

SCR Project (Product Rating)

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1. Lösungsidee

1.1. Architektur

Als Grundlage für die Architektur wurde das Projekt aus der Übung verwendet. Commands und Queries wurden in eigene Folders verschoben, um die Projektstruktur übersichtlicher zu gestalten. Zum Editieren, Bearbeiten, Löschen und Laden der Daten wurden einige Commands bzw. Queries ergänzt. Beim Presentation-Layer wurden grundsätzlich Controller für Products, Ratings & User erstellt, außerdem gibt es einen Error404 Controller. Datentechnisch wurden nie Entities zurückgegeben, lediglich sogenannte Data Transform Objects (DTOs). Diese wurden gleich wie die Entites benannt und enthalten die Daten in der Form, in der sie auch bei den Views angezeigt werden sollen.

1.2. Allgemein

Zu Beginn wurde eine neue Datenbank erstellt, welche genau 3 Tabellen enthält, jeweils eine für Produkt, eine für Benutzer und eine für Bewertungen.

Die Tabellen wurden entsprechend mit Testdaten (in diesem Fall Bohrmaschinen) befüllt, dies wurde in ein eigenes SQL File ausgelagert.

Insgesamt wurden außerdem drei Controller erstellt, welche sich um die Anzeige, Speichern und Aktualisieren der unterschiedlichen Entitäten kümmern, nämlich:

- Users
- Products
- Ratings

1.3. Anzeigen von Produkten

Anschließend wurde eine Übersichtsseite für die Produkte erstellt, wo alle Produkte mit ihren Bewertungen und der Bewertungsanzahl angezeigt werden. Dazu gibt es eine Query, welche die Produkte mit deren Durchschnittsbewertungen und Anzahl der Bewertungen lädt.

1.4. Erstellen und Editieren von Produkten

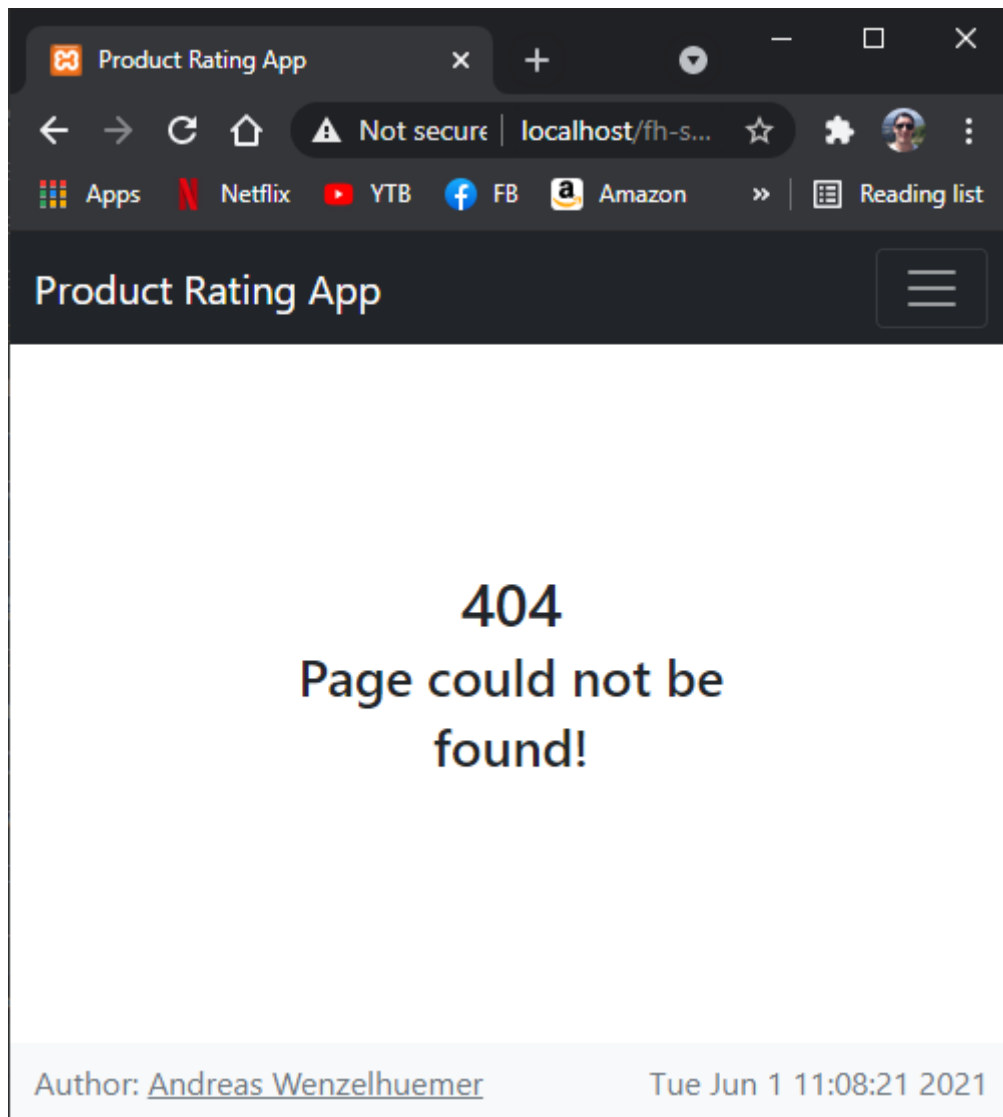
Für das Editieren und Erstellen wurden zwei eigene Seiten erstellt, wobei diese alle auf den ProductsController zugreifen. Hier wird auch entsprechend validiert, ob es sich um valide Daten handelt (keine leeren Felder) und beim Aktualisieren noch zusätzlich, ob der Nutzer auch tatsächlich der Ersteller ist. Dies wird rein über den Server überprüft, der User wird hier nicht mitgegeben. Wenn über die Url auf ein Produkt zugegriffen werden sollte, welches nicht existiert, wird dies in einer Fehlermeldung angezeigt.

1.5. Produktdetailseite

Wenn man den Link beim Produktnamen auswählt, kommt man auf eine Detailseite, wo Produktdetails, Durchschnittsbewertung und Anzahl aufgelistet wird. Darunter werden in einem Bootstrap Accordion alle Bewertungen aufgelistet. Zusätzlich gibt es immer an erster Stelle ein Formular, wo neue Bewertungen eingetragen werden können. Darunter werden die anderen Bewertungen aufgelistet und es können entsprechend Bewertungen (nur vom User erstellte) aktualisiert bzw. gelöscht werden. Ansonsten sind diese nur im Read-Only Modus verfügbar. Für die Produktdetailseite wurde eine eigene Query erstellt, da hier zusätzlich die Bewertungen geladen werden müssen. Daher gibt es eine ProduktDetailQuery und eine ProduktQuery. Wenn auf ein Produkt zugegriffen wird, welches nicht existiert, wird ein entsprechender Fehler angezeigt.

1.6. Fehlerseite bei ungültigem Controller oder Action

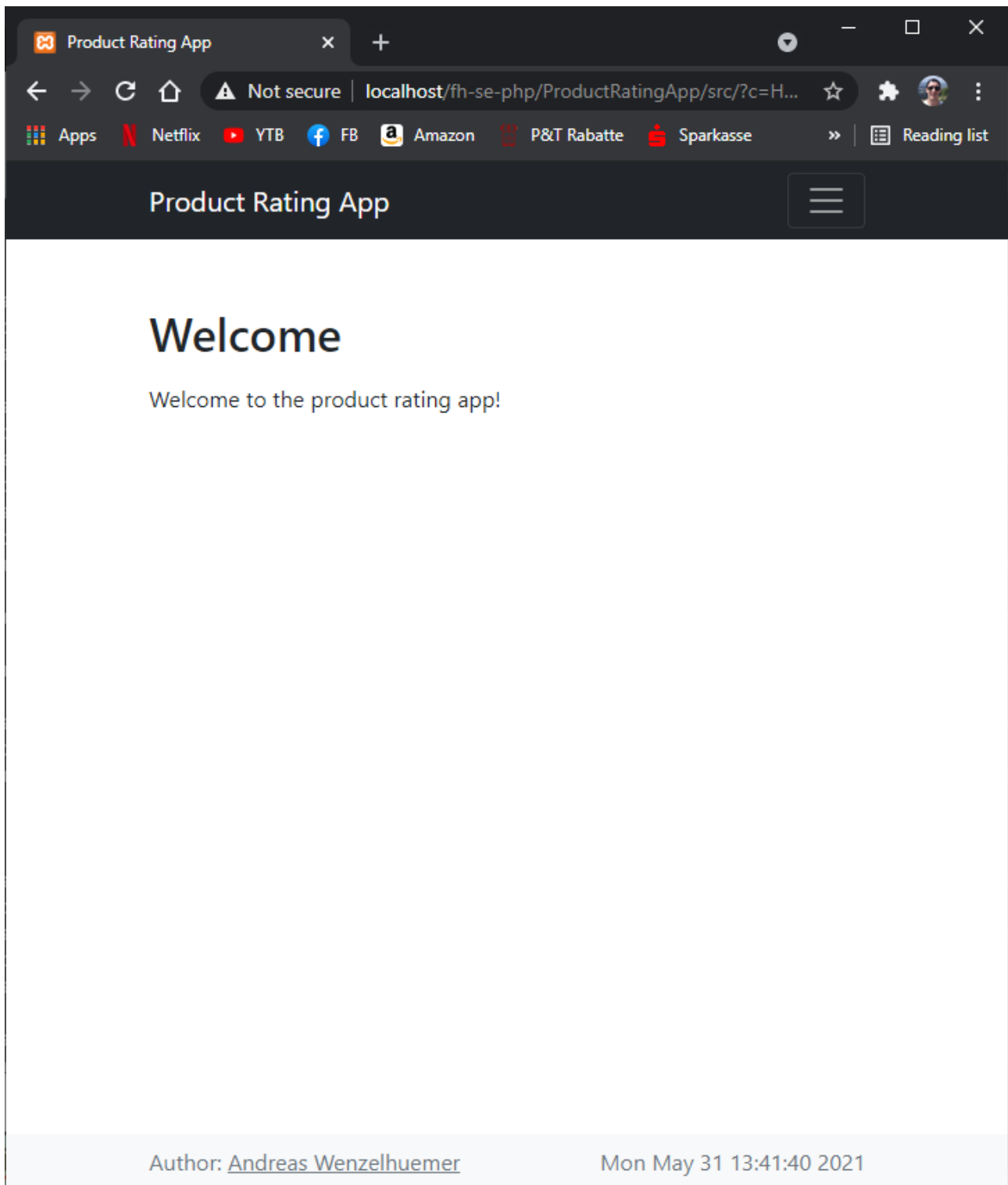
Wenn ein ungültiger Controllername beziehungsweise eine ungültige Action eingegeben wird, wird automatisch auf eine 404 Page weitergeleitet. Dazu wurde die Methode `handleRequest` in der Klasse `MVC.php` erweitert.



2. Testfälle

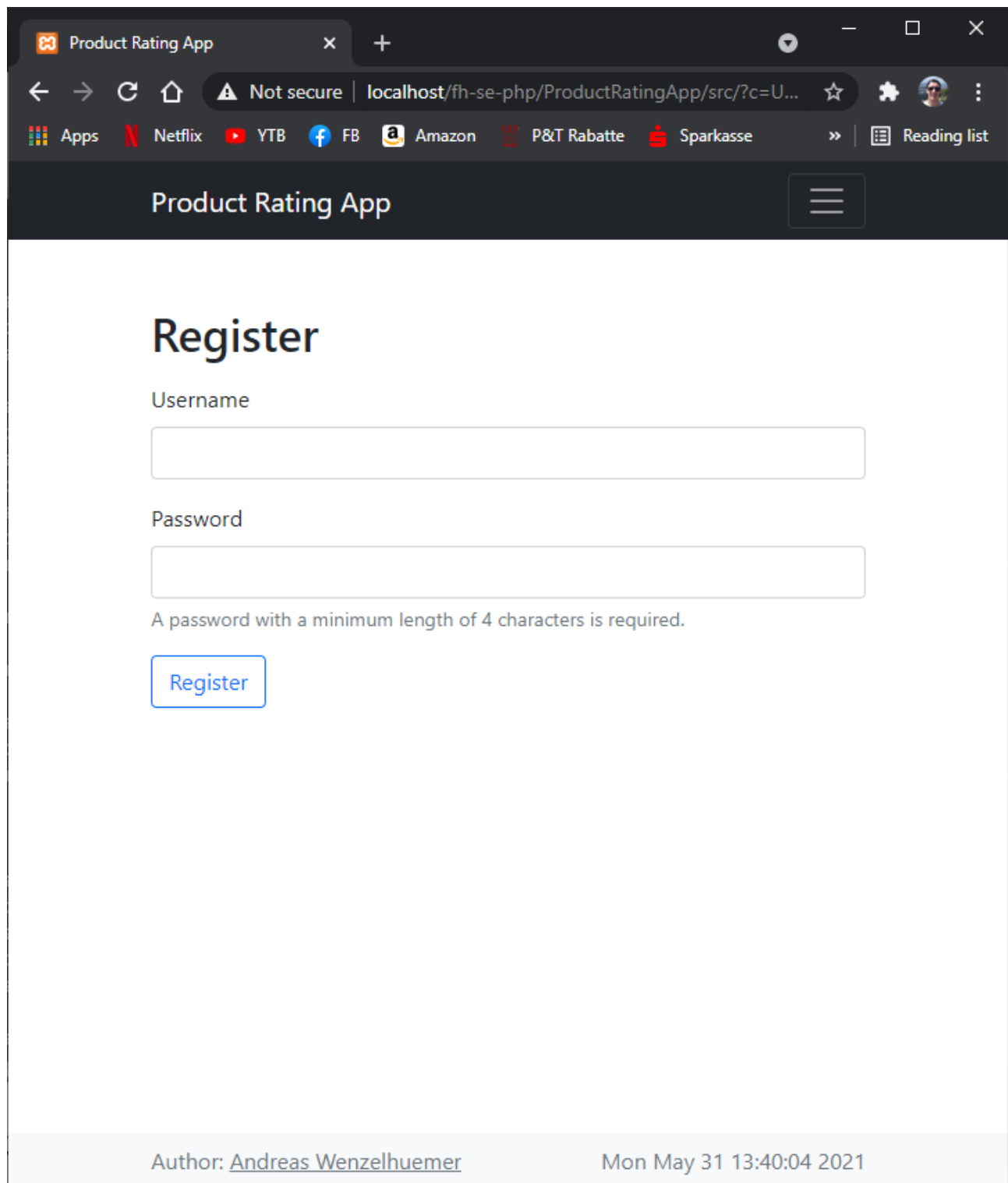
2.1. Testfall: Allgemein

Website lässt sich ausführen und liefert keine Fehler.



2.2. Testfall: Registrierung

Neuer Benutzer kann sich registrieren und wird angemeldet.



Product Rating App

Register

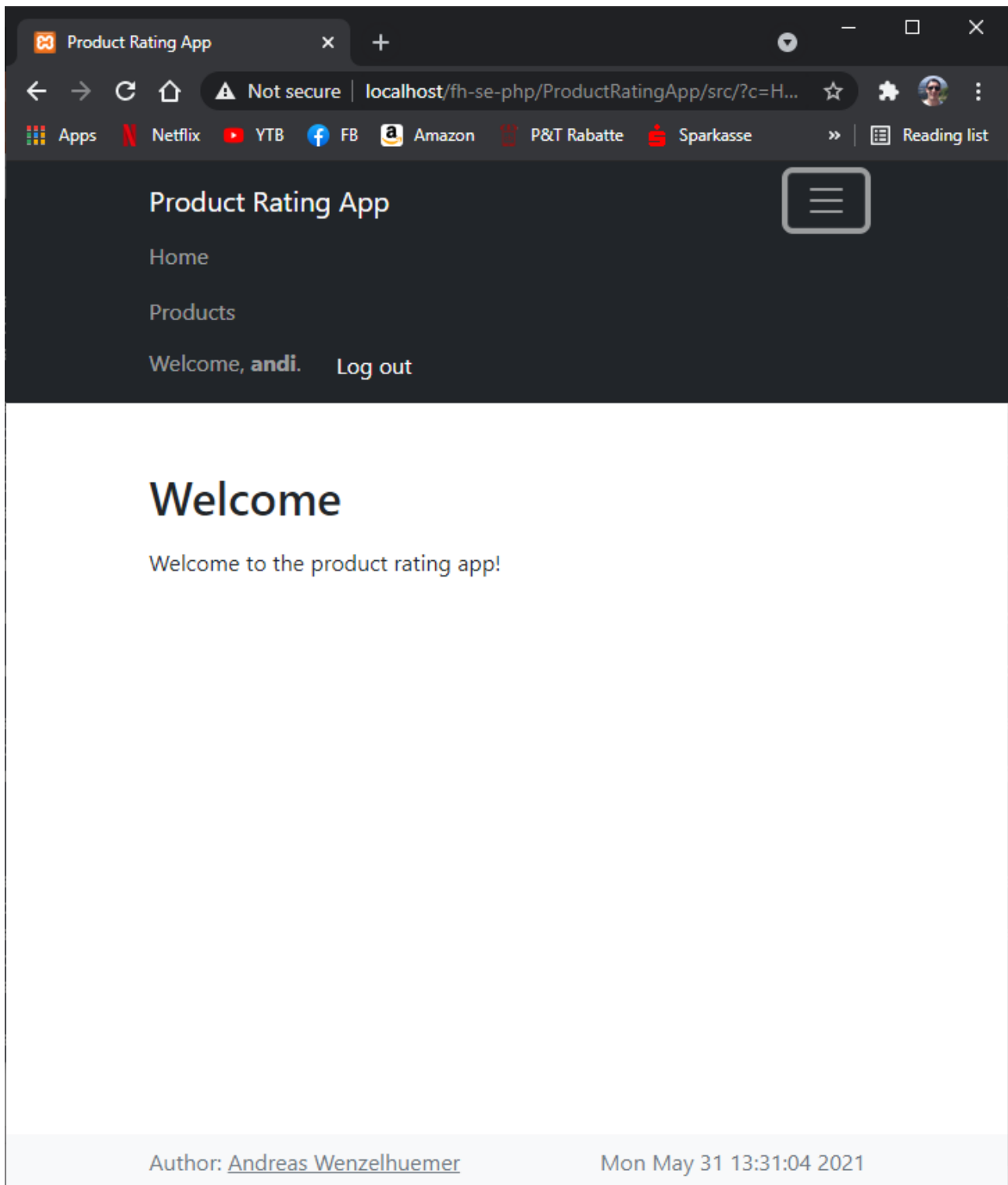
Username

Password

A password with a minimum length of 4 characters is required.

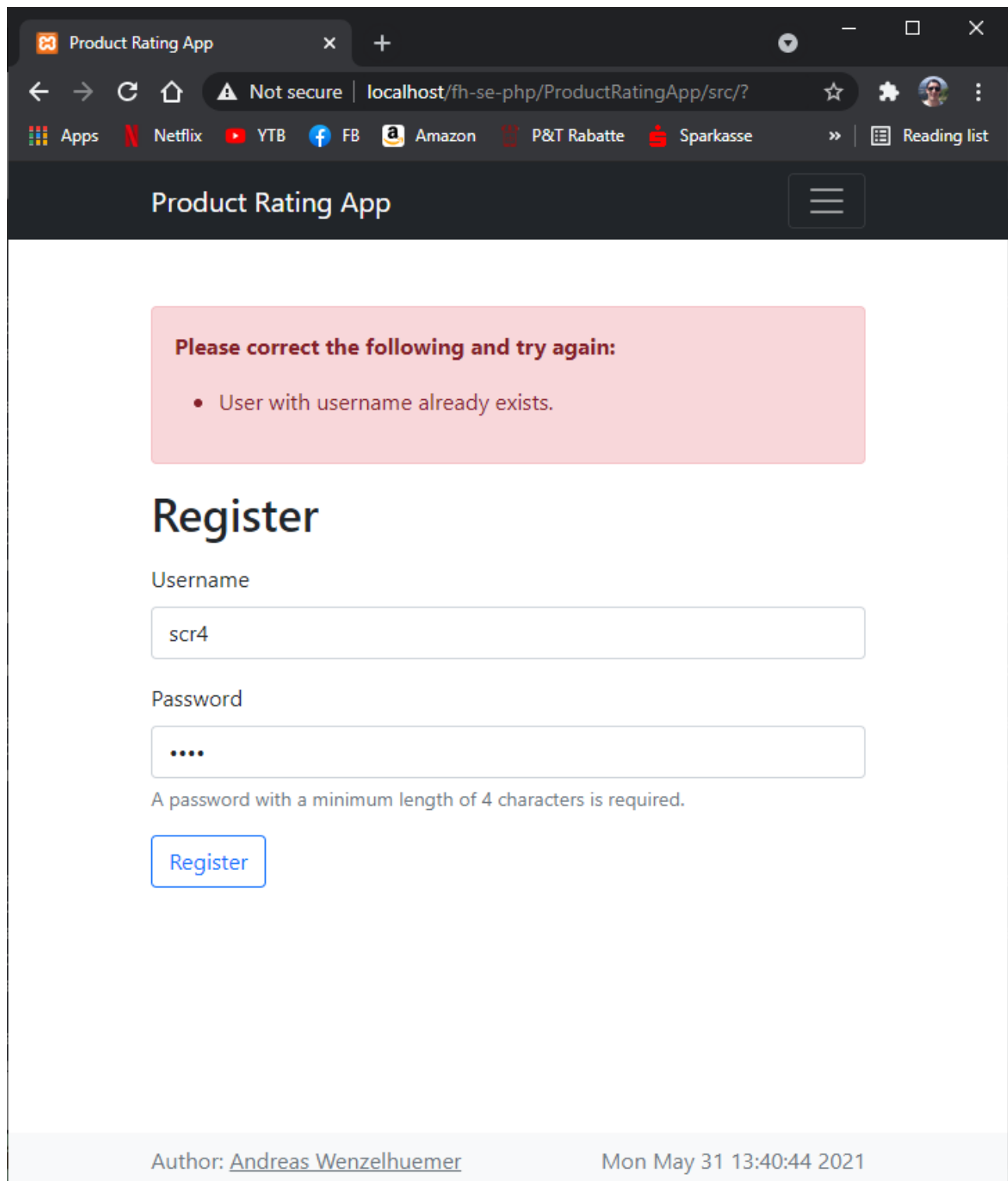
Register

Author: [Andreas Wenzelhuemer](#) Mon May 31 13:40:04 2021



2.3. Testfall: Registrierung

Registrierung mit bereits im System vorhandenem Benutzernamen.liefert
Validierungsfehler



The screenshot shows a web browser window titled "Product Rating App" with the URL "localhost/fh-se-php/ProductRatingApp/src?". The browser's address bar shows "Not secure" and the URL. The page has a dark header with the app name and a menu icon. The main content area has a light background. A red error message box is displayed, stating "Please correct the following and try again:" followed by a bullet point: "User with username already exists." Below this, the "Register" form is shown. It has two input fields: "Username" with the value "scr4" and "Password" with four dots. A note below the password field says "A password with a minimum length of 4 characters is required." A blue "Register" button is at the bottom of the form. The footer of the page shows "Author: [Andreas Wenzelhuemer](#)" and the timestamp "Mon May 31 13:40:44 2021".

Product Rating App

Please correct the following and try again:

- User with username already exists.

Register

Username

Password

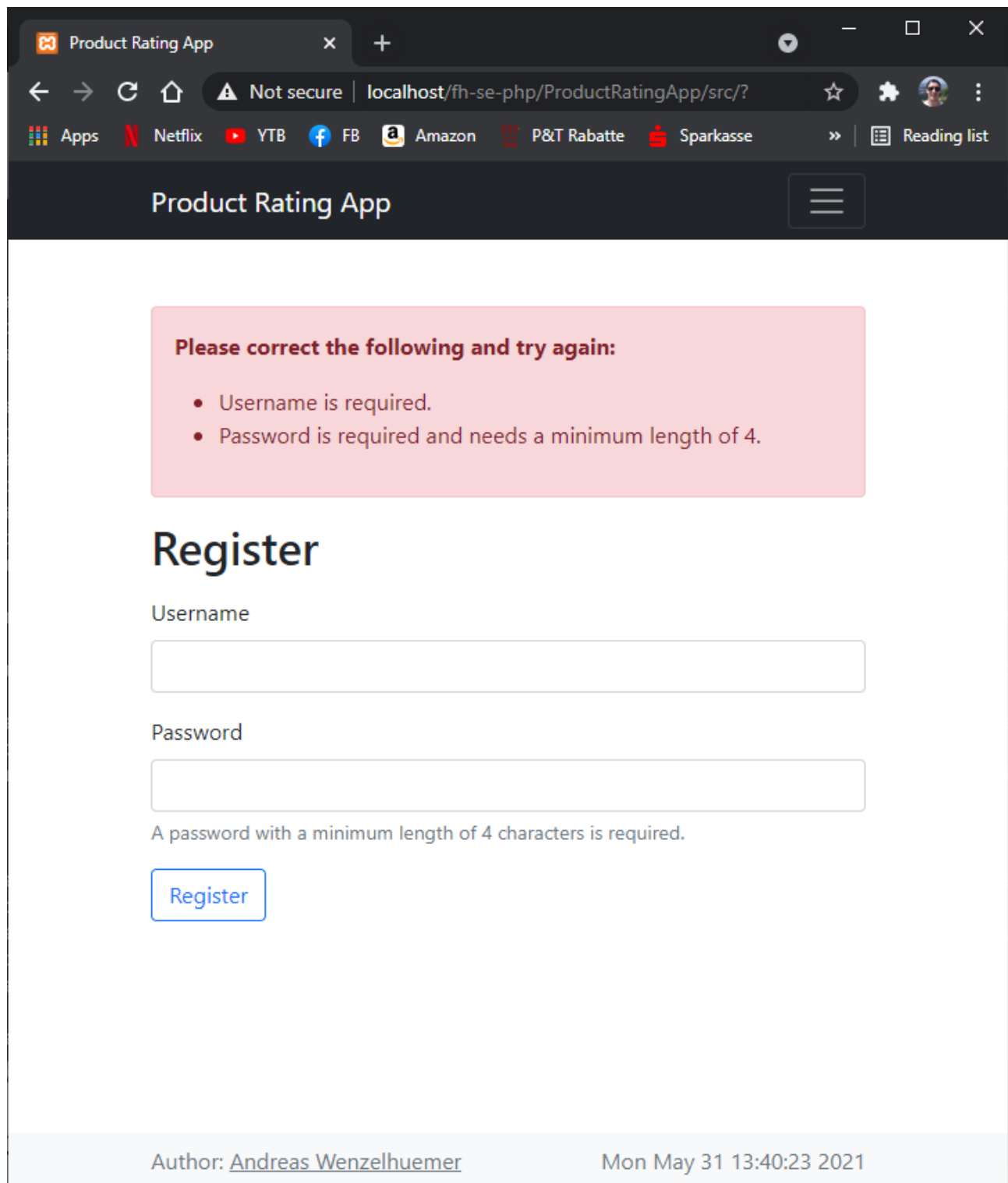
A password with a minimum length of 4 characters is required.

Register

Author: [Andreas Wenzelhuemer](#) Mon May 31 13:40:44 2021

2.4. Testfall: Registrierung

Registrierung mit invaliden Eingaben liefert Validierungsfehler.



The screenshot shows a web browser window with the title "Product Rating App". The address bar shows "localhost/fh-se-php/ProductRatingApp/src/?". The browser's bookmark bar includes "Apps", "Netflix", "YTB", "FB", "Amazon", "P&T Rabatte", "Sparkasse", and "Reading list". The app's header has the title "Product Rating App" and a hamburger menu icon.

A red error message box is displayed, stating: "Please correct the following and try again:"

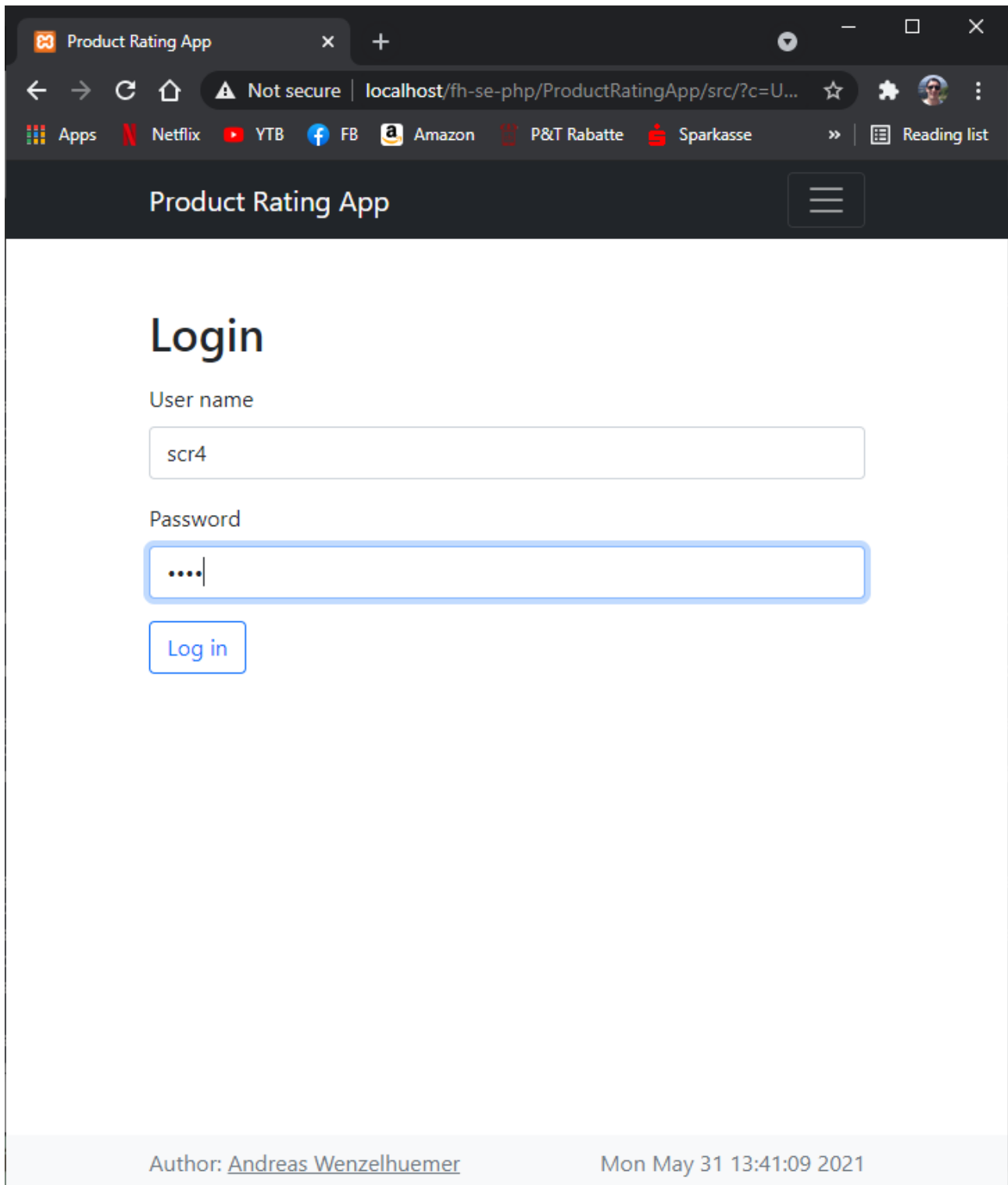
- Username is required.
- Password is required and needs a minimum length of 4.

Below the error message is the "Register" section. It contains two input fields: "Username" and "Password". The "Password" field has a validation message below it: "A password with a minimum length of 4 characters is required." A blue "Register" button is located below the password field.

The footer of the app shows the author "Author: [Andreas Wenzelhuemer](#)" and the timestamp "Mon May 31 13:40:23 2021".

2.5. Testfall: Anmeldung

Anmeldung mit validen Eingaben führt zu Anmeldung.



The screenshot shows a web browser window with the title "Product Rating App". The address bar shows the URL "localhost/fh-se-php/ProductRatingApp/src/?c=U...". The browser's bookmark bar includes links to Apps, Netflix, YTB, FB, Amazon, P&T Rabatte, Sparkasse, and a Reading list. The page content features a dark header with the app name and a menu icon. Below this is a "Login" section with a title, a "User name" label, a text input field containing "scr4", a "Password" label, a password input field with masked characters, and a "Log in" button. At the bottom, a footer contains the text "Author: [Andreas Wenzelhuemer](#)" and the timestamp "Mon May 31 13:41:09 2021".

Product Rating App

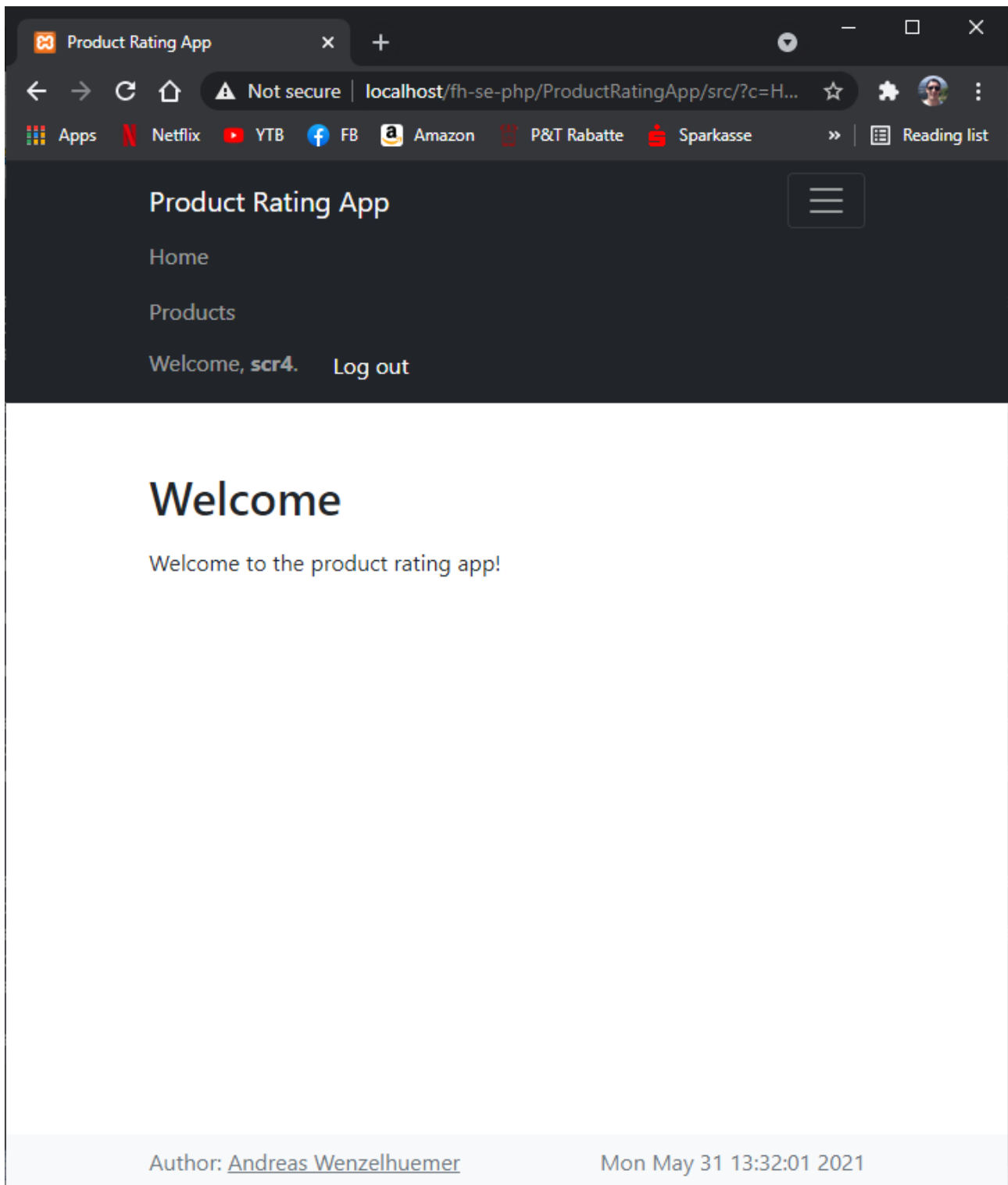
Login

User name

Password

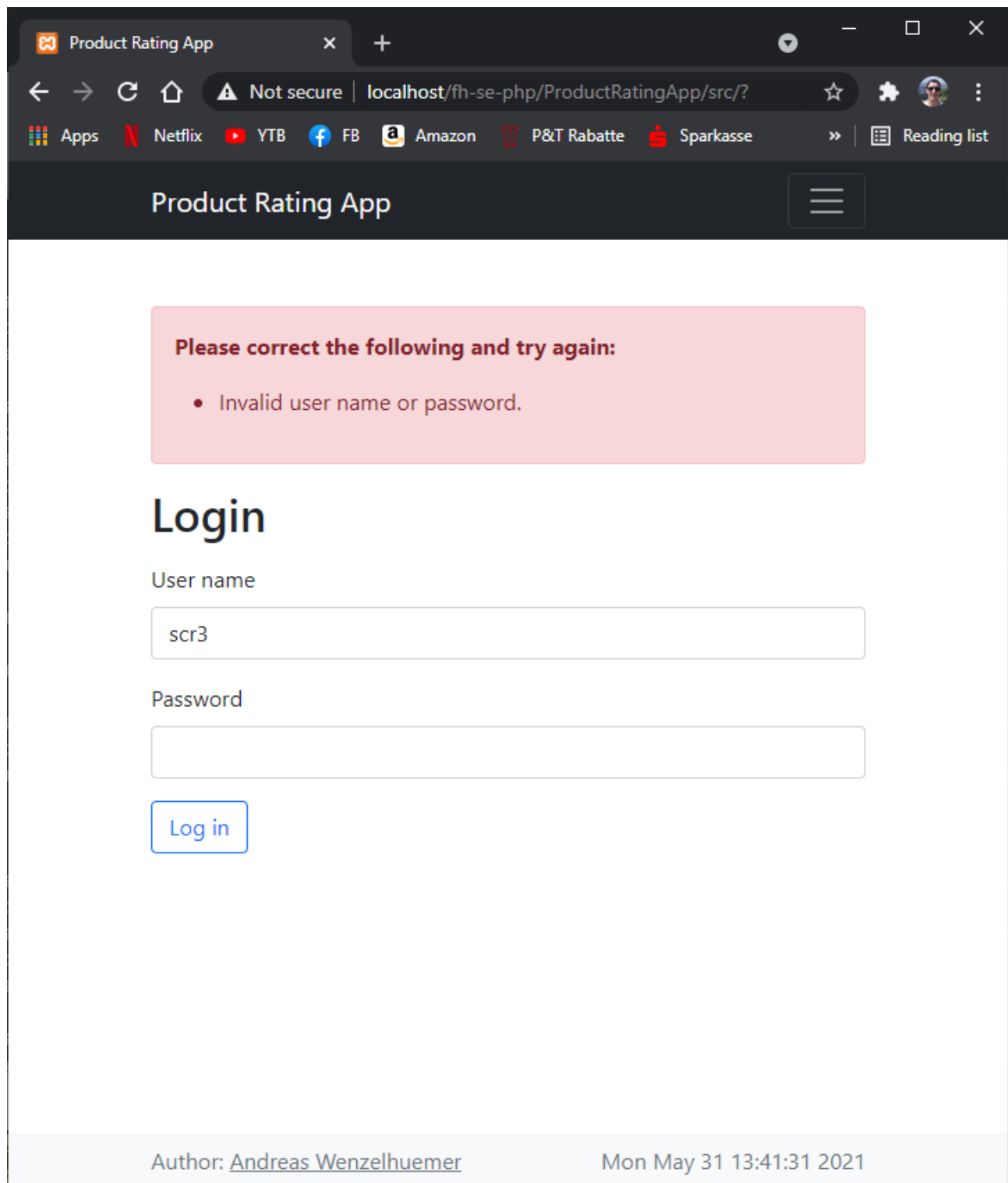
[Log in](#)

Author: [Andreas Wenzelhuemer](#) Mon May 31 13:41:09 2021



2.6. Testfall: Anmeldung

Anmeldung mit invaliden Eingaben führt zu Fehlermeldungen.



The screenshot shows a web browser window with the title "Product Rating App". The address bar shows "localhost/fh-se-php/ProductRatingApp/src/?". The browser's bookmark bar includes "Apps", "Netflix", "YTB", "FB", "Amazon", "P&T Rabatte", "Sparkasse", and "Reading list". The page header "Product Rating App" is on the left, and a hamburger menu icon is on the right.

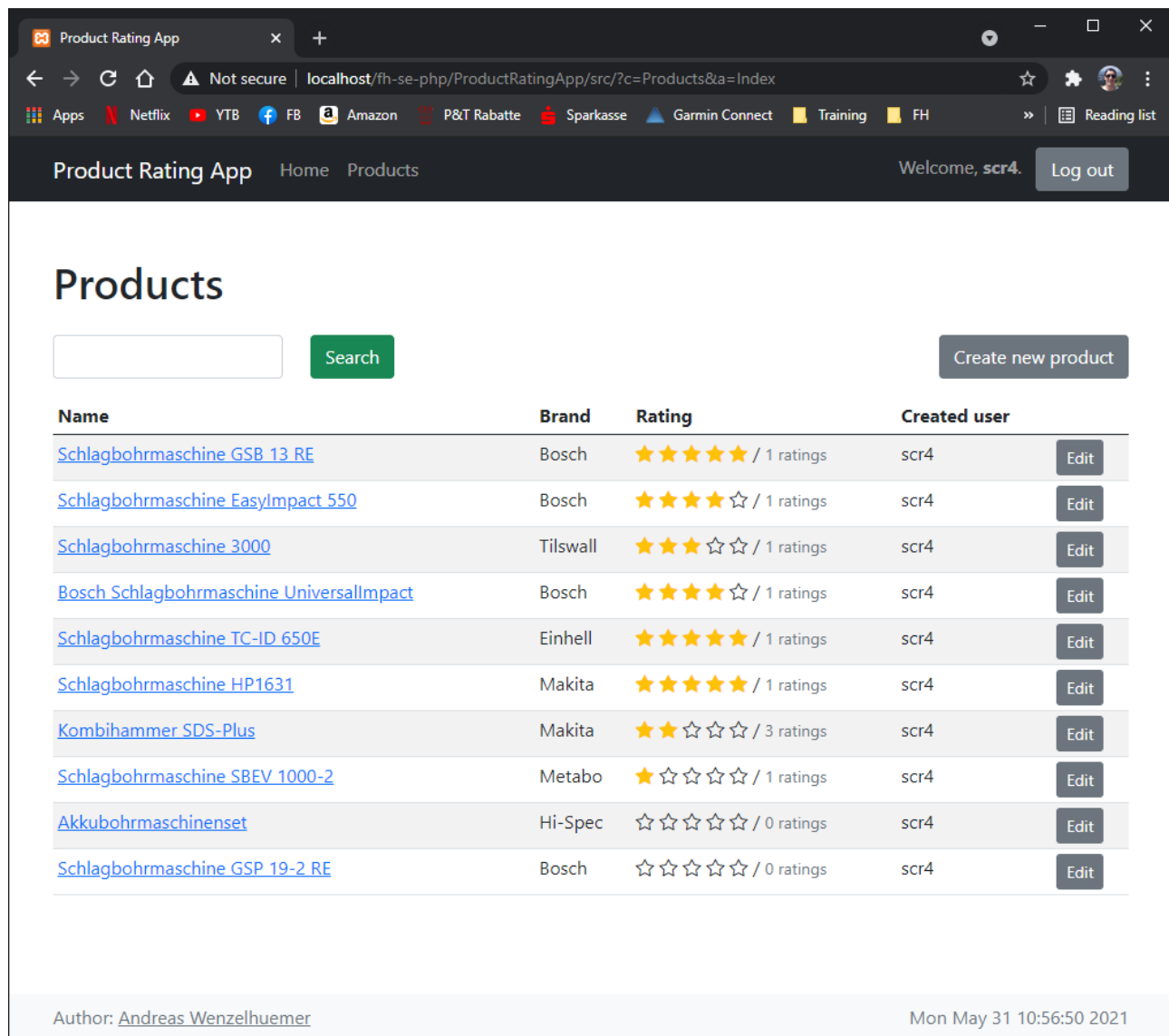
A red error message box is displayed, containing the text "Please correct the following and try again:" followed by a bulleted list: "Invalid user name or password."

Below the error message is the "Login" section. It includes a "User name" label and a text input field containing "scr3". Below that is a "Password" label and an empty password input field. A "Log in" button is positioned below the password field.

The footer of the page contains the text "Author: [Andreas Wenzelhuemer](#)" on the left and "Mon May 31 13:41:31 2021" on the right.

2.7. Testfall: Produktübersicht

Produkte aus der Datenbank werden entsprechend angezeigt.



The screenshot shows a web browser window displaying the 'Product Rating App'. The browser's address bar shows the URL 'localhost/fh-se-php/ProductRatingApp/src/?c=Products&a=Index'. The app's header includes a navigation bar with 'Home' and 'Products' links, a 'Welcome, scr4.' message, and a 'Log out' button. Below the header, the 'Products' section features a search bar, a 'Search' button, and a 'Create new product' button. The main content area displays a table of products with columns for Name, Brand, Rating, and Created user. Each product row includes an 'Edit' button. The footer shows the author 'Andreas Wenzelhuemer' and the timestamp 'Mon May 31 10:56:50 2021'.

Name	Brand	Rating	Created user
Schlagbohrmaschine GSB 13 RE	Bosch	★★★★★ / 1 ratings	scr4
Schlagbohrmaschine EasyImpact 550	Bosch	★★★★☆ / 1 ratings	scr4
Schlagbohrmaschine 3000	Tilswall	★★★★☆ / 1 ratings	scr4
Bosch Schlagbohrmaschine UniversallImpact	Bosch	★★★★☆ / 1 ratings	scr4
Schlagbohrmaschine TC-ID 650E	Einhell	★★★★★ / 1 ratings	scr4
Schlagbohrmaschine HP1631	Makita	★★★★★ / 1 ratings	scr4
Kombihammer SDS-Plus	Makita	★★★☆☆ / 3 ratings	scr4
Schlagbohrmaschine SBEV 1000-2	Metabo	★☆☆☆☆ / 1 ratings	scr4
Akkubohrmaschinenset	Hi-Spec	☆☆☆☆☆ / 0 ratings	scr4
Schlagbohrmaschine GSP 19-2 RE	Bosch	☆☆☆☆☆ / 0 ratings	scr4

Author: [Andreas Wenzelhuemer](#) Mon May 31 10:56:50 2021

2.8. Testfall: Produktübersicht

Produkte werden entsprechend anhand des Namens bzw. Hersteller gefiltert.

The screenshot shows a web browser window with the 'Product Rating App' running on localhost. The address bar shows the URL: `localhost/fh-se-php/ProductRatingApp/src/?c=Products&a=Index&f=bosch`. The browser's taskbar at the top includes icons for various applications like Netflix, YTB, FB, Amazon, P&T Rabatte, Sparkasse, Garmin Connect, Training, and FH. The app's navigation bar at the top has 'Product Rating App', 'Home', and 'Products' links, along with a 'Welcome, scr4.' message and a 'Log out' button.

The main content area is titled 'Products'. It features a search bar with the text 'bosch' and a green 'Search' button. To the right of the search bar is a 'Create new product' button. Below the search bar is a table listing products.

Name	Brand	Rating	Created user
Schlagbohrmaschine GSB 13 RE	Bosch	★★★★★ / 1 ratings	scr4 Edit
Schlagbohrmaschine EasyImpact 550	Bosch	★★★★☆ / 1 ratings	scr4 Edit
Bosch Schlagbohrmaschine UniversallImpact	Bosch	★★★★☆ / 1 ratings	scr4 Edit
Schlagbohrmaschine GSP 19-2 RE	Bosch	☆☆☆☆☆ / 0 ratings	scr4 Edit

At the bottom of the page, there is a footer with the text 'Author: [Andreas Wenzelhuemer](#)' on the left and 'Mon May 31 10:58:20 2021' on the right.

2.9. Testfall: Erstellen eines Produktes

Produkt mit entsprechender Eingabe wird erstellt.

The screenshot shows a web browser window with the title 'Product Rating App'. The address bar shows 'localhost/fh-se-php/ProductRatingApp/src/?c=Pr...'. The browser's bookmark bar includes 'Apps', 'Netflix', 'YTB', 'FB', 'Amazon', 'P&T Rabatte', 'Sparkasse', and 'Reading list'. The app's header has the title 'Product Rating App' and a hamburger menu icon. The main content area is titled 'New product' and contains two input fields: 'Name' with the value 'newProduct' and 'Brand' with the value 'newProduct'. Below these fields is a 'Create' button. At the bottom of the app, a footer shows 'Author: [Andreas Wenzelhuemer](#)' and 'Mon May 31 13:37:27 2021'. Below the app's footer, a list of products is shown. The first product is 'newProduct' with a rating of 4 stars (scr4) and 0 ratings. A link to 'newProduct' is also visible.

Product Rating App

New product

Name

Brand

Create

Author: [Andreas Wenzelhuemer](#) Mon May 31 13:37:27 2021

[newProduct](#) newProduct ☆☆☆ scr4 ☆ / 0 ratings

2.10. Testfall: Erstellen eines Produktes

Produkt mit ungültigen Eingaben liefert Validierungsfehler.

The screenshot shows a web browser window with the title 'Product Rating App'. The address bar shows 'localhost/fh-se-php/ProductRatingApp/src/'. The browser's bookmark bar includes 'Apps', 'Netflix', 'YTB', 'FB', 'Amazon', 'P&T Rabatte', 'Sparkasse', and 'Reading list'. The app's header has the title 'Product Rating App' and a hamburger menu icon. The main content area features a red validation message box that reads: 'Please correct the following and try again:' followed by a bulleted list: 'Product name is required.' and 'Brand name is required.'. Below this is the 'New product' section, which contains two input fields labeled 'Name' and 'Brand', and a 'Create' button. The footer of the app shows 'Author: [Andreas Wenzelhuemer](#)' and the timestamp 'Mon May 31 13:37:53 2021'.

Product Rating App

Please correct the following and try again:

- Product name is required.
- Brand name is required.

New product

Name

Brand

Create

Author: [Andreas Wenzelhuemer](#) Mon May 31 13:37:53 2021

2.11. Testfall: Erstellen eines Produktes

Produkterstellung ohne Anmeldung ist nicht möglich.

Product Rating App

Please correct the following and try again:

- Product can only be added when user is signed in.

New product

Name



Brand

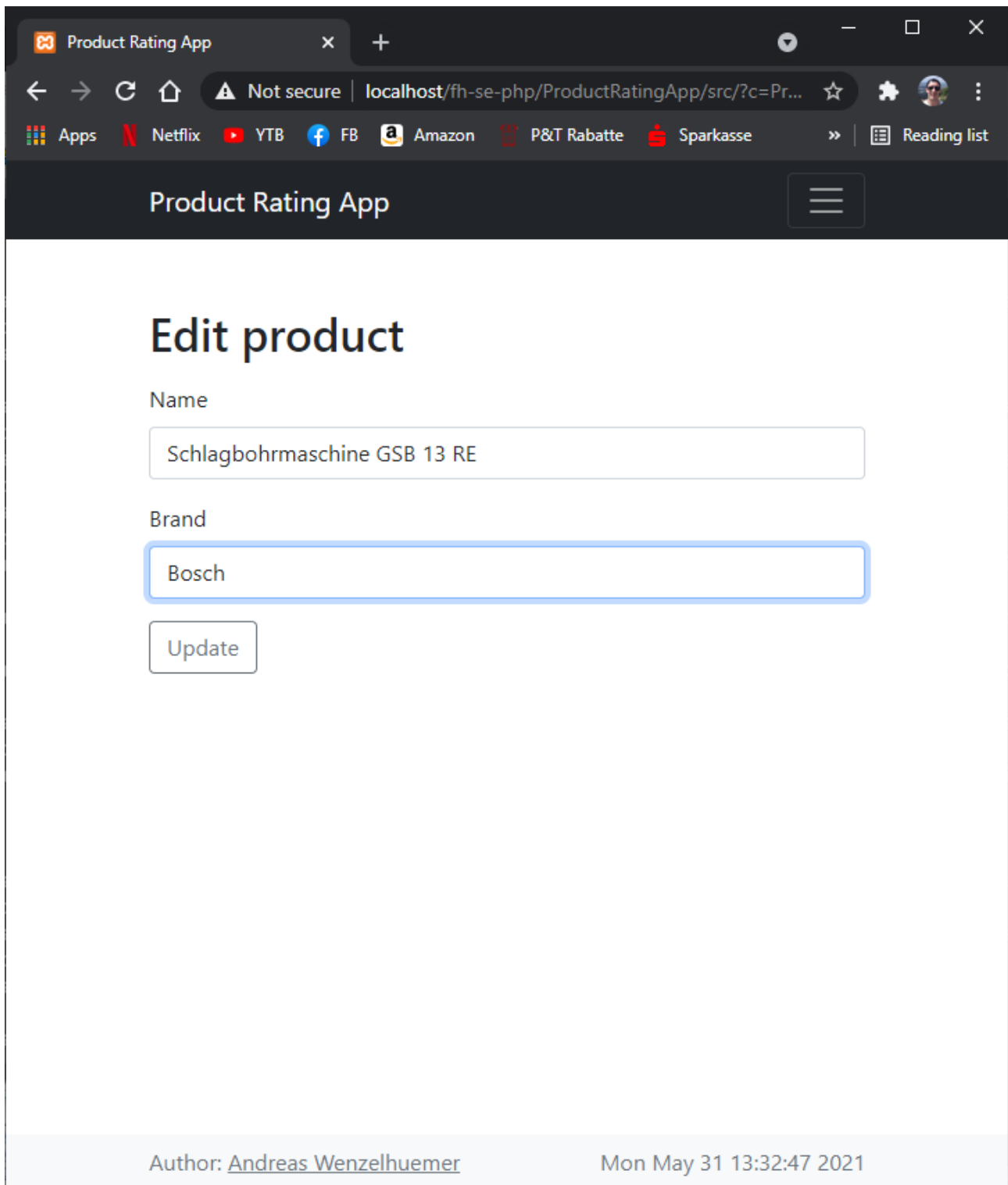
Create

Author: [Andreas Wenzelhuemer](#) Mon May 31 13:38:38 2021

2.12. Testfall: Bearbeiten eines Produktes

Produkt wird entsprechend bearbeitet

Name	Brand	Rating	Created user	
Schlagbohrmaschine GSB 13 RE	Updated Bosch	★★★★★ / 1 ratings	scr4	
Schlagbohrmaschine GSB 13 RE	Bosch	★★★★★	scr4	



The screenshot shows a web browser window with the title 'Product Rating App'. The address bar indicates a 'Not secure' connection to 'localhost/fh-se-php/ProductRatingApp/src/?c=Pr...'. The browser's bookmark bar includes links to 'Apps', 'Netflix', 'YTB', 'FB', 'Amazon', 'P&T Rabatte', 'Sparkasse', and a 'Reading list'. The app's header is dark with the title 'Product Rating App' and a hamburger menu icon. The main content area is titled 'Edit product' and contains two text input fields: 'Name' with the value 'Schlagbohrmaschine GSB 13 RE' and 'Brand' with the value 'Bosch'. Below the 'Brand' field is an 'Update' button. The footer of the app shows the author 'Andreas Wenzelhuemer' and the timestamp 'Mon May 31 13:32:47 2021'.

Product Rating App

Edit product

Name


Brand

Update

Author: [Andreas Wenzelhuemer](#) Mon May 31 13:32:47 2021

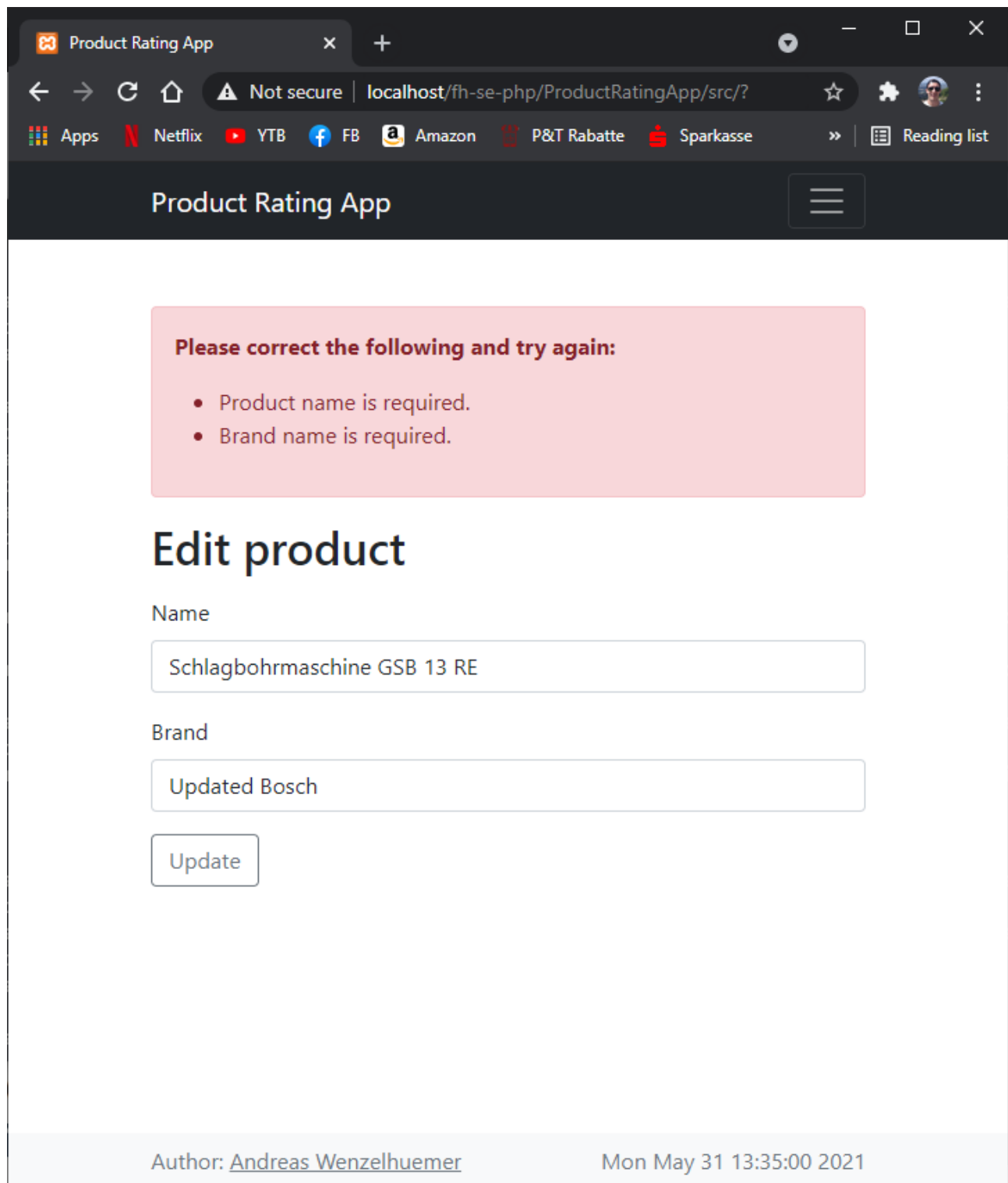
Brand

Update

Name	Brand	Rating	Created user
Schlagbohrmaschine GSB 13 RE	Updated Bosch	★★★★★ / 1 ratings	scr4 

2.13. Testfall: Bearbeiten eines Produktes

Produkt mit ungültigen Eingaben liefert Validierungsfehler.



The screenshot shows a web browser window with the title 'Product Rating App'. The address bar indicates the URL is 'localhost/fh-se-php/ProductRatingApp/src/'. The browser's developer tools are open, showing a list of applications: Apps, Netflix, YTB, FB, Amazon, P&T Rabatte, Sparkasse, and a Reading list. The main content area of the app has a dark header with the title 'Product Rating App' and a hamburger menu icon. Below the header, a red error message box states: 'Please correct the following and try again:' followed by two bullet points: 'Product name is required.' and 'Brand name is required.' The main heading is 'Edit product'. Below this, there are two input fields: 'Name' with the value 'Schlagbohrmaschine GSB 13 RE' and 'Brand' with the value 'Updated Bosch'. An 'Update' button is located below the 'Brand' field. At the bottom of the page, a footer bar contains the text 'Author: [Andreas Wenzelhuemer](#)' and the timestamp 'Mon May 31 13:35:00 2021'.

Product Rating App

Please correct the following and try again:

- Product name is required.
- Brand name is required.

Edit product

Name

Brand

Update

Author: [Andreas Wenzelhuemer](#) Mon May 31 13:35:00 2021

2.14. Testfall: Bearbeiten eines Produktes

Bearbeitung mit Nutzer != Ersteller ist nicht möglich.

Product Rating App

Please correct the following and try again:

- Product can only be updated when user is signed in.

Edit product

Name

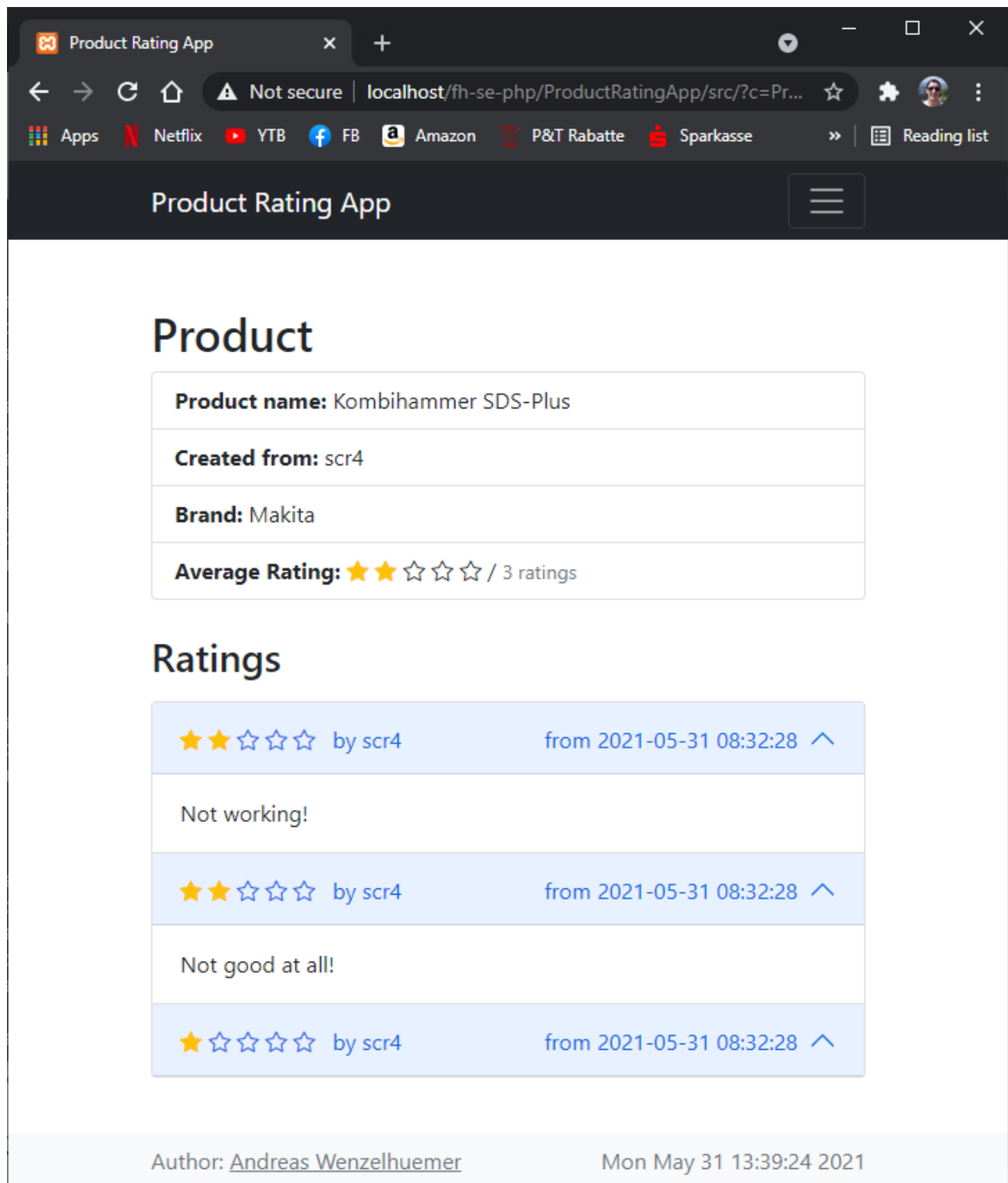
Brand

Update

Author: [Andreas Wenzelhuemer](#) Mon May 31 13:35:41 2021

2.15. Testfall: Produktdetails

Anzeige der Produktdetails inklusive Bewertungen.



The screenshot shows a web browser window with the 'Product Rating App' open. The browser's address bar shows 'localhost/fh-se-php/ProductRatingApp/src/?c=Pr...'. The app's header is dark with the title 'Product Rating App' and a menu icon. The main content area is white and divided into two sections: 'Product' and 'Ratings'.

Product

Product name: Kombihammer SDS-Plus
Created from: scr4
Brand: Makita
Average Rating: ★★☆☆☆ / 3 ratings

Ratings

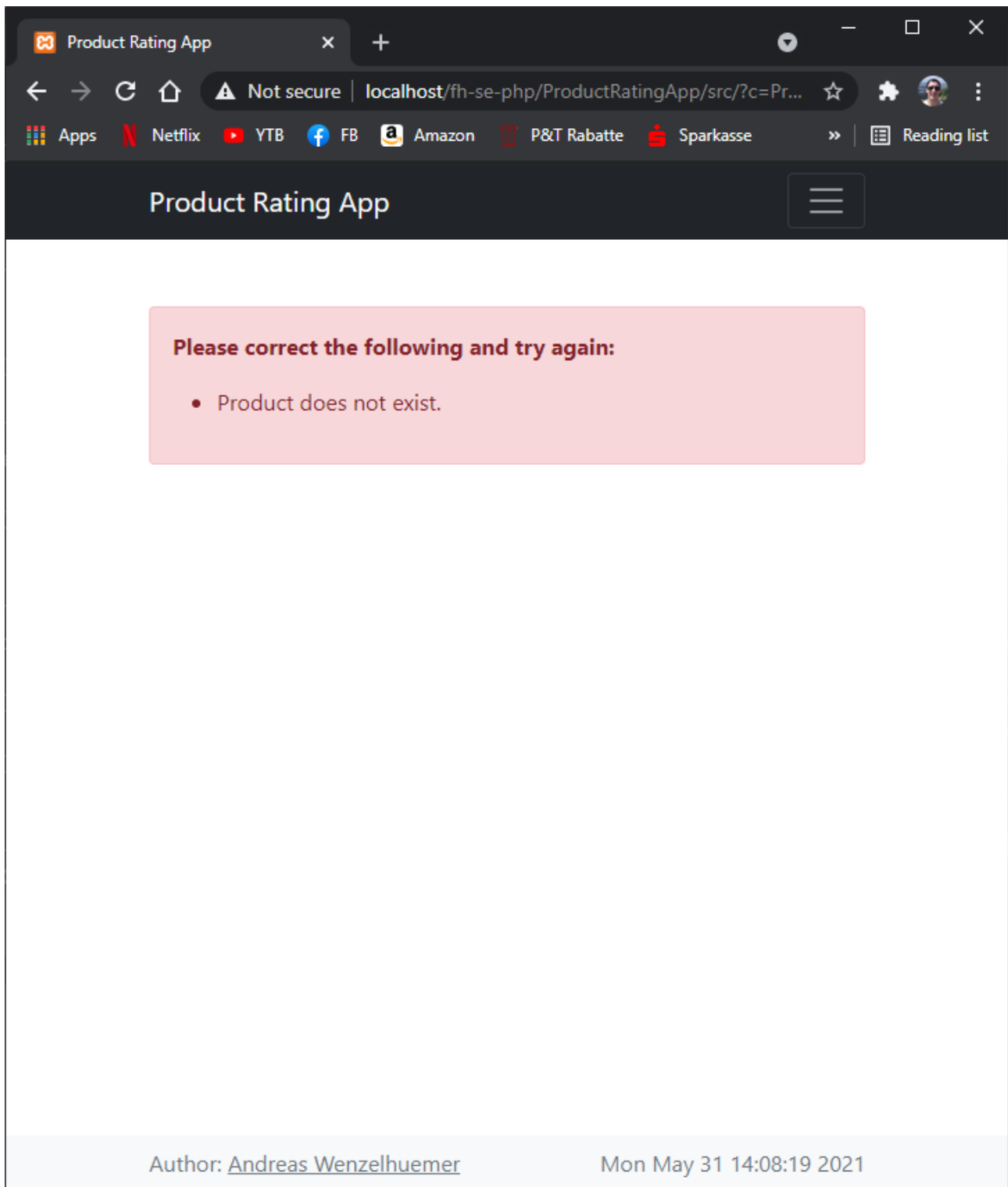
★★☆☆☆ by scr4	from 2021-05-31 08:32:28 ^
Not working!	
★★☆☆☆ by scr4	from 2021-05-31 08:32:28 ^
Not good at all!	
★☆☆☆☆ by scr4	from 2021-05-31 08:32:28 ^

Author: [Andreas Wenzelhuemer](#) Mon May 31 13:39:24 2021

2.16. Testfall: Produktdetails

Anzeige eines Produkts, welches nicht existiert, weil es gelöscht wurde oder eine

ungültige Id ausgewählt wurde.



2.17. Testfall: Bewertungen

Hinzufügen einer neuen Bewertung.

The screenshot shows a web browser window with the 'Product Rating App' running on localhost. The browser's address bar shows the URL: `localhost/fh-se-php/ProductRatingApp/src/?c=Products&a=Detail&pid=11`. The browser's taskbar at the bottom includes icons for Apps, Netflix, YTB, FB, Amazon, P&T Rabatte, Sparkasse, Garmin Connect, Training, and FH. The app's header is dark with the title 'Product Rating App', navigation links 'Home' and 'Products', a user greeting 'Welcome, test.', and a 'Log out' button. The main content area is divided into two sections: 'Product' and 'Ratings'. The 'Product' section displays details for 'Testprodukt': 'Created from: scr4', 'Brand: Testmarke', and 'Average Rating: ☆☆☆☆☆ / 0 ratings'. The 'Ratings' section features a 'New rating' header, a 5-star rating scale with the 5th star selected, a 'Comment' text area containing the word 'Test', and an 'Add new rating' button. The footer of the app shows the author 'Andreas Wenzelhuemer' and the timestamp 'Mon May 31 12:33:24 2021'.

Product Rating App

Not secure | localhost/fh-se-php/ProductRatingApp/src/?c=Products&a=Detail&pid=11

Apps Netflix YTB FB Amazon P&T Rabatte Sparkasse Garmin Connect Training FH

Product Rating App Home Products Welcome, test. Log out

Product

Product name: Testprodukt

Created from: scr4

Brand: Testmarke

Average Rating: ☆☆☆☆☆ / 0 ratings

Ratings

New rating

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☒ 5

Comment

Test

Add new rating

Author: [Andreas Wenzelhuemer](#) Mon May 31 12:33:24 2021

Product Rating App

Home Products

Welcome, **test.** Log out

Average Rating: ★★★★★ / 1 ratings

Ratings

New rating

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☒ 5

Comment

Add new rating

★★★★★ by test from 2021-05-31 12:34:06

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☒ 5 Remove

Comment

Test

2.18. Testfall: Bewertungen

Bewertung entfernen

The screenshot shows a web browser window with the 'Product Rating App' running on localhost. The browser's address bar shows the URL: `localhost/fh-se-php/ProductRatingApp/src/?c=Products&a=Detail&pid=11`. The app's header includes the title 'Product Rating App', navigation links 'Home' and 'Products', a user greeting 'Welcome, test.', and a 'Log out' button. The main content area is titled 'Product' and displays details for 'Testprodukt':

- Product name:** Testprodukt
- Created from:** scr4
- Brand:** Testmarke
- Average Rating:** ★★★★★ / 1 ratings

Below the product details is a 'Ratings' section. It features a 'New rating' header with an upward arrow. The rating interface includes five radio buttons for ratings 1 through 5, with the 5th button selected. A 'Comment' label is followed by a text input field. An 'Add new rating' button is positioned below the comment field. At the bottom of the ratings section, a summary bar shows '★★★★★ by test' and 'from 2021-05-31 12:38:51' with an upward arrow. The footer of the app displays 'Author: Andreas Wenzelhuemer' on the left and 'Mon May 31 12:38:51 2021' on the right.

Product Rating App

Not secure | localhost/fh-se-php/ProductRatingApp/src/?c=Products&a=Detail&pid=11

AppsNetflixYTBFBAmazonP&T RabatteSparkasseGarmin ConnectTrainingFHR

Product Rating AppHomeProductsWelcome, test. Log out

Product

Product name: Testprodukt
Created from: scr4
Brand: Testmarke
Average Rating: ☆☆☆☆☆ / 0 ratings

Ratings

New rating

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☒ 5

Comment

Add new rating

Author: [Andreas Wenzelhuemer](#)

Mon May 31 12:34:57 2021

2.19. Testfall: Bewertungen

Bewertung aktualisieren

Product Rating App

Not secure | localhost/fh-se-php/ProductRatingApp/src/?c=Products&a=Detail&pid=11

Apps Netflix YTB FB Amazon P&T Rabatte Sparkasse Garmin Connect Training FH Reading list

Product Rating App Home Products Welcome, test. Log out

Average Rating: ★★★★★ / 1 ratings

Ratings

New rating

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☒ 5

Comment

Add new rating

★★★★★ by test from 2021-05-31 12:38:51

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☒ 5 Remove

Comment

Updated test

Update existing rating

Author: [Andreas Wenzelhuemer](#) Mon May 31 12:38:51 2021

Product Rating App

Not secure | localhost/fh-se-php/ProductRatingApp/src/?c=Products&a=Detail&pid=11

AppsNetflixYTBFBAmazonP&T RabatteSparkasseGarmin ConnectTrainingFHR

Product Rating AppHomeProductsWelcome, test.Log out

Average Rating: ★★★★★ ☆ / 1 ratings

Ratings

New rating

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Comment

Add new rating

★★★★★ ☆ by testfrom 2021-05-31 12:38:51

☐ 1 ☐ 2 ☐ 3 ☒ 4 ☐ 5

Comment

Updated test

Update existing rating

Remove

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2.19. Testfall: Bewertungen

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3. Quellcode

Listing 1. Index.php

```
<?php

spl_autoload_register(function ($class) {
    $file = __DIR__ . '/src/' . str_replace('\\', '/', $class) .
    '.php';
    if (file_exists($file)) {
        require_once($file);
    }
});

function registerCommandsAndQueries(\ServiceProvider $sp): void {
    // queries
    $sp->register(\Application\Queries\SignedInUserQuery::class);
    $sp->register(\Application\Queries\ProductsQuery::class);
    $sp->register(\Application\Queries\ProductQuery::class);
    $sp->register(\Application\Queries\ProductDetailQuery::class);

    // commands
    $sp->register(\Application\Commands\AddProductCommand::class);
    $sp->register(\Application\Commands>EditProductCommand::class);
    $sp->register(\Application\Commands\SignInCommand::class);
    $sp->register(\Application\Commands\SignOutCommand::class);
    $sp->register(\Application\Commands\RegisterCommand::class);
    $sp->register(\Application\Commands\AddRatingCommand::class);
    $sp->register(\Application\Commands\RemoveRatingCommand::class);
    $sp->register(\Application\Commands>EditRatingCommand::class);
}

function registerServices(\ServiceProvider $sp): void {
    $sp->register(\Application\Services\AuthenticationService::class);
}

function registerRepositories(\ServiceProvider $sp): void {
    $sp->register(\Infrastructure\FakeRepository::class, isSingleton:
true);
    $sp->register(\Infrastructure\Repository::class, function() {
return new \Infrastructure\Repository("localhost", "root", "",
"productrating");});
    $sp->register(\Application\Interfaces\UserRepository::class,
\Infrastructure\Repository::class, isSingleton: true);
}
```

```
$sp->register(\Application\Interfaces\ProductRepository::class,
\Infrastructure\Repository::class, isSingleton: true);
$sp->register(\Application\Interfaces\RatingRepository::class,
\Infrastructure\Repository::class, isSingleton: true);
}

function registerControllers(\ServiceProvider $sp): void {
    $sp->register(\Presentation\MVC\MVC::class, function () {
        return new \Presentation\MVC\MVC();
    }, isSingleton: true);

    $sp->register(\Presentation\Controllers\Error404::class);
    $sp->register(\Presentation\Controllers\Home::class);
    $sp->register(\Presentation\Controllers\User::class);
    $sp->register(\Presentation\Controllers\Products::class);
    $sp->register(\Presentation\Controllers\Ratings::class);
}

// === register services
$sp = new \ServiceProvider();

// --- Application
registerCommandsAndQueries($sp);

// --- Services
registerServices($sp);

// --- Infrastructure
$sp->register(\Infrastructure\Session::class, isSingleton: true);
$sp->register(\Application\Interfaces\Session::class,
\Infrastructure\Session::class);
registerRepositories($sp);

// --- Presentation
registerControllers($sp);

// === handle requests
$sp->resolve(\Presentation\MVC\MVC::class)->handleRequest($sp);
```

3.1. Application

3.1.1. Commands

Listing 2. AddProductCommand.php

```
<?php

namespace Application\Commands;

class AddProductCommand
{
    const Error_NotAuthenticated = 0x01; // 1
    const Error_InvalidName = 0x02; // 2
    const Error_InvalidProducer = 0x04; // 4
    const Error_CreateProductFailed = 0x08; // 8

    public function __construct(
        private \Application\Services\AuthenticationService
        $authenticationService,
        private \Application\Interfaces\ProductRepository
        $productRepository
    ) {

    }

    public function execute(string $producer, string $name): int
    {
        $errors = 0;
        $name = trim($name);
        $producer = trim($producer);

        $userId = $this->authenticationService->getUserId();

        // check for authenticated user
        if($userId === null) {
            $errors |= self::Error_NotAuthenticated;
        }

        if(strlen($name) == 0) {
            $errors |= self::Error_InvalidName;
        }

        if(strlen($producer) == 0) {
            $errors |= self::Error_InvalidProducer;
        }
    }
}
```

```
        if(!$errors) {
            $productId = $this->productRepository->addProduct(
                $producer, $userId, $name);

            if($productId === null) {
                $errors |= self::Error_CreateProductFailed;
            }
        }

        return $errors;
    }
}
```

Listing 3. AddRatingCommand.php

```
<?php

namespace Application\Commands;

use Application\Interfaces\RatingRepository;
use Application\Services\AuthenticationService;

class AddRatingCommand {

    const Error_NotAuthenticated = 0x01; // 1
    const Error_CreateRatingFailed = 0x2; // 2

    public function __construct(
        private AuthenticationService $authenticationService,
        private RatingRepository $ratingRepository
    ) { }

    public function execute(int $productId, int $rating, ?string
        $comment): int
    {
        $userId = $this->authenticationService->getUserId();
        $errors = 0;

        $comment = trim($comment);
        $comment = $comment === "" ? null : $comment;

        // check for authenticated user
        if($userId === null) {
```

```
        $errors |= self::Error_NotAuthenticated;
    }

    if(!$errors) {
        // try to create new rating
        $ratingId = $this->ratingRepository->addRating(
            $userId,
            $productId,
            $rating,
            $comment
        );

        if($ratingId === null) {
            $errors |= self::Error_CreateRatingFailed;
        }
    }

    return $errors;
}
}
```

Listing 4. EditProductCommand.php

```
<?php

namespace Application\Commands;

class EditProductCommand
{
    const Error_NotAuthenticated = 0x01; // 1
    const Error_InvalidName = 0x02; // 2
    const Error_InvalidProducer = 0x04; // 4

    public function __construct(
        private \Application\Services\AuthenticationService
        $authenticationService,
        private \Application\Interfaces\ProductRepository
        $productRepository
    ) {

    }

    public function execute(int $id, string $producer, string $name):
    int
```

```
{
    $errors = 0;
    $name = trim($name);
    $producer = trim($producer);

    $userId = $this->authenticationService->getUserId();

    // check for authenticated user
    if($userId === null || $this->productRepository-
>canEditProduct($id, $userId) == 0) {
        $errors |= self::Error_NotAuthenticated;
    }

    if(strlen($name) == 0) {
        $errors |= self::Error_InvalidName;
    }

    if(strlen($producer) == 0) {
        $errors |= self::Error_InvalidProducer;
    }

    if(!$errors) {
        $this->productRepository->editProduct($id, $producer,
$name);
    }

    return $errors;
}
}
```

Listing 5. EditRatingCommand.php

```
<?php

namespace Application\Commands;

use Application\Interfaces\RatingRepository;
use Application\Services\AuthenticationService;

class EditRatingCommand {

    const Error_NotAuthenticated = 0x01; // 1

    public function __construct(
```

```
        private AuthenticationService $authenticationService,
        private RatingRepository $ratingRepository
    ) { }

    public function execute(int $ratingId, int $productId, int $rating,
        ?string $comment): int
    {
        $userId = $this->authenticationService->getUserId();
        $errors = 0;

        $comment = trim($comment);
        $comment = $comment === "" ? null : $comment;

        // check for authenticated user
        if($userId === null || $this->ratingRepository->canEditRating
            ($ratingId, $userId) == 0) {
            $errors |= self::Error_NotAuthenticated;
        }

        if(!$errors) {
            // try to edit rating
            $this->ratingRepository->editRating(
                $ratingId,
                $productId,
                $rating,
                $comment
            );
        }

        return $errors;
    }
}
```

Listing 6. RegisterCommand.php

```
<?php

namespace Application\Commands;

use Application\Interfaces\UserRepository;

class RegisterCommand
{

```

```
const Error_UsernameAlreadyExists = 0x01; // 1
const Error_CreateUserFailed = 0x02; // 2
const Error_InvalidUsername = 0x04; // 4
const Error_InvalidPassword = 0x08; // 8

public function __construct(
    private UserRepository $userRepository
) { }

public function execute(string $username, string $password): int
{
    $errors = 0;
    $username = trim($username);

    if($this->userRepository->getUserForUserName($username) !==
null) {
        $errors |= self::Error_UsernameAlreadyExists;
    } else {
        if(strlen($username) == 0) {
            $errors |= self::Error_InvalidUsername;
        }

        if(strlen($password) < 4) {
            $errors |= self::Error_InvalidPassword;
        }

        if(!$errors) {
            $userId = $this->userRepository->createUser($username,
$password);
            if($userId === null) {
                $errors |= self::Error_CreateUserFailed;
            }
        }
    }

    return $errors;
}
}
```


Listing 7. RemoveRatingCommand.php

```
<?php

namespace Application\Commands;

use Application\Interfaces\RatingRepository;
use Application\Services\AuthenticationService;

class RemoveRatingCommand
{
    const Error_NotAuthenticated = 0x01; // 1

    public function __construct(
        private AuthenticationService $authenticationService,
        private RatingRepository $ratingRepository
    ) { }

    public function execute(int $ratingId): int
    {
        $userId = $this->authenticationService->getUserId();
        $errors = 0;

        // check for authenticated user
        if($userId === null || !$this->ratingRepository->canEditRating(
            $ratingId, $userId)) {
            $errors |= self::Error_NotAuthenticated;
        }

        if(!$errors) {
            // try to remove rating
            $this->ratingRepository->removeRating($ratingId);
        }

        return $errors;
    }
}
```

Listing 8. *SignInCommand.php*

```
<?php

namespace Application\Commands;

use Application\Interfaces\UserRepository;
use Application\Services\AuthenticationService;

class SignInCommand
{
    public function __construct(
        private AuthenticationService $authenticationService,
        private UserRepository $userRepository
    ) {

    }

    public function execute(string $username, string $password): bool
    {
        $this->authenticationService->signOut();
        $user = $this->userRepository->getUserForUserNameAndPassword(
            ($username, $password);
        if($user != null) {
            $this->authenticationService->signIn($user->getId());
            return true;
        }

        return false;
    }
}
```

Listing 9. SignOutCommand.php

```
<?php

namespace Application\Commands;

use Application\Services\AuthenticationService;

class SignOutCommand
{
    public function __construct(
        private AuthenticationService $authenticationService
    ) {
    }

    public function execute(): void
    {
        $this->authenticationService->signOut();
    }
}
```

3.1.2. Entities

Listing 10. Product.php

```
<?php

namespace Application\Entities;

class Product {

    /**
     * Product constructor.
     * @param int $id
     * @param string $producer
     * @param string $userId
     * @param string $name
     */
    public function __construct(
        private int $id,
        private string $producer,
        private string $userId,
        private string $name)
    { }

    /**
     * @return int
     */
    public function getId(): int
    {
        return $this->id;
    }

    /**
     * @return string
     */
    public function getProducer(): string
    {
        return $this->producer;
    }

    /**
     * @return string
     */
    public function getUserId(): string
```

```
{  
    return $this->userId;  
}  
  
/**  
 * @return string  
 */  
public function getName(): string  
{  
    return $this->name;  
}  
}
```

Listing 11. Rating.php

```
<?php  
  
namespace Application\Entities;  
  
class Rating {  
  
    /**  
     * Rating constructor.  
     */  
    public function __construct(  
        private int $id,  
        private int $userId,  
        private int $productId,  
        private int $rating,  
        private ?string $comment,  
        private string $createdDate  
    ) { }  
  
    /**  
     * @return int  
     */  
    public function getId(): int  
    {  
        return $this->id;  
    }  
  
    /**  
     * @return int  
     */
```

```
public function getUserId(): int
{
    return $this->userId;
}

/**
 * @return int
 */
public function getProductId(): int
{
    return $this->productId;
}

/**
 * @return int
 */
public function getRating(): int
{
    return $this->rating;
}

/**
 * @return string
 */
public function getComment(): ?string
{
    return $this->comment;
}

/**
 * @return string
 */
public function getCreatedDate(): string
{
    return $this->createdDate;
}
}
```

Listing 12. User.php

```
<?php

namespace Application\Entities;

class User {
    public function __construct(
        private int $id,
        private string $userName
    )
    { }

    public function getId(): int {
        return $this->id;
    }

    public function getUserName(): string {
        return $this->userName;
    }
}
```

3.1.3. Interfaces

Listing 13. *ProductRepository.php*

```
<?php

namespace Application\Interfaces;

use Application\Entities\Product;

interface ProductRepository
{
    public function getProduct(int $id): ?Product;
    public function getProducts(): array;
    public function getProductsForFilter(string $filter): array;
    public function addProduct(string $producer, int $userId, string
$name): ?int;
    public function canEditProduct(int $id, int $userId): bool;
    public function editProduct(int $id, string $producer, string
$name);
}
```

Listing 14. *RatingRepository.php*

```
<?php

namespace Application\Interfaces;

interface RatingRepository {

    public function getRatingAverageForProduct(int $productId): float;
    public function getRatingCountForProduct(int $productId): int;
    public function getRatingsFromProduct(int $productId): array;
    public function addRating(int $userId, int $productId, int $rating,
?string $comment): ?int;
    public function editRating(int $id, int $productId, int $rating,
?string $comment): void;
    public function removeRating(int $id);
    public function canEditRating(int $id, int $userId): bool;
}
```


Listing 15. Session.php

```
<?php

namespace Application\Interfaces;

interface Session {
    public function get(string $key): mixed;
    public function put(string $key, mixed $value): void;
    public function delete(string $key): void;
}
```

Listing 16. UserRepository.php

```
<?php

namespace Application\Interfaces;

interface UserRepository {
    public function getUserForUserName(string $userName) : ?
    \Application\Entities\User;
    public function getUserForUserNameAndPassword(string $userName,
    string $password) : ?\Application\Entities\User;
    public function getUser(int $id): ?\Application\Entities\User;
    public function createUser(string $userName, string $password) :
    int;
}
```

3.1.4. Models

Listing 17. *ProductData.php*

```
<?php

namespace Application\Models;

class ProductData {

    public function __construct(
        private int $id,
        private string $producer,
        private UserData $user,
        private string $name,
        private float $rating,
        private int $ratingCount
    ) { }

    /**
     * @return int
     */
    public function getId(): int
    {
        return $this->id;
    }

    /**
     * @return string
     */
    public function getProducer(): string
    {
        return $this->producer;
    }

    /**
     * @return string
     */
    public function getUser_name(): ?string
    {
        if($this->user) {
            return $this->user->getUser_name();
        } else {
            return null;
        }
    }
}
```

```
    }  
}  
  
/**  
 * @return int  
 */  
public function getUserId(): ?int  
{  
    if($this->user) {  
        return $this->user->getId();  
    } else {  
        return null;  
    }  
}  
  
/**  
 * @return string  
 */  
public function getName(): string  
{  
    return $this->name;  
}  
  
/**  
 * @return int  
 */  
public function getRating(): float  
{  
    return $this->rating;  
}  
  
/**  
 * @return int  
 */  
public function getRatingCount(): int  
{  
    return $this->ratingCount;  
}  
  
}
```

Listing 18. ProductDetailData.php

```
<?php

namespace Application\Models;

class ProductDetailData extends ProductData
{
    /**
     * ProductDetailData constructor.
     */
    public function __construct(
        int $id,
        string $producer,
        UserData $user,
        string $name,
        private array $ratings
    ) {

        $ratingSum = 0;
        $ratingCount = 0;
        if(sizeof($this->ratings) > 0) {
            foreach ($this->ratings as $rating) {
                $ratingCount++;
                $ratingSum += $rating->getRating();
            }
        }

        $ratingAverage = $ratingCount > 0 ? round($ratingSum /
$ratingCount, 2) : 0;

        parent::__construct($id, $producer, $user, $name,
$ratingAverage, $ratingCount);
    }

    /**
     * @return array
     */
    public function getRatings(): array
    {
        return $this->ratings;
    }
}
```

Listing 19. RatingData.php

```
<?php

namespace Application\Models;

class RatingData {
    public function __construct(
        private int $id,
        private UserData $user,
        private int $rating,
        private ?string $comment,
        private String $createdDate
    ) { }

    /**
     * @return int
     */
    public function getId(): int
    {
        return $this->id;
    }

    /**
     * @return UserData
     */
    public function getUser(): UserData
    {
        return $this->user;
    }

    /**
     * @return int
     */
    public function getRating(): int
    {
        return $this->rating;
    }

    /**
     * @return string
     */
    public function getComment(): ?string
    {

```

```
        return $this->comment;
    }

    /**
     * @return String
     */
    public function getCreateDate(): String
    {
        return $this->createdDate;
    }
}
```

Listing 20. UserData.php

```
<?php

namespace Application\Models;

class UserData
{
    public function __construct(
        private int $id,
        private string $userName
    ) {
    }

    public function getId(): int
    {
        return $this->id;
    }

    public function getUserName(): string
    {
        return $this->userName;
    }
}
```

3.1.5. Queries

Listing 21. ProductDetailQuery.php

```
<?php

namespace Application\Queries;

use Application\Interfaces\ProductRepository;
use Application\Interfaces\RatingRepository;
use Application\Interfaces\UserRepository;
use Application\Models\ProductDetailData;
use Application\Models\RatingData;
use Application\Models\UserData;

class ProductDetailQuery {

    public function __construct(
        private ProductRepository $productRepository,
        private RatingRepository $ratingRepository,
        private UserRepository $userRepository,
    )
    {
    }

    public function execute(int $id): ?ProductDetailData {
        $product = $this->productRepository->getProduct($id);

        if($product === null) {
            return null;
        }

        $ratingResult = $this->ratingRepository->getRatingsFromProduct($id);
        $userResult = $this->userRepository->getUser($product->getUserId());

        $ratings = [];

        foreach ($ratingResult as $rating) {

            // Load user if necessary
            $ratingUser = $rating->getUserId() != $userResult->getId()
            ? $this->userRepository->getUser($rating->getUserId()) : $userResult;
        }
    }
}
```

```
        $ratings[] = new RatingData(
            $rating->getId(),
            new UserData($ratingUser->getId(), $ratingUser-
>getUserName()),
            $rating->getRating(),
            $rating->getComment(),
            $rating->getCreatedDate()
        );
    }

    return new ProductDetailData(
        $product->getId(),
        $product->getProducer(),
        new UserData($userResult->getId(), $userResult->
getUserName()),
        $product->getName(),
        $ratings
    );
}
}
```

Listing 22. ProductQuery.php

```
<?php

namespace Application\Queries;

use Application\Interfaces\ProductRepository;
use Application\Interfaces\RatingRepository;
use Application\Interfaces\UserRepository;
use Application\Models\ProductData;
use Application\Models\ProductDetailData;
use Application\Models\RatingData;
use Application\Models\UserData;

class ProductQuery {

    public function __construct(
        private ProductRepository $productRepository,
        private UserRepository $userRepository,
        private RatingRepository $ratingRepository
    )
    {

```



```
}

public function execute(int $id): ?ProductData {
    $product = $this->productRepository->getProduct($id);

    if($product === null) {
        return null;
    }

    $userResult = $this->userRepository->getUser($product->
    >getUserId());

    return new ProductData(
        $product->getId(),
        $product->getProducer(),
        new UserData($userResult->getId(), $userResult->
    >getUserName()),
        $product->getName(),
        $this->ratingRepository->getRatingAverageForProduct
    ($product->getId()),
        $this->ratingRepository->getRatingCountForProduct($product
    >getId())
    );
}
```

Listing 23. ProductsQuery.php

```
<?php

namespace Application\Queries;

use Application\Interfaces\ProductRepository;
use Application\Interfaces\RatingRepository;
use Application\Interfaces\UserRepository;
use Application\Models\ProductData;
use Application\Models\UserData;

class ProductsQuery
{
    public function __construct(
        private ProductRepository $productRepository,
        private UserRepository $userRepository,
        private RatingRepository $ratingRepository
```

```
    ) {  
    }  
  
    public function execute(?string $filter): array{  
        $results = [];  
  
        $products = $filter === null || $filter == "" ? $this->productRepository->getProducts() : $this->productRepository->getProductsForFilter($filter);  
  
        foreach($products as $product) {  
  
            $user = $this->userRepository->getUser($product->getUserId());  
            $averageRating = $this->ratingRepository->getRatingAverageForProduct($product->getId());  
            $totalCount = $this->ratingRepository->getRatingCountForProduct($product->getId());  
  
            $results[] = new ProductData(  
                $product->getId(),  
                $product->getProducer(),  
                new UserData($user->getId(), $user->getUserName()),  
                $product->getName(),  
                $averageRating,  
                $totalCount  
            );  
        }  
  
        return $results;  
    }  
}
```

Listing 24. *SignedInUserQuery.php*

```
<?php

namespace Application\Queries;

use Application\Interfaces\UserRepository;
use Application\Services\AuthenticationService;
use Application\Models\UserData;

class SignedInUserQuery
{
    public function __construct(
        private AuthenticationService $authenticationService,
        private UserRepository $userRepository
    ) {
    }

    public function execute(): ?UserData
    {
        $id = $this->authenticationService->getUserId();
        if ($id === null) {
            return null;
        }
        $user = $this->userRepository->getUser($id);
        if ($user === null) {
            return null;
        }
        return new UserData($user->getId(), $user->getUserName());
    }
}
```

3.1.6. Services

Listing 25. AuthenticationService.php

```
<?php

namespace Application\Services;

class AuthenticationService {

    const SESSION_USER_ID = "userId";

    public function __construct(
        private \Application\Interfaces\Session $session
    ) { }

    public function signIn(int $userId) {
        $this->session->put(self::SESSION_USER_ID, $userId);
    }

    public function signOut() : void {
        $this->session->delete(self::SESSION_USER_ID);
    }

    public function getUserId(): ?int {
        return $this->session->get(self::SESSION_USER_ID);
    }
}
```

3.2. Infrastructure

Listing 26. FakeRepository.php

```
<?php

namespace Infrastructure;

use Application\Entities\Book;
use Application\Entities\Category;
use Application\Entities\Product;
use Application\Entities\Rating;
use Application\Entities\User;
use Application\Interfaces\BookRepository;
use Application\Interfaces\CategoryRepository;
use Application\Interfaces\OrderRepository;
use Application\Interfaces\ProductRepository;
use Application\Interfaces\RatingRepository;
use Application\Interfaces\UserRepository;

class FakeRepository implements
    UserRepository,
    ProductRepository,
    RatingRepository
{
    private $mockUsers;
    private $mockProducts;
    private $mockRatings;

    public function __construct()
    {
        // create mock data
        $this->mockUsers = array(
            array(1, 'scr4', 'scr4')
        );

        $this->mockProducts = array(
            array(1, 'Hilti', 1, 'Schlagbohrmaschine'),
            array(2, 'Bosch', 1, 'Schlagbohrmaschine'),
            array(3, 'Makita', 1, 'Schlagbohrmaschine')
        );

        $this->mockRatings = array(
            array(1, 1, 1, 5, "Hilti quality!", date_format(new \
```

```
DateTime(), "Y-m-d H:i:s"))
    );
}

public function getUser(int $id): ?User {
    foreach($this->mockUsers as $u) {
        if($u[0] === $id) {
            return new User($u[0], $u[1]);
        }
    }
    return null;
}

public function getUserForUserNameAndPassword(string $userName,
string $password): ?User
{
    foreach($this->mockUsers as $u) {
        if($u[1] === $userName && $u[2] === $password) {
            return new User($u[0], $u[1]);
        }
    }
    return null;
}

public function getUserForUserName(string $userName): ?
\Application\Entities\User
{
    foreach($this->mockUsers as $u) {
        if($u[1] === $userName) {
            return new User($u[0], $u[1]);
        }
    }
    return null;
}

public function createUser(string $userName, string $password) :
int
{
    $count = sizeof($this->mockUsers);
    $newId = 0;
    if($count > 0) {
        $user = $this->mockUsers[$count - 1];
        $newId = $user[0];
        $newId++;
    }
}
```

```
    }

    array_push($this->mockUsers,
        array($newId, $userName, $password)
    );

    return $newId;
}

public function getProducts(): array
{
    $result = [];
    foreach($this->mockProducts as $product) {
        $result[] = new Product($product[0], $product[1], $product
[2], $product[3]);
    }

    return $result;
}

public function getRatingAverageForProduct(int $productId): float
{
    $ratingSum = 0;
    $ratingCount = 0;
    foreach ($this->mockRatings as $rating) {
        if($rating[3] === $productId) {
            $ratingCount++;
            $ratingSum += $rating[2];
        }
    }
    return $ratingSum > 0 ? $ratingCount / $ratingSum : 0;
}

public function getRatingCountForProduct(int $productId): int
{
    $ratingCount = 0;
    foreach ($this->mockRatings as $rating) {
        if($rating[2] === $productId) {
            $ratingCount++;
        }
    }
    return $ratingCount;
}
```

```
public function getProduct(int $id) : ?Product
{
    foreach ($this->mockProducts as $product) {
        if($product[0] === $id) {
            return new Product($product[0], $product[1], $product[
2], $product[3]);
        }
    }
    return null;
}

public function getRatingsFromProduct(int $productId): array
{
    $result = [];
    foreach($this->mockRatings as $rating) {
        if($rating[2] === $productId) {
            $result[] = new Rating($rating[0], $rating[1], $rating
[2], $rating[3], $rating[4], $rating[5]);
        }
    }

    return $result;
}

public function addRating(int $userId, int $productId, int $rating,
?string $comment): ?int
{
    $count = sizeof($this->mockUsers);
    $newId = 0;
    if($count > 0) {
        $newId = $this->mockUsers[$count - 1][0];
        $newId++;
    }

    $this->mockRatings[] = new Rating(
        $newId,
        $userId,
        $productId,
        $rating,
        $comment,
        date_format(new \DateTime(), "Y-m-d H:i:s")
    );

    return $newId;
}
```



```
}

    public function editRating(int $id, int $productId, int $rating,
?string $comment): void
    {
        for ($i = 0; $i < sizeof($this->mockRatings); $i++) {
            if ($this->mockRatings[$i][0] === $id) {
                $this->mockRatings[$i] = new Rating($id, $this-
>mockRatings[$i][1], $productId, $comment, $rating, $this->mockRatings
[$i][5]);
            }
        }
    }

    public function canEditRating(int $id, int $userId): bool
    {
        foreach($this->mockRatings as $rating) {
            if($rating[0] === $id && $rating[1] == $userId) {
                return true;
            }
        }
        return false;
    }

    public function removeRating(int $id): void
    {
        for ($i = 0; $i < sizeof($this->mockRatings); $i++) {
            if($this->mockRatings[$i][0] === $id) {
                unset($this->mockRatings[$i]);
            }
        }
    }

    public function addProduct(string $producer, int $userId, string
$name): ?int
    {
        $count = sizeof($this->mockUsers);
        $newId = 0;
        if($count > 0) {
            $newId = $this->mockUsers[$count - 1][0];
            $newId++;
        }

        $this->mockProducts[] = new Product(
```

```
        $newId,  
        $producer,  
        $userId,  
        $name  
    );  
  
    return $newId;  
}  
  
public function canEditProduct(int $id, int $userId): bool  
{  
    foreach($this->mockProducts as $product) {  
        if($product[0] === $id && $product[2] == $userId) {  
            return true;  
        }  
    }  
    return false;  
}  
  
public function editProduct(int $id, string $producer, string  
$name)  
{  
    for ($i = 0; $i < sizeof($this->mockProducts); $i++) {  
        if ($this->mockProducts[$i][0] === $id) {  
            $this->mockProducts[$i] = new Product($id, $producer,  
$this->mockProducts[$i][2], $name);  
        }  
    }  
}  
  
public function getProductsForFilter(string $filter): array  
{  
    $products = [];  
    foreach($this->mockProducts as $product) {  
        if($filter == '' || strpos($product[1], $filter) !== false  
|| strpos($product[3], $filter) !== false) {  
            $products[] = new Product($product[0], $product[2],  
$product[3], $product[4]);  
        }  
    }  
    return $products;  
}  
}
```

Listing 27. Repository.php

```
<?php

namespace Infrastructure;

use Application\Entities\Product;
use Application\Entities\Rating;

class Repository
    implements
        \Application\Interfaces\UserRepository,
        \Application\Interfaces\ProductRepository,
        \Application\Interfaces\RatingRepository
{

    private $server;
    private $userName;
    private $password;
    private $database;

    public function __construct(string $server, string $userName,
string $password, string $database)
    {
        $this->server = $server;
        $this->userName = $userName;
        $this->password = $password;
        $this->database = $database;
    }

    // === private helper methods ===

    private function getConnection()
    {
        $con = new \mysqli($this->server, $this->userName, $this-
>password, $this->database);
        if (!$con) {
            die('Unable to connect to database. Error: ' .
mysqli_connect_error());
        }
        return $con;
    }

    private function executeQuery($connection, $query)
```

```

{
    $result = $connection->query($query);
    if (!$result) {
        die("Error in query '$query': " . $connection->error);
    }
    return $result;
}

private function executeStatement($connection, $query, $bindFunc)
{
    $statement = $connection->prepare($query);
    if (!$statement) {
        die("Error in prepared statement '$query': " . $connection
->error);
    }
    $bindFunc($statement);
    if (!$statement->execute()) {
        die("Error executing prepared statement '$query': " .
$statement->error);
    }
    return $statement;
}

// === public methods ===

public function getUserForUserName(string $userName): ?
\Application\Entities\User
{
    $user = null;
    $con = $this->getConnection();
    $stat = $this->executeStatement(
        $con,
        'SELECT id, passwordHash FROM users WHERE userName = ?',
        function ($s) use ($userName) {
            $s->bind_param('s', $userName);
        }
    );
    $stat->bind_result($id, $passwordHash);
    if ($stat->fetch()) {
        $user = new \Application\Entities\User($id, $userName,
$passwordHash);
    }
    $stat->close();
    $con->close();
}

```

```
        return $user;
    }

    public function getUserForUserNameAndPassword(string $userName,
string $password): ?\Application\Entities\User
    {
        $user = null;
        $con = $this->getConnection();
        $stat = $this->executeStatement(
            $con,
            'SELECT id, passwordHash FROM users WHERE userName = ?',
            function ($s) use ($userName) {
                $s->bind_param('s', $userName);
            }
        );
        $stat->bind_result($id, $passwordHash);
        if ($stat->fetch() && password_verify($password,
$passwordHash)) {
            $user = new \Application\Entities\User($id, $userName);
        }
        $stat->close();
        $con->close();
        return $user;
    }

    public function getUser(int $id): ?\Application\Entities\User
    {
        $user = null;
        $con = $this->getConnection();
        $stat = $this->executeStatement(
            $con,
            'SELECT id, userName FROM users WHERE id = ?',
            function ($s) use ($id) {
                $s->bind_param('i', $id);
            }
        );
        $stat->bind_result($id, $userName);
        if ($stat->fetch()) {
            $user = new \Application\Entities\User($id, $userName);
        }
        $stat->close();
        $con->close();
        return $user;
    }
}
```

```
public function createUser(string $userName, string $password): int
{
    $password = password_hash($password, PASSWORD_DEFAULT);
    $con = $this->getConnection();
    $con->autocommit(false);
    $stat = $this->executeStatement(
        $con,
        'INSERT INTO users (userName, passwordHash) VALUES (?, ?)',
        function ($s) use ($userName, $password) {
            $s->bind_param('ss', $userName, $password);
        }
    );
    $userId = $stat->insert_id;
    $stat->close();
    $con->commit();
    $con->close();
    return $userId;
}

public function getProducts(): array
{
    $products = [];
    $con = $this->getConnection();
    $result = $this->executeQuery(
        $con,
        'SELECT id, producer, userId, name FROM products'
    );
    while ($product = $result->fetch_object()) {
        $products[] = new \Application\Entities\Product($product->id, $product->producer, $product->userId, $product->name);
    }
    $result->close();
    $con->close();
    return $products;
}

public function getRatingAverageForProduct(int $productId): float
{
    $con = $this->getConnection();
    $stat = $this->executeStatement(
        $con,
        'SELECT AVG(rating) as averageRating FROM `ratings` WHERE productId = ?',
    );
}
```

```
        function($s) use ($productId) {
            $s->bind_param('i', $productId);
        }
    );

    $stat->bind_result($averageRating);
    $stat->fetch();

    $stat->close();
    $con->close();

    return round($averageRating, 2);
}

public function getRatingCountForProduct(int $productId): int
{
    $con = $this->getConnection();
    $stat = $this->executeStatement(
        $con,
        'SELECT COUNT(ID) as count FROM `ratings` WHERE productId =
?',
        function($s) use ($productId) {
            $s->bind_param('i', $productId);
        }
    );

    $stat->bind_result($count);
    $stat->fetch();

    $stat->close();
    $con->close();

    return $count;
}

public function getProduct(int $id): ?Product
{
    $product = null;
    $con = $this->getConnection();
    $stat = $this->executeStatement(
        $con,
        'SELECT id, producer, userId, name FROM `products` WHERE id
= ?',
        function($s) use ($id) {
```

```
        $s->bind_param('i', $id);
    }
};

$stat->bind_result($id, $producer, $userId, $name);
if ($stat->fetch()) {
    $product = new \Application\Entities\Product($id,
$producer, $userId, $name);
}

$stat->close();
$con->close();

return $product;
}

public function getRatingsFromProduct(int $productId): array
{
    $ratings = [];
    $con = $this->getConnection();
    $stat = $this->executeStatement(
        $con,
        'SELECT id, userId, productId, rating, comment, createdAt
FROM `ratings` WHERE productId = ? ORDER BY createdAt DESC',
        function($s) use ($productId) {
            $s->bind_param('i', $productId);
        }
    );

    $stat->bind_result($id, $userId, $productId, $rating, $comment,
$createdAt);
    while ($stat->fetch()) {
        $ratings[] = new Rating($id, $userId, $productId, $rating,
$comment, $createdAt);
    }

    $stat->close();
    $con->close();

    return $ratings;
}

public function addRating(int $userId, int $productId, int $rating,
?string $comment): ?int
```



```
{
    $con = $this->getConnection();
    $stat = $this->executeStatement(
        $con,
        'INSERT INTO `ratings` (`userId`, `productId`, `rating`,
`comment`, `createdDate`) VALUES (?, ?, ?, ?, NOW())',
        function($s) use ($userId, $productId, $rating, $comment) {
            $s->bind_param('iiis', $userId, $productId, $rating,
$comment);
        }
    );

    $newRatingId = $stat->insert_id;
    $stat->close();
    $con->close();

    return $newRatingId;
}

public function editRating(int $id, int $productId, int $rating,
?string $comment): void
{
    $con = $this->getConnection();
    $stat = $this->executeStatement(
        $con,
        'UPDATE ratings SET productId = ?, rating = ?, comment = ?
WHERE id = ?',
        function($s) use ($id, $productId, $rating, $comment) {
            $s->bind_param('iisi', $productId, $rating, $comment,
$id);
        }
    );
    $stat->close();
    $con->close();
}

public function canEditRating(int $id, int $userId): bool
{
    $con = $this->getConnection();
    $stat = $this->executeStatement(
        $con,
        'SELECT COUNT(id) as count FROM `ratings` WHERE id = ? &&
userId = ?',
        function($s) use ($id, $userId) {
```

```
        $s->bind_param('ii', $id, $userId);
    }
};

$stat->bind_result($count);
$stat->fetch();

$stat->close();
$con->close();

return $count == 1;
}

public function removeRating(int $id)
{
    $con = $this->getConnection();
    $stat = $this->executeStatement(
        $con,
        'DELETE FROM ratings WHERE id = ?',
        function($s) use ($id) {
            $s->bind_param('i', $id);
        }
    );
    $stat->close();
    $con->close();
}

public function addProduct(string $producer, int $userId, string
$name): ?int
{
    $con = $this->getConnection();
    $stat = $this->executeStatement(
        $con,
        'INSERT INTO products (producer, userId, name) VALUES (?,
?, ?);',
        function($s) use ($producer, $userId, $name) {
            $s->bind_param('sis', $producer, $userId, $name);
        }
    );

    $newProductId = $stat->insert_id;
    $stat->close();
    $con->close();
}
```

```
        return $newProductId;
    }

    public function canEditProduct(int $id, int $userId): bool
    {
        $con = $this->getConnection();
        $stat = $this->executeStatement(
            $con,
            'SELECT COUNT(id) as count FROM products WHERE id = ? &&
userId = ?',
            function($s) use ($id, $userId) {
                $s->bind_param('ii', $id, $userId);
            }
        );

        $stat->bind_result($count);
        $stat->fetch();

        $stat->close();
        $con->close();

        return $count == 1;
    }

    public function editProduct(int $id, string $producer, string
$name)
    {
        $con = $this->getConnection();
        $stat = $this->executeStatement(
            $con,
            'UPDATE products SET producer = ?, name = ? WHERE id = ?',
            function($s) use ($producer, $name, $id) {
                $s->bind_param('ssi', $producer, $name, $id);
            }
        );
        $stat->close();
        $con->close();
    }

    public function getProductsForFilter(string $filter): array
    {
        $filter = "%$filter%";
        $products = [];
        $con = $this->getConnection();
```

```
        $stat = $this->executeStatement(  
            $con,  
            'SELECT id, producer, userId, name FROM products WHERE  
(name LIKE ? || producer LIKE ?)',  
            function ($s) use ($filter) {  
                $s->bind_param('ss', $filter, $filter);  
            }  
        );  
  
        $stat->bind_result($id, $producer, $userId, $name);  
        while ($stat->fetch()) {  
            $products[] = new \Application\Entities\Product($id,  
$producer, $userId, $name);  
        }  
        $stat->close();  
        $con->close();  
  
        return $products;  
    }  
}
```

Listing 28. Session.php

```
<?php

namespace Infrastructure;

class Session implements \Application\Interfaces\Session {

    public function __construct() {
        session_start();
    }

    public function get(string $key): mixed {
        return $_SESSION[$key] ?? null;
    }

    public function put(string $key, mixed $value): void {
        $_SESSION[$key] = $value;
    }

    public function delete(string $key): void {
        unset($_SESSION[$key]);
    }
}
```

3.3. Presentation

3.3.1. Controllers

Listing 29. Error404.php

```
<?php

namespace Presentation\Controllers;

use Application\Queries\SignedInUserQuery;
use Presentation\MVC\Controller;
use Presentation\MVC\ViewResult;

class Error404 extends Controller {

    public function __construct(
        private SignedInUserQuery $signedInUserQuery
    ) { }

    public function GET_Index(): ViewResult {
        return $this->view("error404"
            , [
                "user" => $this->signedInUserQuery->execute()
            ]
        );
    }
}
```

Listing 30. Home.php

```
<?php

namespace Presentation\Controllers;

use Application\Queries\SignedInUserQuery;
use Presentation\MVC\Controller;
use Presentation\MVC\ViewResult;

class Home extends Controller {

    public function __construct(
        private SignedInUserQuery $signedInUserQuery
    ) { }

    public function GET_Index(): ViewResult {
        return $this->view("home"
            , [
                "user" => $this->signedInUserQuery->execute()
            ]
        );
    }
}
```

Listing 31. Products.php

```
<?php

namespace Presentation\Controllers;

use Presentation\MVC\ActionResult;
use Presentation\MVC\Controller;
use Presentation\MVC\ViewResult;

class Products extends Controller {

    public function __construct(
        private \Application\Queries\ProductsQuery $productsQuery,
        private \Application\Queries\ProductQuery $productQuery,
        private \Application\Queries\ProductDetailQuery
            $productDetailQuery,
        private \Application\Commands\AddProductCommand
            $addProductCommand,
    ) { }
}
```

```
private \Application\Commands\EditProductCommand
$editProductCommand,
private \Application\Queries\SignedInUserQuery
$signedInUserQuery
) {
}

public function GET_Index(): ViewResult
{
    $filter = $this->tryGetParam('f', $filter) ? trim($filter) :
null;

    return $this->view("productList",
        [
            "user" => $this->signedInUserQuery->execute(),
            "products" => $this->productsQuery->execute($filter),
            "filter" => $filter,
        ]
    );
}

public function GET_Detail(): ActionResult
{
    $errors = [];
    $product = null;
    $idParam = "";
    if(!$this->tryGetParam("pid", $idParam)) {
        $errors[] = "Product does not exist.";
    } else {

        $id = intval($idParam);
        if(intval($idParam) != 0) {
            $product = $this->productDetailQuery->execute($id);
        }

        if($product === null) {
            $errors[] = "Product does not exist.";
        }
    }

    if(sizeof($errors) > 0) {
        return $this->view("productDetail", [
            "user" => $this->signedInUserQuery->execute(),
            "product" => null,
            "errors" => $errors
        ]
    );
}
```



```
    });
} else {
    return $this->view("productDetail",
        [
            "user" => $this->signInUserQuery->execute(),
            "product" => $product
        ]);
}
}

public function GET_Create(): ViewResult {
    return $this->view("newProduct", [
        "user" => $this->signInUserQuery->execute()
    ]);
}

public function Post_Create(): ActionResult {

    $name = $this->getParam("nm");
    $producer = $this->getParam("pd");

    $result = $this->addProductCommand->execute($producer, $name);

    if($result != 0) {
        $errors = [];
        if($result & \Application\Commands\AddProductCommand
::Error_NotAuthenticated) {
            $errors[] = "Product can only be added when user is
signed in.";
        }

        if($result & \Application\Commands\AddProductCommand
::Error_InvalidName) {
            $errors[] = "Product name is required.";
        }

        if($result & \Application\Commands\AddProductCommand
::Error_InvalidProducer) {
            $errors[] = "Brand name is required.";
        }

        if($result & \Application\Commands\AddProductCommand
::Error_CreateProductFailed) {
            $errors[] = "Creating of product failed.";
        }
    }
}
```

```
    }

    return $this->view(
        "newProduct", [
            "user" => $this->signedInUserQuery->execute(),
            "errors" => $errors
        ]);
}

return $this->redirect("Products", "Index");
}

public function GET_Edit(): ActionResult {

    // check for valid id

    $errors = [];
    $product = null;
    if(!$this->tryGetParam("pid", $idParam)) {
        $errors[] = "Product could not be found!";
    } else {

        $id = intval($idParam);
        if(intval($idParam) != 0) {
            $product = $this->productQuery->execute($id);
        }

        if($product === null) {
            $errors[] = "Product could not be found!";
        }
    }

    if(sizeof($errors) > 0) {
        return $this->view(
            "editProduct", [
                "user" => $this->signedInUserQuery->execute(),
                "product" => null,
                "errors" => $errors
            ]);
    } else {
        return $this->view("editProduct",
            [
                "user" => $this->signedInUserQuery->execute(),
                "product" => $product
            ]
        );
    }
}
```

```
        });
    }
}

public function Post_Edit(): ActionResult {

    $productId = $this->getParam("pid");
    $name = $this->getParam("nm");
    $producer = $this->getParam("pd");

    $result = $this->editProductCommand->execute($productId,
    $producer, $name);

    if($result != 0) {
        $errors = [];
        if($result & \Application\Commands\EditProductCommand
::Error_NotAuthenticated) {
            $errors[] = "Product can only be updated when user is
signed in.";
        }

        if($result & \Application\Commands\EditProductCommand
::Error_InvalidName) {
            $errors[] = "Product name is required.";
        }

        if($result & \Application\Commands\EditProductCommand
::Error_InvalidProducer) {
            $errors[] = "Brand name is required.";
        }

        return $this->view(
            "editProduct", [
                "user" => $this->signedInUserQuery->execute(),
                "product" => $this->productQuery->execute($productId),
                "errors" => $errors
            ]);
    }

    return $this->redirect("Products", "Index");
}
}
```

Listing 32. Ratings.php

```
<?php

namespace Presentation\Controllers;

use Presentation\MVC\ActionResult;
use Presentation\MVC\Controller;

class Ratings extends Controller {

    public function __construct(
        private \Application\Commands\AddRatingCommand
    $addRatingCommand,
        private \Application\Commands\EditRatingCommand
    $editRatingCommand,
        private \Application\Commands\RemoveRatingCommand
    $removeRatingCommand,
        private \Application\Queries\ProductDetailQuery
    $productDetailQuery,
        private \Application\Queries\SignedInUserQuery
    $signedInUserQuery,
    ) {
    }

    public function POST_Create(): ActionResult {
        $rating = $this->getParam("rt");
        $comment = $this->getParam("ct");
        $pid = $this->getParam("pid");

        $result = $this->addRatingCommand->execute($pid, $rating,
    $comment);

        if($result != 0) {
            $errors = [];
            if($result & \Application\Commands\AddRatingCommand
::Error_NotAuthenticated) {
                $errors[] = "Rating can only be added when user is
signed in.";
            }

            if($result & \Application\Commands\AddRatingCommand
::Error_CreateRatingFailed) {
                $errors[] = "Creating of rating failed.";
            }
        }
    }
}
```

```
        return $this->view(
            "productDetail", [
                "user" => $this->signedInUserQuery->execute(),
                "product" => $this->productDetailQuery->execute($pid),
                "errors" => $errors
            ]);
    }

    return $this->redirect("Products", "Detail", ["pid" => $pid]);
}

public function POST_Edit(): ActionResult {
    $rating = $this->getParam("rt");
    $comment = $this->getParam("ct");
    $rid = $this->getParam("rid");
    $pid = $this->getParam("pid");

    $result = $this->editRatingCommand->execute($rid, $pid,
    $rating, $comment);
    if($result != 0) {
        $errors = [];
        if($result & \Application\Commands\EditRatingCommand
::Error_NotAuthenticated) {
            $errors[] = "Rating can only be update when user is
signed in.";
        }

        return $this->view(
            "productDetail", [
                "user" => $this->signedInUserQuery->execute(),
                "product" => $this->productDetailQuery->execute
($pid),
                "errors" => $errors
            ]);
    }

    return $this->redirect("Products", "Detail", ["pid" => $pid]);
}

public function POST_Remove(): ActionResult {
    $rid = $this->getParam("rid");
    $pid = $this->getParam("pid");
```

```
$result = $this->removeRatingCommand->execute($rid);
if($result != 0) {
    $errors = [];
    if($result & \Application\Commands\EditRatingCommand
::Error_NotAuthenticated) {
        $errors[] = "Rating can only be removed when user is
signed in.";
    }

    return $this->view(
        "productDetail", [
            "user" => $this->signedInUserQuery->execute(),
            "product" => $this->productDetailQuery->execute($pid),
            "errors" => $errors
        ]);
}

return $this->redirect("Products", "Detail", ["pid" => $pid]);
}
```

Listing 33. User.php

```
<?php

namespace Presentation\Controllers;

use Presentation\MVC\ViewResult;
use Presentation\MVC\ActionResult;
use Presentation\MVC\Controller;

class User extends Controller {
    public function __construct(
        private \Application\Commands\SignInCommand $signInCommand,
        private \Application\Commands\SignOutCommand $signOutCommand,
        private \Application\Queries\SignedInUserQuery
$signedInUserQuery,
        private \Application\Commands\RegisterCommand $registerCommand
    ) {

    }

    public function GET_LogIn() : ActionResult {
        // only show login view when there is no authenticated user
    }
}
```

```
$user = $this->signedInUserQuery->execute();
if($user != null) {
    return $this->redirect("Home", "Index");
}
return $this->view("login", [
    "userName" => "",
    "user" => $user
]);
}

public function POST_LogIn(): ActionResult {
    $ok = $this->signInCommand->execute(
        $this->getParam("un"),
        $this->getParam("pwd"));

    if(!$ok) {
        return $this->view("login", [
            "user" => $this->signedInUserQuery->execute(),
            "userName" => $this->getParam("un"),
            "errors" => ["Invalid user name or password."]
        ]);
    }

    return $this->redirect("Home", "Index");
}

public function POST_LogOut(): ActionResult {
    $this->signOutCommand->execute();
    return $this->redirect("Home", "Index");
}

public function GET_Register() : ActionResult {
    // only show register view when there is no authenticated user
    $user = $this->signedInUserQuery->execute();
    if($user != null) {
        return $this->redirect("Home", "Index");
    }
    return $this->view("register", [
        "userName" => "",
        "password" => "",
        "user" => null
    ]);
}
```

```
public function POST_Register(): ActionResult {
    $userName = $this->getParam("un");
    $password = $this->getParam("pwd");
    $result = $this->registerCommand->execute(
        $userName,
        $password
    );

    // Check for errors
    if($result != 0) {
        $errors = [];
        if($result & \Application\Commands\RegisterCommand
::Error_UsernameAlreadyExists) {
            $errors[] = "User with username already exists.";
        }
        if($result & \Application\Commands\RegisterCommand
::Error_CreateUserFailed) {
            $errors[] = "User creation failed.";
        }
        if($result & \Application\Commands\RegisterCommand
::Error_InvalidUsername) {
            $errors[] = "Username is required.";
        }
        if($result & \Application\Commands\RegisterCommand
::Error_InvalidPassword) {
            $errors[] = "Password is required and needs a minimum
length of 4.";
        }

        if(sizeof($errors) == 0) {
            $errors[] = "Something went wrong.";
        }

        return $this->view("register", [
            "userName" => $userName,
            "password" => $password,
            "user" => null,
            "errors" => $errors
        ]);
    }

    //sign in if successful
    $ok = $this->signInCommand->execute($userName, $password);
}
```



```
if(!$ok) {  
    return $this->view("register", [  
        "userName" => $userName,  
        "password" => $password,  
        "user" => null,  
        "errors" => ["Sign in after registration was  
unsuccessful!"]  
    ]);  
}  
  
//    return $this->view("register");  
return $this->redirect("Home", "Index");  
}  
}
```

3.4. Views

3.4.1. Pages

Listing 34. error404.inc

```
<?php $render("partial/header", $data); ?>
<div class="center">
    <h1 class="text-center">404<br/>
        <small>Page could not be found!</small>
    </h1>
</div>
<?php $render("partial/footer", $data); ?>
```

Listing 35. editProduct.inc

```
<?php $render('partial/header', $data); ?>

<?php $product = $data['product'] ?>

<?php if ($product !== null) {?>
    <h1 class="mb-3">Edit product</h1>
    <?php $beginForm('Products', 'Edit', ["pid" => $product-
>getId()], method: 'post'); ?>
    <div class="mb-3">
        <label for="name" class="form-label">Name</label>
        <input class="form-control" id="name" name="nm"
value="<?php $htmlOut($product->getName()) ?>" autocomplete="off">
    </div>
    <div class="mb-3">
        <label for="producer" class="form-label">Brand</label>
        <input class="form-control" id="producer" name="pd"
value="<?php $htmlOut($product->getProducer()) ?>" autocomplete="off">
    </div>
    <button class="btn btn-outline-secondary">Update</button>
    <?php $endForm(); ?>
<?php } ?>

<?php $render('partial/footer', $data); ?>
```

Listing 36. *home.inc*

```
<?php $render("partial/header", $data); ?>
    <h1 class="mb-3">Welcome</h1>
    <p>Welcome to the product rating app!</p>
<?php $render("partial/footer", $data); ?>
```

Listing 37. *login.inc*

```
<?php $render('partial/header', $data); ?>

    <h1 class="mb-3">Login</h1>

    <?php $beginForm('User', 'LogIn', method: 'post'); ?>
        <div class="mb-3">
            <label for="userName" class="form-label">User name</label>
            <input class="form-control" id="userName" name="un"
value="<?php $htmlOut($data['userName']); ?>" autocomplete="off">
        </div>
        <div class="mb-3">
            <label for="password" class="form-label">Password</label>
            <input type="password" class="form-control" id="password"
name="pwd" autocomplete="off">
        </div>
        <button class="btn btn-outline-primary">Log in</button>
    <?php $endForm(); ?>

<?php $render('partial/footer', $data); ?>
```

Listing 38. *newProduct.inc*

```
<?php $render('partial/header', $data); ?>

<h1 class="mb-3">New product</h1>

<?php $beginForm('Products', 'Create', method: 'post'); ?>
    <div class="mb-3">
        <label for="name" class="form-label">Name</label>
        <input class="form-control" id="name" name="nm"
autocomplete="off">
    </div>
    <div class="mb-3">
        <label for="producer" class="form-label">Brand</label>
        <input class="form-control" id="producer" name="pd"
autocomplete="off">
    </div>
    <button class="btn btn-outline-secondary">Create</button>
<?php $endForm(); ?>

<?php $render('partial/footer', $data); ?>
```

Listing 39. *productDetail.inc*

```
<?php $render("partial/header", $data); ?>

<?php if($data['product'] !== null) { ?>
    <h1>Product</h1>

    <?php $render("partial/productInfo", $data); ?>
    <?php $render("partial/productRatings", $data); ?>

<?php } ?>

<?php $render("partial/footer", $data); ?>
```

Listing 40. *productList.inc*

```
<?php $render("partial/header", $data); ?>

<h1 class="mb-4">Products</h1>

<?php $beginForm("Products", "Index"); ?>
<div class="row justify-content-between">
    <div class="row col-auto mb-3">
        <div class="col-auto">
            <input autocomplete="off" class="form-control" name="f"
value="<?php $htmlOut($data["filter"]); ?>">
        </div>
        <div class="col-auto">
            <button class="btn btn-outline-success">Search</button>
        </div>
    </div>
    <?php if($data['user'] !== null) { ?>
        <div class="col-auto mb-3">
            <?php $link("Create new product", 'Products', 'Create',
cssClass: 'btn btn-outline-secondary'); ?>
        </div>
        <?php } ?>
    </div>
<?php $endForm(); ?>

<?php $render("partial/productTable", $data); ?>

<?php $render("partial/footer", $data); ?>
```

Listing 41. register.inc

```
<?php $render('partial/header', $data); ?>

<h1 class="mb-3">Register</h1>

<?php $beginForm('User', 'Register', method: 'post'); ?>
    <div class="mb-3">
        <label for="userName" class="form-label">Username</label>
        <input class="form-control" id="userName" name="un"
value="<?php $htmlOut($data['userName']); ?>" autocomplete="off">
    </div>
    <div class="mb-3">
        <label for="password" class="form-label">Password</label>
        <input class="form-control" id="password" name="pwd"
type="password" value="<?php $htmlOut($data['password']); ?>"
autocomplete="off">
        <div class="form-text">A password with a minimum length of
4 characters is required.</div>
    </div>
    <button class="btn btn-outline-primary">Register</button>
<?php $endForm(); ?>

<?php $render('partial/footer', $data); ?>
```

3.4.2. Partial views

Listing 42. errors.inc

```
<div class="alert alert-danger">
  <p>
    <strong>Please correct the following and try again:</strong>
  </p>
  <ul>
    <?php foreach ($data as $errMsg): ?>
      <li><?php $htmlOut($errMsg); ?></li>
    <?php endforeach; ?>
  </ul>
</div>
```

Listing 43. footer.inc

```
</div>
<footer class="bg-light fixed-bottom mt-5">
  <div class="container">
    <div class="text-muted py-2 d-flex justify-content-between">
      <span>
        Author:
        <a href="https://github.com/awenzelhuemer" class="link-
secondary">Andreas Wenzelhuemer</a></span>
        <?php $htmlOut(strftime('%c')); ?>
      </div>
    </div>
  </footer>
  <script src="js/bootstrap.bundle.min.js"></script>
</body>
</html>
```

Listing 44. header.inc

```
<!doctype html>
<html lang="en">
<head>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-
scale=1">
  <link rel="stylesheet"
href="https://cdn.jsdelivr.net/npm/bootstrap-
icons@1.5.0/font/bootstrap-icons.css">
  <link href="css/bootstrap.min.css" rel="stylesheet">
  <link href="css/styles.css" rel="stylesheet">
  <title>Product Rating App</title>
</head>
<body>
  <nav class="navbar navbar-expand-lg navbar-dark bg-dark sticky-
top">
    <div class="container">
      <?php $link("Product Rating App", "Home", "Index",
cssClass: "navbar-brand"); ?>
      <button class="navbar-toggler" type="button" data-bs-
toggle="collapse" data-bs-target="#navbar">
        <span class="navbar-toggler-icon"></span>
      </button>
      <div class="collapse navbar-collapse" id="navbar">
        <nav class="navbar-nav me-auto">
          <?php $link("Home", "Home", "Index", cssClass:
"nav-link"); ?>
          <?php $link("Products", "Products", "Index",
cssClass: "nav-link"); ?>
        </nav>
        <?php $render("partial/user", $data["user"]) ?>
      </div>
    </div>
  </nav>
  <div class="container my-5">
    <?php if(isset($data["errors"])) {
      $render("partial/errors", $data["errors"]);
    } ?>
```


Listing 45. *productInfo.inc*

```

<ul class="list-group">
  <?php $product = $data['product'] ?>
  <li class="list-group-item"><strong>Product name:</strong> <?php
$htmlOut($product->getName()) ?></li>
  <li class="list-group-item"><strong>Created from:</strong> <?php
$htmlOut($product->getUsername()) ?></li>
  <li class="list-group-item"><strong>Brand:</strong> <?php
$htmlOut($product->getProducer()) ?></li>
  <li class="list-group-item"
    data-bs-placement="top" title="<?php $htmlOut($product-
>getRating())?> out of 5">
    <strong>Average Rating:</strong>
    <?php for ($i = 0; $i < 5; $i++) {
      if($i < $product->getRating()) {?>
        <i class="bi bi-star-fill text-warning"></i>
      <?php } else {?>
        <i class="bi-star"></i>
      <?php } ?>
    <?php }?>
    / <small class="text-secondary"><?php $htmlOut($product-
>getRatingCount())?> ratings</small>
  </li>
</ul>

```

Listing 46. *productRatings.inc*

```

<h2 class="mt-4 mb-3">Ratings</h2>
<?php $product = $data['product'] ?>
<div class="accordion" id="accordionExample">
  <?php if($data["user"] === null && sizeof($product-
>getRatings()) == 0) { ?>
    <div class="alert alert-info" role="alert">
      No ratings.
    </div>
  <?php } else if($data["user"] !== null) { ?>
    <div class="accordion-item">
      <h2 class="accordion-header">
        <button class="accordion-button" type="button" data-bs-
toggle="collapse" data-bs-target="#newRating" aria-expanded="true">
          New rating
        </button>
      </h2>

```

```

<div id="newRating" class="accordion-collapse collapse
show" data-bs-parent="#newRating">
  <div class="accordion-body">
    <?php $beginForm('Ratings', 'Create', ["pid" =>
$product->getId()], method: 'post'); ?>
    <span class="me-4">Rating</span>
    <div class="form-check form-check-inline">
      <input class="form-check-input" type="radio"
name="rt" id="rating1" value="1">
      <label class="form-check-label" for="rating1">
        <i class="bi bi-star"></i>
      </label>
    </div>
    <div class="form-check form-check-inline">
      <input class="form-check-input" type="radio"
name="rt" id="rating2" value="2">
      <label class="form-check-label" for="rating2">
        <i class="bi bi-star"></i>
        <i class="bi bi-star"></i>
      </label>
    </div>
    <div class="form-check form-check-inline">
      <input class="form-check-input" type="radio"
name="rt" id="rating3" value="3">
      <label class="form-check-label" for="rating3">
        <i class="bi bi-star"></i>
        <i class="bi bi-star"></i>
        <i class="bi bi-star"></i>
      </label>
    </div>
    <div class="form-check form-check-inline">
      <input class="form-check-input" type="radio"
name="rt" id="rating4" value="4">
      <label class="form-check-label" for="rating4">
        <i class="bi bi-star"></i>
        <i class="bi bi-star"></i>
        <i class="bi bi-star"></i>
        <i class="bi bi-star"></i>
      </label>
    </div>
    <div class="form-check form-check-inline">
      <input class="form-check-input" type="radio"
name="rt" id="rating5" value="5" checked>
      <label class="form-check-label" for="rating5">

```

```

        <i class="bi bi-star"></i>
        <i class="bi bi-star"></i>
        <i class="bi bi-star"></i>
        <i class="bi bi-star"></i>
        <i class="bi bi-star"></i>
    </label>
</div>
<div class="my-3">
    <label for="ct" class="form-label">
Comment</label>
        <textarea class="form-control" id="ct"
name="ct" rows="3"></textarea>
    </div>
    <button class="btn btn-outline-primary">Add new
rating</button>

    <?php $sendForm(); ?>
</div>
</div>
<?php } ?>
<?php foreach($product->getRatings() as $rating) { ?>
<div class="accordion-item">
    <h2 class="accordion-header">
        <button class="accordion-button" type="button" data-bs-
toggle="collapse" data-bs-target="#rating<?php $htmlOut($rating-
>getId()) ?>" >

        <div class="d-flex justify-content-between w-100">
            <span>
                <?php for ($i = 0; $i < 5; $i++) {
                    if($i < $rating->getRating()) {?>
                        <i class="bi bi-star-fill text-
warning"></i>

                        <?php } else {?>
                            <i class="bi-star"></i>
                        <?php } ?>
                    <?php }?>
                        <span class="ms-2">by <?php
$htmlOut($rating->getUser()->getUserName()) ?></span>
                    </span>
                        <span class="me-2">from <?php $htmlOut($rating-
>getCreatedDate()) ?></span>
                    </div>
                </button>
            </h2>

```

```

        <div id="rating<?php $htmlOut($rating->getId()) ?>"
class="accordion-collapse collapse <?php ($rating->getComment() !==
null) ? $htmlOut('show') : $htmlOut('')?>">
        <div class="accordion-body">
            <?php if($data["user"] !== null && $data["user"]-
>getId() === $rating->getUser()->getId()) {?>
                <?php $beginForm('Ratings', 'Remove', ["pid" =>
$product->getId(), "rid" => $rating->getId()], method: 'post'); ?>
                <button class="btn btn-sm btn-outline-danger
float-end bi bi-trash-fill"
                    data-bs-toggle="tooltip" data-bs-
placement="top" title="Remove rating" ></button>
                <?php $endForm(); ?>
                <?php $beginForm('Ratings', 'Edit', ["pid" =>
$product->getId(), "rid" => $rating->getId()], method: 'post'); ?>
                <span class="me-4">Rating</span>
                <div class="form-check form-check-inline">
                    <input class="form-check-input"
type="radio" name="rt" id="rating1Update" value="1" <?php ($rating-
>getRating()) === 1 ? $htmlOut('checked') : $htmlOut('') ?>>
                    <label class="form-check-label"
for="rating1Update">
                        <i class="bi bi-star"></i>
                    </label>
                </div>
                <div class="form-check form-check-inline">
                    <input class="form-check-input"
type="radio" name="rt" id="rating2Update" value="2" <?php ($rating-
>getRating()) === 2 ? $htmlOut('checked') : $htmlOut('') ?>>
                    <label class="form-check-label"
for="rating2Update">
                        <i class="bi bi-star"></i>
                        <i class="bi bi-star"></i>
                    </label>
                </div>
                <div class="form-check form-check-inline">
                    <input class="form-check-input"
type="radio" name="rt" id="rating3Update" value="3" <?php ($rating-
>getRating()) === 3 ? $htmlOut('checked') : $htmlOut('') ?>>
                    <label class="form-check-label"
for="rating3Update">
                        <i class="bi bi-star"></i>
                        <i class="bi bi-star"></i>
                        <i class="bi bi-star"></i>

```

```

        </label>
    </div>
    <div class="form-check form-check-inline">
        <input class="form-check-input"
type="radio" name="rt" id="rating4Update" value="4" <?php ($rating-
>getRating()) === 4 ? $htmlOut('checked') : $htmlOut('') ?>>
        <label class="form-check-label"
for="rating4Update">

            <i class="bi bi-star"></i>
            <i class="bi bi-star"></i>
            <i class="bi bi-star"></i>
            <i class="bi bi-star"></i>
        </label>
    </div>
    <div class="form-check form-check-inline">
        <input class="form-check-input"
type="radio" name="rt" id="rating5Update" value="5" <?php ($rating-
>getRating()) === 5 ? $htmlOut('checked') : $htmlOut('') ?>>
        <label class="form-check-label"
for="rating5Update">

            <i class="bi bi-star text-
secondary"></i>
            <i class="bi bi-star text-
secondary"></i>
            <i class="bi bi-star text-
secondary"></i>
            <i class="bi bi-star text-
secondary"></i>
            <i class="bi bi-star text-
secondary"></i>
        </label>
    </div>
    <div class="my-3">
        <label for="ct" class="form-label"
>Comment</label>
        <textarea class="form-control" id="ct"
name="ct" rows="3"><?php $htmlOut($rating->getComment()) ?></textarea>
    </div>
    <button class="btn btn-outline-secondary"
>Update existing rating</button>
    <?php $endForm(); ?>
    <?php } else { ?>

    <?php if($rating->getComment() !== null) {

```

```

        $htmlOut($rating->getComment());
    } else { ?>
        <div class="alert alert-secondary" role=
"alert">

            This rating includes no comment!

        </div>
    <?php } ?>
    <?php } ?>
</div>
</div>
<?php } ?>
</div>

```

Listing 47. productTable.inc

```

<?php if($data['products'] !== null) { ?>
    <?php if(sizeof($data['products']) > 0) { ?>
        <div class="table-responsive">
            <table class="table table-sm table-striped table-hover">
                <thead>
                    <tr>
                        <th>Name</th>
                        <th>Brand</th>
                        <th>Rating</th>
                        <th>Created user</th>
                        <th></th>
                    </tr>
                </thead>
                <tbody>
                    <?php foreach($data['products'] as $product) { ?>
                        <tr>
                            <td>
                                <?php $link($product->getName(),
'Products', 'Detail', ['pid' => $product->getId()], cssClass: 'link-
primary'); ?>
                            </td>
                            <td><?php $htmlOut($product->getProducer());
?></td>
                            <td data-bs-placement="top" title="<?php
$htmlOut($product->getRating())?> out of 5">
                                <?php for ($i = 0; $i < 5; $i++) {
                                    if($i < $product->getRating()) {?>
                                        <i class="bi bi-star-fill text-

```

```

warning"></i>

        <?php } else {?>
            <i class="bi-star"></i>
        <?php }?>

        <?php }?>/
        <small class="text-secondary"><?php
$htmlOut($product->getRatingCount())?> ratings</small></td>
        <td><?php $htmlOut($product->getUserName());
?></td>

        <td>
            <?php if($data['user'] !== null &&
$product->getUserId() === $data['user']->getId()) {?>
                <?php $link("", 'Products', 'Edit',
['pid' => $product->getId()], cssClass: 'btn btn-sm btn-outline-
secondary bi bi-pencil-fill'); ?>
            <?php } ?>
        </td>
    </tr>
</tbody>
</table>
</div>
<?php } else { ?>
    <div class="alert alert-info" role="alert">
        No products founds.
    </div>
    <?php } ?>
<?php } ?>

```

3.5. Styles

Listing 48. styles.css

```
.center {  
    margin: 0;  
    position: absolute;  
    top: 50%;  
    left: 50%;  
    -ms-transform: translate(-50%, -50%);  
    transform: translate(-50%, -50%);  
}
```


4. Datenbank

4.1. Datenbankmodell

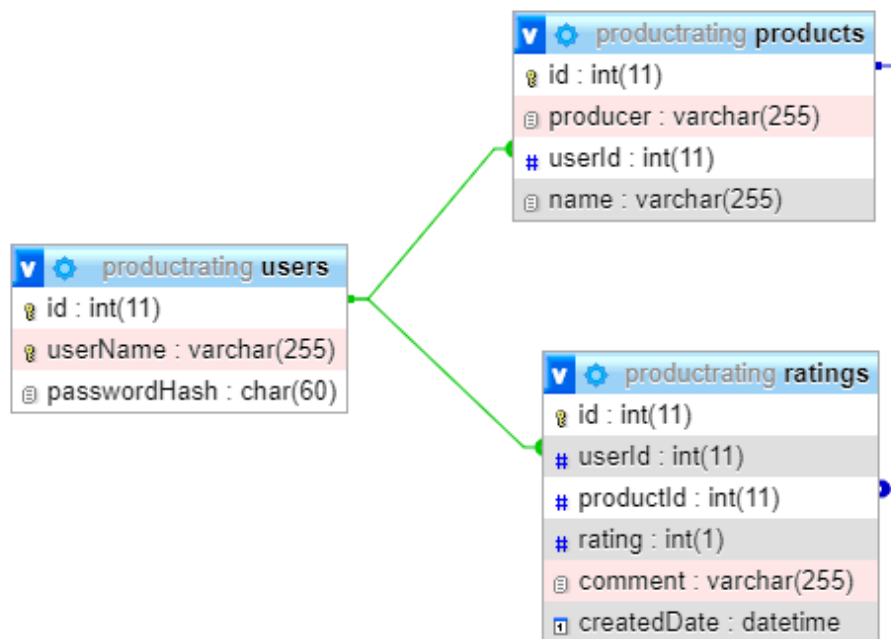


Figure 1. Modell

4.2. Scripts

Listing 49. CREATE_DB.sql

```
SET SQL_MODE = "NO_AUTO_VALUE_ON_ZERO";
SET AUTOCOMMIT = 0;
START TRANSACTION;
SET time_zone = "+00:00";

DROP DATABASE IF EXISTS productRating;

CREATE DATABASE IF NOT EXISTS `productRating` DEFAULT CHARACTER SET
latin1 COLLATE latin1_general_ci;
USE `productRating`;

-- table creation
CREATE TABLE `users` (
    `id` int(11) NOT NULL,
    `userName` varchar(255) NOT NULL,
    `passwordHash` char(60) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

CREATE TABLE `products` (
    `id` int(11) NOT NULL,
    `producer` varchar(255) NOT NULL,
    `userId` int(11) NOT NULL,
    `name` varchar(255) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

CREATE TABLE `ratings` (
    `id` int(11) NOT NULL,
    `userId` int(11) NOT NULL,
    `productId` int(11) NOT NULL,
    `rating` int(1) NOT NULL,
    `comment` varchar(255) NULL,
    `createdDate` datetime NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

-- primary keys
ALTER TABLE `users`
    ADD PRIMARY KEY (`id`),
    ADD UNIQUE KEY `userName` (`userName`);

ALTER TABLE `products`
```

```
    ADD PRIMARY KEY (`id`),
    ADD KEY `userId` (`userId`);

ALTER TABLE `ratings`
    ADD PRIMARY KEY (`id`),
    ADD KEY `userId` (`userId`),
    ADD KEY `productId` (`productId`);

-- auto incrementing ids
ALTER TABLE `users`
    MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=2;
ALTER TABLE `products`
    MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=11;
ALTER TABLE `ratings`
    MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=11;

ALTER TABLE `products`
    ADD CONSTRAINT `products_ibfk_1` FOREIGN KEY (`userId`) REFERENCES
`users` (`id`) ON DELETE CASCADE ON UPDATE CASCADE;

ALTER TABLE `ratings`
    ADD CONSTRAINT `ratings_ibfk_1` FOREIGN KEY (`userId`) REFERENCES
`users` (`id`) ON DELETE CASCADE ON UPDATE CASCADE,
    ADD CONSTRAINT `ratings_ibfk_2` FOREIGN KEY (`productId`)
REFERENCES `products` (`id`) ON DELETE CASCADE ON UPDATE CASCADE;
COMMIT;
```

<< .DB_SEEDING.sql

```
SET SQL_MODE = "NO_AUTO_VALUE_ON_ZERO";
SET AUTOCOMMIT = 0;
START TRANSACTION;
SET time_zone = "+00:00";

-- seeding
INSERT INTO `users` (`id`, `userName`, `passwordHash`) VALUES
(1, 'scr4',
'$2y$10$dhe3ngxlmzgZrX6MpSHkeoDQ.d0aceVTomUq/nQXV0vSkFojq.VG');

INSERT INTO `products` (`id`, `producer`, `userId`, `name`) VALUES
(1, 'Bosch', 1, 'Schlagbohrmaschine GSB 13 RE');
INSERT INTO `products` (`id`, `producer`, `userId`, `name`) VALUES
(2, 'Bosch', 1, 'Schlagbohrmaschine EasyImpact 550');
```

```
INSERT INTO `products` (`id`, `producer`, `userId`, `name`) VALUES
(3, 'Tilswall', 1, 'Schlagbohrmaschine 3000');
INSERT INTO `products` (`id`, `producer`, `userId`, `name`) VALUES
(4, 'Bosch', 1, 'Bosch Schlagbohrmaschine UniversalImpact');
INSERT INTO `products` (`id`, `producer`, `userId`, `name`) VALUES
(5, 'Einhell', 1, 'Schlagbohrmaschine TC-ID 650E');
INSERT INTO `products` (`id`, `producer`, `userId`, `name`) VALUES
(6, 'Makita', 1, 'Schlagbohrmaschine HP1631');
INSERT INTO `products` (`id`, `producer`, `userId`, `name`) VALUES
(7, 'Makita', 1, 'Kombihammer SDS-Plus');
INSERT INTO `products` (`id`, `producer`, `userId`, `name`) VALUES
(8, 'Metabo', 1, 'Schlagbohrmaschine SBEV 1000-2');
INSERT INTO `products` (`id`, `producer`, `userId`, `name`) VALUES
(9, 'Hi-Spec', 1, 'Akkubohrmaschinenset');
INSERT INTO `products` (`id`, `producer`, `userId`, `name`) VALUES
(10, 'Bosch', 1, 'Schlagbohrmaschine GSP 19-2 RE');

INSERT INTO `ratings` (`id`, `userId`, `productId`, `rating`,
`comment`, `createdAt`) VALUES
(1, 1, 1, 5, 'Works perfectly!', NOW());
INSERT INTO `ratings` (`id`, `userId`, `productId`, `rating`,
`comment`, `createdAt`) VALUES
(2, 1, 2, 4, 'Works good!', NOW());
INSERT INTO `ratings` (`id`, `userId`, `productId`, `rating`,
`comment`, `createdAt`) VALUES
(3, 1, 3, 3, 'Works perfectly, some parts are missing!', NOW());
INSERT INTO `ratings` (`id`, `userId`, `productId`, `rating`,
`comment`, `createdAt`) VALUES
(4, 1, 4, 4, 'Works fine!', NOW());
INSERT INTO `ratings` (`id`, `userId`, `productId`, `rating`,
`comment`, `createdAt`) VALUES
(5, 1, 5, 5, 'Works perfectly!', NOW());
INSERT INTO `ratings` (`id`, `userId`, `productId`, `rating`,
`comment`, `createdAt`) VALUES
(6, 1, 6, 5, 'Works perfectly!', NOW());
INSERT INTO `ratings` (`id`, `userId`, `productId`, `rating`,
`comment`, `createdAt`) VALUES
(7, 1, 7, 2, 'Not working!', NOW());
INSERT INTO `ratings` (`id`, `userId`, `productId`, `rating`,
`comment`, `createdAt`) VALUES
(8, 1, 7, 2, 'Not good at all!', NOW());
INSERT INTO `ratings` (`id`, `userId`, `productId`, `rating`,
`comment`, `createdAt`) VALUES
(9, 1, 7, 1, NULL, NOW());
```

```
INSERT INTO `ratings` (`id`, `userId`, `productId`, `rating`,  
`comment`, `createdDate`) VALUES  
(10, 1, 8, 1, 'Total crap!', NOW());  
COMMIT;
```