INVENTION MANAGEMENT SYSTEM

Submitted By
M Prabhath(u4cse17312)
Sasank v(u4cse17347)
Harshith s(u4cse17305)
Abhishek (u4cse17357)

ABSTRACT

Invention Management system, basically it keeps a note of all the inventions and it acts like a dictionary to anyone who wants to track information about any invention, inventor. And also other details like Awards and Patents achieved for a particular work, classifying the inventions into different fields so that user can access all inventions related to a field by searching a keyword.

The Logical level or the Conceptual level contains all the Database queries.

The main entities in the logical level:

- **Inventions:** This contains all the details that are related to inventions like invention id, invention name, year in which it is invented.
- **Inventor:** This contains the inventor id, inventor name, nationality and date of birth.
- **Awards:** This contains the details of the award like award name, award id and the prize money
- **Patents:** All the patents are listed with patent id, patent name.
- **Fields:** This is used to classify inventions into different fields, and the Field name.

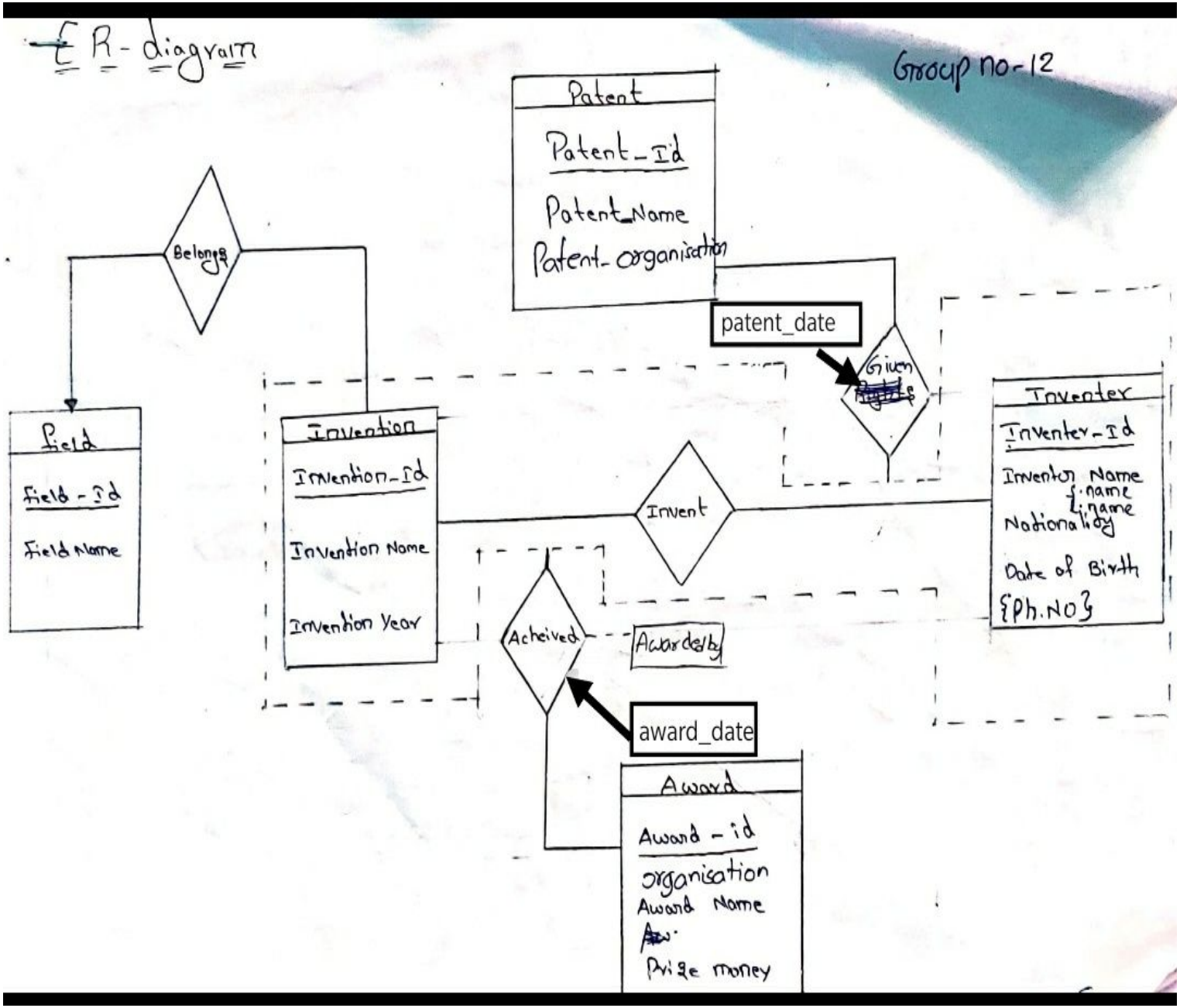
The relation between inventions and the Inventor is many to many. There is an aggregate relationship between inventions, inventor and awards, named achieved. There is an aggregate relationship between Inventor, inventions and patent, named as given. There is a many to one relationship between inventions and fields.

M Prabhath(u4cse17312)
Sasank v(u4cse17347)
Harshith s(u4cse17305)
Abhishek (u4cse17357)

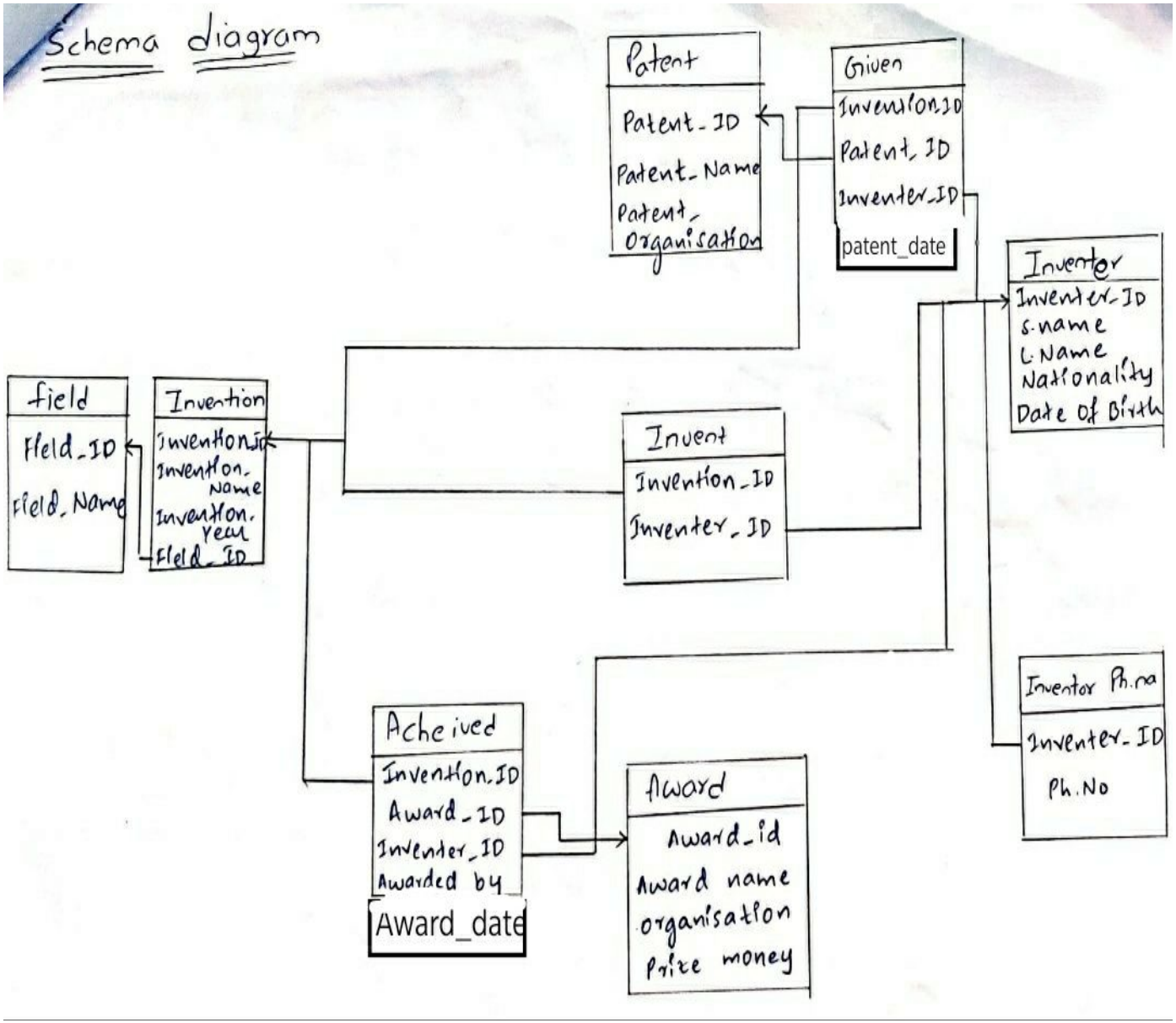
E-R Diagram

E R - diagram

Group no-12



Schema Diagram


Schema diagram
Patent
Patent_ID
Patent_Name
Patent_Organisation
Given
Inventor_ID
Patent_ID
Inventer_ID
patent_date
Inventor
Inventer_ID
s.name
L.Name
Nationality
Date Of Birth
field
Field_ID
Field_Name
Invention
Invention_id
Invention_Name
Invention_Year
Field_ID
Invent
Invention_ID
Inventer_ID
Inventor Ph.no
Inventer_ID
Ph.No
Acheived
Invention_ID
Award_ID
Inventer_ID
Awarded by
Award_date
Award
Award_id
Award name
organisation
Prize money

Relational Schema

Field(field_id , field_name)

Invention(invention_id , invention_name , invention_year , field_id)

Invent(invention_id , inventer_id)

Inventor(inventor_id , fname, lname , nationality , date_of_birth)

Given(patent_id , invention_id , inventer_id , patent_date)

Acheived(invention_id , award_id , inventer_id , awarded_by , award_date)

Patent(patent_id , patent_name , patent_organization)

Award(award_id , award_name , organization , prize_money)

InventorPhoneNo(Inventor_Id, Phone_no)

Normalisation

Observations

Field_id	Unique identifier i.e primary key that is assigned to each Field, it can't be null
Field_Name	Name of The field
Invention_id	Unique identifier i.e primary key that is assigned to each Invention, it can't be null
Invention_Name	Name of the Invention

Invention_Year	Year in which the invention is made
Inventor_id	Unique identifier i.e primary key that is assigned to each Inventor, it can't be null
F.Name	First Name of the Inventor
L.Name	Last Name of the Inventor
Nationality	Country to which the Inventor belongs to

Date_Of _Birth	Date of Birth of the Inventor
Phone_No	Phone No of the Inventor
Patent_Id	Unique identifier i.e primary key that is assigned to each Patent, it can't be null
Patent_Name	Name of the patent
Award_id	Unique identifier i.e primary key that is assigned to each Field, it can't be null

Award_Name	Name of the award
Organisation	Organisation that gave this award
Prize_Money	Prize Money that is being awarded along with the Award
Awarded_By	By whom the award was Awarded by

Justification

1NF : -

1. columns with multivalues are eliminated by adding the equivalent rows.
2. By the end it is made sure that every value in the table is atomic
3. Functional dependencies are identified

2NF :-

1)After making sure that the table is in 1NF

2) new tables are created so that in the tables created each non key attribute is dependent on key attribute so that partial dependencies are eliminated

3)New tables are formed for multivalued attributes

3NF:-

1. Transitive dependencies are identified
2. Created separate tables wherever there was transitive dependency

Comparison with old ER diagram

The tables after the Normalisation are Similar to ER Diagram along with some relations taken as tables, Normalisation and ER Diagrams are two Different

Queries

DDL Statements:

Create table Award(Award_Id varchar(10), Award_Name varchar (20), Organization varchar(10), Prize_Money numeric (11,2), primary key(Award_id));

Create table Inventor(Inventor_Id varchar (10), Fname varchar (25), Lname varchar (25), Nationality varchar(15), Date_Of_Birth date, primary key(Inventor_Id));

create table Field(Field_Id varchar(5), Field_Name varchar(15), primary key(Field_Id));

create table Invention(Invention_Id varchar(5), Invention_Name varchar(20),Invention_year numeric(4,0),field_id varchar(10), primary key(Invention_Id), foreign key(field_id) references field);

create table inventorPhoneNo(Inventor_id varchar(10),Phone_No numeric(10,0), foreign key(Inventor_id) references Inventor);

```
create table patent(Patent_id varchar(5), patent_Name
varchar(20), Patent_organisation varchar(20), primary
key(Patent_id));

create table Invent(Invention_Id varchar(5) not
null,Inventor_Id varchar(10) not null,foreign
key(Invention_Id) references Invention,primary key
(Invention_Id,Inventor_Id),foreign key(Inventor_Id)
references Inventor);

create table given (Invention_Id varchar(5), Inventor_Id
varchar(10),Patent_id varchar(5),foreign
key(Invention_Id,Inventor_Id) references Invent,foreign
key(patent_id) references patent);

create table Acheived(Invention_Id varchar(5), Inventor_Id
varchar(10),Award_Id varchar(10),Awarded_By
varchar(20),foreign key(Invention_Id,Inventor_Id)
references Invent,foreign key(Award_Id) references
Award);

Alter table Acheived add column award_date date;

Alter table given add column patent_date date;
```

DML statements:

insert into field values('f1','Physics');

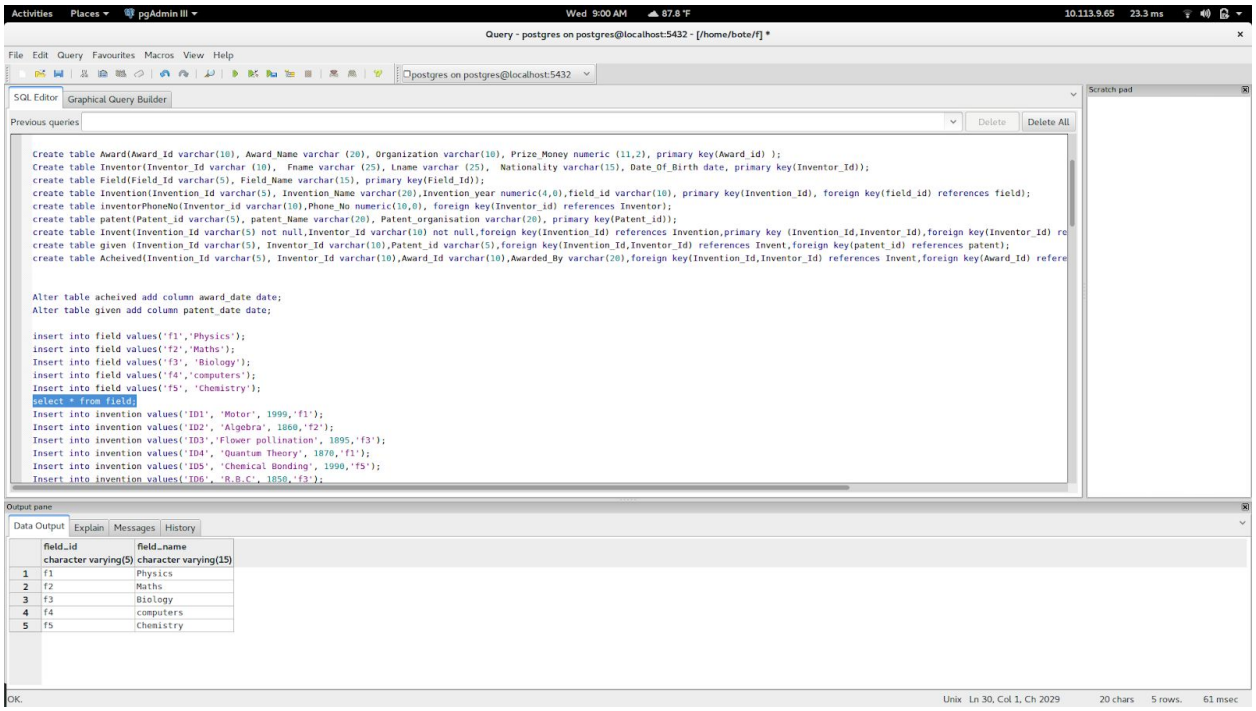
insert into field values('f2','Maths');

Insert into field values('f3', 'Biology');

insert into field values('f4','computers');

Insert into field values('f5', 'Chemistry');

select * from field;



Insert into invention values('ID1', 'Motor', 1999,'f1');

Insert into invention values('ID2', 'Algebra', 1860,'f2');

Insert into invention values('ID3','Flower pollination', 1895,'f3');

Insert into invention values('ID4', 'Quantum Theory', 1870,'f1');

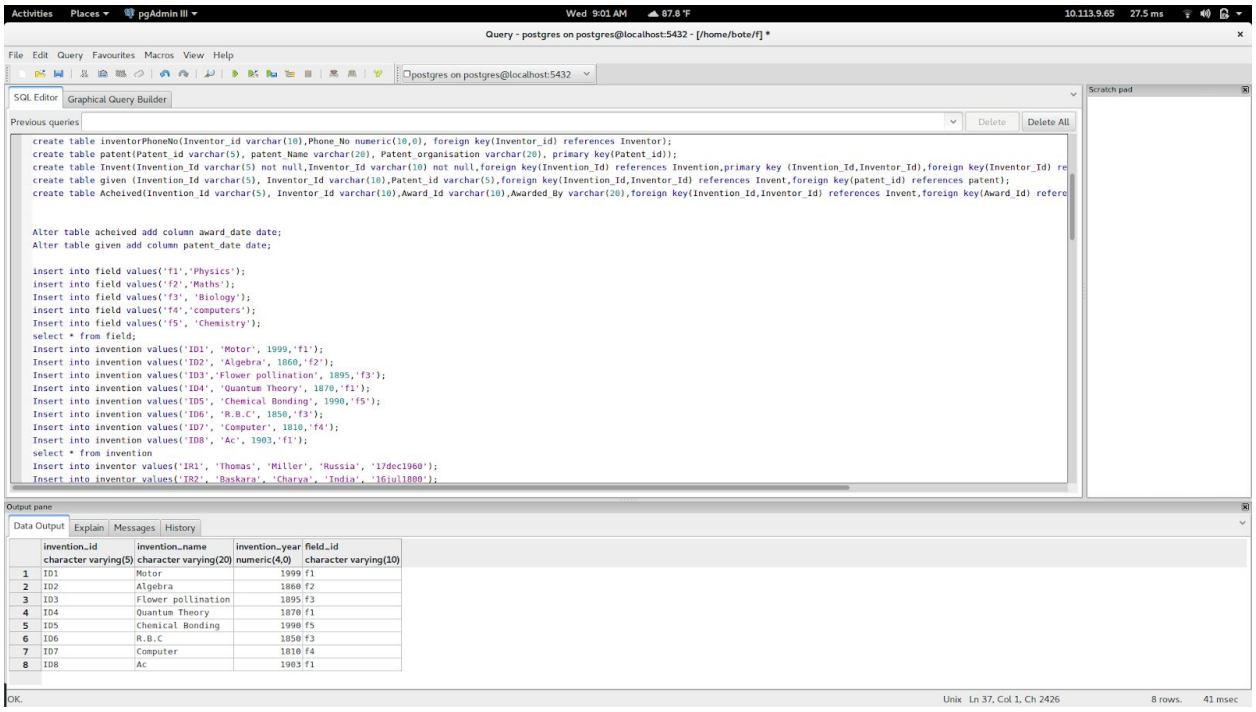
Insert into invention values('ID5', 'Chemical Bonding', 1990,'f5');

Insert into invention values('ID6', 'R.B.C', 1850,'f3');

Insert into invention values('ID7', 'Computer', 1810,'f4');

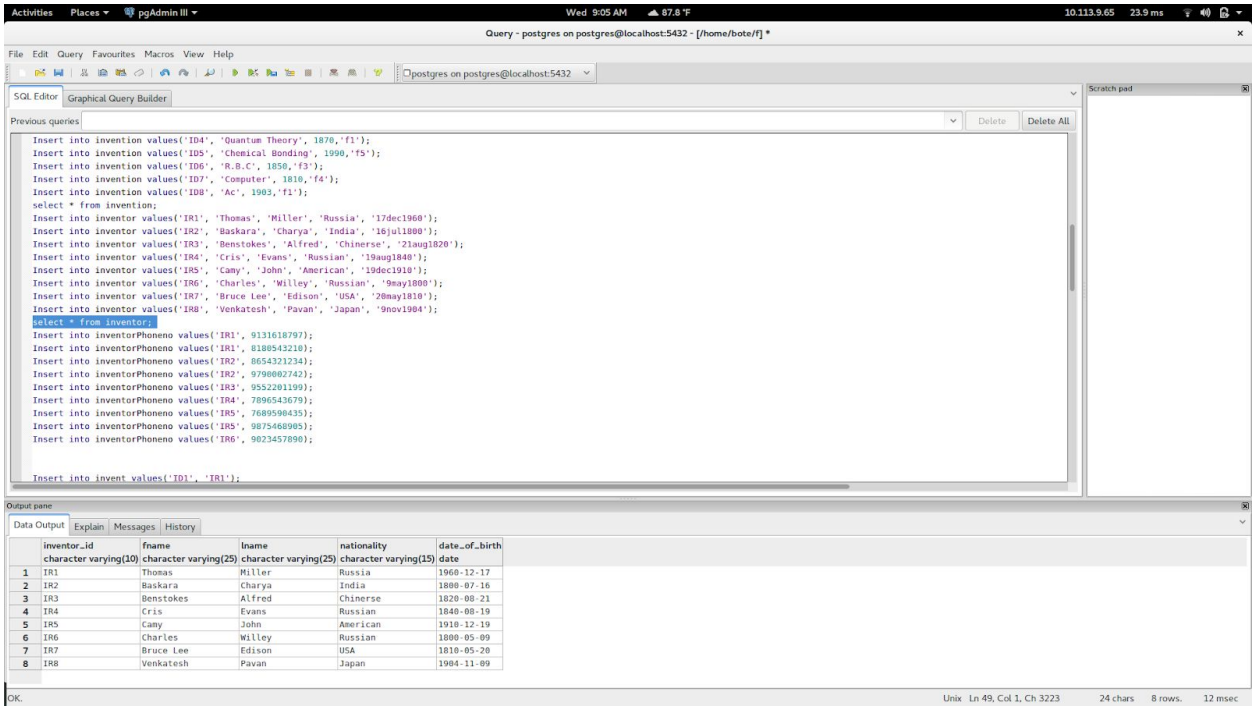
Insert into invention values('ID8', 'Ac', 1903,'f1');

select * from invention



Insert into inventor values('IR1', 'Thomas', 'Miller', 'Russia', '17dec1960');

```
Insert into inventor values('IR2', 'Baskara', 'Charya', 'India',
'16jul1800');

Insert into inventor values('IR3', 'Benstokes', 'Alfred',
'Chinerse', '21aug1820');

Insert into inventor values('IR4', 'Cris', 'Evans', 'Russian',
'19aug1840');

Insert into inventor values('IR5', 'Camy', 'John', 'American',
'19dec1910');

Insert into inventor values('IR6', 'Charles', 'Willey',
'Russian', '9may1800');

Insert into inventor values('IR7', 'Bruce Lee', 'Edison',
'USA', '20may1810');

Insert into inventor values('IR8', 'Venkatesh', 'Pavan',
'Japan', '9nov1904');

select * from inventor;
```



Insert into inventorPhoneno values('IR1', 9131618797);

Insert into inventorPhoneno values('IR1', 8180543210);

Insert into inventorPhoneno values('IR2', 8654321234);

Insert into inventorPhoneno values('IR2', 9790002742);

Insert into inventorPhoneno values('IR3', 9552201199);

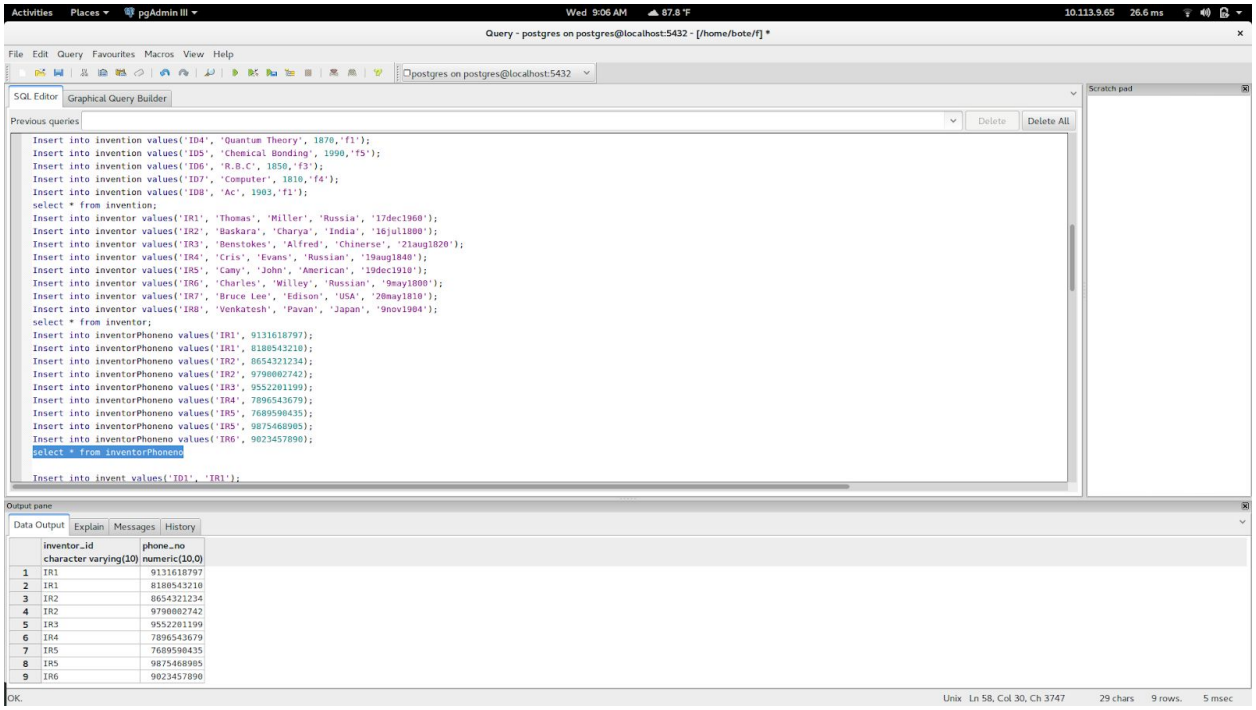
Insert into inventorPhoneno values('IR4', 7896543679);

Insert into inventorPhoneno values('IR5', 7689590435);

Insert into inventorPhoneno values('IR5', 9875468905);

Insert into inventorPhoneno values('IR6', 9023457890);

select * from inventorPhoneno



Insert into invent values('ID1', 'IR1');

Insert into invent values('ID2', 'IR2');

Insert into invent values('ID3', 'IR3');

Insert into invent values('ID4', 'IR1');

Insert into invent values('ID5', 'IR5');

Insert into invent values('ID6', 'IR6');

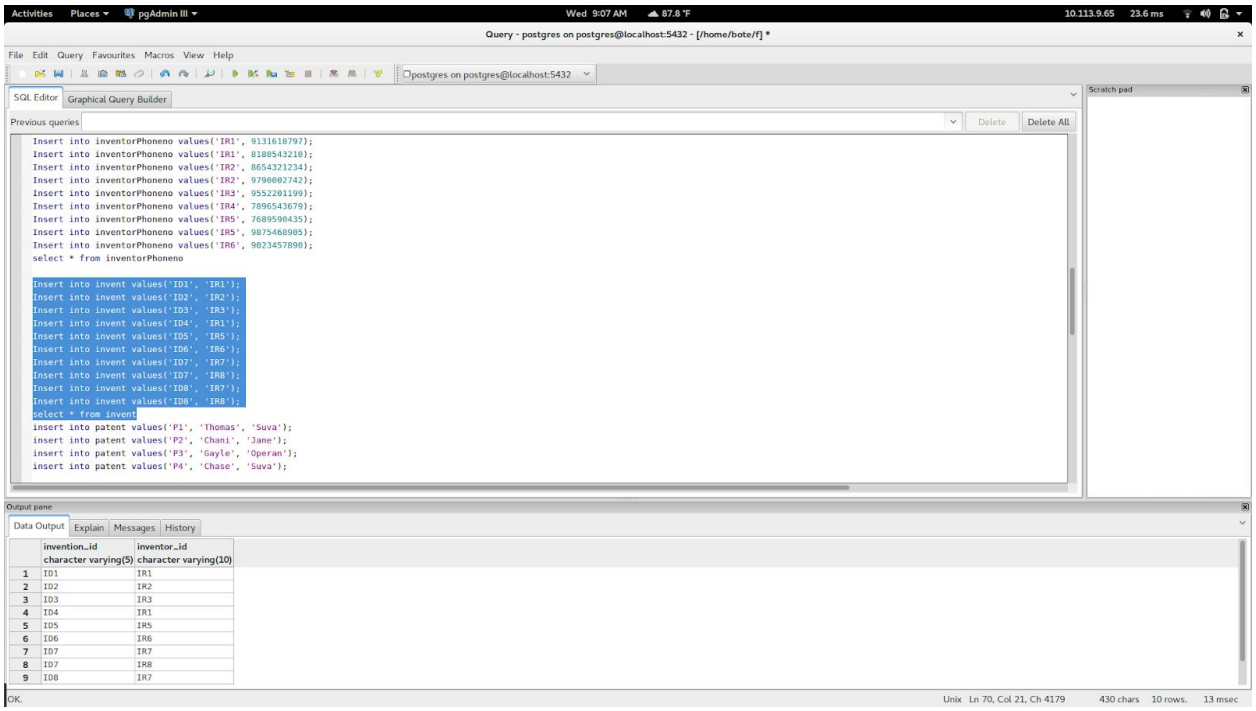
Insert into invent values('ID7', 'IR7');

Insert into invent values('ID7', 'IR8');

Insert into invent values('ID8', 'IR7');

Insert into invent values('ID8', 'IR8');

select * from invent



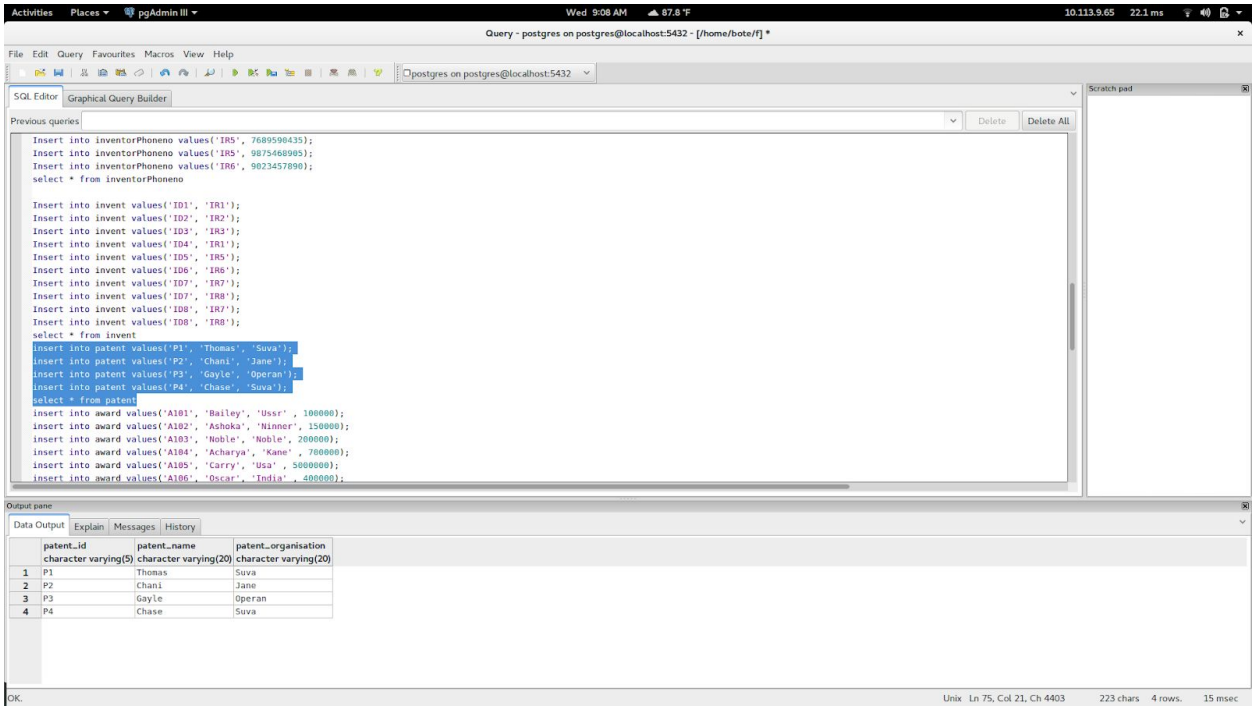
insert into patent values('P1', 'Thomas', 'Suva');

insert into patent values('P2', 'Chani', 'Jane');

insert into patent values('P3', 'Gayle', 'Operan');

insert into patent values('P4', 'Chase', 'Suva');

select * from patent



insert into award values('A101', 'Bailey', 'Ussr' , 100000);

insert into award values('A102', 'Ashoka', 'Ninner', 150000);

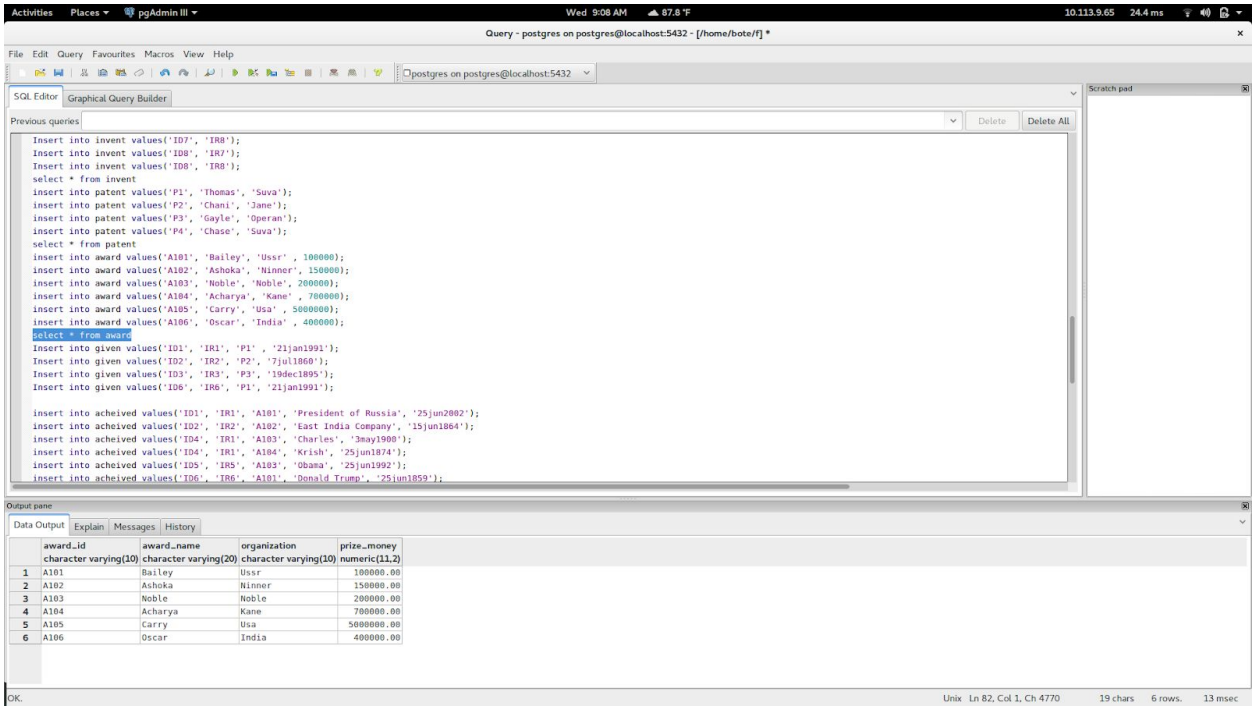
insert into award values('A103', 'Noble', 'Noble', 200000);

insert into award values('A104', 'Acharya', 'Kane' , 700000);

insert into award values('A105', 'Carry', 'Usa' , 5000000);

insert into award values('A106', 'Oscar', 'India' , 400000);

select * from award



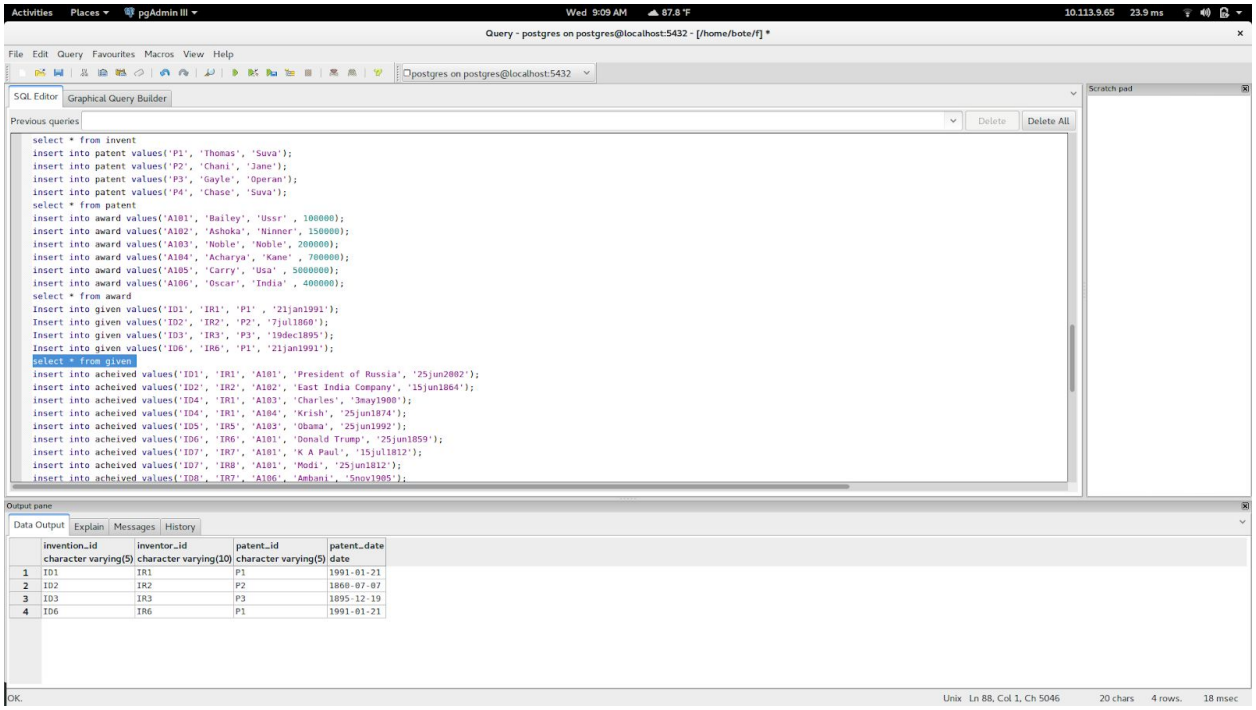
Insert into given values('ID1', 'IR1', 'P1' , '21jan1991');

Insert into given values('ID2', 'IR2', 'P2', '7jul1860');

Insert into given values('ID3', 'IR3', 'P3', '19dec1895');

Insert into given values('ID6', 'IR6', 'P1', '21jan1991');

select * from given



insert into acheived values('ID1', 'IR1', 'A101', 'President of Russia', '25jun2002');

insert into acheived values('ID2', 'IR2', 'A102', 'East India Company', '15jun1864');

insert into acheived values('ID4', 'IR1', 'A103', 'Charles', '3may1900');

insert into acheived values('ID4', 'IR1', 'A104', 'Krish', '25jun1874');

insert into acheived values('ID5', 'IR5', 'A103', 'Obama', '25jun1992');

insert into acheived values('ID6', 'IR6', 'A101', 'Donald Trump', '25jun1859');

insert into acheived values('ID7', 'IR7', 'A101', 'K A Paul', '15jul1812');

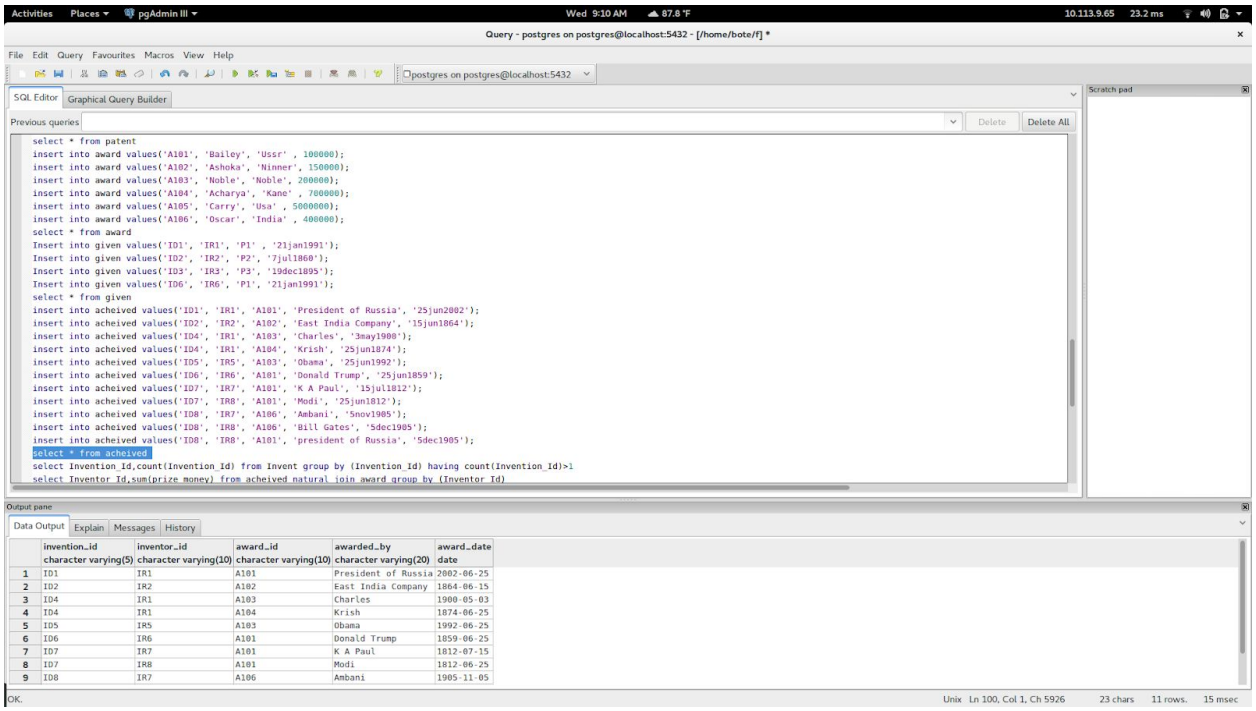
insert into acheived values('ID7', 'IR8', 'A101', 'Modi', '25jun1812');

insert into acheived values('ID8', 'IR7', 'A106', 'Ambani', '5nov1905');

insert into acheived values('ID8', 'IR8', 'A106', 'Bill Gates', '5dec1905');

insert into acheived values('ID8', 'IR8', 'A101', 'president of Russia', '5dec1905');

select * from acheived



1.)

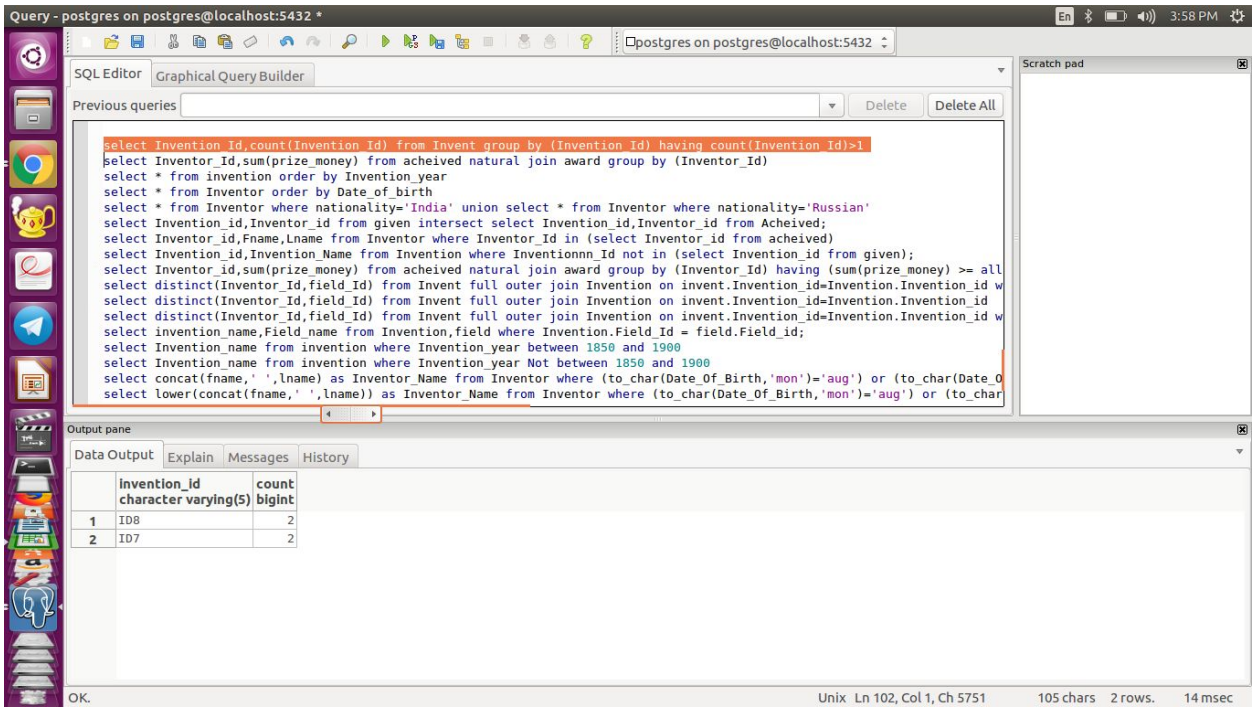
1.1 Query purpose :

To select all the inventions that have more than one inventor and the count of inventors

1.2 Query :

select Invention_Id,count(Invention_Id) from Invent group by (Invention_Id) having count(Invention_Id)>1

1.3 Screenshot :



2.)

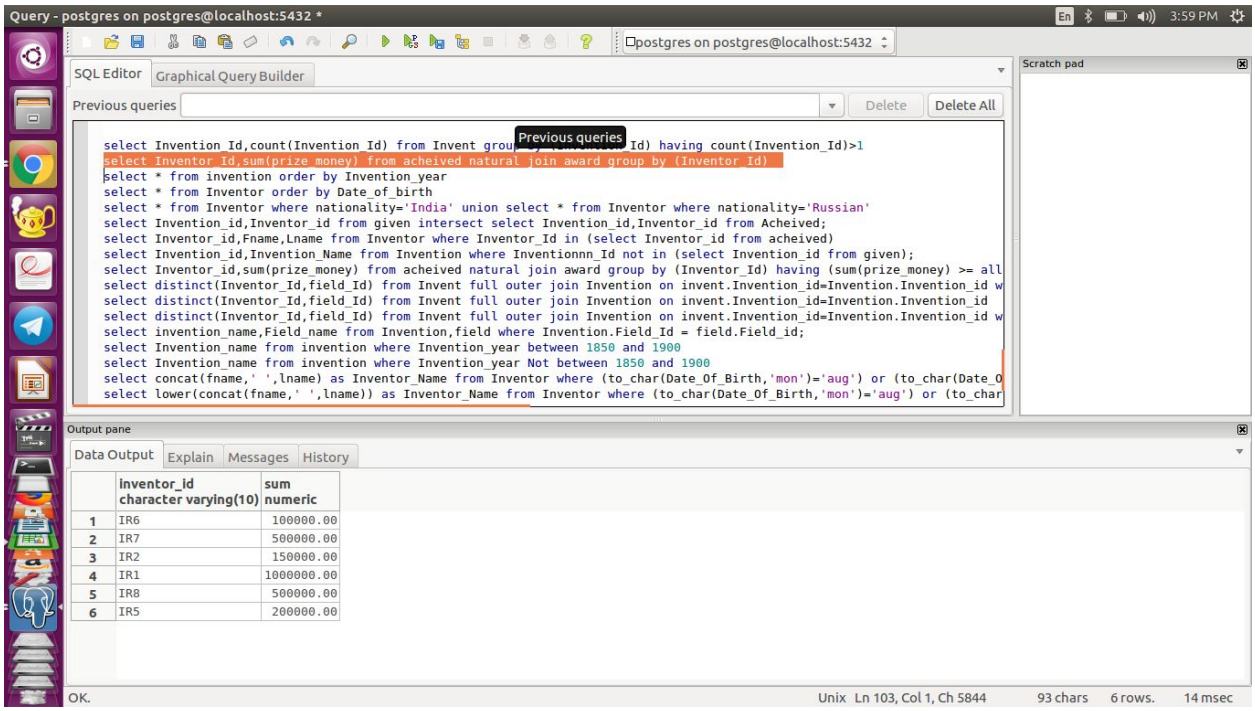
2.1 Query purpose :

To find total prize money he got from all the Awards

2.2 Query :

select Inventor_Id,sum(prize_money) from acheived natural join award group by (Inventor_Id)

2.3 Screenshot :



3.)

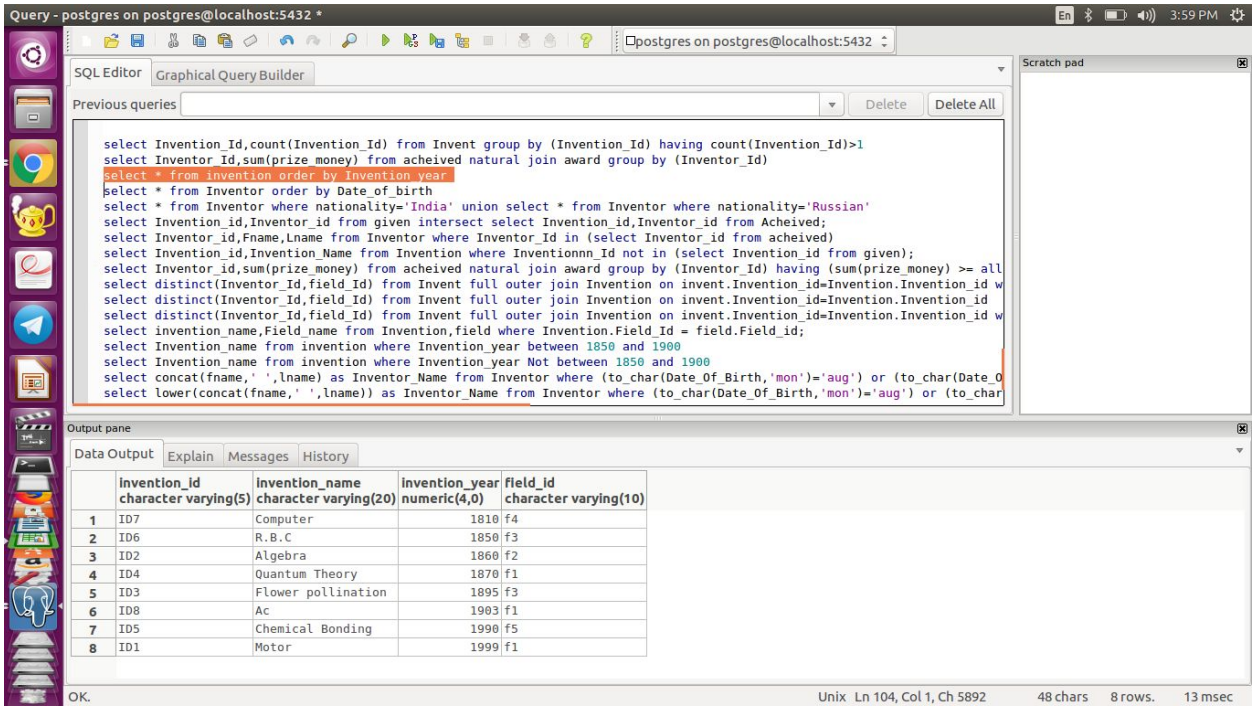
3.1 Query purpose :

Order the inventions in ascending order by invention Year

3.2 Query :

select * from invention order by Invention_year

3.3 Screenshot :



4.)

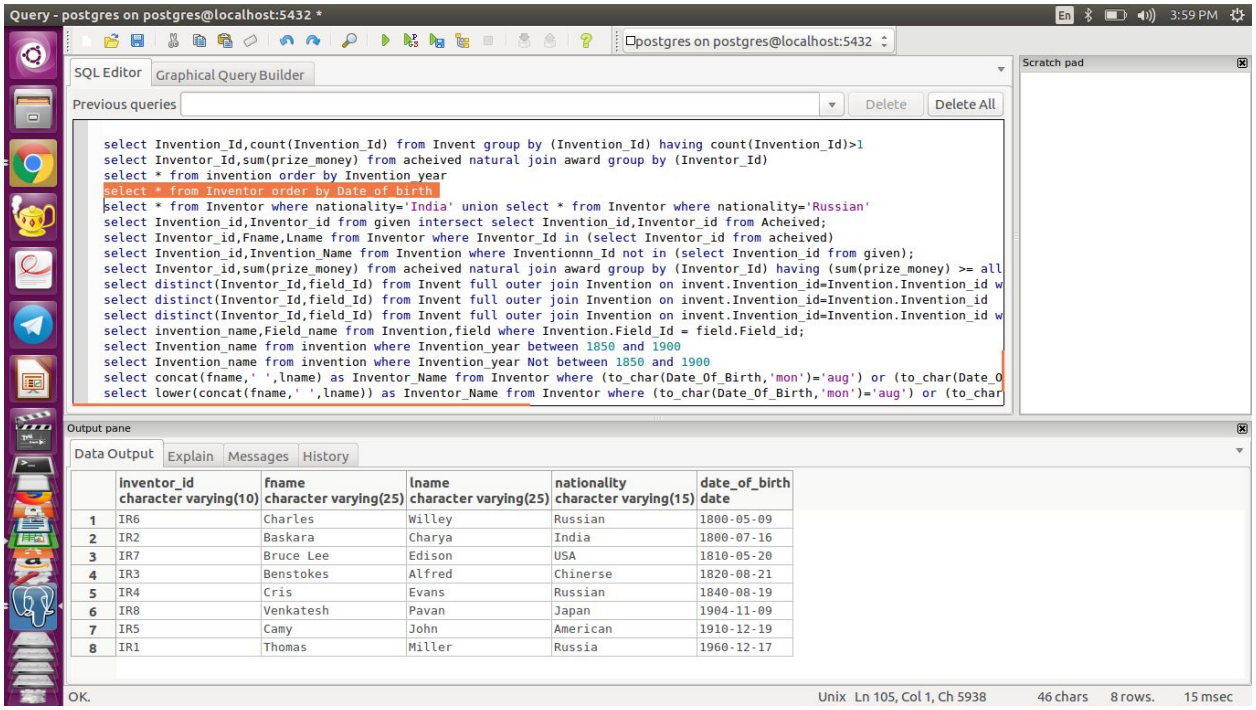
4.1 Query purpose :

Order the inventors in ascending order by their Date of birth

4.2 Query :

select * from Inventor order by Date_of_birth

4.3 Screenshot :



5.)

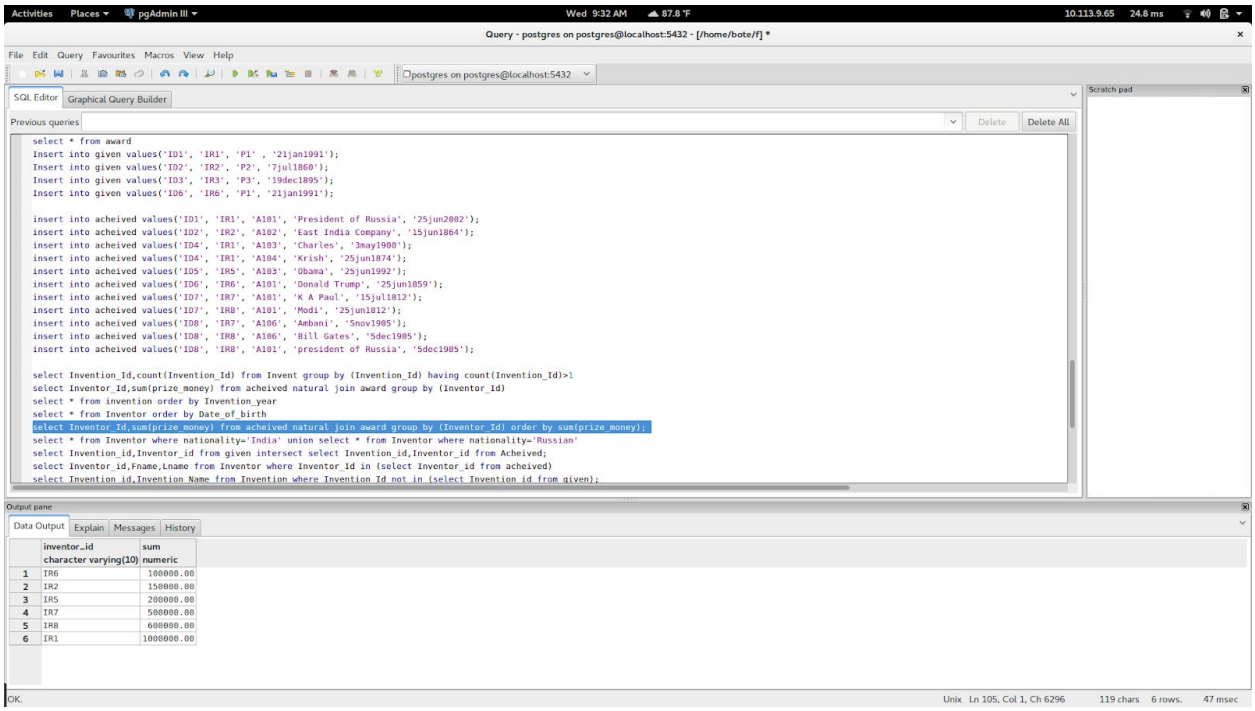
5.1 Query purpose :

To find total prize money he got from all the Awards in sorted order

5.2 Query :

select Inventor_Id,sum(prize_money) from acheived natural join award group by (Inventor_Id) order by sum(prize_money);

5.3 Screenshot :



6.)

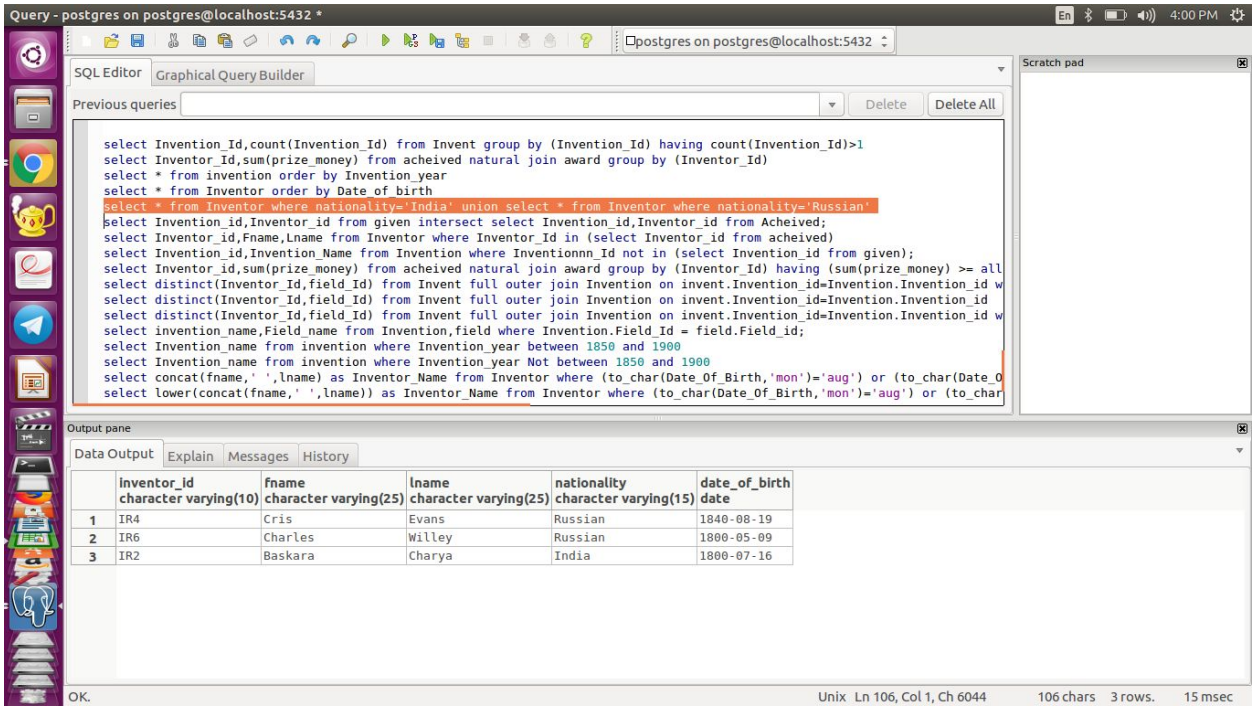
6.1 Query purpose :

To select all the inventors who are from India and Inventors from Russia

6.2 Query :

select * from Inventor where nationality='India' union select * from Inventor where nationality='Russian’

6.3 Screenshot :



7.)

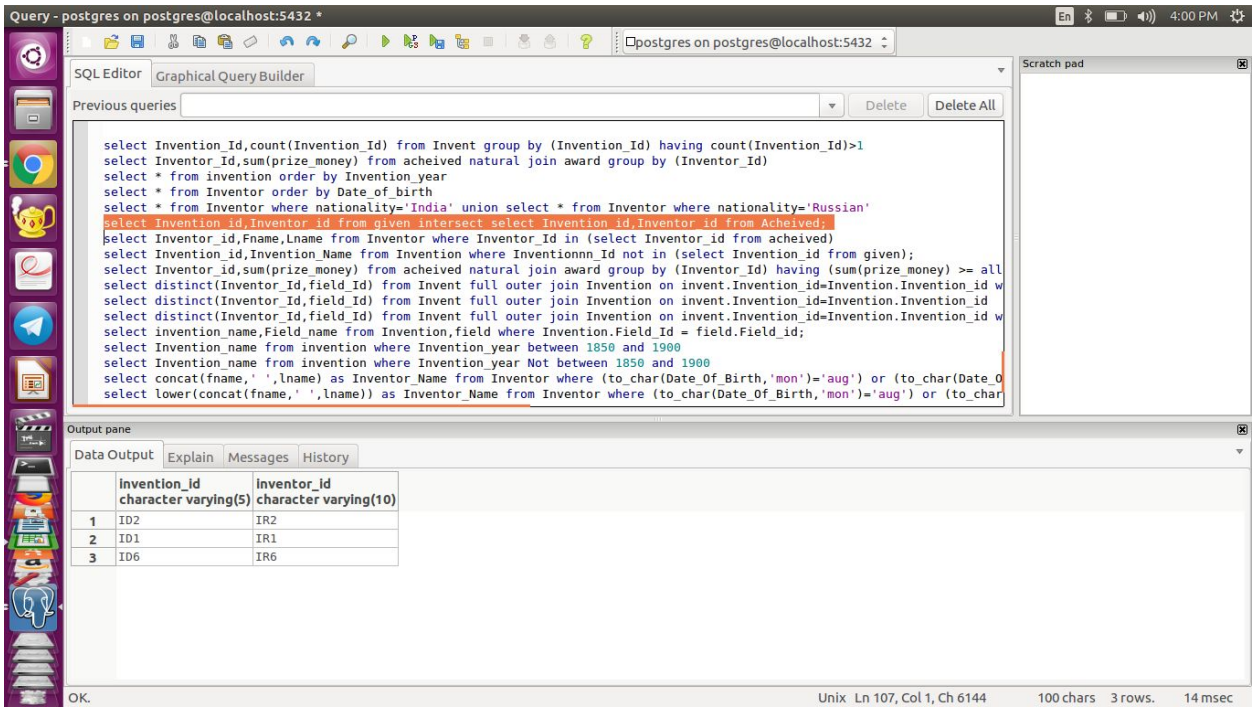
7.1 Query purpose :

To select inventions that got both an award and a patent

7.2 Query :

select Invention_id,Inventor_id from given intersect select Invention_id,Inventor_id from Acheived;

7.3 Screenshot :



8.)

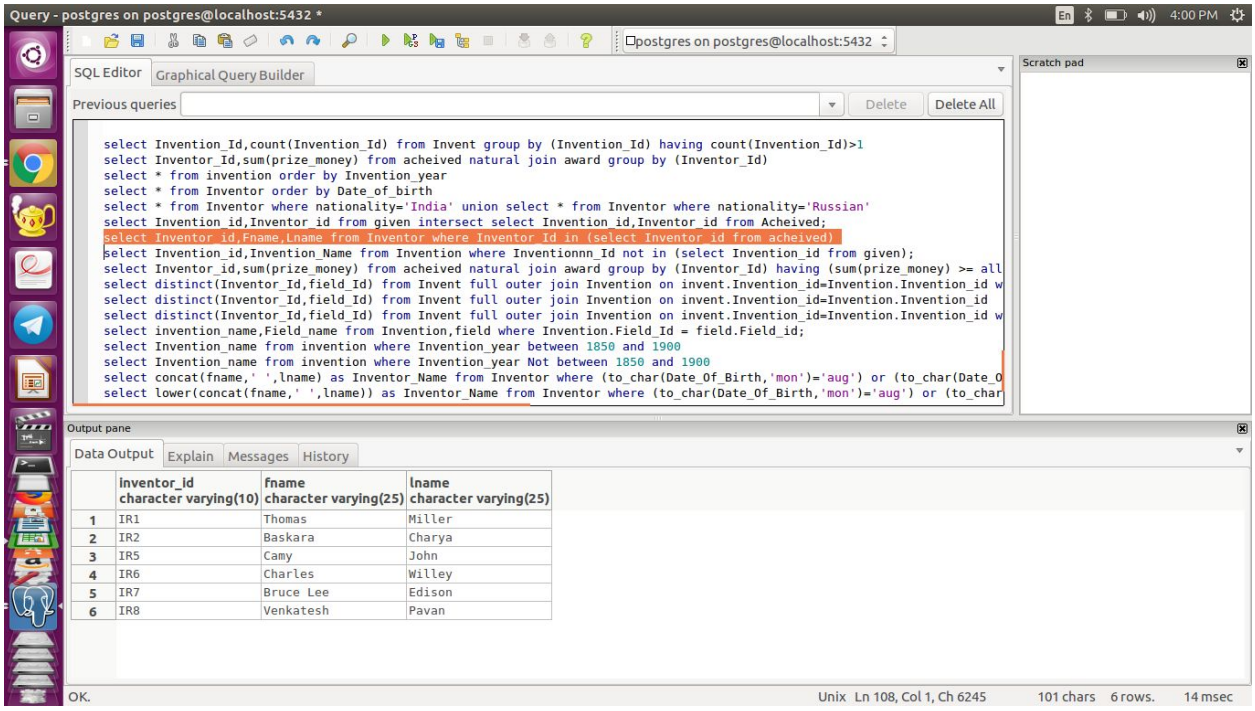
8.1 Query purpose :

To select all the inventors who got an Award

8.2 Query :

select Inventor_id,Fname,Lname from Inventor where Inventor_Id in (select Inventor_id from acheived)

8.3 Screenshot :



9.)

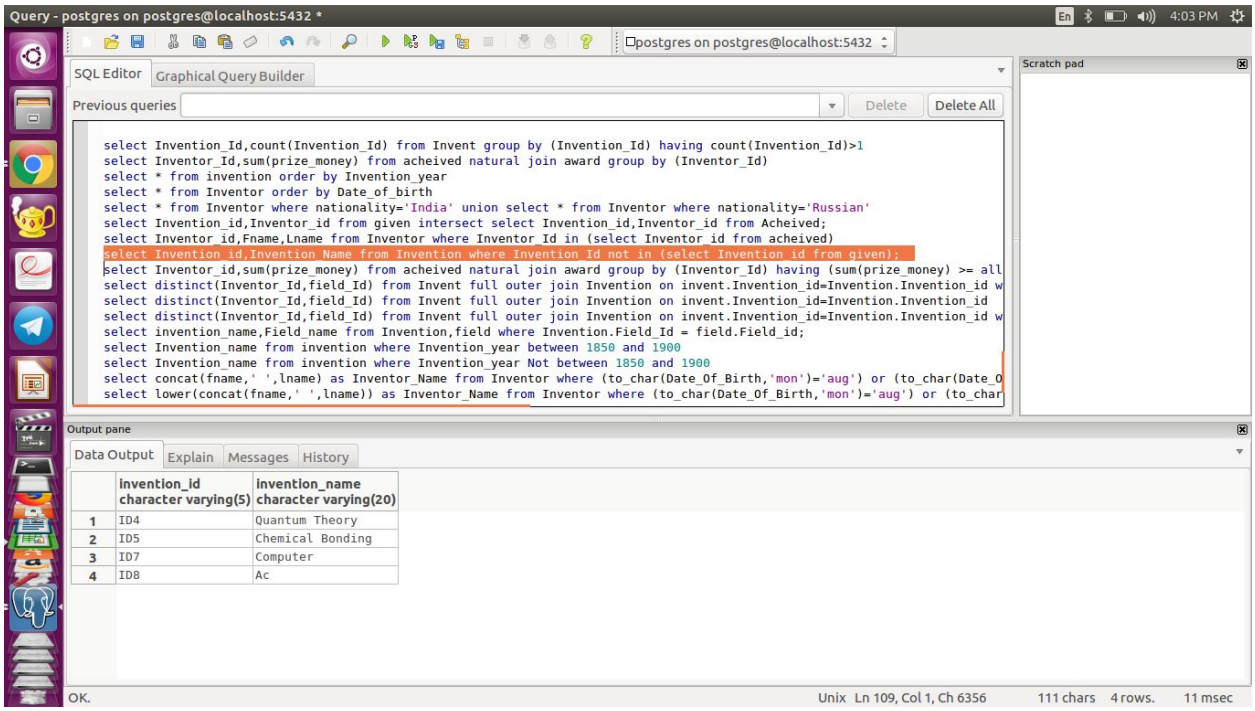
9.1 Query purpose :

To select all the inventions that doesn't have a patent

9.2 Query :

select Invention_id,Invention_Name from Invention where Invention_Id not in (select Invention_id from given);

9.3 Screenshot :



10.)

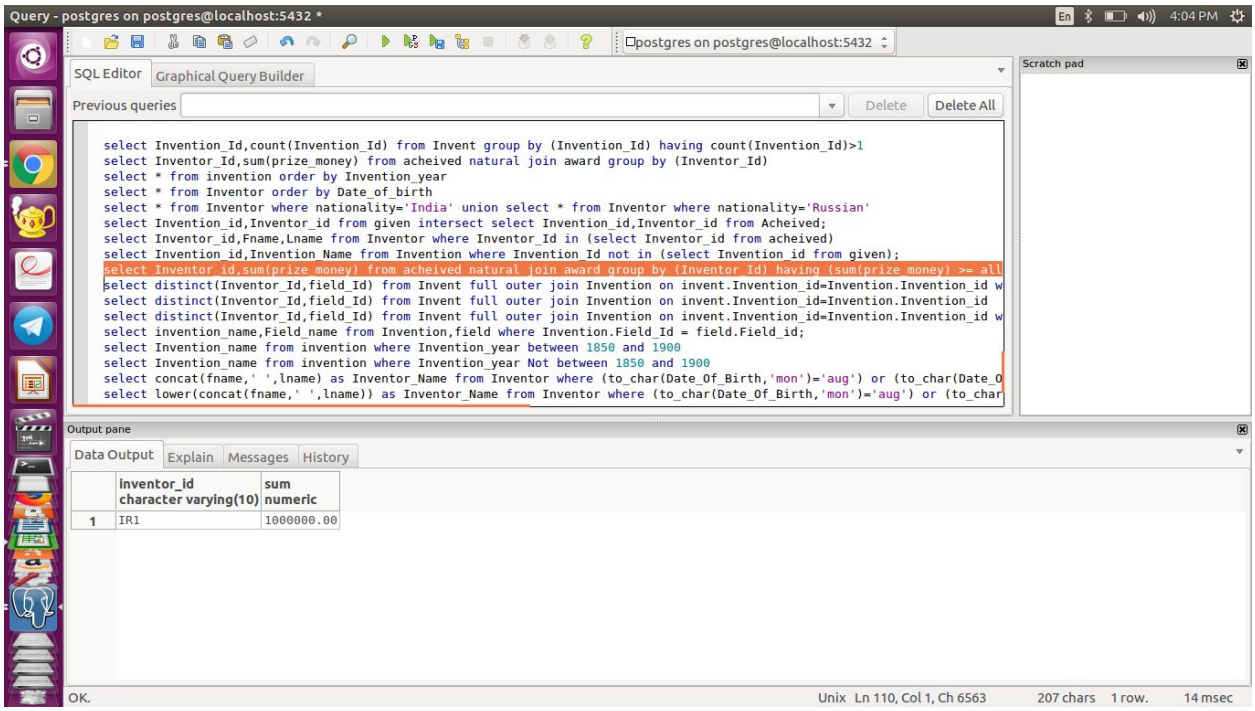
10.1 Query purpose :

To select inventor that got the highest prize money

10.2 Query :

select Inventor_id,sum(prize_money) from acheived natural join award group by (Inventor_Id) having (sum(prize_money) >= all (select sum(prize_money) from acheived natural join award group by (Inventor_Id)))

10.3 Screenshot :



11.)

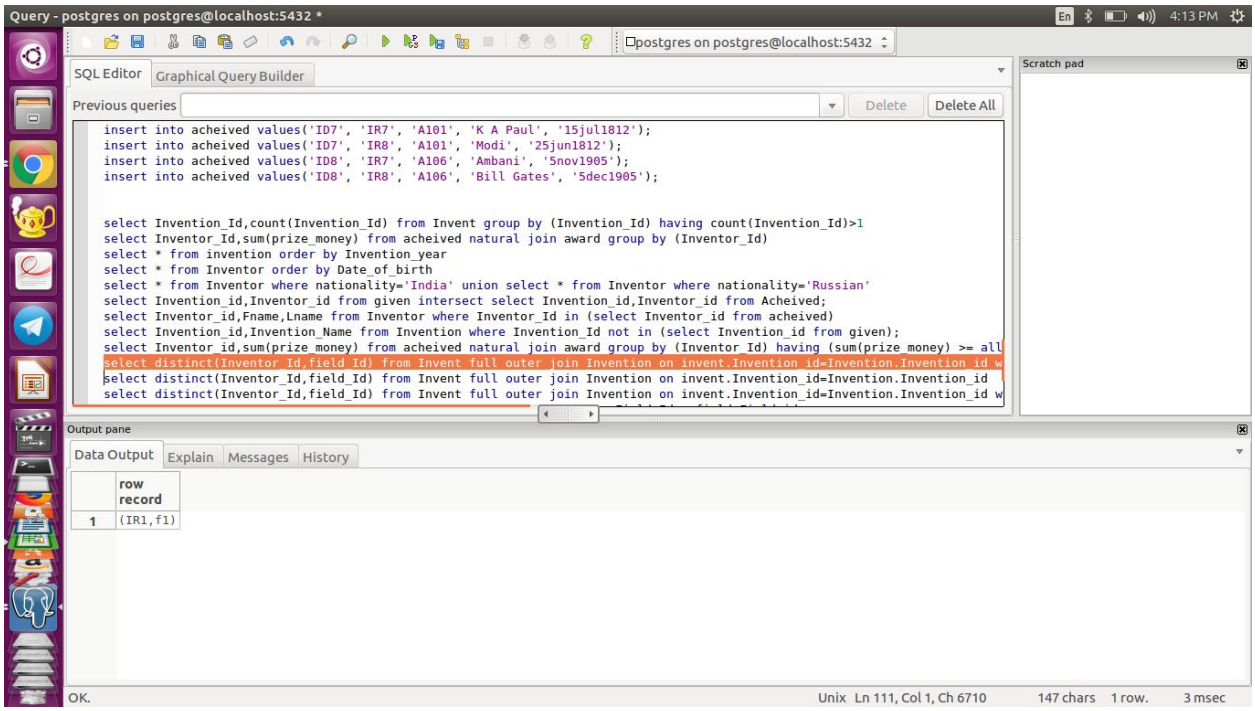
11.1 Query purpose :

To select all the fields to which IR1 has contributed to

11.2 Query :

```
select distinct(Inventor_Id,field_Id) from Invent full outer join Invention
on invent.Invention_id=Invention.Invention_id where
Inventor_id='IR1';
```

11.3 Screenshot :



12.)

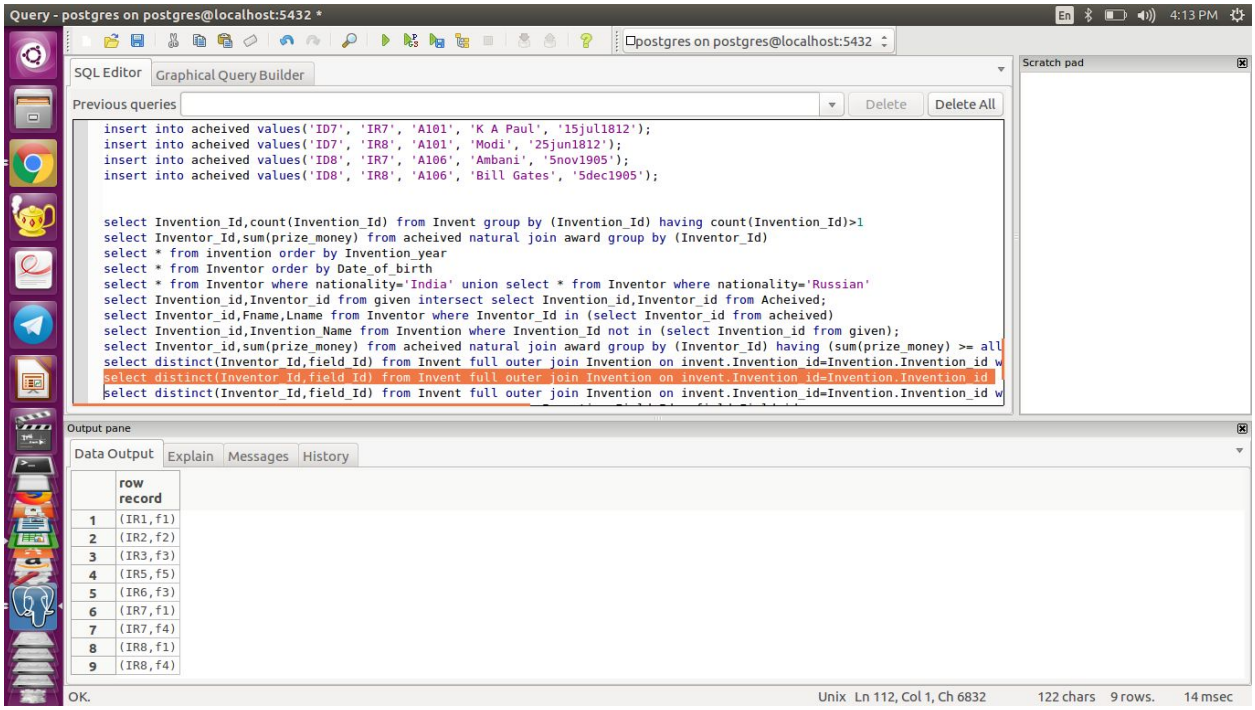
12.1 Query purpose :

To select all the fields to which Inventors contributed has contributed

12.2 Query :

select distinct(Inventor_Id,field_Id) from Invent full outer join Invention on invent.Invention_id=Invention.Invention_id

12.3 Screenshot :



13.)

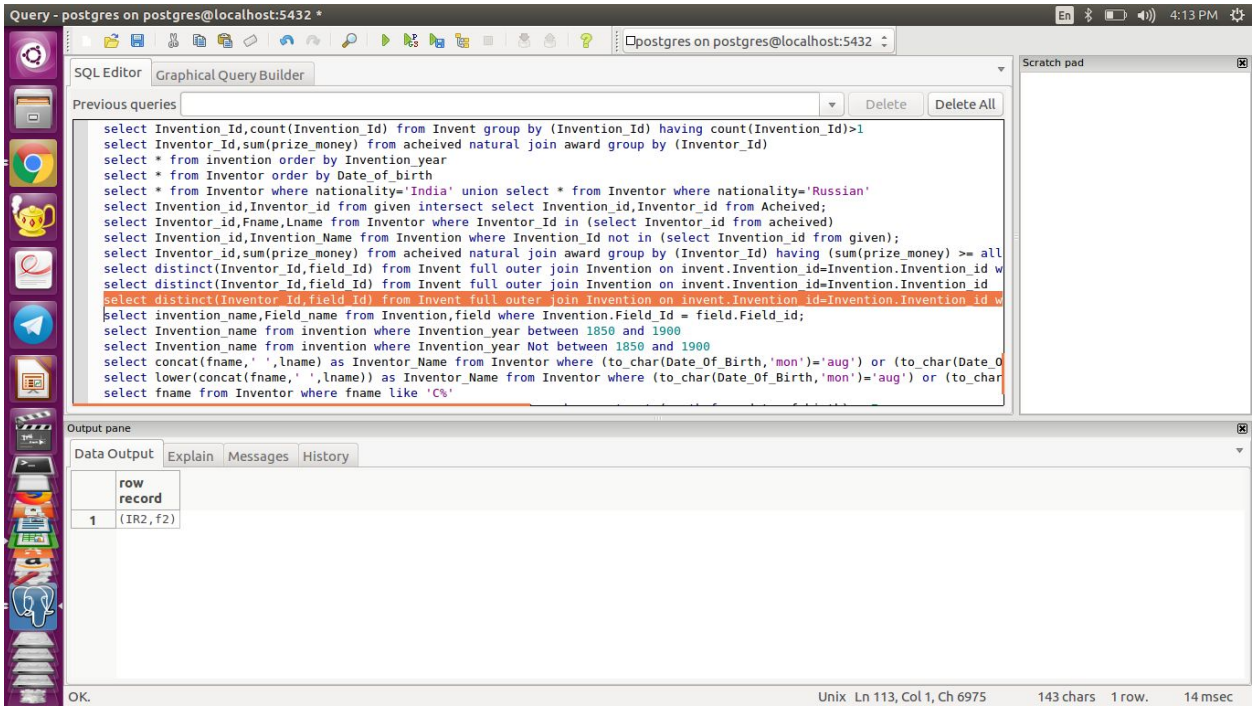
13.1 Query purpose :

To select all the inventors that work in a field ‘f2’

13.2 Query :

select distinct(Inventor_Id,field_Id) from Invent full outer join Invention on invent.Invention_id=Invention.Invention_id where field_id='f2';

13.3 Screenshot :



14.)

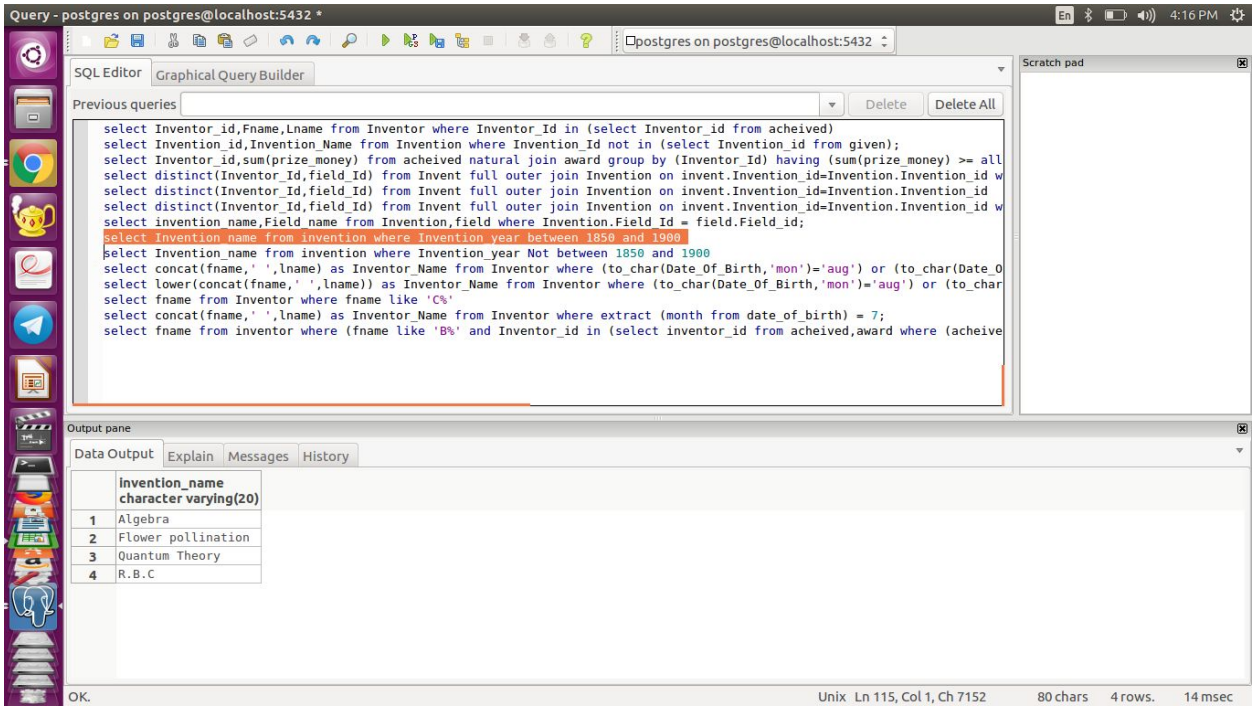
14.1 Query purpose :

To select inventions that are b/w 1850 and 1900

14.2 Query :

select Invention_name from invention where Invention_year between 1850 and 1900

14.3 Screenshot :



15.)

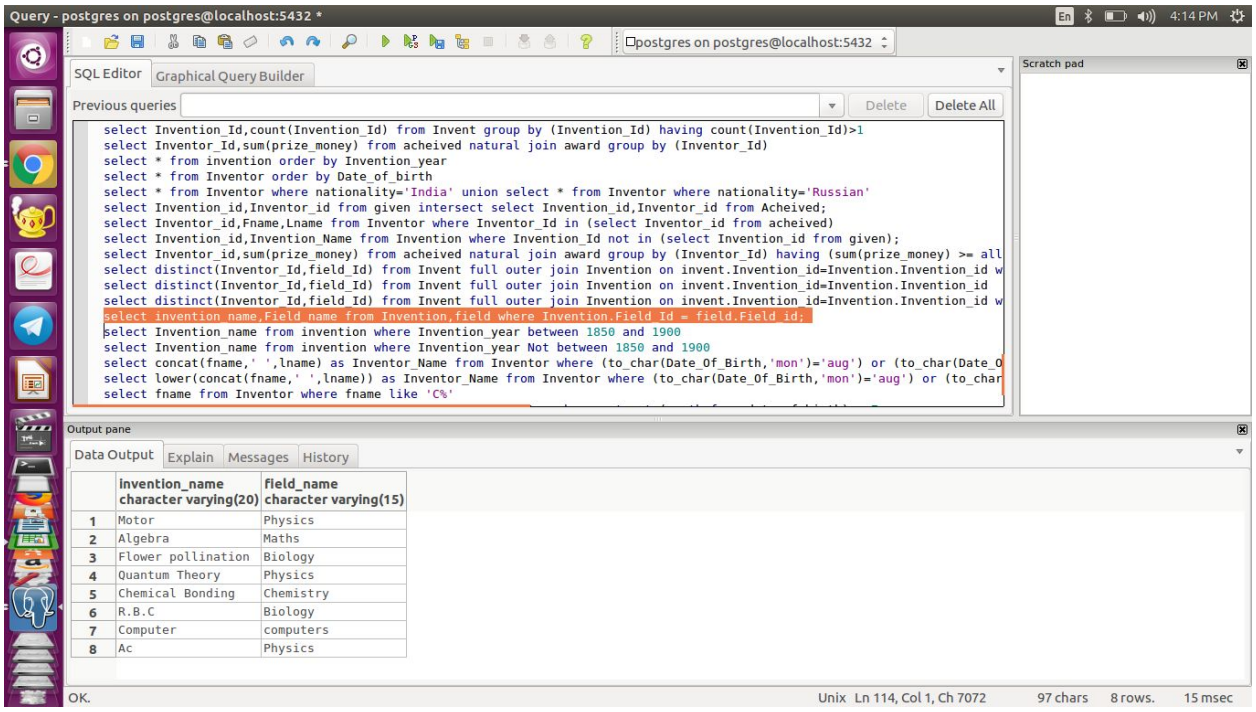
15.1 Query purpose :

To select inventions and their fields

15.2 Query :

```
select invention_name,Field_name from Invention,field where
Invention.Field_Id = field.Field_id;
```

15.3 Screenshot :



16.)

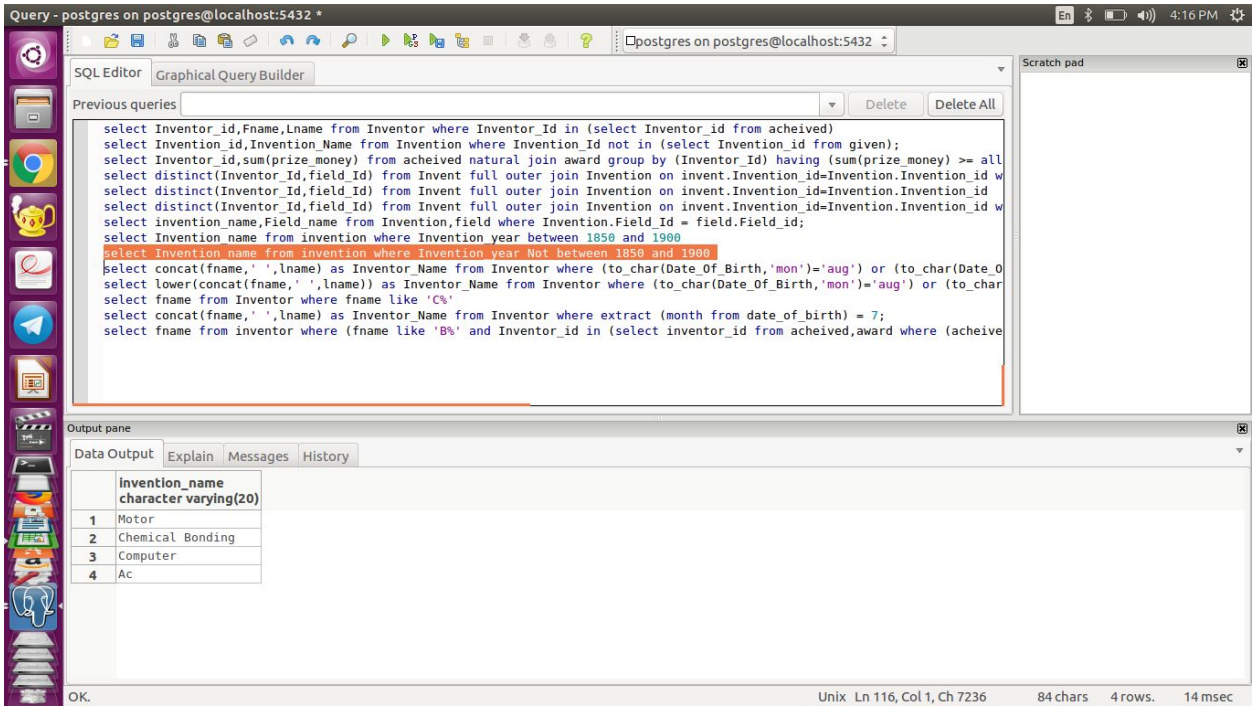
16.1 Query purpose :

To select inventions that are not b/w 1850 and 1900

16.2 Query :

select Invention_name from invention where Invention_year not between 1850 and 1900

16.3 Screenshot :



17.)

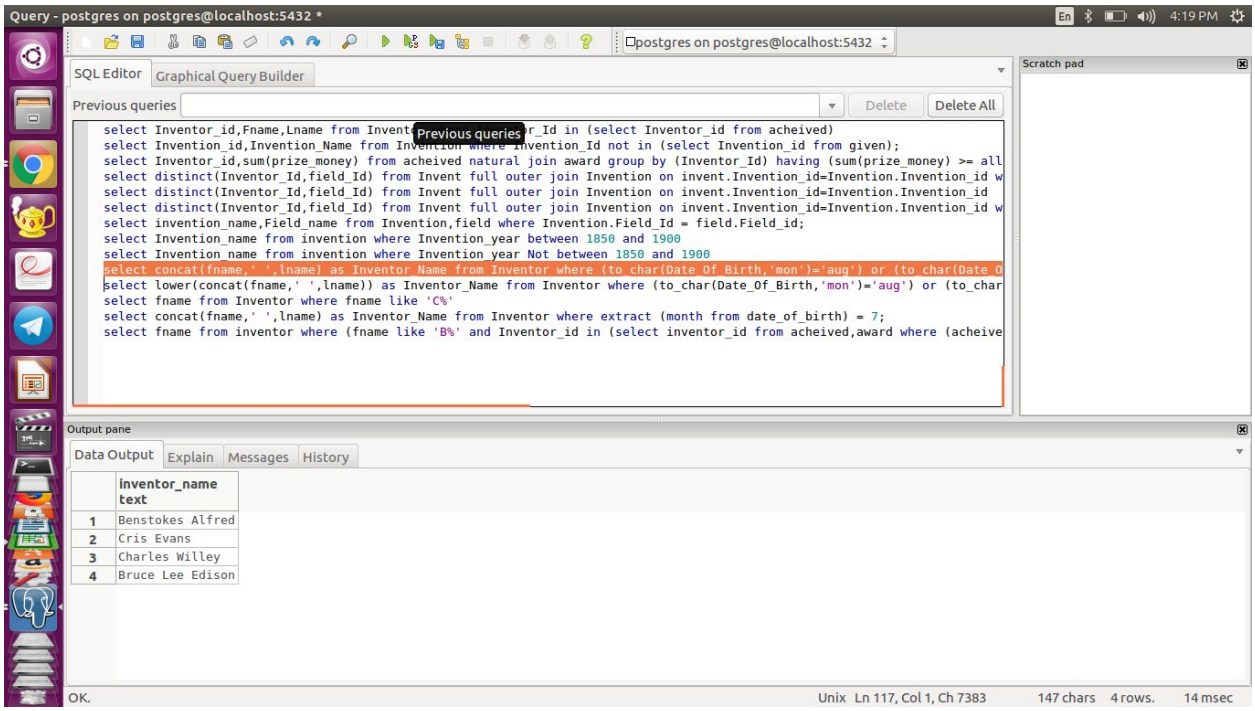
17.1 Query purpose :

To select fname,lname of who are born in august or may concatinated as Inventor_name

17.2 Query :

select concat(fname,' ',lname) as Inventor_Name from Inventor where (to_char(Date_Of_Birth,'mon')='aug') or (to_char(Date_Of_Birth,'mon')='may') ;

17.3 Screenshot :



18.)

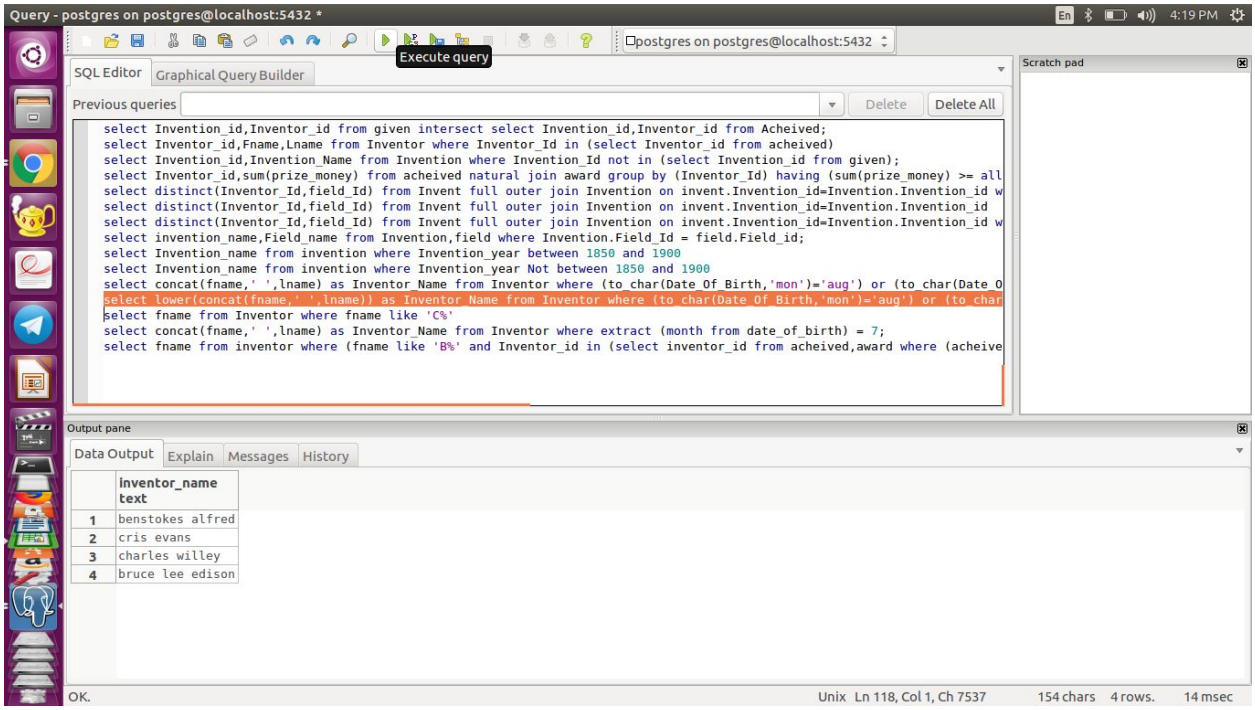
18.1 Query purpose :

To select fname,lname of who are born in august or may concatinated as Inventor_name in lower alphabets

18.2 Query :

```
select lower(concat(fname,' ',lname)) as Inventor_Name from Inventor where (to_char(Date_Of_Birth,'mon')='aug') or (to_char(Date_Of_Birth,'mon')='may');
```

18.3 Screenshot :



19.)

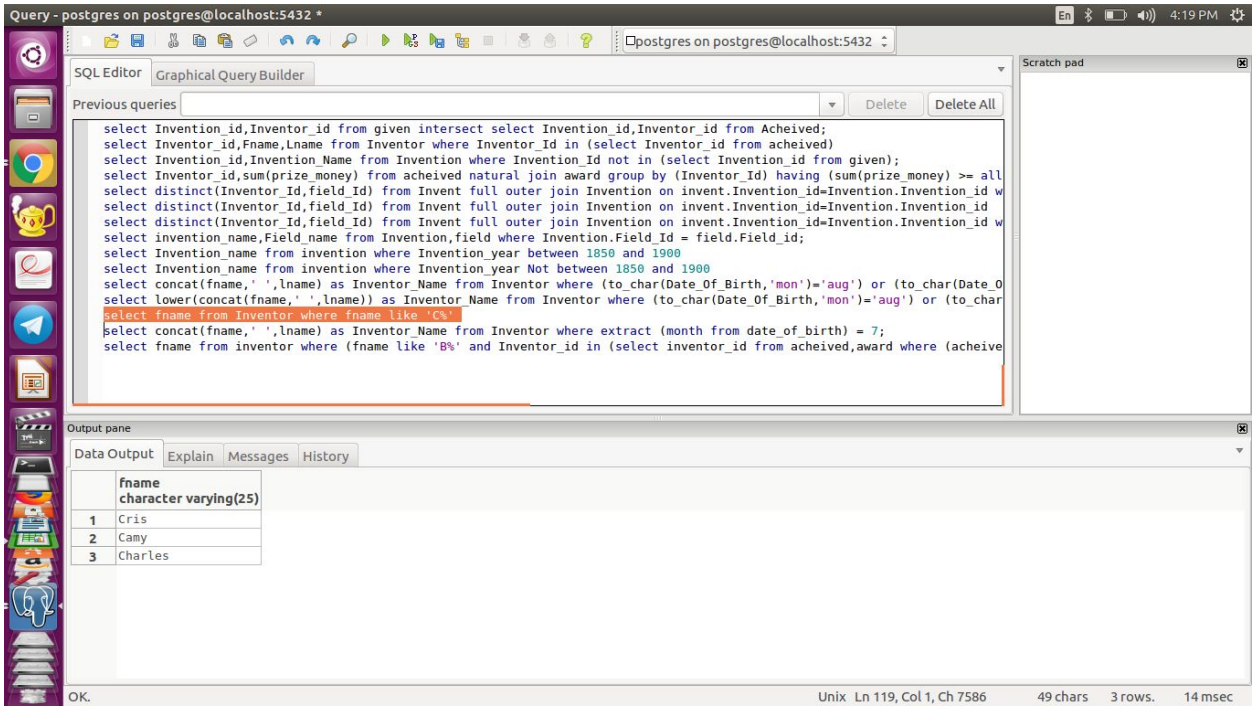
19.1 Query purpose :

To select fname of inventor whose name starts with ‘C’

19.2 Query :

select fname from Inventor where fname like 'C%'

19.3 Screenshot :



20.)

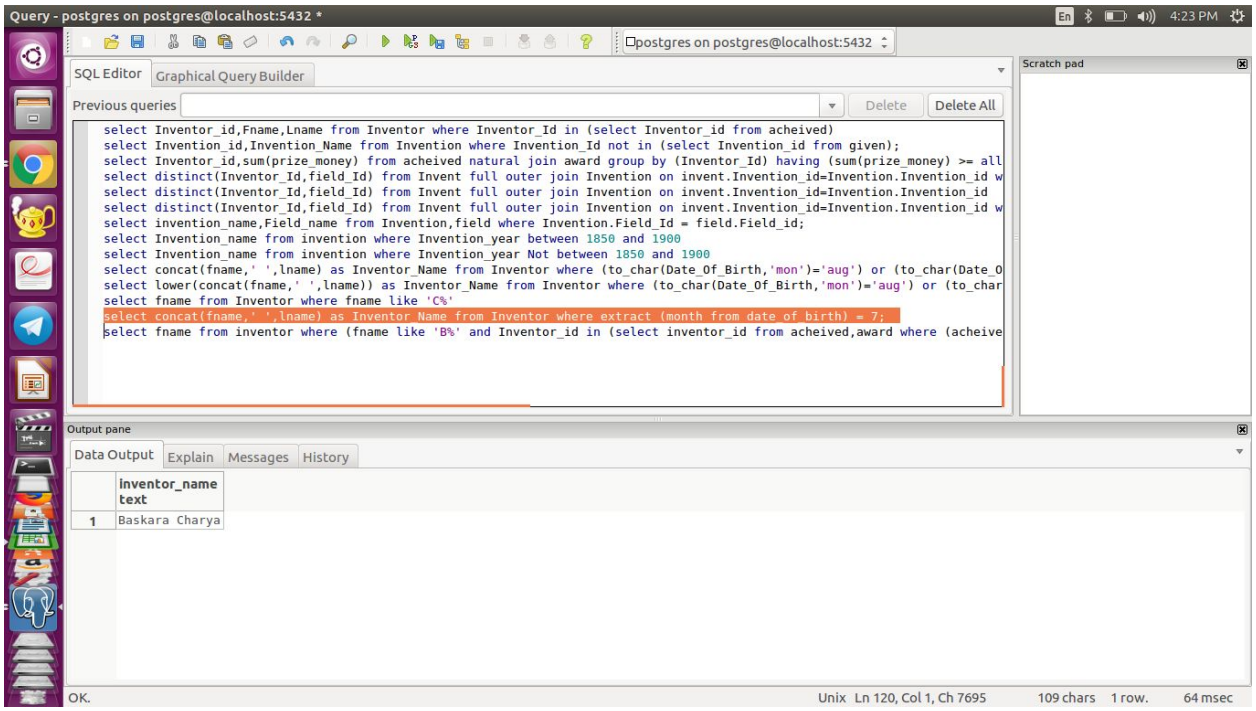
20.1 Query purpose :

To select fname,lname of who are born in july concatinated as Inventor_name using extract

20.2 Query :

select concat(fname,' ',lname) as Inventor_Name from Inventor where extract (month from date_of_birth) = 7;

20.3 Screenshot :



21.)

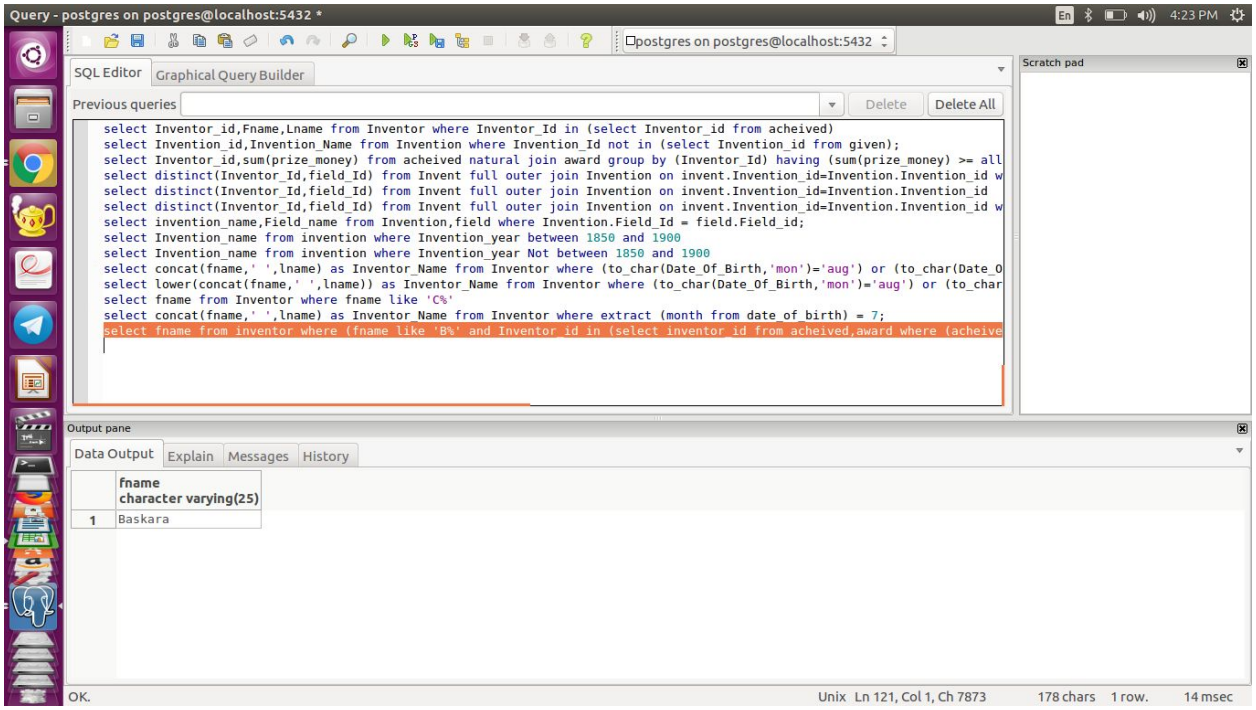
21.1 Query purpose :

To select fname of inventor whose name starts with ‘B’ and got an award with name starting with ‘A’

21.2 Query :

select fname from inventor where (fname like 'B%' and Inventor_id in (select inventor_id from acheived,award where (acheived.award_id=award.award_id and award_name like 'A%')));

21.3 Screenshot :



22.)

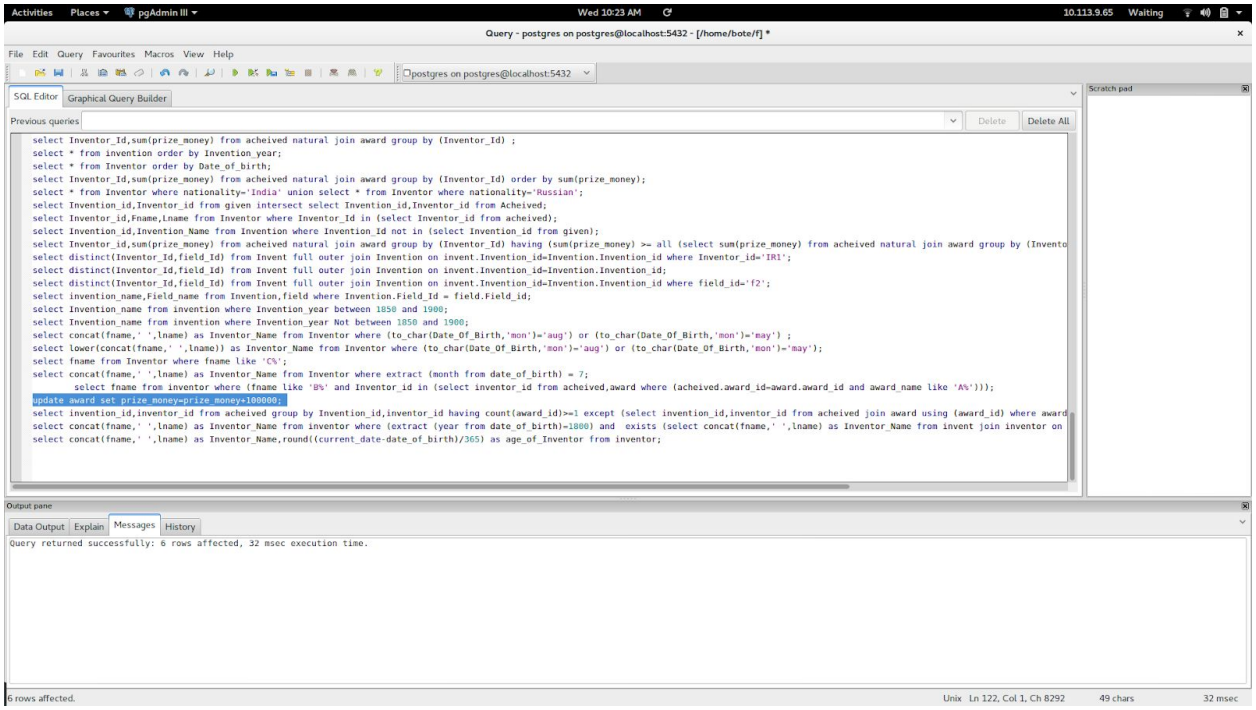
22.1 Query purpose :

To update prize money by 100000

22.2 Query :

update award set prize_money=prize_money+100000;

22.3 Screenshot :



23.)

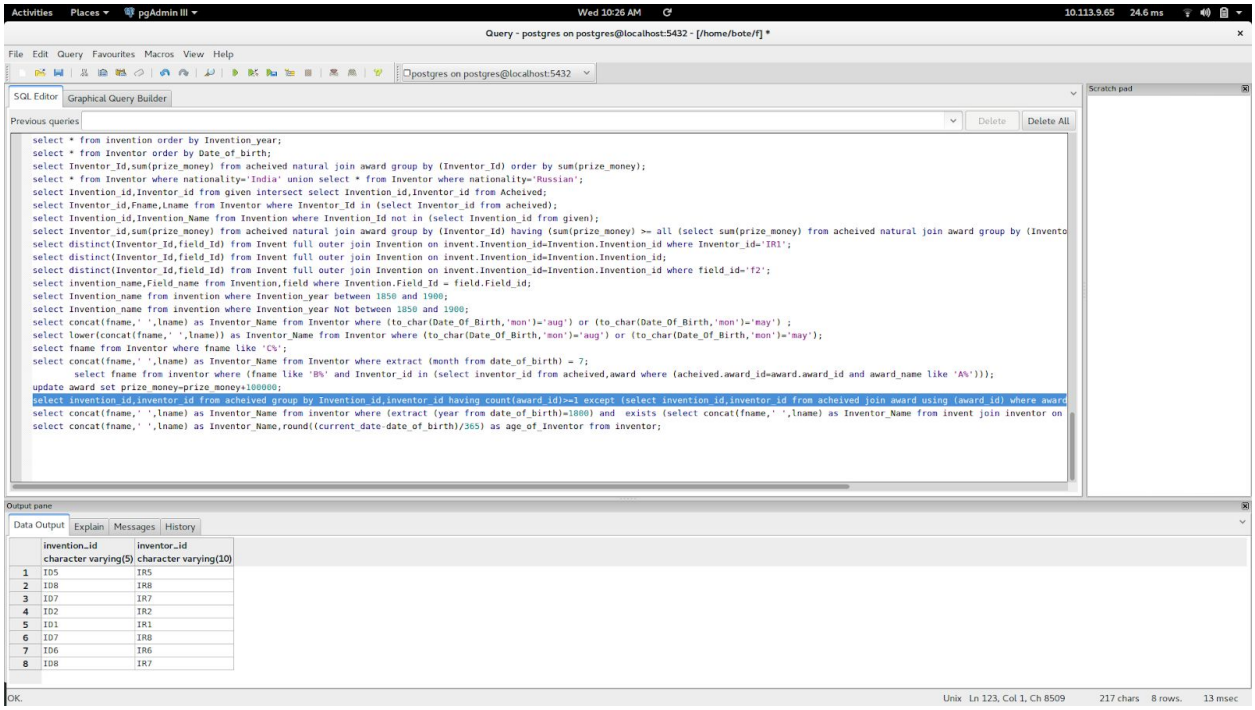
23.1 Query purpose :

To select all inventions along with inventors who got more than 1 award execpt those who got acharya award

23.2 Query :

```
select invention_id,inventor_id from acheived group by Invention_id,inventor_id having count(award_id)>=1 except (select invention_id,inventor_id from acheived join award using (award_id) where award_name='Acharya');
```

23.3 Screenshot :



24.)

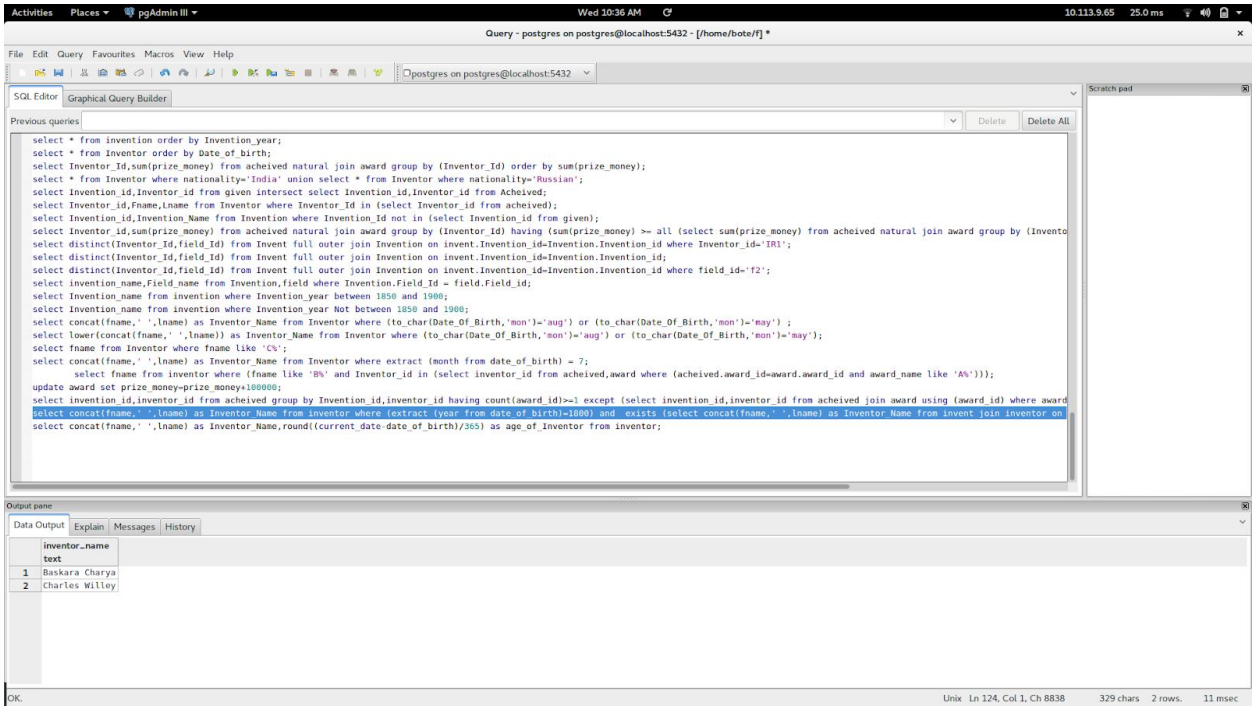
24.1 Query purpose :

To select fname,lname of inventor of those who are born in 1800 made invention in the year 1860

24.2 Query :

select concat(fname,' ',lname) as Inventor_Name from inventor where (extract (year from date_of_birth)=1800) and exists (select concat(fname,' ',lname) as Inventor_Name from invent join inventor on invent.inventor_id=inventor.inventor_id join invention on invent.invention_id=invention.invention_id and invention_year = 1860)

24.3 Screenshot :



25.)

25.1 Query purpose :

To find age of the inventors

25.2 Query :

```
select concat(fname,' ',lname) as
Inventor_Name,round((current_date-date_of_birth)/365) as
age_of_Inventor from inventor;
```

25.3 Screenshot :