

PostgreSQL Backend Development Introductory Course

 PostgresPro

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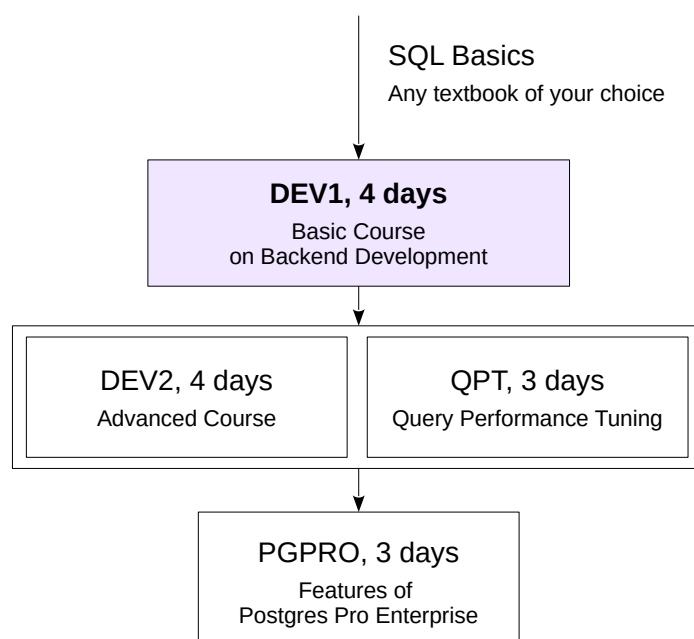
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Developers



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For backend developers, we offer a special range of courses.

Prior knowledge of the basics of the **SQL language** is required to complete these courses. There is no course on the SQL language in our line of courses, but there are many books and other educational resources with which you can master SQL.

DEV1 is a basic course for developers.

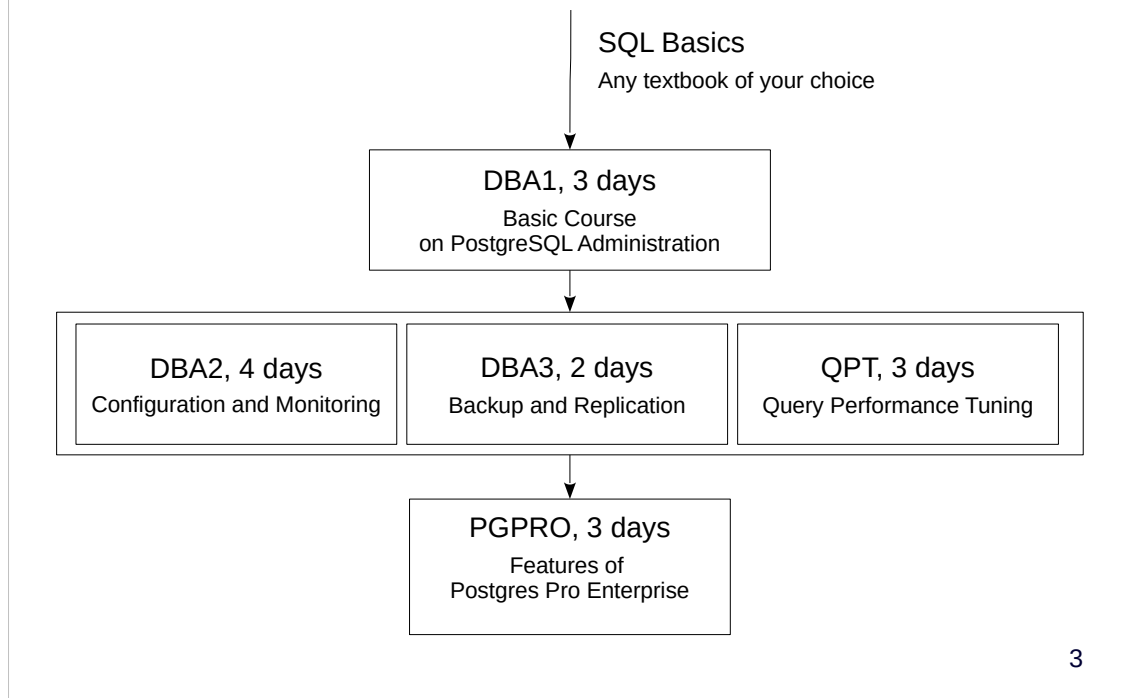
The **DEV2** course examines the features of the server's internal structure that affect the development of application code, and comprehensively discusses extensibility: the ability to extend server mechanisms with your own code, which allows you to use PostgreSQL to solve a wide variety of tasks.

The **QPT** course examines in detail the mechanisms for scheduling and executing queries, discusses the configuration parameters related to performance, and examines the options for finding problematic queries and optimizing them.

The **PGPRO** course discusses additional features provided by the Postgres Pro Enterprise DBMS.

<https://postgrespro.com/education/courses>

Administrators



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For administrators, we offer the following courses.

The **DBA1** basic course provides general information about the PostgreSQL architecture, installation process, basic server configuration and management. It also considers basic administration tasks and access control issues. Lastly, it provides an overview of backup and replication mechanisms.

The **DBA2** course focuses on determining appropriate configuration parameters based on an understanding of the internals of the server. It also talks about monitoring the server and using feedback for iterative parameter tweaking. Besides, it touches upon localization settings, extension management, and server upgrades.

The **DBA3** covers backups, as well as configuration and usage scenarios of physical and logical replication. It also provides a general overview of how to build scalable high-availability clusters and discusses the related challenges.

The **QPT** and **PGPRO** courses are intended for both developers and administrators.

DBA courses can be interesting to developers if they would like to deepen their knowledge of PostgreSQL internals, or if there is no separate administrator role in their project.

About this course



Duration: 2 days

Background knowledge required

- SQL fundamentals
- experience with any procedural programming language
- basic knowledge of Unix OS

Knowledge and skills gained

- working with the main database objects: tables, indexes, views
- backend programming in SQL and PL/pgSQL
- using the main data types, including records and arrays
- setting up client-server interface

This course introduces backend application developers to writing PostgreSQL stored procedures and functions in SQL and PL/pgSQL. It is based on DEV1 course shortened to 2 days.

Provided resources



Pre-configured virtual machine

- Xubuntu 24.04 OS
- PostgreSQL 17 with documentation in English
- a sample web application Bookstore
- DBeaver

Course handouts

- presentations, demonstrations, practical assignments and assignment keys (in html and pdf)
- reference materials: PostgreSQL functions and data types, a chart of the main system catalog tables with psql commands, some Unix commands

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Completing practical assignments is very important to gain the basic skills in working with PostgreSQL. Be sure to try to complete the assignments yourself first, and then review the provided keys, even if the assignment did not raise questions. Assignment keys may contain additional information that is not mentioned in presentations and demonstrations.

Course handouts (presentations, demonstrations, practical assignments and keys) are available in two formats. HTML is good for browsing and copying code snippets. PDF is divided into pages and is easy to print.

Additional reference materials will help you quickly find the information you need.

The virtual machine comes with DBeaver pre-installed. Although we use psql throughout the course, you can use this GUI tool if you like.

Course outline and schedule



Each training day is approximately 6 hours + lunch (1 hour)

Each topic usually consists of

- a presentation with demos: ~25-60 min

- practical assignments: ~20-30 min, including a break



The Bookstore App

01. Data Schema and API

SQL

02. Functions and Procedures

03. Composite Types

PL/pgSQL

04. Overview and Programming Structures



PL/pgSQL (continued)

- 05. Query Execution
- 06. Dynamic Commands
- 07. Arrays
- 08. Error Handling
- 09. Triggers

Practice



To get used to the VM environment, execute some SQL queries.

1. Connect to *bookstore* database.
2. Get version of PostgreSQL.
3. Get value of the *search_path* parameter.

1. You can run `psql` in terminal or launch Dbeaver. Use *current_database* function to check the database you are connected to.

2. Use *version* function.

3. Use `SHOW` command.

Task 1. Connecting to a database

```
student$ psql bookstore
```

```
=> SELECT current_database();
```

```
current_database
-----
bookstore
(1 row)
```

Task 2. PostgreSQL version

```
=> SELECT version();
```

```
version
-----
PostgreSQL 17.4 (Ubuntu 17.4-1.pgdg24.04+2) on x86_64-pc-linux-gnu, compiled by gcc
(Ubuntu 13.3.0-6ubuntu2~24.04) 13.3.0, 64-bit
(1 row)
```

Task 3. Search_path parameter

```
=> SHOW search_path;
```

```
search_path
-----
bookstore, public
(1 row)
```