INVENTION MANAGEMENT

(Group 4)

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Project Abstract:

The main aim of this project is to develop a database system for the inventor application to maintain all the data conveniently and efficiently. This provides faster data access, helps users to read data in database, can share depending on the authorisation to access the data. There will be no chance of encountering duplicate data. The project mainly focuses on developing a database management system to store and maintain the database consisting, the details of various inventions and the information about them like inventor, category, year, story behind the invention, awards received and the year, inventor name, country, job type and a database consisting of different awards in each category. Awards are given by nominations to inventors for which the jury's decision is final. For this we are maintaining the jury's list too. The information is inputted to their corresponding entities and various relationships are made within them. The information of the entities like inventor, invention, award, nominations, jury are entered accordingly. Based on this the award decision is made by jury.

The system consists of following components:

1. Invention
2. Inventor
3. Award
4. Jury

Properties:

1) Invention:

- It has the attributes like id, invention name, year of invention, story behind, invention category.
- It is in many-to-many relationship with the Inventor with total participation.

2) Inventor:

- It has the attributes like inventor id, name of inventor, country, job type and related data to their location etc.
- It is in many-to-many relationship with the Invention with total participation.

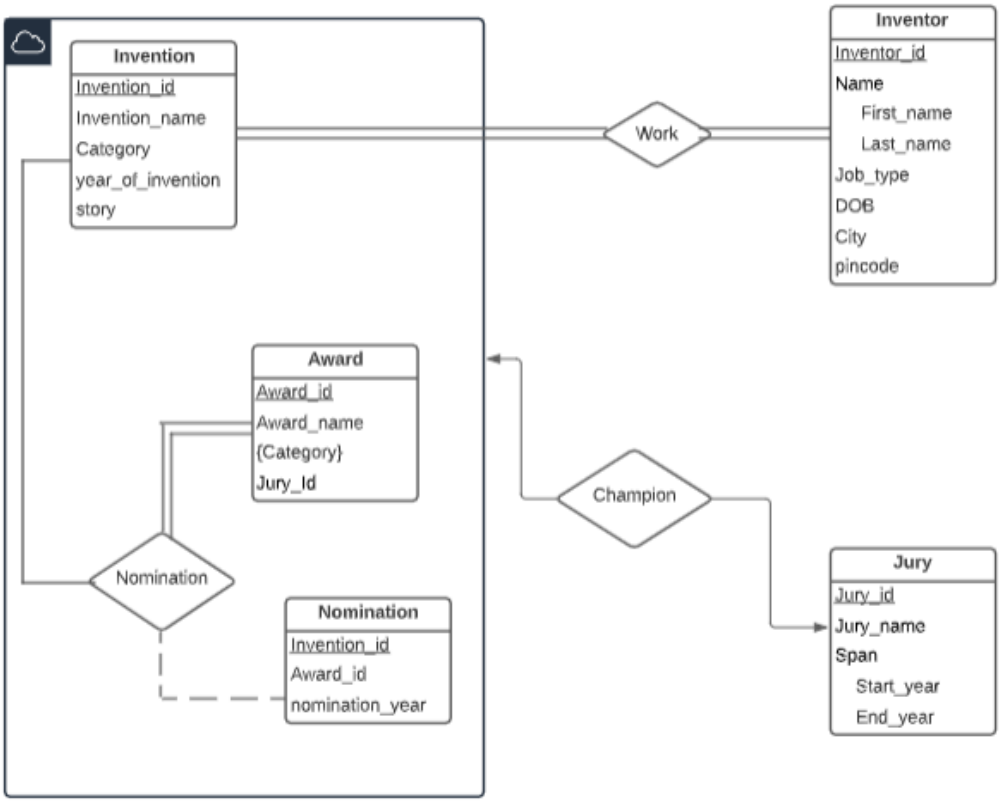
3) Award:

- It has the attributes like award id, name of the award, category.
- Award has a multi valued attribute(category).
- Awards are of different types like National and International.
- Award has the many-to-many relationship with Invention with the total participation.
- The award decision is made by the jury on basis of nominations so the jury attributes with the awards issued.
- There is no such rule that every invention should get award.
- We require attributes for the relation award_nominations like invention id, award id, nomination_year.

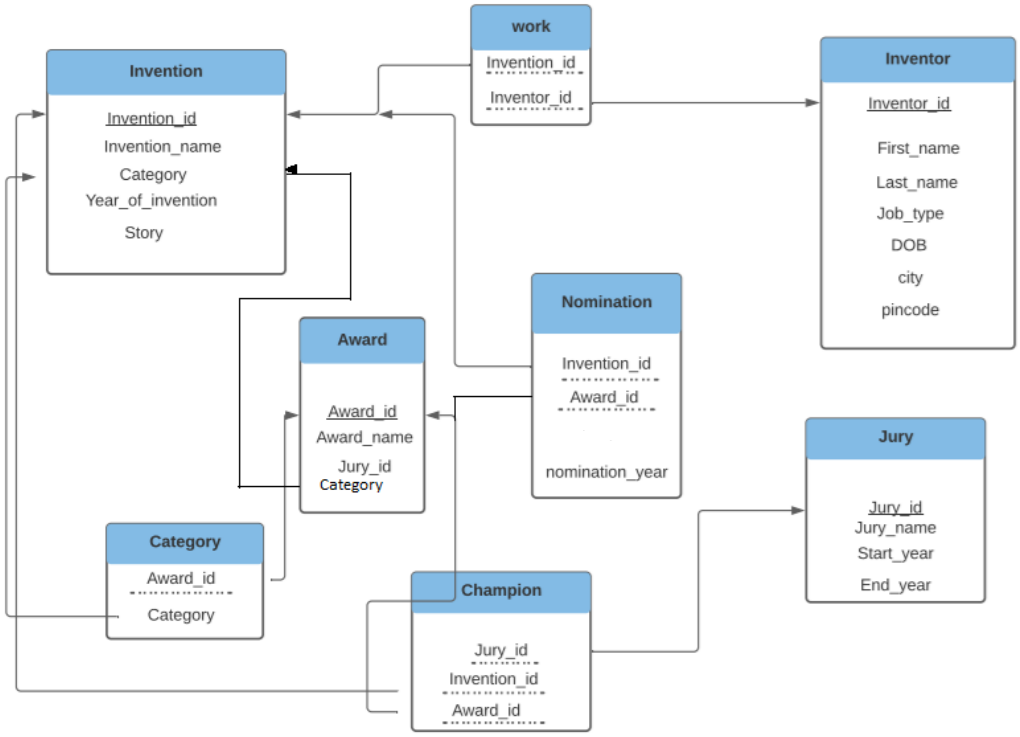
4) Jury:

- It has the attributes like jury id, name of the jury, active years, category.
- Jury's verdict is final for declaring the winner.

ER Diagram


Invention
Invention_id
Invention_name
Category
year_of_invention
story
Work
Inventor
Inventor_id
Name
First_name
Last_name
Job_type
DOB
City
pincode
Award
Award_id
Award_name
{Category}
Jury_Id
Champion
Nomination
Nomination
Invention_id
Award_id
nomination_year
Jury
Jury_id
Jury_name
Span
Start_year
End_year

Schema Diagram



Relational Schema:

Invention (Invention_id, Invention_name, Category, Year_of_invention, Story)

Inventor (Inventor_id, First_name, Last_name, Job_type, DOB, City,Pincode)

Jury(Jury_id, Jury_name, start_year, end_year)

Work (Invention_id, Inventor_id)

Award (Award_id, Award_name, category, jury_id)

Category (Award_id, Category)

Nominations (Invention_id, Award_id, Nomination_year)

Champion (Jury_id, Invention_id, award_id)

The initial table contains the following attributes:

invention_id, invention_name, year_of_invention, story, category,

invertor_id, inventor_name, DOB, Job_type, city, pincode

nomination_year, Award_id, Award_name, Category, Jury_id, Jury_name, Span

The Relation is defined by

Invention_Management(invention_id, invention_name, year_of_invention, story, category, invertor_id, inventor_name, DOB, Job_type, city, pincode, nomination_year, Award_id, Award_name, Jury_id, Jury_name, Span)

The attributes are defined as follows:

Invention_id: identify invention details.

Invention_name: name of the invention

Year_of_invention: year of invention

Story: story behind the invention

Inventor_id: identify inventor details

Inventor_name: it is a composite attribute having first_name and last_name

DOB: date of birth

Job_Type: Job of the inventor

City: city of the inventor

Pin code: pin code of inventor

Nomination_year: year in which award nominated

Award_id: identify all the awards uniquely

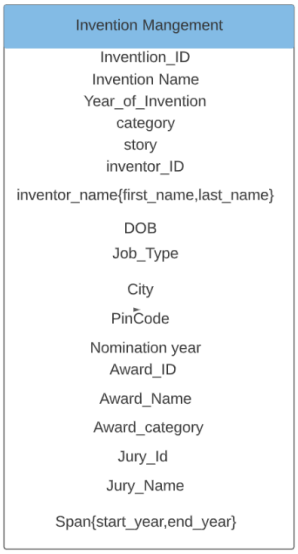
Award_name: Name of the award

Category: The category to which this award belongs to the invention

Jury_id: identify jury

Jury_name: Name of the Jury

Span: service of the jury, it is a composite attribute containing Start and End Year



Applying Normal Forms

1NF

Column should contain values of same type. Duplicate rows shouldn't be there. It disallows the composite attribute. Each tuple should be atomic. So, all multi-valued attributes should be split into individual tuples

Applying 1NF to the universal table

1. Invention_name is split into (First_name, Last_name), Span is split into Start_year, End_year.
2. An invention can have multiple inventors, so each of the inventor details for a specific invention will be shown in separate tuples.
3. An invention can have multiple awards, so each award for a specific invention will be shown in separate tuples.

After applying 1NF:

- Invention_Management(invention_id, invention_name, year_of_invention, story, invertor_id,first_name, last_name, DOB, Job_type, City, Pincode, nomination_year, Award_id, Award_name, Category, Jury_id, Jury_name, Start_Year, End_Year)

-

Functional dependencies after applying 1NF:

1. Invention_id => invention_name, year_of_invention, story.
2. Inventor_id => first_name, last_name, DOB, Job_type, city, pincode.
3. Award_id => award_name, category, jury_id, jury_name, start_year, end_year.
4. Invention_id, award_id => nomination_year.

Primary key:
invention_id, inventor_id, award_id

invention_id, inventor_id, award_id =>

invention_name, year_of_invention, story, first_name, last_name, DOB, Job_type, City, Pincode, nomination_year, Award_name, Category, Jury_id, Jury_name, Start_Year, End_Year

2NF:

A relation will be in 2NF if the partial dependency is eliminated.

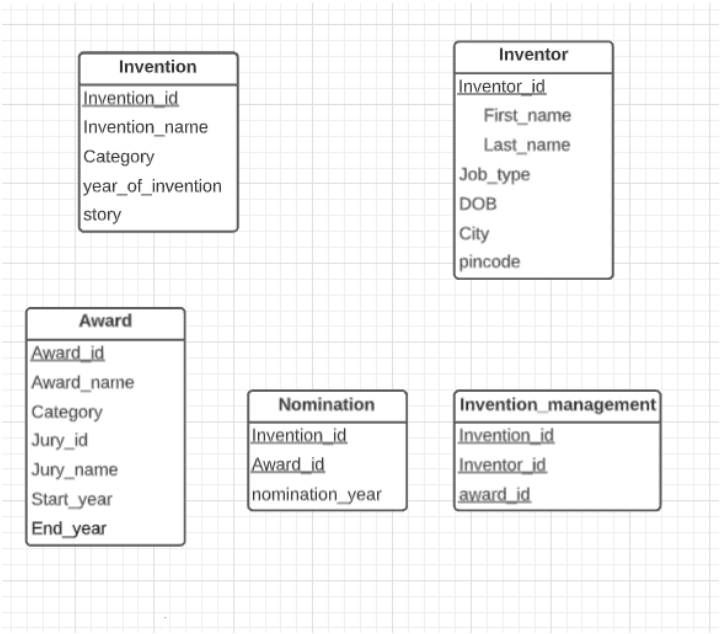
Applying 2NF:

Partial Dependency occurs due to non-prime attributes(invention_name, year_of_invention, story, first_name, last_name, DOB, Job_type, City, Pincode, nomination_year, Award_name, Category, Jury_id, Jury_name, Start_Year, End_Year) are functionally dependent on part of a candidate key.(invention_id, inventor_id, award_id)

After applying 2NF:

- Invention (invention_id, invention_name, year_of_invention,story)
- Inventor (inventor_id, first_name, last_name, DOB, Job_type, City, Pincode)
- Awards (Award_id, Award_name, Category, Jury_id, Jury_name, Start_Year, End_Year)

- Nomination (invention_id, Award_id, nomination_year)
- Invention_Management(invention_id, inventor_id, award_id)



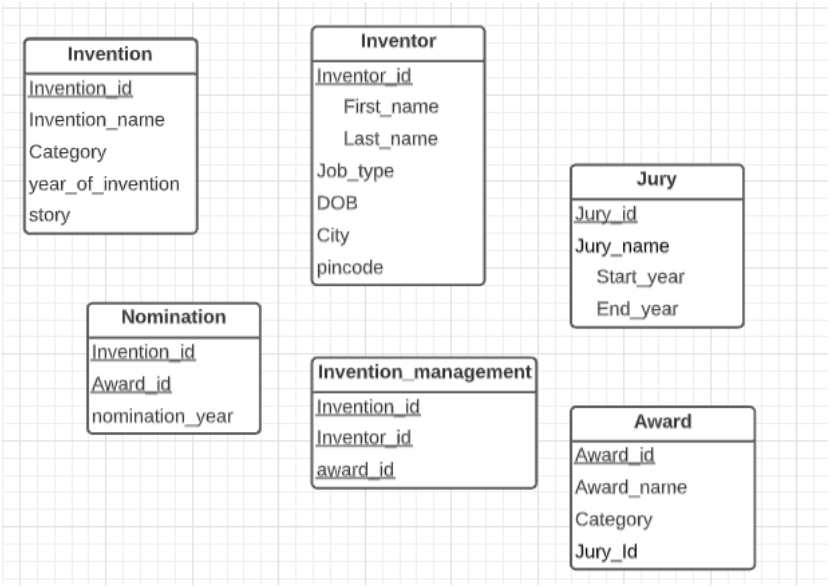
Functional dependencies after applying 2NF:
Transitive dependency exists
Jury_id => jury_name, start_year, end_year

3NF:

In 3NF, we eliminate all transitive dependencies. Transitive dependencies mean that a non-prime attribute is dependent on another non-prime attribute which is not a part of the candidate key but is dependent on candidate key.

After applying 3NF:

- Invention (invention_id, invention_name, year_of_invention, story)
- Inventor (inventor_id, first_name, last_name, DOB, Job_type, City, Pincode)
- Award (Award_id, Award_name, Category, jury_id)
- Nomination (invention_id, Award_id, nomination_year)
- Invention_Management (invention_id, inventor_id, award_id)
- Jury (jury_id, jury_name, Start_year, End_year)



Without normalization

Invention_Name	Year_of_Invention	Category	Story	Inventor_id	Inventor_Name
Autonomous Cars	26-03-2000	Autonomous Systems	ABC	Inr_1001, Inr_1002	Kartik M, Yash P
Automatic Web Design	12-07-2011	Automation of design	DEF	Inr_1003, Inr_1004	Jaswanth T, Sameer San
Text Understanding	26-03-2010	Text Understanding	GHI	Inr_1005, Inr_1006	Yash P,Arjun reddy
Autonomous Cars	26-03-2006	Autonomous Systems	JKL	Inr_1007, Inr_1008	Kartik M, Praneeth P
Adobe XD	26-03-2008	Development Tools	MNO	Inr_1009, Inr_1010	Javed Habib, Satya M

Job_Type	DOB	Address	Award_id
Scientist, Scientist	13-07-1987, 25-02-1988	2,3, b,c	Awr_1001
Scientist, Student	17-05-1975, 28-07-1998	5,6, e,f	Awr_1002
Scientist, Student	25-02-1988, 19-02-1998	b,c, 8,9	Awr_1003
Scientist, Student	13-07-1987, 18-09-1999	2,3, h,i	Awr_1004
Scientist, Student	01-05-1987, 25-02-1998	11,12, k,l	Awr_1005,Awr_1006

Award_Name	Category	Jury_id	Jury_Name	Span
Breakthrough Autonomous Systems	Autonomous Systems	Ju_1001	Virat Kohli	2000 2001
Best Automating Technology	Automation of design	Ju_1002	Rohit Sharma	2011 2012
The Best Software for Text Underst	Text Understanding	Ju_1003	Bhapayee	2010 2011
The Best Potential Future Technolo	Autonomous Systems	Ju_1004	Brett lee	2006 2007
Best Tool For Development, People	Development Tools	Ju_1005,Ju_1006	Shane, Harsha	2008 2009

1NF:

Invention_id	Invention_Name	Year_of_Invention	Story	Inventor_id	F Name	L Name	Job_Type	DOB
Inv_1001	Autonomous Cars	26-03-2000	ABC	Inr_1001	Kartik	M	Scientist	13-07-1987
Inv_1001	Autonomous Cars	26-03-2000	ABC	Inr_1002	Yash	P	Scientist	25-02-1982
Inv_1002	Automatic Web Design	12-07-2011	DEF	Inr_1003	Jaswanth	J	Scientist	17-05-1975
Inv_1003	Automatic Web Design	12-07-2011	DEF	Inr_1004	Sameer	Sam	Student	28-07-1987
Inv_1003	Text Understanding	26-03-2010	GHI	Inr_1002	Yash	P	Scientist	25-02-1982
Inv_1003	Text Understanding	26-03-2010	GHI	Inr_1005	Arjun	Reddy	Student	19-02-1989
Inv_1004	Autonomous Cars	26-03-2006	JKL	Inr_1001	Kartik	M	Scientist	13-07-1987
Inv_1004	Autonomous Cars	26-03-2006	JKL	Inr_1006	Praneeth	P	Student	18-09-1989
Inv_1005	Adobe XD	26-03-2008	MNO	Inr_1007	Javed	Habib	Scientist	01-05-1987
Inv_1005	Adobe XD	26-03-2008	MNO	Inr_1007	Javed	Habib	Scientist	01-05-1987
Inv_1005	Adobe XD	26-03-2008	MNO	Inr_1008	Satya	M	Student	16-12-1988
Inv_1005	Adobe XD	26-03-2008	MNO	Inr_1008	Satya	M	Student	16-12-1988

City	Pincode	Award_id	Award_Name	Category	Jury_id	Jury_Name
2	3	Awr_1001	Breakthrough Autonomous Systems	Autonomous Systems	Ju_1001	Virat Kohli
b	c	Awr_1001	Breakthrough Autonomous Systems	Autonomous Systems	Ju_1001	Virat Kohli
5	6	Awr_1002	Best Automating Technology	Automation of design	Ju_1002	Rohit Sharma
e	f	Awr_1002	Best Automating Technology	Automation of design	Ju_1002	Rohit Sharma
b	c	Awr_1003	The Best Software for Text Understanding	Text Understanding	Ju_1003	Bhapayee
8	9	Awr_1003	The Best Software for Text Understanding	Text Understanding	Ju_1003	Bhapayee
2	3	Awr_1004	The Best Potential Future Technology	Autonomous Systems	Ju_1004	Brett lee
h	i	Awr_1004	The Best Potential Future Technology	Autonomous Systems	Ju_1004	Brett lee
11,	12	Awr_1005	Best Tool For Development	Development Tools	Ju_1005	Shane
11,	12	Awr_1006	People's Choice Best Tool	Development Tools	Ju_1006	Harsha
k	l	Awr_1005	Best Tool For Development	Development Tools	Ju_1005	Shane
l	l	Awr_1006	People's Choice Best Tool	Development Tools	Ju_1006	Harsha

Start Date	Last Date	Category
2000	2001	Autonomous Systems
2000	2001	Autonomous Systems
2011	2012	Automation of design
2011	2012	Automation of design
2010	2011	Text Understanding
2010	2011	Text Understanding
2006	2007	Autonomous Systems
2006	2007	Autonomous Systems
2008	2009	Development Tools
2008	2009	Development Tools
2008	2009	Development Tools
2008	2009	Development Tools

2NF:

Invention

Invention_id	Invention_Name	Story	Year_of_Invention	Category
Inv_1001	Autonomous Cars	ABC	26-03-2000	Autonomous Systems
Inv_1002	Automatic Web Design	DEF	12-07-2011	Automation of design
Inv_1003	Text Understanding	GHI	26-03-2010	Text Understanding
Inv_1004	Autonomous Cars	JKL	26-03-2006	Autonomous Systems
Inv_1005	Adobe XD	MNO	26-03-2008	Development Tools

Inventor

Inventor_id	F Name	L Name	Job_Type	DOB	City	Pincode
Inr_001	Kartik	M	Scientist	13-07-1987	2	3
Inr_002	Yash	Pramod	Scientist	25-02-1988	b	c
Inr_003	Jaswanth	T	Scientist	17-05-1975	5	6
Inr_004	Sameer	Sam	Student	28-07-1998	e	f
Inr_005	Arjun	Reddy	Student	19-02-1998	8	9
Inr_006	Praneeth	P	Student	18-09-1999	h	i
Inr_007	Javed	Habib	Scientist	01-05-1987	11	12
Inr_008	Satya	M	Student	16-12-1998	k	l

Award

Award_id	Award_Name	Category	Jury_id	Jury_Name	Start_Year	End_Year
Awr_1001	Breakthrough Autonomous Systems	Autonomous Systems	Ju_1001	Suresh Patel	2000	2001
Awr_1002	Best Automating Technology	Automation of design	Ju_1002	Ramesh Saxena	2011	2012
Awr_1003	The Best Software for Text Understanding	Text Understanding	Ju_1003	Mike Rooney	2010	2011
Awr_1004	The Best Potential Future Technology	Autonomous Systems	Ju_1004	Kritika Singh	2006	2007
Awr_1005	Best Tool For Development	Development Tools	Ju_1005	Donald Lee	2008	2009
Awr_1006	People's Choice Best Tool	Development Tools	Ju_1006	Harsh Dwivedi	2008	2009

Nominations

Invention_id	Award_id	nomination_year
Inv_1001	Awr_1001	2001
Inv_1001	Awr_1002	2000
Inv_1001	Awr_1004	2002
Inv_1002	Awr_1002	2011
Inv_1002	Awr_1004	2012
Inv_1002	Awr_1005	2013
Inv_1003	Awr_1003	2012
Inv_1003	Awr_1005	2010
Inv_1003	Awr_1006	2011
Inv_1004	Awr_1004	2006
Inv_1004	Awr_1002	2008
Inv_1004	Awr_1001	2010
Inv_1005	Awr_1005	2009
Inv_1005	Awr_1006	2010

	Invention_id	Award_id	Inventor_id
124			
125	Inv_1001	Awr_1001	Inr_1001
126	Inv_1001	Awr_1001	Inr_1002
127	Inv_1002	Awr_1002	Inr_1003
128	Inv_1002	Awr_1002	Inr_1004
129	Inv_1003	Awr_1003	Inr_1002
130	Inv_1003	Awr_1003	Inr_1005
131	Inv_1004	Awr_1004	Inr_1001
132	Inv_1004	Awr_1004	Inr_1006
133	Inv_1005	Awr_1005	Inr_1007
134	Inv_1005	Awr_1006	Inr_1007
135	Inv_1005	Awr_1005	Inr_1008
136	Inv_1005	Awr_1006	Inr_1008
137			

3NF:

Awards

Award_id	Award_Name	Category	Jury_id
Awr_1001	Breakthrough Autonomous Systems	Autonomous Systems	Ju_1001
Awr_1002	Best Automating Technology	Automation of design	Ju_1002
Awr_1003	The Best Software for Text Understanding	Text Understanding	Ju_1003
Awr_1004	The Best Potential Future Technology	Autonomous Systems	Ju_1004
Awr_1005	Best Tool For Development	Development Tools	Ju_1005
Awr_1006	People's Choice Best Tool	Development Tools	Ju_1006

Jury

Jury_id	Jury_Name	Start Date	Last Date
Ju_1001	Virat Kohli	2000	2001
Ju_1002	Rohit Sharma	2011	2012
Ju_1003	Bhapayee	2010	2011
Ju_1004	Brett lee	2006	2007
Ju_1005	Shane	2008	2009
Ju_1006	Harsha	2008	2009

Sql queries: (DDL Statements)

//create

```
create table Inventions(
        invention_id varchar(10) primary key,
        invention_name varchar(20),
        story varchar(100),
        year_of_invention date,
        category varchar(100));

create table Inventor(
        inventor_id varchar(10) primary key,
        first_name varchar(10),
        last_name varchar(10),
        DOB date,
        job_type varchar(20),
        city varchar(30),
        pincode varchar(10));

create table Awards(
        award_id varchar(10) primary key,
        award_name varchar(40),
        category varchar(20),
        jury_id varchar(10),
        foreign key (jury_id) references Jury);

create table Jury(
        jury_id varchar(10) primary key,
        jury_name varchar(20),
        start_year int,
        end_year int);

create table nominations(
        invention_id varchar(10),
        award_id varchar(10),
        nomination_year int,
        primary key(invention_id, award_id),
        foreign key (invention_id) references Inventions,
        foreign key (award_id) references Awards);

create table Invention_management(
        invention_id varchar(10),
        award_id varchar(10),
        inventor_id varchar(10),
        primary key (invention_id, inventor_id, award_id),
        foreign key (invention_id) references Inventions,
        foreign key (inventor_id) references Inventor,
```

foreign key (award_id) references Awards);

//insert

```
INSERT INTO Inventions VALUES ('Inv_1001','Autonomous Cars','ABC','26-MAR-2000','Autonomous Systems'),
 ('Inv_1002','Automatic Web Design','DEF','12-JUL-2011','Automation of design'),
 ('Inv_1003','Text Understanding','GHI','26-MAR-2010','Text Understanding'),
('Inv_1004','Autonomous Cars','JKL','26-MAR-2006','Autonomous Systems'),
 ('Inv_1005','Adobe XD','MNO','26-MAR-2008','Development Tools');

INSERT INTO Inventor VALUES ('Inr_1001','Kartik ','M','13-JUL-1987','Scientist','2','3'),
 ('Inr_1002','Yash ','P','25-FEB-1988','Scientist','b','c'),
 ('Inr_1003','Jaswanth ','T','17-MAY-1975','Scientist','5','6'),
 ('Inr_1004','Sameer ','Sam','28-JUL-1998','Student','e','f'),
 ('Inr_1005','Arjun ','Reddy','19-FEB-1998','Student','8','9'),
('Inr_1006','Praneeth ','P','18-SEP-1999','Student','h','i'),
('Inr_1007','Javed ','Habib','01-MAY-1987','Scientist','11','12'),
 ('Inr_1008','Satya ','M','16-DEC-1998','Student','k','l');

INSERT INTO Jury VALUES ('Ju_1001','Virat Kohli',2000,2001),
 ('Ju_1002','Rohit Sharma',2011,2012),
 ('Ju_1003','Bhapayee',2010,2011),
('Ju_1004','Brett lee',2006,2007),
 ('Ju_1005','Shane',2008,2009),
('Ju_1006','Harsha',2008,2009);

INSERT INTO Awards VALUES ('Awr_1001','Breakthrough Autonomous Systems','Autonomous Systems','Ju_1001'),
 ('Awr_1002','Best Automating Technology','Automation of design','Ju_1002'),
 ('Awr_1003','The Best Software for Text Understanding','Text Understanding','Ju_1003'),
 ('Awr_1004','The Best Potential Future Technology','Autonomous Systems','Ju_1004'),
 ('Awr_1005','Best Tool For Development','Development Tools','Ju_1005'),
 ('Awr_1006','Peoples Choice Best Tool','Development Tools','Ju_1006');

INSERT INTO nominations VALUES ('Inv_1001','Awr_1001',2001),
 ('Inv_1001','Awr_1002',2000),
 ('Inv_1001','Awr_1004',2002),
('Inv_1002','Awr_1002',2011),
('Inv_1002','Awr_1004',2012),
 ('Inv_1002','Awr_1005',2013),
 ('Inv_1003','Awr_1003',2012),
 ('Inv_1003','Awr_1005',2010),
('Inv_1003','Awr_1006',2011),
 ('Inv_1004','Awr_1004',2006),
 ('Inv_1004','Awr_1002',2008),
 ('Inv_1005','Awr_1005',2009),
('Inv_1005','Awr_1006',2010);
```

```
INSERT INTO Invention_management VALUES ('Inv_1001','Awr_1001','Inr_1001'),
('Inv_1001','Awr_1001','Inr_1002'),
 ('Inv_1002','Awr_1002','Inr_1003'),
 ('Inv_1002','Awr_1002','Inr_1004'),
 ('Inv_1003','Awr_1003','Inr_1002'),
('Inv_1003','Awr_1003','Inr_1005'),
 ('Inv_1004','Awr_1004','Inr_1001'),
('Inv_1004','Awr_1004','Inr_1006'),
 ('Inv_1005','Awr_1005','Inr_1007'),
 ('Inv_1005','Awr_1006','Inr_1007'),
 ('Inv_1005','Awr_1005','Inr_1008'),
 ('Inv_1005','Awr_1006','Inr_1008');
```

Queries and Results

/*1*/

Aggregate functions , Group by...having

Display the count of nominations which occurred more than 1 time in the same year

```
select count(invention_id) as Nominations, nomination_year from nominations GROUP BY
nomination_year having count(invention_id)>1;
```

Data Output | Explain | Messages | Notifications

	nominations bigint	nomination_year integer
1	2	2012
2	2	2010
3	2	2011

/*2*/

Order by

Ascending order

Inventions in ascending order of their year_of_invention

```
SELECT invention_id, year_of_invention FROM Inventions ORDER BY (year_of_invention)ASC;
```

Data Output | Explain | Messages | Notifications

	invention_id [PK] character varying (10)	year_of_invention date
1	Inv_1001	2000-03-26
2	Inv_1004	2006-03-26
3	Inv_1005	2008-03-26
4	Inv_1003	2010-03-26
5	Inv_1002	2011-07-12

Descending order

Inventions in descending order of their year_of_invention

SELECT invention_id, year_of_invention FROM Inventions ORDER BY (year_of_invention)DESC;

Data Output | Explain | Messages | Notifications

	invention_id [PK] character varying (10)	year_of_invention date
1	Inv_1002	2011-07-12
2	Inv_1003	2010-03-26
3	Inv_1005	2008-03-26
4	Inv_1004	2006-03-26
5	Inv_1001	2000-03-26

/*3*/

JOIN

Display details from invention_management where award_id from invention_management=awards_id from nominations(using join)

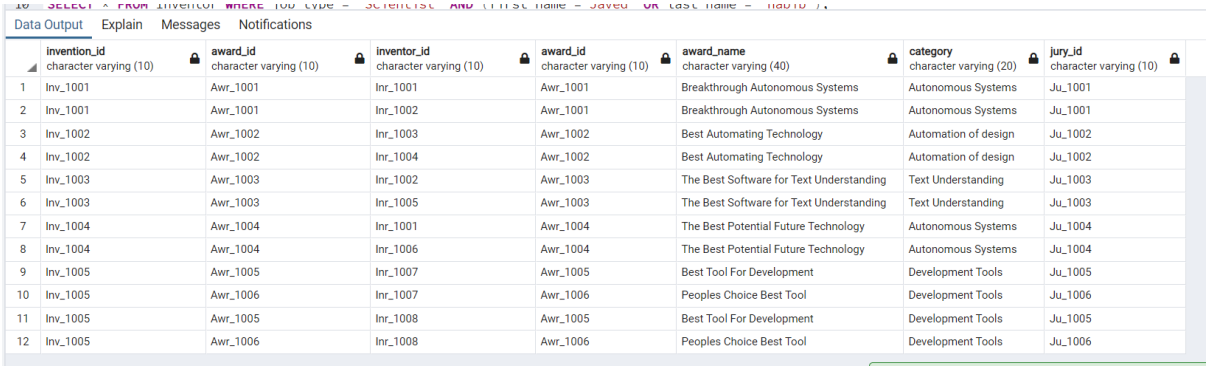
select * from Invention_management right JOIN awards ON Invention_management.award_id=awards.award_id;

Data Output | Explain | Messages | Notifications

	invention_id character varying (10)	award_id character varying (10)	inventor_id character varying (10)	award_id character varying (10)	award_name character varying (40)	category character varying (20)	jury_id character varying (10)
1	Inv_1001	Awr_1001	Inr_1001	Awr_1001	Breakthrough Autonomous Systems	Autonomous Systems	Ju_1001
2	Inv_1001	Awr_1001	Inr_1002	Awr_1001	Breakthrough Autonomous Systems	Autonomous Systems	Ju_1001
3	Inv_1002	Awr_1002	Inr_1003	Awr_1002	Best Automating Technology	Automation of design	Ju_1002
4	Inv_1002	Awr_1002	Inr_1004	Awr_1002	Best Automating Technology	Automation of design	Ju_1002
5	Inv_1003	Awr_1003	Inr_1002	Awr_1003	The Best Software for Text Understanding	Text Understanding	Ju_1003
6	Inv_1003	Awr_1003	Inr_1005	Awr_1003	The Best Software for Text Understanding	Text Understanding	Ju_1003
7	Inv_1004	Awr_1004	Inr_1001	Awr_1004	The Best Potential Future Technology	Autonomous Systems	Ju_1004
8	Inv_1004	Awr_1004	Inr_1006	Awr_1004	The Best Potential Future Technology	Autonomous Systems	Ju_1004
9	Inv_1005	Awr_1005	Inr_1007	Awr_1005	Best Tool For Development	Development Tools	Ju_1005
10	Inv_1005	Awr_1006	Inr_1007	Awr_1006	Peoples Choice Best Tool	Development Tools	Ju_1006
11	Inv_1005	Awr_1005	Inr_1008	Awr_1005	Best Tool For Development	Development Tools	Ju_1005
12	Inv_1005	Awr_1006	Inr_1008	Awr_1006	Peoples Choice Best Tool	Development Tools	Ju_1006

OUTER JOIN

SELECT * from Invention_management FULL OUTER JOIN awards ON Invention_management.award_id=awards.award_id;



Data Output | Explain | Messages | Notifications

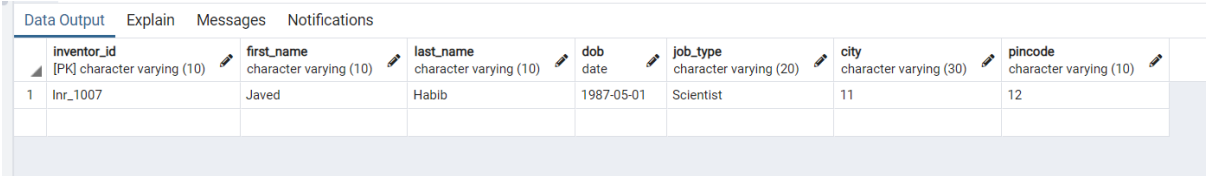
	invention_id character varying (10)	award_id character varying (10)	inventor_id character varying (10)	award_id character varying (10)	award_name character varying (40)	category character varying (20)	jury_id character varying (10)
1	Inv_1001	Awr_1001	Inr_1001	Awr_1001	Breakthrough Autonomous Systems	Autonomous Systems	Ju_1001
2	Inv_1001	Awr_1001	Inr_1002	Awr_1001	Breakthrough Autonomous Systems	Autonomous Systems	Ju_1001
3	Inv_1002	Awr_1002	Inr_1003	Awr_1002	Best Automating Technology	Automation of design	Ju_1002
4	Inv_1002	Awr_1002	Inr_1004	Awr_1002	Best Automating Technology	Automation of design	Ju_1002
5	Inv_1003	Awr_1003	Inr_1002	Awr_1003	The Best Software for Text Understanding	Text Understanding	Ju_1003
6	Inv_1003	Awr_1003	Inr_1005	Awr_1003	The Best Software for Text Understanding	Text Understanding	Ju_1003
7	Inv_1004	Awr_1004	Inr_1001	Awr_1004	The Best Potential Future Technology	Autonomous Systems	Ju_1004
8	Inv_1004	Awr_1004	Inr_1006	Awr_1004	The Best Potential Future Technology	Autonomous Systems	Ju_1004
9	Inv_1005	Awr_1005	Inr_1007	Awr_1005	Best Tool For Development	Development Tools	Ju_1005
10	Inv_1005	Awr_1006	Inr_1007	Awr_1006	Peoples Choice Best Tool	Development Tools	Ju_1006
11	Inv_1005	Awr_1005	Inr_1008	Awr_1005	Best Tool For Development	Development Tools	Ju_1005
12	Inv_1005	Awr_1006	Inr_1008	Awr_1006	Peoples Choice Best Tool	Development Tools	Ju_1006

/*4*/

Query having Boolean operators

Displays information of inventor whose job type=’scientist’ whose last name=habib and last name=javed

```
SELECT * FROM Inventor WHERE job_type = 'Scientist' AND (first_name ='Javed' OR last_name = 'Habib');
```



Data Output | Explain | Messages | Notifications

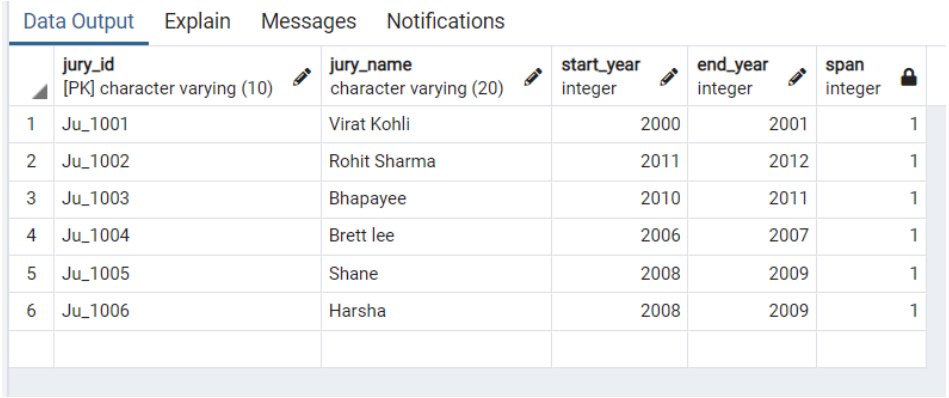
	inventor_id [PK] character varying (10)	first_name character varying (10)	last_name character varying (10)	dob date	job_type character varying (20)	city character varying (30)	pincode character varying (10)
1	Inr_1007	Javed	Habib	1987-05-01	Scientist	11	12

/*5*/

Query having arthimetic operator

Displays jury information whose span <=1 year.

```
SELECT jury_id, jury_name, start_year,end_year,(end_year-start_year) AS span FROM jury where (end_year-start_year)<=1 ;
```



Data Output | Explain | Messages | Notifications

	jury_id [PK] character varying (10)	jury_name character varying (20)	start_year integer	end_year integer	span integer
1	Ju_1001	Virat Kohli	2000	2001	1
2	Ju_1002	Rohit Sharma	2011	2012	1
3	Ju_1003	Bhapayee	2010	2011	1
4	Ju_1004	Brett lee	2006	2007	1
5	Ju_1005	Shane	2008	2009	1
6	Ju_1006	Harsha	2008	2009	1

/*6*/

A search query using string operators

Display full invention_name which starts with Aut.

```
select invention_name from inventions where invention_name like '%Aut%';
```

Data Output | Explain | Messages | Notifications

	invention_name character varying (20)
1	Autonomous Cars
2	Automatic Web Design
3	Autonomous Cars

/*7*/

Usage of to_char

Converting DOB(YYYY-MM-DD) TO YYYY/MM/DD Format

```
select to_char(DOB, 'MM/DD/YYYY') FROM Inventor;
```

Data Output | Explain | Messages | Notifications

	to_char text
1	07/13/1987
2	02/25/1988
3	05/17/1975
4	07/28/1998
5	02/19/1998
6	09/18/1999
7	05/01/1987
8	12/16/1998

Usage of extract

Display only year(YYYY) from the year_of_invention(YYYY-MM-DD).

```
select extract(YEAR FROM DOB), inventor_id FROM Inventor;
```

Data Output | Explain | Messages | Notifications

	date_part double precision	inventor_id [PK] character varying (10)
1	1987	Inr_1001
2	1988	Inr_1002
3	1975	Inr_1003
4	1998	Inr_1004
5	1998	Inr_1005
6	1999	Inr_1006
7	1987	Inr_1007
8	1998	Inr_1008

/*8*/

IN

Display invention info where category='Autonomous Systems' or 'Text Understanding' using IN

```
SELECT * FROM inventions WHERE category IN ('Autonomous Systems', 'Text Understanding');
```

Data Output | Explain | Messages | Notifications

	invention_id [PK] character varying (10)	invention_name character varying (20)	story character varying (100)	year_of_invention date	category character varying (100)
1	Inv_1001	Autonomous Cars	ABC	2000-03-26	Autonomous Systems
2	Inv_1003	Text Understanding	GHI	2010-03-26	Text Understanding
3	Inv_1004	Autonomous Cars	JKL	2006-03-26	Autonomous Systems

NOT IN

Display invention info where category!='Autonomous Systems' or 'Text Understanding' using IN

```
SELECT * FROM inventions WHERE category NoT IN ('Autonomous Systems', 'Text Understanding');
```

Data Output | Explain | Messages | Notifications

	invention_id [PK] character varying (10)	invention_name character varying (20)	story character varying (100)	year_of_invention date	category character varying (100)
1	Inv_1002	Automatic Web Design	DEF	2011-07-12	Automation of design
2	Inv_1005	Adobe XD	MNO	2008-03-26	Development Tools

BETWEEN

Display the details of the inventions which are invented between 2008 and 2011 year

```
SELECT nomination_year FROM nominations WHERE nomination_year BETWEEN 2008 AND 2011;
```

Data Output | Explain | Mes

	nomination_year integer
1	2011
2	2010
3	2011
4	2008
5	2009
6	2010

NOT BETWEEN

Display the details of the inventions which are invented not between 2008 and 2011 year

```
SELECT nomination_year FROM nominations WHERE nomination_year NOT BETWEEN 2008 AND
2011;
```

Data Output | Explain | Mes

	nomination_year integer
1	2001
2	2000
3	2002
4	2012
5	2013
6	2012
7	2006

/*9*/
SET OPERATIONS

SELECT invention_id FROM Inventions INTERSECT SELECT invention_id FROM nominations;

Data Output | Explain | Messages | Notifications

	invention_id character varying (10)
1	Inv_1001
2	Inv_1003
3	Inv_1004
4	Inv_1002
5	Inv_1005

SELECT DISTINCT(invention_id) FROM Inventions UNION SELECT DISTINCT(invention_id) FROM nominations;

Data Output | Explain | Messages | Notifi

	invention_id character varying (10)
1	Inv_1001
2	Inv_1004
3	Inv_1005
4	Inv_1003
5	Inv_1002

/*10*/
SUBQUERY(EXIST)
Displaying Winning inventions from all the nominations
SELECT DISTINCT invention_id, award_id FROM Invention_management WHERE EXISTS (SELECT invention_id, award_id FROM nominations);

Data Output | Explain | Messages | Notifications

	invention_id character varying (10)	award_id character varying (10)
1	Inv_1004	Awr_1004
2	Inv_1003	Awr_1003
3	Inv_1005	Awr_1005
4	Inv_1001	Awr_1001
5	Inv_1005	Awr_1006
6	Inv_1002	Awr_1002

SUBQUERY (NOT EXIST)

SELECT DISTINCT invention_id, award_id FROM Invention_management WHERE Not EXISTS (SELECT invention_id, award_id FROM nominations);

SUBQUERY(ANY)

Inventions nominated for the award Awr_1004

SELECT DISTINCT invention_id FROM Invention_management WHERE invention_id = ANY(SELECT invention_id FROM nominations WHERE award_id='Awr_1004');

Data Output | Explain | Messages | Notifications

	invention_id character varying (10)
1	Inv_1001
2	Inv_1002
3	Inv_1004

SUBQUERY(ALL).

Select all inventions where award_id not null in award_nominations

SELECT DISTINCT invention_id FROM Invention_management WHERE invention_id = ALL(SELECT invention_id FROM nominations WHERE award_id!=NULL);

Data Output | Explain | Messages | Notifications

	invention_id character varying (10)
1	Inv_1001
2	Inv_1003
3	Inv_1004
4	Inv_1002
5	Inv_1005

~Thank You