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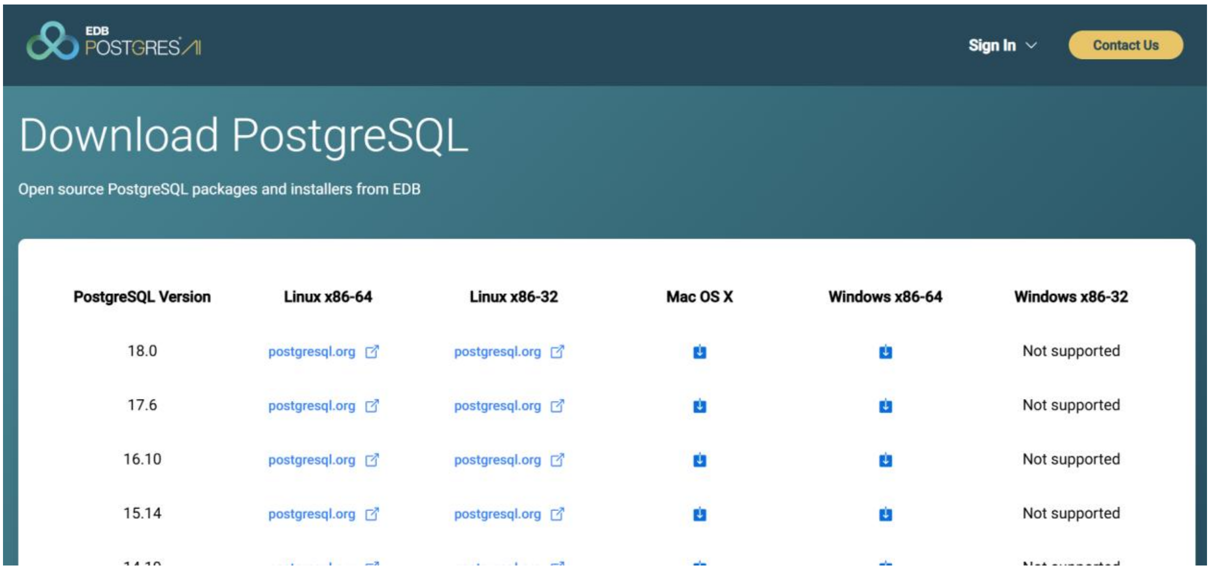
PostgreSQL Installation Steps

1. Download the Installer

1. Open your web browser and search for **"PostgreSQL"**.
2. Go to the official website, **postgresql.org**, and click on the **Download** button.
3. On the download page, select **Windows**.
4. Look for the **"Interactive installer by EDB"** and click the link to download the installer.
5. Select the desired version for Windows (the latest is usually recommended) to begin the download of the .exe file.



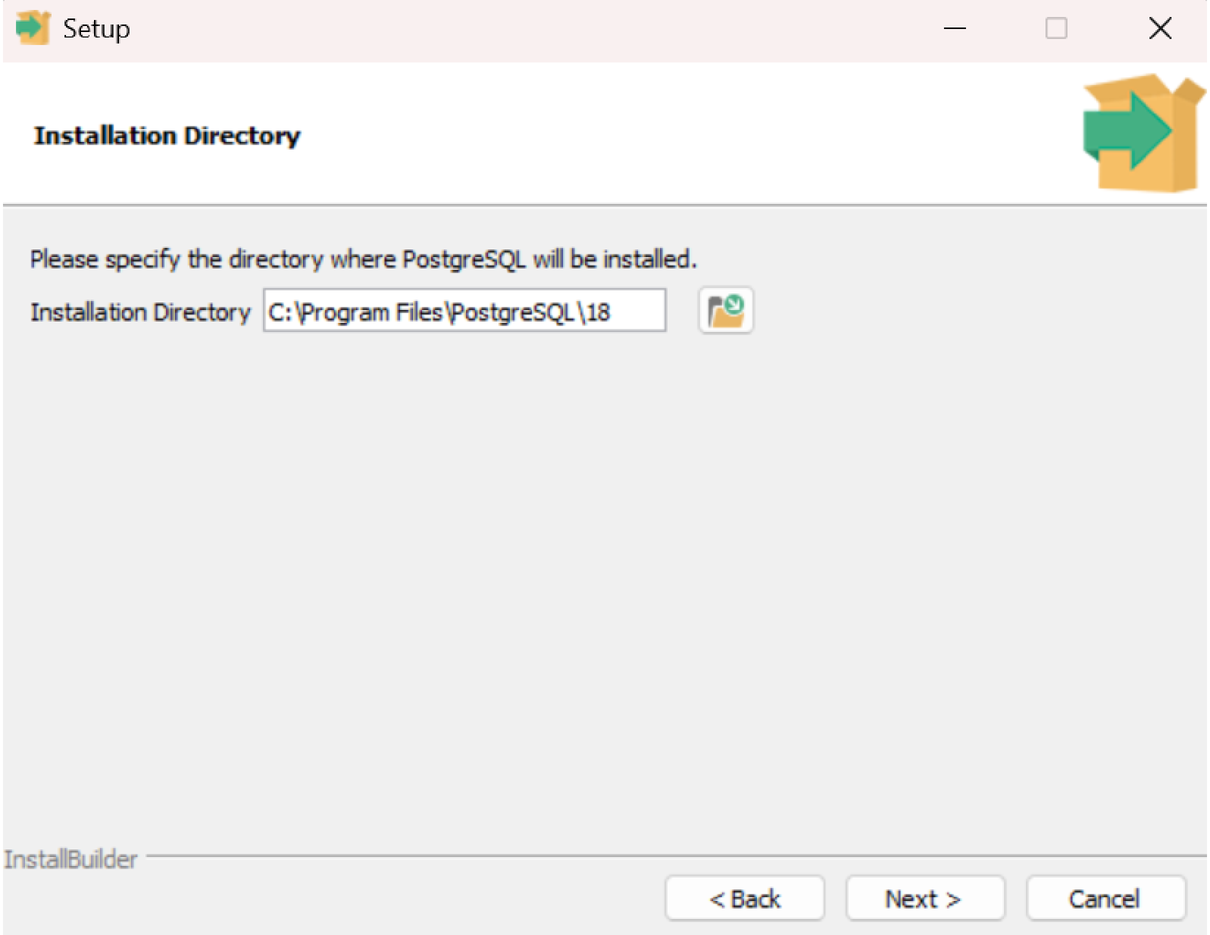
Download PostgreSQL

Open source PostgreSQL packages and installers from EDB

PostgreSQL Version	Linux x86-64	Linux x86-32	Mac OS X	Windows x86-64	Windows x86-32
18.0	postgresql.org	postgresql.org	⬇	⬇	Not supported
17.6	postgresql.org	postgresql.org	⬇	⬇	Not supported
16.10	postgresql.org	postgresql.org	⬇	⬇	Not supported
15.14	postgresql.org	postgresql.org	⬇	⬇	Not supported

2. Run the Setup Wizard

1. Once the .exe file is downloaded, **right-click** it and choose **Open** to start the installation.
2. The setup wizard will begin. Click **Next**.
3. The wizard will show the installation directory. Keep the default location unless you need to change it, and then click **Next**.



Setup

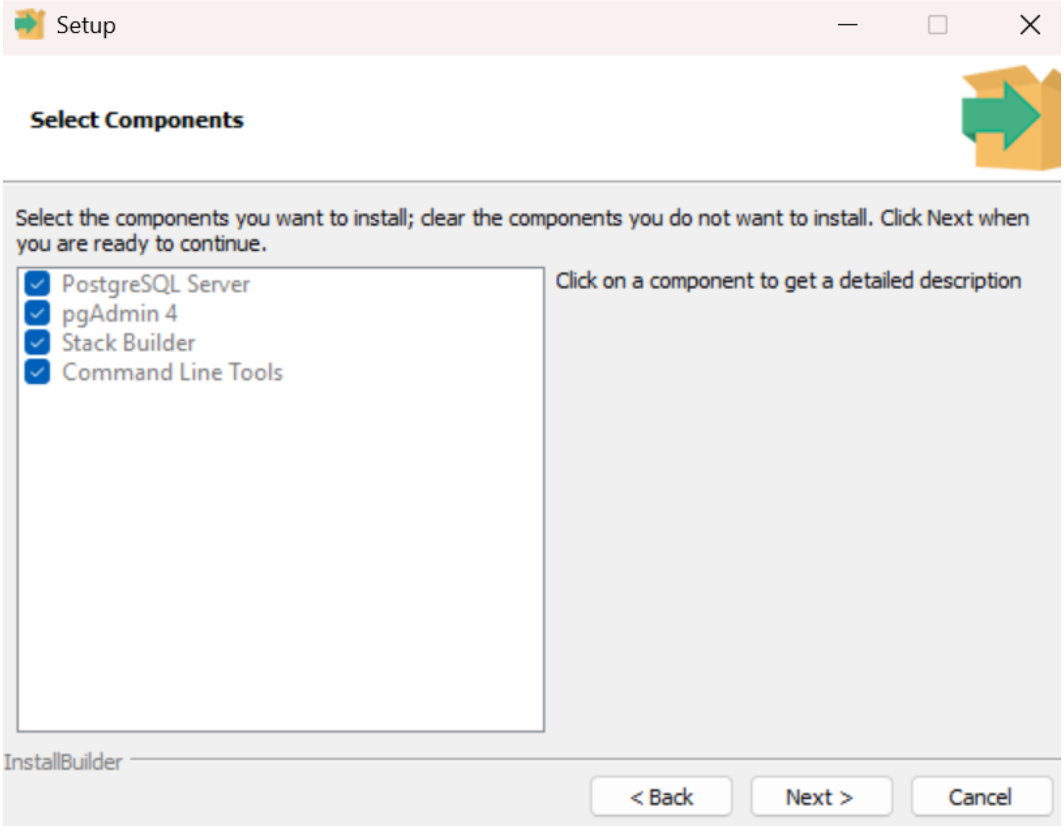
Installation Directory

Please specify the directory where PostgreSQL will be installed.

Installation Directory C:\Program Files\PostgreSQL\18

4. The components screen will show the items that will be installed:
   - **PostgreSQL Server**
   - **pgAdmin** (the database management tool)
   - **Stack Builder** (a package manager)
   - **Command Line Tools**
   - Keep all components selected and click **Next**.

PostgresSQL Setup



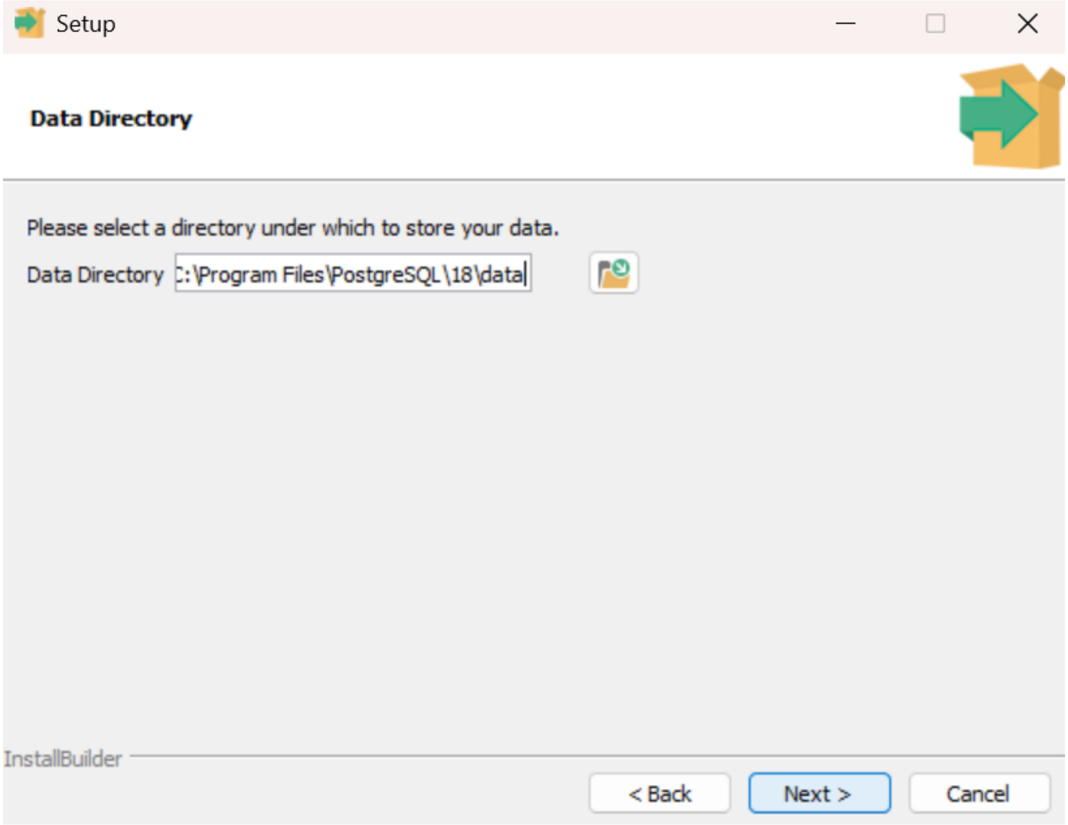
Select Components

Select the components you want to install; clear the components you do not want to install. Click Next when you are ready to continue.

☑ PostgreSQL Server
☑ pgAdmin 4
☑ Stack Builder
☑ Command Line Tools

Click on a component to get a detailed description

5. The next step is to specify the **Data Directory**, where your databases will be saved. Keep the default location and click **Next**.



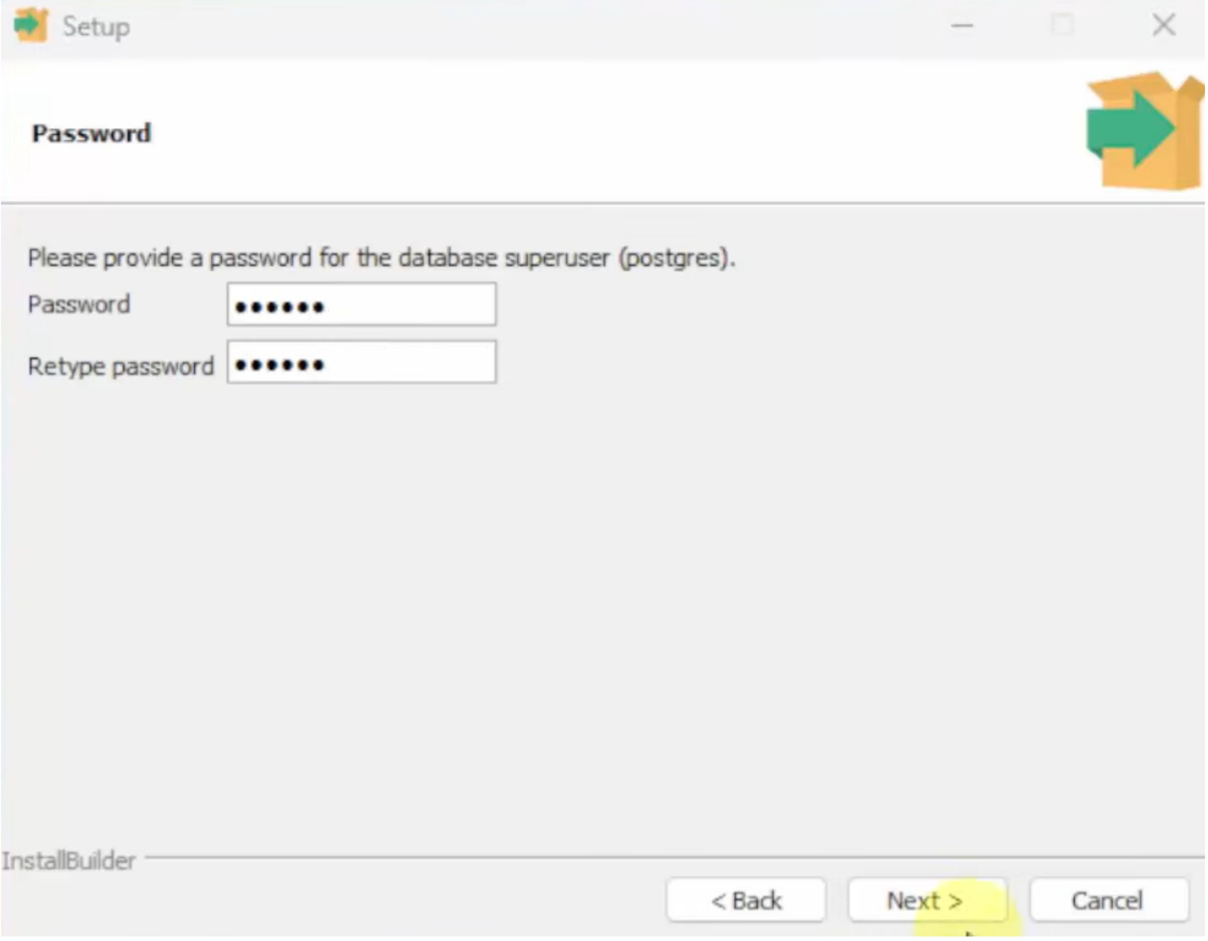
Data Directory

Please select a directory under which to store your data.

Data Directory :\Program Files\PostgreSQL\18\data

3. Configure User Credentials

1. You will be prompted to **Enter a password** for the database superuser (the default user is postgres).
2. Enter a secure password and confirm it. This is important for securing your server.



Please provide a password for the database superuser (postgres).

Password ••••••

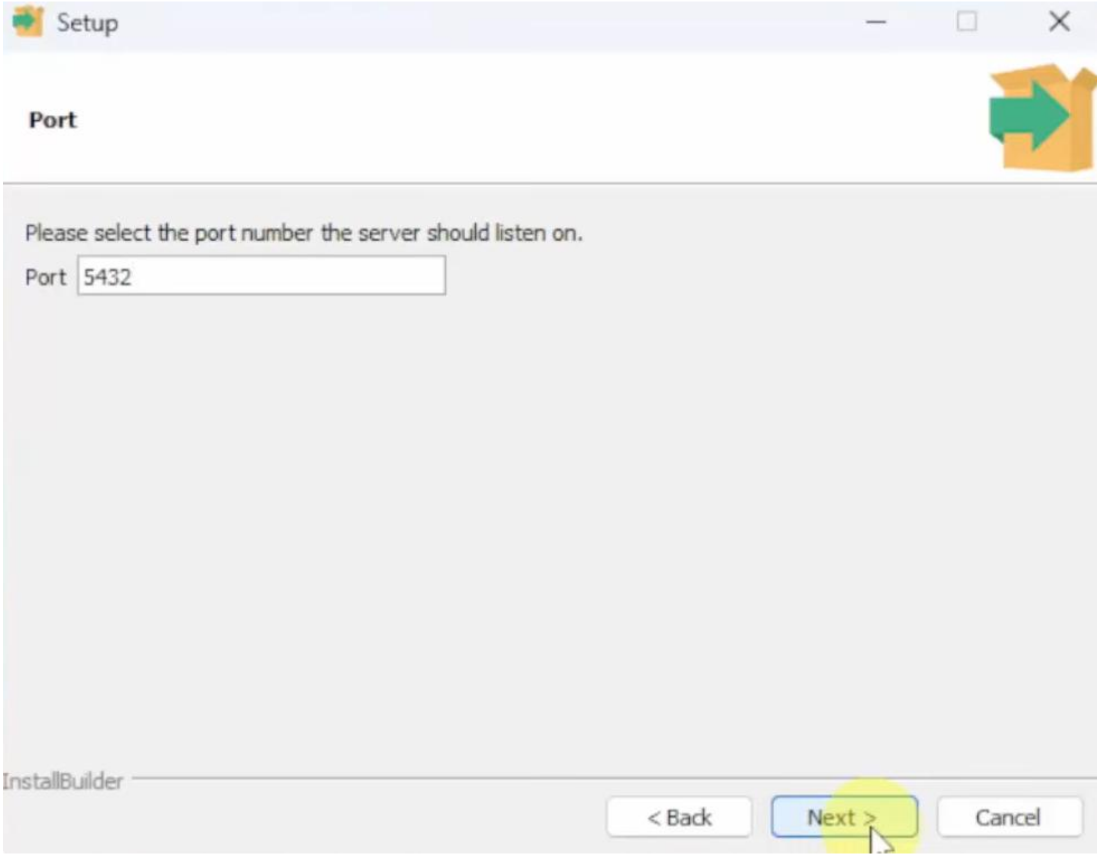
Retype password ••••••

3. Click **Next**.

---

4. Final Configuration and Installation

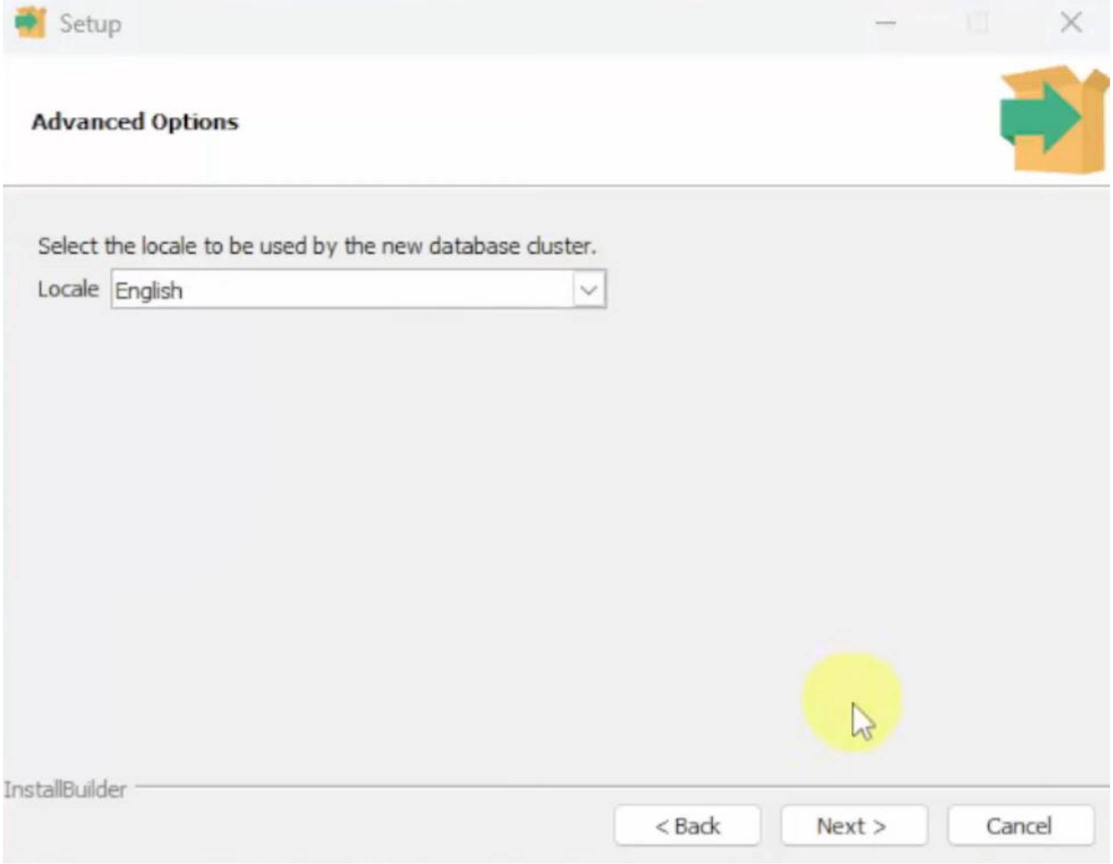
1. The next screen shows the **Port** number (default is 5432). Keep the default port and click **Next**.



Please select the port number the server should listen on.

Port 5432

2. In the **Advanced options** screen, you can select the **Locale**. Choose your preferred locale (e.g., English) and click **Next**.



Select the locale to be used by the new database cluster.

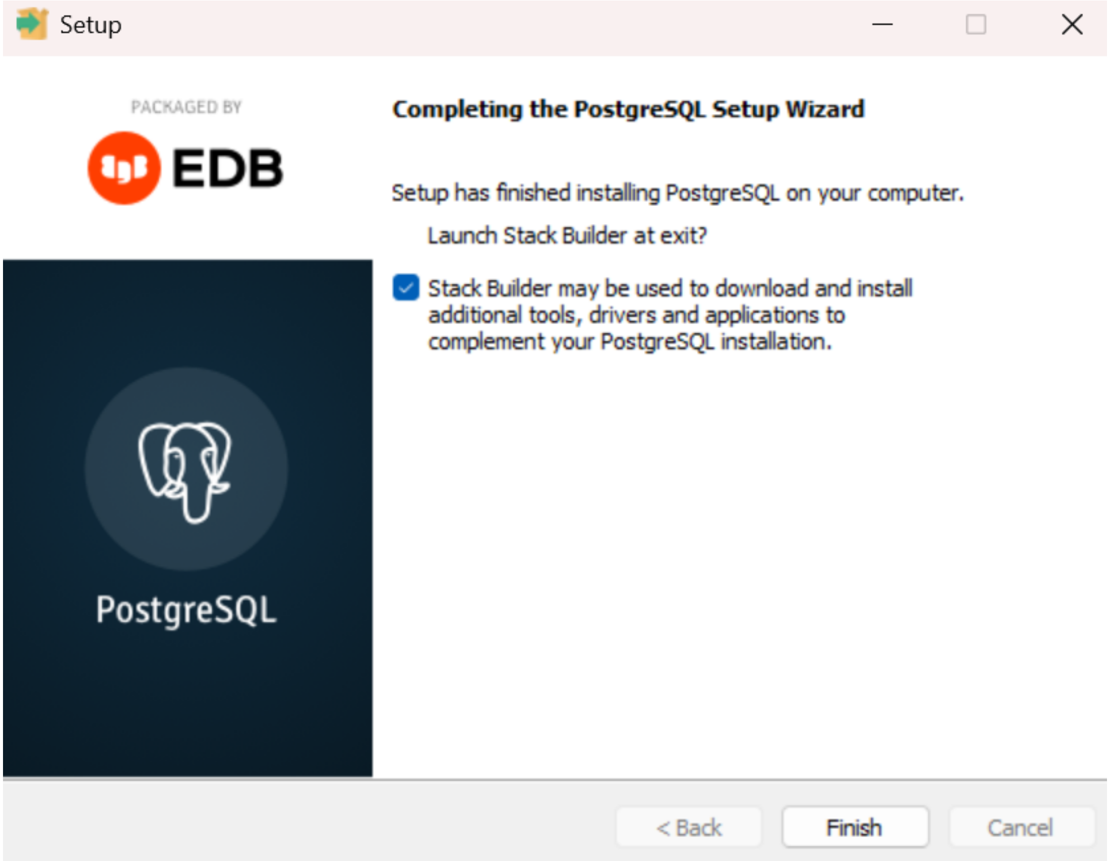
Locale English

3. Review the **Pre-installation Summary** and click **Next**.
4. Click **Next** again to begin the installation. Wait for the process to complete.

---

5. Finish and Access pgAdmin

1. Once the installation is complete, click **Finish**.
2. The installer may ask if you want to launch **Stack Builder** for additional tools. For a basic installation, you can **cancel/close** this wizard.



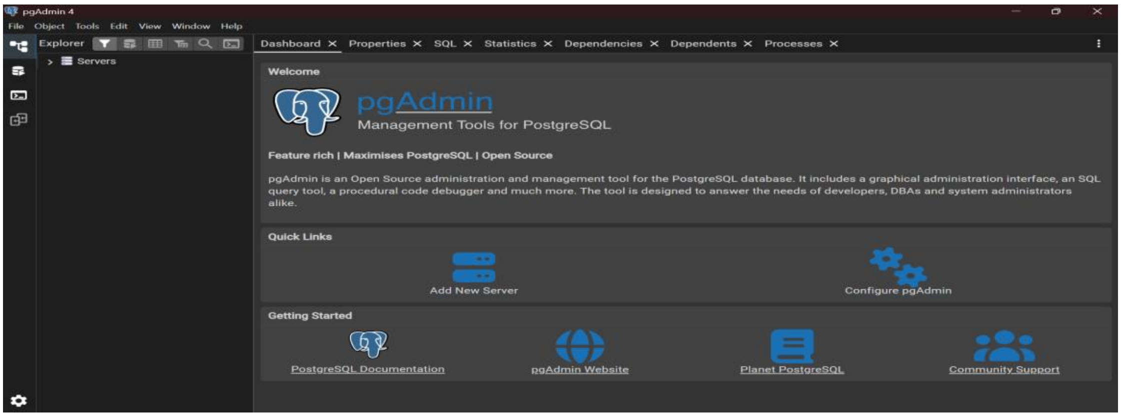
Completing the PostgreSQL Setup Wizard

Setup has finished installing PostgreSQL on your computer.

Launch Stack Builder at exit?

☑ Stack Builder may be used to download and install additional tools, drivers and applications to complement your PostgreSQL installation.

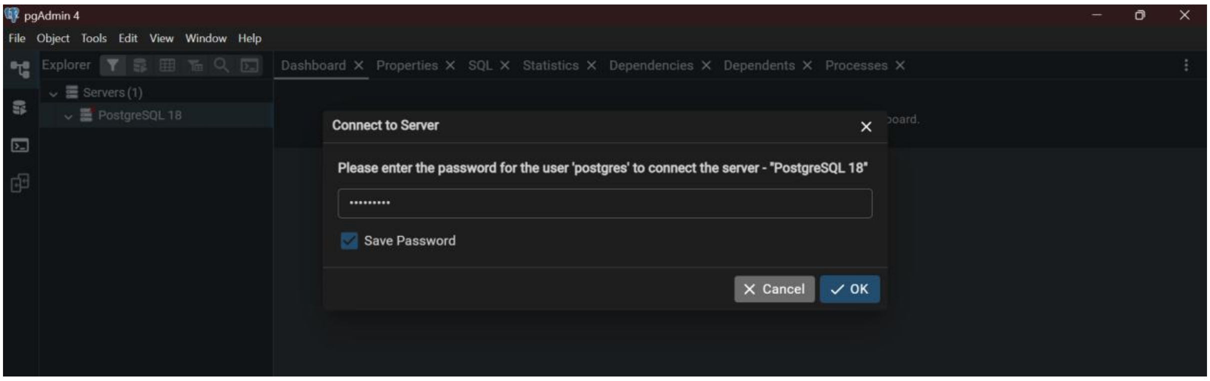
3. To access your database, go to the Start menu, type **"pgAdmin"**, and open the application.



Feature rich | Maximises PostgreSQL | Open Source

pgAdmin is an Open Source administration and management tool for the PostgreSQL database. It includes a graphical administration interface, an SQL query tool, a procedural code debugger and much more. The tool is designed to answer the needs of developers, DBAs and system administrators alike.

4. When prompted, enter the **password** you created during the installation process to connect to your PostgreSQL server.


pgAdmin 4
File Object Tools Edit View Window Help
Explorer
Servers (1)
PostgreSQL 18
Dashboard Properties SQL Statistics Dependencies Dependents Processes

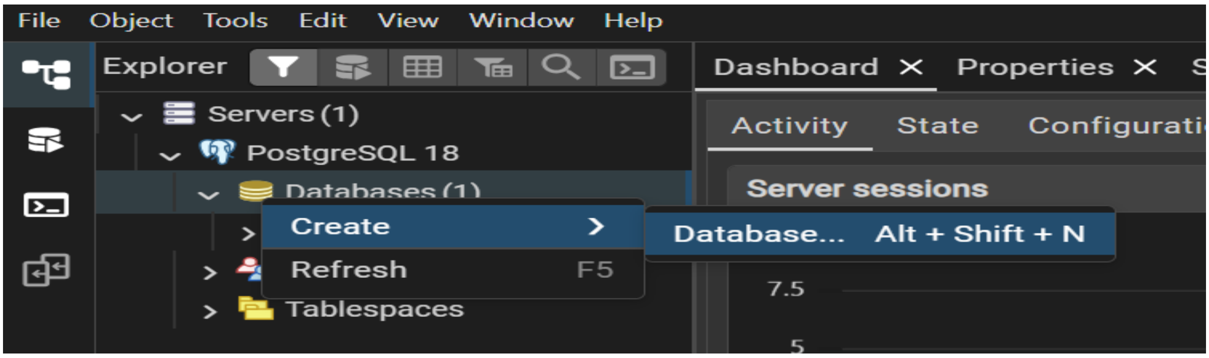
Connect to Server

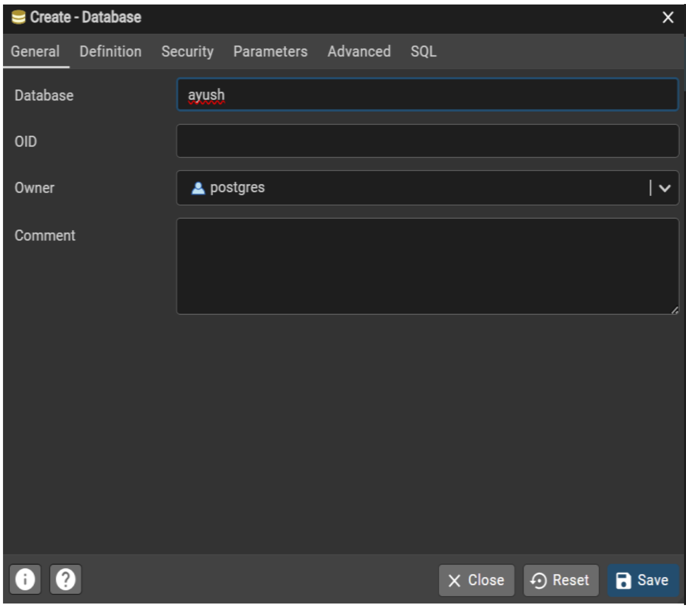
Please enter the password for the user 'postgres' to connect the server - "PostgreSQL 18"

•••••••••

☑ Save Password

5. You can now manage your databases, including creating a new one by right-clicking **Databases** in the browser panel and selecting **Create** > **Database...**.



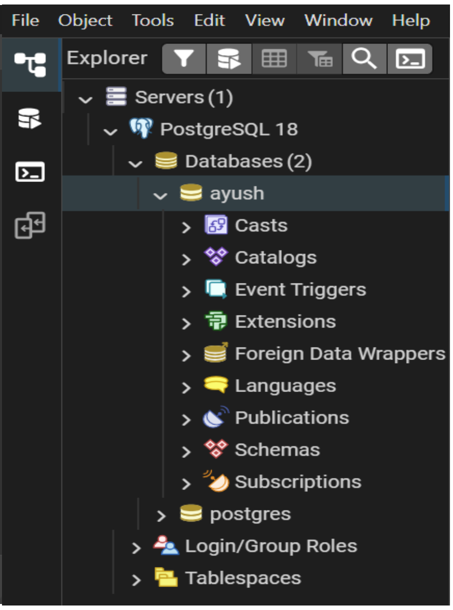


Database: ayush

OID:

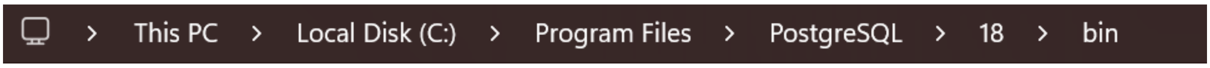
Owner: postgres

Comment:



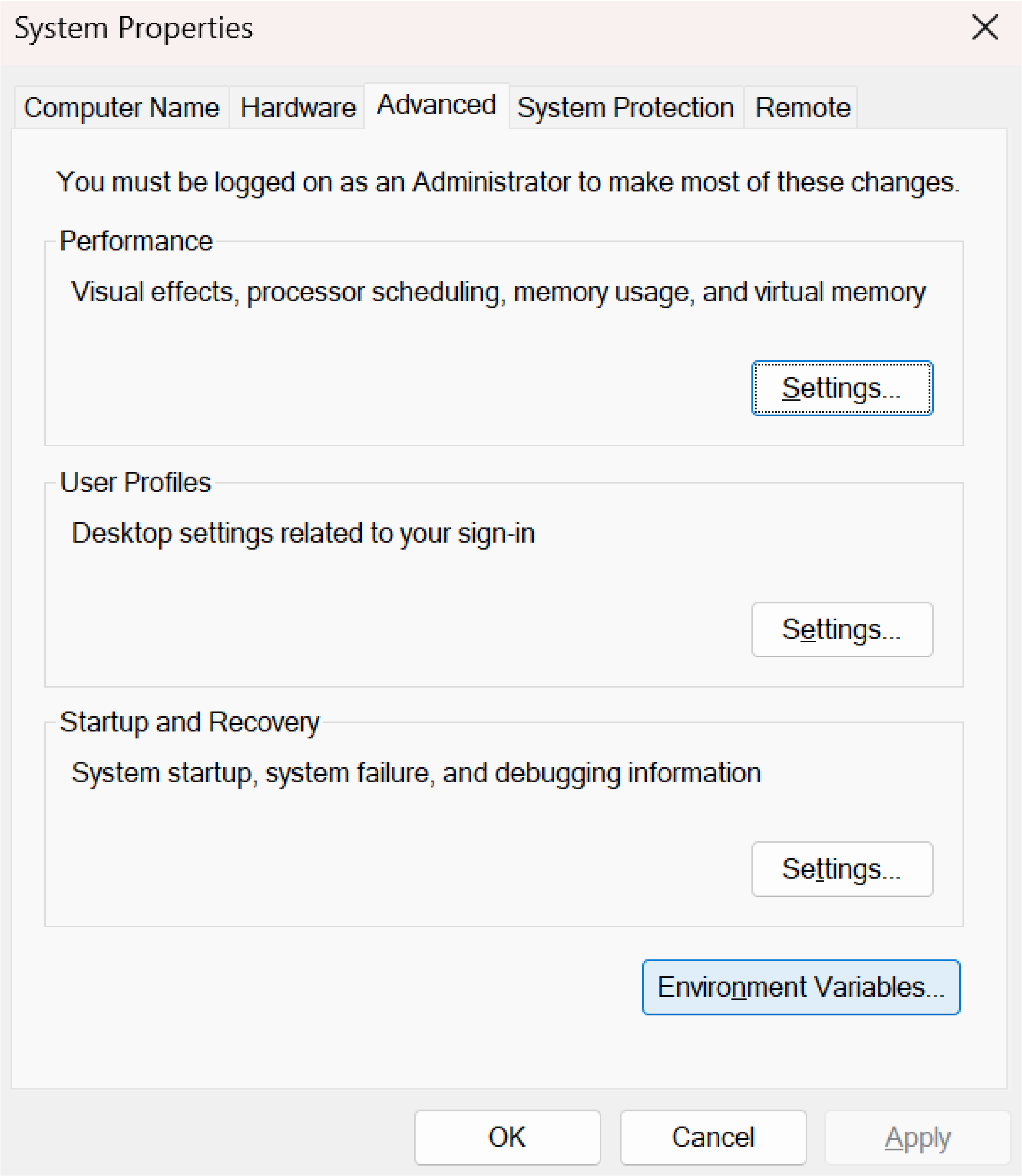
6. Setting Environment Variable for PostgreSQL

- Your PostgreSQL 18 "bin" folder is typically at: C:\Program Files\PostgreSQL\18\bin\



This PC > Local Disk (C:) > Program Files > PostgreSQL > 18 > bin

- Go to Windows search and type “Environment Variables”
- Open “Edit the system environment variables,” then click “Environment Variables...”



System Properties

You must be logged on as an Administrator to make most of these changes.

Performance

Visual effects, processor scheduling, memory usage, and virtual memory

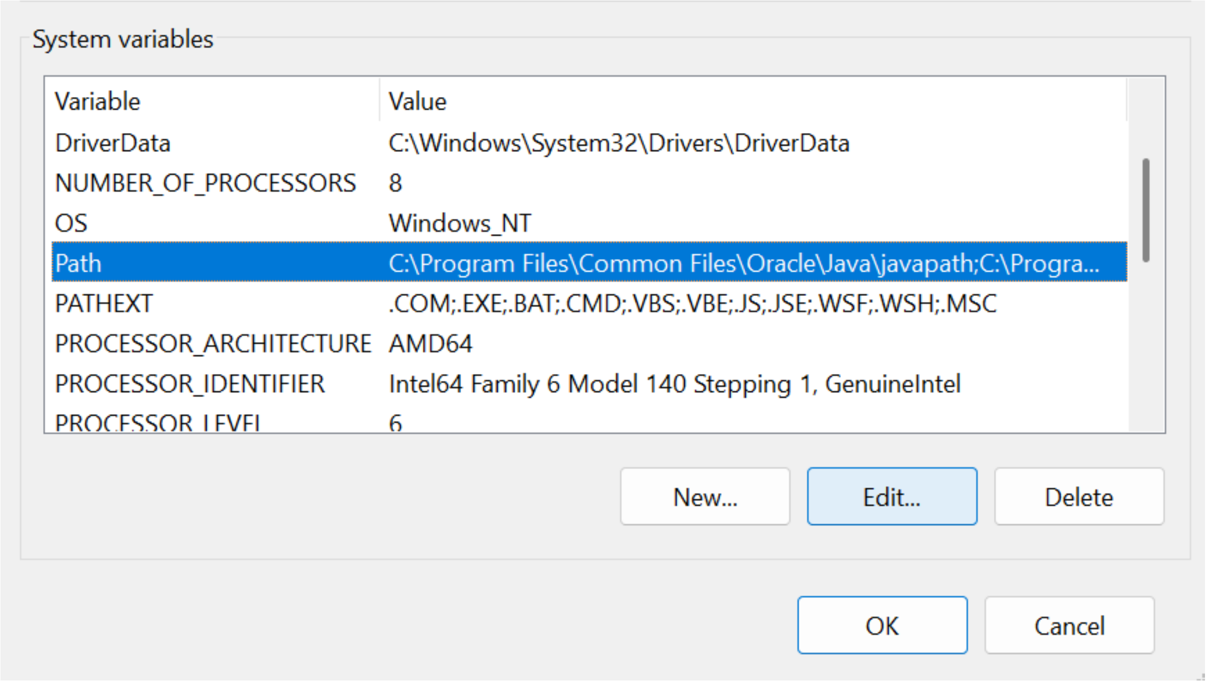
User Profiles

Desktop settings related to your sign-in

Startup and Recovery

System startup, system failure, and debugging information

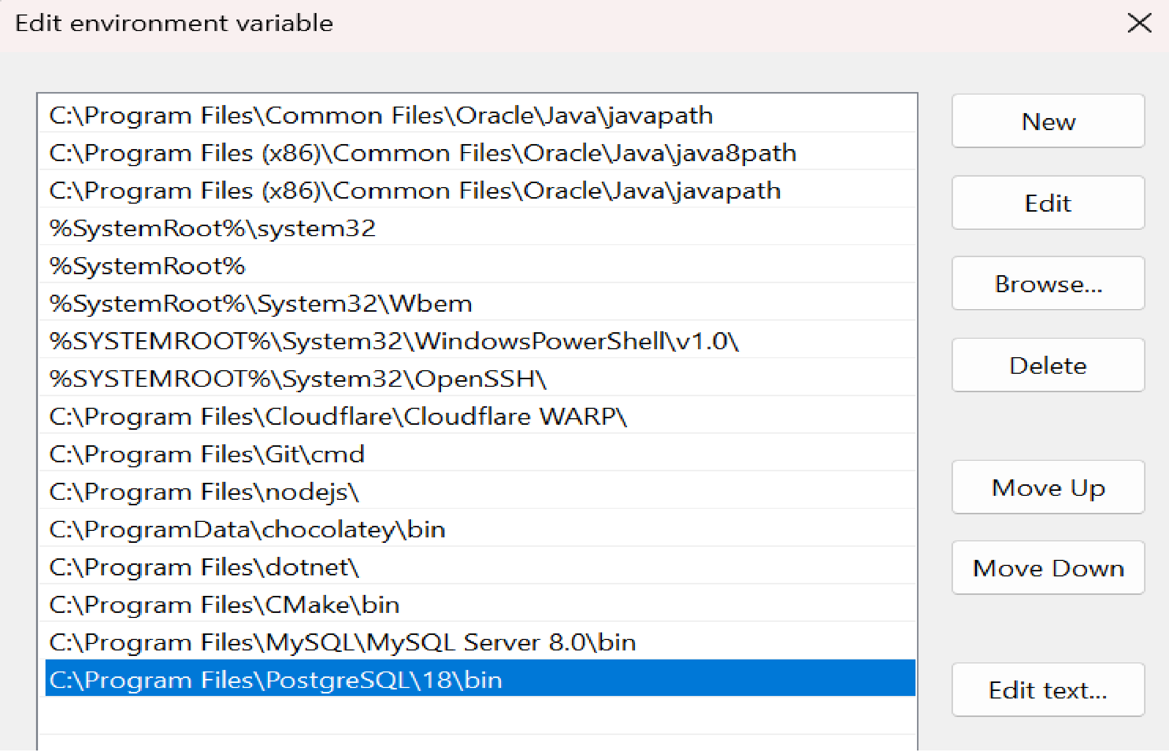
- Under “System variables,” select “Path,” and click “Edit”



System variables

Variable	Value
DriverData	C:\Windows\System32\Drivers\DriverData
NUMBER_OF_PROCESSORS	8
OS	Windows_NT
Path	C:\Program Files\Common Files\Oracle\Java\javapath;C:\Progra...
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC
PROCESSOR_ARCHITECTURE	AMD64
PROCESSOR_IDENTIFIER	Intel64 Family 6 Model 140 Stepping 1, GenuineIntel
PROCESSOR_LEVEL	6

- Click “New” and paste
  C:\Program Files\PostgreSQL\18\bin



Edit environment variable

```
C:\Program Files\Common Files\Oracle\Java\javapath
C:\Program Files (x86)\Common Files\Oracle\Java\java8path
C:\Program Files (x86)\Common Files\Oracle\Java\javapath
%SystemRoot%\system32
%SystemRoot%
%SystemRoot%\System32\Wbem
%SYSTEMROOT%\System32\WindowsPowerShell\v1.0\
%SYSTEMROOT%\System32\OpenSSH\
C:\Program Files\Cloudflare\Cloudflare WARP\
C:\Program Files\Git\cmd
C:\Program Files\nodejs\
C:\ProgramData\chocolatey\bin
C:\Program Files\dotnet\
C:\Program Files\CMake\bin
C:\Program Files\MySQL\MySQL Server 8.0\bin
C:\Program Files\PostgreSQL\18\bin
```

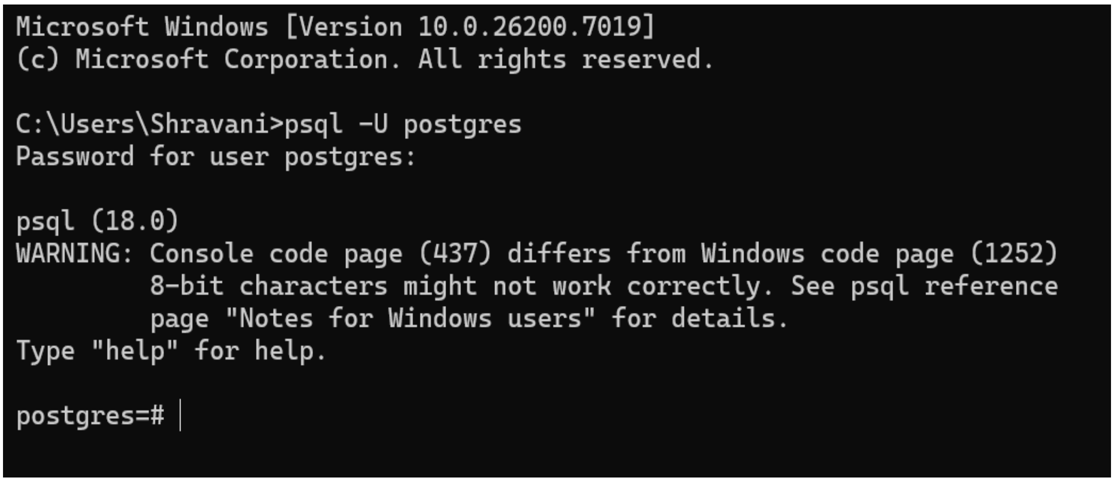
- Click OK to save your changes on all windows

7. How to Open psql in Command Prompt

- Launch Command Prompt (cmd)
- Type:

  “psql -U postgres”

  and press Enter (replace postgres with your database username if different)
- Enter your database password when prompted to access the psql shell



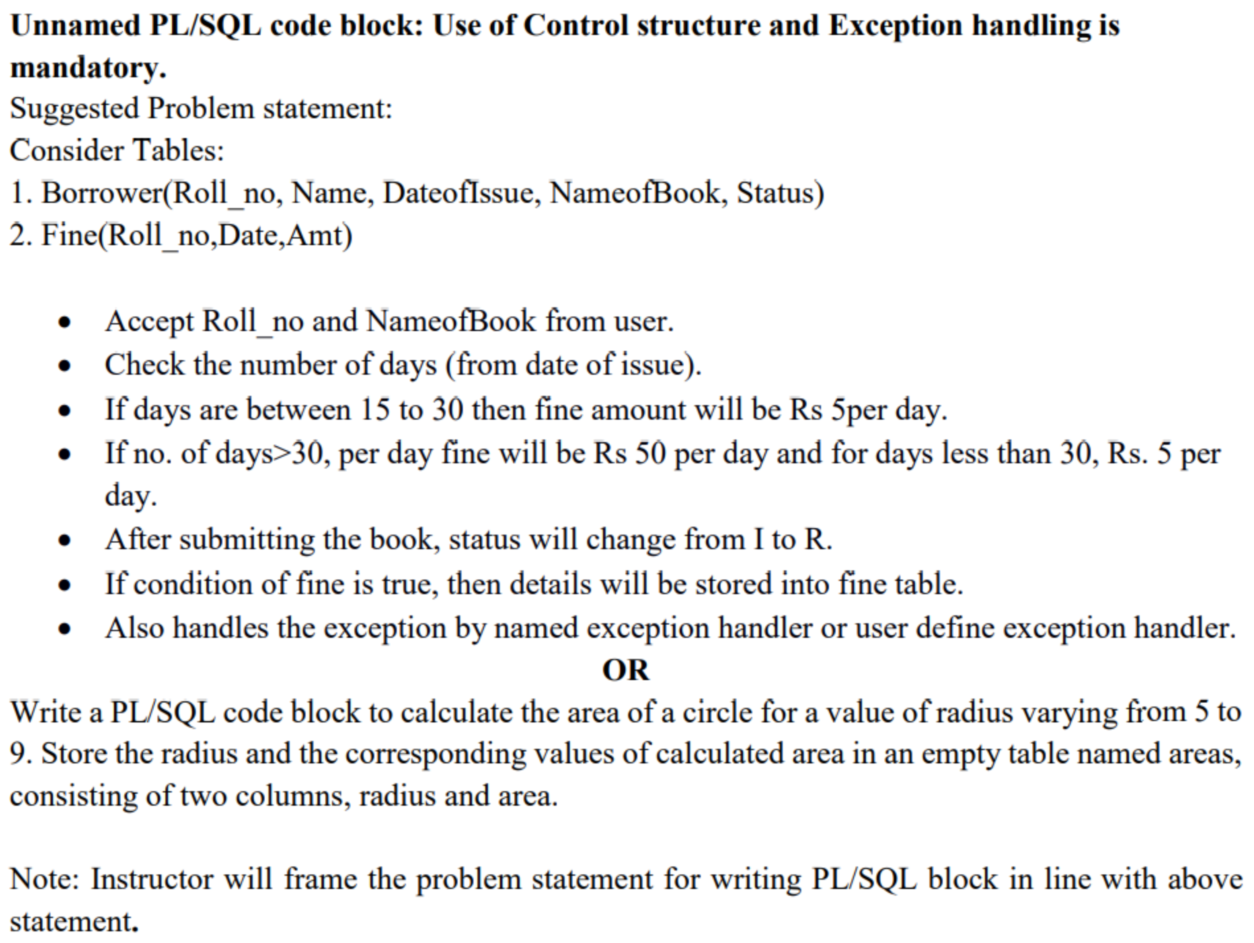
```
Microsoft Windows [Version 10.0.26200.7019]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Shravani>psql -U postgres
Password for user postgres:

psql (18.0)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

postgres=#
```

This lets you run PostgreSQL commands globally from your command prompt.

Reference Video Link:

https://youtu.be/SBEtF7EfY6w?si=RUa5iXWs-su-hFhX

PL/SQL Experiment



Unnamed PL/SQL code block: Use of Control structure and Exception handling is mandatory.

Suggested Problem statement:

Consider Tables:

1. Borrower(Roll_no, Name, DateofIssue, NameofBook, Status)
2. Fine(Roll_no,Date,Amt)

- Accept Roll_no and NameofBook from user.
- Check the number of days (from date of issue).
- If days are between 15 to 30 then fine amount will be Rs 5per day.
- If no. of days>30, per day fine will be Rs 50 per day and for days less than 30, Rs. 5 per day.
- After submitting the book, status will change from I to R.
- If condition of fine is true, then details will be stored into fine table.
- Also handles the exception by named exception handler or user define exception handler.

OR

Write a PL/SQL code block to calculate the area of a circle for a value of radius varying from 5 to 9. Store the radius and the corresponding values of calculated area in an empty table named areas, consisting of two columns, radius and area.

Note: Instructor will frame the problem statement for writing PL/SQL block in line with above statement**.**

Steps to Implement Library Fine Calculation Using PL/SQL

Step 1: Drop Existing Tables (if any)

text

```
BEGIN
  EXECUTE IMMEDIATE 'DROP TABLE Fine';
EXCEPTION
  WHEN OTHERS THEN
    IF SQLCODE != -942 THEN -- Table does not exist
      RAISE;
    END IF;
END;
/

BEGIN
  EXECUTE IMMEDIATE 'DROP TABLE Borrower';
EXCEPTION
  WHEN OTHERS THEN
    IF SQLCODE != -942 THEN
      RAISE;
    END IF;
END;
/
```

Output:

```
PL/SQL procedure successfully completed.
Elapsed: 00:00:00.026
```

Step 2: Create Tables

sql

```
CREATE TABLE Borrower(
  Roll_no     NUMBER(5),
  Name        VARCHAR2(25),
  DateOfIssue  DATE,
  NameOfBook   VARCHAR2(50),
  Status      VARCHAR2(10)
);


CREATE TABLE Fine(
  Roll_no     NUMBER(5),
  Return_date  DATE,
  Amt        NUMBER(10,2)
);
```

Output:

```
Table BORROWER created.
Elapsed: 00:00:00.007
Table FINE created.
Elapsed: 00:00:00.009
```

Step 3: Insert Sample Data into Borrower

sql

```
INSERT INTO Borrower VALUES (45, 'Ayush', TO_DATE('01-08-2022','DD-MM-YYYY'), 'HARRY POTTER', 'I');
INSERT INTO Borrower VALUES (46, 'Shreyas',   TO_DATE('15-08-2022','DD-MM-YYYY'), 'DARK MATTER',  'I');
INSERT INTO Borrower VALUES (47, 'Prajwal',   TO_DATE('24-08-2022','DD-MM-YYYY'), 'SILENT HILL',  'I');
INSERT INTO Borrower VALUES (48, 'Aman',   TO_DATE('26-08-2022','DD-MM-YYYY'), 'GOD OF WAR',   'I');
INSERT INTO Borrower VALUES (49, 'Gauri',  TO_DATE('09-09-2022','DD-MM-YYYY'), 'SPIDER-MAN',   'I');
```

```
COMMIT;
```

Output:

```
5 rows inserted.
Elapsed: 00:00:00.000

Commit complete.
Elapsed: 00:00:00.001
```

Step 4: Create Procedure to Calculate Fine and Process Book Return

text

```
CREATE OR REPLACE PROCEDURE proc_BookReturn(
  p_roll_no    IN NUMBER,
  p_nameofbook IN VARCHAR2
) IS
  v_dateofissue DATE;
  v_days       NUMBER;
  v_fine       NUMBER := 0;
  v_return_date DATE := SYSDATE;

BEGIN
  -- Get issue date for the given borrower and book
  SELECT DateOfIssue INTO v_dateofissue
  FROM Borrower
  WHERE Roll_no = p_roll_no
    AND NameOfBook = p_nameofbook;
```

PL/SQL Experiment

```
-- Calculate the number of days book was borrowed
v_days := v_return_date - v_dateofissue;

-- Calculate fine as per rules
IF v_days > 30 THEN
  v_fine := (30 * 5) + (v_days - 30) * 50;
ELSIF v_days >= 15 THEN
  v_fine := v_days * 5;
ELSE
  v_fine := 0;
END IF;

-- Update the status of book to returned
UPDATE Borrower
SET Status = 'R'
WHERE Roll_no = p_roll_no
  AND NameOfBook = p_nameofbook;

-- Insert a fine record if applicable
IF v_fine > 0 THEN
  INSERT INTO Fine VALUES(p_roll_no, v_return_date, v_fine);
END IF;

-- Output message with details
DBMS_OUTPUT.PUT_LINE('Book returned by Roll No: ' || p_roll_no);
DBMS_OUTPUT.PUT_LINE('Book: ' || p_nameofbook);
```

```
  DBMS_OUTPUT.PUT_LINE('Days borrowed: ' || v_days);
  DBMS_OUTPUT.PUT_LINE('Fine: ' || v_fine);

EXCEPTION
  WHEN NO_DATA_FOUND THEN
    DBMS_OUTPUT.PUT_LINE(' No matching borrower/book found.');
  WHEN OTHERS THEN
    DBMS_OUTPUT.PUT_LINE('⚠ Error: ' || SQLERRM);
END;
/
```

Output:

```
Procedure PROC_BOOKRETURN compiled
No errors.
Elapsed: 00:00:00.025
```

Step 5: Enable Output Display

sql

```
SET SERVEROUTPUT ON;
```

Step 6: Execute the Procedure With Specific Input

text

```
BEGIN
  proc_BookReturn(45, 'HARRY POTTER'); -- Change the values for testing different records
END;
/
```

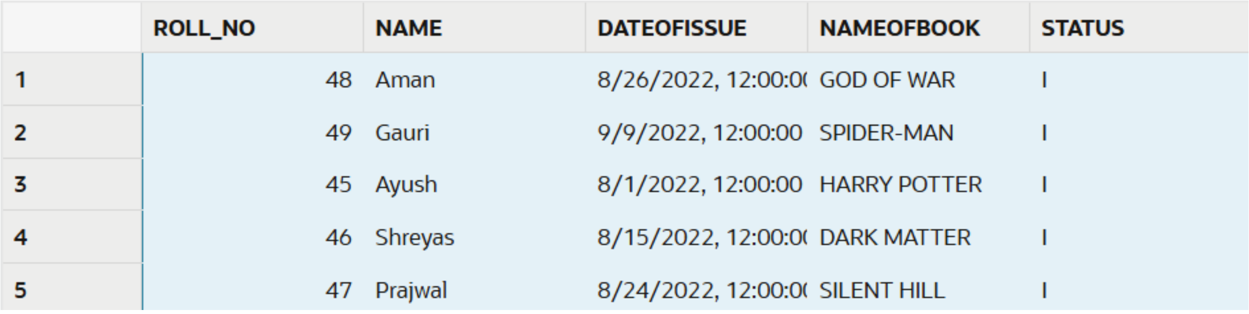
Output:

```
Book returned by Roll No: 45
Book: HARRY POTTER
Days borrowed: 1141.630787037037037037037037037037037037
Fine: 55731.5393518518518518518518518518518519
PL/SQL procedure successfully completed.

Elapsed: 00:00:00.030
```

Step 7: Verify the Data in Tables

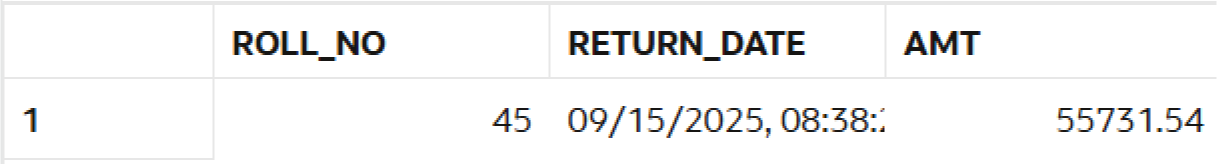
sql

SELECT * **FROM** Borrower;



	ROLL_NO	NAME	DATEOFISSUE	NAMEOFBOOK	STATUS
1	48	Aman	8/26/2022, 12:00:0(	GOD OF WAR	I
2	49	Gauri	9/9/2022, 12:00:00	SPIDER-MAN	I
3	45	Ayush	8/1/2022, 12:00:00	HARRY POTTER	I
4	46	Shreyas	8/15/2022, 12:00:0(	DARK MATTER	I
5	47	Prajwal	8/24/2022, 12:00:0(	SILENT HILL	I

SELECT * **FROM** Fine;



	ROLL_NO	RETURN_DATE	AMT
1	45	09/15/2025, 08:38:	55731.54
