

Good question 🤙 — here's a simple, clear explanation:

💡 What is H2 Database?

H2 is a **lightweight, in-memory database** that comes built into Java — perfect for **development and testing** small projects.

⚙️ Main Idea

- It **runs inside your Spring Boot app** — no need to install or start a separate database server.
 - You can **store data temporarily in memory** (disappears when you stop the app), or **persist it to a local file** if you want.
 - It's **fully compatible with SQL**, so later you can easily switch to MySQL or PostgreSQL without changing much code.
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✳️ Why we use it

Environment	Recommended Database	Why
Development / Testing	H2	Super fast, simple setup, no external DB required
Production	MySQL / PostgreSQL	Persistent, secure, handles large data

💻 How it looks in Spring Boot

When you add H2 Database as a dependency:

- Spring Boot automatically creates a temporary DB.
 - You can open the **H2 Console** at → <http://localhost:8080/h2-console>
 - Default JDBC URL:
 - `jdbc:h2:mem:testdb`
 - Username: sa
Password: (*empty*)
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🧠 Example

If you create an entity:

```
@Entity  
public class Bin {  
    @Id  
    @GeneratedValue
```

```
private Long id;  
private String binCode;  
private String location;  
}
```

Spring Boot + H2 will automatically:

- Create a BIN table in memory.
 - Let you insert and read records instantly — no setup needed.
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Then, when ready for real deployment

You just change the config in application.properties or application.yml:

```
spring.datasource.url: jdbc:mysql://localhost:3306/smartwaste
```

```
spring.datasource.username: root
```

```
spring.datasource.password: yourpassword
```

```
spring.jpa.hibernate.ddl-auto: update
```

...and switch dependency to **MySQL Driver**.

Everything else (code, repositories, services) stays the same.

In short:

H2 is a built-in temporary database used to quickly develop, test, and debug your Spring Boot app — before moving to a real database like MySQL in production.

Would you like me to show you **how to configure H2 and access its web console** once you generate your project?