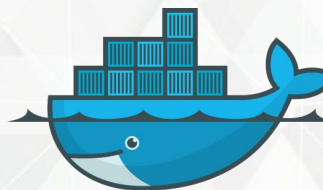




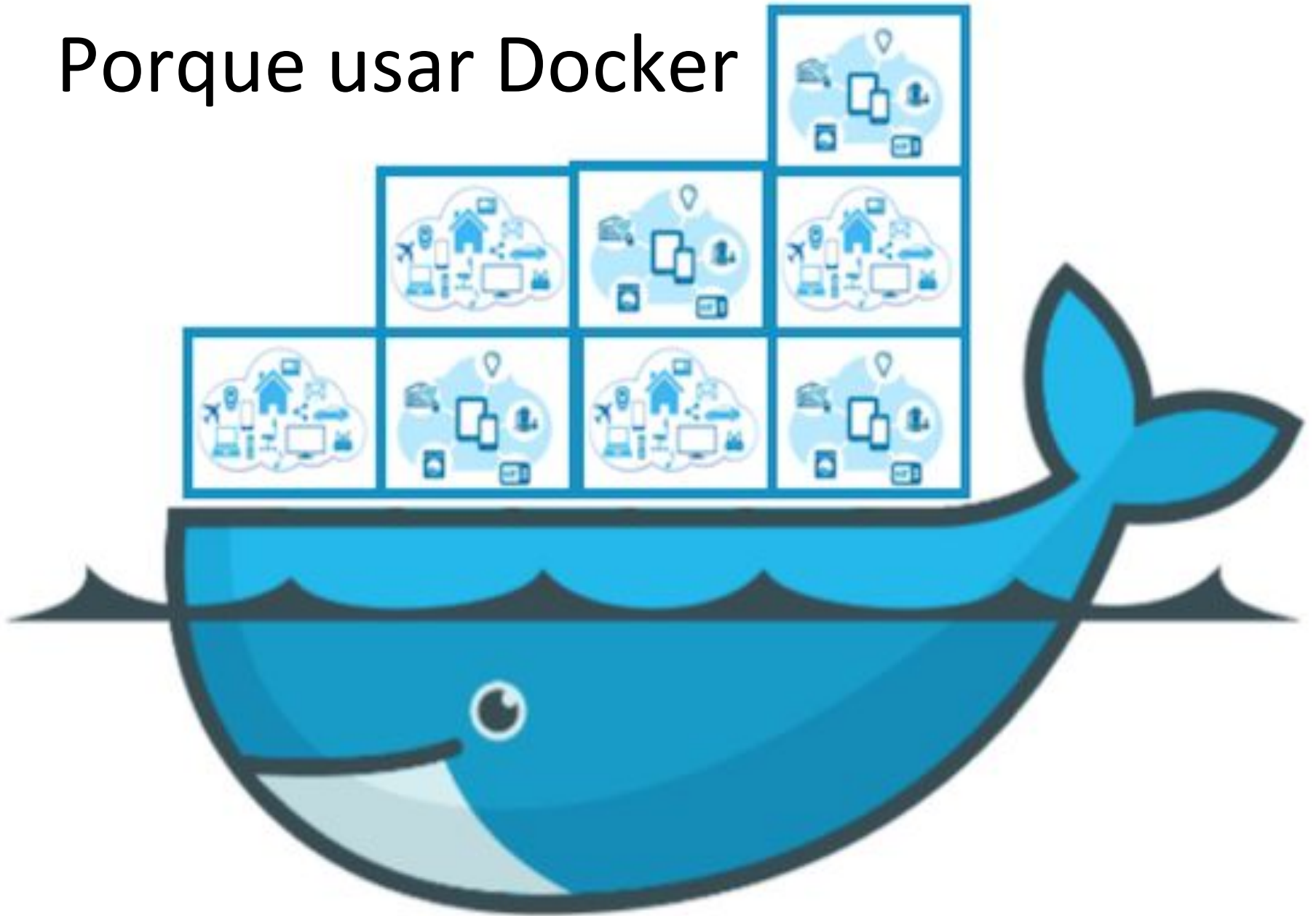
**TYPE**ORM



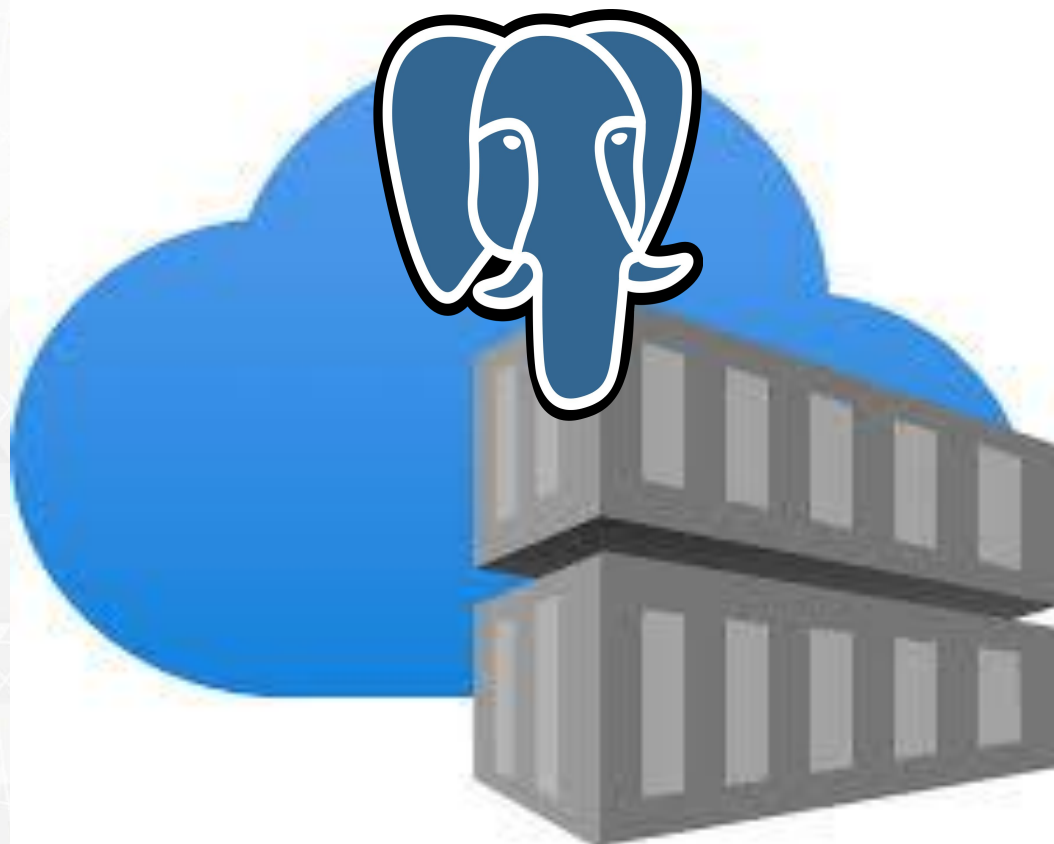
**docker**

Aluno: Marcos Alexandre dos Anjos  
Disciplina: TDS

# Porque usar Docker

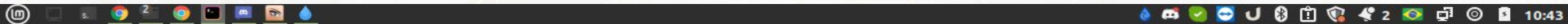


# Proposta para uso Docker



<https://www.docker.com>





marcos@pc: ~

```
marcos in ~  
> docker --version  
Docker version 19.03.8, build afacb8b7f0  
marcos in ~  
> █
```


# Criar um container com imagem do Postgres

<https://hub.docker.com>

We've updated our Terms of Service. [Learn more.](#)

docker hub  Explore Pricing Sign In [Sign Up](#)

Explore > postgres



PostgreSQL

postgres ☆

Docker Official Images

The PostgreSQL object-relational database system provides reliability and data integrity.

↓ 1B+

Container Linux ARM 64 IBM Z PowerPC 64 LE mips64le ARM x86-64 386 Databases

Official Image

Linux - x86-64 ( latest )

Copy and paste to pull this image

```
docker pull postgres
```

[View Available Tags](#)

Description Reviews Tags

marcos in ~

```
> docker run --name some-postgres -e POSTGRES_PASSWORD=mysecretpassword -d postgres
```





```
marcos@pc: ~  
marcos in ~  
> docker run --name tds -e POSTGRES_PASSWORD=1q2w3e -p 5433:5432 -d postgres  
ec6d6e3f4f411e5204570d242c7949e08dec282dea0f106b1c115f6473b68588  
marcos in ~  
> docker ps  
CONTAINER ID      IMAGE      COMMAND      CREATED      STATUS      PORTS      NAMES  
ec6d6e3f4f41     postgres  "docker-entr...  8 seconds ago  Up 6 seconds  0.0.0.0:5433->5432/tcp  tds
```

# Conectar ao banco



Versão Community  
<https://dbeaver.io/>



File Edit Navigate Search Editor de SQL Banco de Dados

Navegador de banco de Dados

Enter a part of table name here

DB Beaver Sample Database (SQLite)

Pointofix

Start

Project - General

Name DataSource

Bookmarks

ER Diagram

Scripts

General connections

### Connect to database

Select your database

Create new database connection. Find your database driver in the list below.

Type part of database/driver name to filter

Classic

All	SQLite	IBM DB2 LUW	MariaDB	MySQL 5	Oracle
Popular	PostgreSQL	SQL Server	Apache Drill	Apache Hive	Apache Ignite
SQL					
NoSQL					
Analytical					
Timeseries					
Embedded					
Hadoop / BigData					
Full-text search					
Graph databases					
	Apache Phoenix	Apache Spark			

Connection view: ☐ Simple ☒ Advanced

Test Connection ...

< Anterior Seguinte >

Cancelar Terminar

Connect to database

Configurações de conexão

PostgreSQL connection settings

PostgreSQL

Main PostgreSQL Driver properties SSH Proxy SSL

Server

Host: localhost Port: 5433

Database: postgres PORT 5432

Authentication

Authentication: Database Native

Username: postgres

Password: .....

Save password locally

Advanced

User role:

Local Client:

You can use variables in connection parameters.

Connection details (name, type, ...)

Driver name: PostgreSQL Edit Driver Settings

Test Connection ...

< Anterior Seguinte > Cancelar Terminar

General connections

BRT pt\_BR

Enter a part of table name here

> DBeaver Sample Database (SQLite)

✓ postgres - localhost:5433

- ✓ postgres ✓
  - > Esquemas
  - > Papeis
  - > Administrador
  - > Extensões
  - > Armazenamento
  - > Informações do sistema

Pointofix

Start

Project - General

Name	DataSource
> Bookmarl	
> ER Diagra	
> Scripts	

Painel do banco de dados

postgres

BRT pt\_BR



Docker : OK  
Container (Postgres): Ok  
Conexão com BD: OK



**TYPE**ORM

# TypeORM

É um ORM que pode ser executado nas plataformas:

**NodeJS, Cordova, PhoneGap, Ionic, ReactNative, NativeScript, Expo, Electron.**

Pode ser usando com TypeScript e JavaScript (ES5, ES6, ES7 e ES8)

TypeORM busca sempre oferecer suporte aos recursos mais recentes do JS para dev. de app que use BD.

**TypeORM** é foi influenciado pelo Hibernate



TypeORM

# https://typeorm.io

## Getting Started

### Connection

- Working with Connection
- Using ormconfig.json
- Connection Options
- Multiple Connections
- Connection API

### Entity

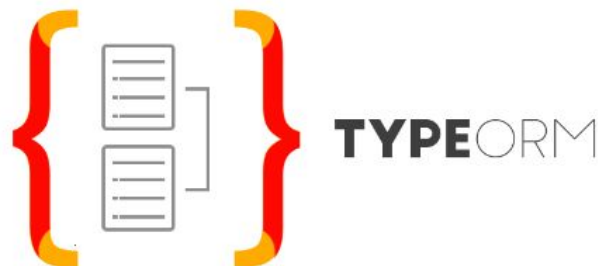
- What is Entity?
- Embedded Entities
- Entity Inheritance
- Tree Entities
- View Entities
- Separating Entity Definition

### Relations

- What are Relations?
- One-to-One
- Many-to-One and One-to-Many
- Many-to-Many
- Eager and Lazy Relations
- Relations FAQ

### Entity Manager and Repository

Working with Entity Manager



circleci **passing** npm package **0.2.28** dependencies **up to date** coverage **74%** chat **on slack**

TypeORM is an [ORM](#) that can run in NodeJS, Browser, Cordova, PhoneGap, Ionic, React Native, NativeScript, Expo, and Electron platforms and can be used with TypeScript and JavaScript (ES5, ES6, ES7, ES8). Its goal is to always support the latest JavaScript features and provide additional features that help you to develop any kind of application that uses databases - from small applications with a few tables to large scale enterprise applications with multiple databases.

TypeORM supports both [Active Record](#) and [Data Mapper](#) patterns, unlike all other JavaScript ORMs currently in existence, which means you can write high quality, loosely coupled, scalable, maintainable applications the most productive way.

TypeORM is highly influenced by other ORMs, such as [Hibernate](#), [Doctrine](#) and [Entity Framework](#).

## # Features



# Instalação

1. Install the npm package:

```
npm install typeorm --save
```

2. You need to install `reflect-metadata` shim:

```
npm install reflect-metadata --save
```

and import it somewhere in the global place of your app (for example in `app.ts`):

```
import "reflect-metadata";
```

3. You may need to install node typings:

```
npm install @types/node --save-dev
```

4. Install a database driver:

- for **MySQL** or **MariaDB**

```
npm install mysql --save (you can install mysql2 instead as well)
```

- for **PostgreSQL** or **CockroachDB**

```
npm install pg --save
```

```
marcos@pc: ~/www/utfpr/tds/trabalho

marcos in tds/trabalho on master [?]
> sudo npm i typeorm -g
[sudo] senha para marcos:
/usr/bin/typeorm -> /usr/lib/node_modules/typeorm/cli.js
+ typeorm@0.2.28
added 3 packages from 2 contributors, removed 18 packages and updated 12 packages in 4.163s
marcos in tds/trabalho on master [?] took 7s
>
```





marcos@pc: ~/www/utfpr/tds/trabalho/quicktypeorm

```
marcos in tds/trabalho on □ master [?]  
> typeorm init --name quicktypeorm --database pg  
Project created inside /home/marcos/www/utfpr/tds/trabalho/quicktypeorm directory.
```



```
marcos in tds/trabalho on □ master [?]
```

```
> ls
```

```
quicktypeorm ✓
```

```
marcos in tds/trabalho on □ master [?]
```

```
> cd quicktypeorm ✓
```

```
marcos in tds/trabalho/quicktypeorm on □ master [?]
```

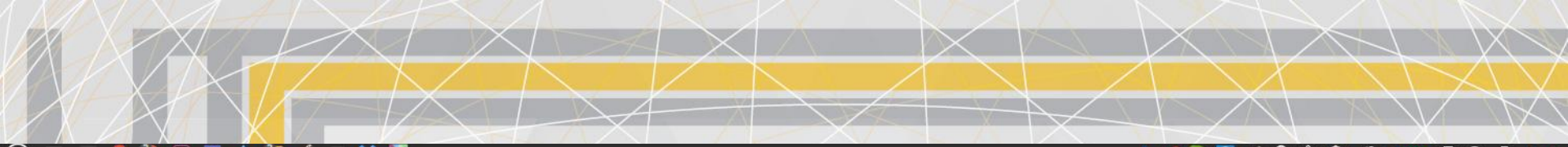
```
> ls  
ormconfig.json package.json README.md src tsconfig.json
```



```
marcos in tds/trabalho/quicktypeorm on □ master [?]
```

```
> █
```





quicktypeorm - Visual Studio Code

13:59

EXPLORER

> OPEN EDITORS

QUICKTYPEORM

- > node\_modules ✓
- > src
- .gitignore U
- ormconfig.json U
- package-lock.json U
- package.json U
- README.md U
- tsconfig.json U



```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
1: zsh
marcos in tds/trabalho/quicktypeorm on master [?]  
> npm i ✓  
npm notice created a lockfile as package-lock.json. You should commit this file.  
npm WARN quicktypeorm@0.0.1 No repository field.  
npm WARN quicktypeorm@0.0.1 No license field.  
  
added 119 packages from 431 contributors and audited 120 packages in 4.048s  
  
4 packages are looking for funding  
  run 'npm fund' for details  
  
found 0 vulnerabilities  
  
marcos in tds/trabalho/quicktypeorm on master [?] took 5s  
> |
```

> OUTLINE

> TIMELINE

master\* 0 0 0 Live Share



Go Live Found 0 variables



ormconfig.json - quicktypeorm - Visual Studio Code

EXPLORER

OPEN EDITORS

QUICKTYPEORM

- node\_modules
- src
  - entity ✓
  - migration ✓
  - index.ts
  - .gitignore
  - ormconfig.json
  - package-lock.json
  - package.json
  - README.md
  - tsconfig.json

OUTLINE

TIMELINE

```
1 {
2   "synchronize": true,
3   "logging": false,
4   "entities": [
5     "src/entity/**/*.ts"
6   ],
7   "migrations": [
8     "src/migration/**/*.ts"
9   ],
10  "subscribers": [
11    "src/subscriber/**/*.ts"
12  ],
13  "cli": {
14    "entitiesDir": "src/entity",
15    "migrationsDir": "src/migration",
16    "subscribersDir": "src/subscriber"
17  }
18 }
```

Entity -> Tabelas

Migrations -> Versionamento do BD



PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

1: zsh

```
npm WARN quicktypeorm@0.0.1 No license field.
added 119 packages from 431 contributors and audited 120 packages in 4.048s
4 packages are looking for funding
  run 'npm fund' for details
found 0 vulnerabilities
marcos in tds/trabalho/quicktypeorm on master [?] took 5s
>
```

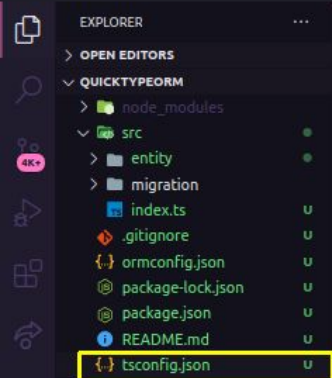
master\* 0 0 Live Share

Ln 1, Col 1 Spaces: 3 UTF-8 LF JSON Go Live Found 0 variables Prettier

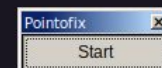




tsconfig.json - quicktypeorm - Visual Studio Code



```
1 {  
2   "compilerOptions": {  
3     "lib": [  
4       "es5",  
5       "es6"  
6     ],  
7     "target": "es5",  
8     "module": "commonjs",  
9     "moduleResolution": "node",  
10    "outDir": "./build",  
11    "emitDecoratorMetadata": true,  
12    "experimentalDecorators": true,  
13    "sourceMap": true  
14  }  
15 }
```



PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

1: zsh

```
npm WARN quicktypeorm@0.0.1 No license field.  
  
added 119 packages from 431 contributors and audited 120 packages in 4.048s  
  
4 packages are looking for funding  
  run `npm fund` for details  
  
found 0 vulnerabilities  
  
marcos in tds/trabalho/quicktypeorm on master [?] took 5s  
> 
```

master\* 0 0 Live Share



package.json - quicktypeorm - Visual Studio Code

EXPLORER

OPEN EDITORS

QUICKTYPEORM

- node\_modules
- src
  - entity
  - migration
  - index.ts
  - .gitignore
  - ormconfig.json
  - package-lock.json
  - package.json**
  - README.md
  - tsconfig.json

```
1 {
2   "name": "quicktypeorm",
3   "version": "0.0.1",
4   "description": "Awesome project developed with TypeORM.",
5   "devDependencies": {
6     "ts-node": "3.3.0",
7     "@types/node": "^8.0.29",
8     "typescript": "3.3.3333"
9   },
10  "dependencies": {
11    "typeorm": "0.2.26",
12    "reflect-metadata": "^0.1.10"
13  },
14  "scripts": {
15    "start": "ts-node src/index.ts"
16  }
17 }
18
```

Pointofix

Start

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

1: zsh

npm WARN quicktypeorm@0.0.1 No license field.

added 119 packages from 431 contributors and audited 120 packages in 4.048s

4 packages are looking for funding  
run 'npm fund' for details

found 0 vulnerabilities

marcos in tds/trabalho/quicktypeorm on master [?] took 5s

> []

master\* 0 0 0 Live Share

Ln 1, Col 1 Spaces: 3 UTF-8 LF JSON Go Live Found 0 variables Prettier



ormconfig.json - quicktypeorm - Visual Studio Code

EXPLORER

OPEN EDITORS 1 UNSAVED

QUICKTYPEORM

- node\_modules
- src
  - entity
  - migration
  - index.ts
  - .gitignore
  - ormconfig.json
  - package-lock.json
  - package.json
  - README.md
  - tsconfig.json

ormconfig.json > database

```
1  {
2    "type": "postgres",
3    "host": "localhost",
4    "port": 5433,
5    "username": "postgres",
6    "password": "1q2w3e",
7    "database": "appTypeorm",
8    "synchronize": true,
9    "logging": false,
10   "entities": ["src/entity/**/*.ts"],
11   "migrations": ["src/migration/**/*.ts"],
12   "subscribers": ["src/subscriber/**/*.ts"],
13   "cli": {
14     "entitiesDir": "src/entity",
15     "migrationsDir": "src/migration",
16     "subscribersDir": "src/subscriber"
17   }
18 }
```

Configuração para conexão ao BD

Pointofix

Start

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

1: zsh

npm WARN quicktypeorm@0.0.1 No license field.

added 119 packages from 431 contributors and audited 120 packages in 4.048s

4 packages are looking for funding  
run 'npm fund' for details

found 0 vulnerabilities

marcos in tds/trabalho/quicktypeorm on master [?] took 5s

> []

master\* 0 0 Live Share



Visual Studio Code interface showing a TypeScript file named `User.ts` in the `entity` folder. The code defines a `User` entity using `typeorm` decorators.

```
1 import {Entity, PrimaryGeneratedColumn, Column} from "typeorm";
2
3 @Entity()
4 export class User {
5
6   @PrimaryGeneratedColumn()
7   id: number;
8
9   @Column()
10  firstName: string;
11
12  @Column()
13  lastName: string;
14
15  @Column()
16  age: number;
17
18
19 }
```

Annotations and Diagram:

- Representacao de uma tabela**: Points to the `@Entity()` decorator.
- ID unico dentro da tabela**: Points to the `@PrimaryGeneratedColumn()` decorator.
- Colunas da Tabela**: Points to the `@Column()` decorators for `firstName`, `lastName`, and `age`.

Terminal output:

```
npm WARN quicktypeorm@0.0.1 No license field.
added 119 packages from 431 contributors and audited 120 packages in 4.048s
4 packages are looking for funding
  run `npm fund` for details
found 0 vulnerabilities
marcos in tds/trabalho/quicktypeorm on master [?] took 5s
```

index.ts - quicktypeorm - Visual Studio Code

EXPLORER

- QUICKTYPEORM
  - node\_modules
  - src
    - entity
      - User.ts
    - migration
      - index.ts
  - .gitignore
  - ormconfig.json
  - package-lock.json
  - package.json
  - README.md
  - tsconfig.json

src > index.ts > then() callback

```
5 createConnection()
6 .then(async (connection) => {
7   console.log("Inserindo um novo usuário no banco de dados ...");
8
9   const user = new User();
10  user.firstName = "Timber";
11  user.lastName = "Saw";
12  user.age = 25;
13
14  await connection.manager.save(user);
15
16  console.log("Salvando um novo usuário com id: " + user.id);
17  console.log("Carregando usuários do banco de dados...");
18
19  const users = await connection.manager.find(User);
20
21  console.log("Usuários carregados: ", users);
22  console.log(
23    "Aqui você pode configurar e executar express / koa / qualquer outro framework."
24  );
25 })
26 .catch((error) => console.log(error));
27
```

Inserindo novo User

Salvando novo User

Logs

Buscando user

Pointofix

Start

1: zsh

marcos in tds/trabalho/quicktypeorm on master [?]

Ln 21, Col 1 Spaces: 4 UTF-8 LF TypeScript Go Live 4.0.2 Found 0 variables Prettier: ✓





index.ts - quicktypeorm - Visual Studio Code

EXPLORER

- package.json quicktypeorm
- ormconfig.json quicktypeorm
- index.ts src

OPEN EDITORS 2 UNSAVED

src > index.ts > then() callback

13

QUICKTYPEORM

- node\_modules
- src
  - entity
  - User.ts
  - migration
  - index.ts
  - .gitignore
  - ormconfig.json
  - package-lock.json
  - package.json
  - README.md
  - tsconfig.json

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

1: zsh

found 0 vulnerabilities

marcos in tds/trabalho/quicktypeorm on master [?] took 4s

> npm run start

> quicktypeorm@0.0.1 start /home/marcos/www/utfpr/tds/trabalho/quicktypeorm  
> ts-node src/index.ts

error: database "appTypeorm" does not exist

```
at Parser.parseErrorMessage (/home/marcos/www/utfpr/tds/trabalho/quicktypeorm/node_modules/pg-protocol/src/parser.ts:357:11)
at Parser.handlePacket (/home/marcos/www/utfpr/tds/trabalho/quicktypeorm/node_modules/pg-protocol/src/parser.ts:186:21)
at Parser.parse (/home/marcos/www/utfpr/tds/trabalho/quicktypeorm/node_modules/pg-protocol/src/parser.ts:101:30)
at Socket.<anonymous> (/home/marcos/www/utfpr/tds/trabalho/quicktypeorm/node_modules/pg-protocol/src/index.ts:7:48)
at Socket.emit (events.js:315:20)
at Socket.EventEmitter.emit (domain.js:483:12)
at addChunk (_stream_readable.js:295:12)
at readableAddChunk (_stream_readable.js:271:9)
at Socket.Readable.push (_stream_readable.js:212:10)
at TCP.onStreamRead (internal/stream_base_commons.js:186:23) {
  length: 95,
  severity: 'FATAL',
  code: '3D000',
  detail: undefined,
  hint: undefined,
  position: undefined,
  internalPosition: undefined,
  internalQuery: undefined,
  where: undefined,
  schema: undefined,
  table: undefined,
  column: undefined,
  dataType: undefined,
  constraint: undefined,
  file: 'postinit.c',
  line: '890',
  routine: 'InitPostgres'
}
```

marcos in tds/trabalho/quicktypeorm on master [?]

>

Ln 13, Col 2 Spaces: 4 UTF-8 LF TypeScript Go Live 4.0.2 Found 0 variables Prettier: ✓





**Navegador de banco de Dados**

Enter a part of table name here

- > DBEaver Sample Database (SQLite)
- ▼ postgres - localhost:5433
  - ▼ postgres
    - > Esquemas
    - > Papeis
    - > Administrador
    - > Extensões
    - > Armazenamento
    - > Informações do sistema

**Create database**

General

Database name: appTypeorm

Owner: postgres

Definition

Template database:

Encoding: UTF8

Tablespace: pg\_default

Buttons: Cancelar, Ok

**Project - General**

Name	DataSource
> Bookmarl	
> ER Diagra	
> Scripts	

**Painel do banco de dados**

Enter a part of table name here

- DBBeaver Sample Database (SQLite)
- postgres - localhost:5433
  - postgres
    - appTypeorm ✓
    - Esquemas
    - Papeis
    - Administrador
    - Extensões
    - Armazenamento
    - Informações do sistema

Project - General

Name	DataSource
Bookmark	
ER Diagram	
Scripts	

Painel do banco de dados

Pointofix Start





EXPLORER

OPEN EDITORS 1 UNSAVED

QUICKTYPEORM

node\_modules

src

entity

User.ts

migration

index.ts

.gitignore

ormconfig.json

package-lock.json

package.json

README.md

tsconfig.json

ormconfig.json > database

```
1 {
2   "type": "postgres",
3   "host": "localhost",
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
marcos in tds/trabalho/quicktypeorm on master [?]  
> npm run start ✓  
  
> quicktypeorm@0.0.1 start /home/marcos/www/utfpr/tds/trabalho/quicktypeorm  
> ts-node src/index.ts  
  
Inserindo um novo usuário no banco de dados ... ✓  
Salvando um novo usuário com id: 2 ✓  
Carregando usuários do banco de dados... ✓  
Usuários carregados: [  
  User { id: 1, firstName: 'Timber', lastName: 'Saw', age: 25 }, ✓  
  User { id: 2, firstName: 'Timber', lastName: 'Saw', age: 25 } ✓  
]  
Aqui você pode configurar e executar express / koa / qualquer outro framework.  
□
```

1: npm

Pointofix  
Start

DBBeaver 7.2.2 - public

File Edit Navigate Search Editor de SQL Banco de dados Window Help

Enviar Reverter Auto postgres public@appTypeorm

Navegador de banco de Dados

Enter a part of table name here

- DBBeaver Sample Database (SQLite)
- postgres - localhost:5433
  - postgres
  - appTypeorm
    - Esquemas
      - information\_schema
      - pg\_catalog
      - public
        - Tabelas
          - user
        - Visualizações
        - Visualizações materializadas
        - Indíces
        - Funções
        - Sequências
        - Tipos de dados

public user

Properties ER Diagrama

postgres appTypeorm Esquemas public

user	
123	id
ABC	firstName
ABC	lastName
123	age

1 objects 100% Persist diagram

Project - General

Name	DataSource
Bookmark	
ER Diagram	
Scripts	

Painel do banco de dados

DBeaver 7.2.2 - user

File Edit Navigate Search Editor de SQL Banco de dados Window Help

Enviar Reverter Auto postgres public@appTypeorm

Navegador de banco de Dados

Enter a part of table name here

- DBEaver Sample Database (SQLite)
- postgres - localhost:5433
  - postgres
  - appTypeorm
    - Esquemas
      - information\_schema
      - pg\_catalog
      - public
        - Tabelas
          - user
        - Visualizações
        - Visualizações materializadas
        - Índices
        - Funções
        - Sequências
        - Tipos de dados

public user

Properties Dado ER Diagrama

postgres appTypeorm Esquemas public Tabelas user

user Enter a SQL expression to filter results (use Ctrl+Space)

Grade	id	firstName	lastName	age
1	1	Timber	Saw	25
2	2	Timber	Saw	25

Valor

2

Pointofix Start

Save Cancel Script 200 2 Rows: 1

2 row(s) fetched - 1 ms

Project - General

Name	DataSource
Bookmarl	
ER Diagra	
Scripts	

Painel do banco de dados

BRT pt\_BR



# Instalação/Configuração Typeorm

## Estrutura de arquivos

## Como usar métodos no Typeorm

# Mão na massa!

Passo a passo!

1 - Projeto base

2 - npm i

3 - Conf. BD

4 - npm run typeorm migration:run

5 - npm run dev

6 - Rotas

7 - Teste