COMPULSORY WORK

in the course: Internet Application Technologies of his 6th semester of studies

Department of Information Technology & Telecommunications. Spring Semester 2022-23.

Title: Internet Application for Renting Rooms / Houses

Introduction

The aim of this work is to develop a room rental application / of residences. Users will access the application through synchronous web browser.

In the application there are 4 roles: Administrator / Host / Tenant / Anonymous. The administrator role is assigned to a specific user / users when installing the application. Any other user who registers on application selects the role of tenant, host, or both. In each role corresponds to a separate graphical user interface through which: A) administrators manage the users of the application, B) hosts register residences / rooms for rent, the time periods during which are available for rent and their characteristics in terms of pricing, location, area, floor, heating, etc. Also they can edit and change all the above items. C) The tenants can search for houses / rooms for rent, to review their features and make reservations. Anonymous users who have not registered in the application can like the tenants to looking for rooms and residences and to examine their characteristics and the their availability but cannot make reservations.

Application Requirements

1. The application initially displays in its browser visitor a welcome page (Welcome page). This page should to enable the user to register in the application by tapping the corresponding button in the navigation bar. Also, it should give the ability to login a user to the application by giving the username (username) and the user code (password) in the navigation bar. The corresponding HTTP requests must be encrypted through it SSL/TLS protocol. This page should also include in the main part of a form in which the anonymous user can enter it location (district, city, country) for which he is looking for a room / residence, the rental period and the number of people the search concerns.

2. A new user's registration page will require them to login username, username, password confirmation, username, surname, e-mail address, contact telephone number, desired roles in the application, photo and any other elements are deemed necessary. If the username is already in use by someone else user, the application should prompt them to enter a new one Username. In case the user chooses the host role, after successfully entering his details, a message will be displayed which will informs him that the approval of his registration application in the application is pending with the role of host. In any case, the new user will be able to enter the application as a tenant after registering if he has chosen this role.

3. The app will have one built in by installation user who will have the administrator role. When the administrator correctly enters the name of the user corresponding to him and his password will be taken to the page management.

4. Through the administration page the administrator should navigate to list of users. From the list of users it will be possible to navigate to the page

of the details of each user, through which he will be able to examine the details of users and approve their application in the system if they are young people users want to acquire the host role. Also, the administrator it will be able to export its data to JSON and XML files application (the spaces available for rent from the hosts along with all relevant data, tenant bookings, reviews that have submitted each tenant after the rental, the reviews they have submitted and related to each host).

5. After a user (anonymous / tenant) enters in the form home page search the information required (location, dates, number of people) and submits it the app will display a list that will contain the search results sorted by lowest to highest price (spaces must be available on specific dates to which the search relates). If the results are more than ten, then they will be divided into pages that each will contain up to ten results to be navigated to with appropriate links at top and bottom of results. The results will are presented in the form of a grid. Each grid cell will contain a representative photo of the space for rent, the cost per day, the type of rental space (private room, shared room, entire residence), the number of beds, the number of reviews and their average rating from 1 to 5 stars. The user will have the ability to add more search filters by giving specific options on the following criteria: room type, maximum cost, amenities: wireless internet, cooling, heating, kitchen, TV, parking, elevator.

6. The user will examine the detailed information of each rental space by selecting with the mouse the corresponding cell in the grid, in which case it will navigate to page detailing the site's details. The detail page presentation will include the details of the rental space classified into the following categories: space (number of beds, number of bathrooms,

type of rental space, number of bedrooms, existence of living room, area space), description (free text), rental rules (if allowed or not smoking, pets and events, as well as the minimum number rental days), location (Openstreetmap, address, neighborhood, transportation), photos of the place, details of the host (photo, critics). Through the details of the host will be able to navigate to page messaging him/her to ask questions and provide clarifications. Finally, you will be given the option to confirm the space reservation for the time period originally specified in the search.

7. When a user enters the application with their role host will navigate to the management page of the spaces it offers to tenancy. This page will include an Openstreetmap where you will it can specify the geographic location of the residence as well as a form through which he will be able to enter the address in text form. Also will enter information about access by transport to rental space. After determining the geographical location of the residence will the individual characteristics are entered (dates on which the space available for rent within the year, maximum number of people, minimum rental price and additional costs per person, type of rental space, photos, rental rules, description, number of beds, number of bathrooms, number of bedrooms, existence of living room, area of space and everything else it is considered necessary). The list of places that is listed for rent. By choosing one of these spaces you will he can navigate to his details page where he will be able to edit all of the above features, add or delete photos, view, reply and delete new and old ones messages sent to him by interested tenants (paged suitable in case their number is large), etc.

8. Any user in whatever role they belong to will be able to edit his account information on a corresponding profile management page at which will be navigable via an appropriate link in the bar

navigation.

9. **[Recommendation System]**The app will show tenants who enter it proposed spaces for rent based on the history of the tenant, i.e. based on the premises he has already rented and the reviews which he has given for them. To produce the sentences you should used Matrix Factorization algorithm, based on what is described on the corresponding slides posted in the e-class. Also provided related dataset. In the event that a tenant has not taken any action booked in the past or has not written any reviews, the app will record and will utilize a) the searches the tenant has made and b) them specific spaces whose details have been navigated to in order to construct the vector representing it and make it feasible calculating its similarity to other users. This is one way to address the problem of data sparsity.**The algorithms for generating recommendations must be implemented from it zero. The use of ready-made libraries is not allowed.**

Other Information

1. The work is compulsory and is carried out by groups of two or three persons.
2. Assignments will be checked for copy. In case that found duplication between two or more groups, all the involved tasks will automatically be zeroed out.
3. The assignment will be submitted electronically, exclusively through the website e-class of the course. The submission will include
   - a file .zip which will contain the source code and the necessary libraries,
   - a text file (inpdf), in which the designs are described decisions, assumptions, and various other details implementation, installation and execution of the work. The structure of this of the file should be the following:
     - Cover page with paper title, group names and registration numbers
     - Table of Contents,
     - Introductory chapter (which will briefly describe the objective of the work and the content of the chapters that follow),
     - Remaining funds
     - Epilogue, where you will summarize the tasks during development of the application, any difficulties encountered and how how did you deal with them etc.

4. The work should be delivered according to the above method either by 3 July, 23.59 or from 3 July to 20 September 2023, 23.59.

5. It should be emphasized that the design and implementation of the application has a large degree of freedom, from the presentation (design of the web pages) and database design to adding extras
functions than those mentioned in the pronunciation. Its quality code organization and database design will
graded according to what is taught in the course and also according to with the general design principles of databases and applications world wide web.

6.**The spine of the application (Backend) provides mandatory REST API and object-oriented services programming interface display. The front end of the application is mandatorily implemented based on Javascript/Typescript Web framework (14, React, coke). The consumption of services is allowed only after authentication of the user and based on authorization depending on their role with the use of JWT technology.**

Good luck!