САНКТ-ПЕТЕРБУРГСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ ИТМО

Дисциплина: Бэк-энд разработка

Отчет

Лабораторная работа №2

Выполнил:

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Группа

К33401

Проверил:
Добряков Д. И.

Санкт-Петербург

2022 г.

Задача

Необходимо реализовать RESTful API средствами express + typescript.

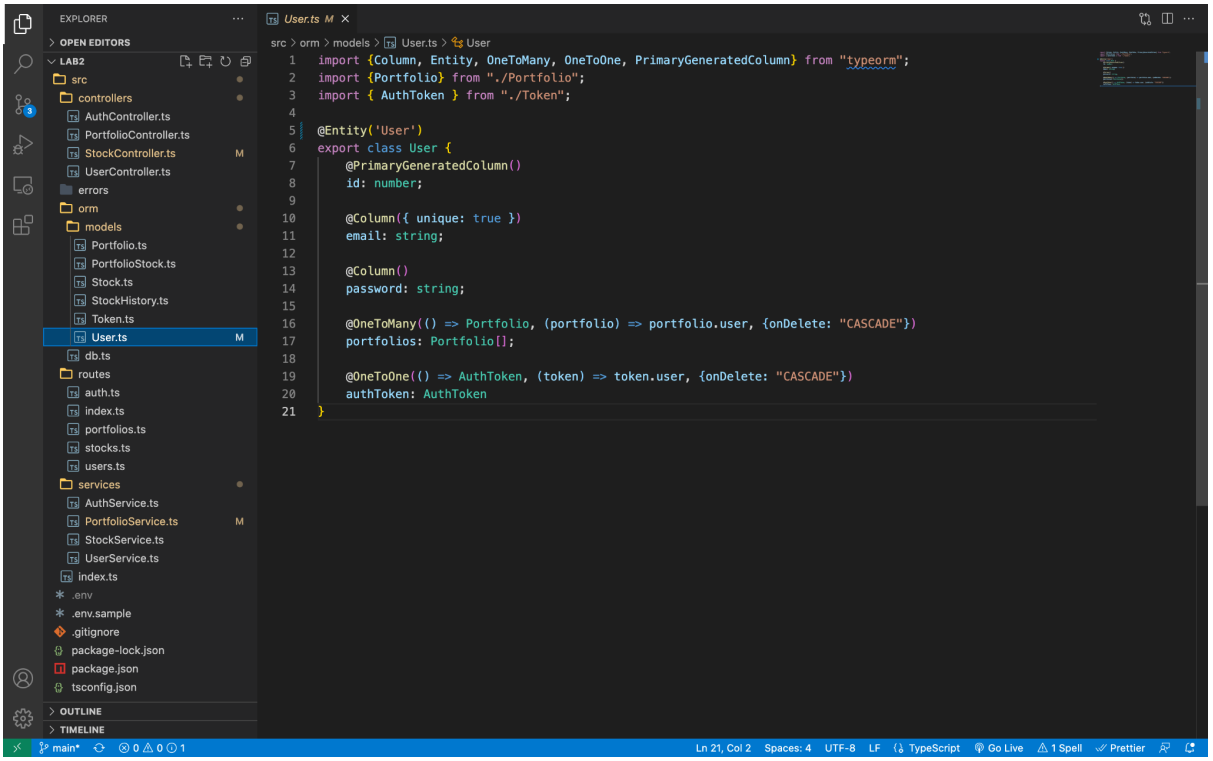
Сайт криптобиржи:

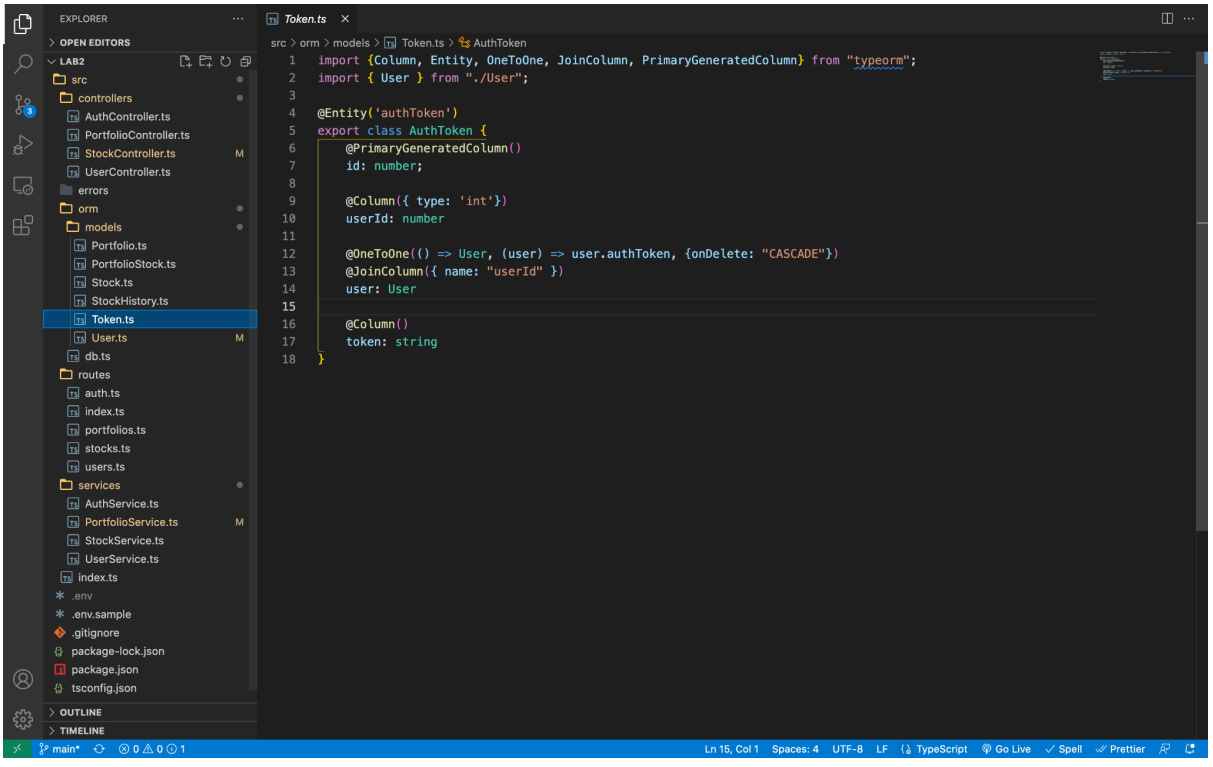
- Вход
- Регистрация
- Портфель пользователя с указанием различных криптовалют и их количеством
- Графики роста криптовалют
- Поиск по криптовалютам с возможностью фильтрации по дате добавления на биржу

Ход работы

1. Структура приложения

2. Модели


EXPLORER
OPEN EDITORS
LAB2
src
controllers
AuthController.ts
PortfolioController.ts
StockController.ts M
UserController.ts
errors
orm
models
Portfolio.ts
PortfolioStock.ts
Stock.ts
StockHistory.ts
Token.ts
User.ts M
db.ts
routes
auth.ts
index.ts
portfolios.ts
stocks.ts
users.ts
services
AuthService.ts
PortfolioService.ts M
StockService.ts
UserService.ts
index.ts
.env
.env.sample
.gitignore
package-lock.json
package.json
tsconfig.json
OUTLINE
TIMELINE
User.ts M
src > orm > models > User.ts > User
1 import {Column, Entity, OneToMany, OneToOne, PrimaryGeneratedColumn} from "typeorm";
2 import {Portfolio} from "./Portfolio";
3 import { AuthToken } from "./Token";
4
5 @Entity('User')
6 export class User {
7 @PrimaryGeneratedColumn()
8 id: number;
9
10 @Column({ unique: true })
11 email: string;
12
13 @Column()
14 password: string;
15
16 @OneToMany(() => Portfolio, (portfolio) => portfolio.user, {onDelete: "CASCADE"})
17 portfolios: Portfolio[];
18
19 @OneToOne(() => AuthToken, (token) => token.user, {onDelete: "CASCADE"})
20 authToken: AuthToken
21 }
main*
0 0 1
Ln 21, Col 2
Spaces: 4
UTF-8
LF
TypeScript
Go Live
1 Spell
Prettier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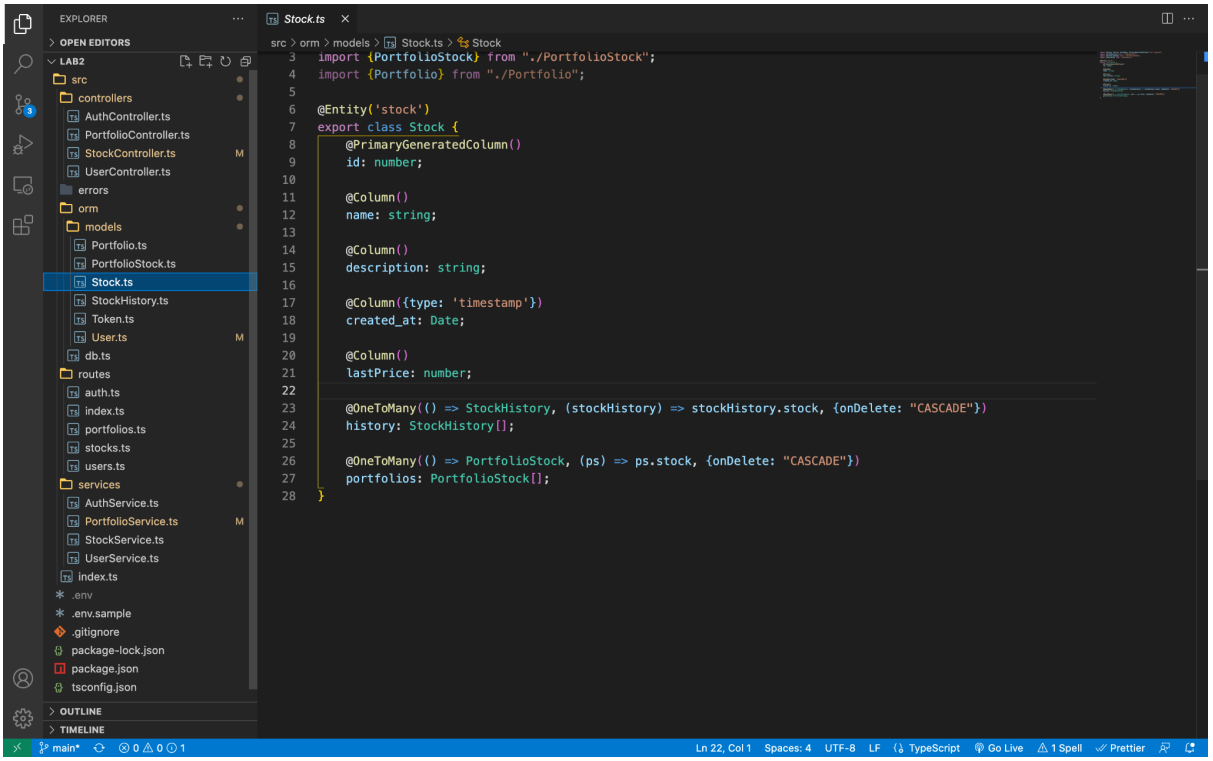
.env
.env.sample
.gitignore
package-lock.json
package.json
tsconfig.json
OUTLINE
TIMELINE
Token.ts
src > orm > models > Token.ts > AuthToken
1 import {Column, Entity, OneToOne, JoinColumn, PrimaryGeneratedColumn} from "typeorm";
2 import { User } from "./User";
3
4 @Entity('authToken')
5 export class AuthToken {
6 @PrimaryGeneratedColumn()
7 id: number;
8
9 @Column({ type: 'int'})
10 userId: number
11
12 @OneToOne(() => User, (user) => user.authToken, {onDelete: "CASCADE"})
13 @JoinColumn({ name: "userId" })
14 user: User
15
16 @Column()
17 token: string
18 }
main*
0 0 1
Ln 15, Col 1
Spaces: 4
UTF-8
LF
TypeScript
Go Live
Spell
Prettier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.env.sample
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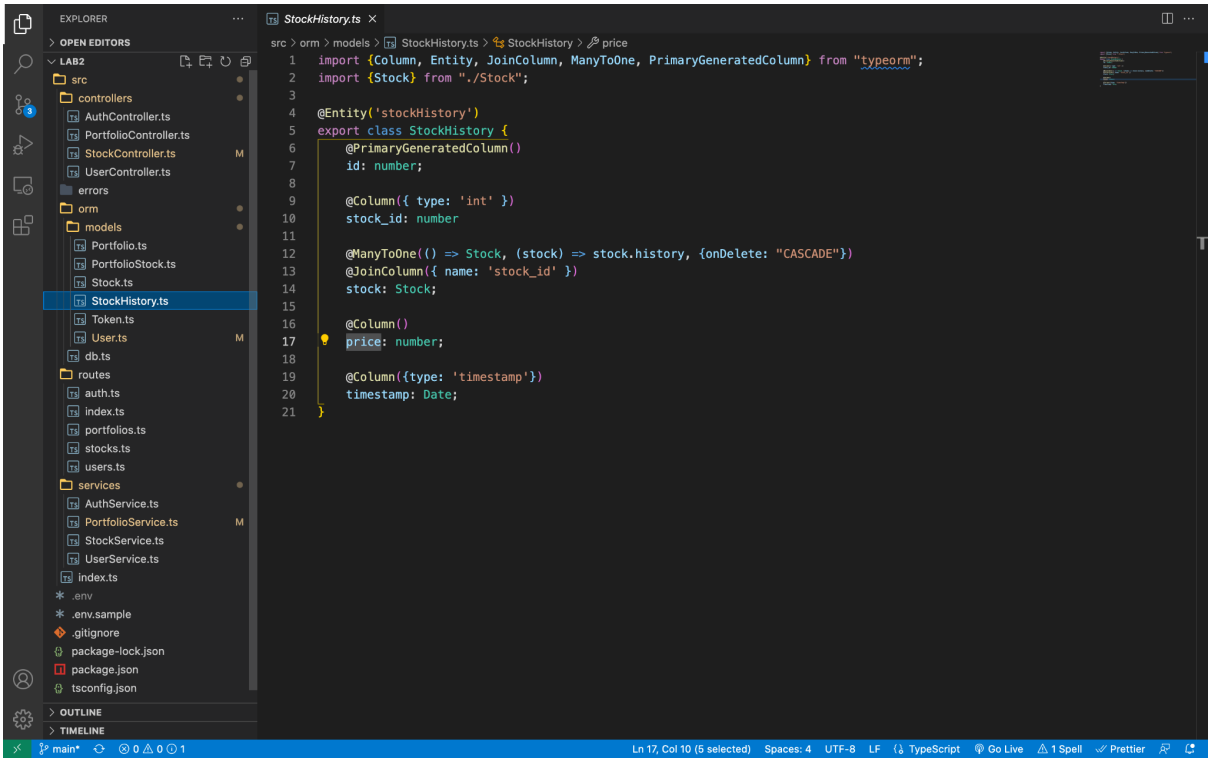
package.json
tsconfig.json
OUTLINE
TIMELINE
Stock.ts
src > orm > models > Stock.ts > Stock
3 import {PortfolioStock} from "./PortfolioStock";
4 import {Portfolio} from "./Portfolio";
5
6 @Entity('stock')
7 export class Stock {
8 @PrimaryGeneratedColumn()
9 id: number;
10
11 @Column()
12 name: string;
13
14 @Column()
15 description: string;
16
17 @Column({type: 'timestamp'})
18 created_at: Date;
19
20 @Column()
21 lastPrice: number;
22
23 @OneToMany(() => StockHistory, (stockHistory) => stockHistory.stock, {onDelete: "CASCADE"})
24 history: StockHistory[];
25
26 @OneToMany(() => PortfolioStock, (ps) => ps.stock, {onDelete: "CASCADE"})
27 portfolios: PortfolioStock[];
28 }
main*
0 0 1
Ln 22, Col 1
Spaces: 4
UTF-8
LF
TypeScript
Go Live
1 Spell
Prettier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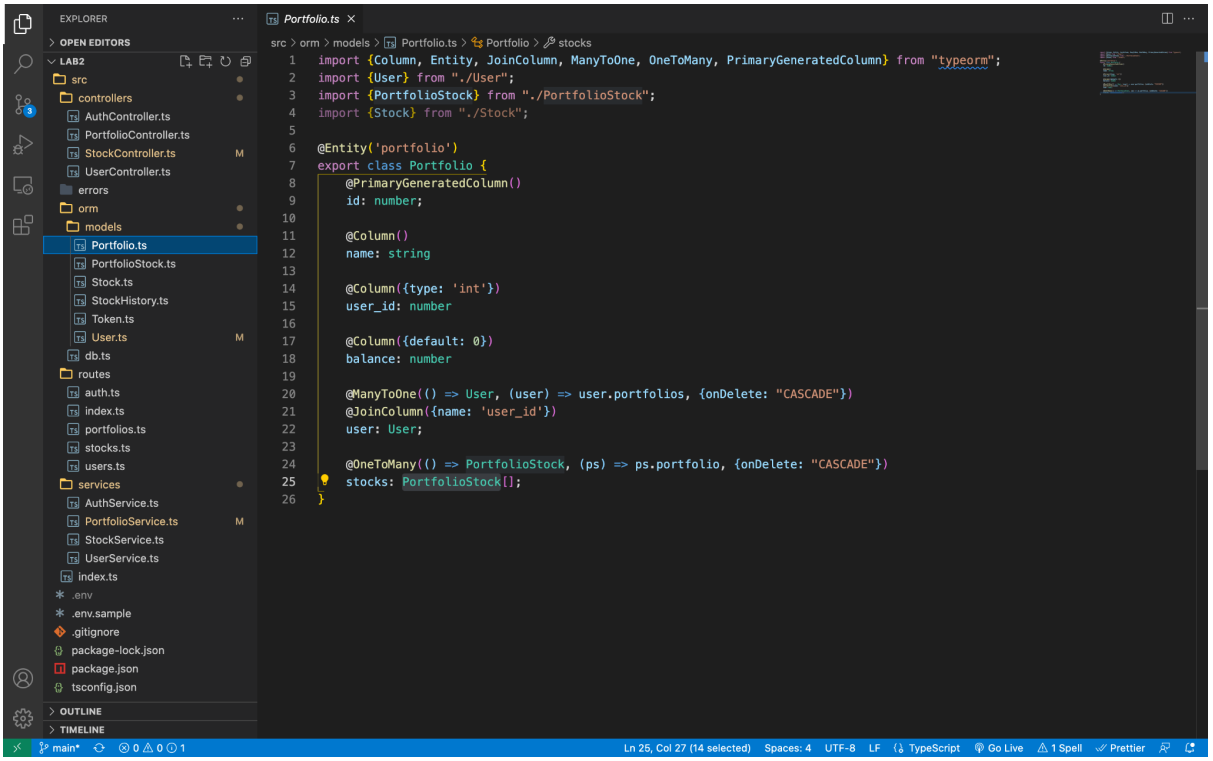
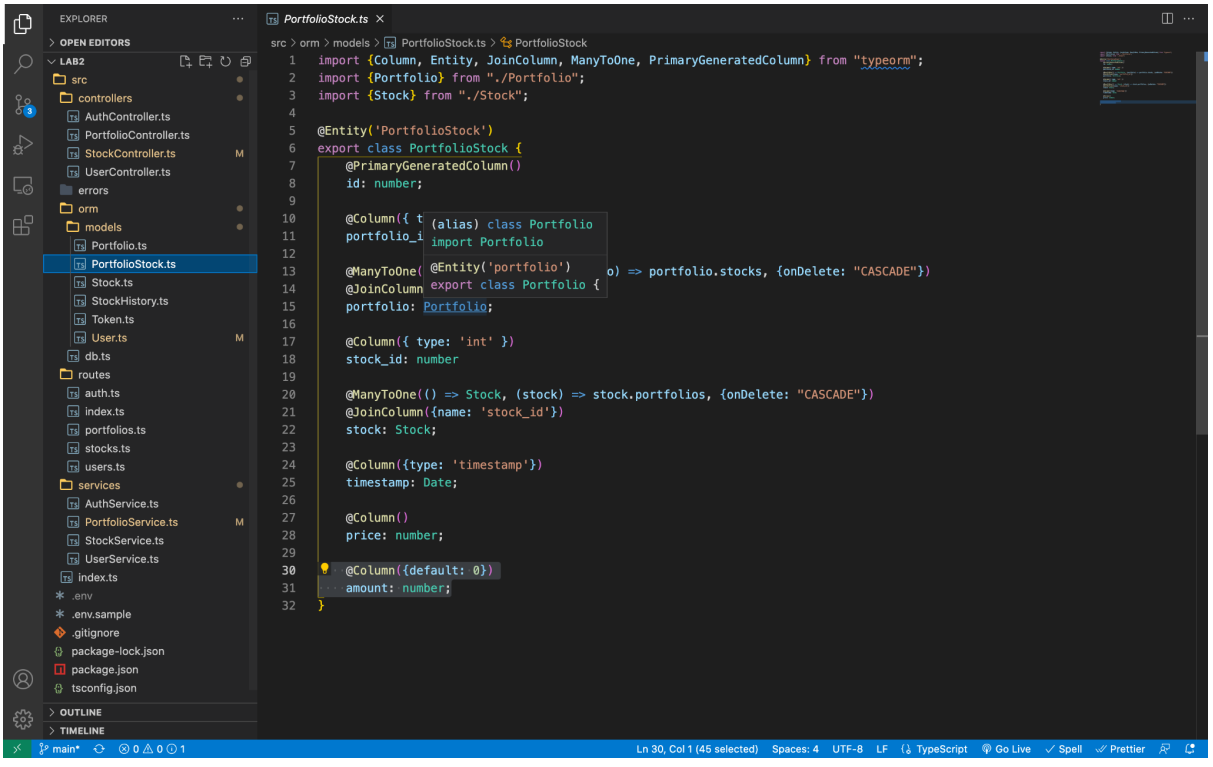
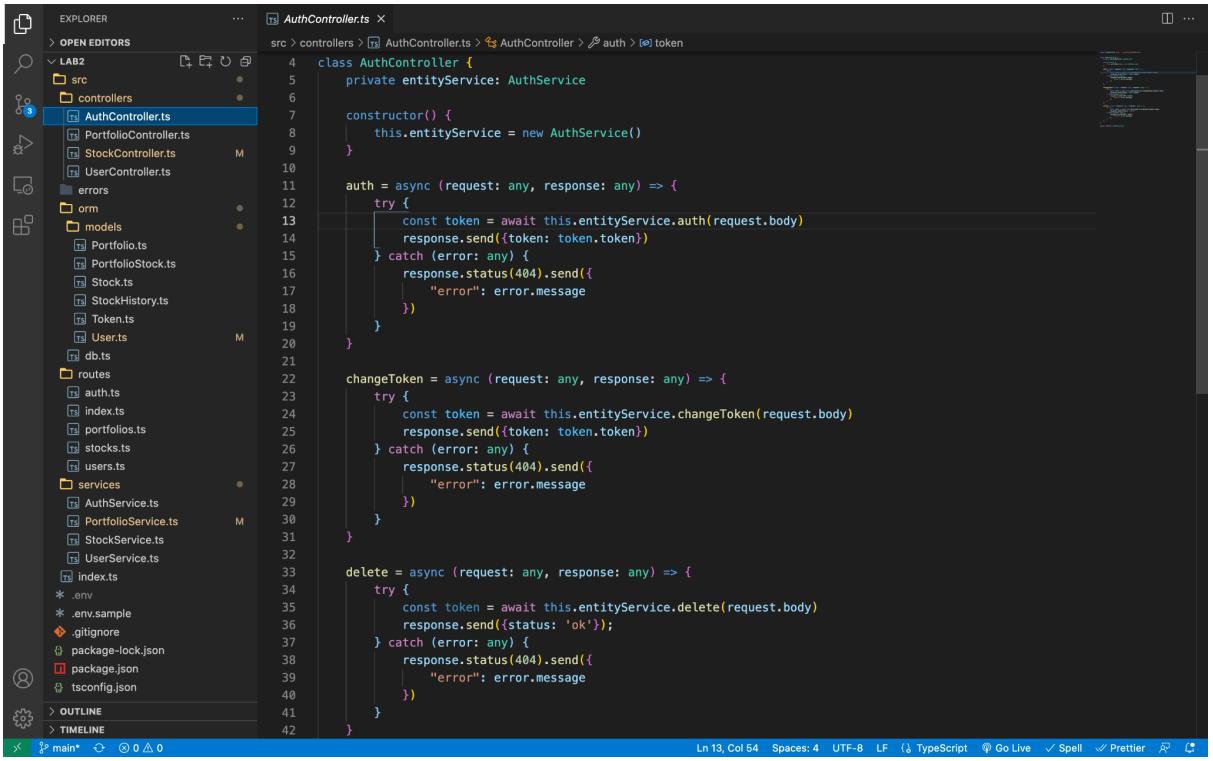
package.json
tsconfig.json
OUTLINE
TIMELINE
StockHistory.ts
src > orm > models > StockHistory.ts > StockHistory > price
1 import {Column, Entity, JoinColumn, ManyToOne, PrimaryGeneratedColumn} from "typeorm";
2 import {Stock} from "./Stock";
3
4 @Entity('stockHistory')
5 export class StockHistory {
6 @PrimaryGeneratedColumn()
7 id: number;
8
9 @Column({ type: 'int' })
10 stock_id: number
11
12 @ManyToOne(() => Stock, (stock) => stock.history, {onDelete: "CASCADE"})
13 @JoinColumn({ name: 'stock_id' })
14 stock: Stock;
15
16 @Column()
17 price: number;
18
19 @Column({type: 'timestamp'})
20 timestamp: Date;
21 }
main*
0 0 1
Ln 17, Col 10 (5 selected)
Spaces: 4
UTF-8
LF
TypeScript
Go Live
1 Spell
Prettier





3. Контроллеры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.env
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tsconfig.json
OUTLINE
TIMELINE
AuthController.ts
src > controllers > AuthController.ts > AuthController > auth > token
class AuthController {
private entityService: AuthService
constructor() {
this.entityService = new AuthService()
}
auth = async (request: any, response: any) => {
try {
const token = await this.entityService.auth(request.body)
response.send({token: token.token})
} catch (error: any) {
response.status(404).send({
"error": error.message
})
}
}
changeToken = async (request: any, response: any) => {
try {
const token = await this.entityService.changeToken(request.body)
response.send({token: token.token})
} catch (error: any) {
response.status(404).send({
"error": error.message
})
}
}
delete = async (request: any, response: any) => {
try {
const token = await this.entityService.delete(request.body)
response.send({status: 'ok'});
} catch (error: any) {
response.status(404).send({
"error": error.message
})
}
}
main*
0 0
Ln 13, Col 54
Spaces: 4
UTF-8
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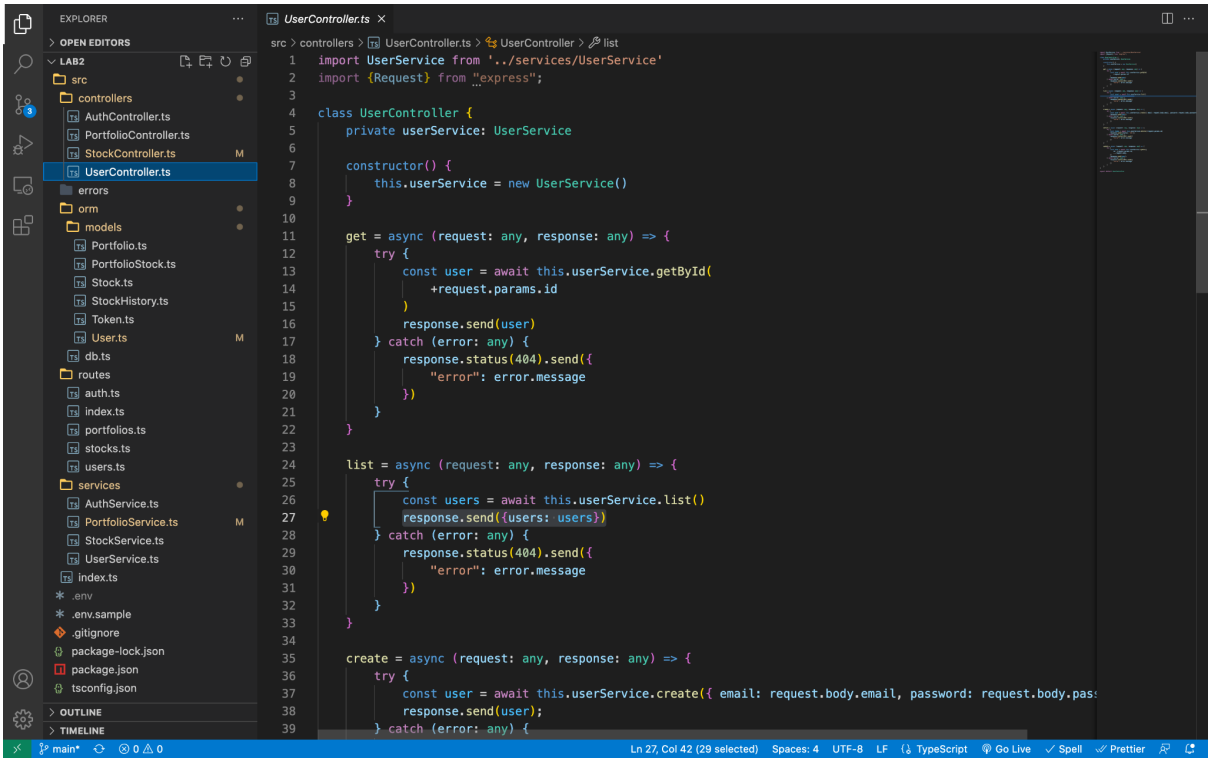
TypeScript
Go Live
Spell
Prettier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OUTLINE
TIMELINE
UserController.ts
src > controllers > UserController.ts > UserController > list
import UserService from '../services/UserService'
import {Request} from "express";
class UserController {
private userService: UserService
constructor() {
this.userService = new UserService()
}
get = async (request: any, response: any) => {
try {
const user = await this.userService.getById(
+request.params.id
)
response.send(user)
} catch (error: any) {
response.status(404).send({
"error": error.message
})
}
}
list = async (request: any, response: any) => {
try {
const users = await this.userService.list()
response.send({users: users})
} catch (error: any) {
response.status(404).send({
"error": error.message
})
}
}
create = async (request: any, response: any) => {
try {
const user = await this.userService.create({ email: request.body.email, password: request.body.pas
response.send(user);
} catch (error: any) {
main*
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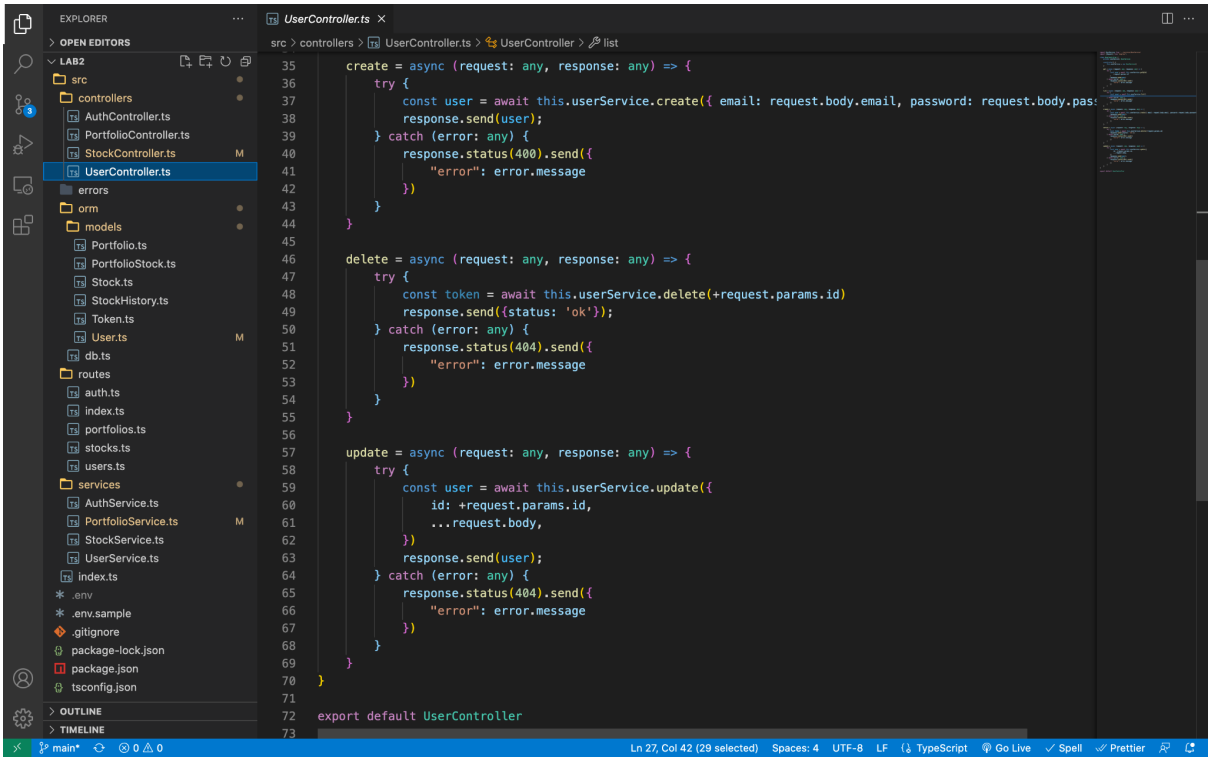
TypeScript
Go Live
Spell
Prettier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package.json
tsconfig.json
OUTLINE
TIMELINE
UserController.ts
src > controllers > UserController.ts > UserController > list
create = async (request: any, response: any) => {
try {
const user = await this.userService.create({ email: request.body.email, password: request.body.pas
response.send(user);
} catch (error: any) {
response.status(400).send({
"error": error.message
})
}
}
delete = async (request: any, response: any) => {
try {
const token = await this.userService.delete(+request.params.id)
response.send({status: 'ok'});
} catch (error: any) {
response.status(404).send({
"error": error.message
})
}
}
update = async (request: any, response: any) => {
try {
const user = await this.userService.update({
id: +request.params.id,
...request.body,
})
response.send(user);
} catch (error: any) {
response.status(404).send({
"error": error.message
})
}
}
}
export default UserController
main*
0 0
Ln 27, Col 42 (29 selected)
Spaces: 4
UTF-8
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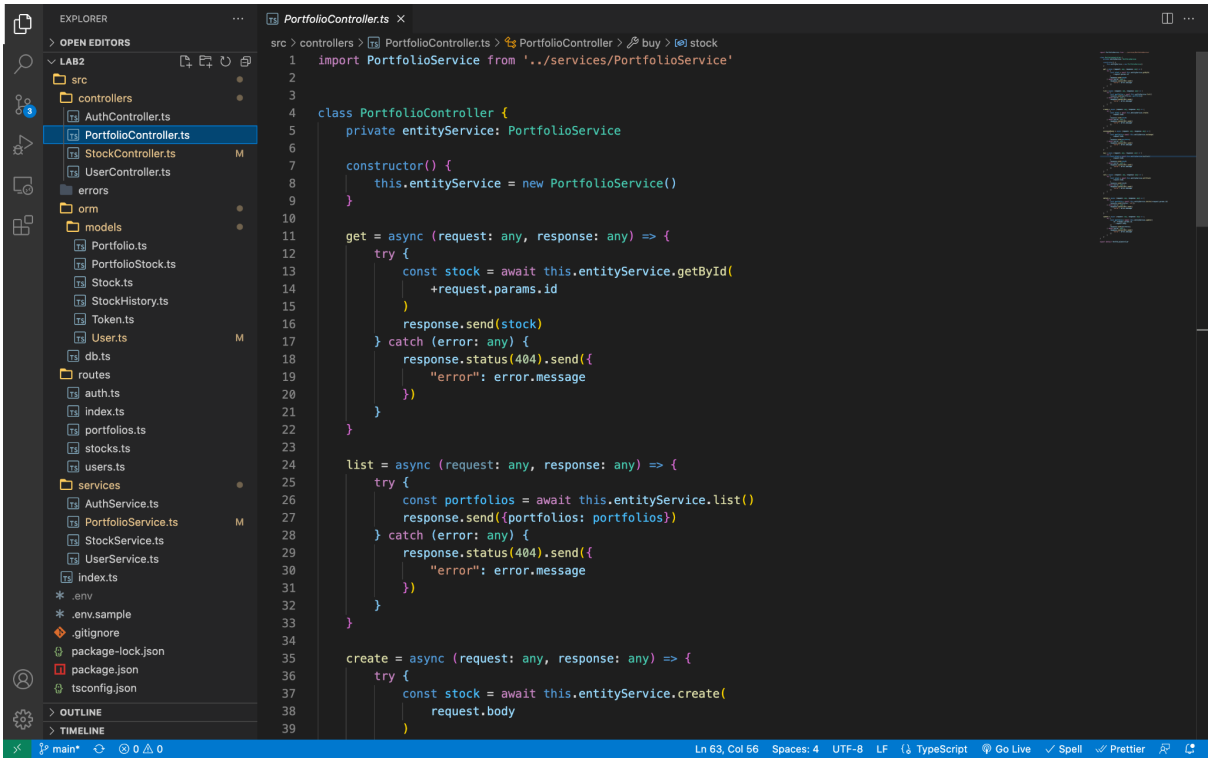
TypeScript
Go Live
Spell
Prettier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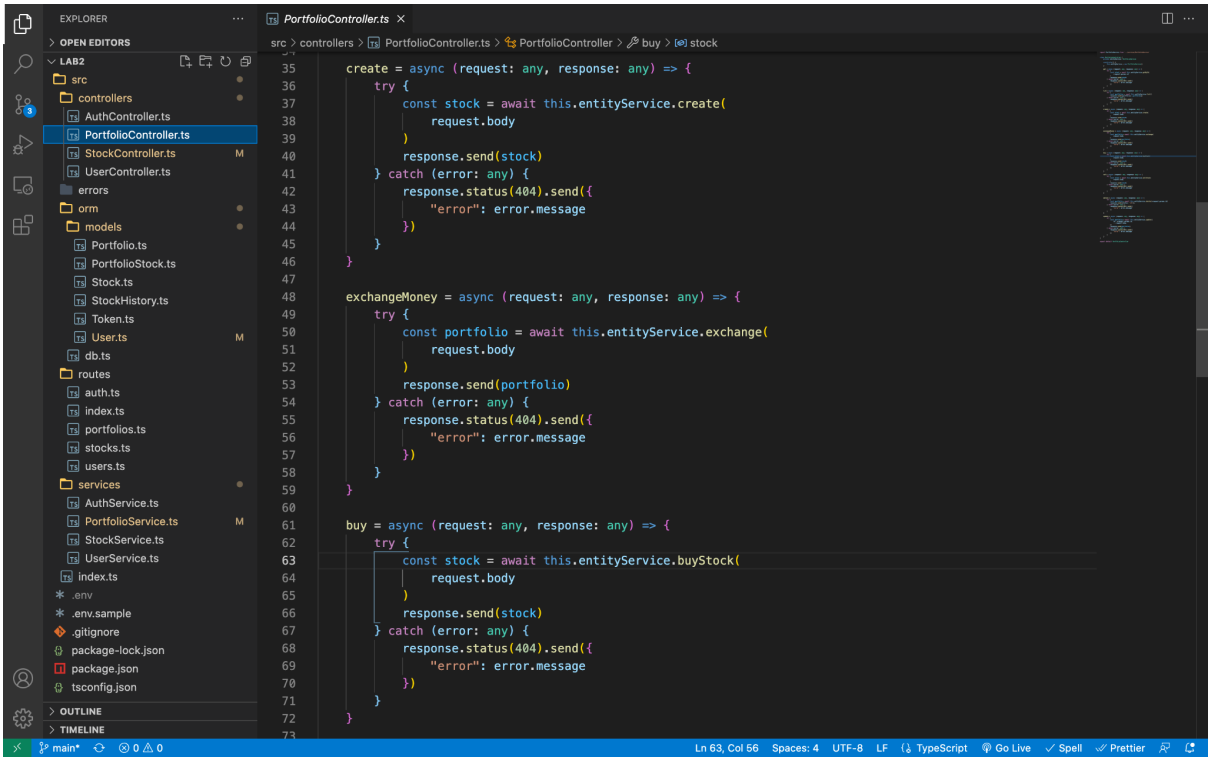
package.json
tsconfig.json
OUTLINE
TIMELINE
PortfolioController.ts
src > controllers > PortfolioController.ts > PortfolioController > buy > stock
import PortfolioService from '../services/PortfolioService'
class PortfolioController {
private entityService: PortfolioService
constructor() {
this.entityService = new PortfolioService()
}
get = async (request: any, response: any) => {
try {
const stock = await this.entityService.getById(
+request.params.id
)
response.send(stock)
} catch (error: any) {
response.status(404).send({
"error": error.message
})
}
}
list = async (request: any, response: any) => {
try {
const portfolios = await this.entityService.list()
response.send({portfolios: portfolios})
} catch (error: any) {
response.status(404).send({
"error": error.message
})
}
}
create = async (request: any, response: any) => {
try {
const stock = await this.entityService.create(
request.body
)
main*
0 0
Ln 63, Col 56
Spaces: 4
UTF-8
LF
TypeScript
Go Live
Spell
Prettier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tsconfig.json
OUTLINE
TIMELINE
PortfolioController.ts
src > controllers > PortfolioController.ts > PortfolioController > buy > stock
create = async (request: any, response: any) => {
try {
const stock = await this.entityService.create(
request.body
)
response.send(stock)
} catch (error: any) {
response.status(404).send({
"error": error.message
})
}
}
exchangeMoney = async (request: any, response: any) => {
try {
const portfolio = await this.entityService.exchange(
request.body
)
response.send(portfolio)
} catch (error: any) {
response.status(404).send({
"error": error.message
})
}
}
buy = async (request: any, response: any) => {
try {
const stock = await this.entityService.buyStock(
request.body
)
response.send(stock)
} catch (error: any) {
response.status(404).send({
"error": error.message
})
}
}
main*
0 0
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Spaces: 4
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TypeScript
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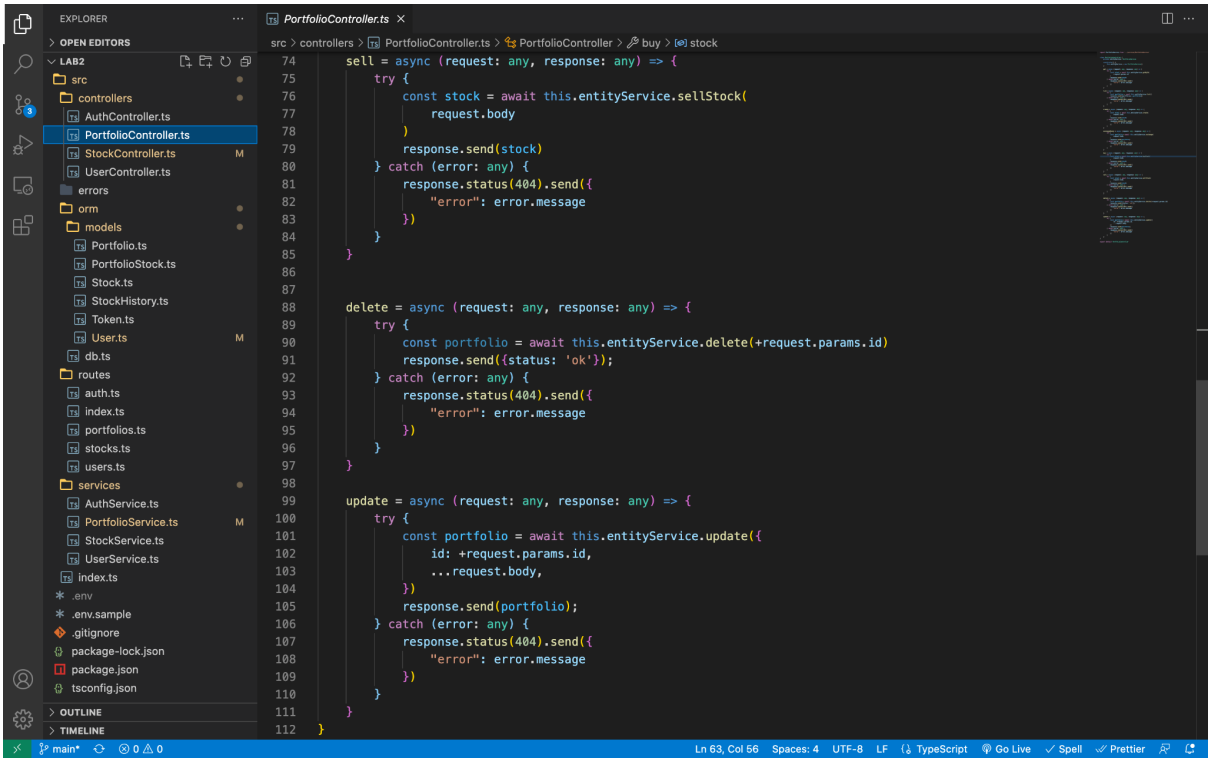
Spell
Prettier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OUTLINE
TIMELINE
PortfolioController.ts
src > controllers > PortfolioController.ts > PortfolioController > buy > stock
sell = async (request: any, response: any) => {
try {
const stock = await this.entityService.sellStock(
request.body
)
response.send(stock)
} catch (error: any) {
response.status(404).send({
"error": error.message
})
}
}
delete = async (request: any, response: any) => {
try {
const portfolio = await this.entityService.delete(+request.params.id)
response.send({status: 'ok'});
} catch (error: any) {
response.status(404).send({
"error": error.message
})
}
}
update = async (request: any, response: any) => {
try {
const portfolio = await this.entityService.update({
id: +request.params.id,
...request.body,
})
response.send(portfolio);
} catch (error: any) {
response.status(404).send({
"error": error.message
})
}
}
}
main*
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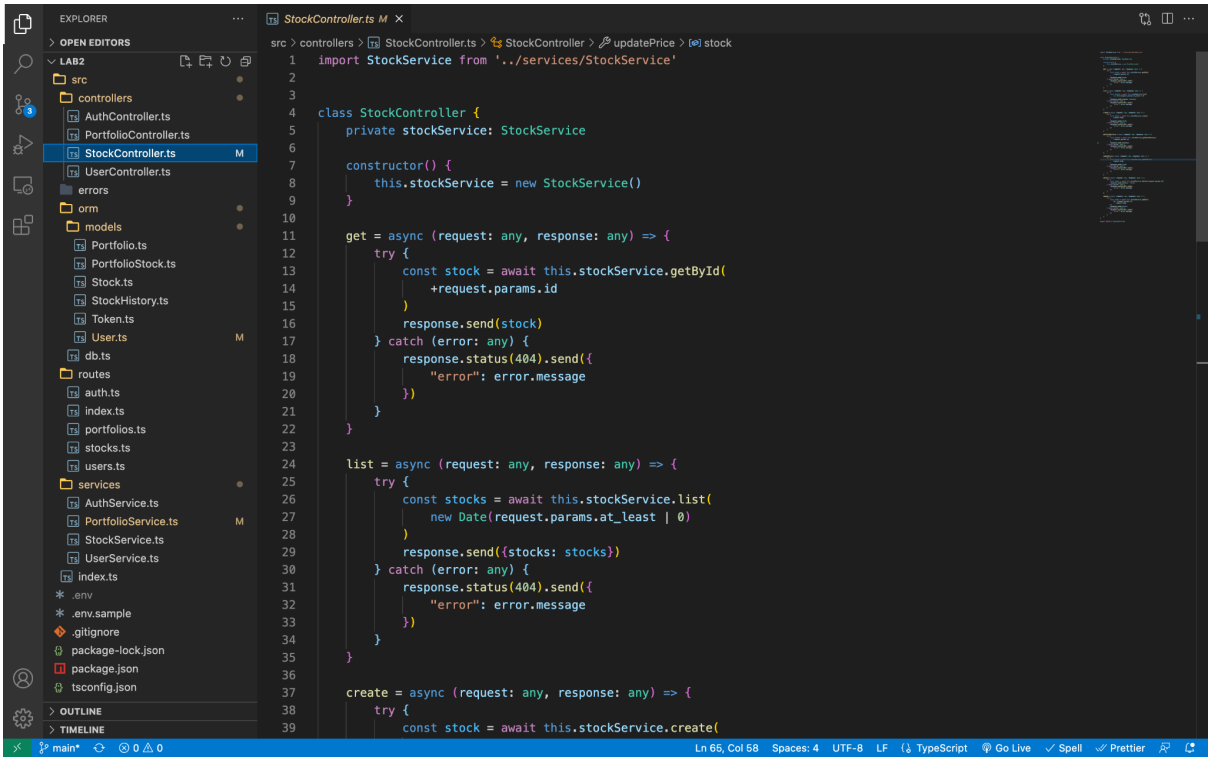
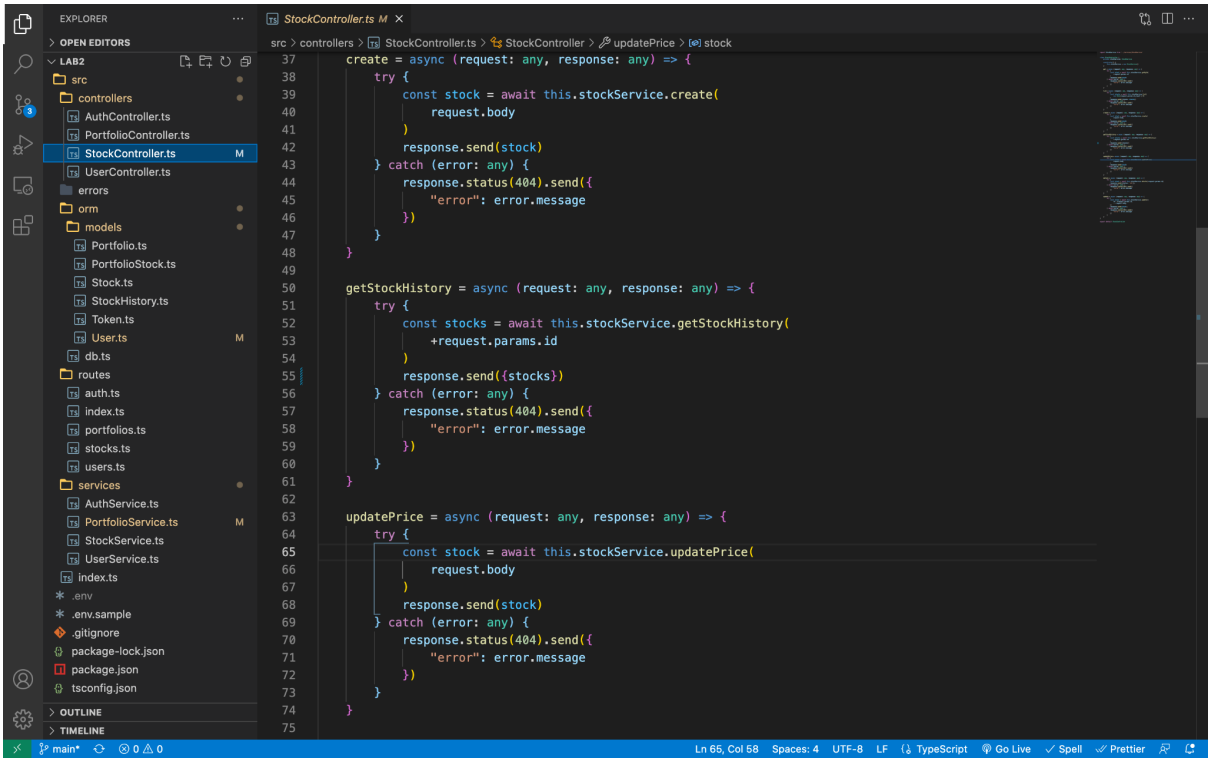
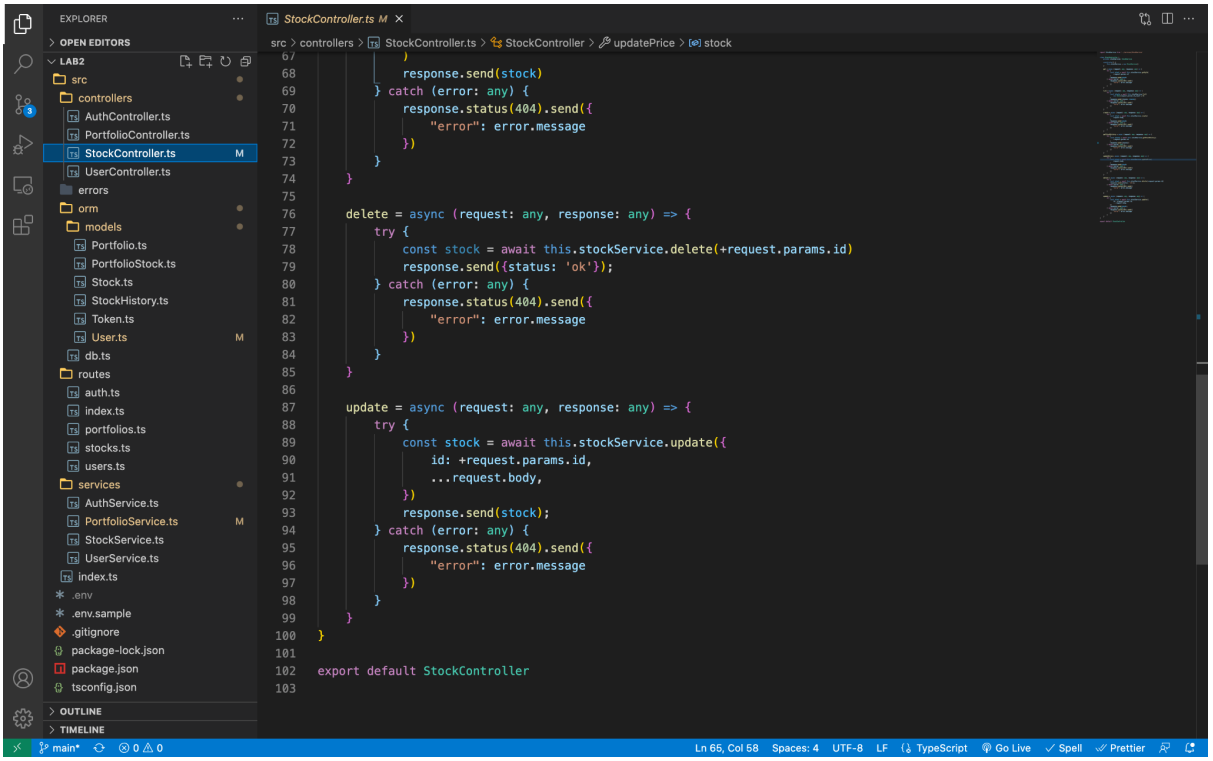
Prettier



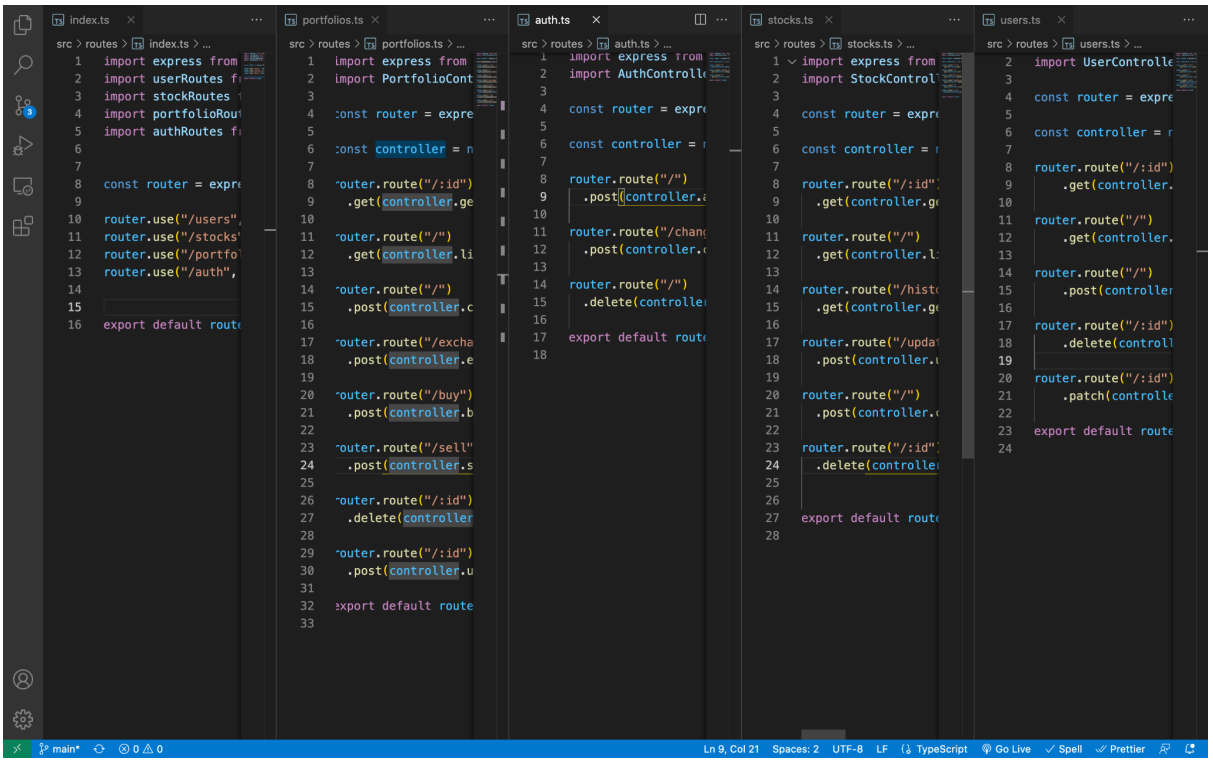

```ts
import StockService from '../services/StockService'


class StockController {
    private stockService: StockService

    constructor() {
        this.stockService = new StockService()
    }

    get = async (request: any, response: any) => {
        try {
            const stock = await this.stockService.getById(
                +request.params.id
            )
            response.send(stock)
        } catch (error: any) {
            response.status(404).send({
                "error": error.message
            })
        }
    }

    list = async (request: any, response: any) => {
        try {
            const stocks = await this.stockService.list(
                new Date(request.params.at_least | 0)
            )
            response.send({stocks: stocks})
        } catch (error: any) {
            response.status(404).send({
                "error": error.message
            })
        }
    }

    create = async (request: any, response: any) => {
        try {
            const stock = await this.stockService.create(
```



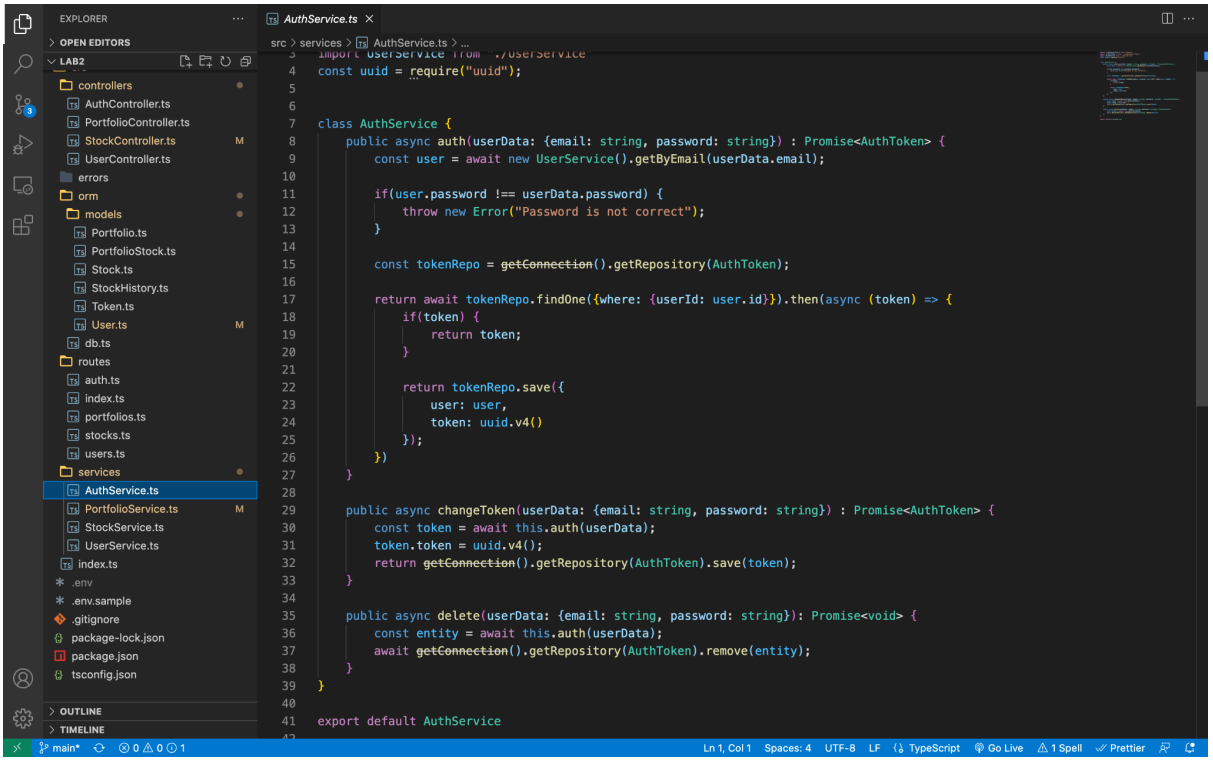

```ts
    create = async (request: any, response: any) => {
        try {
            const stock = await this.stockService.create(
                request.body
            )
            response.send(stock)
        } catch (error: any) {
            response.status(404).send({
                "error": error.message
            })
        }
    }

    getStockHistory = async (request: any, response: any) => {
        try {
            const stocks = await this.stockService.getStockHistory(
                +request.params.id
            )
            response.send({stocks})
        } catch (error: any) {
            response.status(404).send({
                "error": error.message
            })
        }
    }

    updatePrice = async (request: any, response: any) => {
        try {
            const stock = await this.stockService.updatePrice(
                request.body
            )
            response.send(stock)
        } catch (error: any) {
            response.status(404).send({
                "error": error.message
            })
        }
    }

```



4. Routes



5. Сервисы


EXPLORER
OPEN EDITORS
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OUTLINE
TIMELINE
AuthService.ts
src > services > AuthService.ts > ...
import userService from "./userService"
const uuid = require("uuid");
class AuthService {
public async auth(userData: {email: string, password: string}) : Promise<AuthToken> {
const user = await new UserService().getByEmail(userData.email);
if(user.password !== userData.password) {
throw new Error("Password is not correct");
}
const tokenRepo = getConnection().getRepository(AuthToken);
return await tokenRepo.findOne({where: {userId: user.id}}).then(async (token) => {
if(token) {
return token;
}
return tokenRepo.save({
user: user,
token: uuid.v4()
});
})
}
public async changeToken(userData: {email: string, password: string}) : Promise<AuthToken> {
const token = await this.auth(userData);
token.token = uuid.v4();
return getConnection().getRepository(AuthToken).save(token);
}
public async delete(userData: {email: string, password: string}): Promise<void> {
const entity = await this.auth(userData);
await getConnection().getRepository(AuthToken).remove(entity);
}
}
export default AuthService
main*
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Go Live
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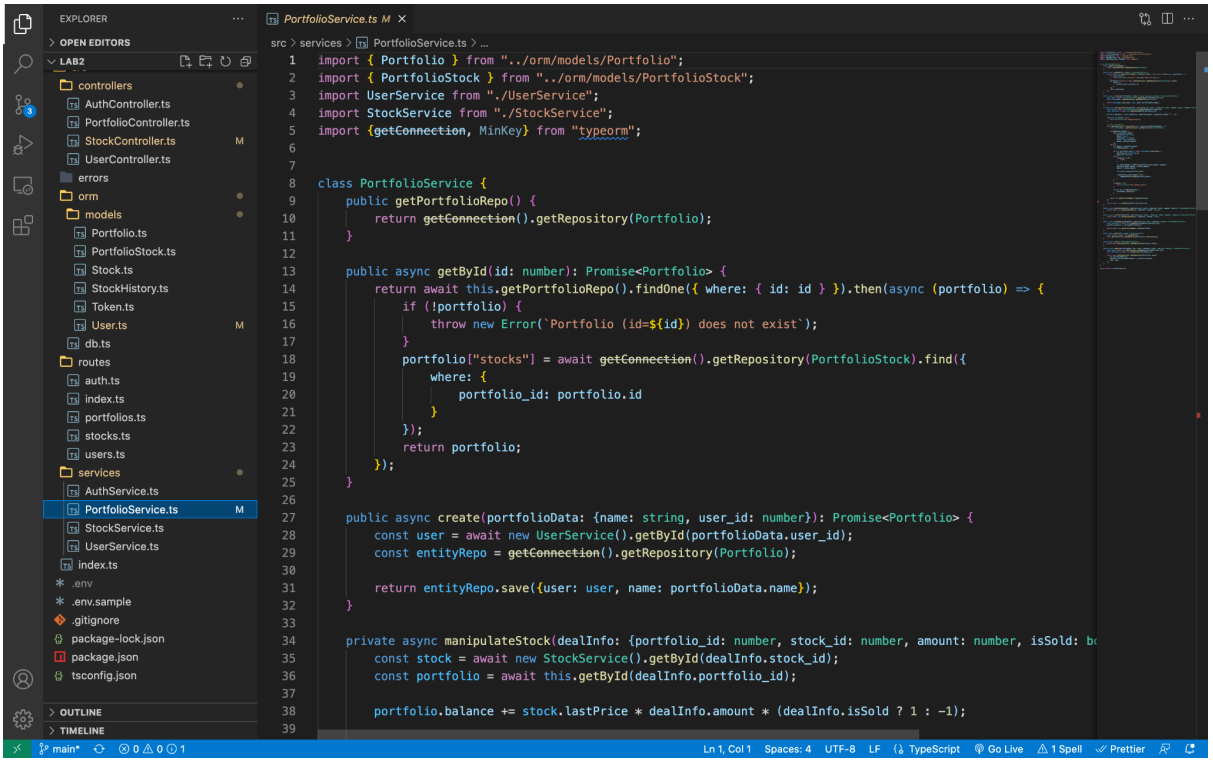
Prettier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OUTLINE
TIMELINE
PortfolioService.ts M
src > services > PortfolioService.ts > ...
import { Portfolio } from "../orm/models/Portfolio";
import { PortfolioStock } from "../orm/models/PortfolioStock";
import UserService from "./UserService";
import StockService from "./StockService";
import {getConnection, MinKey} from "typeorm";
class PortfolioService {
public getPortfolioRepo() {
return getConnection().getRepository(Portfolio);
}
public async getById(id: number): Promise<Portfolio> {
return await this.getPortfolioRepo().findOne({ where: { id: id } }).then(async (portfolio) => {
if (!portfolio) {
throw new Error(`Portfolio (id=${id}) does not exist`);
}
portfolio["stocks"] = await getConnection().getRepository(PortfolioStock).find({
where: {
portfolio_id: portfolio.id
}
});
return portfolio;
});
}
public async create(portfolioData: {name: string, user_id: number}): Promise<Portfolio> {
const user = await new UserService().getById(portfolioData.user_id);
const entityRepo = getConnection().getRepository(Portfolio);
return entityRepo.save({user: user, name: portfolioData.name});
}
private async manipulateStock(dealInfo: {portfolio_id: number, stock_id: number, amount: number, isSold: b
const stock = await new StockService().getById(dealInfo.stock_id);
const portfolio = await this.getById(dealInfo.portfolio_id);
portfolio.balance += stock.lastPrice * dealInfo.amount * (dealInfo.isSold ? 1 : -1);
main*
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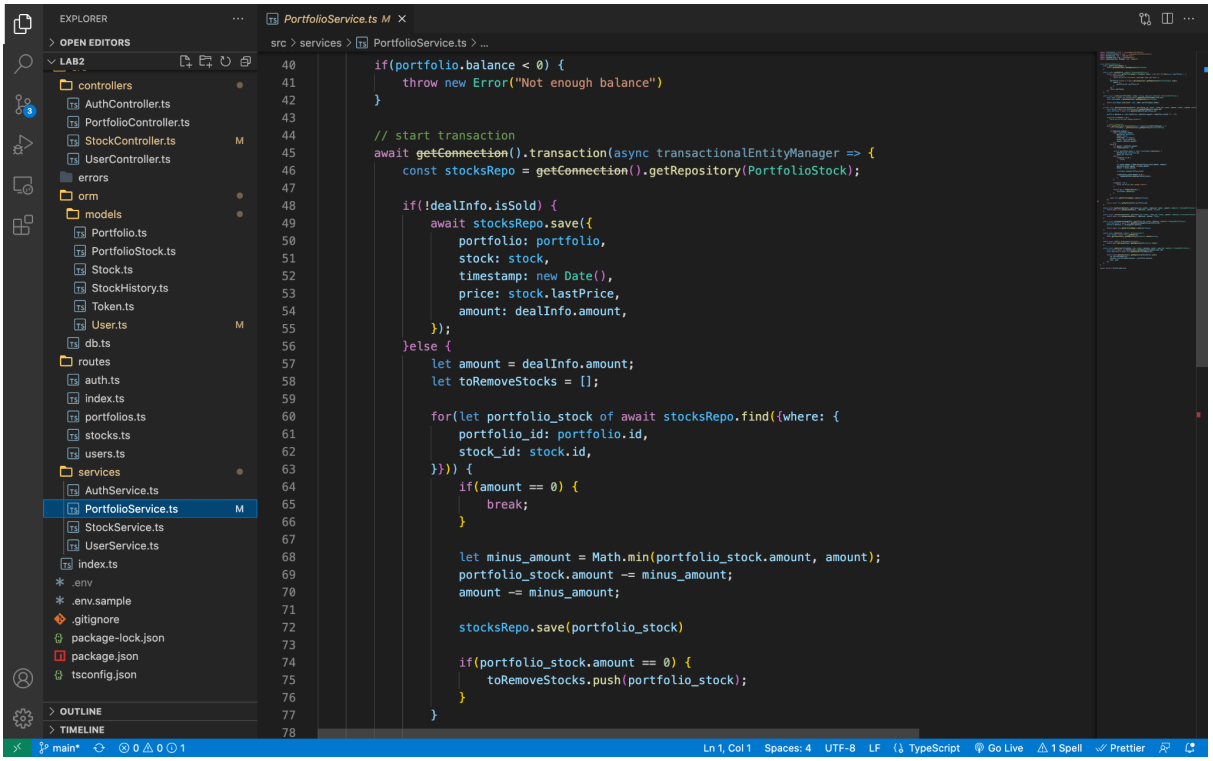
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OUTLINE
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PortfolioService.ts M
src > services > PortfolioService.ts > ...
if(portfolio.balance < 0) {
throw new Error("Not enough balance")
}
// start transaction
await getConnection().transaction(async transactionalEntityManager => {
const stocksRepo = getConnection().getRepository(PortfolioStock);
if(!dealInfo.isSold) {
await stocksRepo.save({
portfolio: portfolio,
stock: stock,
timestamp: new Date(),
price: stock.lastPrice,
amount: dealInfo.amount,
});
}else {
let amount = dealInfo.amount;
let toRemoveStocks = [];
for(let portfolio_stock of await stocksRepo.find({where: {
portfolio_id: portfolio.id,
stock_id: stock.id,
}})) {
if(amount == 0) {
break;
}
let minus_amount = Math.min(portfolio_stock.amount, amount);
portfolio_stock.amount -= minus_amount;
amount -= minus_amount;
stocksRepo.save(portfolio_stock)
if(portfolio_stock.amount == 0) {
toRemoveStocks.push(portfolio_stock);
}
}
main*
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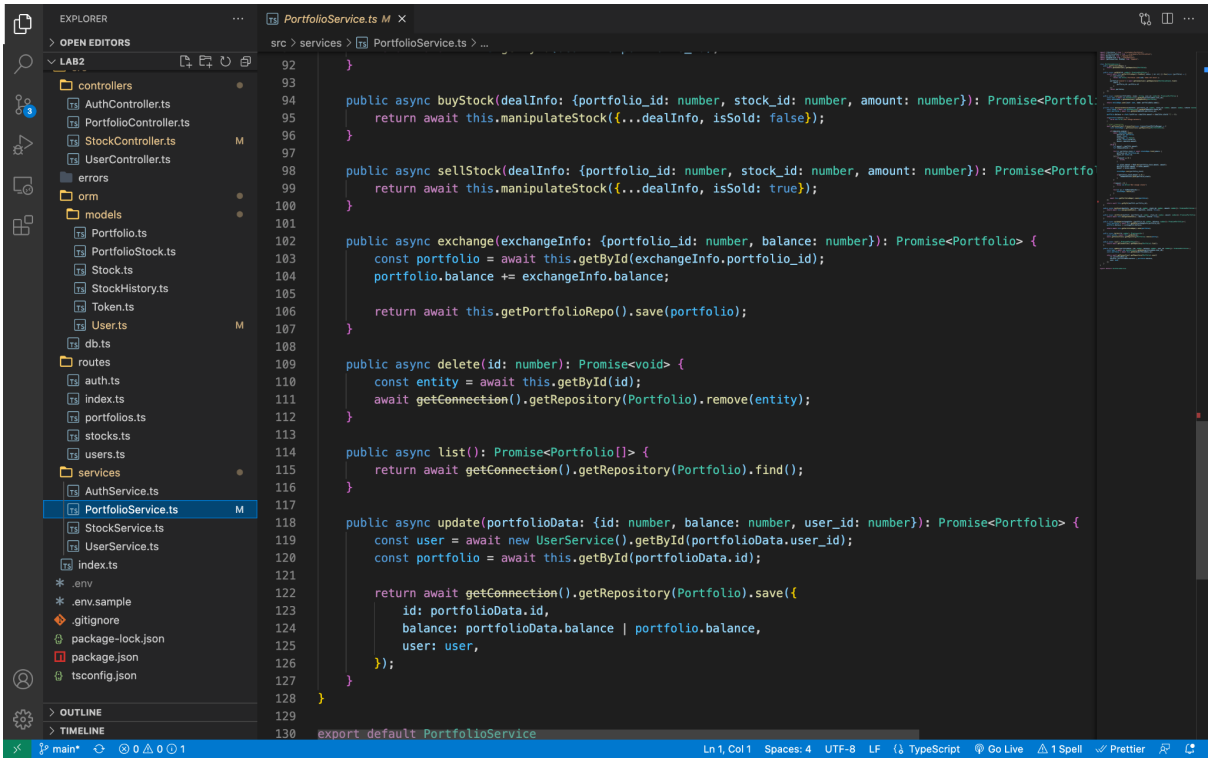
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PortfolioService.ts M
src > services > PortfolioService.ts > ...
}
public async buyStock(dealInfo: {portfolio_id: number, stock_id: number, amount: number}): Promise<Portfol
return await this.manipulateStock({...dealInfo, isSold: false});
}
public async sellStock(dealInfo: {portfolio_id: number, stock_id: number, amount: number}): Promise<Portfo
return await this.manipulateStock({...dealInfo, isSold: true});
}
public async exchange(exchangeInfo: {portfolio_id: number, balance: number}): Promise<Portfolio> {
const portfolio = await this.getById(exchangeInfo.portfolio_id);
portfolio.balance += exchangeInfo.balance;
return await this.getPortfolioRepo().save(portfolio);
}
public async delete(id: number): Promise<void> {
const entity = await this.getById(id);
await getConnection().getRepository(Portfolio).remove(entity);
}
public async list(): Promise<Portfolio[]> {
return await getConnection().getRepository(Portfolio).find();
}
public async update(portfolioData: {id: number, balance: number, user_id: number}): Promise<Portfolio> {
const user = await new UserService().getById(portfolioData.user_id);
const portfolio = await this.getById(portfolioData.id);
return await getConnection().getRepository(Portfolio).save({
id: portfolioData.id,
balance: portfolioData.balance | portfolio.balance,
user: user,
});
}
}
export default PortfolioService
main*
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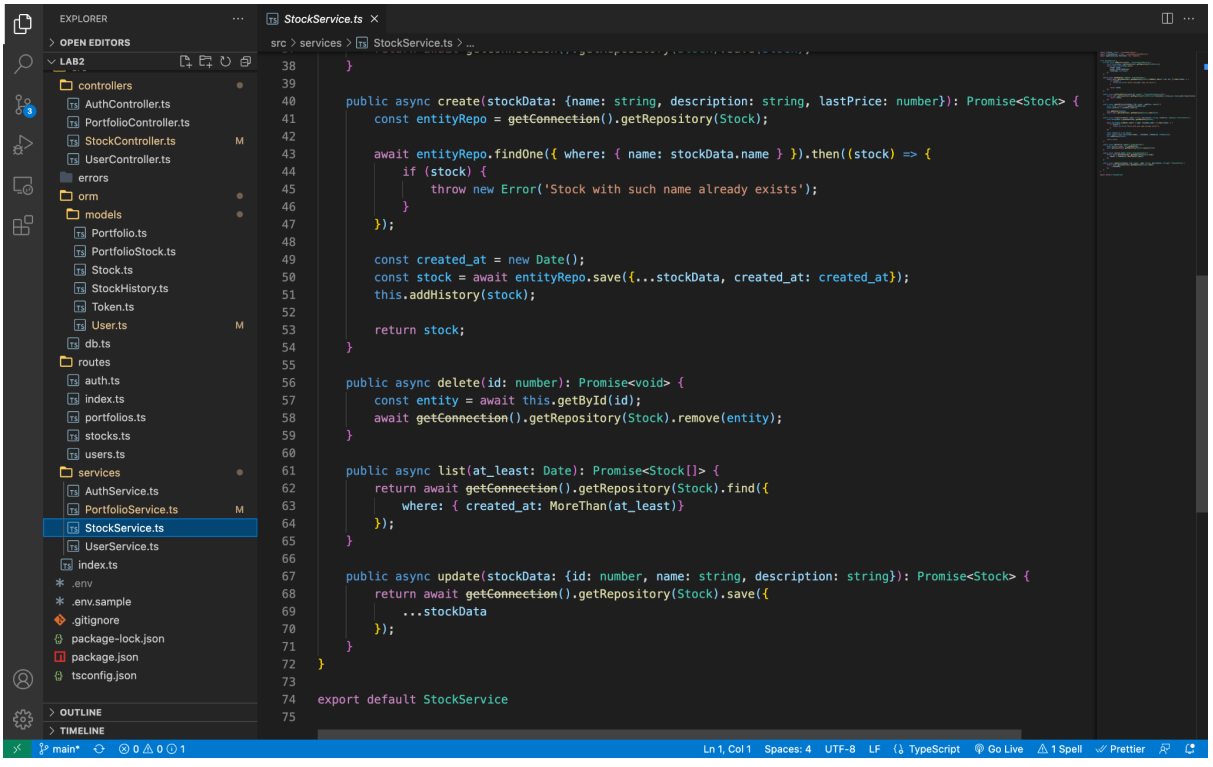
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src > services > StockService.ts > ...
38 }
39
40 public async create(stockData: {name: string, description: string, lastPrice: number}): Promise<Stock> {
41 const entityRepo = getConnection().getRepository(Stock);
42
43 await entityRepo.findOne({ where: { name: stockData.name } }).then((stock) => {
44 if (stock) {
45 throw new Error('Stock with such name already exists');
46 }
47 });
48
49 const created_at = new Date();
50 const stock = await entityRepo.save({...stockData, created_at: created_at});
51 this.addHistory(stock);
52
53 return stock;
54 }
55
56 public async delete(id: number): Promise<void> {
57 const entity = await this.getById(id);
58 await getConnection().getRepository(Stock).remove(entity);
59 }
60
61 public async list(at_least: Date): Promise<Stock[]> {
62 return await getConnection().getRepository(Stock).find({
63 where: { created_at: MoreThan(at_least)}
64 });
65 }
66
67 public async update(stockData: {id: number, name: string, description: string}): Promise<Stock> {
68 return await getConnection().getRepository(Stock).save({
69 ...stockData
70 });
71 }
72 }
73
74 export default StockService
75
main*
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Spaces: 4
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TypeScript
Go Live
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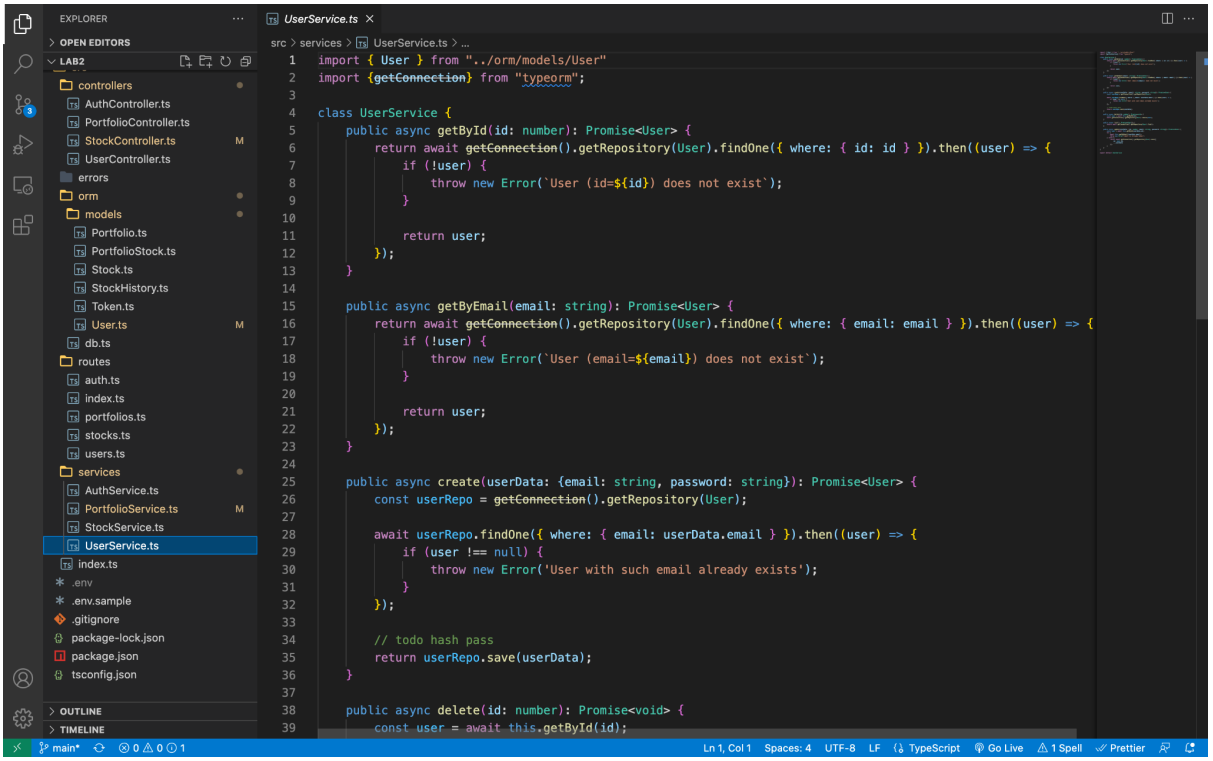
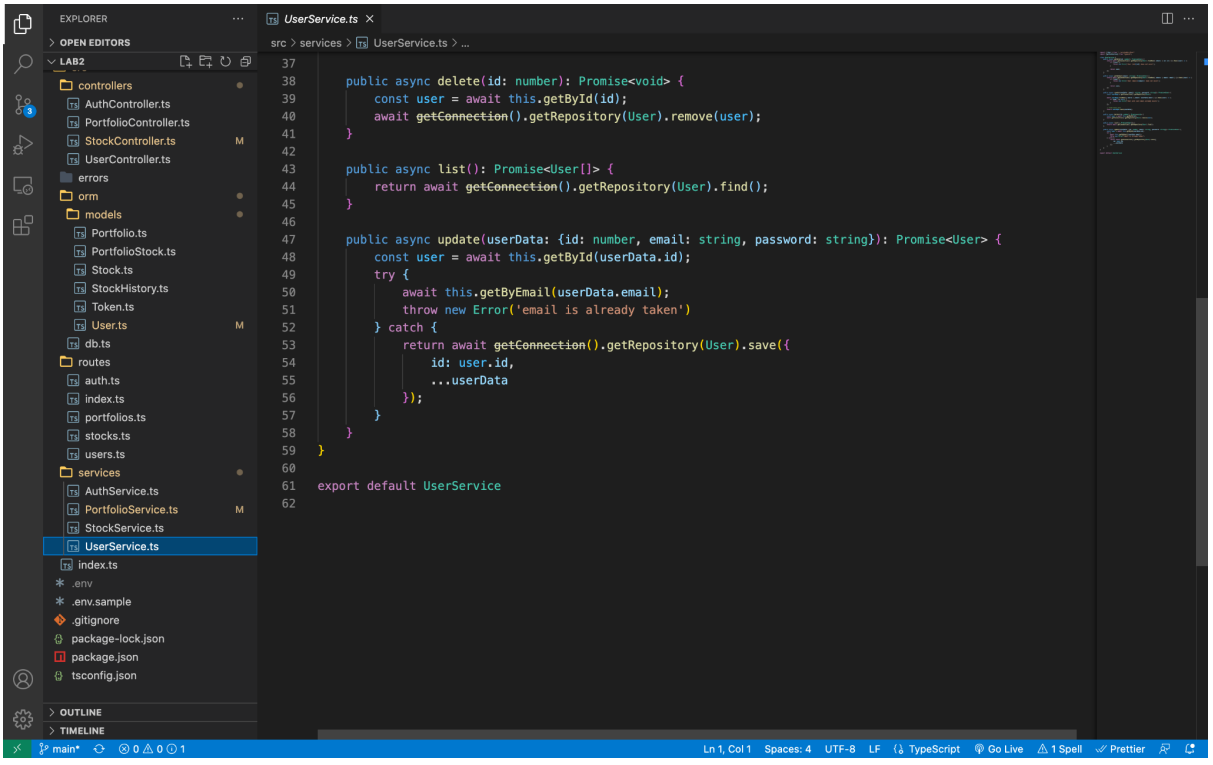
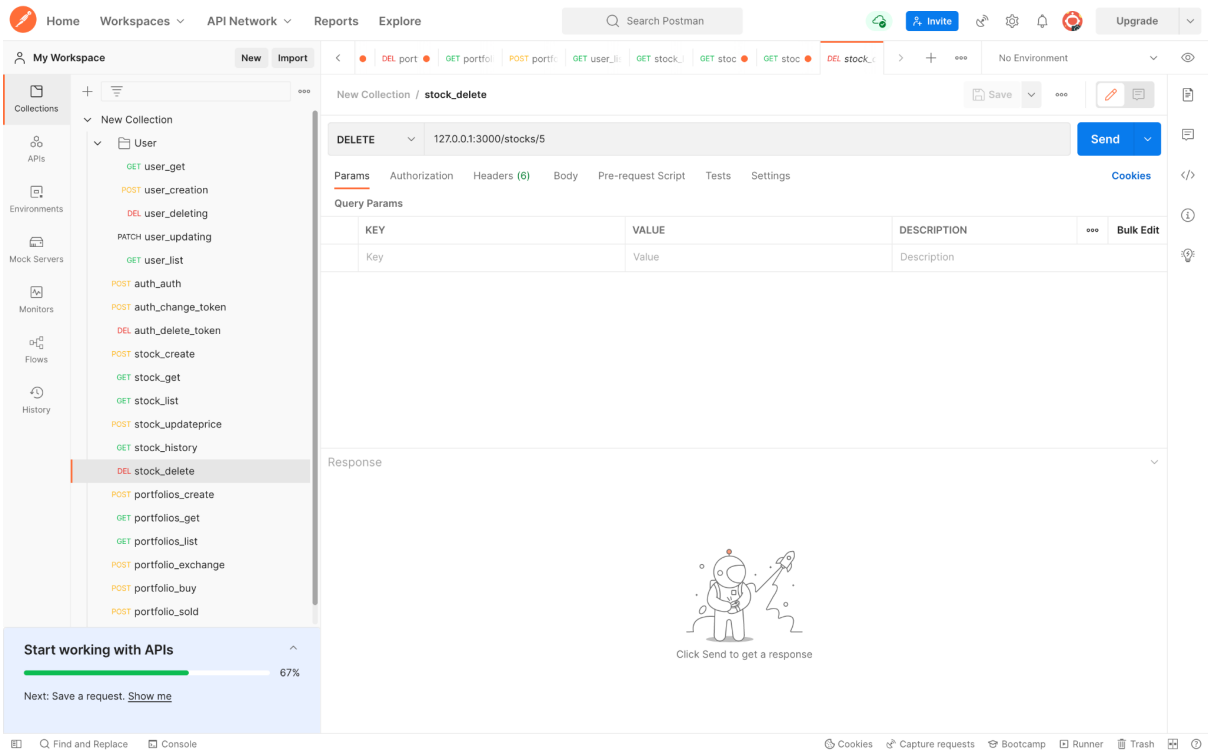
Prettier





6. Тестирование с помощью Postman



Вывод

В ходе данной лабораторной работы мы реализовали RESTful API приложение сайта криптобиржи.