Collaborative RDF Graph Generator
Software Design & User Manual Documentation

Masters in Computer Science Cyber-Physical and Social Systems

Project in Virtual Communities

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Software Design Documentation

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1. Introduction

1.1 Purpose

The purpose of this software is to generate RDF graph from the triples with the features of collaborative editing.

This document presents the detailed description of the software name as Collaborative RDF Graph Generator. The working of the software, Functional and non-functional requirement, User expectation and constraints are explained in this document.

This document is used by the developers of the system as well as the stakeholders of the project and will present to the broad of directors for approval.

1.2 Intended Audience

This software is mainly used by the students and researchers for their experimentations.

1.3 Intended Use

With the help of this software user can generate RDF graphs from the triples with collaborative feature such as Discussion, invitation, comments, approve/disapprove etc. With the help of this software user can create multiple RDF graphs quickly

1.4 Scope of the project

The Main objective of the project to convert give set of the triples in to RDF Graphs. Give a User Authentication System to restrict only authorized users allowed to access to the software. Also, the user can able to create multiple datasets and in each dataset, there should be able to create multiples triples. Also, only triples approved by other registered users is converted to RDF Graphs. Possibility to edit and delete the created triples. Using the software, the user can able to invite new users or make discussion.

1.5 User Classes and Functions

- Can login to the software
- Create Datasets
- Create Triple
- Approve/Disapprove Triples
- Give Votes to Triples
- Invite new User

- Generate RDF Graphs
- Download RDF Graphs
- Edit/Delete Turtle

1.6 Definitions and Acronyms

- RDF - Resource Description Framework
- Triples – Subjects, Predicates, Object/Value

2. Overall Description

2.1 Constraints

There are no hardware, software, or software technical constraints identified with this project. Institutional constraints mays exist due to the systems need for regional coordination, participation, and interoperability.

3. System Features and Requirements

3.1 Functional Requirements

- Software allows the users to create a new account.
- Require authentication of the users to allow them to use the system.
- The software allows the registered users to add multiple datasets and see the existing datasets.
- It allows users to add new triple to the dataset.
- Users can able to edit triple, delete triple, comment to triple and vote the triple in the dataset.
- It generates multiple RDF graphs to multiple datasets.
- If suppose one user add any triple in the dataset, anyone of the other users can check and approve/disapprove it for the generation of the RDF graphs.
- Upload triples from external sources.
- Download the generated RDF graph.
- Need conduct discussions about knowledge graph generation with help this software.
- Registered users can able invite the new user to the system.

3.2 External Interface Requirements

3.2.1 User Interfaces

- Login and Registration page

- Dataset's creation page
- RDF Graph generator and Triple creation and visualization
- The GUI of the product shall be designed in HTML/CSS, allowing a multitude of different user's access. The HTML design will remove most limits of access because every popular operating system has HTML viewing capabilities.
- The UI/UX design of the software should be user friendly
- The design should be responsive and able to open in any devices like iPad, mobile etc

3.2.2 Communication Interface

- SMTP is used to send emails for inviting new user for editing

3.2.3 Hardware Interfaces

- Wi-Fi router is required to access the software for multiple user from multiple system.

3.3 System Features

3.3.1 Hardware Features

- Processor – I5
- Hard disk – SSD (500GB < Max)
- RAM – 16 GB

3.3.2 Software Features

- Windows 10 Professional Operating system
- Node.js
- Visual Studio Code
- MongoDB Compass

3.4 Non-Functional Requirements

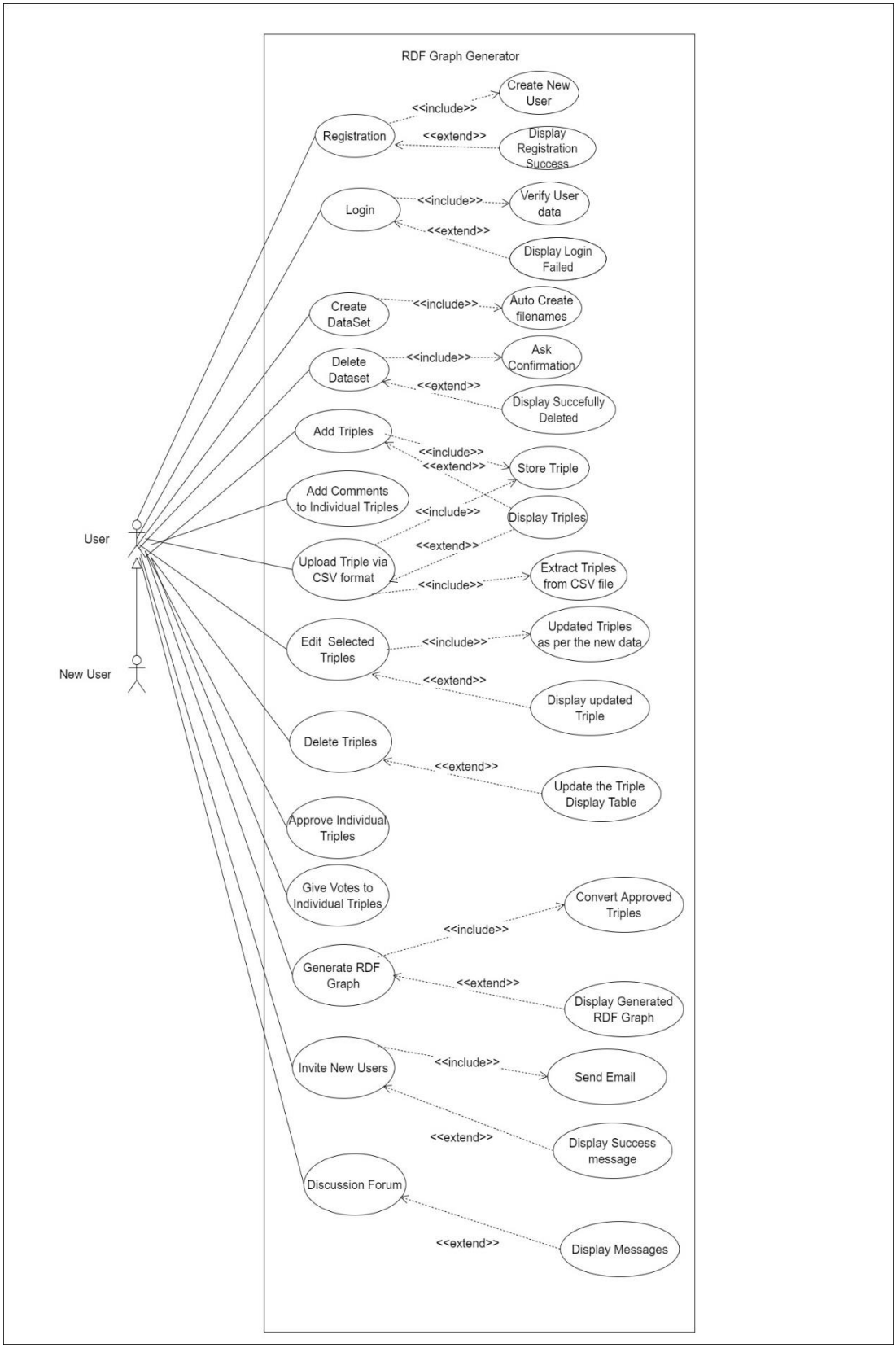
- Usability
- Responsive
- Performance

4. User Stories and Use case diagram

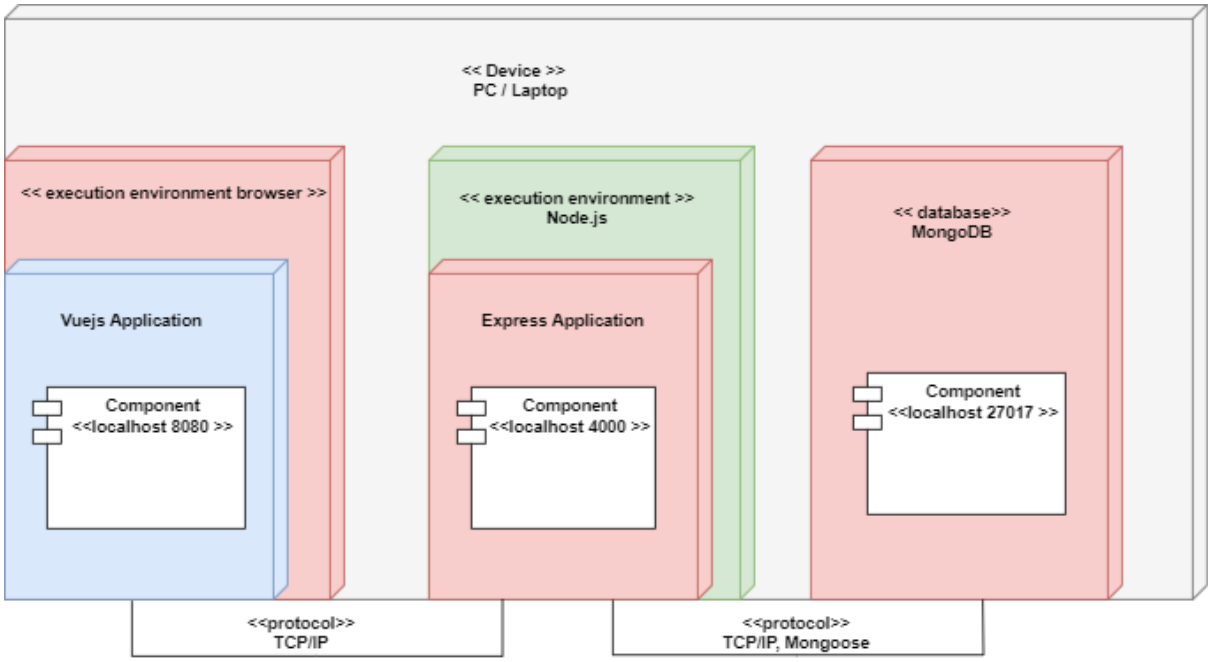
4.1 User Stories

USER	ACTION	VALUE
As a user(s)	I want to register for the application by entering my name, email, password and confirming password.	So I can get access as a registered user to the application.
As a registered user(s)	I/we want to login into the application by entering my email and password.	So that I can use application for the purpose and it will secured.
As a registered user(s)	I/we want to add/create one or multiple dataset.	So I/we can add new triples to each dataset.
As a registered user(s)	I/we want to create RDF triples in a form of *subject-property-value/object*.	So I/we can generate RDF Graph.
As a registered user(s)	I/we want to edit & delete the created triples in each dataset.	So I/we can make changes in the triple to generate RDF Graph.
As a registered user(s)	I/ we want to vote or approve triple	So I/we can confirm those triples to generate RDF graph.
As a registered user(s)	I/we want to upload triples from external sources in particular format	So it will make the software more user friendly
As a registered user(s)	I/we want to download generated RDF Graph.	So I/we can get it as a PDF format.
As a registered user(s)	I/we want to have a discussion forums.	So I/we can ask questions and give/get answers.
As a registered user(s)	I/we want to invite new user(s)	So that they can join the platform for contribution.

4.2 User Case Diagram

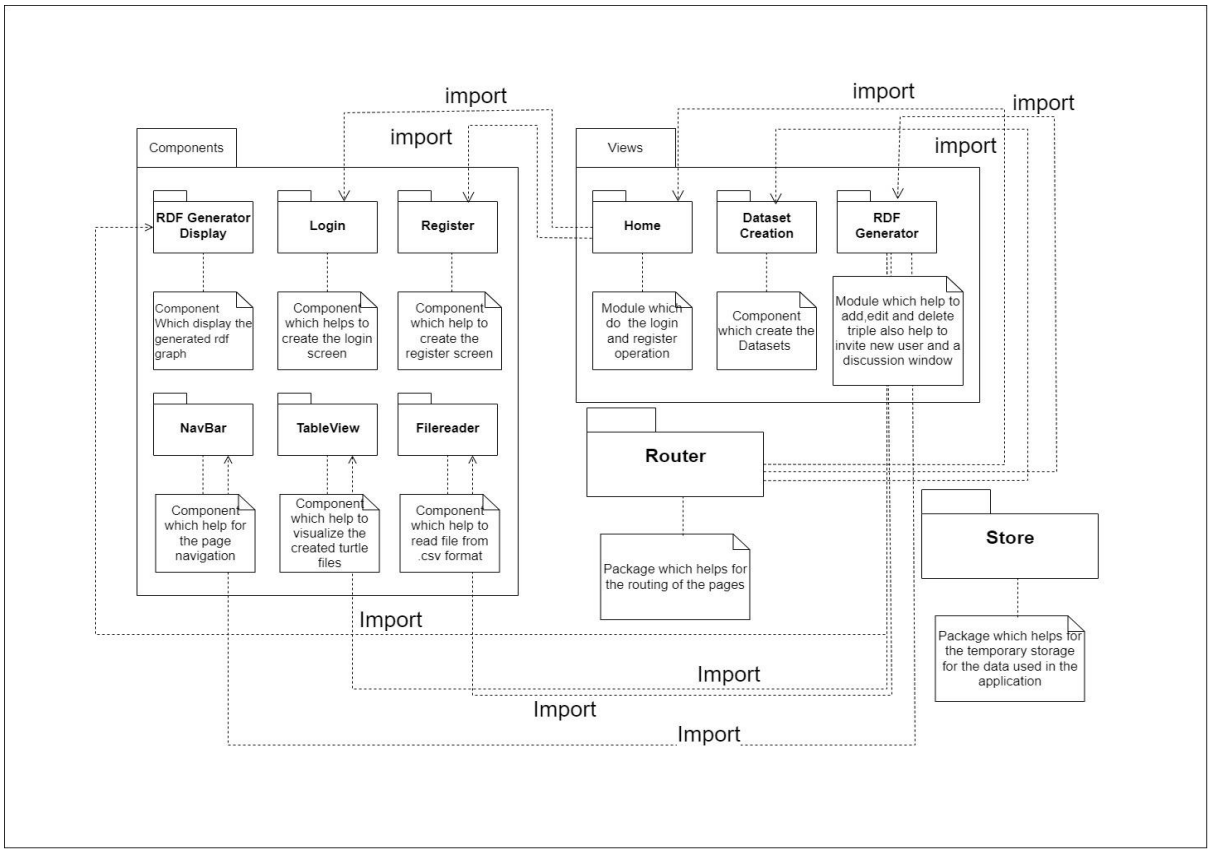


5. Deployment Diagram

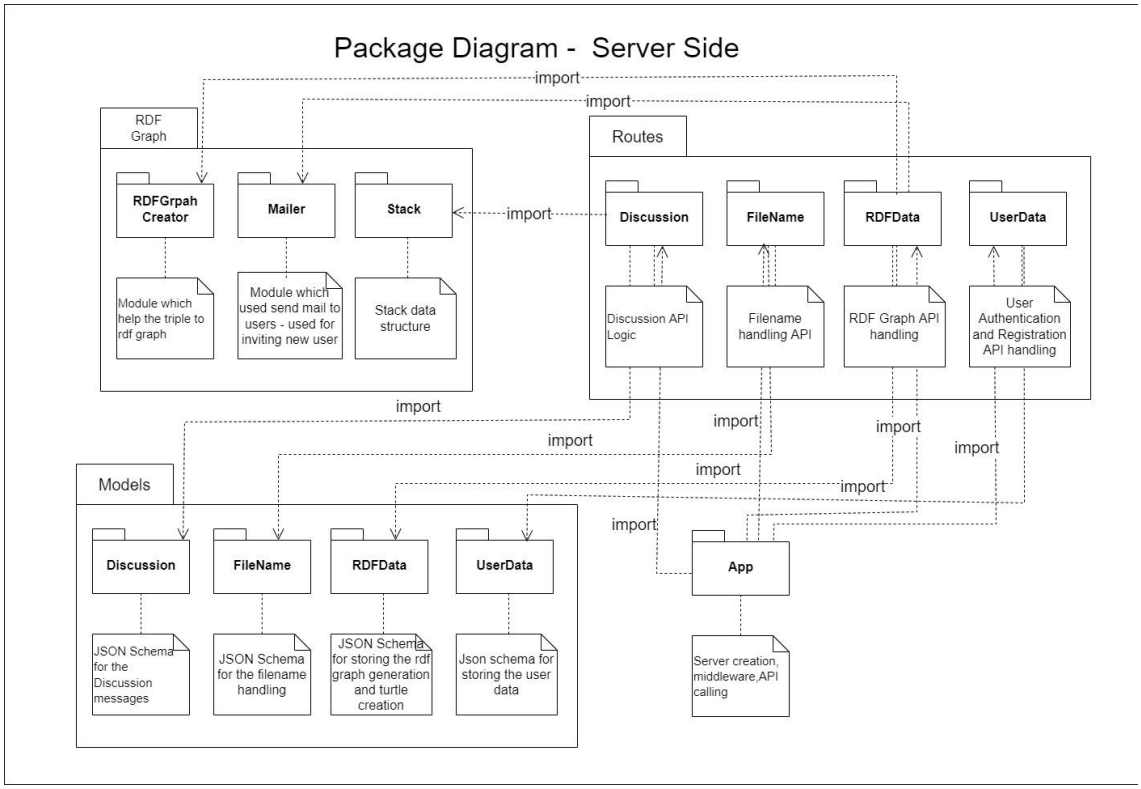


6. Package Diagram

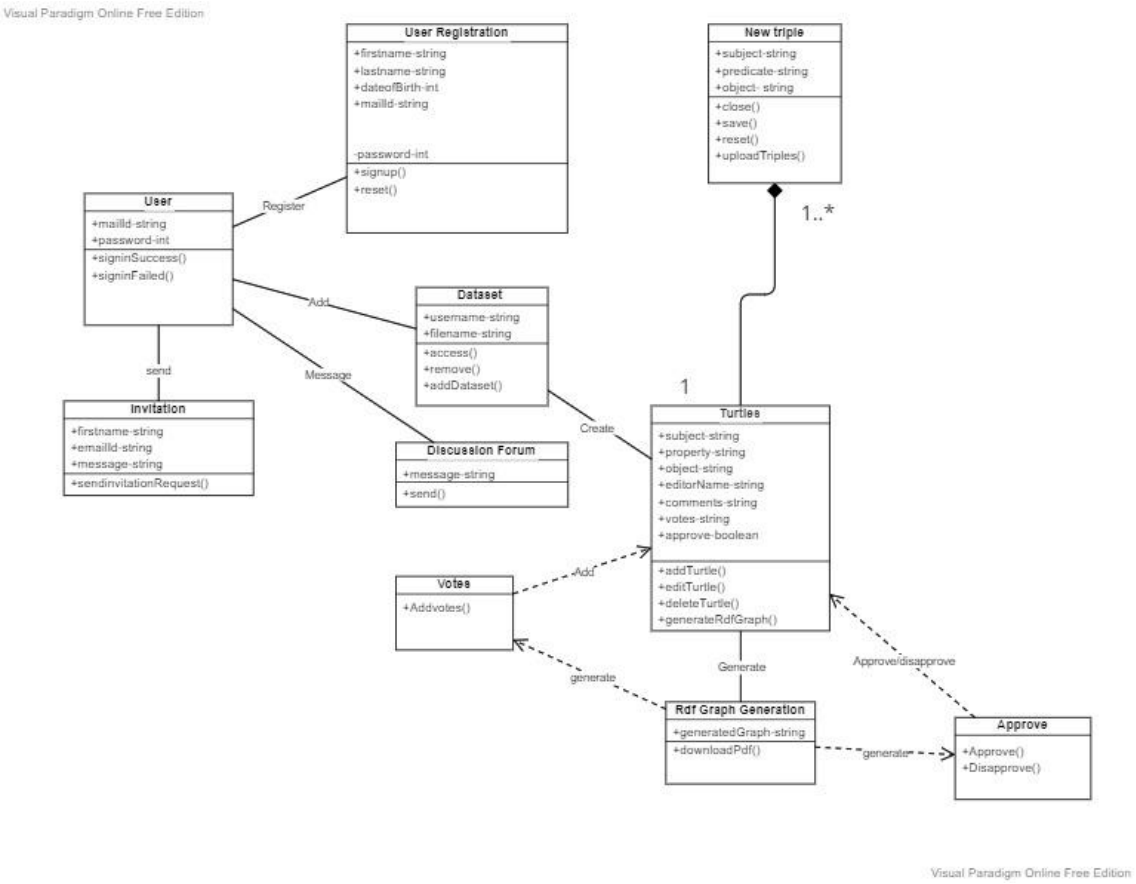
6.1 Package Diagram for Client Side



6.2 Package Diagram for Server Side

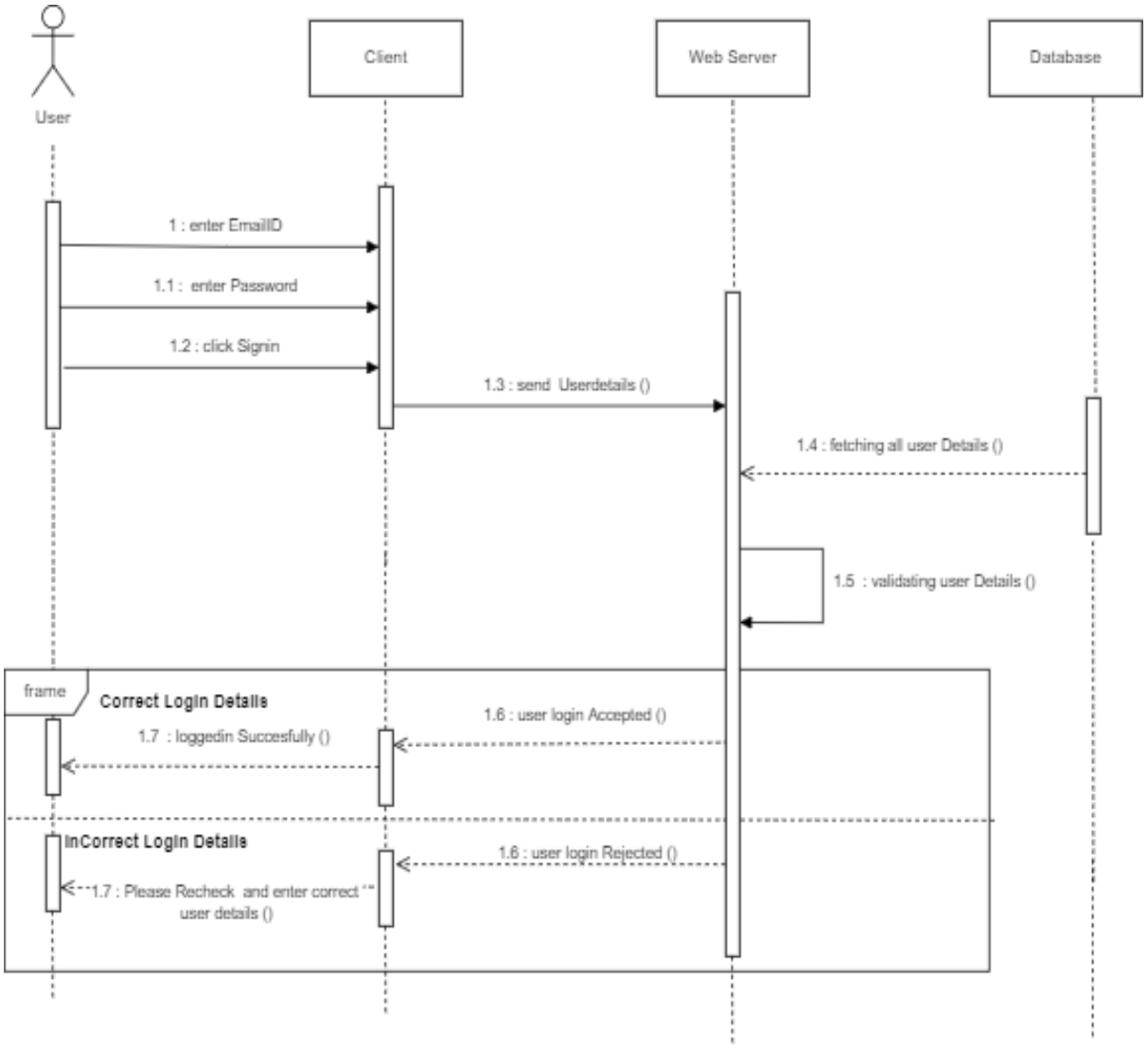


7. Class Diagram

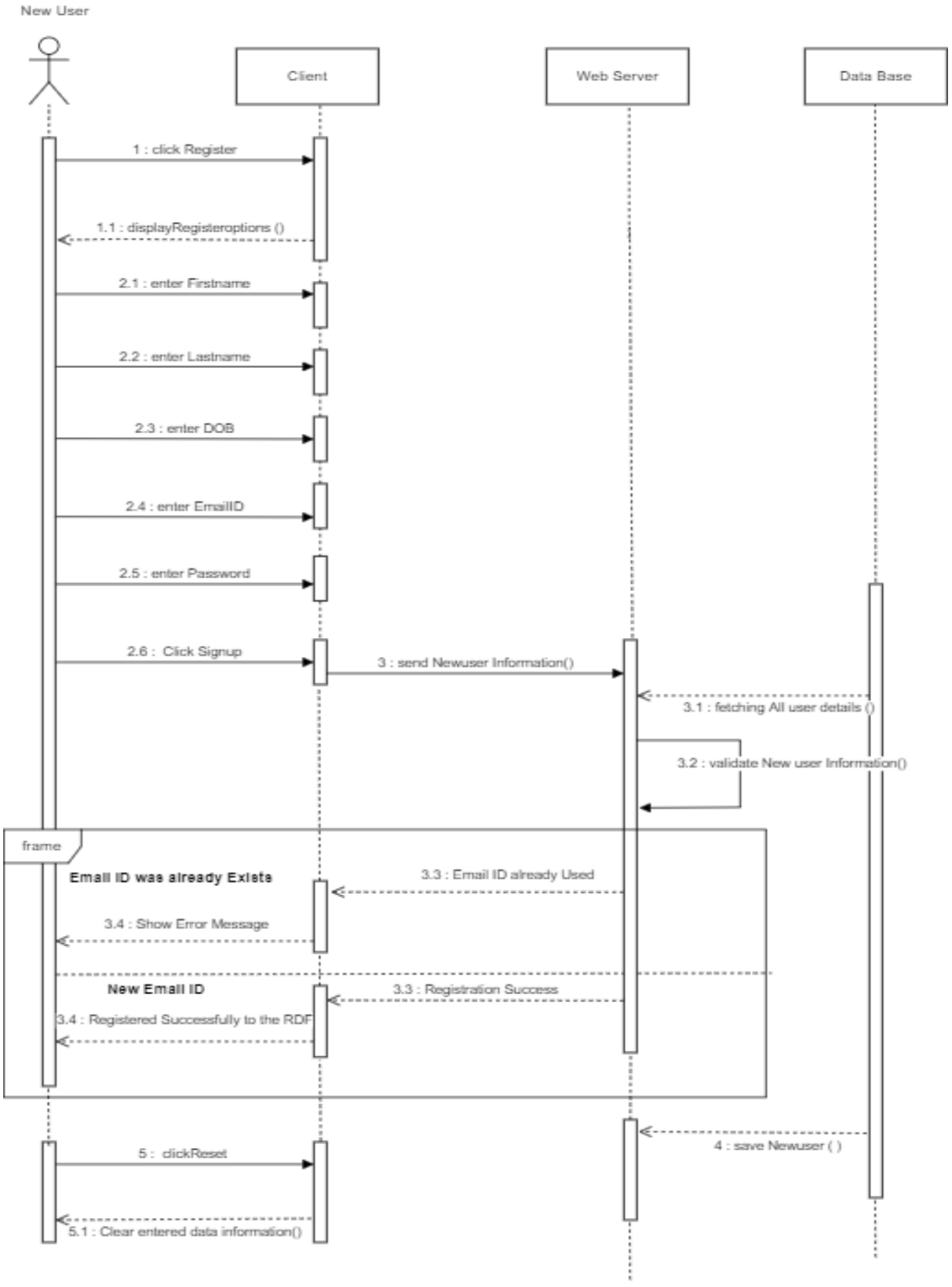


8. Sequence Diagram

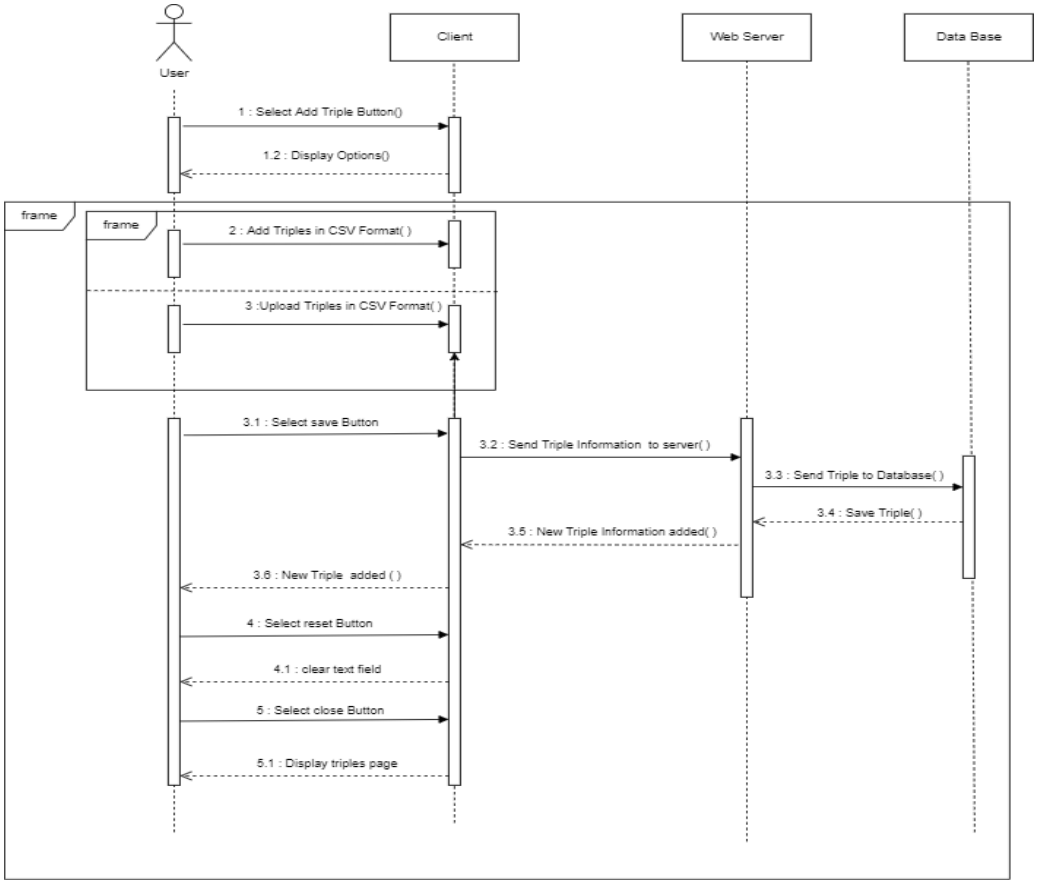
8.1 Sequence diagram for Login to system



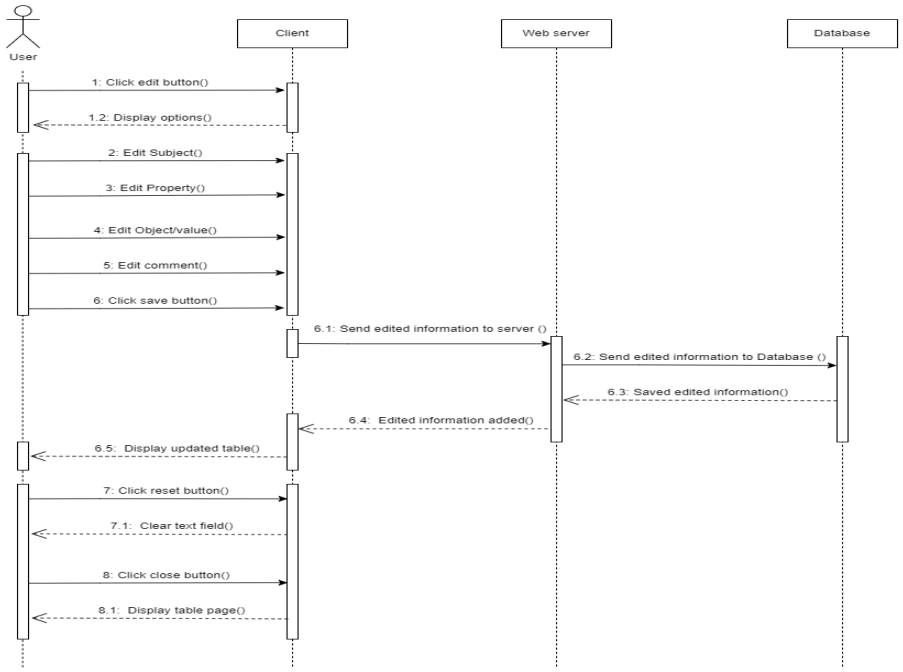
8.2 Sequence Diagram for Register to system



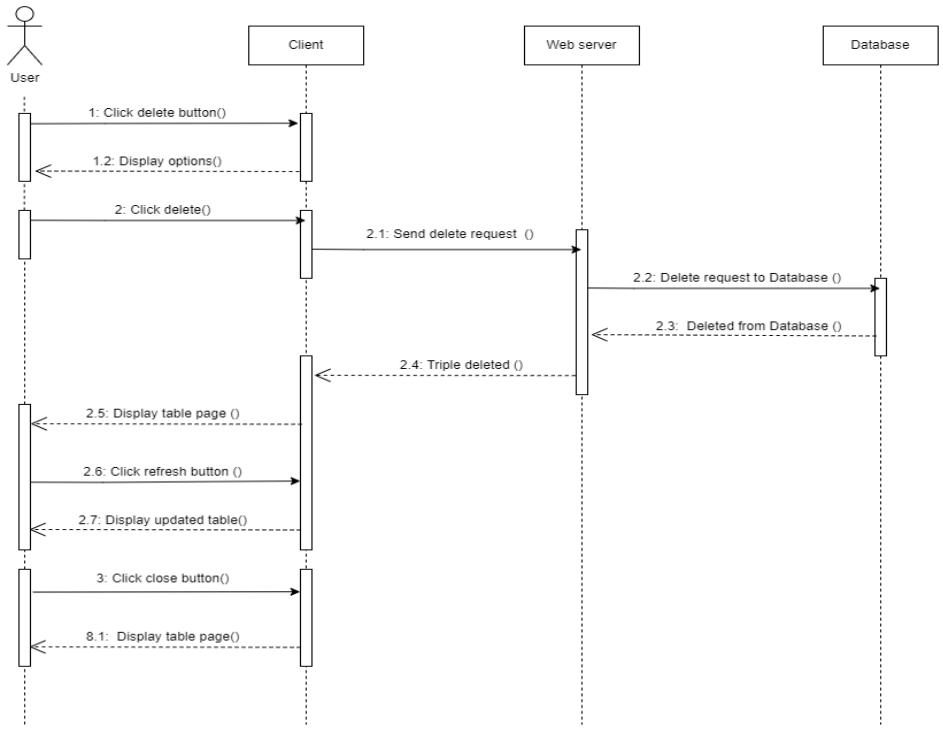
8.3 Sequence Diagram for create RDF triple



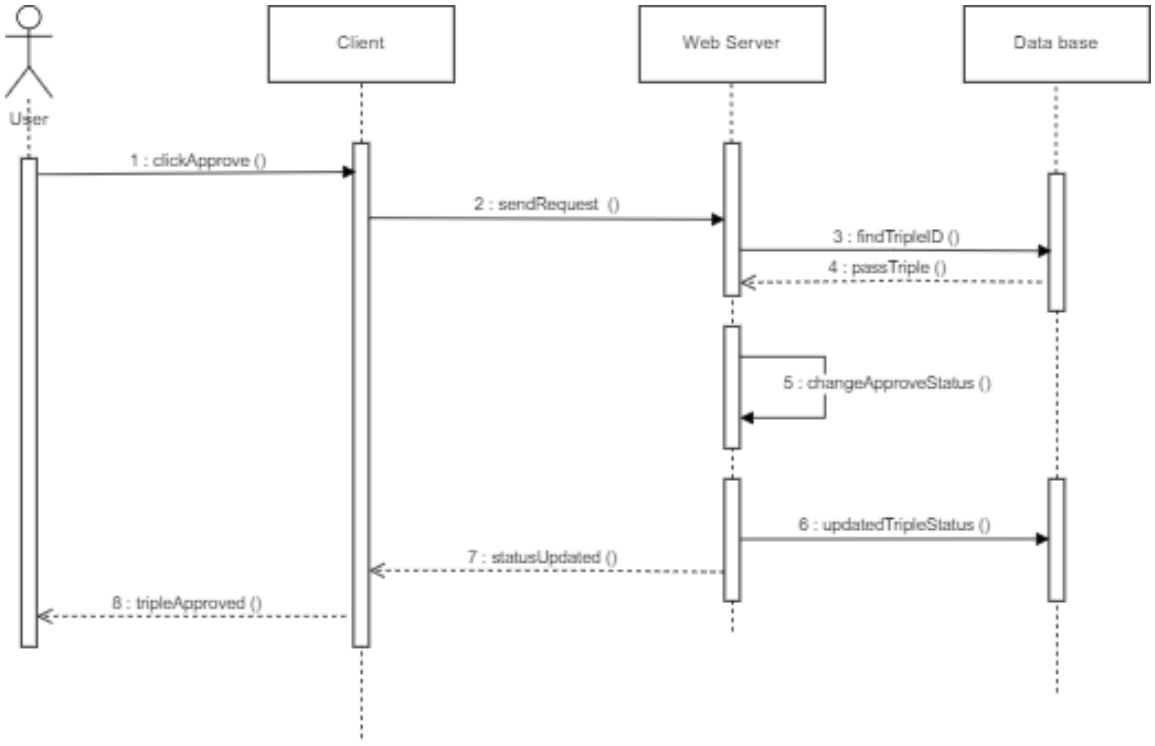
8.4 Sequence Diagram for edit RDF triple



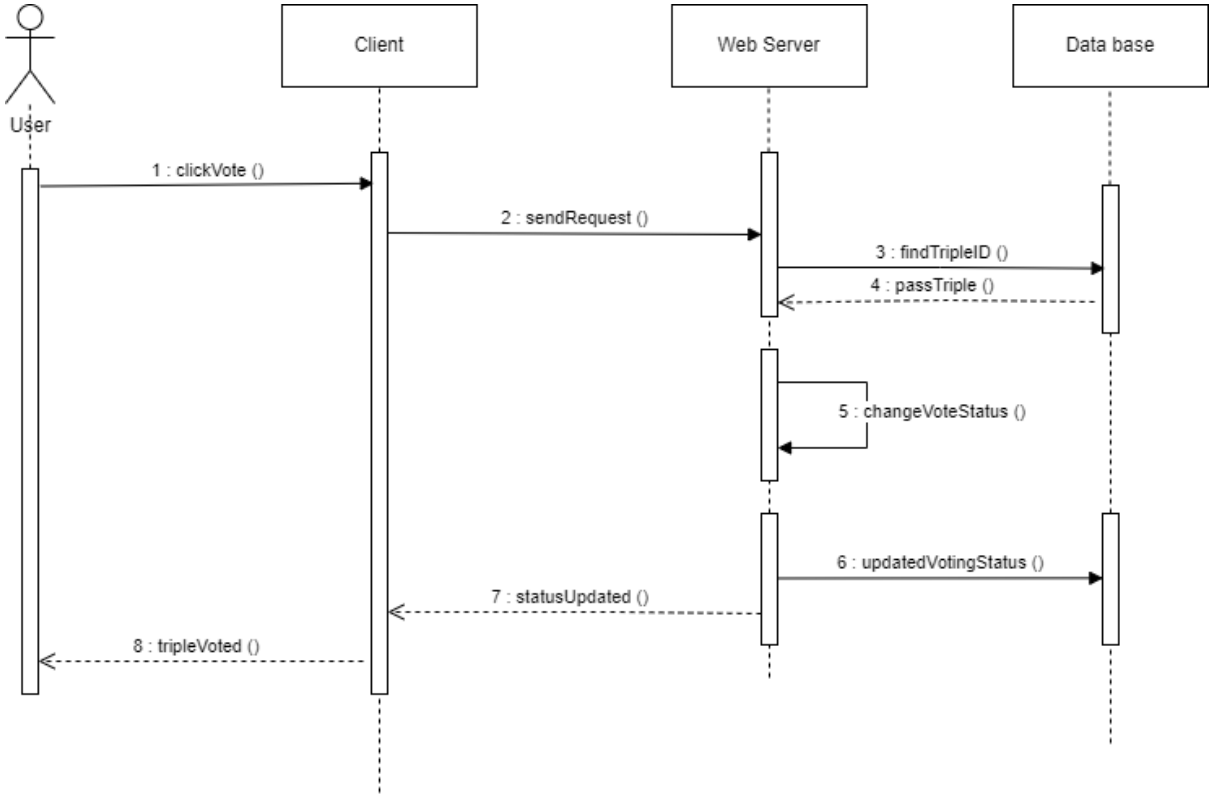
8.5 Sequence Diagram for delete RDF triple



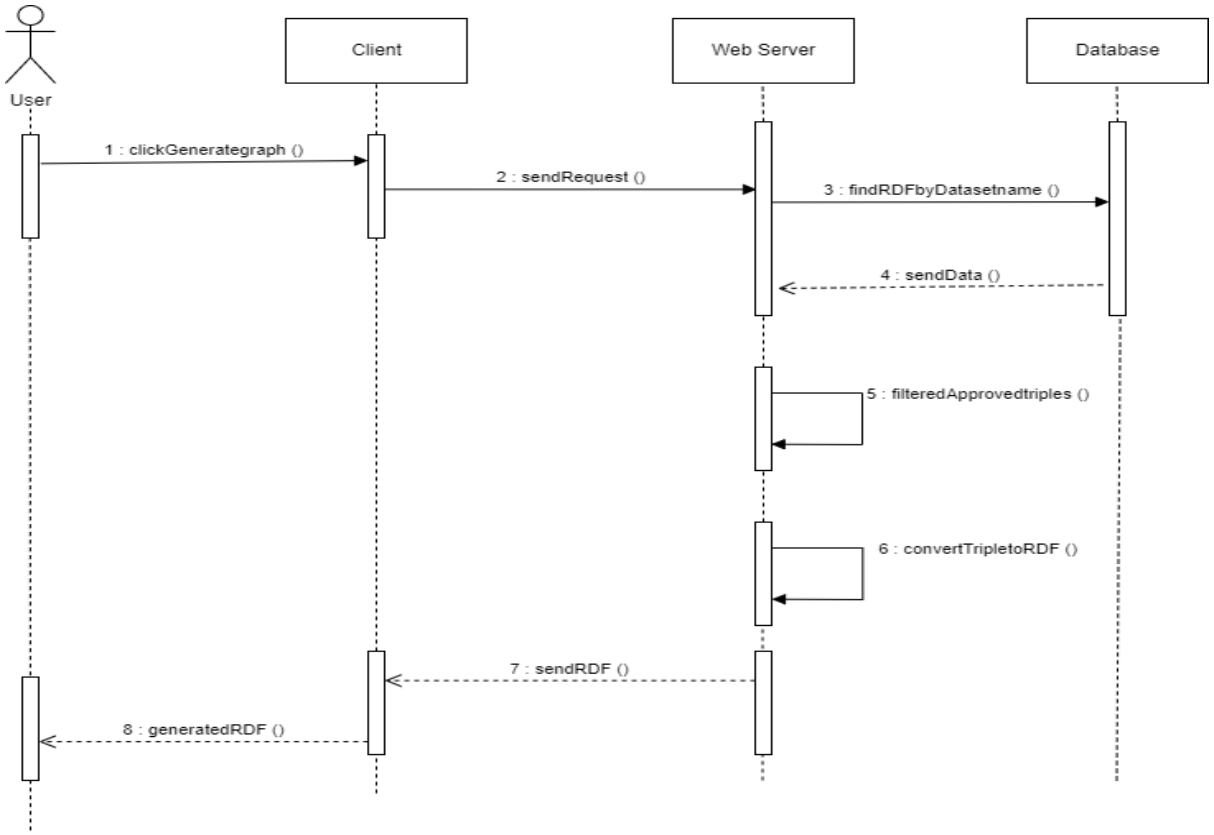
8.6Sequence Diagram for approve RDF triple



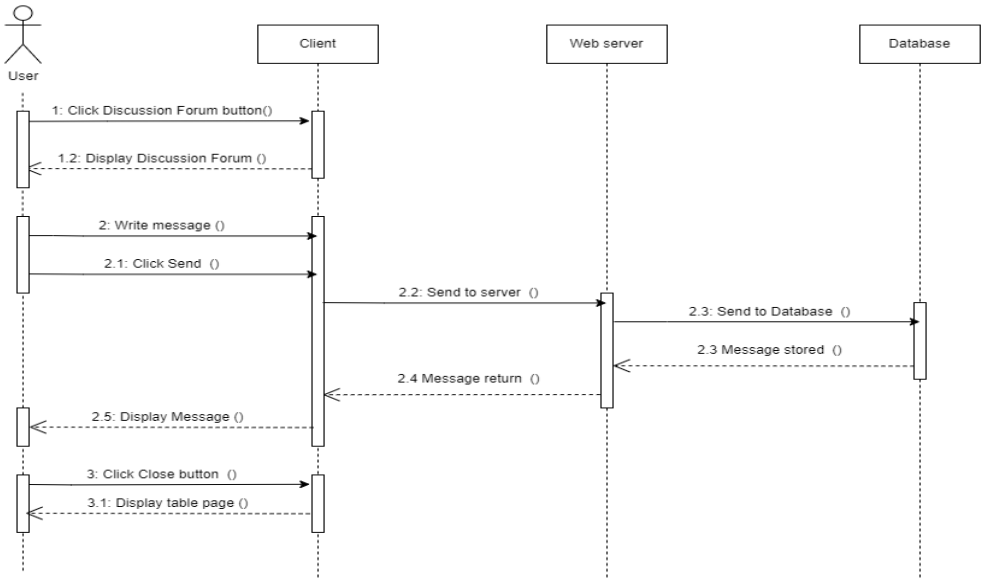
8.7 Sequence Diagram for voting RDF triple:



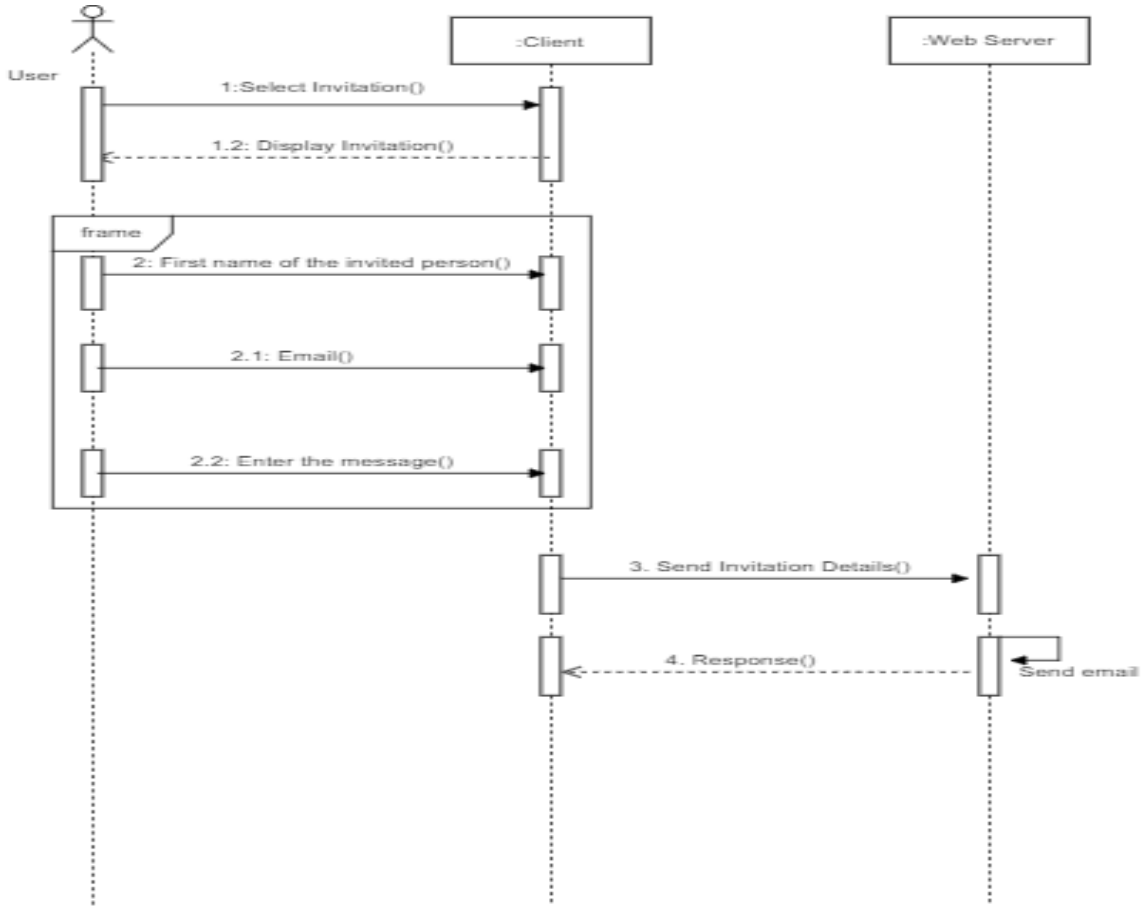
8.8 Sequence Diagram for generate RDF Graph:



8.9 Sequence Diagram for discussion form:



8.10 Sequence Diagram for Invite new user:



User Manual Description

Introduction

This document describes the procedure for working with software to generate the RDF graph. Also attached a video demonstration with this.

Procedure for Working with the Software

Step1 – Open Git command line in the system and clone the repository using the following commands

- git clone - https://github.com/Arunvishnu123/RDF-Graph-Generator.git

Step2 – Make sure the following software are installed

- Node.js - https://nodejs.org/en/download/
- Vue.js, vue-cli - npm install vue, npm install -g @vue/cli in command promt
- MongoDB https://fastdl.mongodb.org/windows/mongodb-windows-x86_64-5.0.6-signed.msi
- Visual Studio Code https://code.visualstudio.com/docs/?dv=win

Step3 – After Cloning, proceed with following command - "cd RDF-Graph-Generator" and then enter the "code.". Then the software opened in the visual studio.

Step4 – Then execute following command to run the client-side application – "cd rdf-client" and then "npm install" and then "npm run serve" and then go to this location http://localhost:8084/

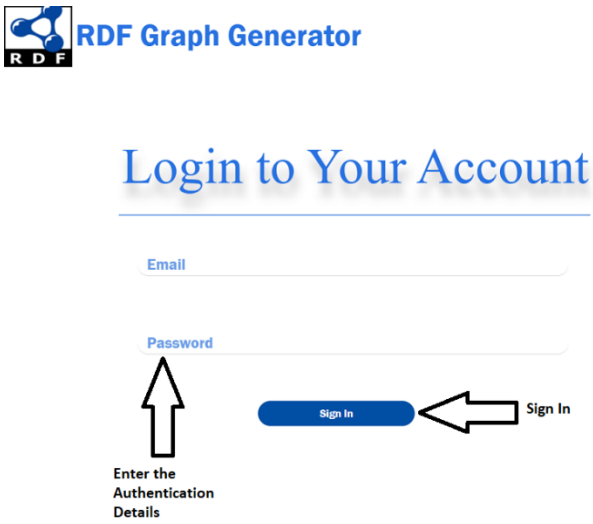
Step5 – Then execute following commands to run the server-side application – "cd rdf-server" and then "npm run dev"

Step6 – Now the application is online and new user can register and login to the software.

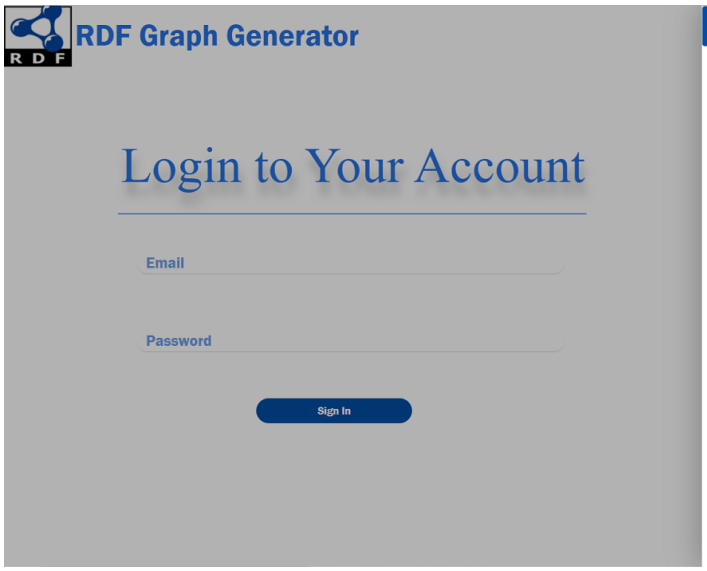
Step7 – Create multiple datasets and multiple triples for each dataset.

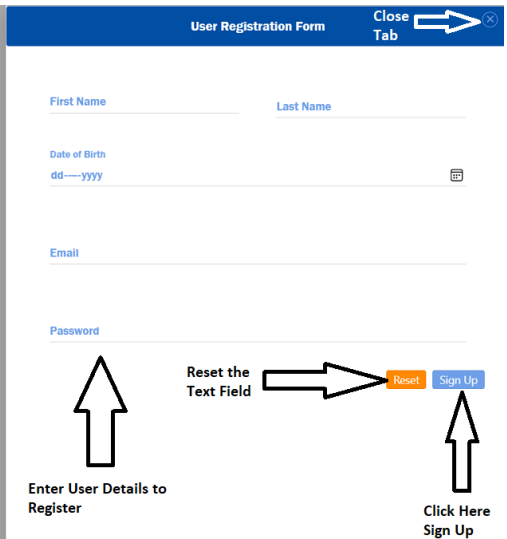
Step8 – Generate the RDF knowledge graph from the created triples

Login Page -

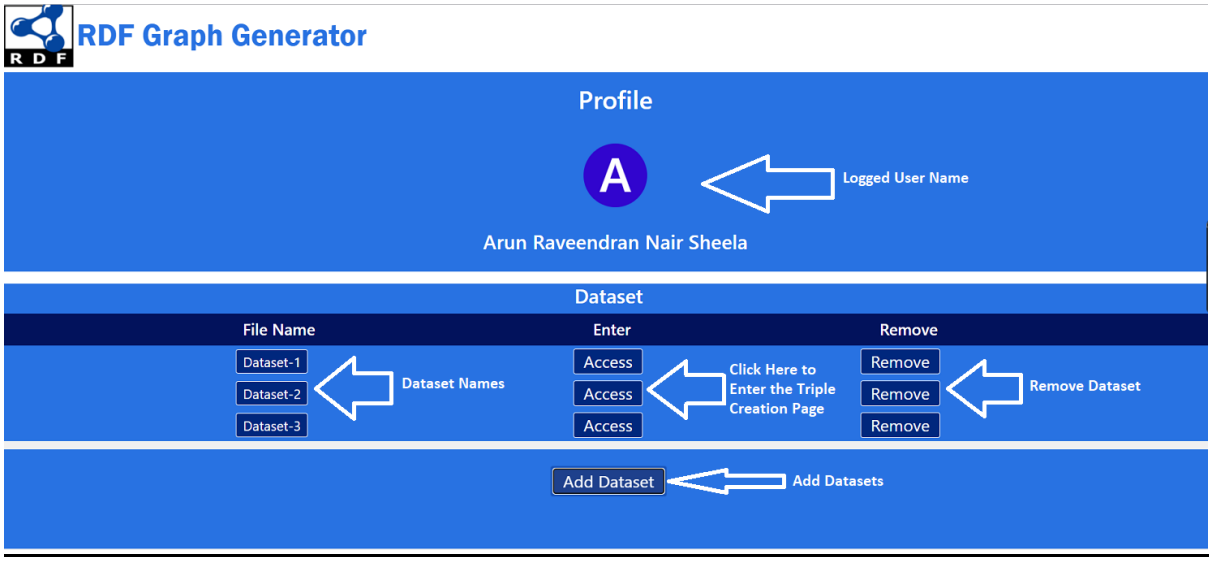


Registration Page -

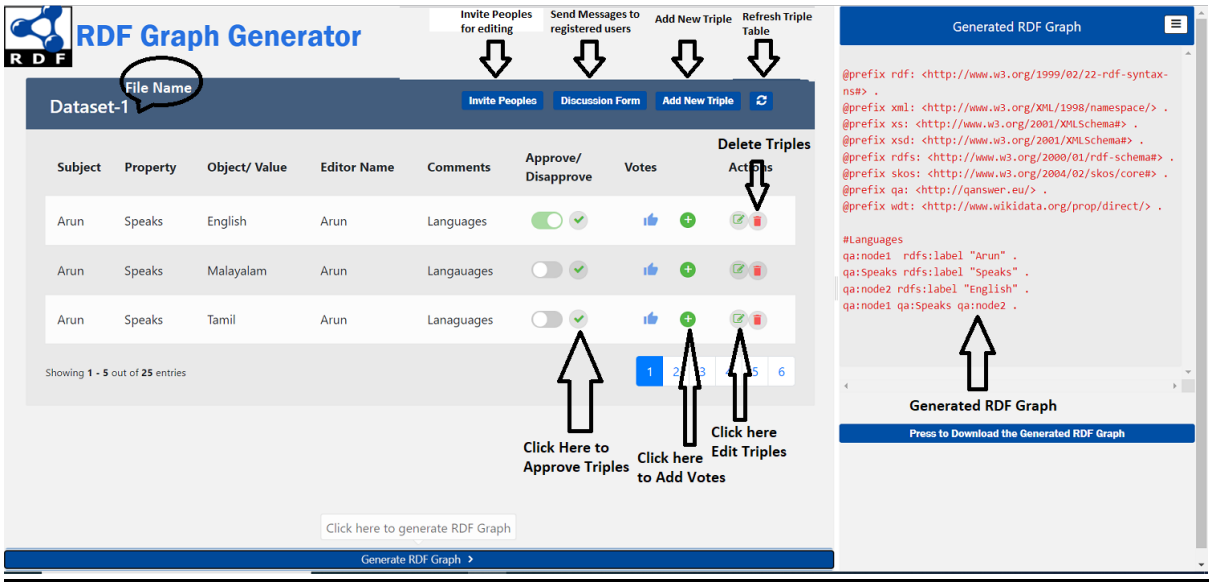




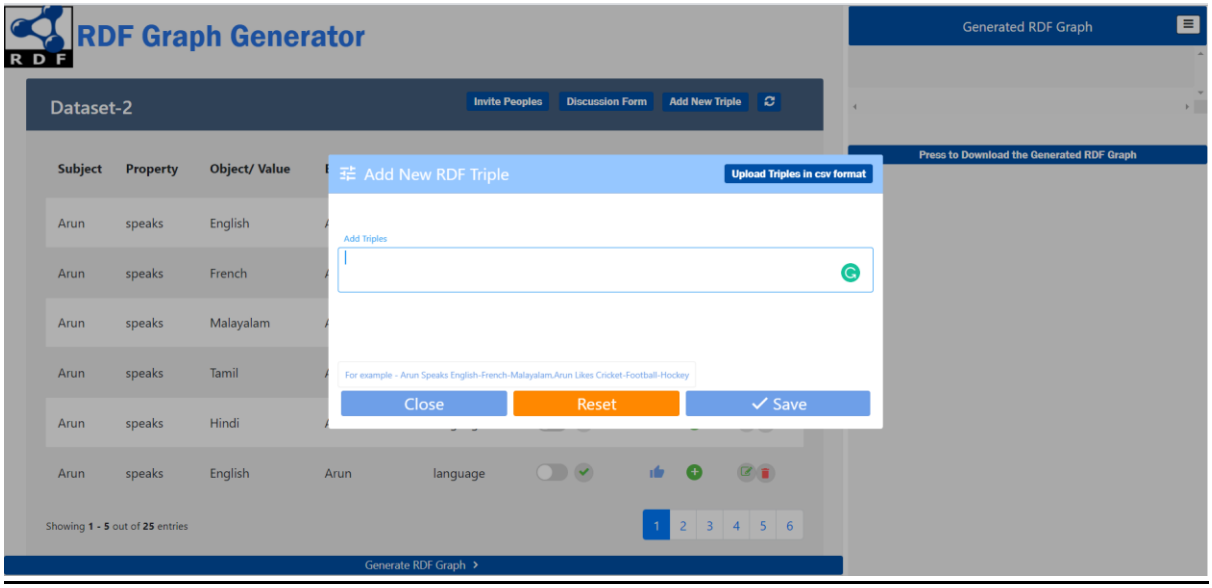
Dataset Creation Page -



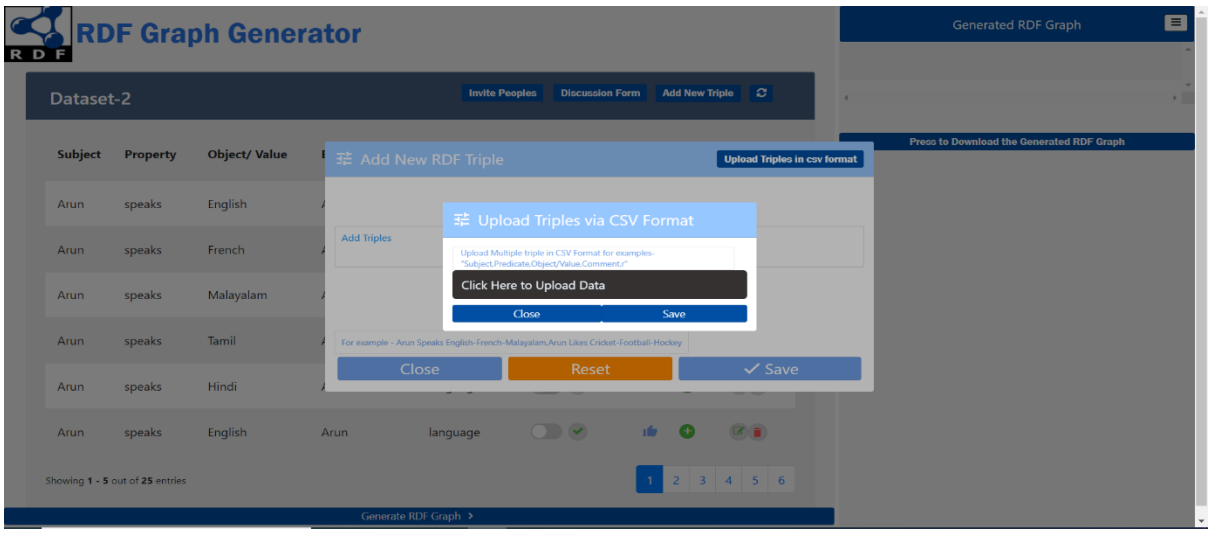
Triple Creation Page-



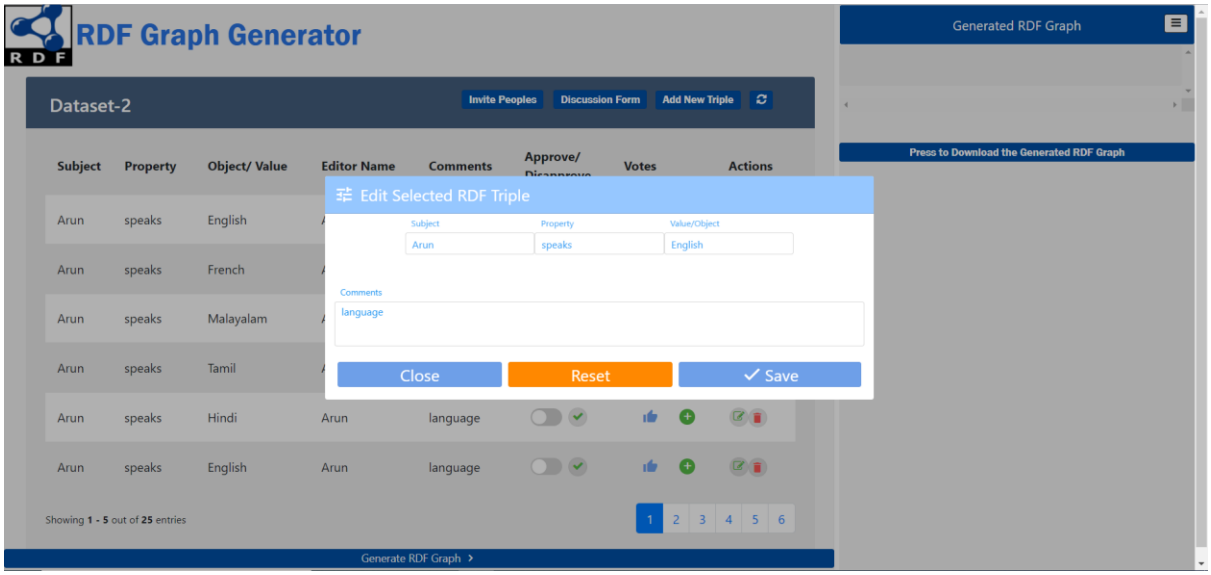
Add Triple Page -



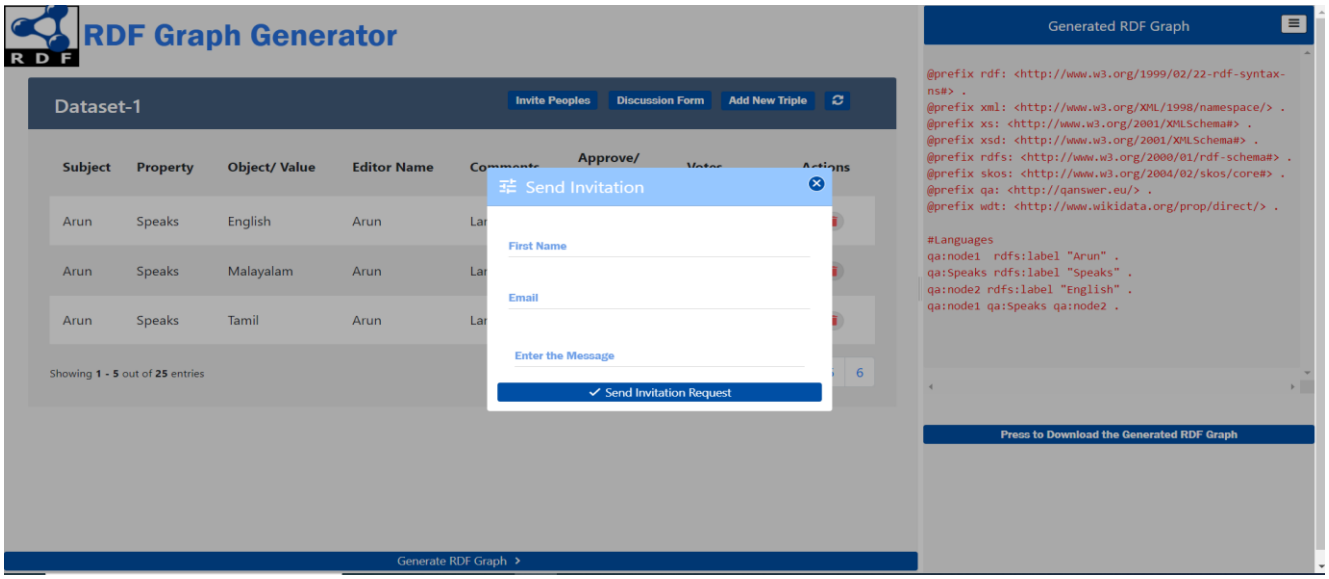
Upload Triple as CSV format Page -



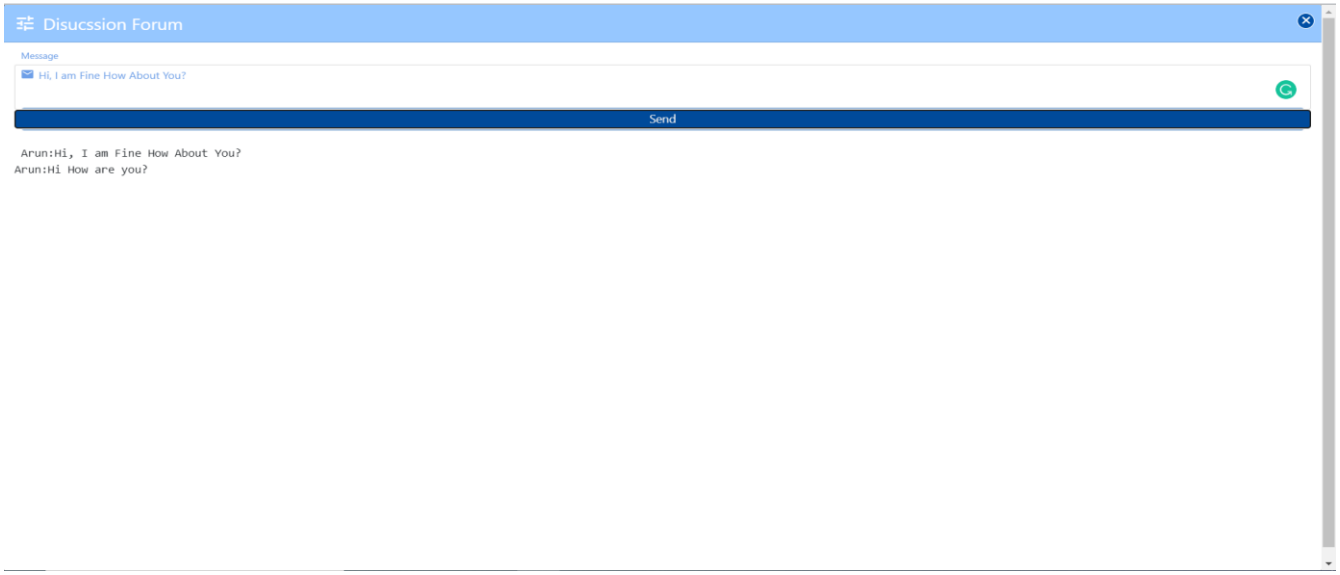
Edit Created Triples -



Invitation Page -



Discussion Forum -



Project Organization

No	Name	Contribution
1	Arun Raveendran Nair Sheela	Back-End Part, Front-End Part, Documentation
2	Siva Ratnam Pachava	Back-End Part, Front-End Part, Documentation
3	Sushanta Saha	Front-End Part, Documentation
4	Nuren Samia	Front-End Part, Documentation

Conclusion

The Collaborative RDF Turtle Generator is successfully deployed and Tested the Generated RDF Graph in QA Answer and Found that it is working as per the requirement

References

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2. https://www.freecodecamp.org/
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4. https://claroline-connect.univ-st-etienne.fr/web/app.php/resource/open/file/1505407
5. https://www.mongodb.com/
6. https://vuex.vuejs.org/guide/#the-simplest-store
7. https://nodejs.dev/learn/run-nodejs-scripts-from-the-command-line