# Database Management with PostgreSQL

- **By J. Jaya Prakash**

1. How can you retrieve all the information from the cd.facilities table?

Query | Query History

```
1  SELECT * FROM cd.facilities
```

| | facid [PK] integer | name character varying (100) | membercost numeric | guestcost numeric | initialoutlay numeric | monthlymaintenance numeric |
|---|---|---|---|---|---|---|
| 1 | 0 | Tennis Court 1 | 5 | 25 | 10000 | 200 |
| 2 | 1 | Tennis Court 2 | 5 | 25 | 8000 | 200 |
| 3 | 2 | Badminton Court | 0 | 15.5 | 4000 | 50 |
| 4 | 3 | Table Tennis | 0 | 5 | 320 | 10 |
| 5 | 4 | Massage Room 1 | 35 | 80 | 4000 | 3000 |
| 6 | 5 | Massage Room 2 | 35 | 80 | 4000 | 3000 |

2. You want to print out a list of all of the facilities and their cost to members. How would you retrieve a list of only facility names and costs?

Query | Query History

```
1  SELECT name, membercost FROM cd.facilities
```

| | name character varying (100) | membercost numeric |
|---|---|---|
| 1 | Tennis Court 1 | 5 |
| 2 | Tennis Court 2 | 5 |
| 3 | Badminton Court | 0 |
| 4 | Table Tennis | 0 |
| 5 | Massage Room 1 | 35 |
| 6 | Massage Room 2 | 35 |

3. How can you produce a list of facilities that charge a fee to members?

Query | Query History

```
1  SELECT name, membercost FROM cd.facilities
2  WHERE membercost > 0
```

| | name<br>character varying (100) | membercost<br>numeric |
|---|---|---|
| 1 | Tennis Court 1 | 5 |
| 2 | Tennis Court 2 | 5 |
| 3 | Massage Room 1 | 35 |
| 4 | Massage Room 2 | 35 |
| 5 | Squash Court | 3.5 |

4. How can you produce a list of facilities that charge a fee to members, and that fee is less than 1/50th of the monthly maintenance cost? Return the facid, facility name, member cost, and monthly maintenance of the facilities in question.

Query | Query History

```
1  SELECT facid, name, membercost, monthlymaintenance FROM cd.facilities
2  WHERE membercost > 0 AND membercost < monthlymaintenance/50
```

| | facid<br>[PK] integer | name<br>character varying (100) | membercost<br>numeric | monthlymaintenance<br>numeric |
|---|---|---|---|---|
| 1 | 4 | Massage Room 1 | 35 | 3000 |
| 2 | 5 | Massage Room 2 | 35 | 3000 |

5. How can you produce a list of all facilities with the word 'Tennis' in their name?

Query | Query History

```
1  SELECT name FROM cd.facilities
2  WHERE name ILIKE '%Tennis%'
```

| | name<br>character varying (100) |
|---|---|
| 1 | Tennis Court 1 |
| 2 | Tennis Court 2 |
| 3 | Table Tennis |

6. How can you retrieve the details of facilities with ID 1 and 5? Try to do it without using the OR operator.

Query | Query History

```
1  SELECT * FROM cd.facilities
2  WHERE facid in (1, 5)
```

| | facid [PK] integer | name character varying (100) | membercost numeric | guestcost numeric | initialoutlay numeric | monthlymaintenance numeric |
|---|---|---|---|---|---|---|
| 1 | 1 | Tennis Court 2 | 5 | 25 | 8000 | 200 |
| 2 | 5 | Massage Room 2 | 35 | 80 | 4000 | 3000 |

7. How can you produce a list of members who joined after the start of September 2012? Return the memid, surname, firstname, and joindate of the members in question.

Query | Query History

```
1  SELECT memid, surname, firstname, joindate FROM cd.members
2  WHERE joindate > '2012-09-01'
```

| | memid [PK] integer | surname character varying (200) | firstname character varying (200) | joindate timestamp without time zone |
|---|---|---|---|---|
| 1 | 24 | Sarwin | Ramnaresh | 2012-09-01 08:44:42 |
| 2 | 26 | Jones | Douglas | 2012-09-02 18:43:05 |
| 3 | 27 | Rumney | Henrietta | 2012-09-05 08:42:35 |
| 4 | 28 | Farrell | David | 2012-09-15 08:22:05 |
| 5 | 29 | Worthington-Smyth | Henry | 2012-09-17 12:27:15 |

8. How can you produce an ordered list of the first 10 surnames in the members table? The list must not contain duplicates.

Query | Query History

```
1  SELECT DISTINCT(surname) FROM cd.members
2  ORDER BY surname
3  LIMIT 10
```

| | surname character varying (200) |
|---|---|
| 1 | Bader |
| 2 | Baker |
| 3 | Boothe |
| 4 | Butters |
| 5 | Coplin |
| 6 | Crumpet |

9. You'd like to get the signup date of your last member. How can you retrieve this information?

Query | Query History

```
SELECT joindate FROM cd.members
ORDER BY joindate DESC
LIMIT 1
```

| | joindate<br>timestamp without time zone |
|---|---|
| 1 | 2012-09-26 18:08:45 |

10. Produce a count of the number of facilities that have a cost to guests of 10 or more.

Query | Query History

```
SELECT COUNT(name) FROM cd.facilities
WHERE guestcost > 10
```

| | count<br>bigint |
|---|---|
| 1 | 6 |

11. Produce a list of the total number of slots booked per facility in the month of September 2012. Produce an output table consisting of facility id and slots, sorted by the number of slots.

Query | Query History

```
SELECT facid, SUM(slots) FROM cd.bookings
WHERE EXTRACT(MONTH FROM starttime) = 9
GROUP BY facid
ORDER BY SUM(slots) DESC
```

| | facid<br>integer | sum<br>bigint |
|---|---|---|
| 1 | 4 | 648 |
| 2 | 0 | 591 |
| 3 | 1 | 588 |
| 4 | 2 | 570 |
| 5 | 6 | 540 |
| 6 | 8 | 471 |

12. Produce a list of facilities with more than 1000 slots booked. Produce an output table consisting of facility id and total slots, sorted by facility id.

Query | Query History

```
SELECT facid, SUM(slots) FROM cd.bookings
GROUP BY facid
HAVING SUM(slots) > 1000
ORDER BY facid
```

| | facid integer | sum bigint |
|---|---|---|
| 1 | 0 | 1320 |
| 2 | 1 | 1278 |
| 3 | 2 | 1209 |
| 4 | 4 | 1404 |
| 5 | 6 | 1104 |

13. How can you produce a list of the start times for bookings for tennis courts, for the date '2012-09-21'? Return a list of start time and facility name pairings, ordered by the time.

Query | Query History

```
SELECT starttime, name FROM cd.facilities
INNER JOIN cd.bookings
ON cd.facilities.facid = cd.bookings.facid
WHERE starttime >= '2012-09-21' AND starttime < '2012-09-22'
AND name ILIKE 'Tennis%'
ORDER BY starttime
```

| | starttime timestamp without time zone | name character varying (100) |
|---|---|---|
| 1 | 2012-09-21 08:00:00 | Tennis Court 1 |
| 2 | 2012-09-21 08:00:00 | Tennis Court 2 |
| 3 | 2012-09-21 09:30:00 | Tennis Court 1 |
| 4 | 2012-09-21 10:00:00 | Tennis Court 2 |
| 5 | 2012-09-21 11:30:00 | Tennis Court 2 |
| 6 | 2012-09-21 12:00:00 | Tennis Court 1 |

14. How can you produce a list of the start times for bookings by members named 'David Farrell'?

Query | Query History

```
1  SELECT starttime, firstname, surname FROM cd.bookings
2  INNER JOIN cd.members
3  ON cd.bookings.memid = cd.members.memid
4  WHERE firstname = 'David' AND surname = 'Farrell'
5  ORDER BY starttime
```

| | starttime<br>timestamp without time zone | firstname<br>character varying (200) | surname<br>character varying (200) |
|---|---|---|---|
| 1 | 2012-09-18 09:00:00 | David | Farrell |
| 2 | 2012-09-18 13:30:00 | David | Farrell |
| 3 | 2012-09-18 17:30:00 | David | Farrell |
| 4 | 2012-09-18 20:00:00 | David | Farrell |
| 5 | 2012-09-19 09:30:00 | David | Farrell |
| 6 | 2012-09-19 12:00:00 | David | Farrell |

**Complete the following task:**

Create a new database called "School" this database should have two tables: **teachers** and **students.**

The **students** table should have columns for student_id, first_name,last_name, homeroom_number, phone,email, and graduation year.

The **teachers** table should have columns for teacher_id, first_name, last_name,

homeroom_number, department, email, and phone.

The constraints are mostly up to you, but your table constraints do have to consider the following:

1. We must have a phone number to contact students in case of an emergency.
2. We must have ids as the primary key of the tables
3. Phone numbers and emails must be unique to the individual.

Once you've made the tables, insert a student named Mark Watney (student_id=1) who has a phone number of 777-555-1234 and doesn't have an email. He graduates in 2035 and has 5 as a homeroom number.

Then insert a teacher names Jonas Salk (teacher_id = 1) who as a homeroom number of 5 and is from the Biology department. His contact info is: jsalk@school.org and a phone number of 777-555-4321.

Query | Query History

```sql
CREATE TABLE students(
    student_id SERIAL PRIMARY KEY,
    first_name VARCHAR(50) NOT NULL,
    homeroom_number SMALLINT UNIQUE NOT NULL,
    phone INTEGER UNIQUE NOT NULL,
    email VARCHAR(100) UNIQUE NOT NULL,
    graduation_year SMALLINT NOT NULL
);
```

Query | Query History

```sql
CREATE TABLE teachers(
    teacher_id SERIAL PRIMARY KEY,
    first_name VARCHAR(50) NOT NULL,
    last_name VARCHAR(50) NOT NULL,
    homeroom_number SMALLINT UNIQUE NOT NULL,
    department VARCHAR(50) NOT NULL,
    email VARCHAR(100) UNIQUE NOT NULL,
    phone INTEGER UNIQUE NOT NULL
);
```

Query | Query History

```sql
ALTER TABLE students
ADD last_name VARCHAR(50) NOT NULL;
```

Query | Query History

```sql
ALTER TABLE students ALTER COLUMN phone SET DATA TYPE VARCHAR(20);
```

Query | Query History

```sql
INSERT INTO students (first_name, last_name, homeroom_number,
                      phone, graduation_year, email)
VALUES ('Mark', 'Watney', 5, '7775551234', 2035, 'unknown');
```

Query | Query History

```sql
INSERT INTO teachers (first_name, last_name, homeroom_number,
                      phone, department, email)
VALUES ('Jonas', 'Salk', 5, 777-555-4321, 'Biology', 'jsalk@school.org');
```

| | student_id [PK] integer | first_name character varying (50) | homeroom_number smallint | phone character varying (20) | email character varying (100) | graduation_year smallint | last_name character varying (50) |
|---|---|---|---|---|---|---|---|
| 1 | 3 | Mark | 5 | 7775551234 | unknown | 2035 | Watney |