**Lab Exercise 2- Understanding PostgreSQL Processes & Components**

**Objective**

Explore PostgreSQL processes and components running on a Windows system using system tools and SQL queries.

**Part 1: Identify PostgreSQL Processes (System-Level)**

**1. View PostgreSQL processes using Task Manager**

* Open **Task Manager** (Ctrl + Shift + Esc)
* Go to the **Details** or **Processes** tab
* Look for entries like:

postgres.exe

Each instance of postgres.exe represents a different server process, such as:

* Checkpointer
* WAL writer
* Background writer
* Autovacuum
* Backend (user sessions)

**2. Match process roles**

You won’t see full labels in Task Manager, but you can confirm process roles using SQL in Part 2.

**Part 2: Monitor Connections and Backends (SQL Queries)**

**3. Open SQL shell (psql)**

From **Command Prompt**:

psql -U postgres -d your\_database

You may be prompted for a password.

**4. View current backend connections**

SELECT pid, usename, datname, client\_addr, backend\_start, state

FROM pg\_stat\_activity;

**Expected Output:**  
List of sessions with state (e.g., active, idle).

**Part 3: Inspect Memory Settings**

**5. Show memory configuration**

SHOW shared\_buffers;

SHOW wal\_buffers;

SHOW work\_mem;

SHOW maintenance\_work\_mem;

These determine how much memory is allocated to:

* Shared data pages
* WAL (Write-Ahead Logging)
* Sorting, hashing
* Maintenance tasks like VACUUM

**Part 4: Locate and Explore Disk-Level Components**

**6. Find the data directory**

SHOW data\_directory;

**7. Browse the directory in File Explorer**

* Navigate to the path shown (e.g., C:\Program Files\PostgreSQL\15\data)
* Look for:
  + base\ – actual table files
  + pg\_wal\ – transaction logs
  + pg\_stat\ – runtime stats
  + postgresql.conf – settings
  + pg\_hba.conf – access rules

**Part 5: Analyze Background Writer and Checkpoint Behavior**

**8. View checkpoint and bgwriter stats**

SELECT \* FROM pg\_stat\_bgwriter;