

Project Description

Our project aims to model the Canadian immigration system. The users of this application should ideally be the Canadian government. The users can search and view all the issued visas. The users can also manage all the approved institutions needed for granting work and student visas. The users can view or add new visa-applicants, and view all visa-holders and their travel history. And at last, the users can manage all the embassies or consulates.

Link: https://github.students.cs.ubc.ca/CPSC304-2022W-T1/project_f3a3g_o7c8d_t5h6p

Changes in Schemas

We decided to denormalize our *Applicants*, *Holds*, *EmbassyConsulates* schemas and delete some attributes since we realized that we were storing redundant data.

In *Applicants*, we deleted the attribute *Age* since we could generate applicants' age through their date of birth.

In *Holds*, we deleted the attribute *Status* since we could generate the status of visas through their expiration dates.

In *EmbassyConsulates*, we deleted the functional dependencies *Address* → *Country* as we deemed it unnecessary.

We also renamed all of our schemas. We realized that we could not include the underscore and ampersand signs in table names and we made some of the table names and attribute names more descriptive. For example, we changed the schema *By* to *InterviewedBy*.

Final Schemas & Initial Data

ApprovedInstitutions

```
CREATE TABLE ApprovedInstitutions (
    InstitutionID      VARCHAR(100),
    InstitutionName    VARCHAR(100),
    Category           VARCHAR(100),
    PRIMARY KEY (InstitutionID)
);
```

INSTITUTIONID	INSTITUTIONNAME	CATEGORY
EHBG1356	University of British Columbia	University/College
ENEA2891	University of Toronto	University/College
AHBG1356	Amazon	Company
QKCG1920	CIBC	Company
QPXM2917	Microsoft	Company

EmbassyConsulates

```
CREATE TABLE EmbassyConsulates (
    ECID          VARCHAR(100)      PRIMARY KEY,
    AddressName   VARCHAR(100)      UNIQUE,
    Country       VARCHAR(100)      NOT NULL
);
```

ECID	ADDRESSNAME	COUNTRY
DB0Q4348	Canada House, Trafalgar Sq, London SW1Y 5BJ	United Kingdom
RHPW1067	466 Lexington Ave 20th floor, New York, NY 10017	United States
EGHE3624	501 Pennsylvania Avenue, N.W., Washington, D.C.	United States
ECQR2462	1175 Peachtree Street N.E., Suite 1700, Atlanta, Georgia	United States
ECID	ADDRESSNAME	COUNTRY
RHRU2471	Leipziger Platz 17, Berlin	Germany

Applications

```
CREATE TABLE Applications (
    ApplicationID      VARCHAR(100)      PRIMARY KEY,
    StatusOfApp        NUMBER(1)          NOT NULL
);
```

APPLICATIONID	STATUSOFAPP
11111111	1
44444444	1
66666666	1
77777777	1
22222228	1
11111119	1

APPLICATIONID**STATUSOFAPP**

66666664
177777773
035627464
0**APPLICATIONID****STATUSOFAPP**

24624724
032524624
146246244
187346363
102395923
132512353
1**APPLICATIONID****STATUSOFAPP**

62534351
163133451
101453300
1

51236111

1

06104326

1

67777109

1

APPLICATIONID

STATUSOFAPP

61087321

1

VisaFromIssue

```
CREATE TABLE VisaFromIssue (
    VisaID      VARCHAR(100)      PRIMARY KEY,
    VisaType    VARCHAR(100),
    ApplicationID  VARCHAR(100)      NOT NULL,
    ECID        VARCHAR(100)      NOT NULL,
    FOREIGN KEY (ApplicationID)
        REFERENCES Applications
        ON DELETE CASCADE,
    FOREIGN KEY (ECID)
        REFERENCES EmbassyConsulates
        ON DELETE CASCADE
);
```

VISAID	VISATYPE	APPLICATIONID	ECID
TETY1471	TOURIST	11111111	DBOQ4348
TQPX2910	TOURIST	44444444	RHPW1067
TREG2135	TOURIST	32524624	RHPW1067
TREG2134	TOURIST	32512353	RHPW1067
TREG2133	TOURIST	51236111	RHPW1067
AEYE2472	ASYLUM	66666666	EGHE3624
AXPQ2041	ASYLUM	77777777	ECQR2462
AFYW3933	ASYLUM	46246244	ECQR2462
AFYW3934	ASYLUM	62534351	ECQR2462
AFYW3034	ASYLUM	06104326	ECQR2462
WBEY1254	WORK	11111119	DBOQ4348
VISAID	VISATYPE	APPLICATIONID	ECID
WICN4561	WORK	22222228	RHRU2471
WRYW2754	WORK	87346363	RHRU2471
WRYW2755	WORK	63133451	RHRU2471
WRYW0755	WORK	67777109	RHRU2471
SXTR5137	STUDENT	66666664	RHRU2471
SRYC2471	STUDENT	77777773	ECQR2462
SERE3452	STUDENT	02395923	ECQR2462
SERE3453	STUDENT	01453300	ECQR2462
SERE3450	STUDENT	61087321	ECQR2462

TouristVisa

```
CREATE TABLE TouristVisa (
    VisaID      VARCHAR(100)          PRIMARY KEY,
    Destination VARCHAR(100),
    FOREIGN KEY (VisaID)
        REFERENCES VisaFromIssue
        ON DELETE CASCADE
);
```

VISAID	DESTINATION
TETY1471	Vancouver
TQPX2910	Montreal
TREG2135	Toronto
TREG2134	Calgary
TREG2133	Edmonton

AsylumRefugeeVisa

```
CREATE TABLE AsylumRefugeeVisa (
    VisaID      VARCHAR(100)      PRIMARY KEY,
    Reason      VARCHAR(100)      NOT NULL,
    FOREIGN KEY (VisaID)
        REFERENCES VisaFromIssue
        ON DELETE CASCADE
);
```

VISAID	REASON
AEYE2472	Famine
AXPQ2041	Political Prosecution
AFYW3933	War
AFYW3934	Religious Prosecution
AFYW3034	Climate Change

WorkVisaSponseredBy

```
CREATE TABLE WorkVisaSponseredBy (
    VisaID          VARCHAR(100)      PRIMARY KEY,
    WorkType        VARCHAR(100),
    InstitutionID  VARCHAR(100),
    FOREIGN KEY (VisaID)
        REFERENCES VisaFromIssue
        ON DELETE CASCADE,
    FOREIGN KEY (InstitutionID)
        REFERENCES ApprovedInstitutions
        ON DELETE SET NULL
);
```

VISAID	WORKTYPE	INSTITUTIONID
WBEY1254	Programmer	AHBG1356
WICN4561	Analyst	QKCG1920
WRYW2754	Engineer	QPXM2917
WRYW2755	Cook	AHBG1356
WRYW0755	Gardener	QPXM2917

StudentVisaVerifiedBy

```
CREATE TABLE StudentVisaVerifiedBy (
    VisaID      VARCHAR(100)      PRIMARY KEY,
    StudyLevel   VARCHAR(100)      NOT NULL,
    InstitutionID  VARCHAR(100),
    FOREIGN KEY (VisaID)
        REFERENCES VisaFromIssue
        ON DELETE CASCADE,
    FOREIGN KEY (InstitutionID)
        REFERENCES ApprovedInstitutions
        ON DELETE SET NULL
);
```

VISAID	STUDYLEVEL	INSTITUTIONID
SXTR5137	UNDERGRADUATE	EHBG1356
SRYC2471	UNDERGRADUATE	ENEA2891
SERE3452	GRADUATE	EHBG1356
SERE3453	GRADUATE	ENEA2891
SERE3450	GRADUATE	EHBG1356

InOut

```
CREATE TABLE InOut (
    Destination      VARCHAR(100),
    Departure        VARCHAR(100),
    InOut            NUMBER(1)          NOT NULL,
    PRIMARY KEY (Destination, Departure)
);
```

DESTINATION	DEPARTURE
INOUT	
Canada	US
1	
US	Canada
0	
Canada	China
1	
China	Canada
0	
Canada	Mexico
1	
Mexico	Canada
0	
Canada	Germany
1	
Germany	Canada
0	

TravelHistoryRecordsTravelsBy

```
CREATE TABLE TravelHistoryRecordsTravelsBy (
    RecordID      VARCHAR(100)      PRIMARY KEY,
    TimeOfTravel   TIMESTAMP        NOT NULL,
    Destination    VARCHAR(100)      NOT NULL,
    Departure      VARCHAR(100)      NOT NULL,
    VisaID         VARCHAR(100)      NOT NULL,
    FOREIGN KEY (VisaID)
        REFERENCES VisaFromIssue
        ON DELETE CASCADE,
    FOREIGN KEY (Destination, Departure)
        REFERENCES InOut(Destination, Departure)
);
```

RECORDID	TIMEOFTREL	DESTINATION	DEPARTURE	VISAID
WWW111	06-DEC-12 02.34 .56.035000 PM	Canada	US	TETY1471
WWW112	28-DEC-12 09.23 .22.453000 AM	US	Canada	TETY1471
WWW113	05-DEC-13 12.23 .11.123500 PM	Canada	US	TETY1471
WWW114	27-DEC-13 07.10 .11.456600 AM	US	Canada	TETY1471
RECORDID	TIMEOFTREL	DESTINATION	DEPARTURE	VISAID
EEE222	30-SEP-18 02.45 .23.356100 AM	China	Canada	AEYE2472
EEE223	28-NOV-18 03.03 .24.155100 PM	Canada	China	AEYE2472
RRR444	12-MAR-15 07.12 .06.462474 AM	US	Canada	SXTR5137
YYY666	25-DEC-00 09.34	Canada	Mexico	TQPX2910

RECORDID	TIMEOFTTRAVEL	DESTINATION	DEPARTURE	VISAID
	.50.647246 AM			
FFF222	18-APR-14 11.52	Germany	Canada	SRYC2471 .09.672461 AM

Applicants

```
CREATE TABLE Applicants (
    ApplicantID          VARCHAR(100)      PRIMARY KEY,
    NameOfApplicants     VARCHAR(100)      NOT NULL,
    Nationality          VARCHAR(100)      NOT NULL,
    DateOfBirth          DATE            NOT NULL
);
```

APPLICANTID	NAMEOFAPPLICANT	NATIONALITY	DATEOFBIRTH
QOXQMDHO	Yitang Zhang	China	01-AUG-96
QKXMSNAM	Quinn Holmquist	Haiti	01-JUN-62
SJZMWISK	Kostyantyn Zele	Ukraine	01-DEC-84
	nsky		
WPSMZKSJ	Shinichi Mochizuki	Japan	01-AUG-35
XISMALPQ	Naruto Uzumaki	Japan	27-AUG-99
AMSIEKZP	Kakashi Hatake	Japan	27-JUL-88
QISMZKLP	Jingping Xi	China	01-JAN-53
APPLICANTID	NAMEOFAPPLICANT	NATIONALITY	DATEOFBIRTH
ISXWUSPE	Xuexiang Ding	China	01-JAN-90
AIRJXKAL	Ping Song	China	01-JAN-86
WIXNDKXL	Yi Wang	China	01-JAN-75
WIXNDSUW	Qi Cai	China	11-FEB-52
ZKEOXNWB	Huning Wang	China	12-JAN-80
SINCSMSK	Miner Chen	China	01-OCT-48
XIEJABCG	Leji Zhao	China	01-SEP-13
ERIXNSJS	Qiang Li	China	01-AUG-08
SICNFHDK	Xingrui Ma	China	01-JUN-00
ENSHTAHQ	Lebron James	United States	04-JUN-89
PSIENDJS	Stephen Curry	United States	01-JUN-54

APPLICANTID	NAMEOFPPLICANT	NATIONALITY	DATEOFBIRTH
SLEODIFN	James Harden	United States	13-APR-88
WYZMSNJA	Will Byers	United States	01-FEB-55
WPEIDNSH	Kevin Love	United States	21-MAR-00
DJSNZMSJ	Ketty Perry	Haiti	21-MAR-90
DJZIRUEI	Ketty Perry	Haiti	21-MAR-90
ZMDKWPPL	Ratni Hamdan	Haiti	24-FEB-60
PTORNSMD	Max Gregor	Haiti	31-MAR-80
IRNXURHS	Rosa Bale	Haiti	30-APR-52
RIEPZMCJ	James Bowen	Ukraine	01-DEC-94
FJTUDISM	Norlan Heinz	Ukraine	01-NOV-99

Holds

```
CREATE TABLE Holds (
    ApplicantID      VARCHAR(100),
    VisaID           VARCHAR(100),
    IssueDate        DATE          NOT NULL,
    ExpirationDate   DATE          NOT NULL,
    PRIMARY KEY (ApplicantID, VisaID),
    FOREIGN KEY (ApplicantID)
        REFERENCES Applicants(ApplicantID)
        ON DELETE CASCADE,
    FOREIGN KEY (VisaID)
        REFERENCES VisaFromIssue(VisaID)
        ON DELETE CASCADE
);
```

APPLICANTID	VISAID	ISSUEDATE	EXPIRATIONDATE
QOXQMDHO	TETY1471	12-OCT-12	12-OCT-22
QKXMSNAM	TQPX2910	12-OCT-11	12-OCT-21
WPSMZKSJ	AEYE2472	12-OCT-13	12-OCT-23
SJZMWISK	AXPQ2041	12-OCT-14	12-OCT-24
QISMZKLP	WBEY1254	12-OCT-10	12-OCT-20
QOXQMDHO	WICN4561	12-OCT-12	12-OCT-22
QKXMSNAM	SXTR5137	12-OCT-11	12-OCT-21
WPSMZKSJ	SRYC2471	12-OCT-13	12-OCT-23

Creates

```
CREATE TABLE Creates (
    ApplicantID          VARCHAR(100),
    ApplicationID        VARCHAR(100),
    CreateDate            DATE                NOT NULL,
    PRIMARY KEY (ApplicantID, ApplicationID),
    FOREIGN KEY (ApplicantID)
        REFERENCES Applicants(ApplicantID),
    FOREIGN KEY (ApplicationID)
        REFERENCES Applications(ApplicationID)
        ON DELETE CASCADE
);
```

APPLICANTID	APPLICATIONID	CREATEDATE
QOXQMDHO	11111111	01-JAN-00
QOXQMDHO	44444444	02-JAN-00
QKXMSNAM	66666666	03-JAN-00
QKXMSNAM	77777777	04-JAN-00
SJZMWISK	66666664	05-JAN-00
WPSMZKSJ	11111119	06-JAN-00
WPSMZKSJ	22222228	07-JAN-00
QISMZKLP	77777773	08-JAN-00
WPEIDNSH	32524624	09-JAN-00
WPEIDNSH	46246244	10-JAN-00
WPEIDNSH	87346363	11-JAN-00
APPLICANTID	APPLICATIONID	CREATEDATE
WPEIDNSH	02395923	12-JAN-00
WPSMZKSJ	32512353	13-JAN-00
WPSMZKSJ	62534351	14-JAN-00
WPSMZKSJ	63133451	15-JAN-00
WPSMZKSJ	01453300	16-JAN-00
XISMALPQ	51236111	17-JAN-00
XISMALPQ	06104326	18-JAN-00
XISMALPQ	67777109	19-JAN-00
XISMALPQ	61087321	20-JAN-00

InterviewMakes

```
CREATE TABLE InterviewsMakes (
    InterviewID      VARCHAR(100),
    TimeOfInterview  TIMESTAMP,
    ApplicationID   VARCHAR(100)      NOT NULL,
    PRIMARY KEY (InterviewID),
    FOREIGN KEY (ApplicationID)
        REFERENCES Applications(ApplicationID)
);
```

INTERVIEWID	TIMEOFINTERVIEW	APPLICATIONID
ABCD1111	25-FEB-00 11.11 .11.345673 AM	11111111
ABCD4444	20-MAR-00 11.12 .12.567123 AM	44444444
ABCD6666	05-MAR-00 11.13 .13.524126 AM	66666666
ABCD7777	15-JUL-00 11.14 .14.040011 AM	77777777

INTERVIEWID	TIMEOFINTERVIEW	APPLICATIONID
ABCD8888	19-DEC-01 11.15 .15.624722 AM	77777773

ImmigrationOfficerWorksIn

```
CREATE TABLE ImmigrationOfficersWorksIn (
    ECID          VARCHAR(100),
    OfficerID     VARCHAR(100),
    NameOfOfficer VARCHAR(100)      NOT NULL,
    PRIMARY KEY (ECID, OfficerID),
    FOREIGN KEY (ECID)
        REFERENCES EmbassyConsulates(ECID)
        ON DELETE CASCADE
);
```

ECID	OFFICERID	NAMEOFFICER
RHRU2471	AAAA1111	MingZe Xi
RHPW1067	BBBB1111	Lelouch vi Britannia
DBOQ4348	CCCC1111	Shane Dawson
EGHE3624	DDDD1111	Finn Hudson
ECQR2462	EEEE1111	Georg Hainz

InterviewedBy

```
CREATE TABLE InterviewedBy(
    InterviewID      VARCHAR(100),
    ECID             VARCHAR(100),
    OfficerID        VARCHAR(100),
    PRIMARY KEY (InterviewID, ECID, OfficerID),
    FOREIGN KEY (InterviewID)
        REFERENCES InterviewsMakes,
    FOREIGN KEY (ECID, OfficerID)
        REFERENCES ImmigrationOfficersWorksIn(ECID, OfficerID)
        ON DELETE CASCADE
);
```

INTERVIEWID	ECID	OFFICERID
ABCD1111	RHRU2471	AAAA1111
ABCD4444	RHPW1067	BBBB1111
ABCD6666	DBOQ4348	CCCC1111
ABCD7777	EGHE3624	DDDD1111
ABCD8888	ECQR2462	EEEE1111

All SQL Queries & GUI Results & Implementation Code

INSERTION

SQL QUERY

```
INSERT into Applicants VALUES ($Var1, $Var2, $Var3, $Var4)
```

GUI RESULTS

Before insertion...

View All Applicants

[View](#)

Retrieving data...

ApplicantID	NameOfApplicants	Nationality	DateOfBirth
QOXQMDHO	Yitang Zhang	China	01-AUG-96
SICNFHDK	Xingrui Ma	China	01-JUN-00
ERIXNSJS	Qiang Li	China	01-AUG-08
XIEJABCG	Leji Zhao	China	01-SEP-13
SINCSMSK	Miner Chen	China	01-OCT-48
WIXNDSUW	Qi Cai	China	11-FEB-52
QISMZKLP	Jingping Xi	China	01-JAN-53
ISXWUSPE	Xuexiang Ding	China	01-JAN-90
AIRJXKAL	Ping Song	China	01-JAN-86
WIXNDKXL	Yi Wang	China	01-JAN-75
ZKEOXNWB	Huning Wang	China	12-JAN-80
QKXMSNAM	Quinn Holmquist	Haiti	01-JUN-62
IRNXURHS	Rosa Bale	Haiti	30-APR-52
PTORNSMD	Max Gregor	Haiti	31-MAR-80
ZMDKWPSL	Ratni Hamdan	Haiti	24-FEB-60
DJZIRUEI	Ketty Perry	Haiti	21-MAR-90
DJSNZMSJ	Ketty Perry	Haiti	21-MAR-90

XISMALPQ	Naruto Uzumaki	Japan	27-AUG-99
WPSMZKSJ	Shinichi Mochizuki	Japan	01-AUG-35
AMSIEKZP	Kakashi Hatake	Japan	27-JUL-88
SJZMWISK	Kostyantyn Zelensky	Ukraine	01-DEC-84
FJTUDISM	Norlan Heinz	Ukraine	01-NOV-99
RIEPZMCJ	James Bowen	Ukraine	01-DEC-94
WPEIDNSH	Kevin Love	United States	21-MAR-00
WYZMSNJ	Will Byers	United States	01-FEB-55
SLEODIFN	James Harden	United States	13-APR-88
PSIENDJS	Stephen Curry	United States	01-JUN-54
ENSHTAHQ	Lebron James	United States	04-JUN-89

Inserting...

Add a New Applicant

Applicant Number:

Applicant Name:

Nationality:

Birthday (DD-MM-YYYY, i.e., 01-DEC-2000):

After insertion...

View All Applicants

Retrieving data...

ApplicantID	NameOfApplicants	Nationality	DateOfBirth
12345	testName	Afghanistan	28-AUG-98
SICNFHDK	Xingrui Ma	China	01-JUN-00
ERIXNSJS	Qiang Li	China	01-AUG-08

IMPLEMENTATION IN *applicants.php*

```
function handleInsertRequest()
{
    global $db_conn;

    //Getting the values from user and insert data into the table
    $tuple = array(
        ":bind1" => $_POST['anumber'],
        ":bind2" => $_POST['aname'],
        ":bind3" => $_POST['country'],
        ":bind4" => $_POST['abirthday']
    );

    $alltuples = array(
        $tuple
    );

    executeBoundSQL("insert into Applicants values (:bind1, :bind2,
        :bind3, :bind4)", $alltuples);
    OCICommit($db_conn);
}
```

DELETION

SQL QUERY

```
DELETE FROM EmbassyConsulates WHERE ECID = $Var1
```

GUI RESULTS

Before deletion...

View all the Embassies & Consulates

[View](#)

Retrieving data...

ECID	Address	Country
DBOQ4348	Canada House, Trafalgar Sq, London SW1Y 5BJ	United Kingdom
RHPW1067	466 Lexington Ave 20th floor, New York, NY 10017	United States
EGHE3624	501 Pennsylvania Avenue, N.W., Washington, D.C.	United States
ECQR2462	1175 Peachtree Street N.E., Suite 1700, Atlanta, Georgia	United States
RHRU2471	Leipziger Platz 17, 10117 Berlin	Germany

View All the issued visas

[View](#)

Retrieving data...

VisaID	VisaType	ApplicationID	ECID
TETY1471	TOURIST	11111111	DBOQ4348
TQPX2910	TOURIST	44444444	RHPW1067
TREG2135	TOURIST	32524624	RHPW1067
TREG2134	TOURIST	32512353	RHPW1067
TREG2133	TOURIST	51236111	RHPW1067
AEYE2472	ASYLUM	66666666	EGHE3624
AXPQ2041	ASYLUM	77777777	ECQR2462
AFYW3933	ASYLUM	46246244	ECQR2462
AFYW3934	ASYLUM	62534351	ECQR2462
AFYW3034	ASYLUM	06104326	ECQR2462
WBEY1254	WORK	11111119	DBOQ4348
WICN4561	WORK	22222228	RHRU2471
WRYW2754	WORK	87346363	RHRU2471
WRYW2755	WORK	63133451	RHRU2471
WRYW0755	WORK	67777109	RHRU2471
SXTR5137	STUDENT	66666664	RHRU2471
SRYC2471	STUDENT	77777773	ECQR2462
SERE3452	STUDENT	02395923	ECQR2462
SERE3453	STUDENT	01453300	ECQR2462
SERE3450	STUDENT	61087321	ECQR2462

Deleting...

Delete Embassy/Consulate

Please use ECID to identity the embassy/consulate whose address you want to delete (*click "View" above to see all the ECIDs*).

Warning: deleting a embassy/consulate will delete all the visa records associated with the embassy/consulate!

ECID: RHPW1067

After deletion...

View all the Embassies & Consulates

Retrieving data...

ECID	Address	Country
DBOQ4348	Canada House, Trafalgar Sq, London SW1Y 5BJ	United Kingdom
EGHE3624	501 Pennsylvania Avenue, N.W., Washington, D.C.	United States
ECQR2462	1175 Peachtree Street N.E., Suite 1700, Atlanta, Georgia	United States
RHRU2471	Leipziger Platz 17, 10117 Berlin	Germany

View All the issued visas

[View](#)

Retrieving data...

VisaID	VisaType	ApplicationID	ECID
TETY1471	TOURIST	11111111	DBOQ4348
AEYE2472	ASYLUM	66666666	EGHE3624
AXPQ2041	ASYLUM	77777777	ECQR2462
AFYW3933	ASYLUM	46246244	ECQR2462
AFYW3934	ASYLUM	62534351	ECQR2462
AFYW3034	ASYLUM	06104326	ECQR2462
WBEY1254	WORK	11111119	DBOQ4348
WICN4561	WORK	22222228	RHRU2471
WRYW2754	WORK	87346363	RHRU2471
WRYW2755	WORK	63133451	RHRU2471
WRYW0755	WORK	67777109	RHRU2471
SXTR5137	STUDENT	66666664	RHRU2471
SRYC2471	STUDENT	77777773	ECQR2462
SERE3452	STUDENT	02395923	ECQR2462
SERE3453	STUDENT	01453300	ECQR2462
SERE3450	STUDENT	61087321	ECQR2462

IMPLEMENTATION in *embassy_consulates.php*

```
function handleDeleteRequest()
{
    global $db_conn, $deleteStatement;

    $ECIDToDelete = trim($_POST['ECIDToDelete']);

    $query = "DELETE FROM EmbassyConsulates WHERE ECID = '" . $ECIDToDelete . "'";

    executePlainSQL($query);

    $deleteStatement = "Delete the embassy/consulate with ECID: " . $ECIDToDelete;

    OCICommit($db_conn);
}
```

UPDATE

SQL Query

```
UPDATE Applicants SET $AttrX = $Var1 WHERE ApplicantID = $Var2
```

GUI RESULTS

Before updating...

View All Applicants

Retrieving data...

ApplicantID	NameOfApplicants	Nationality	DateOfBirth
QOXQMDHO	Yitang Zhang	China	01-AUG-96
SICNFHDK	Xingrui Ma	China	01-JUN-00
ERIXNSJS	Qiang Li	China	01-AUG-08

Updating Name of Applicants...

Update Name in Applicants

Please identify the applicants whose information you want to update by ApplicantID

ApplicantID:

New Value:

After updating...

View All Applicants

[View](#)

Retrieving data...

ApplicantID	NameOfApplicants	Nationality	DateOfBirth
QOXQMDHO	testName	China	01-AUG-96
SICNFHDK	Xingrui Ma	China	01-JUN-00
ERIXNSJS	Qiang Li	China	01-AUG-08

Updating Date of Birth...

Update Name in Applicants

Please identify the applicants whose information you want to update by ApplicantID

ApplicantID:

New Value:

[Update](#)

After Updating Date of Birth...

View All Applicants

[View](#)

Retrieving data...

ApplicantID	NameOfApplicants	Nationality	DateOfBirth
QOXQMDHO	testName	China	02-MAY-88
SICNFHDK	Xingrui Ma	China	01-JUN-00
ERIXNSJS	Qiang Li	China	01-AUG-08

Updating nationality...

Update Name in Applicants

Please identify the applicants whose information you want to update by ApplicantID

ApplicantID: QOXQMDHO

New Value: A country

After updating nationality...

View All Applicants

Retrieving data...

ApplicantID	NameOfApplicants	Nationality	DateOfBirth
QOXQMDHO	testName	A country	02-MAY-88
ERIXNSJS	Qiang Li	China	01-AUG-08
XIEJABCG	Leji Zhao	China	01-SEP-13

IMPLEMENTATION IN *applicants.php*

```
function handleUpdateRequest()
{
    global $db_conn;

    $ApplicantID = $_POST['ApplicantID'];
    $newValue = $_POST['newValue'];
    $UpdateOptions = $_POST['UpdateOptions'];

    if ($UpdateOptions == "Update name") {
        $UpdateOptions = "NameOfApplicants";
    } else if ($UpdateOptions == "Update DateOfBirth") {
        $UpdateOptions = "DateOfBirth";
    } else if ($UpdateOptions == "Update Nationality") {
        $UpdateOptions = "Nationality";
    }

    // UPDATE
    executePlainSQL("UPDATE Applicants SET " .
        $UpdateOptions . " = '" . $newValue .
        "' WHERE ApplicantID ='" . $ApplicantID . "'");
    OCICommit($db_conn);
}
```

SELECTION

SQL Query

```
SELECT $Attr1, $Attr2, . . . , $AttrN  
FROM $TableX, VisaFromIssue  
WHERE VisaFromIssue.$AttrX = $Var AND  
$TableX.VisaID = VisaFromIssue.VisaID
```

GUI RESULTS

Search for visa:

Choose a visa:

Select the column names of the table (*please select at least one*):

VisalD ApplicationID ECID

Search by: Input:

Retrieving data...

VisalD	ECID	Reason
AEYE2472	EGHE3624	Famine

IMPLEMENTATION IN *issued_visas.php*

```

function handleSearchRequest()
{
    global $db_conn, $viewSelectedStatement, $numOfColumns;

    checkColumnNum();

    $visa = trim($_POST['visa']);
    $attribute = trim($_POST['attribute']);
    $searchItem = trim($_POST['searchItem']);
    $input = trim($_POST['input']);

    $result = executePlainSQL(searchQueryGenerator());

    $viewSelectedStatement = printSelectedTuples($result);
}

function handleCountRequest()
{
    global $db_conn, $countAllStatement;

    $result = executePlainSQL("SELECT Count(*) FROM VisaFromIssue");
    if (($row = oci_fetch_row($result)) != false) {
        $countAllStatement = $countAllStatement . "<br> The total number of issued visas is: " . $row[0] . "<br>";
    }
}

```

```

function searchQueryGenerator()
{
    global $columns;
    $query = "SELECT DISTINCT";

    foreach($columns as $x => $column) {
        if (!empty($column)) {
            $query .= " " . $column . ",";
        }
    }

    $query = substr($query, 0, -1);
    $visa = trim($_POST['visa']);
    $searchItem = trim($_POST['searchItem']);
    $input = trim($_POST['input']);

    if ($visa == "TouristVisa") {
        $query .= ",Destination FROM " . $visa. " v, VisaFromIssue vf WHERE v.VisaID=vf.VisaID AND vf." . $searchItem. " = '" . $input. "'";
    } else if ($visa == "AsylumRefugeeVisa") {
        $query .= ",Reason FROM " . $visa. " v, VisaFromIssue vf WHERE v.VisaID=vf.VisaID AND vf." . $searchItem. " = '" . $input. "'";
    } else if ($visa == "WorkVisaSponsoredBy") {
        $query .= ",WorkType,InstitutionID FROM " . $visa. " v, VisaFromIssue vf WHERE v.VisaID=vf.VisaID AND vf." . $searchItem. " = '" . $input. "'";
    } else if ($visa == "StudentVisaVerifiedBy") {
        $query .= ",StudyLevel,InstitutionID FROM " . $visa. " v, VisaFromIssue vf WHERE v.VisaID=vf.VisaID AND vf." . $searchItem. " = '" . $input. "'";
    }
}

return $query;
}

```

PROJECTION

SQL Query

```

SELECT $Attr1, $Attr2, . . . , $AttrN
FROM Holds, Applicants
WHERE Holds.ApplicantID = Applicants.ApplicantID

```

GUI RESULTS

View All Visa-Holders

Select the column names of the table (*please select at least one*):

ApplicantID Name Nationality VisaID Issue Date Expiration Date

View

Retrieving data...

ApplicantID	Name	Nationality	Issue Date
WPSMZKSJ	Shinichi Mochizuki	Japan	12-OCT-13
QISMZKLP	Jingping Xi	China	12-OCT-10
QOXQMDHO	Yitang Zhang	China	12-OCT-12
SJZMWISK	Kostyantyn Zelensky	Ukraine	12-OCT-14
QKXMSNAM	Quinn Holmquist	Haiti	12-OCT-11

IMPLEMENTATION IN *holders.php*

```
function handleViewAllHolderRequest()
{
    global $db_conn, $viewAllHolderStatement, $numOfColumns;

    checkColumnNum();

    if ($numOfColumns != 0) {
        $result = executePlainSQL(holderQueryGenerator());
        $viewAllHolderStatement = printHolderTuples($result);
    } else {
        $viewAllHolderStatement = "ERROR: Please select at least one column name!";
    }
}

function holderQueryGenerator()
{
    global $columns;
    $query = "SELECT DISTINCT";

    foreach($columns as $x => $column) {
        if (!empty($column)) {
            $query .= " " . $column . ",";
        }
    }

    $query = substr($query, 0, -1);
    $query .= " FROM Holds, Applicants WHERE Holds.ApplicantID = Applicants.ApplicantID";

    return $query;
}
```

JOIN

SQL QUERY

```
SELECT H.VisaID, A.ApplicantID, A.NameOfApplicants,
       T.Destination, T.Departure, T.TimeOfTravel
  FROM Applicants A, Holds H, TravelHistoryRecordsTravelsBy T, InOut I
 WHERE A.ApplicantID = H.ApplicantID AND
       H.VisaID = T.VisaID AND
       T.Destination = I.Destination AND
       T.Departure = I.Departure AND
       T.VisaID = $Var1 AND
       I.InOut = $Var2
```

GUI RESULTS

Check Travel History

Please use VisaID to identify the individual whose travel history you want to see (*click "View" above for VisaIDs*).

VisaID: Filtered by inbound/outbound:

Retrieving data...

VisaID	ApplicantID	Name	Destination	Departure	Time Stamp
TETY1471	QOXQMDHO	Yitang Zhang	Canada	US	06-DEC-12 02.34.56.035000 PM
TETY1471	QOXQMDHO	Yitang Zhang	US	Canada	28-DEC-12 09.23.22.453000 AM
TETY1471	QOXQMDHO	Yitang Zhang	Canada	US	05-DEC-13 12.23.11.123500 PM
TETY1471	QOXQMDHO	Yitang Zhang	US	Canada	27-DEC-13 07.10.11.456600 AM

Check Travel History

Please use VisaID to identify the individual whose travel history you want to see (*click "View" above for VisaIDs*).

VisaID: Filtered by inbound/outbound:

Retrieving data...

VisaID	ApplicantID	Name	Destination	Departure	Time Stamp
TETY1471	QOXQMDHO	Yitang Zhang	Canada	US	06-DEC-12 02.34.56.035000 PM
TETY1471	QOXQMDHO	Yitang Zhang	Canada	US	05-DEC-13 12.23.11.123500 PM

IMPLEMENTATION in *holders.php*

```
function handleCheckTravelTupleRequest()
{
    global $db_conn, $viewTravelStatement;

    $VisaID = trim($_POST['VisaID']);
    $InOut = $_POST['InOut'];
    $query = "";
    if ($InOut == -1) {
        $query = "SELECT H.VisaID, A.ApplicantID, A.NameOfApplicants,
                    T.Destination, T.Departure, T.TimeOfTravel
                FROM Applicants A, Holds H,
                    TravelHistoryRecordsTravelsBy T, InOut I
                WHERE A.ApplicantID = H.ApplicantID AND
                    H.VisaID = T.VisaID AND
                    T.Destination = I.Destination AND
                    T.Departure = I.Departure AND
                    T.VisaID = '" . $VisaID . "'";
    } else {
        $query = "SELECT H.VisaID, A.ApplicantID, A.NameOfApplicants,
                    T.Destination, T.Departure, T.TimeOfTravel
                FROM Applicants A, Holds H,
                    TravelHistoryRecordsTravelsBy T, InOut I
                WHERE A.ApplicantID = H.ApplicantID AND
                    H.VisaID = T.VisaID AND
                    T.Destination = I.Destination AND
                    T.Departure = I.Departure AND
                    T.VisaID = '" . $VisaID . "' AND
                    I.InOut = '" . $InOut;
    }

    $result = executePlainSQL($query);
    $viewTravelStatement = printTravelTuples($result);
}
```

AGGREGATION WITH GROUP BY

SQL QUERY

```
SELECT Nationality, FLOOR(AVG((CURRENT_DATE - DateOfBirth)/365))
FROM Applicants
GROUP BY Nationality
```

GUI RESULTS

View average age of applicants from each country

[View](#)

Nationality	Average age
China	49
Haiti	50
Japan	48
Ukraine	29
United States	45

IMPLEMENTATION IN *applicants.php*

```
function handleGroupByRequest()
{
    global $db_conn, $viewGroupByStatement;

    // GROUP BY having
    $result = executePlainSQL("SELECT Nationality, COUNT(*) FROM Applicants
    WHERE (CURRENT_DATE - DateOfBirth)/365 > 50 group by nationality HAVING COUNT(*) > 0 ORDER BY Nationality");

    $viewGroupByStatement = printGroupByTuples($result);
}
```


AGGREGATION WITH HAVING

SQL QUERY

```
SELECT Nationality, COUNT(*)
FROM Applicants
WHERE (CURRENT_DATE - DateOfBirth)/365 > 50
group by nationality
HAVING COUNT(*) > 0
```

GUI RESULTS

Find the country having applicants older than 50 years old

[View](#)

Nationality	Count of People older than 50
China	4
Haiti	3
Japan	1
United States	2

IMPLEMENTATION IN *applicants.php*

```
function handleGroupByRequest()
{
    global $db_conn, $viewGroupByStatement;

    // GROUP BY having
    $result = executePlainSQL("SELECT Nationality, COUNT(*) FROM Applicants
    WHERE (CURRENT_DATE - DateOfBirth)/365 > 50 group by nationality HAVING COUNT(*) > 0 ORDER BY Nationality");

    $viewGroupByStatement = printGroupByTuples($result);
}
```

NESTED AGGREGATION WITH GROUP BY

SQL QUERY

```
SELECT A.Nationality, FLOOR(AVG((CURRENT_DATE - A.DateOfBirth)/365))
FROM Applicants A
GROUP BY A.Nationality
HAVING 3 < (SELECT COUNT(*)
               FROM Applicants A2
              WHERE A.Nationality = A2.Nationality)
```

GUI RESULTS

Find the applicants average age in countries having more than 3 applicants

[View](#)

Nationality	Average age
Haiti	50
United States	45
China	49

IMPLEMENTATION IN *applicants.php*

```
function handleNestedRequest()
{
    global $db_conn, $viewNestedStatement;

    // GROUP BY NESTED
    $result = executePlainSQL("SELECT A.Nationality, FLOOR(AVG((CURRENT_DATE - A.DateOfBirth)/365))
                             FROM Applicants A GROUP BY A.Nationality HAVING 3 < (SELECT COUNT(*) FROM Applicants A2 WHERE A.Nationality = A2.Nationality)");

    $viewNestedStatement = printAverageTuples($result);
}
```

DIVISION

SQL QUERY

```
SELECT *
FROM Applicants A
WHERE NOT EXISTS ( SELECT V1.VisaType
                     FROM VisaFromIssue V1
                     MINUS
                     ( SELECT V2.VisaType
                       FROM Creates C, VisaFromIssue V2
                      WHERE A.ApplicantID = C.ApplicantID AND
                            C.ApplicationID = V2.ApplicationID))
```

GUI RESULTS

Find the applicants who have successfully applied for all 4 types of visa

[View](#)

ApplicantID	Name	Nationality	Date of Birth
WPSMZKSJ	Shinichi Mochizuki	Japan	01-AUG-35
XISMALPQ	Naruto Uzumaki	Japan	27-AUG-99
WPEIDNSH	Kevin Love	United States	21-MAR-00

IMPLEMENTATION IN *applicants.php*

```
function handleDivisionRequest()
{
    global $db_conn, $viewDivisionStatement;

    $query = "  SELECT *
                FROM Applicants A
                WHERE NOT EXISTS (  SELECT V1.VisaType
                                        FROM VisaFromIssue V1
                                        MINUS
                                        (  SELECT V2.VisaType
                                            FROM Creates C, VisaFromIssue V2
                                            WHERE A.ApplicantID = C.ApplicantID AND
                                                C.ApplicationID = V2.ApplicationID
                                         ) )";

    $result = executePlainSQL($query);

    $viewDivisionStatement = printDivisionTuples($result);
}
```