

Relational Model

Resident (Health Insurance Number, Date of registration, gender, date of birth, rname, priority group, phone, address)

Nurse (license number, nname, employer)

Employer is the foreign key referncing vaccination venues

Vaccination Venue (vname , address, zip code, city)

Day (vname, date, number of available vaccines)

vname is the foreign key referencing vaccination venues

Vaccine Type (Manufacturer, No. of required doses)

Batch (Manufacturer, Batch No., manufacturing date, expiry date)

Manufacturer is the foreign key referencing vaccine types

Vial (Manufacturer, Batch No., Vial No.)

Batch No. and manufacturer together is the foreign key referencing batches

Nurse assignment(goes to) (license number, vname, date)

license number is the foreign key referencing nurses

date and vname together is the foreign key referencing days

Batch assignment(sends to) (Manufacturer, Batch No., vname, date)

Manufacturer and Batch No. together is the foreign key referencing batches

Vname is the foreign key referencing days

Vaccination_Slot (license number, Health Insurance Number, Manufacturer, Batch No., Vial No., vname, date, time interval, room number)

license number is the foreign key referencing nurses

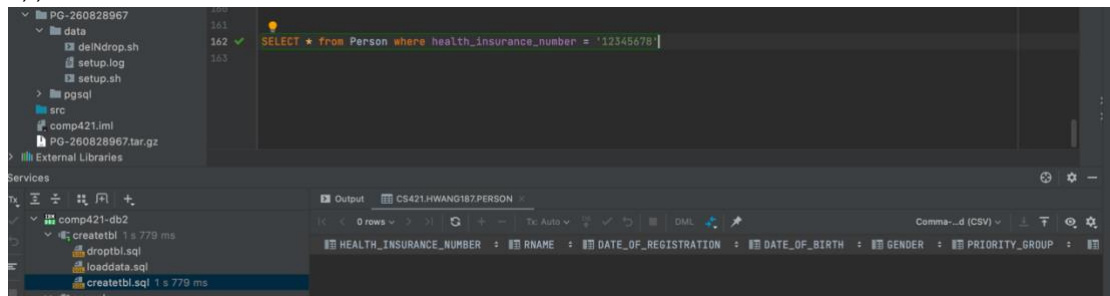
Health Insurance Number is the foreign key referencing residents

Manufacturer, Batch No., and Vial No. together is the foreign key referencing vials

vname, date, time interval, room number together is the foreign key referencing vaccination slots.

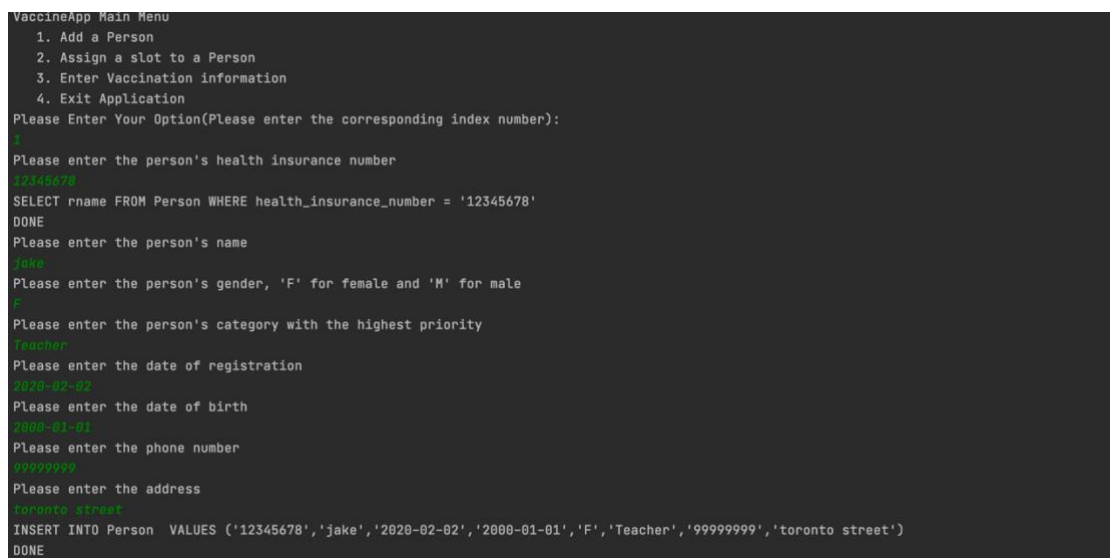
For better visualization when grading, all sql commands called by the java program are printed out when they get called.

a)i)



The screenshot shows an IDE with a project named 'PG-260828967'. The 'src' folder contains files like 'comp421.iml', 'PG-260828967.tar.gz', and 'External Libraries'. The 'data' folder contains 'delDrop.sh', 'setup.log', 'setup.sh', 'pgsql', 'src', 'comp421.iml', and 'PG-260828967.tar.gz'. The 'Services' panel shows 'comp421-db2' with a 'createTbl.sql' file. The 'Output' panel shows the command 'SELECT * from Person where health_insurance_number = '12345678''.

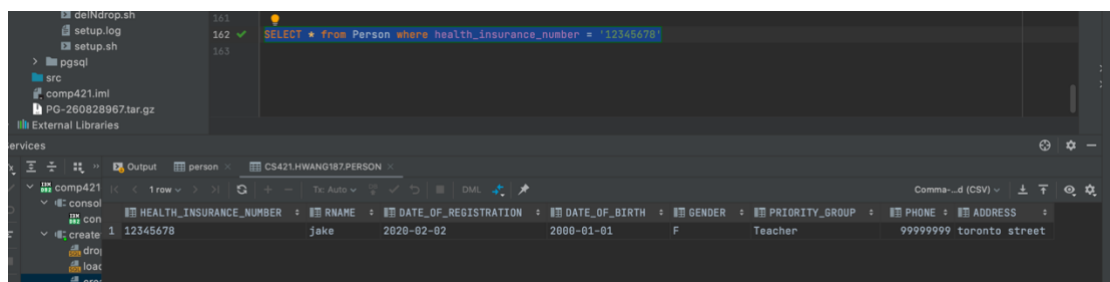
ii)



The screenshot shows a terminal window with the following output:

```
VaccineApp Main Menu
1. Add a Person
2. Assign a slot to a Person
3. Enter Vaccination information
4. Exit Application
Please Enter Your Option(Please enter the corresponding index number):
1
Please enter the person's health insurance number
12345678
SELECT rname FROM Person WHERE health_insurance_number = '12345678'
DONE
Please enter the person's name
jake
Please enter the person's gender, 'F' for female and 'M' for male
F
Please enter the person's category with the highest priority
Teacher
Please enter the date of registration
2020-02-02
Please enter the date of birth
2000-01-01
Please enter the phone number
999999999
Please enter the address
toronto street
INSERT INTO Person VALUES ('12345678','jake','2020-02-02','2000-01-01','F','Teacher','999999999','toronto street')
DONE
```

iii)

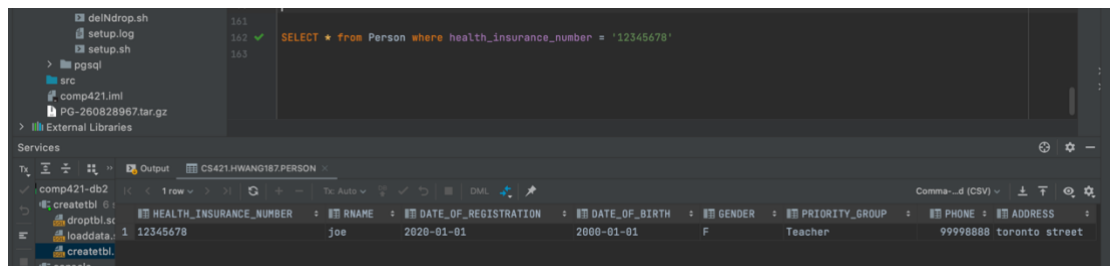


The screenshot shows an IDE with a project named 'PG-260828967'. The 'src' folder contains files like 'comp421.iml', 'PG-260828967.tar.gz', and 'External Libraries'. The 'Services' panel shows 'comp421-db2' with a 'createTbl.sql' file. The 'Output' panel shows the command 'SELECT * from Person where health_insurance_number = '12345678''.

iv)

```
1. Add a Person
2. Assign a slot to a Person
3. Enter Vaccination information
4. Exit Application
Please Enter Your Option(Please enter the corresponding index number):
1
Please enter the person's health insurance number
12345678
SELECT rname FROM Person WHERE health_insurance_number = '12345678'
DONE
Please enter the person's name
joe
Please enter the person's gender, 'F' for female and 'M' for male
Teacher
Please enter the date of registration
2020-01-01
Please enter the date of birth
2000-1-01
Please enter the phone number
99998888
Please enter the address
toronto street
INSERT INTO Person VALUES ('12345678','joe','2020-01-01','2000-1-01','F','Teacher','99998888','toronto street')
DONE
```

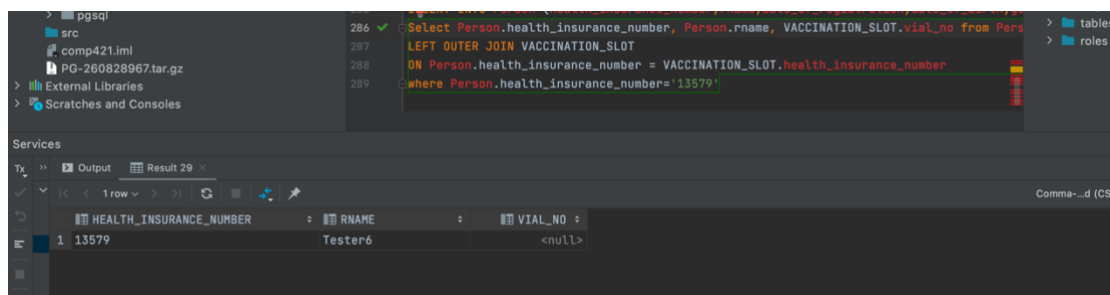
v)



The screenshot shows a database IDE with a file explorer on the left containing files like delNdrops.sh, setup.log, setup.sh, pgsql, src, comp421.iml, and PG-260828967.tar.gz. The main editor displays a SQL query: `SELECT * from Person where health_insurance_number = '12345678'`. Below the editor, the 'Services' panel shows the query results in a table with columns: HEALTH_INSURANCE_NUMBER, RNAME, DATE_OF_REGISTRATION, DATE_OF_BIRTH, GENDER, PRIORITY_GROUP, PHONE, and ADDRESS. The results table contains one row with the following values: 12345678, joe, 2020-01-01, 2000-01-01, F, Teacher, 99998888, and toronto street.

HEALTH_INSURANCE_NUMBER	RNAME	DATE_OF_REGISTRATION	DATE_OF_BIRTH	GENDER	PRIORITY_GROUP	PHONE	ADDRESS
12345678	joe	2020-01-01	2000-01-01	F	Teacher	99998888	toronto street

b)i)



The screenshot shows a database IDE with a file explorer on the left containing files like pgsql, src, comp421.iml, and PG-260828967.tar.gz. The main editor displays a SQL query: `Select Person.health_insurance_number, Person.rname, VACCINATION_SLOT.vial_no from Pers LEFT OUTER JOIN VACCINATION_SLOT ON Person.health_insurance_number = VACCINATION_SLOT.health_insurance_number where Person.health_insurance_number='13579'`. Below the editor, the 'Services' panel shows the query results in a table with columns: HEALTH_INSURANCE_NUMBER, RNAME, and VIAL_NO. The results table contains one row with the following values: 13579, Tester6, and <null>.

HEALTH_INSURANCE_NUMBER	RNAME	VIAL_NO
13579	Tester6	<null>

ii)

```

VaccineApp Main Menu
1. Add a Person
2. Assign a slot to a Person
3. Enter Vaccination information
4. Exit Application
Please Enter Your Option(Please enter the corresponding index number):
1
Please enter the person's health insurance number
13579
SELECT manufacturer from Vaccination_Slot WHERE health_insurance_number = '13579' and manufacturer IS NOT NULL

Please enter the vaccination venue name
CHUM
Please enter the date of the slot in the format of yyyy-MM-dd
2021-04-07
Please enter the starting time of the slot in the format of (hour:minute) in 24h
08:00
Please enter the ending time of the slot in the format of (hour:minute) in 24h
09:00
Please enter the room number of the slot
409
SELECT vname,date,start_time,end_time,room_number FROM Vaccination_Slot WHERE vname = 'CHUM'and date ='2021-04-07'and start_time = '08:00'and end_time ='09:00'and
health_insurance_number IS NOT NULL
DONE
UPDATE Vaccination_Slot SET health_insurance_number = '13579' WHERE vname = 'CHUM'and date ='2021-04-07'and start_time = '08:00'and end_time ='09:00'
DONE
DONE

```

iii)

The screenshot shows a PostgreSQL IDE with a query window and a results window. The query window contains the following SQL query:

```

Select * from VACCINATION_SLOT where health_insurance_number = '13579'

```

The results window displays the following table:

LICENSE_NUMBER	HEALTH_INSURANCE_NUMBER	MANUFACTURER	BATCH_NO	VIAL_NO	VNAME	DATE	START_TIME	END_TIME	ROOM_NUMBER
1	13579	<null>	<null>	<null>	CHUM	2021-04-07	08:00:00	09:00:00	409

iv)

```

VaccineApp Main Menu
1. Add a Person
2. Assign a slot to a Person
3. Enter Vaccination information
4. Exit Application
Please Enter Your Option(Please enter the corresponding index number):
2
Please enter the person's health insurance number
24680
SELECT manufacturer from Vaccination_Slot WHERE health_insurance_number = '24680' and manufacturer IS NOT NULL

Please enter the vaccination venue name
CHUM
Please enter the date of the slot in the format of yyyy-MM-dd
2021-04-07
Please enter the starting time of the slot in the format of (hour:minute) in 24h
08:00
Please enter the ending time of the slot in the format of (hour:minute) in 24h
09:00
Please enter the room number of the slot
409
SELECT vname,date,start_time,end_time,room_number FROM Vaccination_Slot WHERE vname = 'CHUM'and date ='2021-04-07'and start_time = '08:00'and end_time ='09:00'and
health_insurance_number IS NOT NULL
This slot has already been assigned!

```

v)

The screenshot shows a PostgreSQL IDE with a query window and a results window. The query window contains the following SQL query:

```

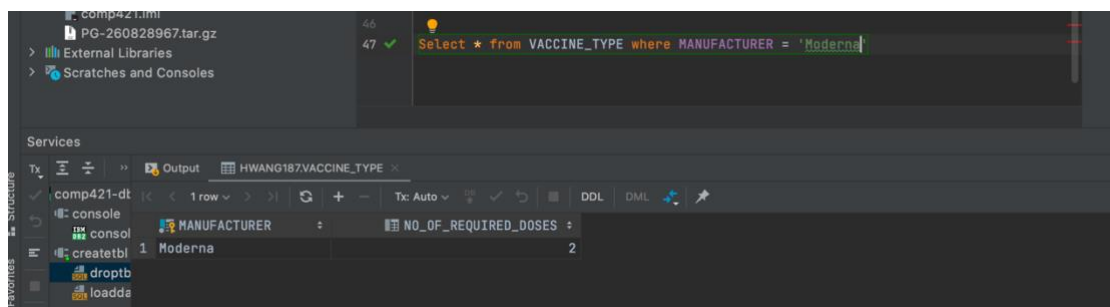
Select * from VACCINATION_SLOT where health_insurance_number = '13579' or health_insurance_number = '24680'

```

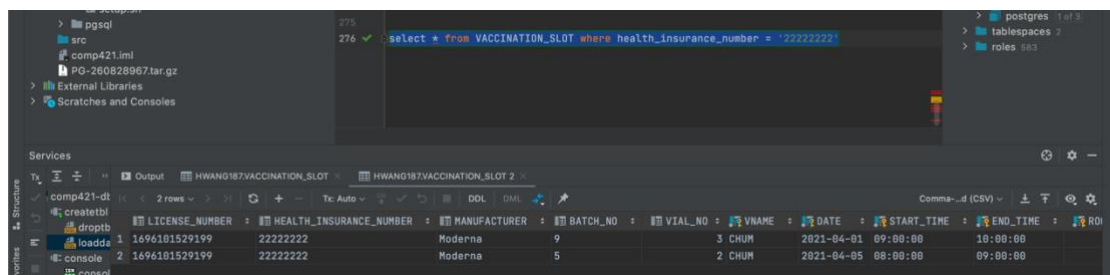
The results window displays the following table:

LICENSE_NUMBER	HEALTH_INSURANCE_NUMBER	MANUFACTURER	BATCH_NO	VIAL_NO	VNAME	DATE	START_TIME	END_TIME	ROOM_NUMBER
1	<null>	13579	<null>	<null>	CHUM	2021-04-07	08:00:00	09:00:00	409

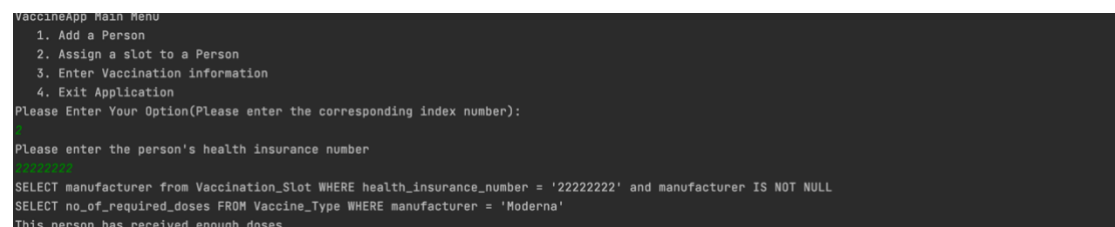
c)i)



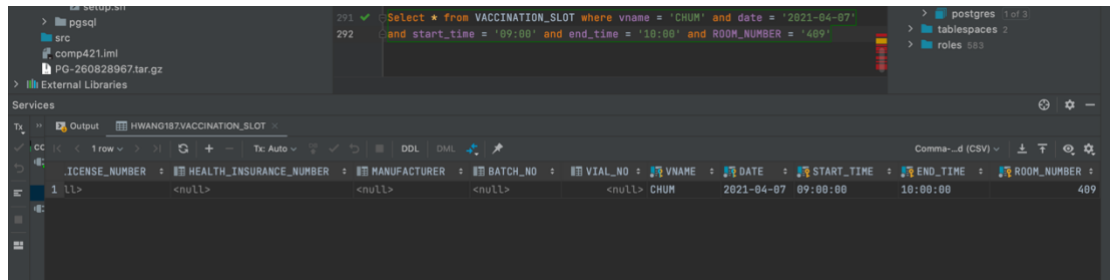
ii)



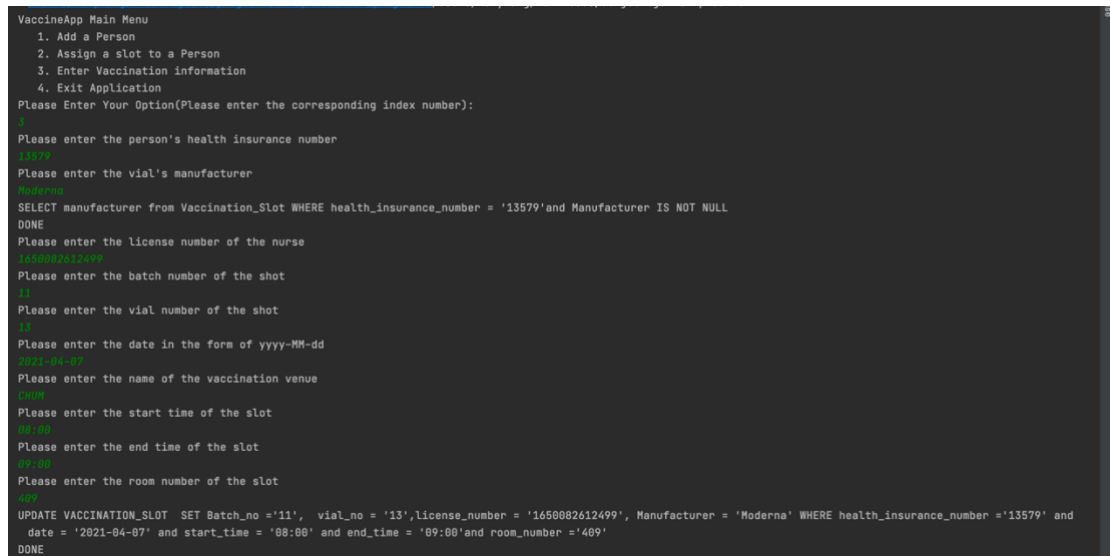
iii)



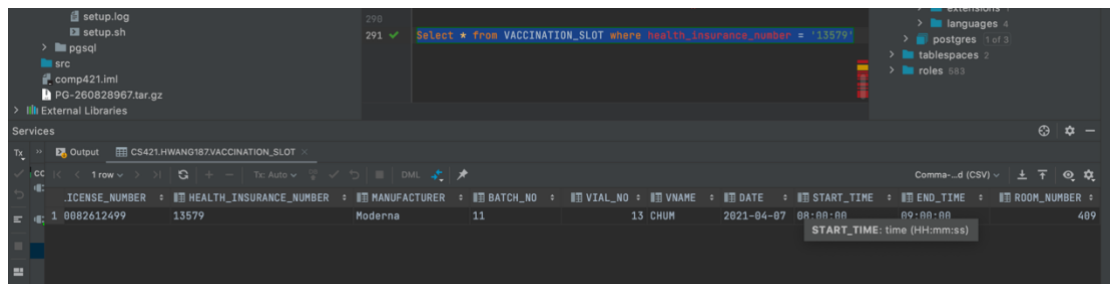
iv)



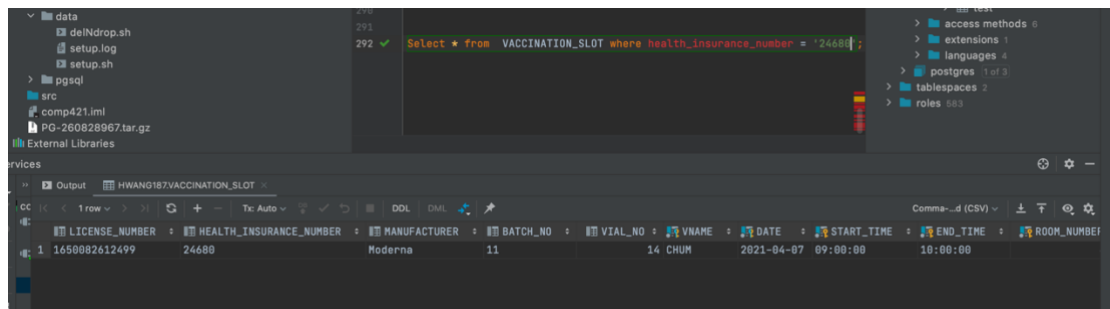
d)i)



ii)



e)i)



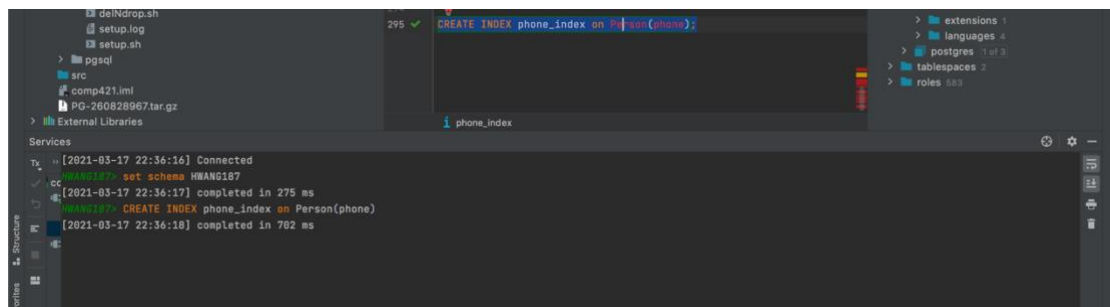
ii)

```
VaccineApp Main Menu
1. Add a Person
2. Assign a slot to a Person
3. Enter Vaccination information
4. Exit Application
Please Enter Your Option(Please enter the corresponding index number):
3
Please enter the person's health insurance number
24680
SELECT manufacturer from Vaccination_Slot WHERE health_insurance_number = '24680' and manufacturer IS NOT NULL
SELECT no_of_required_doses FROM Vaccine_Type WHERE manufacturer = 'Moderna'
DONE
Please enter the vaccination venue name
CHUM
Please enter the date of the slot in the format of yyyy-MM-dd
2021-04-07
Please enter the starting time of the slot in the format of (hour:minute) in 24h
09:00
Please enter the ending time of the slot in the format of (hour:minute) in 24h
10:00
Please enter the room number of the slot
14
SELECT vname,date,start_time,end_time,room_number FROM Vaccination_Slot WHERE vname = 'CHUM'and date ='2021-04-08'and start_time = '08:00'and end_time ='09:00'and
health_insurance_number IS NOT NULL
DONE
UPDATE Vaccination_Slot SET health_insurance_number = '24680' WHERE vname = 'CHUM'and date ='2021-04-08'and start_time = '08:00'and end_time ='09:00'
DONE
DONE
```

iii)

```
VaccineApp Main Menu
1. Add a Person
2. Assign a slot to a Person
3. Enter Vaccination information
4. Exit Application
Please Enter Your Option(Please enter the corresponding index number):
3
Please enter the person's health insurance number
24680
Please enter the vial's manufacturer
Pfizer-BioNTech
SELECT manufacturer from Vaccination_Slot WHERE health_insurance_number = '24680'and Manufacturer IS NOT NULL
Moderna
The manufacturer you entered is not the same as the person's first dose. The first does is made byModerna
```

3. Indexing



This index will be about the same as index directly on the primary key(insurance number). This is because the phone number is also unique to each person, just like insurance number. In real-life situations, using the phone number might be worse. Because a person can have multiple phone numbers, he/she can also change his/her phone number. Some person might not even have phone numbers. But a person must have a unique health insurance number that never changes.

4. Data Analytics

