

GDSD Team3 Project SoSe2020”

“DER MARKT”

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1. Functional Requirements along with Priority -

(1)Search Product by Category:

- User should be able to search product by its category in the navigation bar

(1)Search Desired Product:

- User should be able to search his/her desired product by its title
- User should be able to filter products added by the seller
- User should be able to view the search results and should be able to click on product to know description and some other details of product

(1)Registration:

- User should sign up in the system for selling and buying purposes
- User registration needs Fulda email address for example the email address which contains “@hs-fulda.de” which confirms that the user belongs to the Fulda University of Applied Sciences (Teacher or Student)
- After this specific but personal email address, User should add a password for his account to complete this registration form

(1)User Login:

- User should be able to login/sign in to the system successfully by putting correct email address and correct password to his/her account
- If user put wrong details then system should display a message “ Email or Password is not Valid”

(1)Add a product:

- A registered user should be able to add a product in the system for sale
- User needs to add some information about the product which are necessary otherwise product will not be approved by the admin
 - ☐ At least two pictures of product
 - ☐ Product name
 - ☐ Product description
 - ☐ Product Category
 - ☐ Location to receive
 - ☐ Contact Details

(1)Admin Sign up:

- An admin will be added in the system by default

(1)Admin Login:

- Admin should be able to sign in successfully by providing correct account details, Email address and password

(1)Approval by Admin:

- After adding a product by the seller, the admin will review the product
- If the admin approve this product then the product is ready for sale and it is visible to the other users

(1)Rejection by Admin:

- After adding a product by the seller, the admin will review the product
- And if admin rejects the product then the product should not be published in the system and should not exist in the system.

(1)User Chatting:

- User should be able to send messages to each other
- User should be able to discuss about product details in the system by chatting

(2)Compare Product:

- After searching for a product, user should be able to compare different results
- User should be able to compare different products by seeing in details and descriptions of products before making any decision

(2)Update Profile:

- User should be able to see his/her profile and can manage and update profile

(2)Delete Account:

- User should be able to delete his/her own account
- After deleting account the user needs to register again to the system

(2)View Users:

- Admin should be able to view all the users (Sellers and Buyers) registered in the system

(3)Update Product:

- User should be able to update product details

(3)Delete a product:

- User should be able to delete product added by him/her

(3)Delete Users:

- Admin should be able to delete any user from the system

1.1. Use Cases:



Use Case Diagram

1.1.1. List of Use cases:

1. Browse Product
2. Filter Products according to Postal code
3. Filter Products according to category
4. Compare 2 or more Products
5. Search Product
6. Login
7. Register
8. Chat with the Seller
9. Authorizing User by Admin
10. Accept or Reject Ad by Admin
11. Manage User Profile
12. Post Product Ad
13. Deactivate Account
14. View Users by Admin
15. Delete Product by Seller
16. Update Product
17. Related Products Browse
18. Check Reward Points
19. Check Recently Bought Products
20. Check Recently Sold Products
21. Change Password
22. Edit Profile
23. Chat Monitoring by Admin

1.1.2. Main Use Cases

1. Browse Product (1)

The user (member of University of Applied Sciences), can enter the website 'Der Markt', view the 'Newest Display', which includes the Products that have been added recently onto the platform. The user can browse through this and if he/she finds a product required, can click onto the image to view the 'Product Details' page for that Product. If the user does not find the relevant product in the 'Newest Display' section, the user can search a product by the 'Category' or also directly search a product by its name. If the user wishes to narrow down the search results according to the nearest place, this is also possible by entering the 'Postal Code' and choosing from options like 'Whole place', '+5km', etcetera. After clicking onto the picture of the desired product, the user would be able to find the required product information, like the pictures of that product, the information about the usage of the product, how old the product is etcetera.

2. Compare Products(4)

The user has the possibility to compare products on different basis for choosing a good and most appropriate product for him/her. While browsing through the products available on our website, the user can click on the picture of the product that he/she liked. The 'Product Details' page includes an option of 'Select for Compare', on clicking at which the user would be directed to the 'Browse' page once again. Once the user has selected the products to be compared, the user will click on the 'Compare' button and will be redirected to a 'Compare Products' page. In this page, the user would have a side to side view of the products and can compare according to the details of the products and finally choose the product he/she likes to buy.

3. Chat with the Seller(8)

If a user likes a product and wants to know something more about the selected product, than is made visible on the 'Product Detail' page of that product. In such cases, the user needs a direct interaction with the Seller, hence there is a availability of 'Chat' with the seller on the 'Product Detail' page. To be able to access this functionality, the user needs to be logged into the website account or first register himself/herself for the website. On clicking on this button, the user would be able to discuss all needed details, along with the paying method for the product. To make these transactions more secure, there is monitoring performed by the admin.

4. Authorization of User and Product(9)

A user always wants to have a secure shopping environment. To know if the seller is also genuine is one of the most required information for the Buyer, and vice versa. It is also a really important point to know that the product uploaded is valid and accurate as well. To ensure this sense of security, 'Der Markt' provides an authorization technique. This will involve the user to mention their valid 'Fulda University of Applied Sciences' e-mail address to register into the website. The admin would need to check the validity of the e-mail address provided by the user. For providing security about the authenticity of the product uploaded by the Seller, the admin has to firstly go through the process of trackboaring the products uploaded by the seller and decide if the product is valid for uploading as an ad.

5. Post Product Ad (12)

For a user to be able to upload a product for sale, the user would first log into his/her user account. In the 'Dashboard', he/she would be required to press the 'Start Selling' button. Now, the user would be redirected to the 'Upload Product' page, where the user would be asked to fill the mandatory fields, such as 'Product Title', 'Add Pictures', 'Cost', and the 'Product Detail'. The seller would be requested to add at least 2 pictures of the product, in different angles for verification purposes by the admin. The seller can also add a video of the product along with all the mandatory

details. These product informations enhance the Selling rate of the product, as well as, give the Buyer more sense of security while buying the product.

The highest priority on our list are:

- Account Creation: The account of a user is a must to buy or to sell things. Without the account, there is no possibility to do anything on our website. Especially for the seller, because the seller has to upload the pictures and then the admin will confirm the identity of the seller.

2. List of main data items and entities (expand as necessary)

Data Items & Entities:

Main entities used in the project:

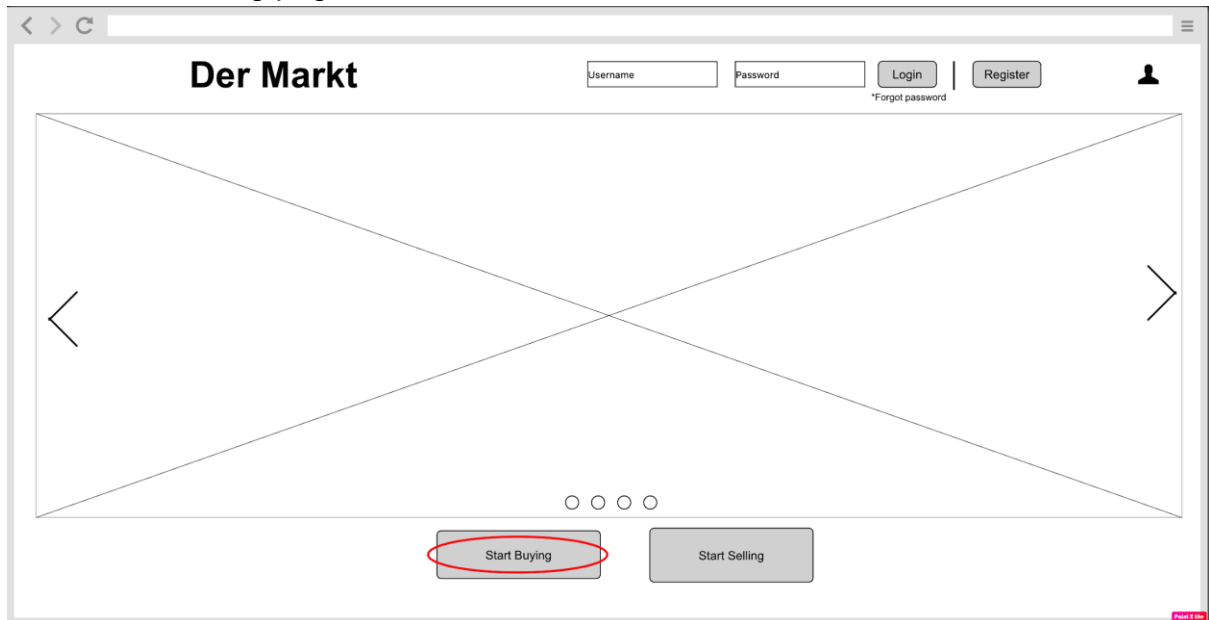
- **Users** : The persons who use our website. There will be two subtypes of users, namely:
 - **Admin** : User with the highest privilege in the system. The user with admin rights can approve, decline and delete ad posts.
 - **General Users** : Buyer and Seller are the general users and are only allowed to post ads and send messages to one another. General users have a lower amount of privileges compared to admin users.
- **Ads** : The ads are the core feature of this whole application. The ads will have the following information in them:
 - **Ad ID number** : Unique identification number to differentiate between ads.
 - **Pictures** : The photos in the ad.
 - **Description** : Additional information by the seller written down to convey any additional information about the product.
 - **Specifications** : Attributes of the product such as color, dimensions, etc.
- **Beneficiary Points** : These points are earned by buying and selling stuff on the website.
- **Product Categories** : Each product will fall in a general category and the category of the product will have to be mentioned, for example, electronics, cars, furniture, etc.
 - **Product Sub-Category** : Subdivision of the larger “General Categories”.
- **Messages** : Simple text messages shared between seller and buyer.
- **Profile** : Complete information about the general users. The following type of information can exist in a profile:
 - **Contact** : Email or phone number of the user.
 - **Name** : Name of user.

3. NEW: UI Mockups and Storyboards (high level only)

3.1. Browse Product:

3.1.1. Landing Page:

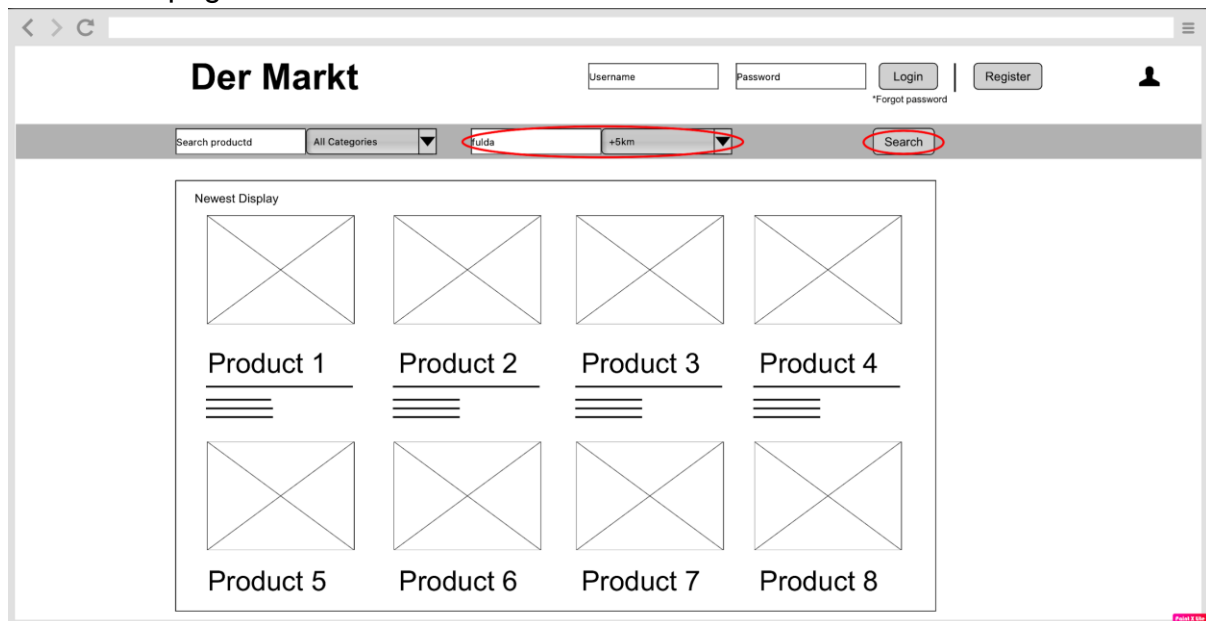
This is the starting page of the website.



- This page will include the Logo on top left, a 'Login' and 'Register' option on the top right, for the user who wants to directly login or register themselves, before starting to use the web service.
- There is a slider, to display the success of the application and how it makes members of the 'Fulda University of Applied Sciences' happy.
- Beneath the slider, 2 buttons are located, which are labelled as 'Start Buying' and 'Start Selling'.

3.1.2. Browse Page:

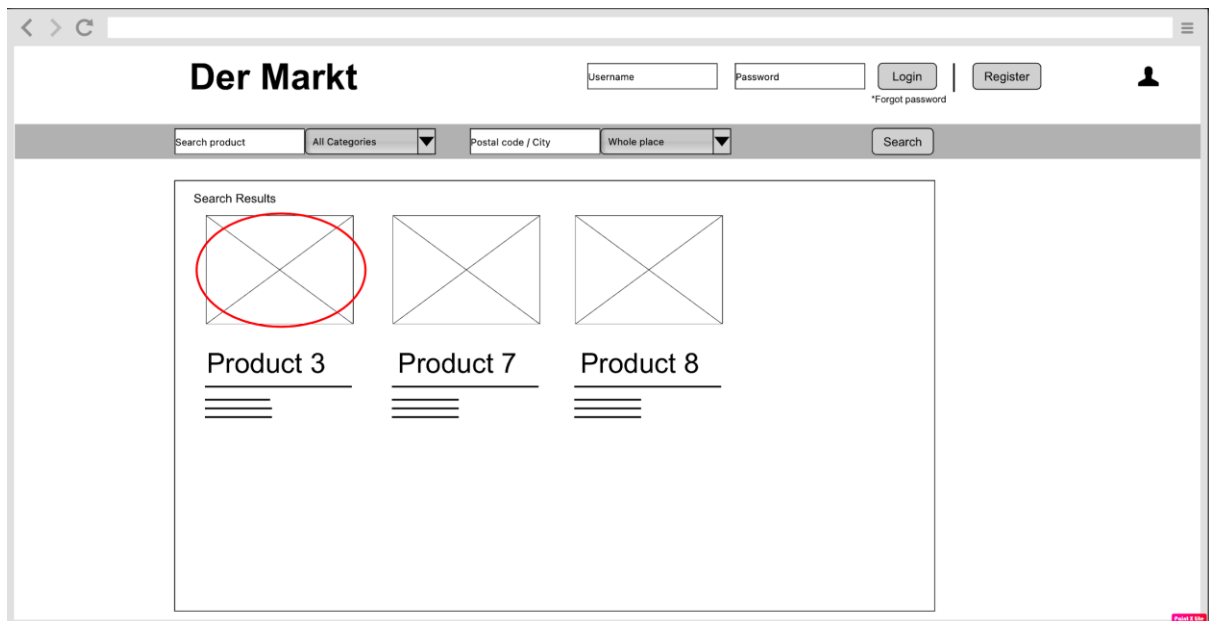
After clicking on the 'Start Buying' button on the 'Landing Page', the user will be shown this page.



- This page will appear in both cases, if a user is logged into the user account or not.
- By default, this page will show the 'Newest Display', which will include all the recently added and approved product ads.
- A user can search a product directly by entering the title of the product into the 'Search Product' bar or even search products by their 'Categories', and clicking 'Search'.
- The user can narrow down the search by applying the 'Postal Code' filter. Users also have the opportunity to choose the radius to the 'Postal Code', like 'Whole area', '+5km' (i.e. in the radius of 5km), etcetera.

3.1.3. Filtered Search

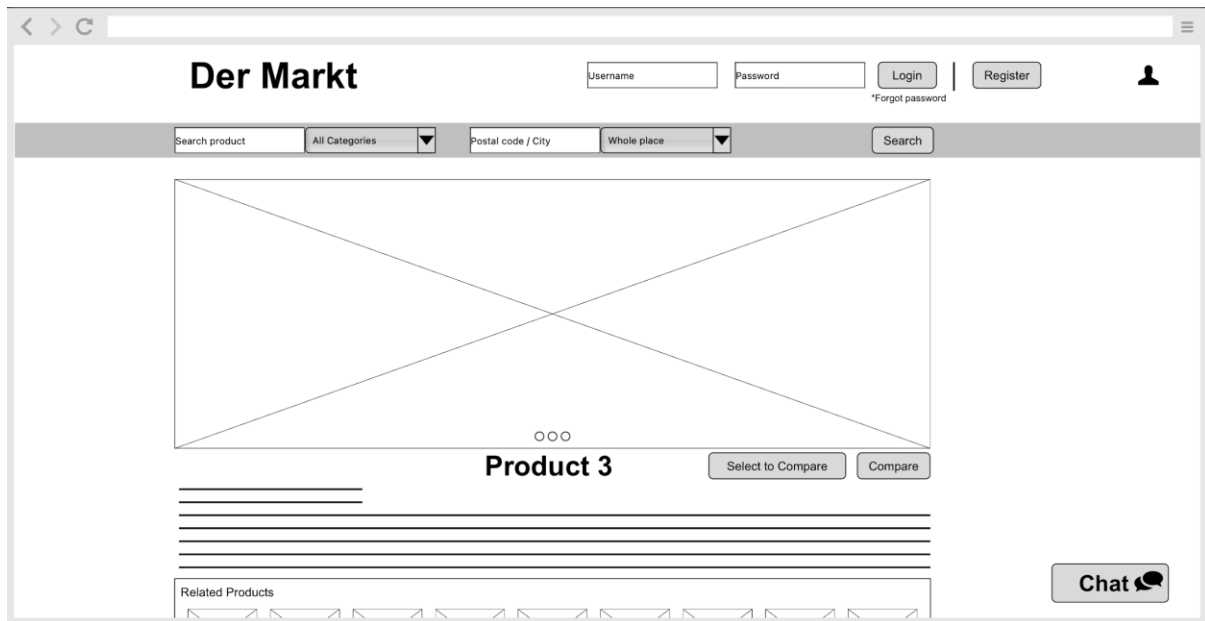
After applying the 'Postal Code / City' filter, the user would be able to see a page like this.



- This page is just like the 'Browse Page', but instead of the 'Newest Display', where products were displayed of every category and every city, it has the 'Search Results' section, where the user has category specific and/or Postal Code specific results.

3.1.4. Product Details

After clicking on the image of the desired product, the user will be redirected to this page.'



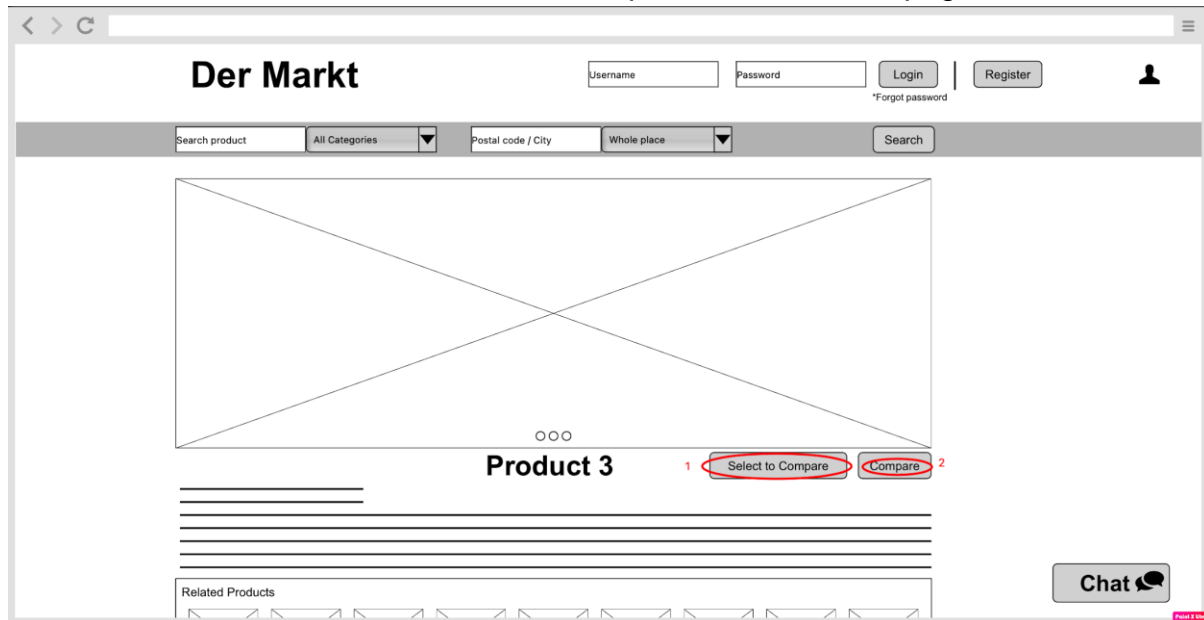
- This page includes the details of a specific product. The user can find at least 2 pictures from different angles of the product, the cost, product specifications mentioned by the seller, etcetera.
- This page also has buttons just below the image slider of the product image, labeled as 'Select to Compare', and 'Compare'.
- At the bottom right corner of the page, the user also has the access of the 'Chat' button, to chat with the Seller.
- Below the Product Description, the user can view 'Related Products' of the selected product. This section will provide the user with choices except for the product he/she is viewing.

3.2. Compare Products

3.2.1. Product Details

This page will include the product details, an option to chat with the Seller about the product, 'Related Products' section for broader user selection, and 2 buttons for the purpose of comparing products by the user.

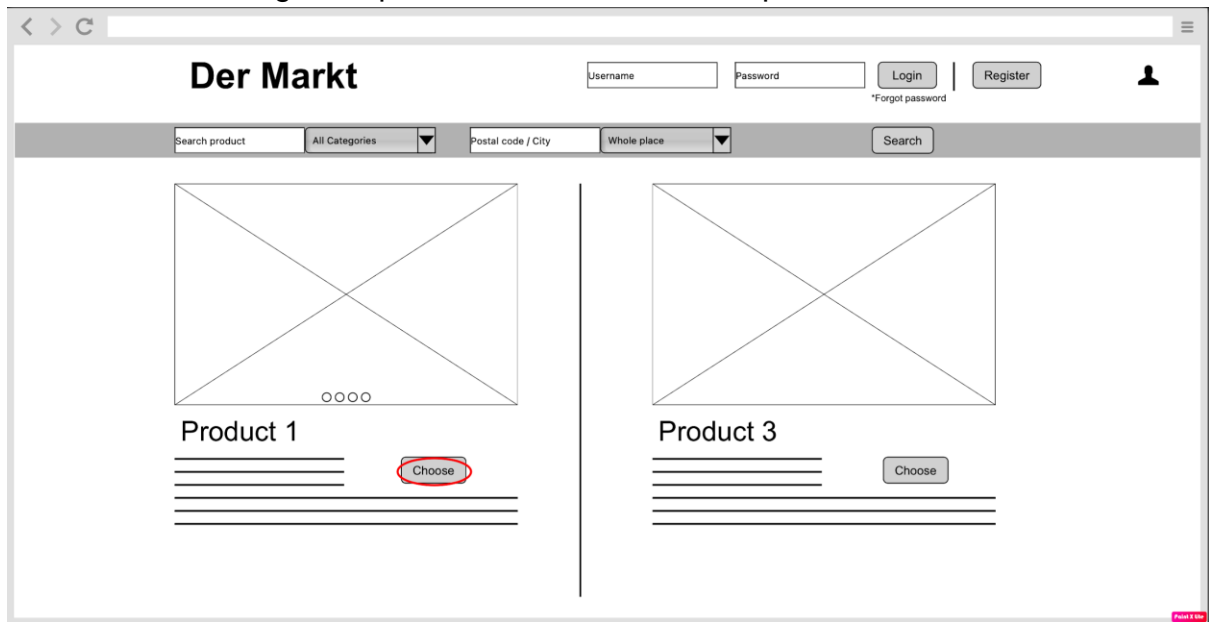
In this we will concentrate more on the Compare feature of this page.



- The compare feature is provided for the user to get a chance to compare 2 or more products for a better product selection.
- To achieve product comparison, the user will click on the 'Select to Compare'(1) button on the 'Product Details' page. This will redirect the user to the 'Browse Page', where the user can now choose and repeat the steps for selecting another product for comparing. Once the user has selected all the products he/she wants to compare, the user will click on 'Compare'(2), the Compare button will only be activated, once the user selects more than 1 product.

3.2.2. Compare Products

After clicking on 'Compare', the user would be able to view the products side to side and make a thorough comparison on the basis of the product details.



- This page will include the side by side view of the products selected by the user for comparison.
- After completing the user has the possibility to 'Choose' a product and directly go to the products 'Product Details' page.

3.2.3. Register / Sign In

After choosing a product, if the user is not logged into the user account yet, the user would be redirected to the 'Register / Sign In' page. This forces the user to be a member first to perform further steps, so as to maintain security.

- This page has 2 parts, one where the user can directly Log into his/her account, if he/she has one. The other part includes registering the user for the web service.
- Once the registration or signing in is done here, the user can then see the “Product Details” page to buy the product again.

3.3. Chat with the Seller:

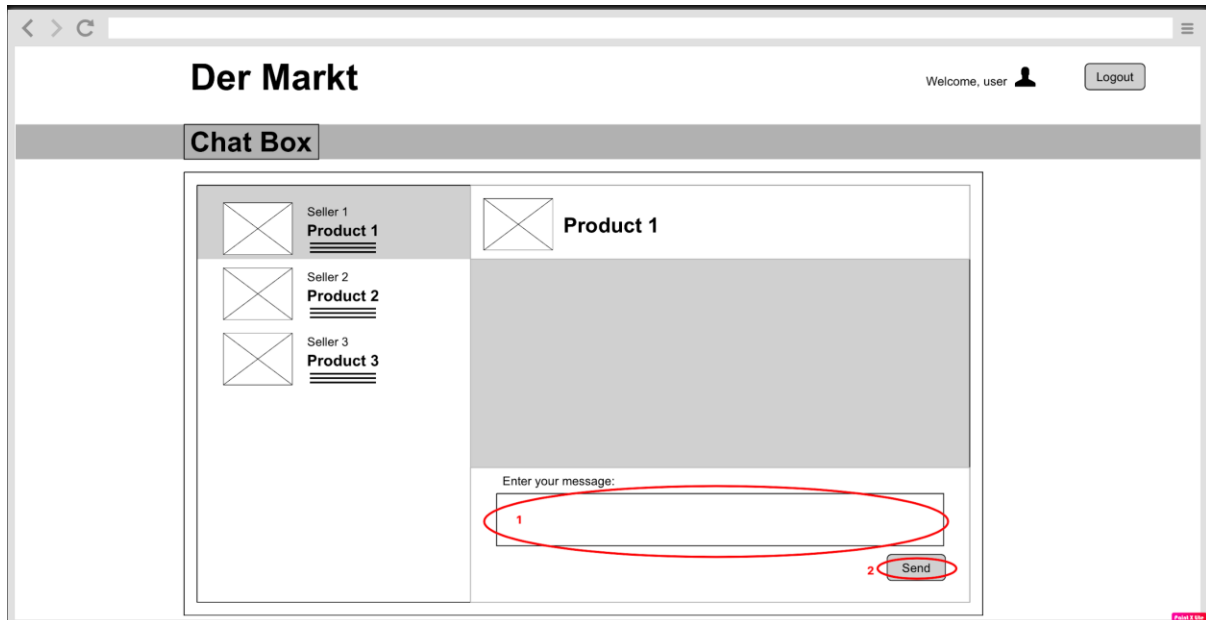
3.3.1. (1) Chat Box

After logging into his/her account, the user can access the ‘Chat’ option from the ‘Product Details’ page.

- This page would initially display all the chats done by the user with either a Buyer, or a Seller.

3.3.2. (2)Chat Box - View Chat

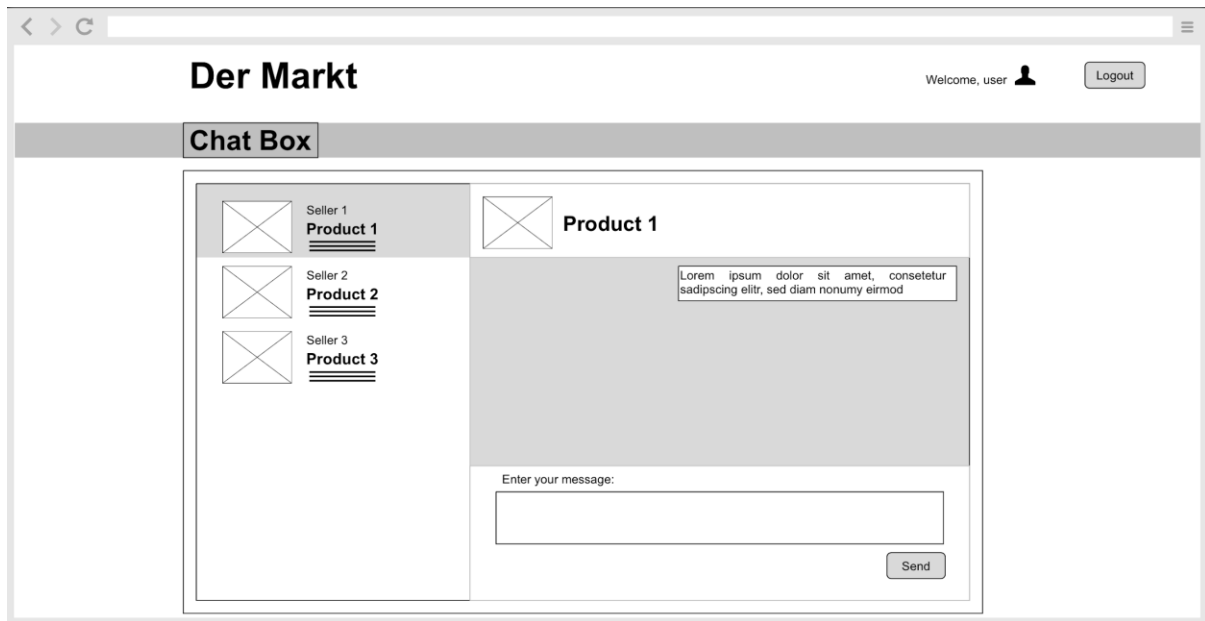
After clicking on one of the previously made chats with different Sellers / Buyers, the user would be able to see the chats that have been made by him/her. If the user has not had a chat with this Seller yet about the Product, the user can do so in this section.



- In this, the user would be provided with a chat box, where the product details (for which this chatting has been invoked) is visible on top, another segment for writing the message(1) and sending(2) it is at the bottom.

3.3.3. (3)Chat Box - Message sent

After writing the message that the Buyer wants to send the Seller into the message box (labeled as '1' in above figure) and sending that message (labeled as '2' in above figure) to the seller of desired product, this is how it would look.



- After sending a message to the Seller, the user would be able to see his/her message on the left aligned chat boxes. If the Seller replies, the chat box (which includes the message from the seller) would be right aligned in the chat box section for chatting.

3.4. Authorization of User and Product

3.4.1. Register

This website only promotes authorized users. Hence for that purpose, the user needs to register for accessing the special functionalities like chat, buy product, sell product, etcetera.

- In this, the user would be required to fill all the columns cautiously.

- It has all general columns, except for email. The user can not register with any other e-mail address than that of 'Fulda University of Applied Sciences'. This has been done to ensure User authorization and validation (security purpose).

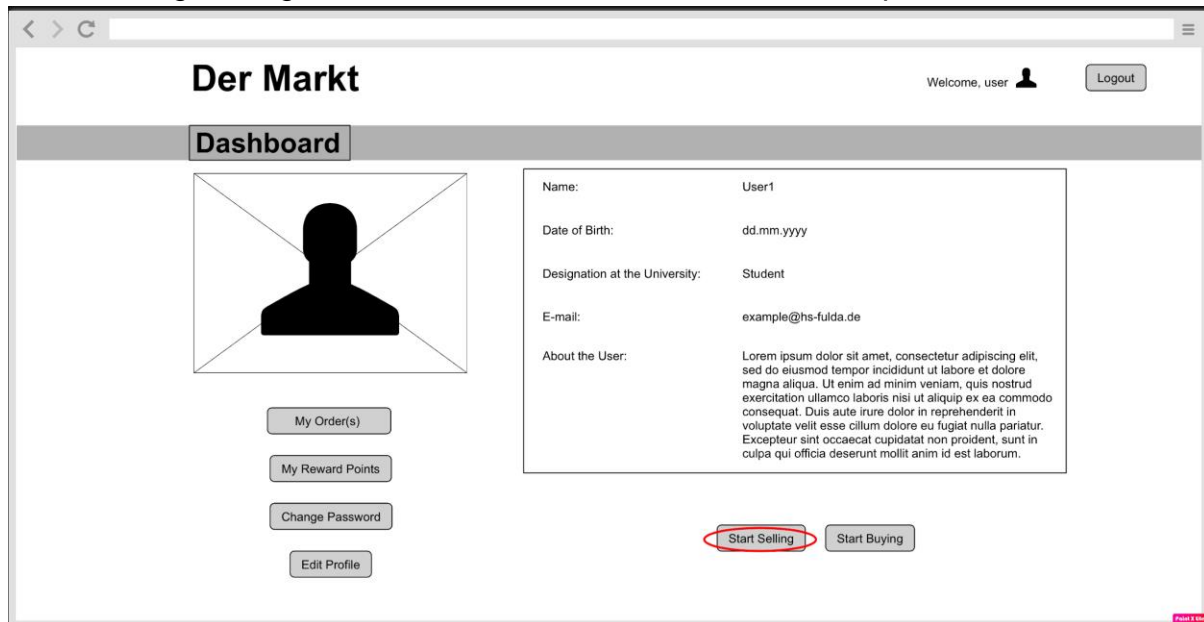
3.4.2. Sign In

After having registered, i.e. clicking done once all the columns of the Registration form have been cautiously filled by the user, the user would be taken to the 'Sign In' page, so as to Log in to his/her account.

- This page includes 2 columns, one for entering 'Username' or e-mail address in our case, and the second for entering the linked 'Password'.
- If the user forgets his/her password, it has the chance to click on 'Forgot Password' and claim a new password. The auto generated password would then be sent to the user on the registered email and from there he/she can login again to the account and change the password if necessary.
- The Login button, would proceed the user to the User Specific Dashboard.

3.4.3. Dashboard

After clicking on Login the user would be redirected to his/her personal dashboard.



- This page includes the details entered by the user while the registering process, user image on the top left, buttons like 'My Order(s)', 'My Reward Points', 'Change Password', and 'Edit Profile' are situated below the user image. 'Start Selling' and 'Start Buying' buttons are situated below the user details.
- The user can start to add products for selling onto the platform, by clicking on the 'Start Selling' button.
- The user can start his/her buying adventure from 'Der Markt', by clicking on the 'Start Buying' button.

3.4.4. Add Product

The user would be redirected onto the 'Add Product' page, by clicking on 'Start Selling' in the 'Dashboard'. In this page, the user can upload all the details required

for the user to launch the ad of his/her product that he/she wants to sell.

The screenshot shows a web browser window with the address bar containing '< > C'. The page title is 'Der Markt'. In the top right corner, it says 'Welcome, user' next to a user icon and a 'Logout' button. A grey header bar contains the text 'Add Product'. The main form area has the following fields and buttons:

- 'Product Title*': A text input field.
- 'Add Pictures*': A text input field followed by a 'Browse' button.
- 'Add Video*': A text input field followed by a 'Browse (.mp4)...' button.
- 'Cost*': A text input field.
- 'Product Detail*': A large text area with the placeholder text 'Enter product detail...'. Below this area is a 'Done' button, which is circled in red.

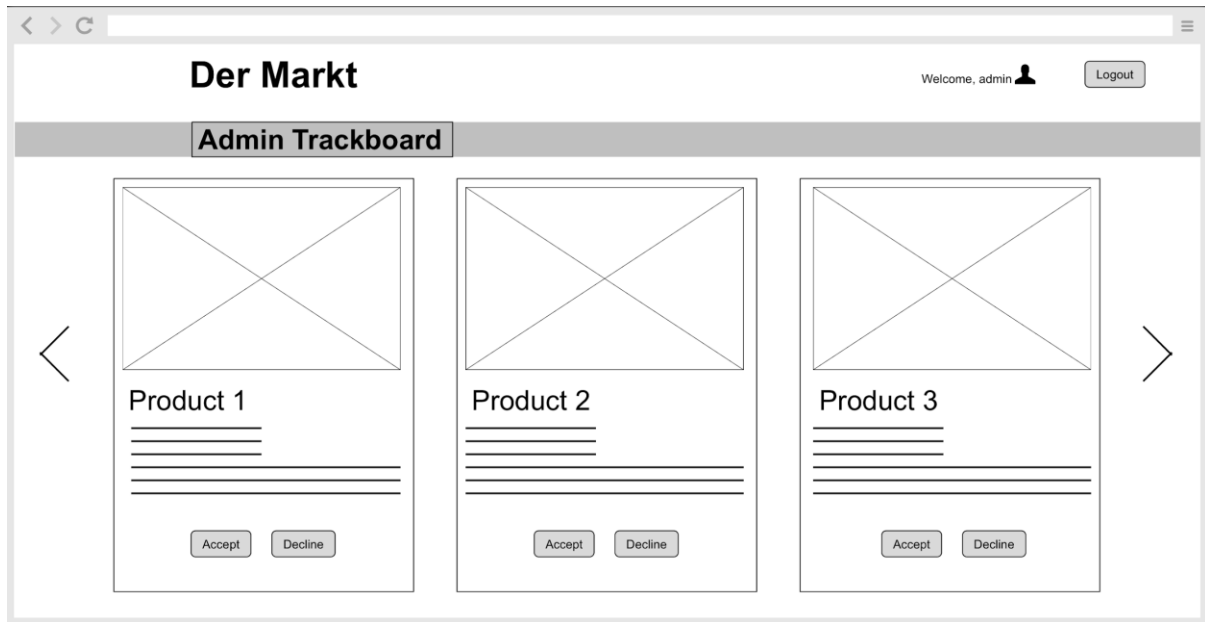
A small 'Print & Save' button is visible in the bottom right corner of the form area.

- In this page, the user would be required to give details of the product he/she wants to post an ad for, so as to sell on 'Der Markt'.
- The details would include the title, pictures (a minimum of 2, from different angles), cost of the product, and some detail (how long it has been used, if there's anything harmed in the product, any cautions the buyer needs to know about, etcetera).
- Apart from the above mandatory details, the user can also upload a video of the product (fully optional).
- When the user is done filling out the details of the product, he/she can click on 'Done'. This will submit the request for the product to be uploaded on 'Der Markt' as an ad.

3.4.5. Admin Trackboard

After submitting the product ad request by the User, the Admin will receive the approval request on his/her Trackboard. The following is how the Trackboard will

look like.

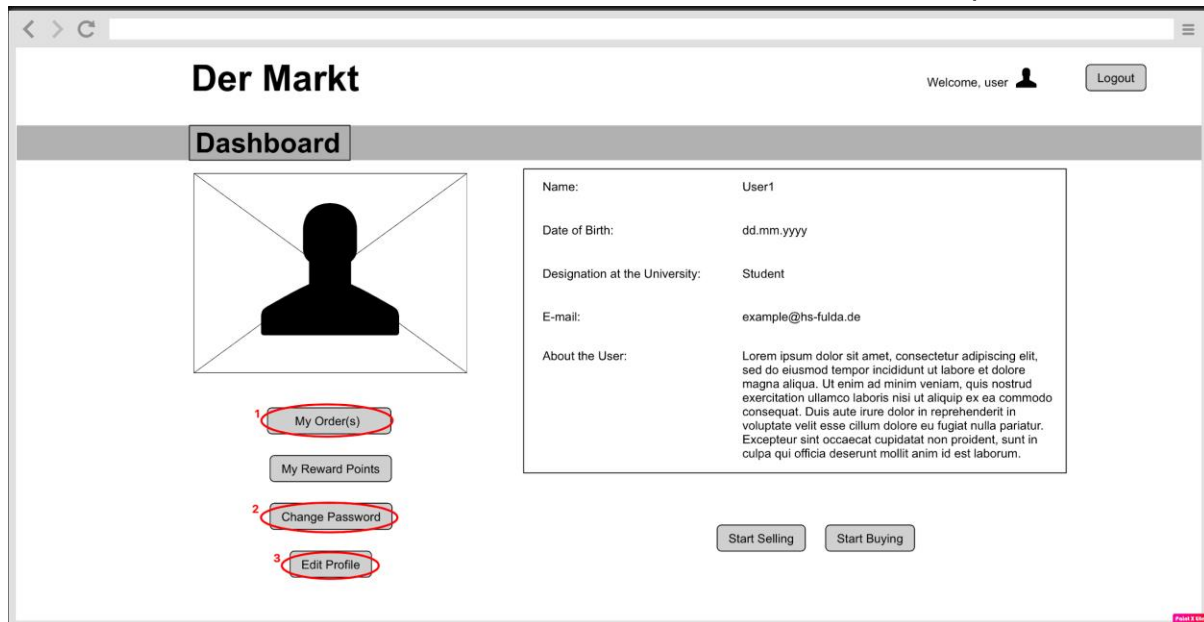


- For the admin to be able to access this page, the admin would need to login using its username and password.
- This will include all the tasks for the Admin, i.e. the products uploaded by the users for ads in the 'Der Markt' website.
- The user would have a broad view of all the requests and would have the buttons 'Approve' and 'Decline' at the bottom of the product details, that have been submitted by the users.
- The admin will either accept or decline the ad, based on the images and description of the product.

3.5. Viewing Orders and Editing User Dashboard

3.5.1. Dashboard

This is the user dashboard, where the user can see and edit his/her profile.



- In this page, the user details while registering is displayed, a button to edit this information is present beneath the user profile, which is on the top left.
- The user can check the recent order(s), i.e. buy products history, as well as, sell products history.
- The user can also view the gathered reward points in the process of buying and selling products on 'Der Markt'.
- This page also provides a chance to change their password of their 'Der Markt' profile.
- If a user wants to start selling or start browsing through products to buy, he/she can do that too by clicking on 'Start Selling' or 'Start Buying' on bottom right of the page.

3.5.2. My Order(s)(1)

On click of the button 'My Order(s)' marked as '1' in the above illustration, a window including the sell history and bought history is displayed.

The screenshot shows a web browser window with the title 'Der Markt'. The page has a header with 'Welcome, user' and a 'Logout' button. The main content area is divided into two columns. The left column is titled 'Recently bought:' and contains a bulleted list with 'Product 1', 'Product 2', and 'Product 3'. The right column is titled 'Recently sold:' and also contains a bulleted list with 'Product 1', 'Product 2', and 'Product 3'. At the bottom center of the page is a button labeled 'Back to Profile'.

- This page displays the sell and buy history of the user.
- Using the 'Back to Profile' button, the user can go back to the 'Dashboard'.

3.5.3. Change Password(2)

On click of the button 'Change Password' marked as '2' in the user profile illustration, a window to change the password is visible.

The screenshot shows a web browser window with the title 'Der Markt'. The page has a header with 'Change Password' in a box. The main content area contains a form with two text input fields. The first field is labeled 'Username:' and has 'Username' entered. The second field is labeled 'E-mail address:' and has 'example@hs-fulda.de' entered. Below the fields is a button labeled 'Verify'.

- This page would initially include only 2 text fields, that would request the user to enter his/her 'Username' and official university e-mail address for verification purposes.

- After entering the desired information into the fields, the user would press 'Verify'. This would result in another column to be displayed, graying the verification column out.

The screenshot shows a web browser window with the address bar empty. The page title is "Der Markt". Below the title is a gray bar with a button labeled "Change Password". The main content area contains two side-by-side form boxes. The left box is grayed out and contains the following fields: "Username:" with a text input field containing "Username", and "E-mail address:" with a text input field containing "example@hs-fulda.de". Below these fields is a "Verify" button. The right box is white and contains the following fields: "Enter new Password:" with a text input field, and "Repeat Password:" with a text input field. Below these fields is a "Done" button.

- In this, the left section i.e. verification section is now grayed out (not accessible) and only the right section is clickable.
- In the right section, the user is asked to give in a new password and repeat the entered password for verifying that the password entered is really the desired password of the user.
- Once the user is done with the process, he/she can click on done and would once again be redirected to the 'Dashboard'.

3.5.4. Edit profile(3)

On click of the button 'Edit Profile' marked as '3' in the user profile illustration, a window to enable the user to edit their profile details is visible.

The screenshot shows a web browser window titled 'Der Markt'. The browser's address bar is empty. The page header includes the site name 'Der Markt' on the left, and 'Welcome, user' with a user icon and a 'Logout' button on the right. A grey bar below the header contains the 'Edit Profile' button. The main content area is a form for editing profile details. It includes the following fields and controls:

- Upload Image:** A text input field followed by a 'Browse' button.
- Name:** A text input field.
- Designation:** A dropdown menu with 'Designation' selected and a downward arrow.
- Date of Birth:** A date picker control.
- About me:** A text area with the placeholder text 'Enter your text here...'.

A 'Done' button is located at the bottom center of the form.

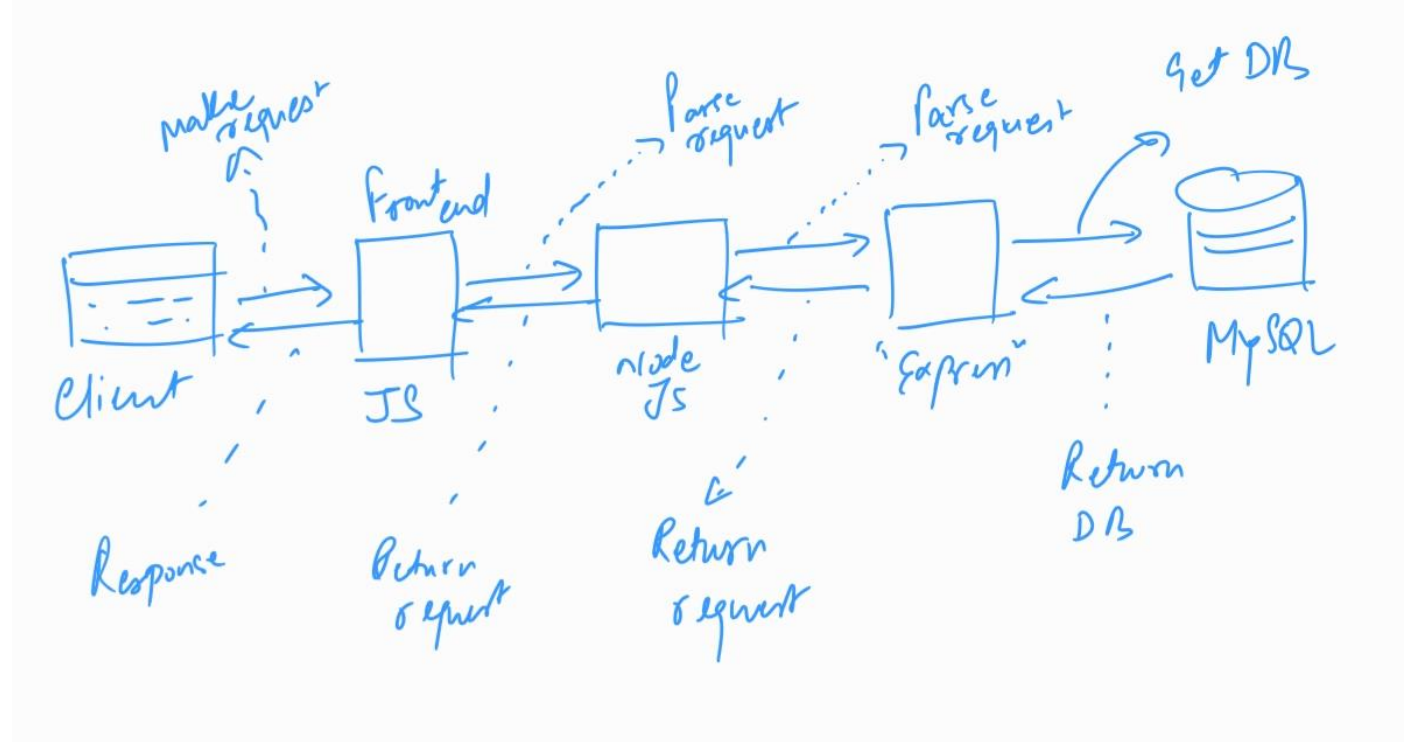
- This page includes all the columns of details that can be changed by the user, like profile image, name, designation (example if a student has been promoted to professor), date of birth, and about me section.
- The user does not fill all the columns, only the ones he/she wants to edit or change.
- On click of 'Done', the user would be redirected to the 'Dashboard' page once again.

4. NEW High level Architecture, Database Organization

HIGH LEVEL ARCHITECTURE:

For the backend purpose, we are going to use NodeJS because it is asynchronous in nature and balances the load time between front-end and back-end. The load time actually is the backbone of an ecommerce website. The more the load time, the slower the website will be and less and less people will come to the website. Node.js helps developers to make the best use of event loop and callbacks for I/O operations. The event loop is the classic Node.js's way of breaking the long-running request into smaller chunks.

The choice of database is MySQL. There is a very big community of MySQL users and if there comes an issue we can always check. Also MySQL is fast enough to parse the requests back to the backend Framework.



DATABASE:

List of tables:

Table : User Info

Column	Data type
user_id	int, Auto_Increment
contact	varchar
DOB	date
email_address	varchar
password	varchar
reward_points	int
role	varchar
user_name	varchar

Table : Products	
Column	Data type
product_id	int, Auto_Increment
approval_status	boolean
category	category_id
city	varchar
color	varchar
condition	varchar
description	varchar
dimensions	varchar
image_URL	varchar
pickup_address	varchar
PLZ	int
product_name	varchar
posted_on	date
posted_by	user_id
price	int

sold_status	varchar
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Table : Categories	
Column	Data type
category_id	int, Auto_Increment
name	varchar

Table : Messages	
Column	Data type
message_id	int, Auto_Increment
chat room	chatroom_id
message	varchar
created_at	date
created_by	user_id

Table : Chatrooms	
Column	Data type
chatroom_id	int, Auto_Increment
name	product_name

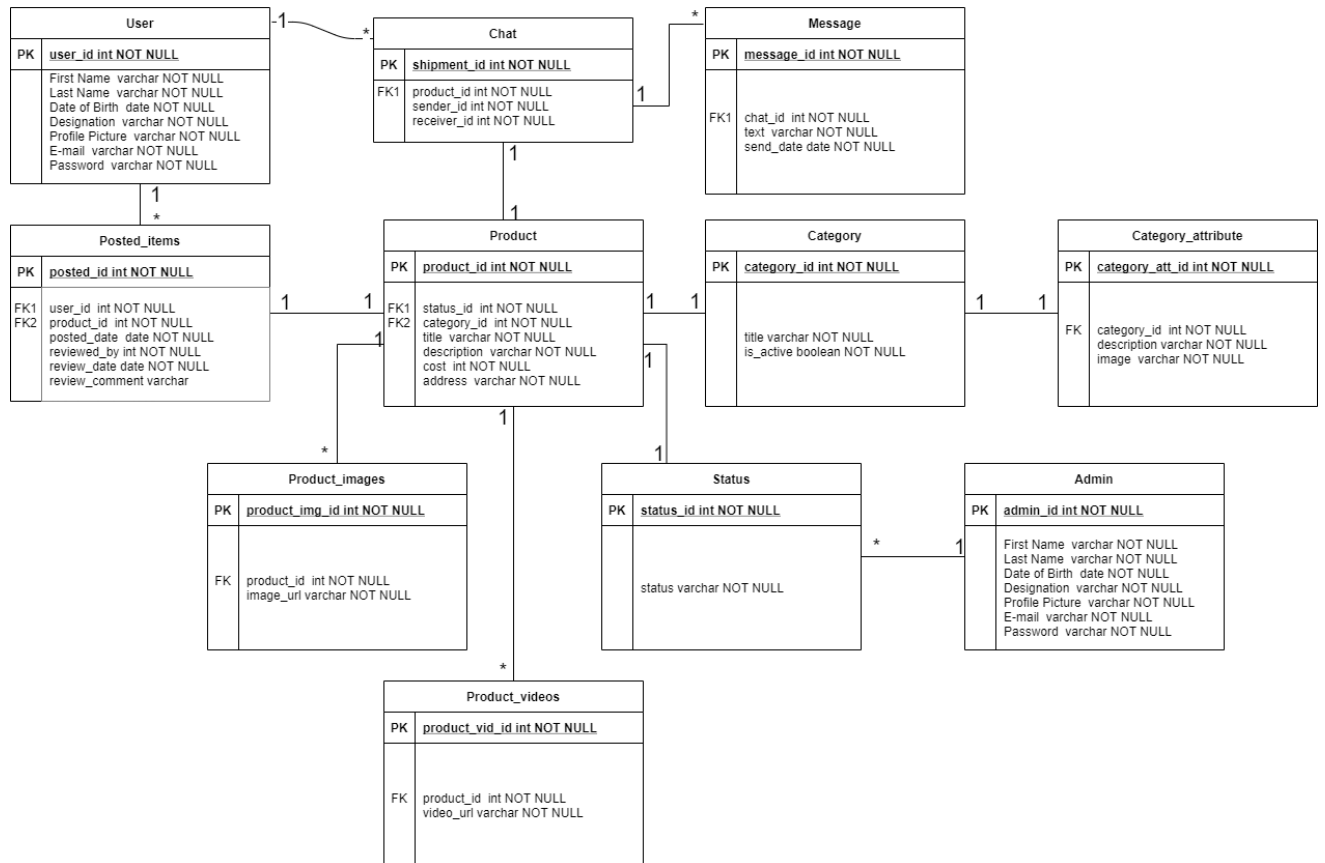
Media Storage: For this project, we have decided to go with storing the images on the filesystem instead of storing them in the database as BLOBS. The reason for that being that BLOB will increase the size of our database and at the moment, we are refraining from buying premium services. Therefore, in a scenario like this, storing images on the file system makes more sense.

Search/filter Architecture and criteria: By default the search results will be sorted by date in ascending order, meaning that the newest record will be shown first. However, the user will have the flexibility of sorting the data in ascending and descending order by price, date and name. To achieve this, we can simply use the MySQL keyword ASC or DESC and apply it on the price, name or posted_on column in the “products” table. Additionally, users can select categories to see items relevant to the selected category only. Each category will be given an ID and that will be associated with the product as “category”.

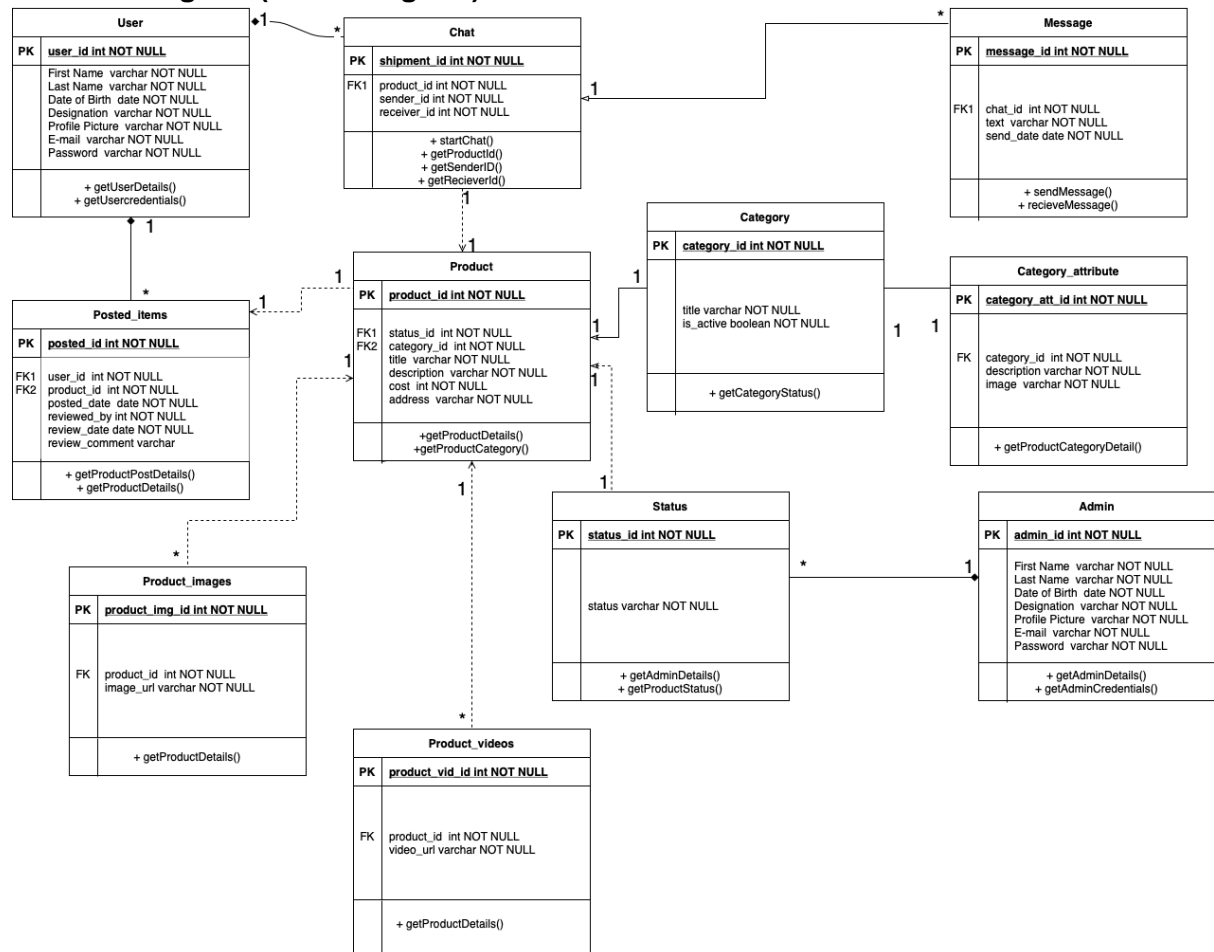
Our own API: We will create a simple API using node.js and express. This API will be used for sending post, get, delete and put requests to the database for performing basic CRUD operations.

5. NEW High Level UML Diagrams

5.1 ER Diagram (Entity- relationship Diagram)



5.2 UML Diagram (Class Diagram)



6 .Identify *actual* key risks for your project at this time

- **Skill risk:** We have a 3 member team for frontend and same for backend. Team leads of both teams have created websites requiring similar sets of skills. All the team members also have a basic to medium level of knowledge about frontend and backend. Our team as a whole has the right skills required for creating the website and deploying it in production.
- **Schedule risk:** The team lead, frontend lead and backend lead have never worked with a team, following a schedule, so there is some risk involved here. The team might underestimate the time required to complete the committed work. To avoid this risk, we will divide the project into milestones/tasks and set a deadline to complete them. We will try to follow the milestone sequence on time, and try to reserve some time for unexpected problems that may occur.
- **Technical risk:** The server on which the website is hosted, can go down anytime. So we need to make sure we use a good server to host our website. The website may not be compatible with some browsers used by a considerable amount of users, so we need to make sure the website runs on all major browsers.
- **Teamwork risk:** No one in our team has any experience in working with a team on such a project following industry standards. There is a risk that we might not be able to communicate properly, two or more people may work on the same task, the requirements & task may not be clear to every member. The team has members from different time zones (Germany & India), so that might be an issue. To avoid these issues, we are having regular meetings at a time, which is suitable for everyone where we discuss the project with each other and make sure everyone is on the same page.
- **Legal/content risk:** Since our website will collect some user data, we need to follow the GDPR policy, to avoid that risk. We need to make sure we do not use any copyrighted content (code, images) and have the proper licence for using open source code. We need to write a privacy policy and make sure users agree to our policy before creating an account on our website. We need to research various policies that we may or may need to follow such as GDPR, COPPA policy etc.
- **Internet risk:** Since all of our group members, or to say some of our group members are not in germany, and also not in a good internet connectivity area, there always exists internet issues while trying to set a meeting. We always have to manage it somehow, but due to the group members being in different countries, hence different Time zones and sometimes bad connectivity areas, we have to make some exceptions and presume someones replies and ideas.

7. Project management

We have been able to complete this milestone by having our Team meetings on Teams Platform and Google documents. We have already implemented a tool called “Mind meister” as our scrum platform in our Teams. We are planning to divide the work into daily tasks and assign it to team members and we will calculate the amount of time we are spending there to finish the tasks. Also we can check if the tasks are getting done within time limit and also which person is doing more or less work, so that we can divide the work into equal chunks.