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MVC USING SCALA PLAY

Assignment 2 - Software Architectures

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General remarks

1.1 Notes on the assignment

None of the assignments for the Software Architectures course were submitted in the first examination period due to personal reasons. Because of this, all of the code written for this assignment is written specifically for the second examination period. All code was written by using the course material and the online Akka Play documentation¹. The solution of exercise 7 was used as a starter template for this project. A previous MEAN stack school project of mine based on Bootstrap, CarMeets (Bontinck, 2019), was used as concept and styling (HTML + CSS) inspiration for this project.

1.2 Important files

All code written is available on the GitHub repository for this assignment (Bontinck, 2021). Rights to this private GitHub repository can be granted upon request. A copy of this GitHub repository is accompanied by this report. An overview of important files is given below:

- `README.md`
 - General information of the GitHub repository as well as some technical details about the used environment and how to run the project. The general flow of the application for the end-user is also demonstrated with some screenshots. The pre-loaded account information is also supplied here.
- `assignment.pdf`, `Lennert-Bontinck-SA2.pdf` and `report/`
 - The assignment PDF, this report and the source files of the report. A VUB themed L^AT_EX template by De Smet (2020) was used to create this report.
- `code/Lennert-Bontinck-SA2/`
 - The folder containing the code of the assignment solution.
 - Instructions on how to run the code are available in the `README.md` file.

¹<https://www.playframework.com/documentation/2.8.x/Home>

Project defence

In what follows a high-level discussion is held on the created code. Multiple figures and screenshots were made to illustrate the different parts of the project. Some of these figures are provided in the extra figures list at the end of this report. For more technical details the reader is invited to read the documentation and comments in the code. The `README.md` file contains a screenshot and discussion of every important part for the end-user.

2.1 Ideology of CarLovers

CarLovers is a social media platform where registered users can share automobile-related pictures with all other users or a select group of users. Other users can interact with the shared post by liking and/or commenting on it. The ideology and styling (HTML + CSS) of this application are inspired by and sometimes taken from the earlier discussed CarMeets application (Bontinck, 2019) where users can share and plan car meetings.

2.2 Protecting pages from unwanted users

As with any project, security is an important aspect. With web-based applications, the most challenging part is often limiting what request which users can and can't execute. The general strategy of handling page requests is shown in figure 2.1. Due to the use of an MVC pattern, requests sent by the user are processed by a controller. With Akka Play the controller provides `Actions` of a certain type to process these requests. The custom made classes `AuthenticatedUserAction` and `AuthenticatedUserActionWithMessageRequest` are responsible for blocking any request that doesn't have a cookie containing a username. Such actions can thus be used to limit requests to signed-in users, as is done for most of the pages. The denial page that is shown by these `Actions` upon a blocked request is the login required page shown in figure 2.2. Sometimes a request is only allowed for a specific user, to process this, the code provided inside the Action should handle the blocking on a per Action basis.

From this login required page, it becomes apparent the user can indeed register an account and log in to his/her account. Since no database had to be used, the users, and all other objects, are just stored in memory and plain text. It is noted that this approach may not be used in the real world since such data must be hashed and stored according to various regulations. Simply having a username cookie is also a very weak account validation mechanism. The login and register forms are made with Akka Play's form methods and provide various types of validation and error handling. Figure 2.3 shows the login and register page with some of those validation and error handling features present. Once the user is logged in, a different menu is shown where the user can log out, add a post or view his/her profile.

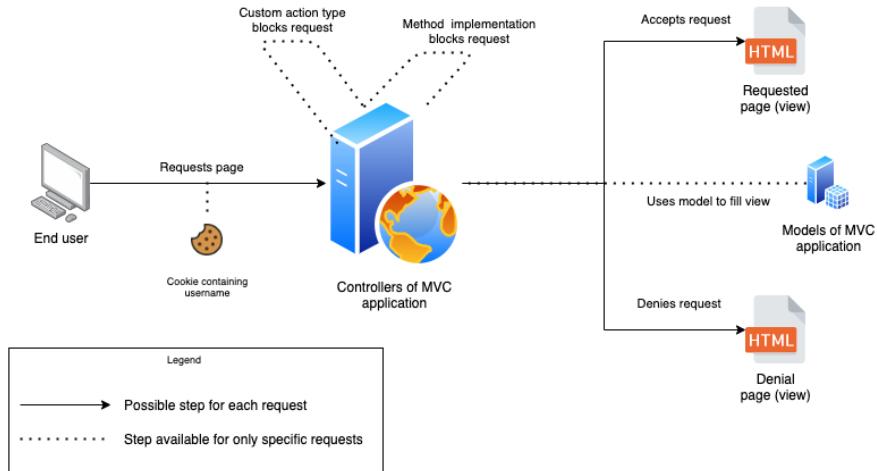


Figure 2.1: Simplified representation of page request procedure.

2.3 Post overview, single post and profile pages

The main pages of the project revolve around viewing posts from users. Since many of these pages share the same components, these shared components are made available as sub-views. An obvious such sub-view is `main`, which provides the header and navigation bar as well as the footer. As discussed, a different navigation bar (menu), is shown for logged in users. Less obvious sub-views include the like button (`postLikeButtonAndCount.scala`), a *post card* which shows a singular post for an overview page (`postListItem.scala`), comments (`commentListItem.scala`) and more. This reuse of sub-views is very visible with the overview and the profile page shown in figure 2.4. The same sub-view for showing a *post card* can be used but the view is just supplied with a different list of `PostWithInfo` objects, e.g. from a specific user or ordered differently. Such a `PostWithInfo` object contains a `Post` and `Visibility` object as well as a list of `Likes` and `Comments`. The MVC pattern is present: after a user request, the controller sets up the model so that the view can display information to the end-user. The controller is thus responsible for reasoning about which `PostWithInfo` objects should be visible to the user, based on the information from the `Visibility` object. Figure 2.7 shows that the homepage for two users can be different based on the `Visibility` information.

Figure 2.4a shows that a user can like a post from the overview page and sees at most three comments per post on the overview page. If the post in question is placed by the logged-in user, the delete and edit buttons are also present. The user is forwarded to the single page of a post when clicking read more, the image, or the like button. As shown in figure 2.5, all comments can be read on this single post page and a comment can be placed by the user.

2.4 Managing and visibility of posts

The last important part of the puzzle for this project is managing posts. Compared to previous forms where Akka Play neatly created instances of objects upon form bind, uploading a file and working with lists provides some manual work. Luckily the Akka Play documentation pointed in the right direction¹. The add post form is shown in figure 2.6a and a correct `PostWithInfo` object is made in two different parts. Firstly the standard form approach is used to create a `Post` object and validate the description field by using hidden fields in a pre-filled form for the system-generated values. For the image and visibility settings, the form body is manually checked for correctness and error messages are shown manually through view settings. The code in the `PostController` is well documented and explains this procedure in greater detail.

After submitting the form successfully, the user is forwarded to the just created post. The edit visibility page is shown in figure 2.6b and demonstrates that also this form is pre-filled with the settings chosen on post creation. Deleting the post simply takes the user to his profile page after a successful deletion with a flash message notifying him of the successful deletion.

2.5 Other caveats

This assignment has proven to be rather lengthy and explaining each portion in great detail is simply not possible in a document that is already over the page limit. The `README` file provides screenshots for each important step and discusses briefly what is important in each step. As always, the code is very well documented and the reader is invited to take a look at specific methods to have a better understanding of how certain parts of the code work.

¹<https://www.playframework.com/documentation/2.8.x/ScalaFileUpload>

Extra figures

To make the report more readable some figures are not provided directly in the text. These figures are provided here.

Login required page

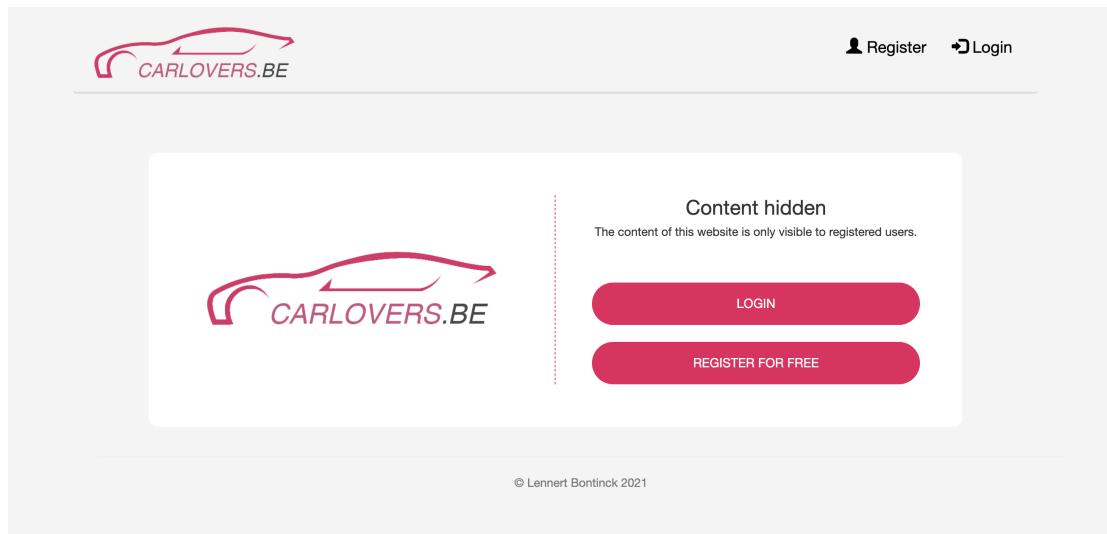
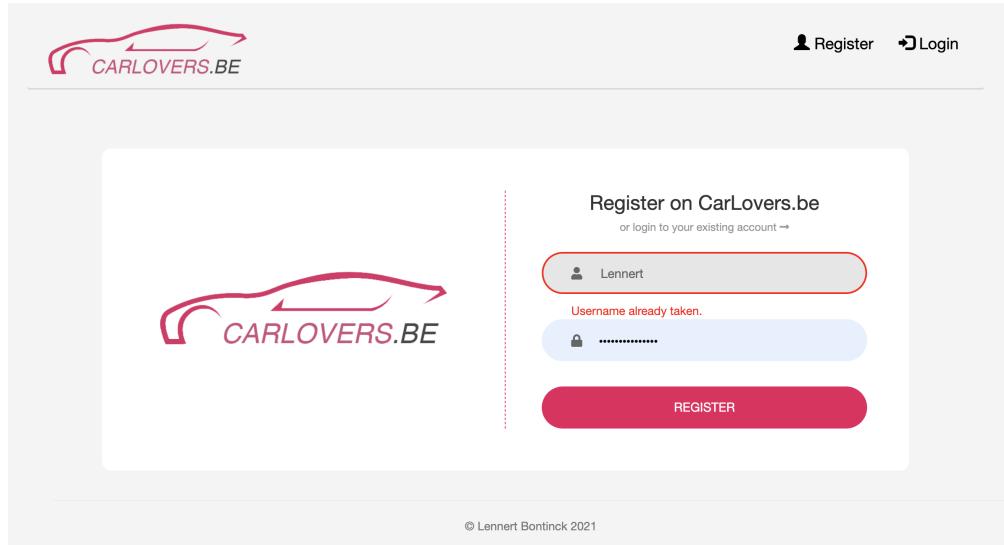
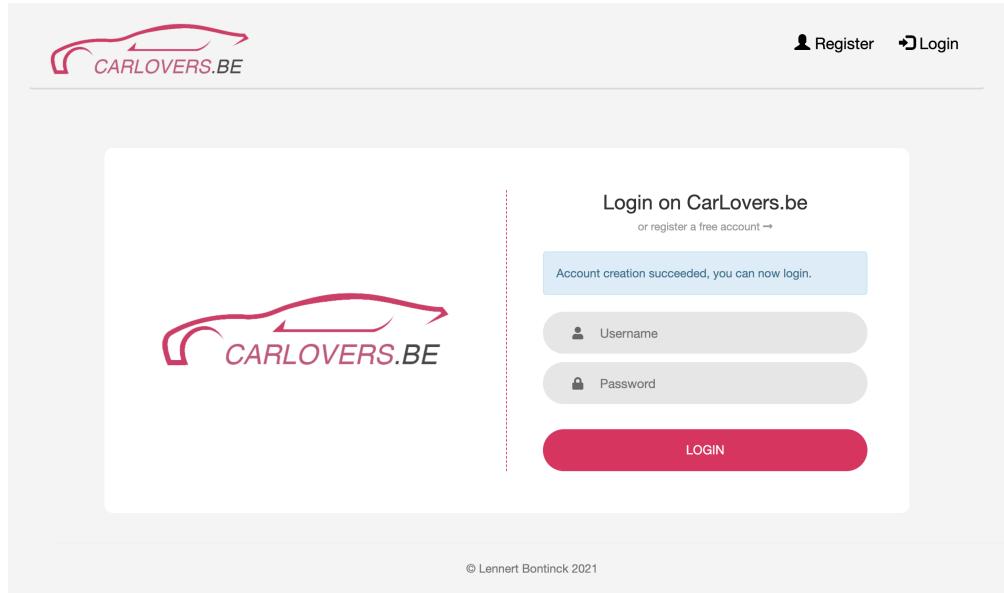


Figure 2.2: Page notifying the user an account is required.

Register and login page



(a) Register page with validation that username is already in use.



(b) Login page with flash message.

Figure 2.3: Login and register page of CarLovers website.

Overview and profile page

Most recent posts

Show me the most liked posts first →

Welcome to CarLovers, a social media platform where registered CarLovers can share their favourite car pictures. Comment and like others CarLovers posts to your hearts desire! You can view someone's profile by clicking on their name. Everyone is welcome, from old-timers to supercars. Spread love not hate 🌟

Post by JohnyBravo

Only my true friend SnellenEddy may see this post.

Posted on: July 23, 2021

Info: This post has no comments yet.

Read more →

0 CarLover(s) liked this.

(a) The main overview page which may be sorted on date or likes.

Posts by Lennert

Welcome to the profile of Lennert, one of our CarLovers. Comment and like on the posts of Lennert to your hearts desire, but remember, spread love not hate 🌟

Post by Lennert

Since you guys seem to like my previous car picture, I present to you: my clean interior! I also have an instagram: @blackquette.

Posted on: July 22, 2021

Delete

Change visibility

Info: This post has no comments yet.

Read more →

0 CarLover(s) liked this.

(b) The profile page of a specific user.

Figure 2.4: Overview and profile page of Carlovers that share sub-views.

Single post page

The screenshot shows a single post detail page from the website CARLOVERS.BE. At the top left is the site's logo, a stylized car icon with the text 'CARLOVERS.BE'. At the top right is the user profile 'Lennert' with a small photo and a checkmark. Below the header is a white rectangular post card.

Post by Lennert
Posted on: 2021-07-21T19:30

A large image of a dark grey/black Peugeot 106 GTi hatchback parked on a paved driveway in front of a brick garage. To the left is a green hedge. The car has a prominent front bumper and side skirts.

My awesome 106 GTi, finally finished after more then 3 years of revision!

Below the image are two pink buttons: 'Delete' with a trash bin icon and 'Change visibility' with a gear icon.

At the bottom of the post card is a thin horizontal line.

Below the post card is another white rectangular section titled 'Comments on this post'.

Comments on this post
Share your thoughts!

Comments listed:

- SnellenEddy:** Looks good man!
- Lennert:** Thanks SnellenEddy!
- SnellenEddy:** No worries man, I really wish I had one like it. Actually, I had one in the past but I crashed it. It was too fast, even for me, SnellenEddy!
- Lennert:** Haha, well, it's not for sale, at least not for the moment!

Share your thoughts
Let people know what you think!

Type your comment

PLACE NEW COMMENT

At the very bottom of the screenshot is a small line of text: '© Lennert Bontinck 2021'

Figure 2.5: The detail page of single post.

Add post end edit visibility

Publish post to CarLovers.be

This is a new post of my motorcycle :)

SELECT ONE JPG/JPEG IMAGE

My post may be visible to

Everyone

A specific list of users specified below

Only show posts to:

JohnyBravo SnellenEddy

PUBLISH POST

(a) The add post page.

Edit visibility of post

My post may be visible to

Everyone

A specific list of users specified below

Only show posts to:

JohnyBravo SnellenEddy

EDIT VISIBILITY

(b) The edit visibility page.

Figure 2.6: The add post page end edit visibility page for managing posts.

Limited visibility

The screenshot shows the CarLovers.BE homepage for user Lennert. At the top, there is a navigation bar with the CarLovers logo and a user profile icon for Lennert. Below the header, a section titled "Most recent posts" displays a single post from Lennert. The post shows the interior of a car with black quilted leather seats and a red safety harness. The caption reads: "Post by Lennert Since you guys seem to like my previous car picture, I present to you: my clean interior! I also have an instagram: @blackquette." The post was posted on July 22, 2021. Below the post are two buttons: "Delete" and "Change visibility". To the right of the post, there is an info box stating "Info: This post has no comments yet." and a "Read more" button. A heart icon indicates 0 likes.

(a) Homepage of user who can't see JohnyBravo's post.

The screenshot shows the CarLovers.BE homepage for user SnellenEddy. At the top, there is a navigation bar with the CarLovers logo and a user profile icon for SnellenEddy. Below the header, a section titled "Most recent posts" displays a single post from JohnyBravo. The post shows a small blue toy car with glowing headlights. The caption reads: "Post by JohnyBravo Only my true friend SnellenEddy may see this post." The post was posted on July 23, 2021. Below the post are two buttons: "Delete" and "Change visibility". To the right of the post, there is an info box stating "Info: This post has no comments yet." and a "Read more" button. A heart icon indicates 0 likes.

(b) Homepage of user who can see JohnyBravo's post.

Figure 2.7: Different posts are shown on the home page for different users according to the visibility settings.

References

- Bontinck, L. (2019). *Carmeets: Project web iv 2017-2018 bontinck lennert 2tina* [GitHub commit: a6f960b...]. Retrieved July 14, 2021, from <https://github.com/pikawika/carmeets>
- Bontinck, L. (2021). *Assignment 2 of software architecture course* [GitHub commit: 41cc69e]. Retrieved August 5, 2021, from <https://github.com/pikawika/VUB-SA-assignment-2>
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