CPSC 304 Project Cover Page

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Group Number: 85

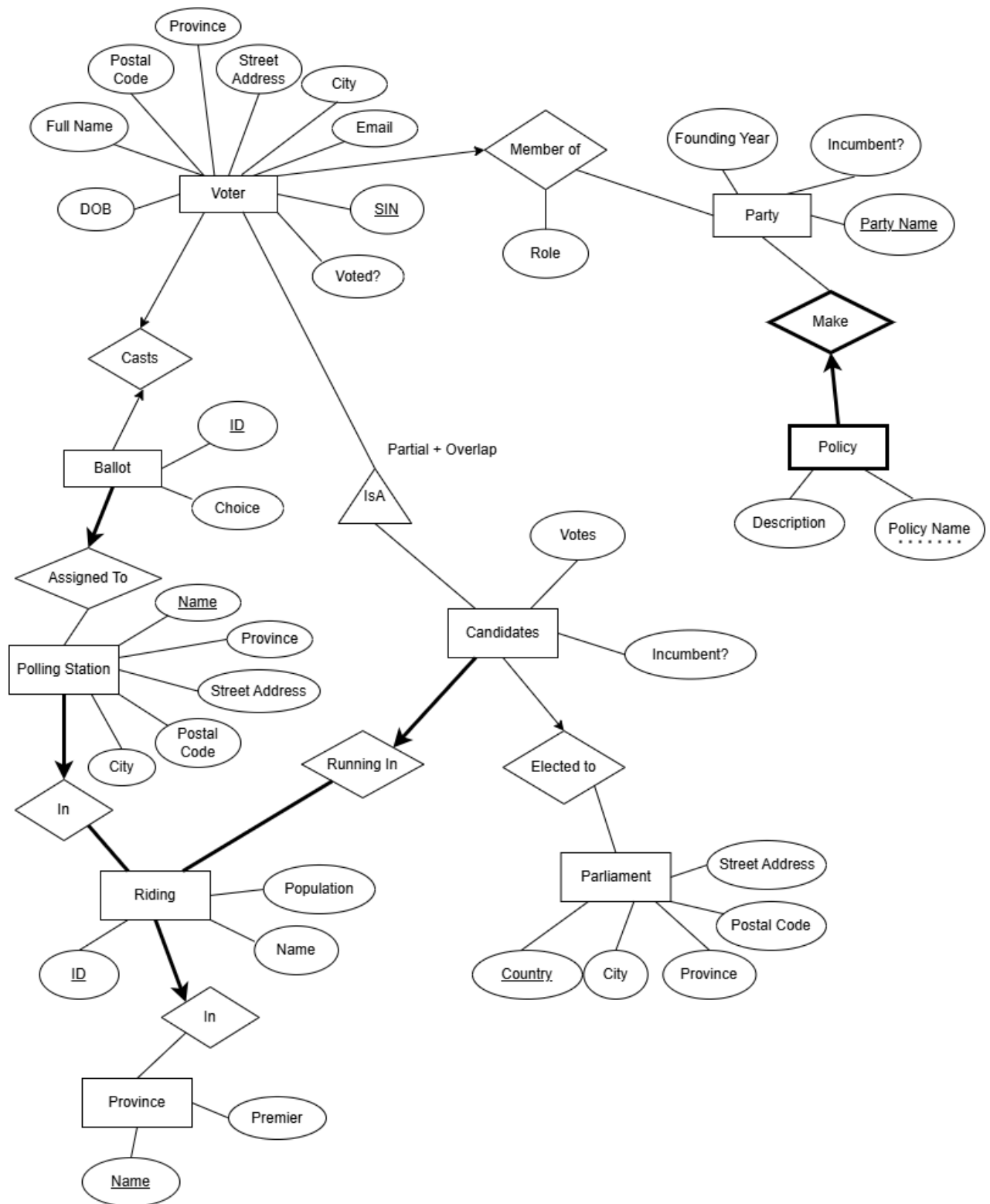| Name	Student Number	CS Alias (Userid)	Preferred E-mail Address
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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included 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 Summary

Our application will be a one stop place to get all the info they could possibly need during an election season. It will include info about their candidates, their platform and how they can vote.

ER Diagram

Voter entity with attributes: Province, Postal Code, Street Address, City, Full Name, Email, DOB, SIN (underlined), Voted?

Voter — *Member of* → **Party**
- *Member of* relationship has attribute: Role

Party entity with attributes: Founding Year, Incumbent?, Party Name (underlined)

Party — *Make* → **Policy**

Policy entity with attributes: Description, Policy Name (underlined, dotted)

Voter — *Casts* → **Ballot**

Ballot entity with attributes: ID (underlined), Choice

Ballot — *Assigned To* → **Polling Station**

Polling Station entity with attributes: Name (underlined), Province, Street Address, Postal Code, City

Polling Station — *In* → **Riding**

Voter — IsA (Partial + Overlap) → **Candidates**

Candidates entity with attributes: Votes, Incumbent?

Candidates — *Running In* → **Riding**

Candidates — *Elected to* → **Parliament**

Riding entity with attributes: Population, Name, ID (underlined)

Riding — *In* → **Province**

Province entity with attributes: Premier, Name (underlined)

Parliament entity with attributes: Street Address, Postal Code, Country (underlined), City, Province

Changes:
- Specified the type of iSA (partial + overlap) per the TA's suggestions
- Added a many to one relationship between Ballot and Polling Station
- Renamed Riding Code to ID, and Polling Station ID to Name for clarity and consistency purposes
- Changed Parliament attribute Number to Address
- Broke down Address into Street Address, Postal Code and City

Schema

Voter(SIN: INTEGER (PK), Email: VARCHAR (UNIQUE), FullName: VARCHAR (NOT NULL), DateOfBirth: VARCHAR (NOT NULL), Voted: BOOLEAN (NOT NULL), Party_PartyName: VARCHAR (FK), Role: VARCHAR, Street Address: VARCHAR (NOT NULL), City: VARCHAR (NOT NULL), Province: VARCHAR (NOT NULL), Postal Code: VARCHAR (NOT NULL))

Candidate (SIN: INTEGER (PK) (FK), Votes: INTEGER (NOT NULL), Incumbent?: BOOLEAN (NOT NULL), Parliament_Country: VARCHAR (FK), Riding_ID: INTEGER (FK) (NOT NULL))

Ballot(ID: INTEGER (PK), Choice: VARCHAR, Voter_SIN: INTEGER (FK) (UNIQUE), PollingStation_NAME: VARCHAR (FK))

PollingStation(NAME: VARCHAR (PK), Street Address: VARCHAR (NOT NULL), City: VARCHAR (NOT NULL), Province: VARCHAR (NOT NULL), Postal Code: VARCHAR (NOT NULL), Riding_ID: INTEGER (FK) (NOT NULL))

Party(PartyName: VARCHAR (PK), FoundingYear: INTEGER (NOT NULL), Incumbent?: BOOLEAN (NOT NULL))

Policy(Party_PartyName: VARCHAR (FK) (PK), PolicyName: VARCHAR (PK), Description: VARCHAR (NOT NULL))

Riding(ID: INTEGER (PK), Population: INTEGER (NOT NULL), Name: VARCHAR (UNIQUE) (NOT NULL), Province_Name: VARCHAR (FK) (NOT NULL))

Province(Name: VARCHAR (PK), Premier: VARCHAR)

Parliament(Country: VARCHAR (PK), City: VARCHAR (NOT NULL), StreetAddress: VARCHAR (NOT NULL), PostalCode: VARCHAR (NOT NULL), Province: VARCHAR (NOT NULL))

Functional Dependencies

Voter:
SIN -> Email, FullName, DateOfBirth, Voted, Party_PartyName, Role, Street Address, City, Province, Postal Code, BallotID
Postal Code -> City, Province

Ballot:
ID -> Choice, PollingStationName, Voter_SIN

Polling Station:
Name -> Street Address, City, Province, Postal Code, Riding_ID
Postal Code -> City, Province

Riding:
ID-> Population, Name, Province_Name
Name -> ID, Population, Province_Name

Province:
Name -> Premier

Party:
PartyName -> Founding Year, Incumbent?

Policy:
Party_PartyName, PolicyName -> Description

Candidates:
SIN -> Votes, Incumbent?, Riding_ID, Parliament_Country

Parliament:
Country -> Street Address, City, Province, Postal Code
Postal Code -> City, Province

Normalization

Voter
Postal Code -> City, Province (not in BCNF or 3NF)

Notation:
Street Address: A
Province: PR
Postal Code: PC
Party Name: P

Everything else is just its first letter

$PC \rightarrow C$ not in BCNF
$PC \rightarrow PR$ not in BCNF

$R(S, E, N, D, V, P, R, A, C, PR, PC)$

$R_1(PC, C)$ $R_2(S, E, V, D, V, P, R, A, PR, PC)$

$R_3(S, E, V, D, V, R, A, P, PC)$ $R_4(PC, PR)$

Polling Station

$PC \rightarrow C$ not in BCNF

$PC \rightarrow PR$ not in BCNF

$R(N, A, C, PR, PC, RID)$

$R_1(PC, C)$ $R_2(N, A, PR, PC, RID)$

$R_3(N, A, PC, RID)$ $R_4(PC, PR)$
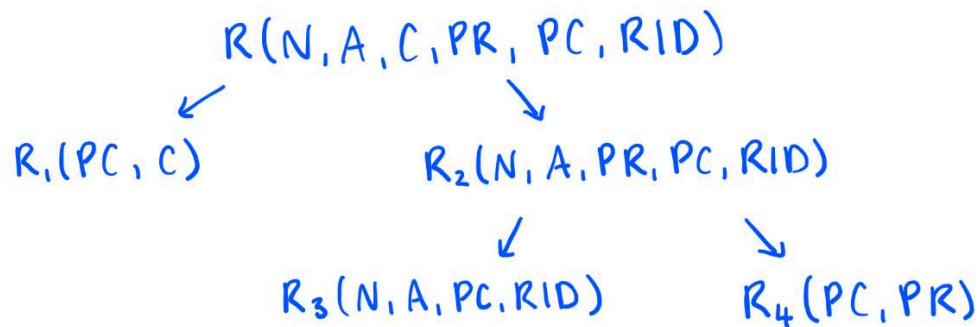
Parliament

$PC \rightarrow C$ not in BCNF

$PC \rightarrow PR$ not in BCNF

$R(CO, A, C, PR, PC)$

$R_1(PC, C)$ $R_2(CO, A, PR, PC)$

$R_3(CO, A, PC)$ $R_4(PC, PR)$
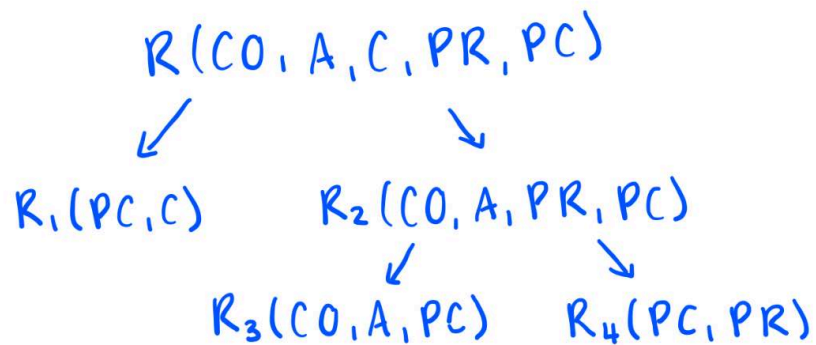
All other relations and their functional dependencies are already in BCNF or 3NF.

Voter(SIN: INTEGER (PK), Email: VARCHAR (UNIQUE), Address: VARCHAR, FullName: VARCHAR (NOT NULL), DateOfBirth: VARCHAR (NOT NULL), Voted: BOOLEAN (NOT NULL), Party_PartyName: VARCHAR (FK), Role: VARCHAR)

Candidate (SIN: INTEGER (PK) (FK), Votes: INTEGER (NOT NULL), Incumbent?: BOOLEAN, Parliament_Country: VARCHAR (FK), Riding_ID: INTEGER (FK) (NOT NULL))

Ballot(ID: INTEGER (PK), Choice: VARCHAR, Voter_SIN: INTEGER (FK) (UNIQUE), PollingStation_NAME: VARCHAR (FK))

PollingStation(NAME: VARCHAR (PK), Street Address: VARCHAR (UNIQUE) (NOT NULL), Postal Code: VARCHAR (UNIQUE) (NOT NULL), City: VARCHAR (UNIQUE) (NOT NULL), ID: INTEGER (FK) (NOT NULL))

Party(PartyName: VARCHAR (PK), FoundingYear: INTEGER, Incumbent?: BOOLEAN)

Policy(Party_PartyName: VARCHAR (FK) (PK), PolicyName: VARCHAR (PK), Description: VARCHAR (NOT NULL))

Riding(ID: INTEGER (PK), Population: INTEGER (NOT NULL), Name: VARCHAR (UNIQUE) (NOT NULL), Province_Name: VARCHAR (FK) (NOT NULL))

Province(Name (PK), Premier)

Parliament(Country: VARCHAR (PK), Number: INTEGER)

SQL DDL Statements

CREATE TABLE Voter(
      SIN INTEGER PRIMARY KEY,
      Email VARCHAR UNIQUE,
      FullName VARCHAR NOT NULL,
      DateOfBirth VARCHAR NOT NULL,
      Voted BOOLEAN NOT NULL,
      Party_PartyName VARCHAR,
      Role VARCHAR,
      Street Address VARCHAR NOT NULL,
      City VARCHAR NOT NULL,
      Province VARCHAR NOT NULL,
      Postal Code VARCHAR NOT NULL,
      FOREIGN KEY (Party_PartyName) REFERENCES Party(PartyName)
      ON DELETE SET NULL ON UPDATE CASCADE
);

CREATE TABLE Candidate (
      SIN INTEGER PRIMARY KEY,
      Votes INTEGER NOT NULL,
      Incumbent? BOOLEAN NOT NULL,
      Parliament_Country VARCHAR,
      Riding_ID INTEGER NOT NULL,
      FOREIGN KEY (SIN) REFERENCES VOTER (SIN),
      FOREIGN KEY (Parliament_Country) REFERENCES Parliament
      (Country) ON DELETE SET NULL ON UPDATE CASCADE,
      FOREIGN KEY (Riding_ID) REFERENCES Riding (ID) ON DELETE
      CASCADE ON UPDATE CASCADE
);

CREATE TABLE Ballot(
      ID INTEGER PRIMARY KEY,
      Choice VARCHAR,
      Voter_SIN INTEGER UNIQUE,
      PollingStation_Name VARCHAR,

```sql
        FOREIGN KEY (Voter_SIN) REFERENCES Voter (SIN) ON DELETE
        CASCADE ON UPDATE CASCADE,
        FOREIGN KEY (PollingStation_Name) REFERENCES PollingStation
        (Name) ON DELETE CASCADE ON UPDATE CASCADE
);

CREATE TABLE PollingStation(
        Name VARCHAR PRIMARY KEY,
        StreetAddress VARCHAR NOT NULL,
        City VARCHAR NOT NULL,
        Province VARCHAR NOT NULL,
        Postal Code VARCHAR NOT NULL,
        Riding_ID INTEGER NOT NULL,
        FOREIGN KEY (Riding_ID) REFERENCES Riding (ID) ON DELETE
        SET CASCADE ON UPDATE CASCADE
);

CREATE TABLE Party(
        PartyName VARCHAR PRIMARY KEY,
        FoundingYear INTEGER NOT NULL,
        Incumbent? BOOLEAN NOT NULL
);

CREATE TABLE Policy(
        Party_PartyName VARCHAR,
        PolicyName VARCHAR,
        Description VARCHAR NOT NULL,
        PRIMARY KEY (Party_PartyName,PolicyName)
        FOREIGN KEY(Party_PartyName) REFERENCES Party ON DELETE
        CASCADE ON UPDATE CASCADE
);

CREATE TABLE Riding(
        ID INTEGER PRIMARY KEY,
        Population INTEGER NOT NULL,
        Name VARCHAR UNIQUE NOT NULL,
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        Province_Name VARCHAR NOT NULL,
        FOREIGN KEY (Province_Name) REFERENCES Province(Name) ON
        DELETE CASCADE ON UPDATE CASCADE
);

CREATE TABLE Province(
        Name VARCHAR PRIMARY KEY,
        Premier VARCHAR
);

CREATE TABLE Parliament(
        Country VARCHAR PRIMARY KEY,
        City VARCHAR NOT NULL,
        StreetAddress VARCHAR NOT NULL,
        PostalCode VARCHAR NOT NULL,
        Province VARCHAR
);
```

Insert Statements

Voter

Insert
Into Voter (SIN, Full Name, DOB, PostalCode, Province, StreetAddress, City, Email, Voted?)
Values (123456789, John Smith, 08/12/1999, V6L 2H3, BC, 2628 McBain Ave, Vancouver, johnsmith@gmail.com, False)

Insert
Into Voter (SIN, Full Name, DOB, PostalCode, Province, StreetAddress, City, Email, Voted?)
Values (223456789, Jack Smith, 03/20/1999, T2E 5S2, AB, 4636 Greenhill Crescent NE, Calgary, jacksmith@gmail.com, True)

Insert

Into Voter (SIN, Full Name, DOB, PostalCode, Province, StreetAddress, City, Email, Voted?)
Values (323456789, Robert Doyle, 08/12/1999, V6L 2H3, BC, 2628 McBain Ave, Vancouver, robertdoyle@gmail.com, True)

Insert
Into Voter (SIN, Full Name, DOB, Postal Code, Province, Street Address, City, Email, Voted?)
Values (423456789, John Smith, 05/13/1966, V6L 2H3, BC, 2628 McBain Ave, Vancouver, johnsmith1@gmail.com, False)

Insert
Into Voter (SIN, Full Name, DOB, Postal Code, Province, Street Address, City, Email, Voted?)
Values (523456789, John Smith, 02/09/1945, V6L 2H3, BC, 2628 McBain Ave, Vancouver, johnsmith2@gmail.com, True)

Insert
Into Voter (SIN, Full Name, DOB, Postal Code, Province, Street Address, City, Email, Voted?)
Values (723456789, John Smith, 01/10/1967, V6L 2H3, BC, 2628 McBain Ave, Vancouver, johnsmith3@gmail.com, True)

Candidate

Insert
Into Candidate (SIN, Votes, Incumbent?, Parliament_Country, Riding_ID)
Values (987654321, 99999, Yes, Canada, 500)

Insert
Into Candidate (SIN, Votes, Incumbent?, Parliament_Country, Riding_ID)
Values (31415926, 400000, No, France, 300)

Insert
Into Candidate (SIN, Votes, Incumbent?, Parliament_Country, Riding_ID)

Values (1234321, 30000, No, Canada, 200)

Insert
Into Candidate (SIN, Votes, Incumbent?, Parliament_Country, Riding_ID)
Values (1234322, 30001, No, Canada, 200)

Insert
Into Candidate (SIN, Votes, Incumbent?, Parliament_Country, Riding_ID)
Values (11111111111111, 24000, Yes, United Kingdom, 47)

Ballot

Insert
Into Ballot (ID, Choice, Voter_SIN, PollingStation_Name)
Values (123456, Justin Trudeau, 223456789, UBC Nest)

Insert
Into Ballot (ID, Choice, Voter_SIN, PollingStation_Name)
Values (323456, Pierre Pollievre, 323456789, Eaton's Center)

Insert
Into Ballot (ID, Choice, Voter_SIN, PollingStation_Name)
Values (423456, Jagmeet Singh, 523456789, UBC Nest)

Insert
Into Ballot (ID, Choice, Voter_SIN, PollingStation_Name)
Values (523456, Jagmeet Singh, 623456789, Moscrop Secondary)

Insert
Into Ballot (ID, Choice, Voter_SIN, PollingStation_Name)
Values (623456, Justin Trudeau, 723456789, Metrotown)

Party

Insert
Into Party (PartyName, FoundingYear, Incumbent?)

Values (Liberal Party, 1867, Yes)

Insert
Into Party (PartyName, FoundingYear, Incumbent?)
Values (Conservative Party, 2003, No)

Insert
Into Party (PartyName, FoundingYear, Incumbent?)
Values (New Democratic Party, 1961, No)

Insert
Into Party (PartyName, FoundingYear, Incumbent?)
Values (Bloc Québécois, 1991, No)

Insert
Into Party (PartyName, FoundingYear, Incumbent?)
Values (Green Party, 1983, No)

Policy

Insert
Into Policy (Party_PartyName, PolicyName, Description)
Values (Liberal Party, Affordable Housing, Building 160,000 new homes; improving access to safe, stable, sustainable and affordable housing)

Insert
Into Policy (Party_PartyName, PolicyName, Description)
Values (Liberal Party, Primary Health Care Availability, Take immediate steps to fund, streamline and/or shorten processes, and increase the capacities to qualify foreign trained professionals on an expedited basis, with an emphasis on primary health care)

Insert
Into Policy (Party_PartyName, PolicyName, Description)

Values (Conservative Party, Senate Reform, The election of senators to address the uneven distribution of Canada's population and to provide a balance to safeguard regional interests)

Insert
Into Policy (Party_PartyName, PolicyName, Description)
Values (New Democratic Party, Physical infrastructure and transportation, Improving rail travel for both passengers and goods and developing proposals for high-speed systems)

Insert
Into Policy (Party_PartyName, PolicyName, Description)
Values (Green Party, Forest Management, The permanent protection of all remaining high-risk old-growth ecosystems and establishing a 21st Century regulatory framework for forestry management)

Province

Insert
Into Province(Name, Premier)
Values(British Columbia, David Eby)

Insert
Into Province(Name, Premier)
Values(Alberta, Danielle Smith)

Insert
Into Province(Name, Premier)
Values(Saskatchewan, Scott Moe)

Insert
Into Province(Name, Premier)
Values(Manitoba, Wab Kinew)

Insert
Into Province(Name, Premier)

Values(Ontario, Doug Ford)

Riding

Insert
Into Riding(ID, Population, Name, Province_Name)
Values(59001, 116265, Abbotsford-South Langley, British Columbia)

Insert
Into Riding(ID, Population, Name, Province_Name, British Columbia)
Values(59002, 120734, Burnaby Central)

Insert
Into Riding(ID, Population, Name, Province_Name)
Values(59003, 102486, Burnaby North-Seymour, British Columbia)

Insert
Into Riding(ID, Population, Name, Province_Name)
Values(59004, 108252, Cariboo-Prince George, British Columbia)

Insert
Into Riding(ID, Population, Name, Province_Name)
Values(59005, 92734, Chilliwack-Hope, British Columbia)

Parliament

Insert
Into Parliament(Country, City, StreetAddress, PostalCode, Province)
Values(Canada, Ottawa, 111 Wellington St, K1A 0A9, Ontario)

Insert
Into Parliament(Country, City, StreetAddress, PostalCode, Province)
Values(United States, Washington, 1st Street SE, 20515, DC)

Insert
Into Parliament(Country, City, StreetAddress, PostalCode, Province)

Values(United Kingdom, London, Parliament Square, SW1A 0AA, Westminster)

Insert
Into Parliament(Country, City, StreetAddress, PostalCode, Province)
Values(France, Paris, 126 Rue de l'Université, 75007, Île-de-France)

Insert
Into Parliament(Country, City, StreetAddress, PostalCode, Province)
Values(Germany, Berlin, Platz der Republik 1, 11011, Berlin)