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UNIVERSITÀ DEGLI STUDI DI PADOVA
DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE

Web Applications A.Y. 2022-2023

Homework 1 – Server-side Design and Development

Master Degree in Computer Engineering
Master Degree in Cybersecurity
Master Degree in ICT for Internet and Multimedia

Deadline: 28 April, 2023

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1 Objectives

The objective of this project is to develop a web application that can help new and existing UniPD members of the University of Padova. The project will ensure that the products that the members need or no longer need are exchanged or sold/bought only among the UniPD members. In this way, it is aimed to ensure reliable and fast shopping, to prevent fraud and being deceived with defective products.

2 Main Functionalities

DamacaNaN is a web application that can only be used by UniPD members. Members will be able to register to the system with their university e-mail addresses (@studenti.unipd.it, @unipd.it, alumni@unip.it). This way, some of the user information will be visible, and a secure environment will be provided for all members of the University of Padua. In case of possible complaints, the user can be reported to the necessary authorities. This way, fraudulence actions can be prevented.

After registering to the web application, users can list their products for sale (paid/free/barter) based on their needs, or they can search for the product they need among the listed items for sale. The pages of the products for sale contain their own descriptions, visuals, and keywords. This way, the buyer will have an idea about the product they will purchase. After the purchase, the buyer can leave a review about the seller, and the seller can be introduced to other buyers through their reviews, and they can act accordingly.

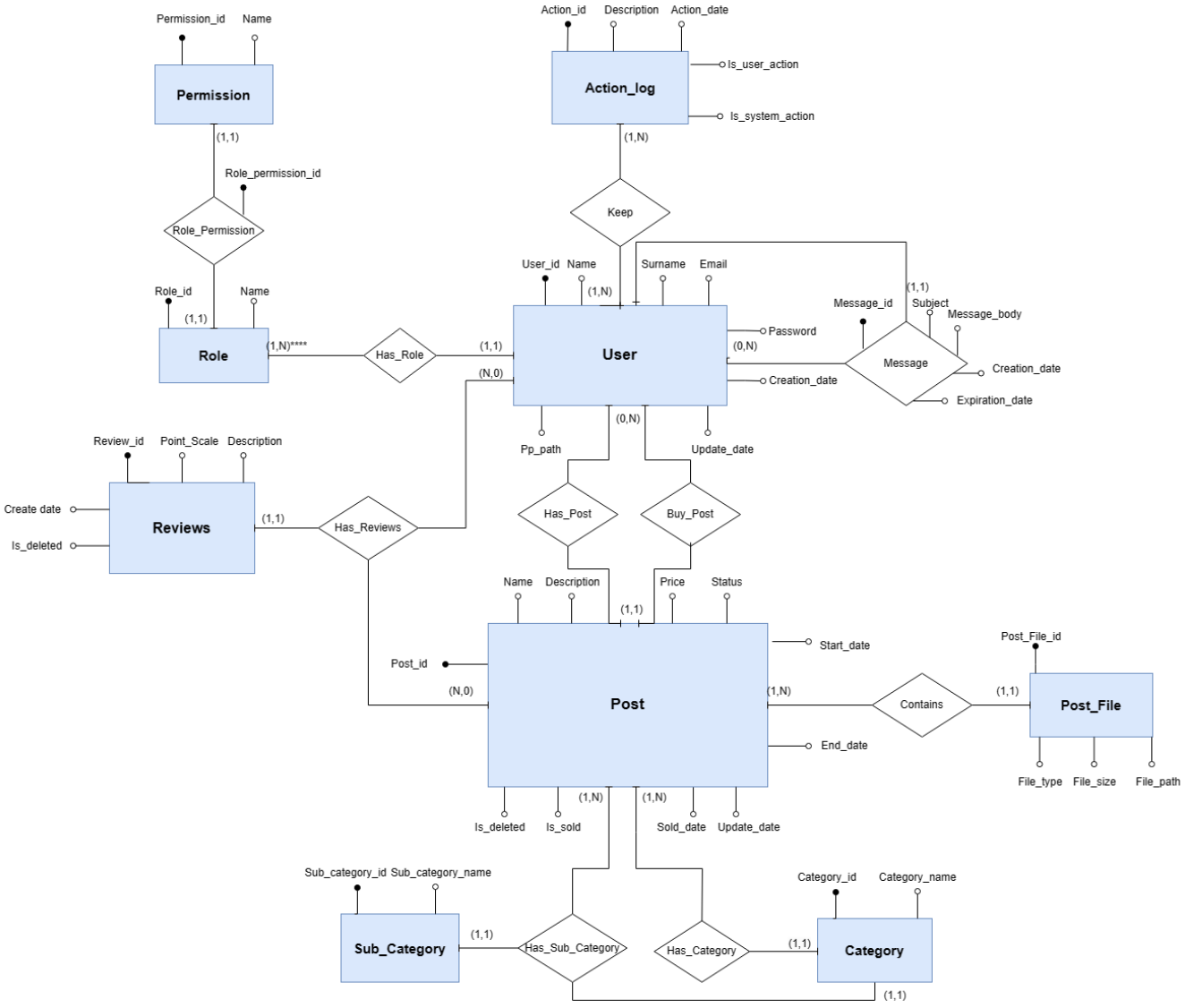
The website is divided into 3 main areas:

- **Publicly Visible Area :** Publicly visible area is the indication for the welcome page of our application that is accessible for both authorized and unathorized users. In this area, there are informations about the main logic behind our DamacaNaN marketplace and contributors. Additionaly users can access the marketplace by signing up and signing in.
- **User Area:** Is an area that is accessible for normal user that have permissions to:
  - Creating new posts in the marketplace
  - Updating their existed posts
  - Delete their posts
  - View posts of other users
  - Adding posts to their favorites
  - Searching for particular posts
  - Contacting sellers about details of their posts
  - Purchasing products from marketplace
  - Update their profile information
  - Viewing other user profiles
  - Rating users after the purchase operation
- **Administrative Area:** Is an area that is accessible for an admin that have permissions to:
  - Adding new categories to the system
  - Adding new subcategory under the desired category
  - Delete category and its corresponding subcategories
  - Delete subcategory from a category
  - Deleting unwanted posts

- Deleting unwanted users
- View all posts within the system
- View all users within the system
- View action logs of the overall system
- View and delete unwanted reviews

3 Data Logic Layer

3.1 Entity-Relationship Schema



Entity Relationship Schema

Entity-Relationship(ER) modal have 9 main entities:

- **User:** Each user has an unqiue user_id which is set as primary key. Also we are recording their name, surname, email, password, creation_date(timestamp for the moment that user generated), update_date(timestamp for the last time that the user information is updated), pp_path(where the profile photo of the user is stored as byte array). The admin user and a normal user's login credentials are below:
  E-mail: admin@gmail.com —— **Password:** 123456
  E-mail: user@gmail.com —— **Password:** 123456

- **Role:** Roles are the identifiers for the permissions. Each Role hes it's own unique Role Id.

- **Post:** Users create posts. Each post has it's own unique post_id. Posts contain Name, Description, Price, Status, start_date and update informations. According to situation of the post there are two boolean for each post. Those two booleans are Is_deleted and Is_sold. According to these boolean's value, End_date, Sold_date and Update_date can change.

- **Review:** After completion of the selling process, user that bought the item which post owner was selling can give Review to the post owner about their buying experience. Each Review has it's own unique Review_id. Review contains date, Point_scale and Description.

- **PostFile:** The file that post contains. It is the files that the post should have and that the user wanted to add.

- **Category:** Each category has it's own unique Category Id. Categories have just 2 datas, Category_Id and Category_name. Each post should have a category.

- **Subcategory:** Subcategory is under the Category. Like Category, Sub Category has its own sub_category_Id, and sub_category_name.

- **Permission:** Permissions are the things that users allowed to do. Each permission has it's own Permission_Id, each different permission has their own name. According to the user's role, permissions will be given by the system.

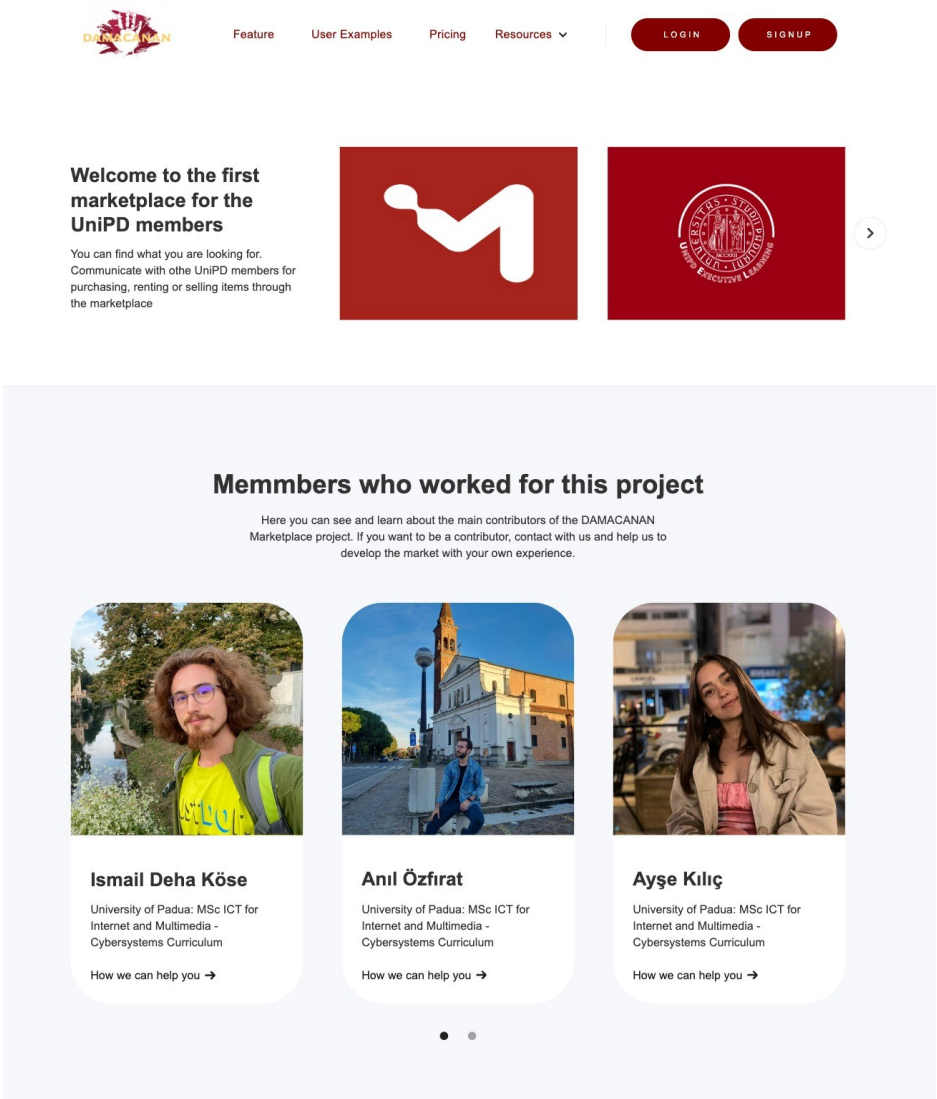
- **ActionLog:** ActionLog contains every action and those actions information (like date and description) in it.

4 Presentation Logic Layer

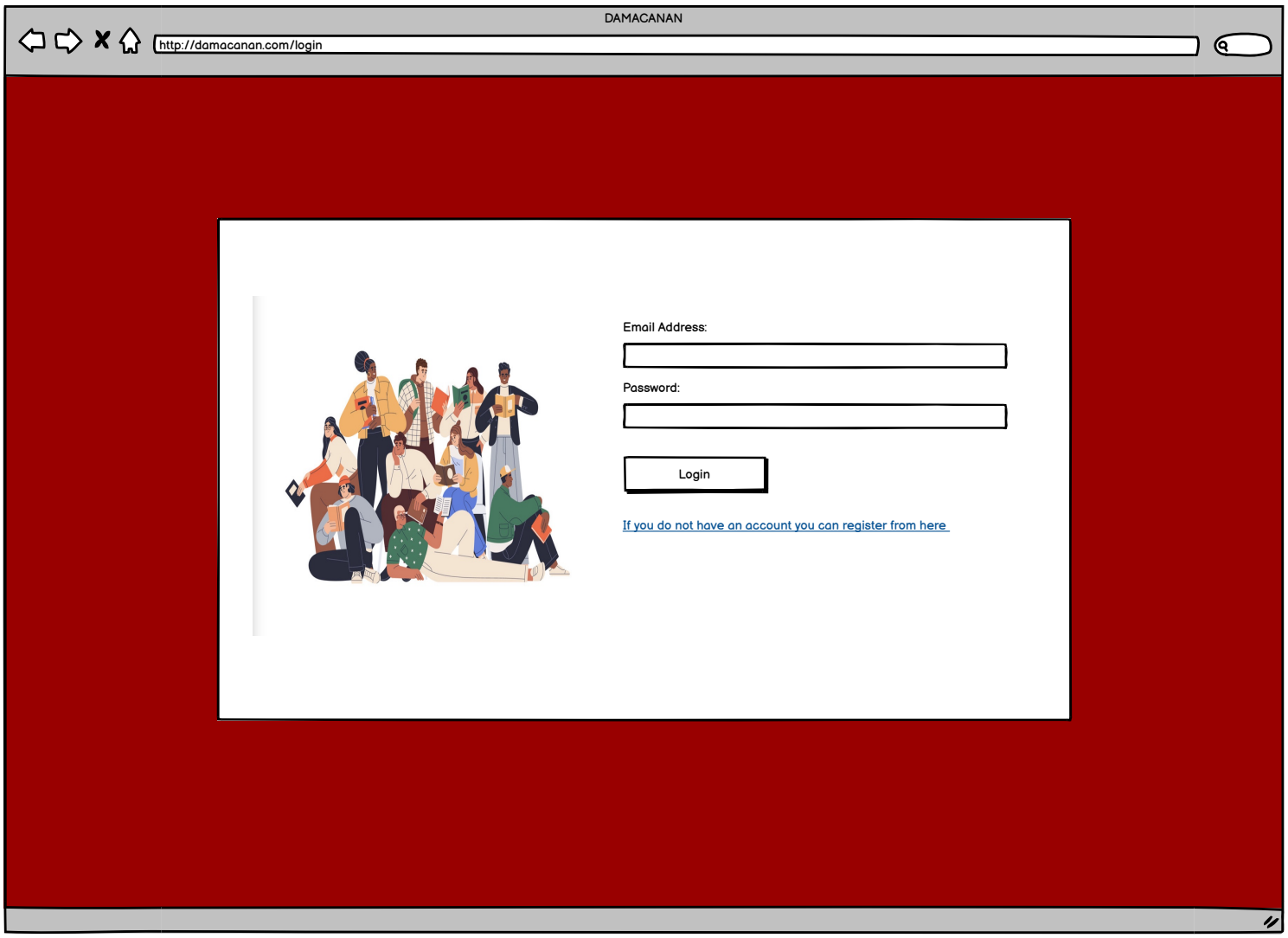
DamacaNaN will have a welcome, login, register, homepage, about us, search, profile, posts, post view, add post, edit post, message, pages. When users are logged or registered, they will be directed to the home page. Otherwise, they will be stuck on the login/register page and cannot get on the website. After the login/register operation, they can surf through other pages indicated above.

We have designed 9 mockup pages. They are welcome, register, login, profile, main page, post view, post addition, post edition, message page you can see then at below

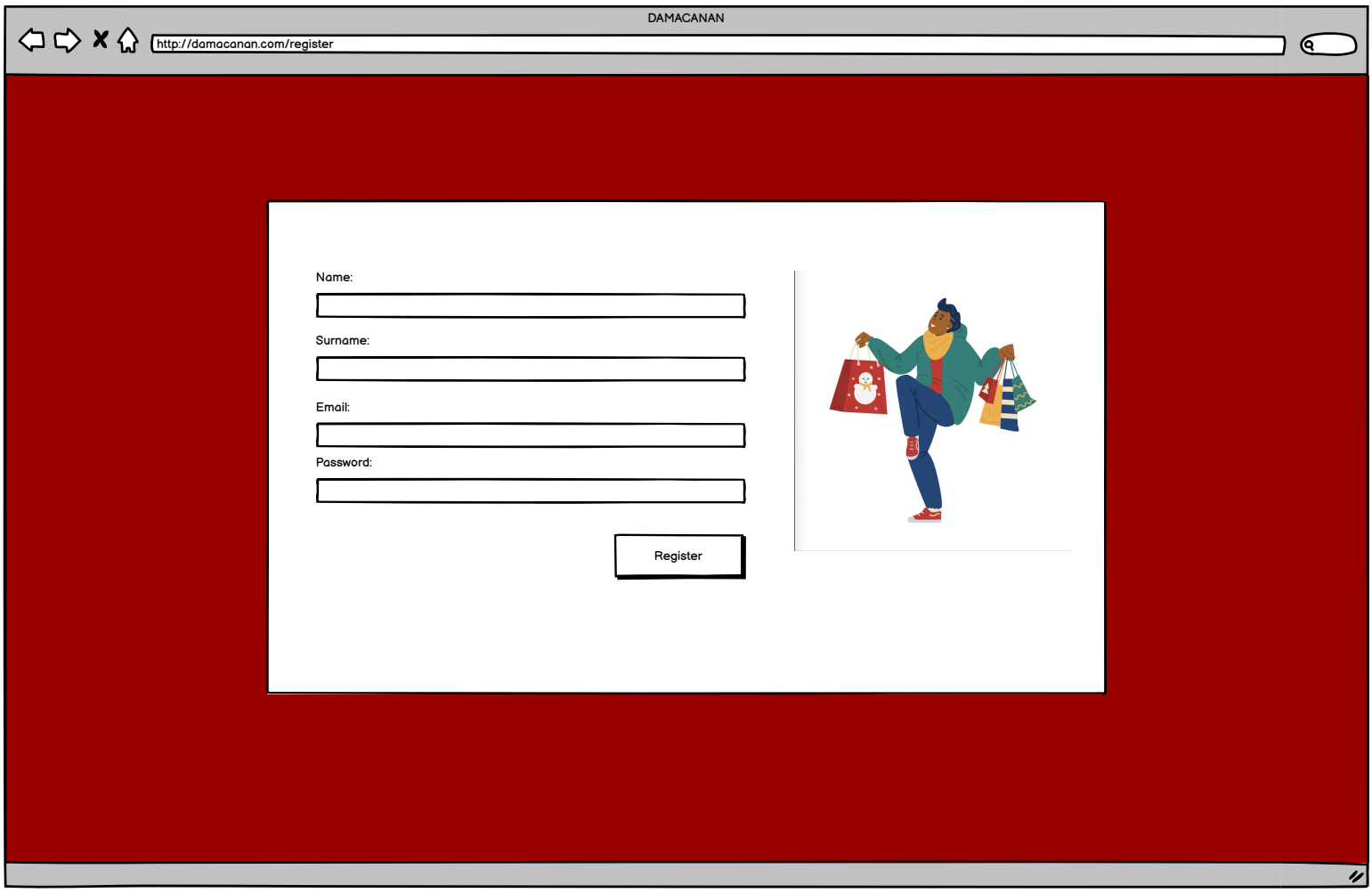
4.1 Mockup Pages:



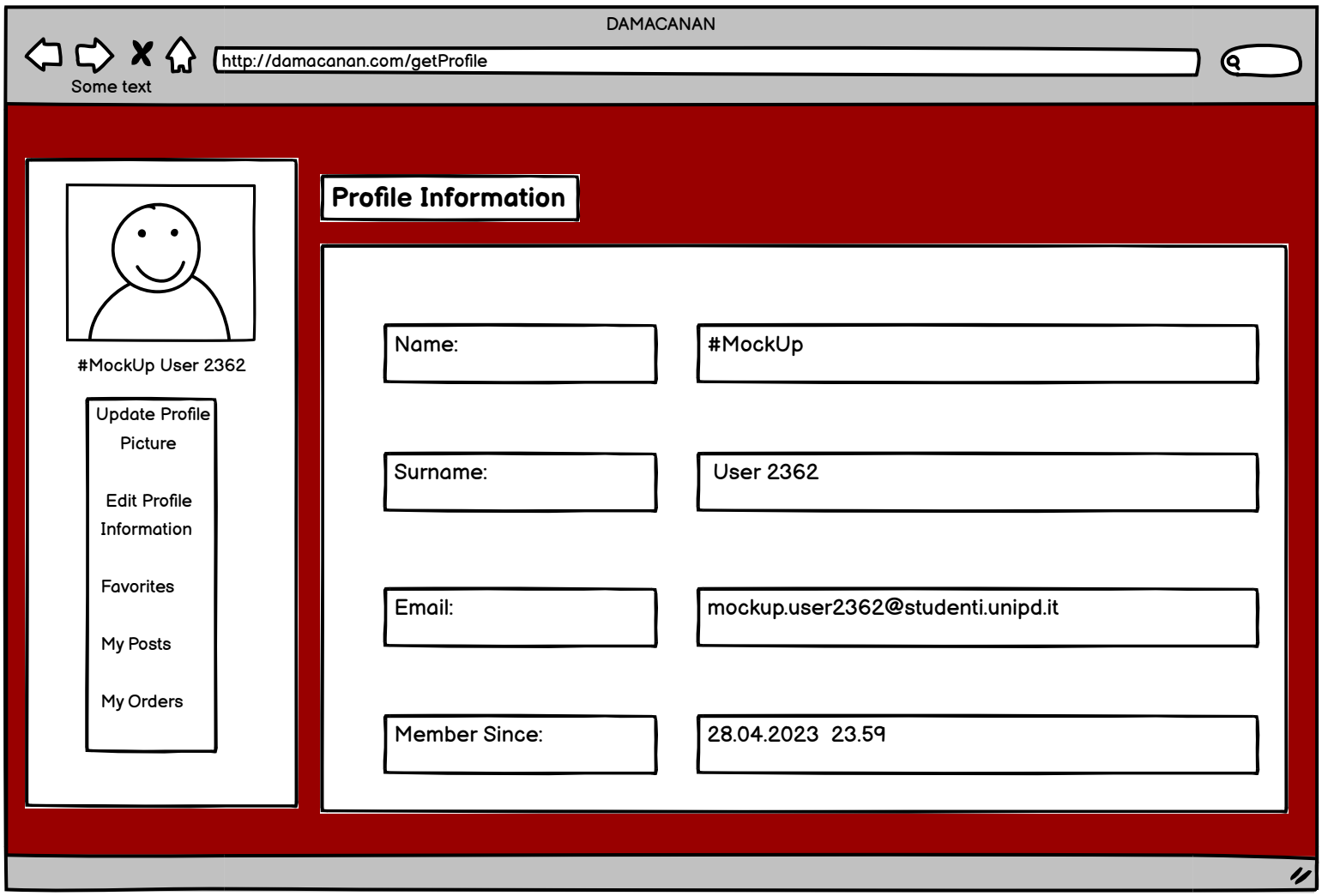
Home Page Mockup



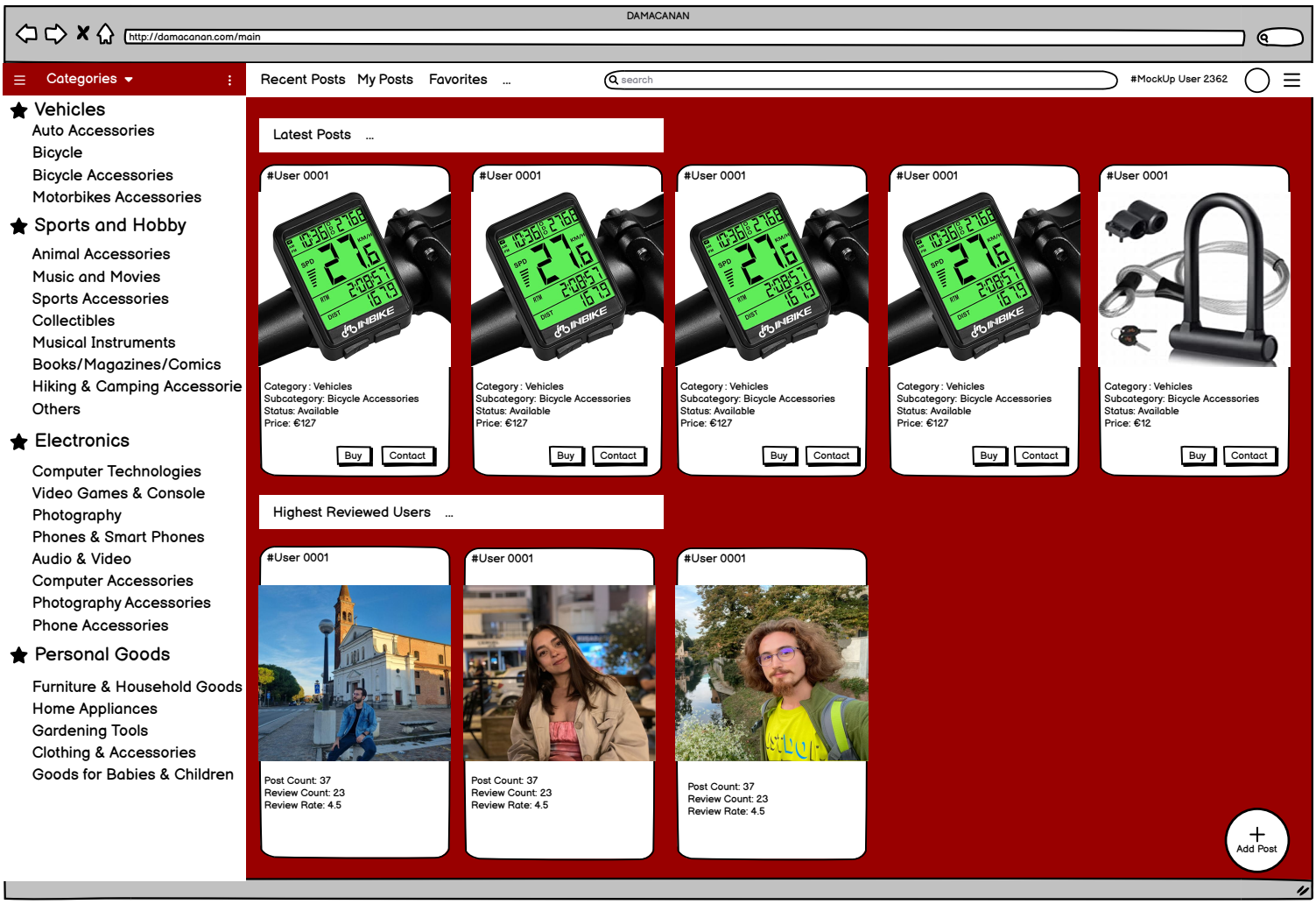
Login Page Mockup



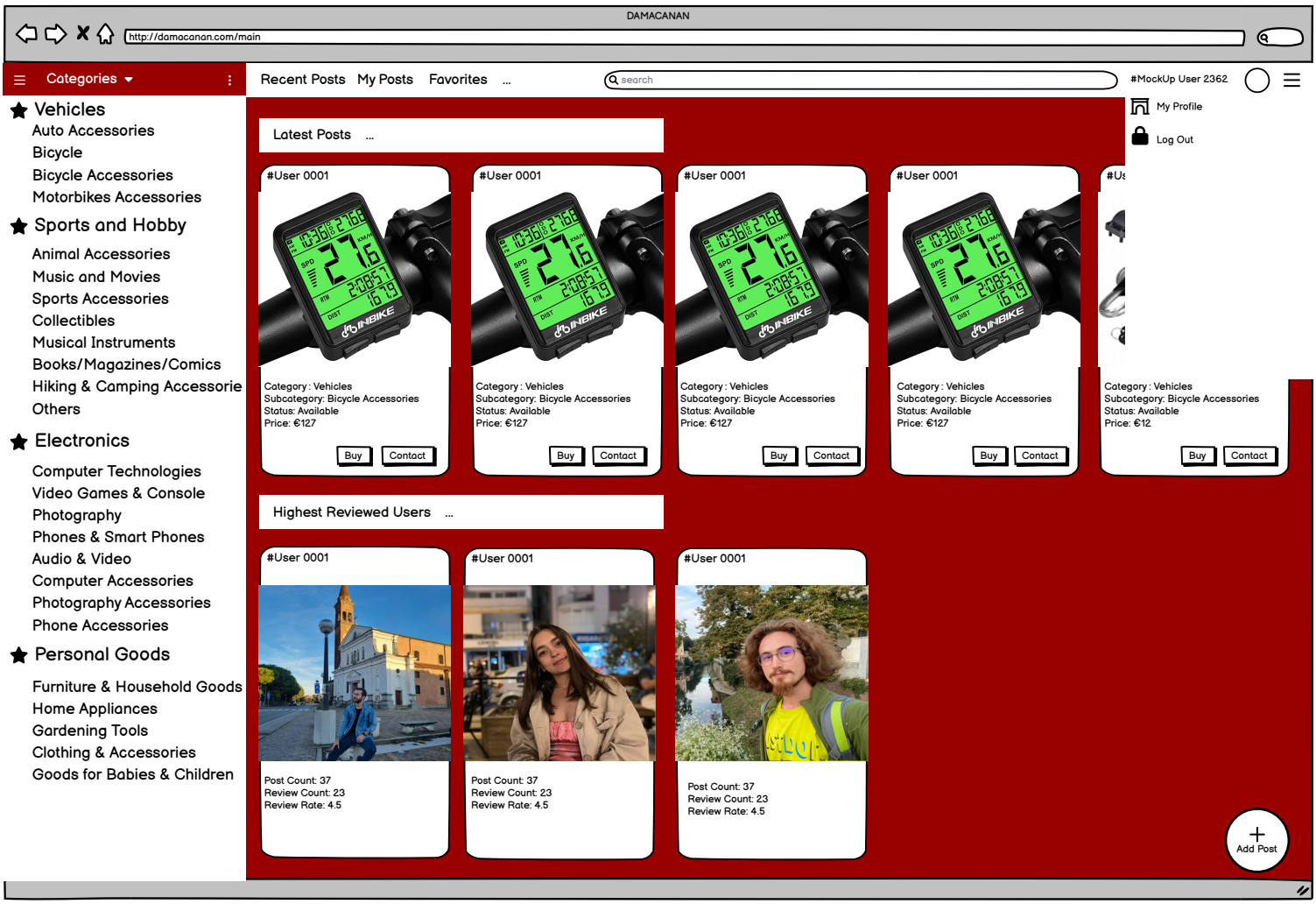
Register Page Mockup



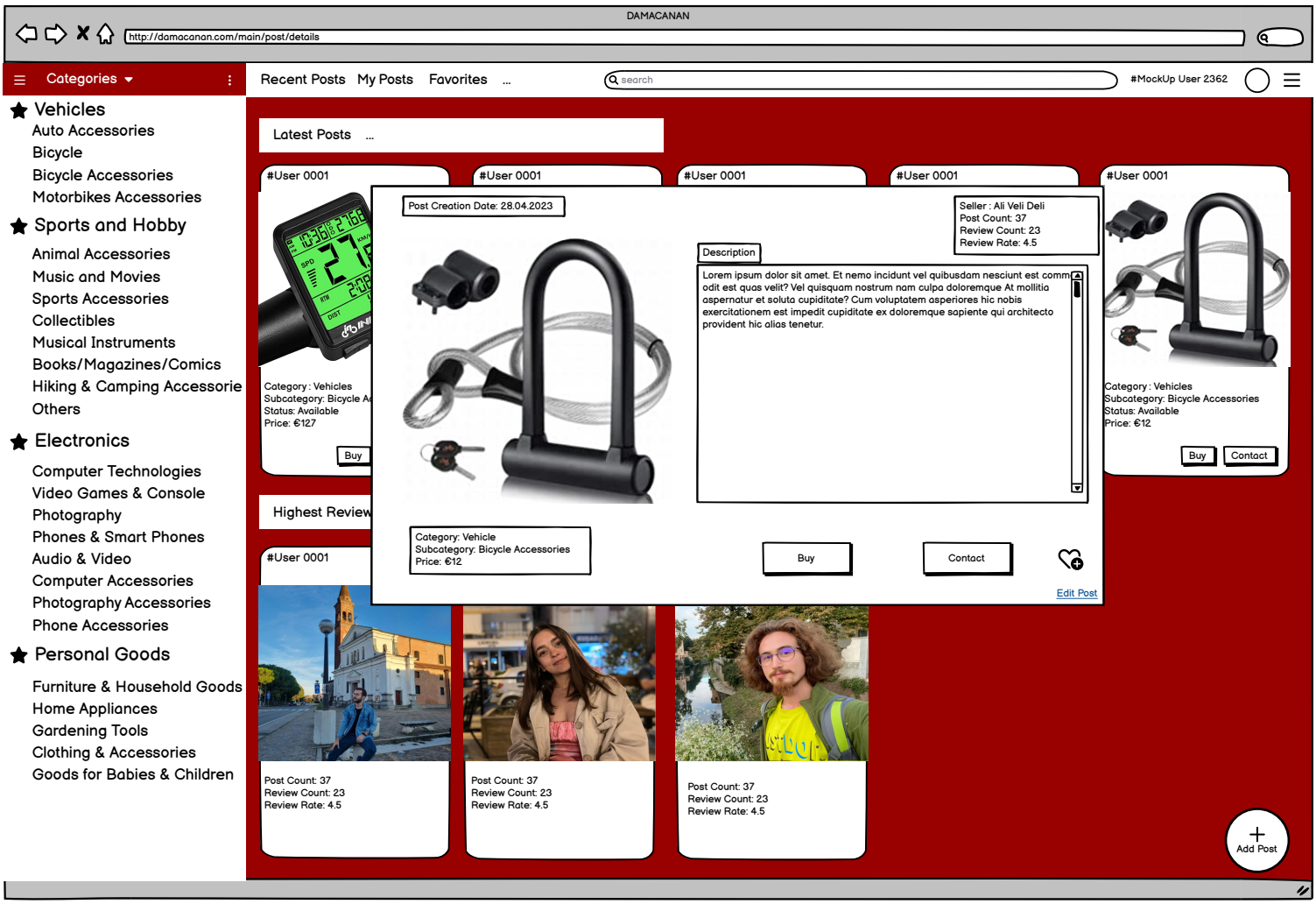
Profile Page Mockup



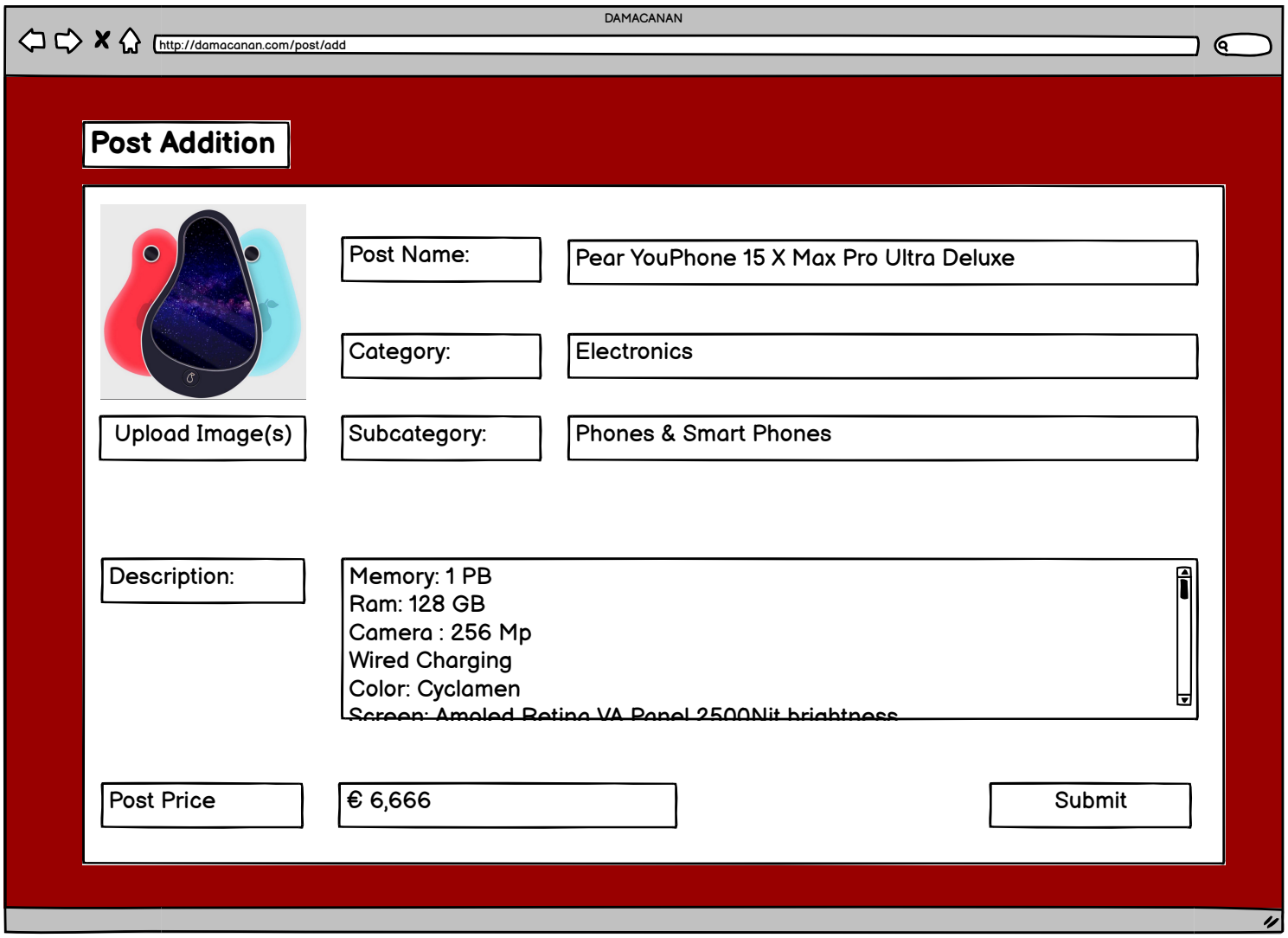
Home Page Mockup



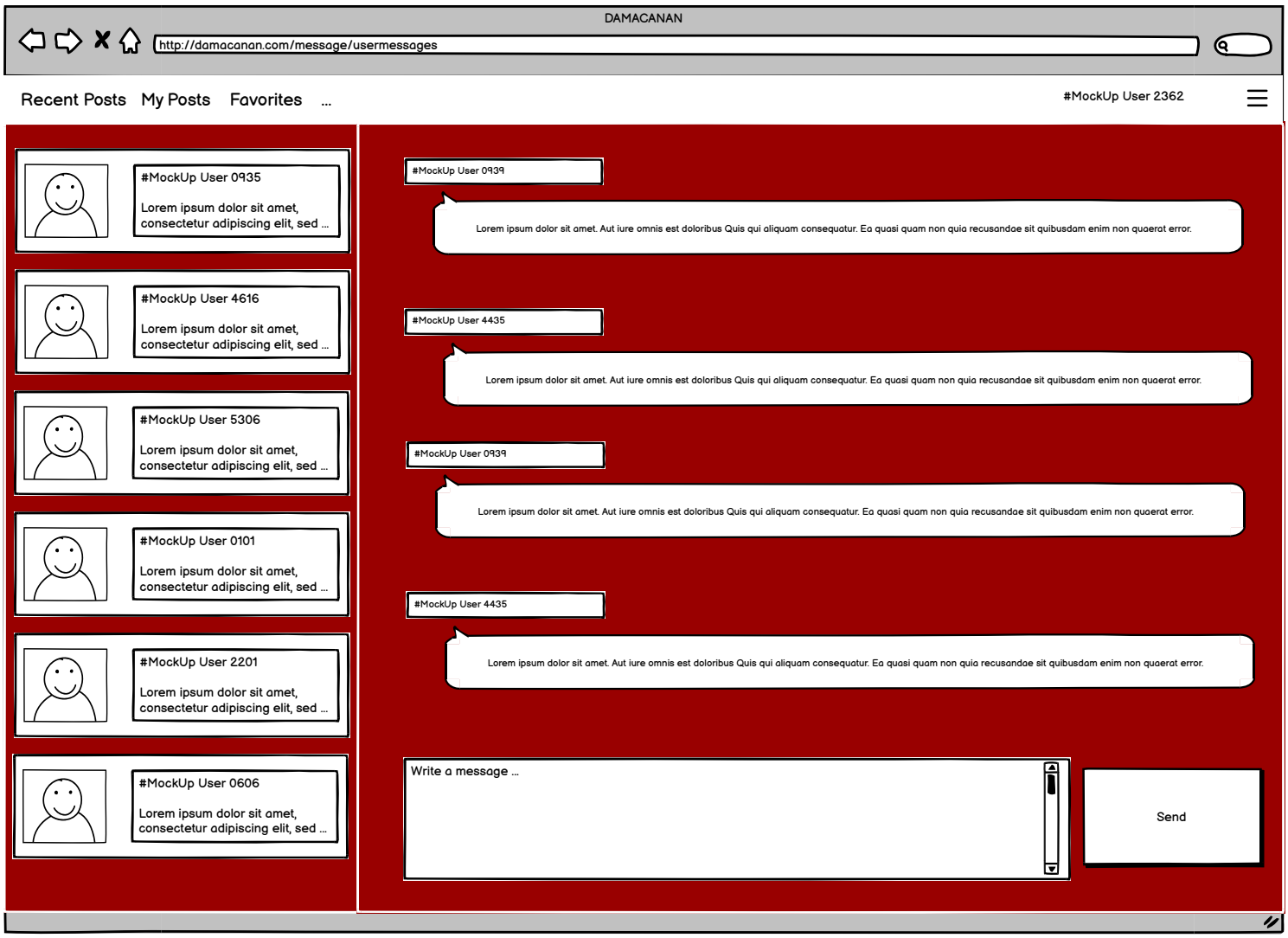
Home Page Profile Bar Mockup



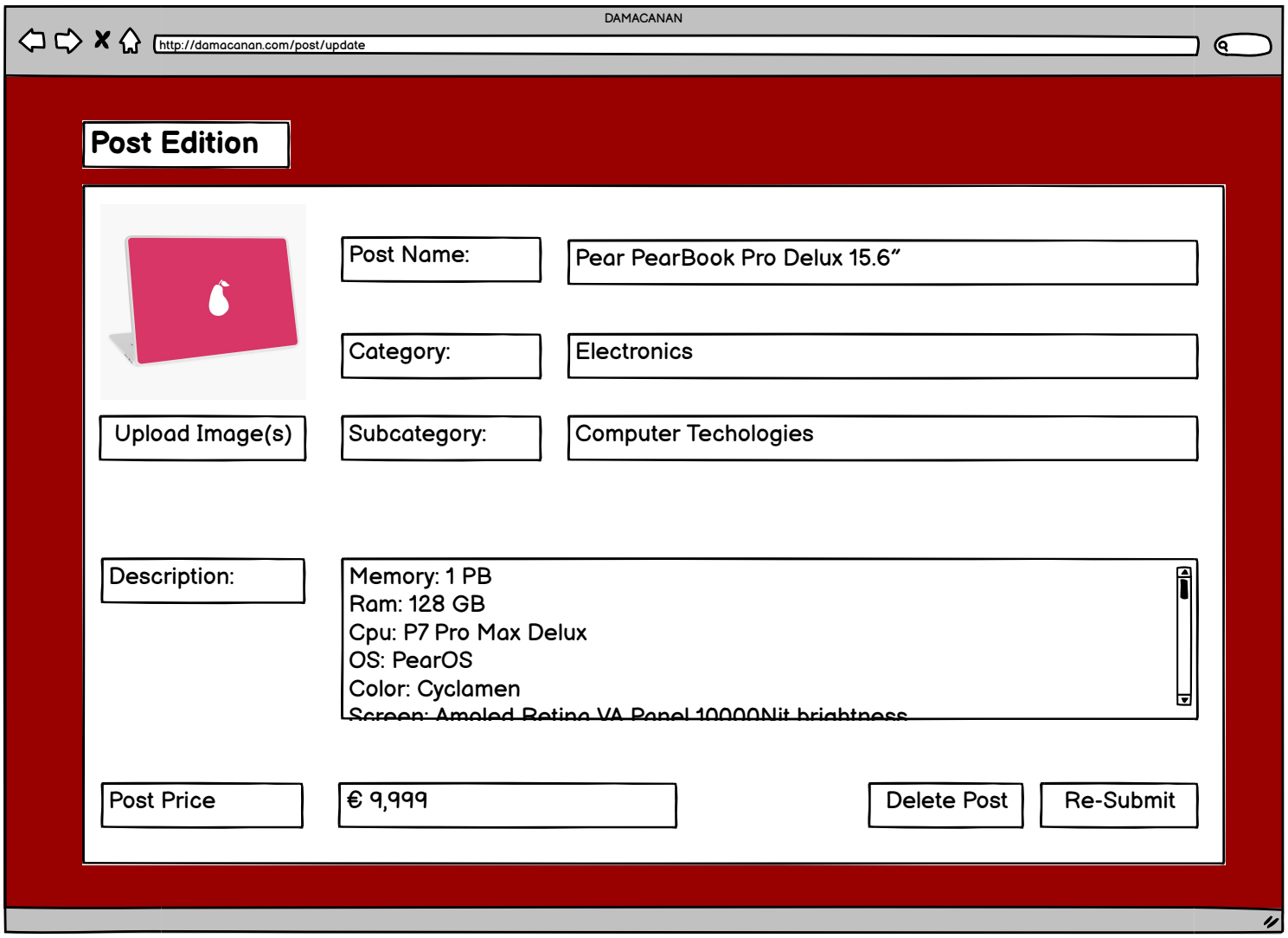
Post View Page Mockup



Post Addition Page Mockup



Message Page Mockup



Post Edition Page Mockup

Welcome Page, there is a short introduction about our website, and at the bottom, you can see the creators of the "DamacaNaN" website. At the top of the website, you can see some buttons to click. At the top right corner, you can see the login and register buttons.

The Sign in and log-in pages, both of them, are like traditional register and login pages.

The profile page, is an editable page for just profile owners, others just see the information such as profile picture (if exists), name, surname, email and date of their membership. Password specifically can be seen and edited just by the owner of the account.

Home Page, this page is only visible after the login operation, so if and only if registered users can see this page. This page has posts that lasted added, users who have the highest review point, a search bar that can search what you want, a category bar that has categories, and next to the below of categories themselves subcategories. Also, this page has a profile bar that can visit the profile and get logged out.

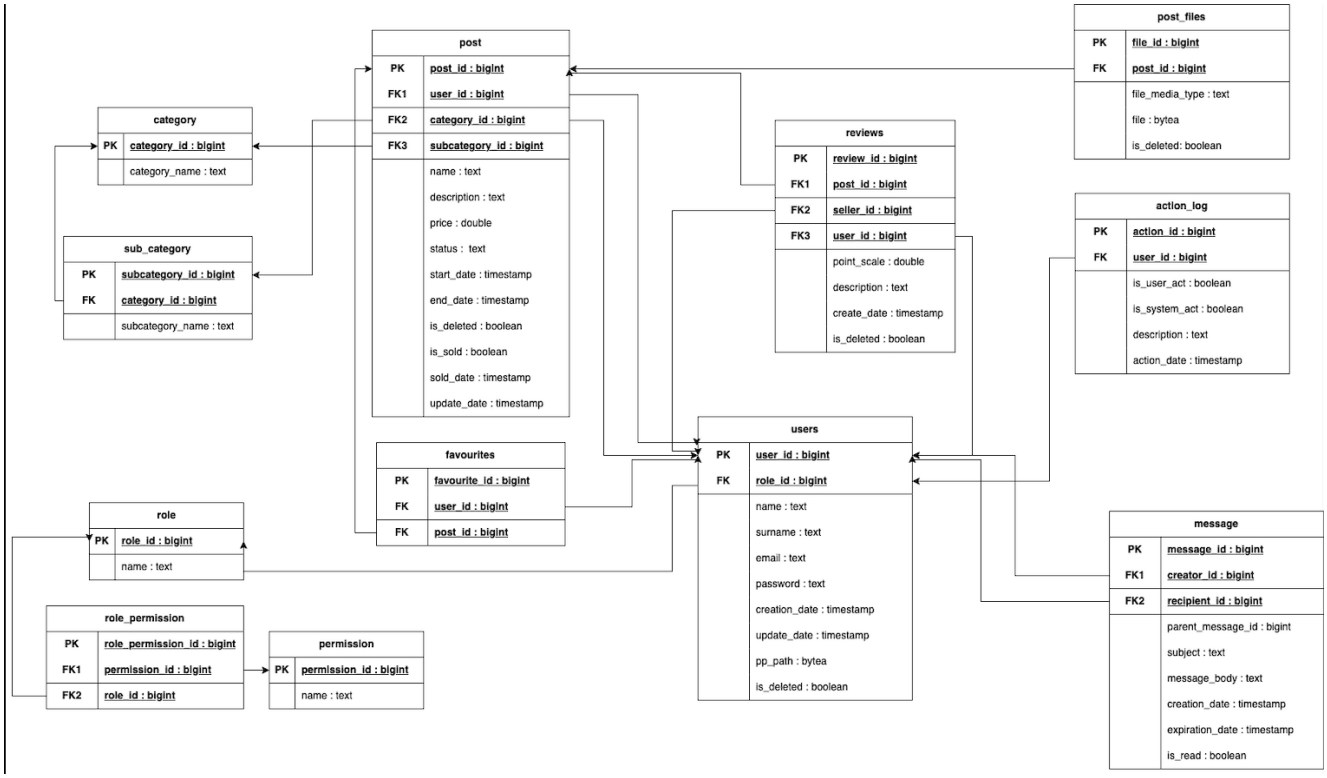
Post view page, when get into the post in which you are interested, there will be post pictures (bigger than the previous page), post descriptions, seller part which has some seller information such as a profile picture (if exists), name, and surname, post count, review count, review rate (if exists).

Post addition page, sellers can create their posts here. They can add pictures, descriptions, categories, subcategories, and prices about the post.

Post edition page, sellers can update or change their posts here. They can update or change pictures, descriptions, categories, subcategories, and prices about the post. In addition, you can delete your post.

5 Business Logic Layer

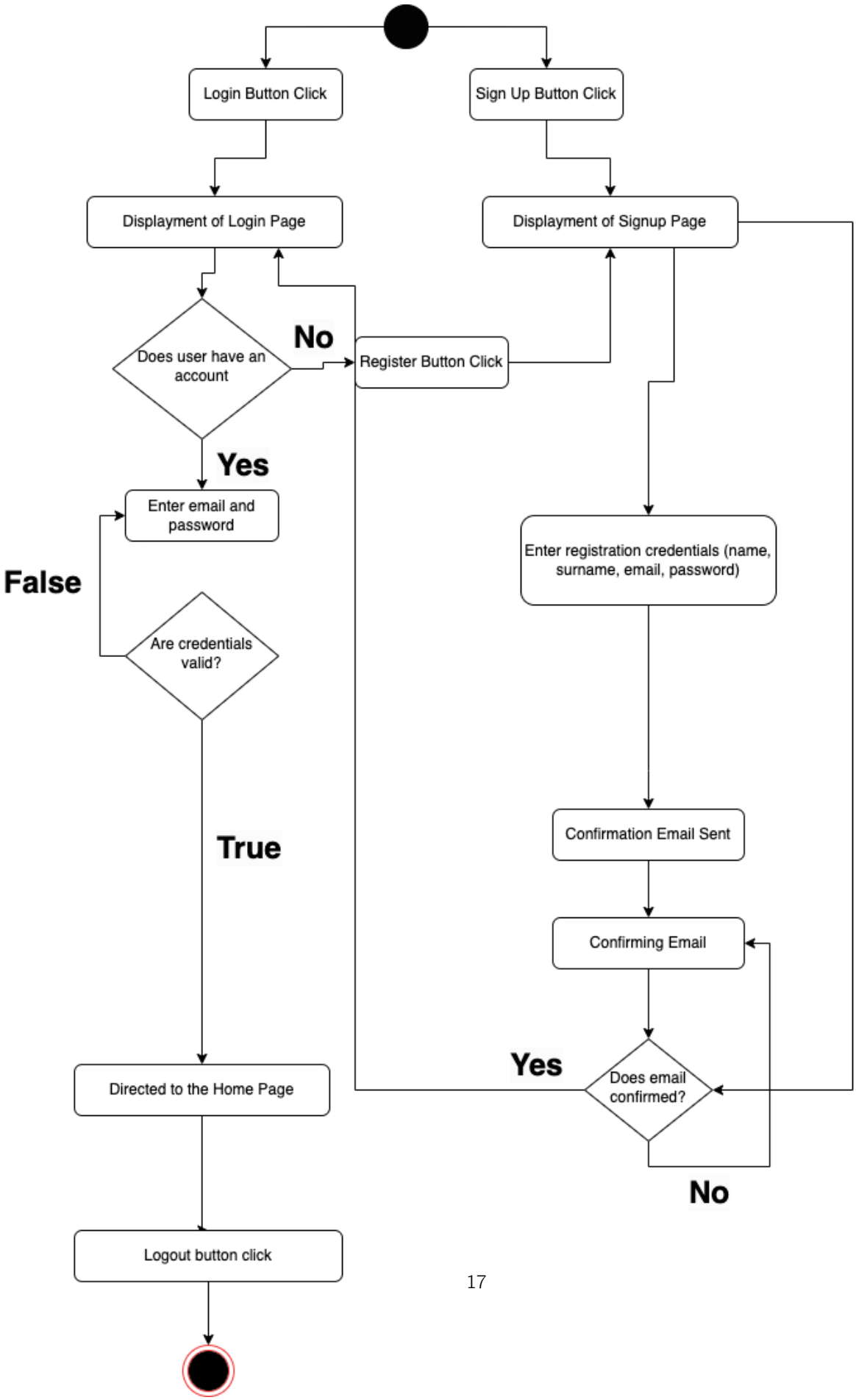
5.1 Class Diagram



Class Diagram

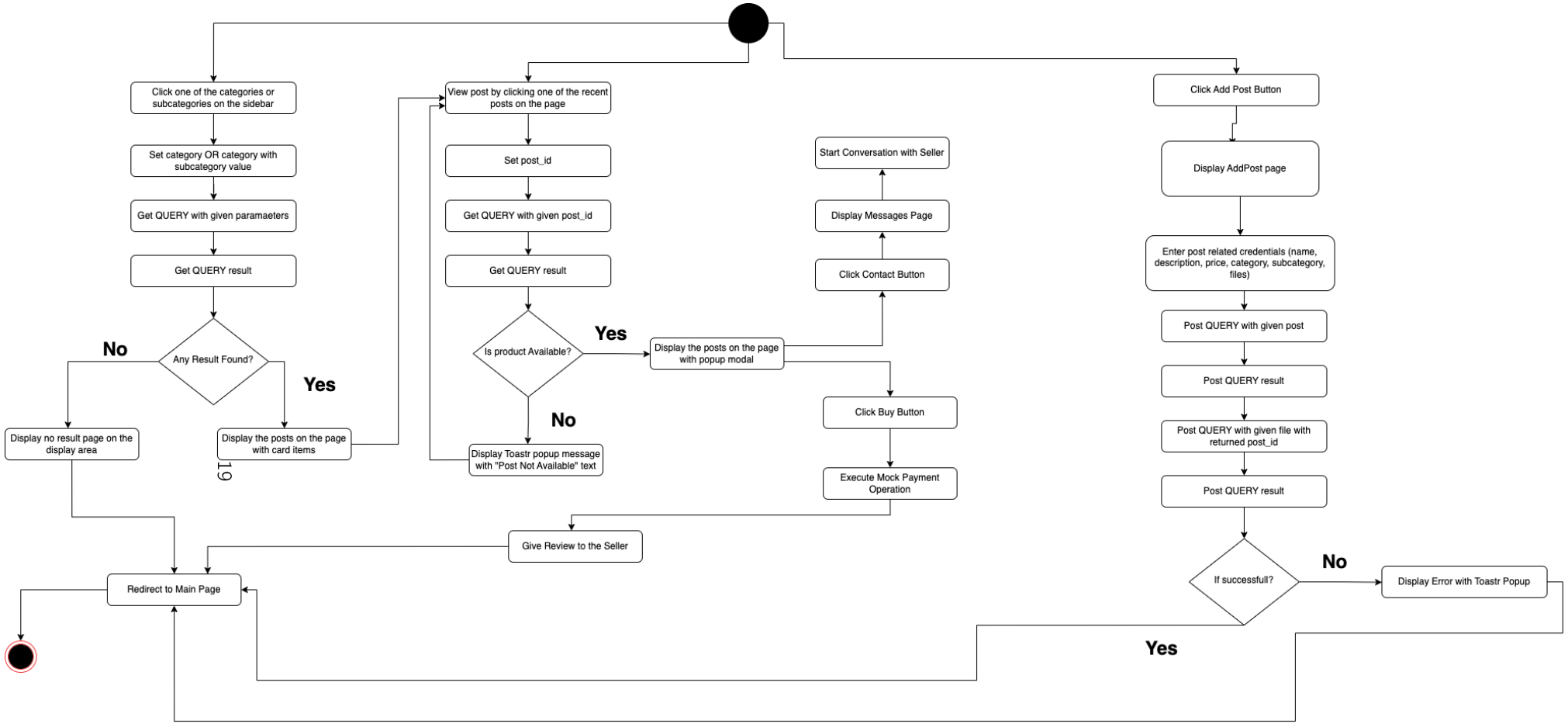
As a software engineering definition, "class diagram" in UML architecture structural design that describes the structure of a system by showing the overall systems classes, their attributes, operations (or methods), and the relationships among objects. For our project we made class diagram for our Resources with their attributes and their types.

Activity diagrams are one of the most significant diagram in UML architecture for the representation of dynamic aspects of the overall system in parts. Dynamic operations which are also can be denoted as the activities can be shown as flowchart representations before the real development of the system. That is why in each activity diagram there exist a start and end point that encapsulates the overall activity flow in each represented part.


Login Button Click
Sign Up Button Click
Displayment of Login Page
Displayment of Signup Page
Does user have an account
No
Register Button Click
Yes
Enter email and password
False
Are credentials valid?
Enter registration credentials (name, surname, email, password)
True
Confirmation Email Sent
Confirming Email
Yes
Does email confirmed?
No
Directed to the Home Page
Logout button click

In the above, activity diagram represents the flow of the login and registration operations within the system. As shown in the diagram, they work in a coherent way and interacts with each other.

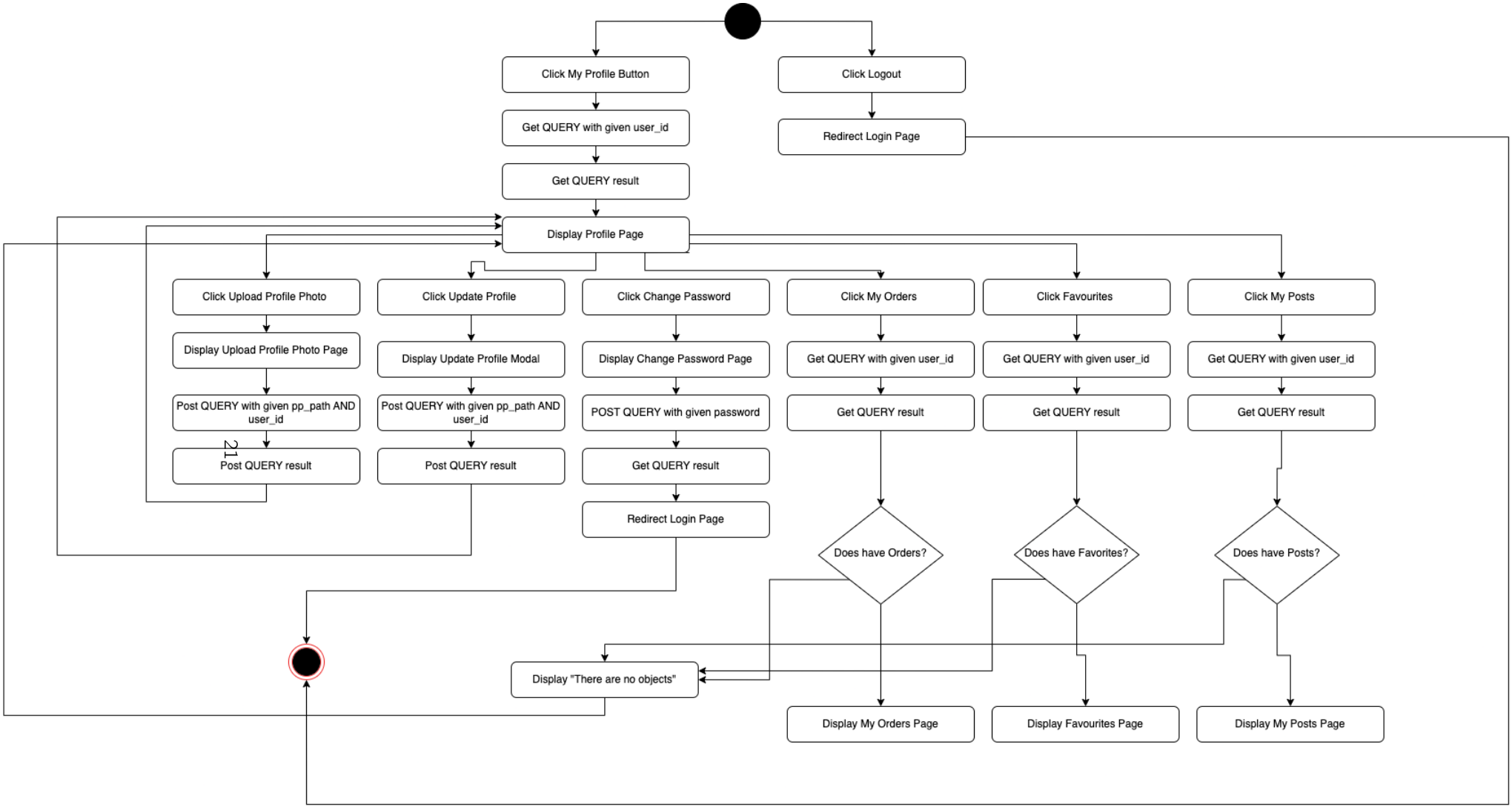
Further Development Plans: Google Authentication for the login operation and Google Registration for the registration operation will be implemented. And email service will be supplied with external email services.


Click one of the categories or subcategories on the sidebar
Set category OR category with subcategory value
Get QUERY with given paramaeters
Get QUERY result
Any Result Found?
No
Yes
Display no result page on the display area
Display the posts on the page with card items
19
View post by clicking one of the recent posts on the page
Set post_id
Get QUERY with given post_id
Get QUERY result
Is product Available?
Yes
No
Display Toastr popup message with "Post Not Available" text
Display the posts on the page with popup modal
Start Conversation with Seller
Display Messages Page
Click Contact Button
Click Buy Button
Execute Mock Payment Operation
Give Review to the Seller
Click Add Post Button
Display AddPost page
Enter post related credentials (name, description, price, category, subcategory, files)
Post QUERY with given post
Post QUERY result
Post QUERY with given file with returned post_id
Post QUERY result
If successfull?
No
Display Error with Toastr Popup
Yes
Redirect to Main Page

Above diagram demonstrates the post related flows that can be accessed from the main page of the system. Post operations can be overviewed as by viewing and adding activities. Additional operations on the posts such as buying and contacting with the seller will be directed to their services and related pages. If the view operation observed from the perspective of authorized user, user is authorized for editing his/her post.

If we observe the flows in parts user is authorized for post addition, viewing other users posts and viewing authenticated users posts. By viewing other post user can either buy or contact with the seller for further informations. When the post related operation finished user will be redirected to the main page and activity will be set as finished.

Further Development Plans: Buy operation will be handled by an external payment service. Java payment libraries will be overview and chosen accordingly.


Click My Profile Button
Click Logout
Get QUERY with given user_id
Redirect Login Page
Get QUERY result
Display Profile Page
Click Upload Profile Photo
Click Update Profile
Click Change Password
Click My Orders
Click Favourites
Click My Posts
Display Upload Profile Photo Page
Display Update Profile Modal
Display Change Password Page
Get QUERY with given user_id
Get QUERY with given user_id
Get QUERY with given user_id
Post QUERY with given pp_path AND user_id
Post QUERY with given pp_path AND user_id
POST QUERY with given password
Get QUERY result
Get QUERY result
Get QUERY result
Post QUERY result
Post QUERY result
Get QUERY result
Redirect Login Page
Does have Orders?
Does have Favorites?
Does have Posts?
Display "There are no objects"
Display My Orders Page
Display Favourites Page
Display My Posts Page

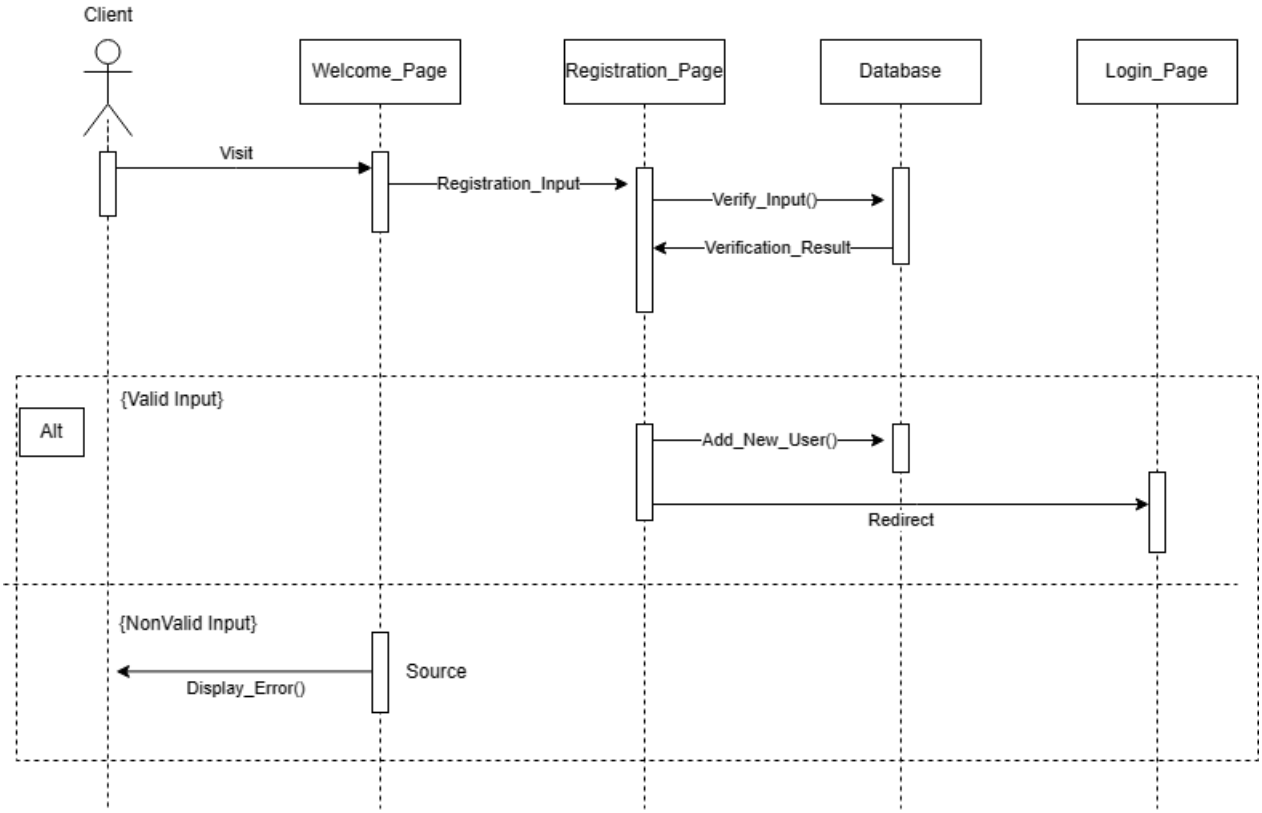
Above diagram demonstrates the profile related flows that can be accessed from the profile page of the user. All user related profile operations can be listed as updating information, changing password, updating profile photo, viewing the aftermath of the operations of purchasing, contacting and adding posts. Every operation in the activity flow triggers the specific queries that will redirect the changes to the profile page.

As an important operation, changing password triggers the logout operation automatically that also navigates user to the login page again.

5.2 Sequence Diagram

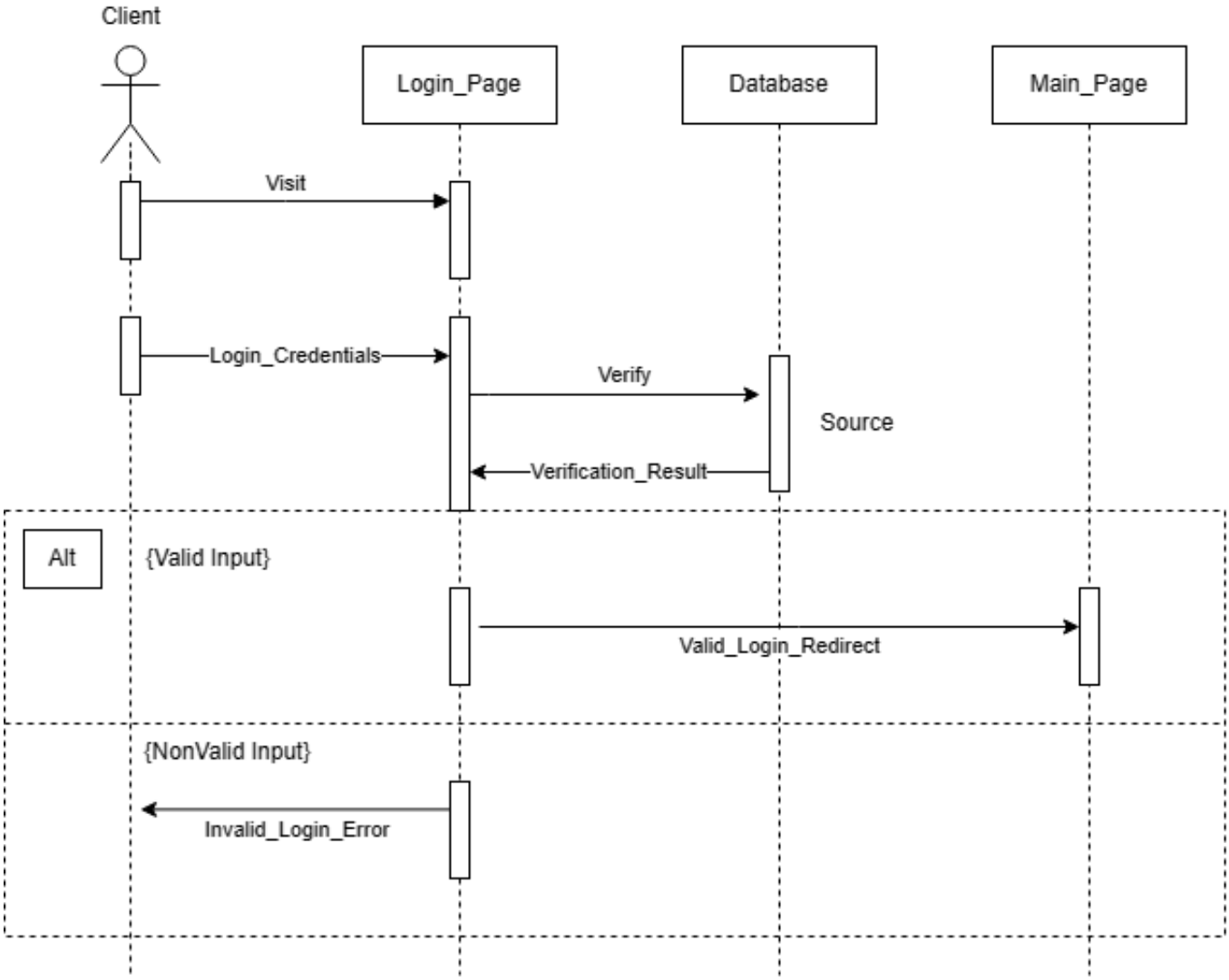
Sequence diagrams shows the object interactions arranged in time sequence, describing how and in what order a group of objects works together.

In below, sequence diagram shows how the user should enter inputs when registering to the system. If the user enters valid input, the system redirects to the login page, and if the user enters invalid inputs, the system shows error messages.



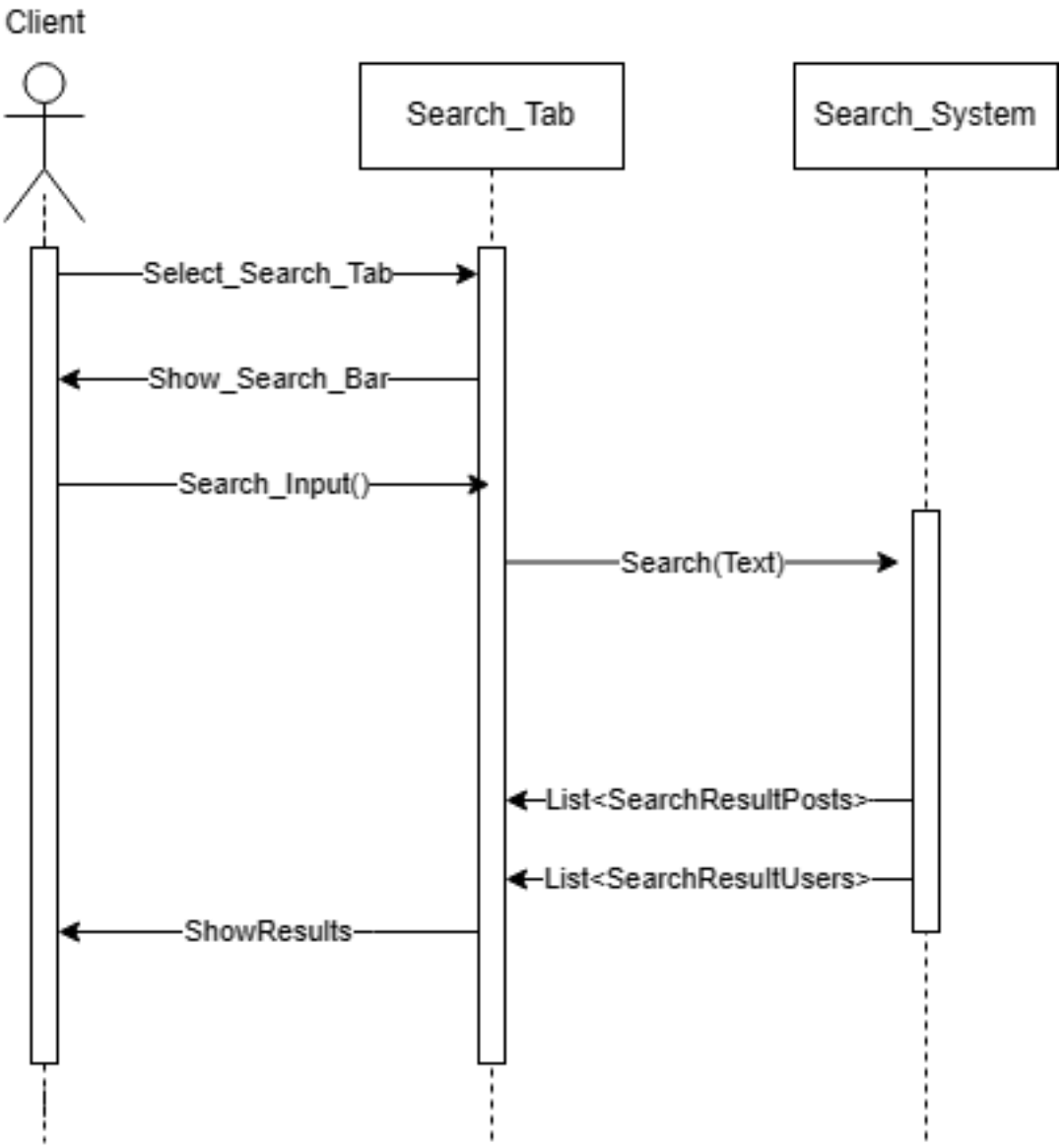
Welcome Page and Registration Sequence Diagram

In this sequence diagram, one can observe how login authentication works. As shown in the diagram, if the user enters valid login credentials the system redirects to the Main Page, and if the user enters invalid login credential error is dispatch for to display.



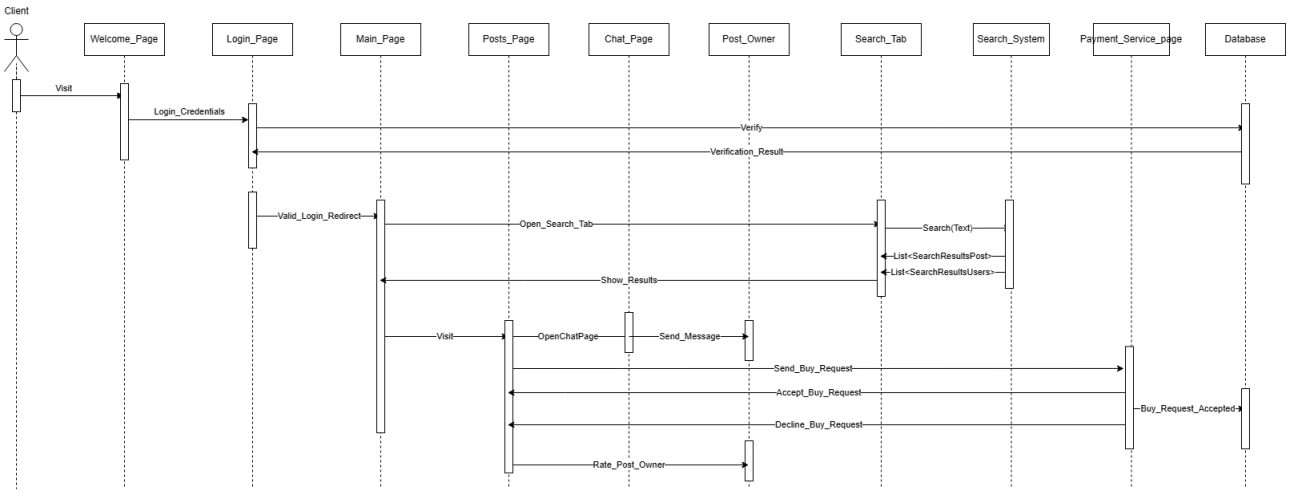
Login page Sequence Diagram

In this sequence diagram, one can observe how login authentication works. As shown in the diagram, if the user enters valid login credentials the system redirects to the Main Page, and if the user enters invalid login credential error is dispatch for to display.



Search Tab Sequence Diagram

In this sequence diagram, one can observe how search operation of the posts and users works. As shown in the diagram, user enters a keyword to the search bar. Search systems handles the requested keyword and returns if there exist any users or posts with that keyword. Then these lists will be shown to the user.



Post Sequence Diagram

In this sequence diagram, one can observe a user interacts with the system from the perspective of post related operations. In each step, diagram shows which inputs we have obtained. By these response inputs we are showing how each post related operation is handled within the system and the resultant directions.

5.3 REST API Summary

Part of the URIs are filtered through the session filtering with the role of the users within the system. With this filter only users with the role of SuperAdmin can access some of the resources.

URI	Method	Description	Filter
user/userById	GET	Retrieves user with the given user_id	
user/userByCreationDate	GET	Retrieves users with the given date-time	Admin
user/userByNameSurname	GET	Retrieves user with the given name and surname	
user/userByUpdateDate	GET	Retrieves users with the given update dates	Admin
user/getAll	GET	Retrieves all users	Admin
user/getProfile	GET	Retrieves user with the given user_id	
user/logout	GET	Logouts user	
user/login	POST	Logins user	
user/register	POST	Registers user	
user/update	POST	Updates user information	
user/delete	POST	Deletes user	Admin
user/changepassword	POST	Changes password of the user	
user/updatephoto	POST	Changes profile picture of the user	
post/details	GET	Brings the details of the post	
post/myorders	GET	Brings the orders of user	
post/myposts	GET	Brings the posts of user	
post/add	POST	Post addition operation	
post/update	POST	Post update operation	
post/delete	POST	Post delete operation	
post/buy	POST	Post buy operation	
subcategory/details	GET	Brings the details of SubCategory	
subcategory/getAll	GET	Brings all the SubCategory	

subcategory/add	POST	Adding SubCategory	
subcategory/update	POST	Updating SubCategory	
subcategory/delete	POST	Deleting SubCategory	
role/allRole	GET	Bringing all the roles	Admin
role/protected/add	POST	Adding Role	Admin
role/protected/deleteRole	POST	Deleting Role	Admin
role/update	POST	Updating Role	Admin
review/details_by_post_id	GET	Bringing review detail by post_id	
review/protected/add	POST	Adding Review	
review/protected/delete	POST	Deleting Review	
review/update	POST	Updating Review	
postFiles/getAllPostFiles	GET	Bringing all post files	Admin
postFiles/loadPostFile	GET	Loading a post File	
postFiles/getPostFilesOp	GET	Getting post file details	
postFiles/add	POST	Adding post files	
postFiles/upload	POST	Uploading post files	
postFiles/update	POST	Updating post files	
postFiles/delete	POST	Deleting post files	
permission/allpermissions	GET	Bringing all permissions	Admin
permission/permissionDetails	GET	Bringing permission details	Admin
permission/add	POST	Adding permission	Admin
permission/update	POST	Updating permission	Admin
permission/delete	POST	Deleting permission	Admin
message/details	GET	Bringing message details	
message/usermessages	GET	Bringing messages of the user with given user_id	
message/getAll	GET	Bringing all messages	Admin
message/add	POST	Sending message	
favourite/getAll	GET	Bringing favorite posts of the user with given user_id	
favourite/add	POST	Adding post to the favorties	
favourite/remove	POST	Removing post from favorites	
category/details	GET	Bringing category details	
category/getAll	GET	Bringing all categories	
category/add	GET	Adding a category	Admin
category/update	POST	Updating a category	Admin
category/delete	POST	Deleting a category	Admin
actionlog/getLogs	GET	Bringing all logs	Admin
actionlog/getSystemLog	GET	Bringing all system logs	Admin
actionlog/getUserLog	GET	Bringing all user logs	Admin
actionlog/add	POST	Adding action log	Admin

Table 2: Describe in this table your REST API

5.4 REST Error Codes

Error Code	HTTP Status Code	Description
99	INVALID_INPUT_TYPES	One or more input fields are invalid.
100	INVALID_USER_ID	ID is invalid for the resource
101	NO_SUCH_RESOURCE_FOUND	Resource not found
102	INVALID_REVIEW_RANGE	Invalid review range
103	EMAIL_MISSING	Email credential is missing
104	PASSWORD_MISSING	Password credential is missing.
105	WRONG_CREDENTIALS	Submitted credentials are not in correct format
106	INVALID_REVIEW_RATING	Rating range of review is invalid
107	INVALID_USER_INFO	Invalid user credentials
108	ADMIN_ONLY_ACTION	Authorized action for only admin.
110	INVALID_EMAIL_ADDRESS	Invalid email address credential.
111	INVALID_PASSWORD	Invalid password credential.
117	USER_NOT_FOUND	User not found.
120	BADLY_FORMATTED_JSON	JSON format is invalid.
200	OPERATION_UNKNOWN	Operation unknown.
500	METHOD_NOT_ALLOWED	The method is not allowed
999	INTERNAL_ERROR	Internal Error

Table 3: Describe in this table your REST API

5.5 REST API Details

Rest Posts Search

- URL: `/rest/posts/search`
- Method: `GET`
- URL Parameters: Content-Type = application/json
- Data Parameters: "keyword": "keyword"
- Success Response: "posts-list" : [Post.objects]
- Error Response:

  Code: -101 NO_SUCH_RESOURCE_FOUND Content: "error": "code": -101, "message" : Resource Not Found." When: The resource, post in our case, not found in the database.
- Curl Example: curl -v -X GET -H "Content-Type:application/json" -d " keyword:MSI " http://localhost:8080 /damacanan_war_exploded/rest/posts/search

Login

- URL: `/user/login`
- Method: `POST`
- URL Parameters: No parameters required
- Data Parameters: Email and Password

- Success Response: Upon success, the servlet logins the user in and redirects to the main.jsp
- Error Response:

  Code: -103 EMAIL MISSING Content: "error": "code": -103, "message" : Email missing." When: If the email box is left empty this error is dispatched.

  Code: -104 PASSWORD MISSING Content: "error": "code": -104, "message" : Password missing." When: If the password box is left empty this error is dispatched.

  Code: -105 WRONG CREDENTIALS Content: "error": "code": -105, "message" : submitted credentials are wrong." When: If there is a SQLException or the user enters wrong login credentials this error is dispatched.

  Code: -109 INVALID EMAIL ADDRESS Content: "error": "code": -109, "message" :Invalid email address" When: If the wrong email is entered this error is dispatched.

  Code: -111 USER NOT FOUND Content: "error": "code": -111, "message" :Invalid password." When: If the user does not exist in the database this error is dispatched.

  Code: -999 INTERNAL ERROR Content: "error": "code": -999, "message" :Internal Error." When: If there is a SQLException this error is dispatched.

6 Group Members Contribution

Adnan Kerem Aksoy Test Engineer, Resource x1.5, DAO x7 ,Servlet x1, JSP x1, Entity Relationship Schema, Sequence Diagram, Report.

Isil Atabek Resource x0, DAO x1 ,Servlet x0, JSP x1.

Ayse Kilic Team Leader, Resource x1.5, DAO x7.5 ,Servlet x1, JSP x1

Ismail Deha Kose Test Engineer, Resource x1, DAO x5 ,Servlet x1, Report.

Merve Ofluoglu Project Manager, Database Population and Creation, Resource x1.5, DAO x16, sevlet x4, JSP x6

Anil Ozfirat Support Engineer, Resource x1 ,DAO x5 ,Servlet x1, JSP x1

Samet Can Ozturk Entity Relationship Schema, Sequence Diagram

Mehmet Sanisoglu Resource x1, DAO x ,Servlet x1, JSP x1

Omer Cem Tabar Scrum Master, Resource x2.5, Database Population and Creation, Resource x1, DAO x16, Servlet x3, JSP x5

Gorkem Yilmaz Resource x1,Servlet x1, JSP x1