# BonsaiDB :: User Manual

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# 1 Introduction

**Welcome to BonsaiDB!**

BonsaiDB is a lightweight and high-performance database engine written in C++17. This project has been designed as a practical demonstration of advanced backend concepts, including efficient data structures, disk storage management, and concurrent programming.

This manual will guide you through compiling, installing, and using BonsaiDB via its Command Line Interface (CLI).

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# 2 Compilation and Installation

To compile BonsaiDB from source, you will need a C++ compiler compatible with the C++17 standard and CMake.

## 2.1 Requirements

- **CMake**: Version 3.10 or higher.

- **C++17 Compiler**: GCC 7+, Clang 5+, or MSVC 2017+.

## 2.2 Compilation Steps

1. Open a terminal and clone the project repository.

2. Navigate to the project root and create a build directory (*out-of-source build*) to keep the source code clean:

```
mkdir build
cd build
```

3. Run CMake to configure the project and `make` to compile it:

```
cmake ..
make -j$(nproc)
```

**Note:** `$(nproc)` is a Linux command that speeds up compilation using all available CPU cores. If you are not using Linux, you can replace it with a number (e.g., `make -j4`).

4. Once finished, you will find the main executable `bonsaidb`, along with the test executables, inside the `build` directory.

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# 3 Using the Command Line Interface (CLI)

BonsaiDB is managed through an interactive command line application.

## 3.1 Starting the Engine

To launch the CLI, run the `bonsaidb` program from the `build` directory, specifying the database file you wish to use or create:

```
./bonsaidb my_database.db
```

If the file `my_database.db` does not exist, it will be created automatically. If it already exists, it will be opened so you can continue working with it.

## 3.2 Available Commands

Once inside the interactive console (`bonsaidb>`), you can use the following commands (as implemented in `main.cpp`):

| Command | Description |
|---|---|
| `insert` | Inserts a new record. |
| | **Syntax**: `insert <id> <name> <age> <balance>` |
| `select` | Searches for and displays a record by its `id`. |
| | **Syntax**: `select <id>` |
| `delete` | Deletes a record using its `id`. |
| | **Syntax**: `delete <id>` |
| `dump` | Shows all records stored in the database. |
| | **Syntax**: `dump` |
| `help` | Displays the list of available commands. |
| | **Syntax**: `help` |
| `exit` | Closes the interactive session safely. |
| | **Syntax**: `exit` or `quit` |

# 4   Usage Examples and Screenshots

Below is an example of a typical CLI session:

```
$ ./build/bonsaidb test.db
BonsaiDB started. Using file 'test.db'.
Type 'help' to see the list of commands or 'exit' to quit.

bonsaidb> insert 101 JuanPerez 35 4500.75
Record inserted successfully.

bonsaidb> select 101
Record found:
  ID     : 101
  Name   : JuanPerez
  Age    : 35
  Balance: 4500.75

bonsaidb> delete 101
Record with ID 101 deleted.

bonsaidb> select 101
Record with ID 101 not found.

bonsaidb> exit
Closing BonsaiDB.
```