaviridae              Double
Example Family                Example Strandedness

13 rows selected.
```

Update Input and Results:

Insertion, Deletion, Update

(if select RNA, leave Genome Shape empty. If select DNA, leave Sense empty.)

Type: DNA

Virus Common Name: Example Virus

Genome Shape: Updated Genome Shape

Sense:

Strandedness:

Genus: Orthohepadnavirus

Family:

Status: Updated Status

TransmissionType: Updated TransmissionType

Insert

Delete To delete input the virus common name

Update

```
VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
Monkeypox Virus               Orthopoxvirus
Active                        Direct Contact

Influenza A Virus             Alphainfluenzavirus
Active                        Respiratory Droplets

Poliovirus                    Enterovirus
Active                        Fecal-oral


VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
Vaccinia Virus                Orthopoxvirus
Active                        Direct Contact

Cowpea Mosaic Virus           Comovirus
Active                        Insects

Herpes Simplex Virus          Simplexvirus
Active                        Bodily Fluids


VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
Phi X 174                     Sinsheimervirus
Active                        Bacterial

Zaire Ebolavirus              Ebolavirus
Active                        Bodily Fluids

Rinderpest morbillivirus      Morbillivirus
Eradicated                    Direct Contact


VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
Hepatitis B Virus             Orthohepadnavirus
Active                        Bodily Fluids

Human Papillomavirus          Chipapillomavirus
Active                        Direct Contact

Example Virus                 Orthohepadnavirus
Updated Status                Updated TransmissionType
```

```
SQL> select * from DNAvirus;

VIRUSCOMMONNAME               GENOMESHAPE
----------------------------- -------------------------------
Variola Virus                 Linear
Monkeypox Virus               Linear
Vaccinia Virus                Linear
Herpes Simplex Virus          Linear
Phi X 174                     Circular
Hepatitis B Virus             Linear
Human Papillomavirus          Circular
Example Virus                 Updated Genome Shape

8 rows selected.
```

Delete Input and results:

Insertion, Deletion, Update

(if select RNA, leave Genome Shape empty. If select DNA, leave Sense empty.)

Type: DNA

Virus Common Name: Vaccinia Virus

Genome Shape:

Sense:

Strandedness:

Genus:

Family:

Status:

TransmissionType:

Insert

Delete To delete input the virus common name

Update

```
VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
SARS-CoV                      Betacoronavirus
Active                        Respiratory Droplets

Variola Virus                 Orthopoxvirus
Eradicated                    Airborne Particles

Human Immunodeficiency Virus  Lentivirus
Active                        Bodily Fluids


VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
Monkeypox Virus               Orthopoxvirus
Active                        Direct Contact

Influenza A Virus             Alphainfluenzavirus
Active                        Respiratory Droplets

Poliovirus                    Enterovirus
Active                        Fecal-oral


VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
Cowpea Mosaic Virus           Comovirus
Active                        Insects

Herpes Simplex Virus          Simplexvirus
Active                        Bodily Fluids

Phi X 174                     Sinsheimervirus
Active                        Bacterial


VIRUSCOMMONNAME               GENUS
----------------------------- -----------------------------
STATUS                        TRANSMISSIONTYPE
----------------------------- -----------------------------
Zaire Ebolavirus              Ebolavirus
Active                        Bodily Fluids

Hepatitis B Virus             Orthohepadnavirus
Active                        Bodily Fluids

Example Virus                 Orthohepadnavirus
Updated Status                Updated TransmissionType
```

ON DELETE CASCADE example:

```
SQL> select * from DNAvirus;

VIRUSCOMMONNAME                GENOMESHAPE
------------------------------ ------------------------------
Variola Virus                  Linear
Monkeypox Virus                Linear
Herpes Simplex Virus           Linear
Phi X 174                      Circular
Hepatitis B Virus              Linear
Example Virus                  Updated Genome Shape

6 rows selected
```

4. Aggregation Queries:

Aggregation with GROUP BY:

Tables used: Virus3

VIRUSCOMMONNAME	GENUS	STATUS	TRANSMISSIONTYPE
SARS-CoV	Betacoronavirus	Active	Respiratory Droplets
Variola Virus	Orthopoxvirus	Eradicated	Airborne Particles
Human Immunodeficiency Virus	Lentivirus	Active	Bodily Fluids
Monkeypox Virus	Orthopoxvirus	Active	Direct Contact
Influenza A Virus	Alphainfluenzavirus	Active	Respiratory Droplets
Poliovirus	Enterovirus	Active	Fecal-oral
Vaccinia Virus	Orthopoxvirus	Active	Direct Contact
Cowpea Mosaic Virus	Comovirus	Active	Insects
Herpes Simplex Virus	Simplexvirus	Active	Bodily Fluids
Phi X 174	Sinsheimervirus	Active	Bacterial
Zaire Ebolavirus	Ebolavirus	Active	Bodily Fluids
Rinderpest morbillivirus	Morbillivirus	Eradicated	Direct Contact
Hepatitis B Virus	Orthohepadnavirus	Active	Bodily Fluids
Human Papillomavirus	Chipapillomavirus	Active	Direct Contact

Input and result:

Virus Data

Choose a query: Count Viruses by Transmission Type

Submit Home

Result:

TRANSMISSION	VIRUSES_COUNT
Bodily Fluids	4
Direct Contact	4
Respiratory Droplets	2
Insects	1
Bacterial	1
Fecal-oral	1
Airborne Particles	1

Aggregation with HAVING:

Tables used: Outbreak

COUNTRYNAME	VIRUSCOMMONNAME	OUTBREAKSIZE	CASUALTY	YEAR	ORIGIN
United States	Influenza A Virus	Pandemic	100000000	1346	Spain
China	SARS-CoV	Pandemic	25000000	2019	China
Mexico	Variola Virus	Epidemic	8000000	1519	Mexico
Japan	Variola Virus	Epidemic	2000000	735	Japan
Congo	Zaire Ebolavirus	Epidemic	55	2020	Congo
China	Influenza A Virus	Pandemic	4000000	1968	Hong Kong
Canada	Human Immunodeficiency Virus	Pandemic	40100000	1981	Central Africa

Input and result:

Virus Data

Choose a query: Average Casualty By Virus (Virus must have caused atleast two outbreaks)

Submit Home

Result:

VIRUS	AVERAGE_DEATHS
Influenza A Virus	52000000
Variola Virus	5000000

Nested aggregation with GROUP BY:

Tables used: Causes, Outbreak, ViralDisease

DISEASENAME	DISEASETYPE
Smallpox	Acute
AIDS	Chronic
Hepatitis	Acute
Herpes Labialis	Dormant
Influenza	Acute

COUNTRYNAME	VIRUSCOMMONNAME	OUTBREAKSIZE	CASUALTY	YEAR	ORIGIN
United States	Influenza A Virus	Pandemic	100000000	1346	Spain
China	SARS-CoV	Pandemic	25000000	2019	China
Mexico	Variola Virus	Epidemic	8000000	1519	Mexico
Japan	Variola Virus	Epidemic	2000000	735	Japan
Congo	Zaire Ebolavirus	Epidemic	55	2020	Congo
China	Influenza A Virus	Pandemic	4000000	1968	Hong Kong
Canada	Human Immunodeficiency Virus	Pandemic	40100000	1981	Central Africa

DISEASENAME	VIRUSCOMMONNAME
AIDS	Human Immunodeficiency Virus
Hepatitis	Hepatitis B Virus
Herpes Labialis	Herpes Simplex Virus
Influenza	Influenza A Virus
Smallpox	Variola Virus

Input and result:

Virus Data

Choose a query: Total death count of each acute viral disease due to outbreaks

Submit Home

Result:

DISEASE	DEATH_COUNT
Influenza	104000000
Smallpox	10000000