**Software Design Specification**

**1. Introduction**

The Software Design Document is a document to provide documentation which will be used to aid in software development by providing the details for how the software should be built. Within the Software Design Document are narrative and graphical documentation of the software design for the project including use case models, sequence diagrams, object behaviour models, and other supporting requirement information.

**1.1 Purpose of this document**

This document will define the design of the one runway simulator. It contains specific information about the expected input, output, classes, and functions. The interaction between the classes to meet the desired requirements are outlined in detailed figures at the end of the document

**1.2 Scope of the development project**

This application is for the Library of NIIT University which will be linked to the upcoming website of NU-LIRC. This will enable the students, faculty and staff to access the benefits of the NU-LIRC website on an Android application. The scope of this product does not include iOS and windows phones.

**1.3 Definitions, acronyms, and abbreviations**

IEEE: Institute of Electrical and Electronics Engineers

iOS: iPhone Operation System

NU-LIRC: NIIT University Library and Information Resource Centre

SDS: Software Design Specification

**1.4 References**

* IEEE SDS template
* UML version 2.0
* NU-LIRC website
* NIIT Library Website
* Firebase Database

**1.5 Overview of document**

This SDS is divided into seven sections with various sub-sections. The sections of the Software Design Document are:

**1. Introduction:** describes about the document, purpose, scope of development project definitions and abbreviations used in the document.

**2. Conceptual Architecture/Architecture Diagram:** describes the overview of components, modules, structure and relationships and user interface issues.

**3. Logical Architecture:** describes Logical Architecture Description and Components.

**4. Execution Architecture:** defines the runtime environment, processes, deployment view.

**5. Design Decisions and Trade-offs:** describes the decisions taken along with the reason as to why they were chosen over other alternatives.

**6. Pseudocode for components:** describes pseudocode, as the name indicates.

**7. Appendices:** describes subsidiary matter if any.

**2. Conceptual Architecture/Architecture Diagram**

NA

**2.1 Overview of modules / components**

NA

**2.2 Structure and relationships**

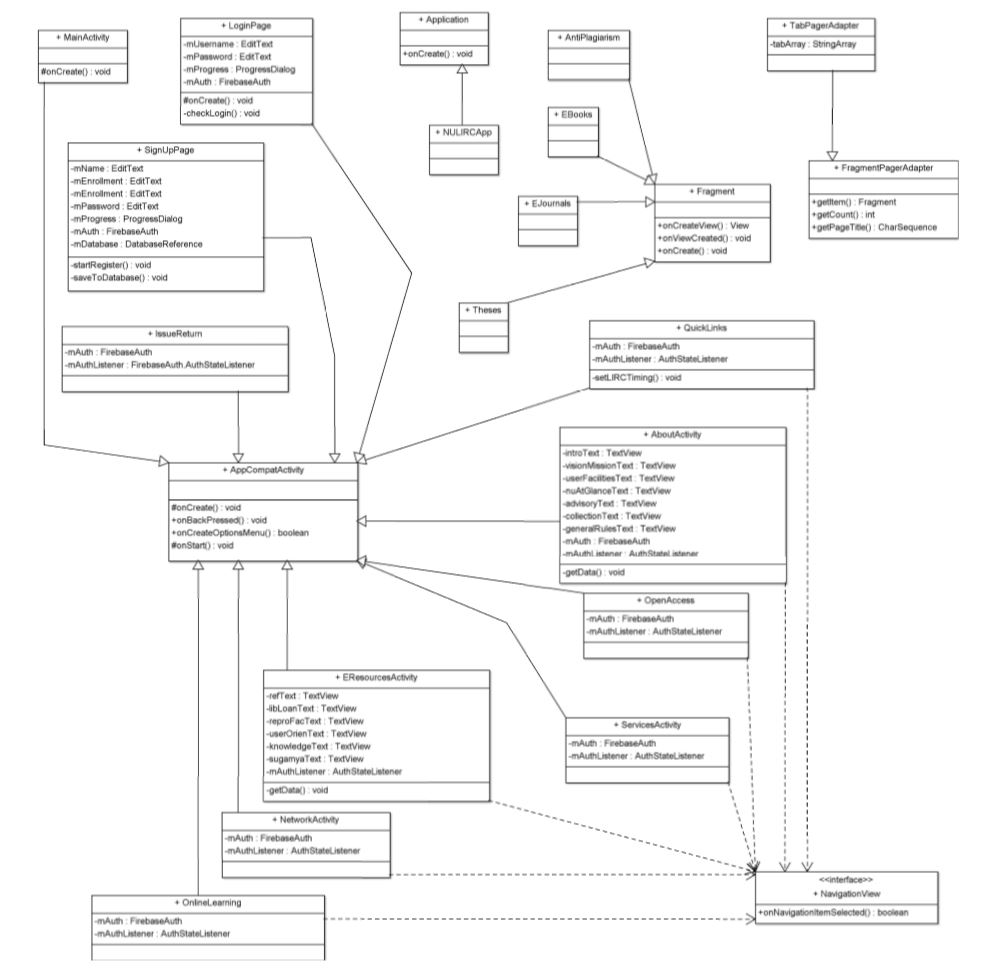
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**2.3 User interface issues**

NA

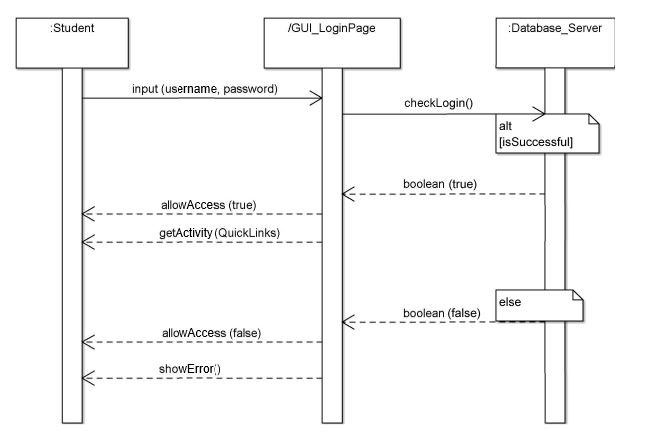
**3. Logical Architecture (Class Diagram, Sequence Diagram, State Diagram)**

**Class Diagram**

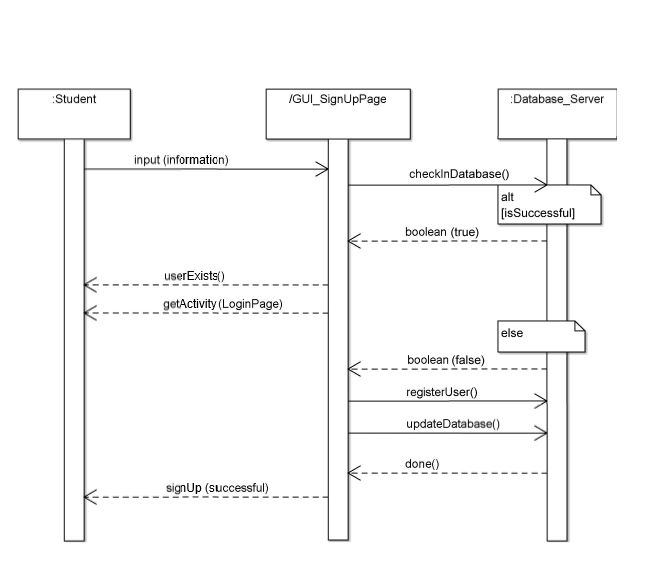


**Sequence Diagrams:**

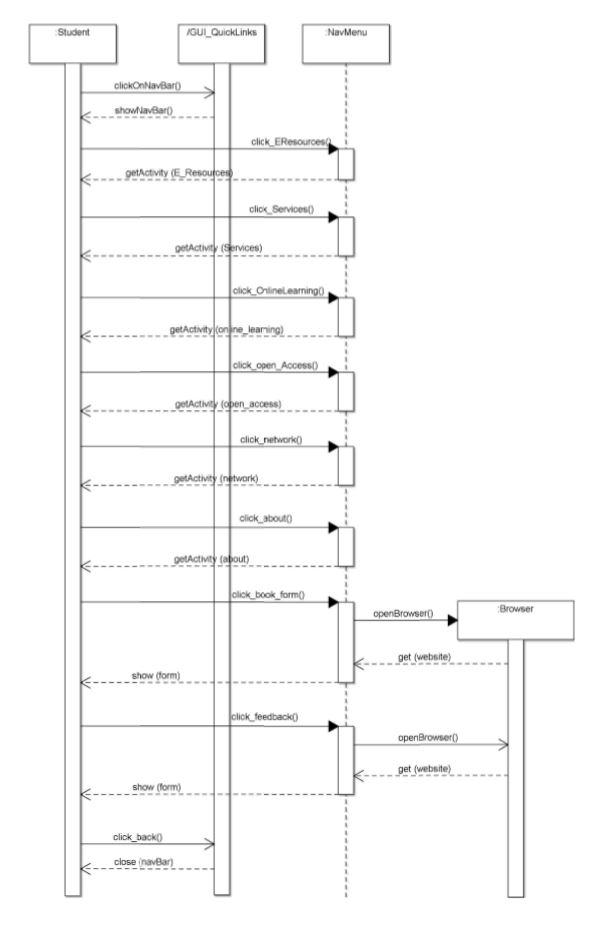
**LOGIN PAGE**

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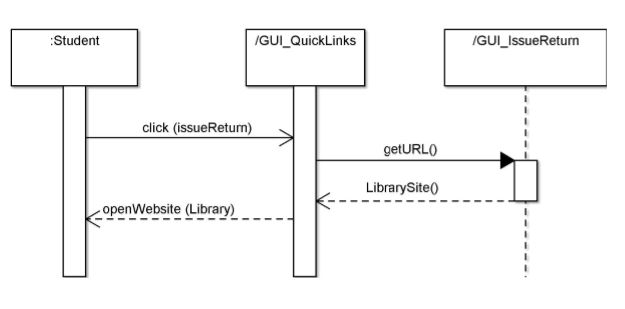
**SIGN UP**

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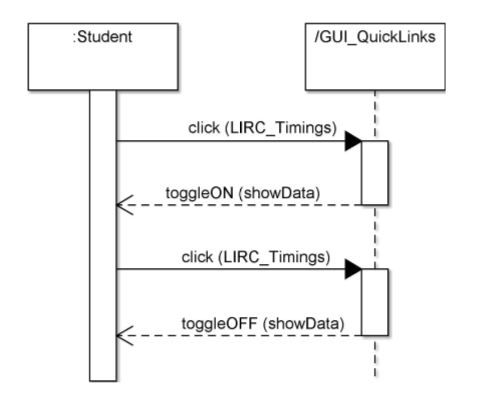
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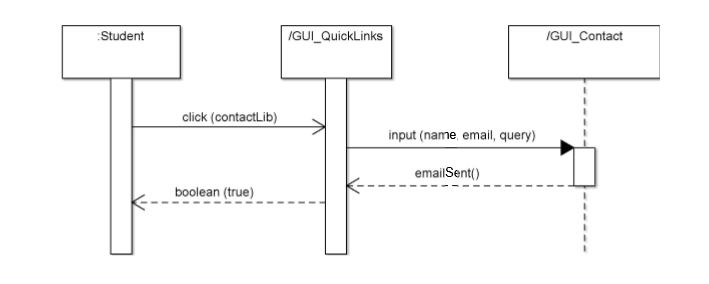
**ISSUE AND RETURN**

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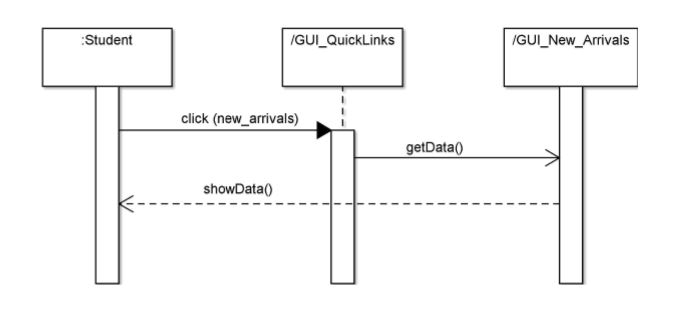
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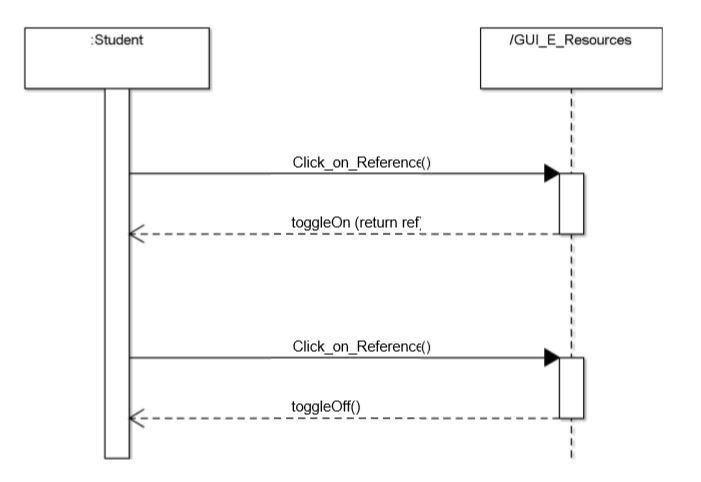
**CONTACT LIBRARIAN**

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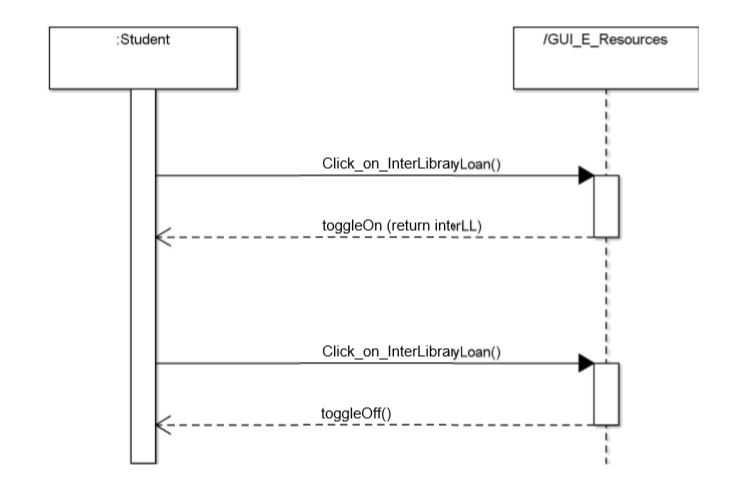
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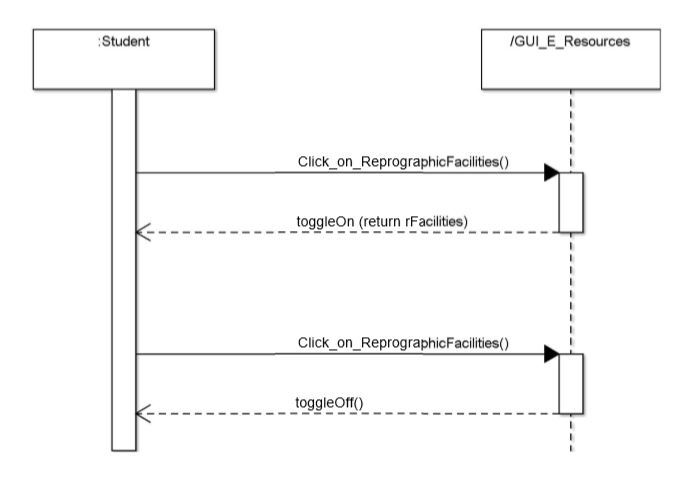
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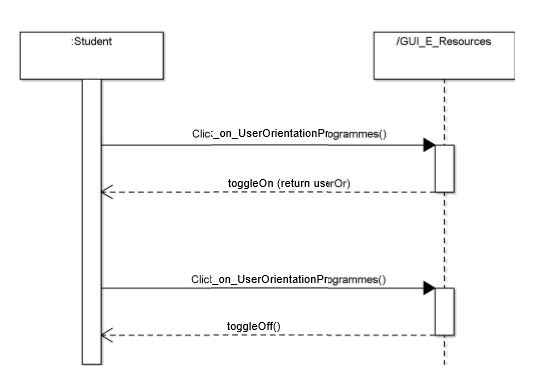
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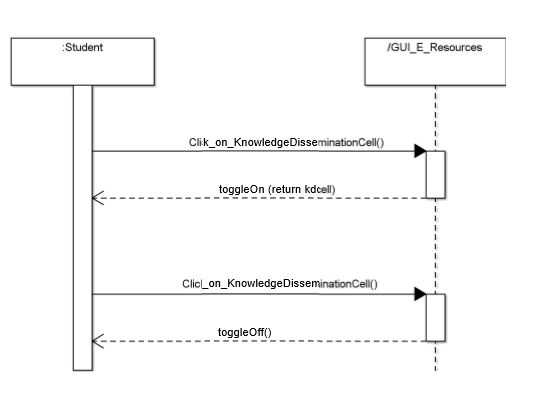
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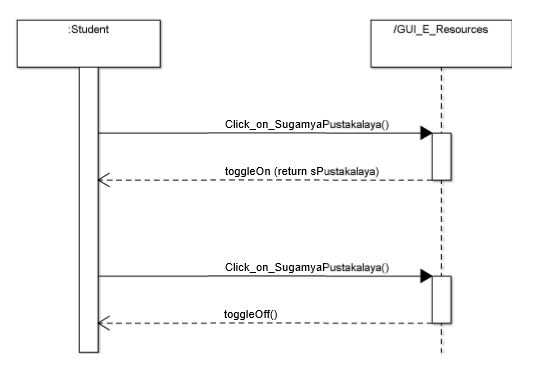
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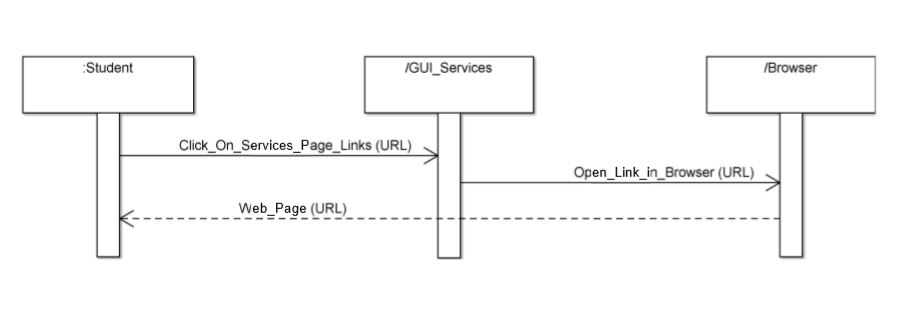
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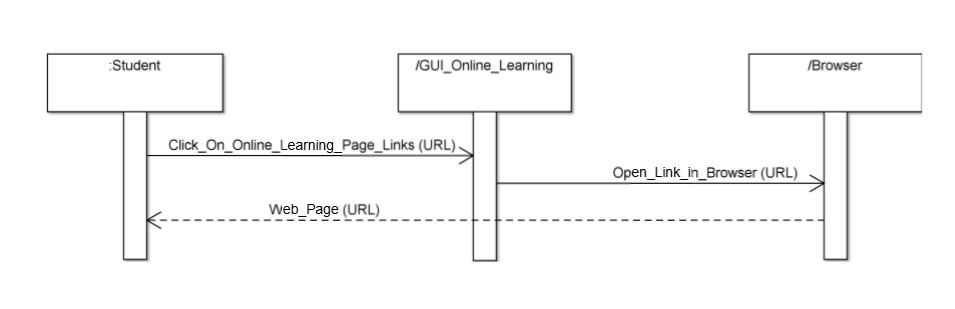
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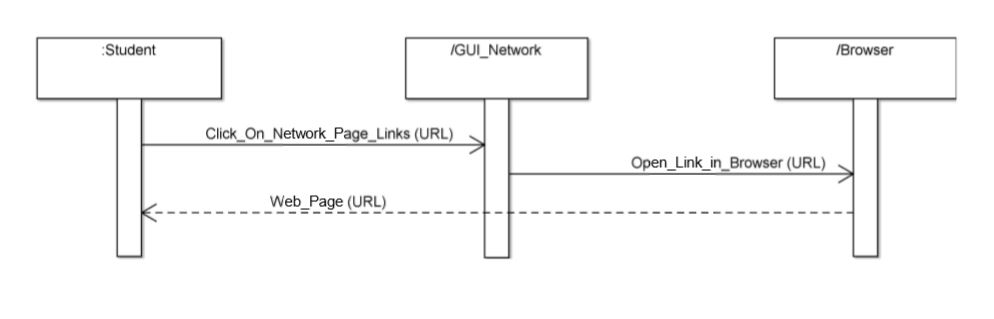
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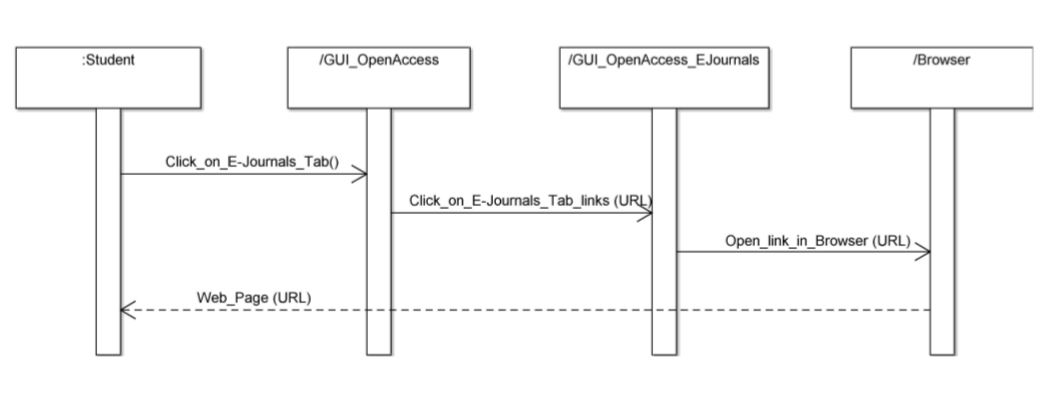
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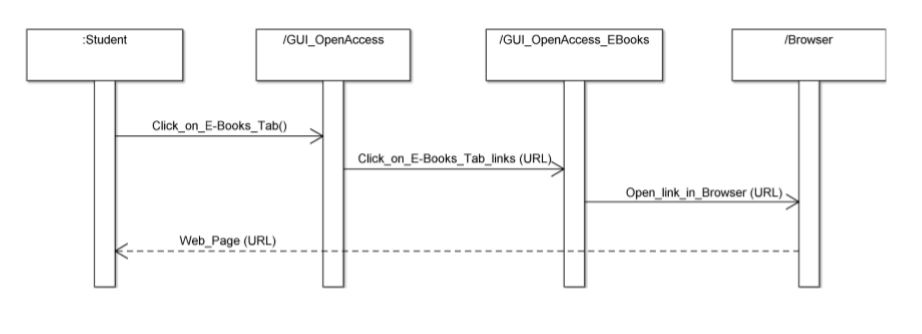
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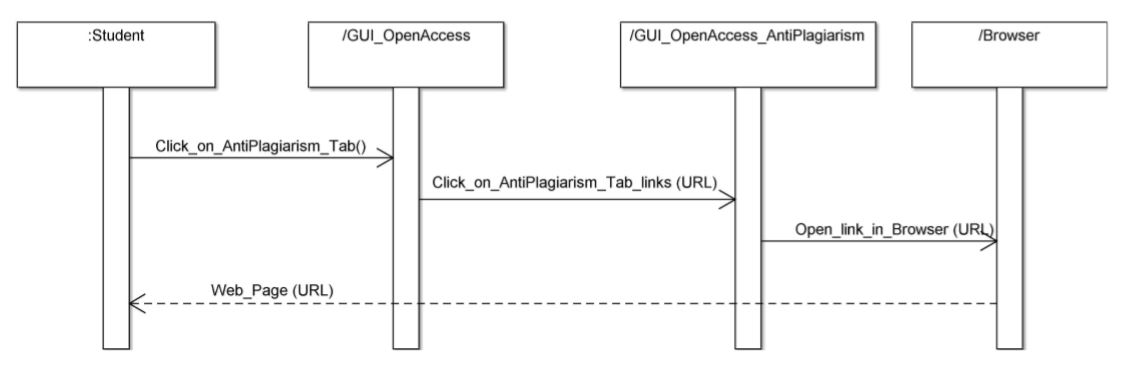
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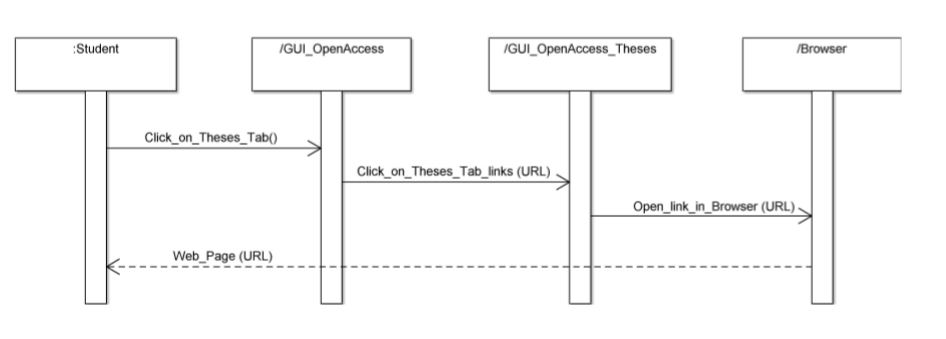
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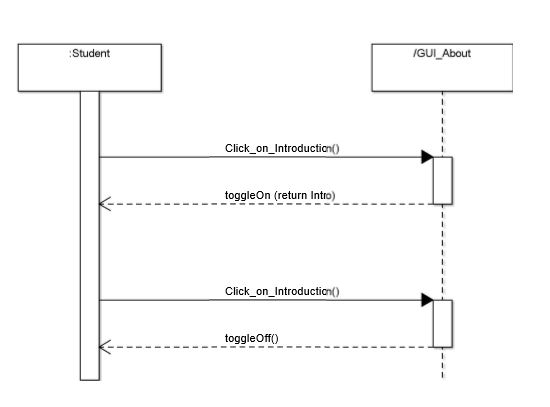
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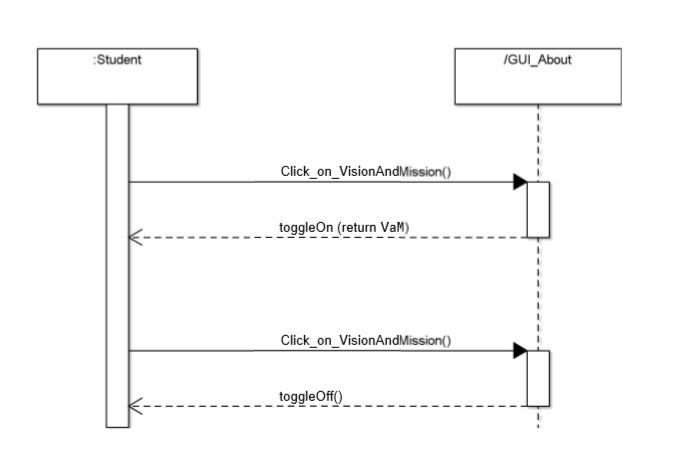
**OPEN ACCESS – THESES**

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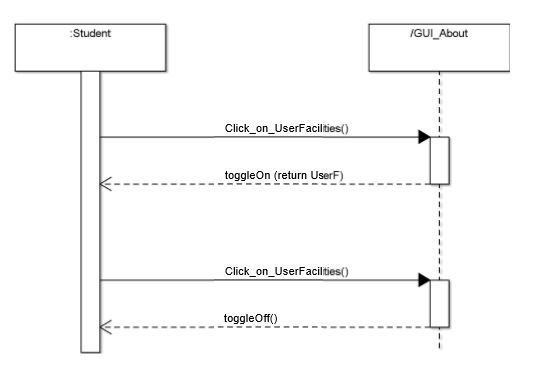
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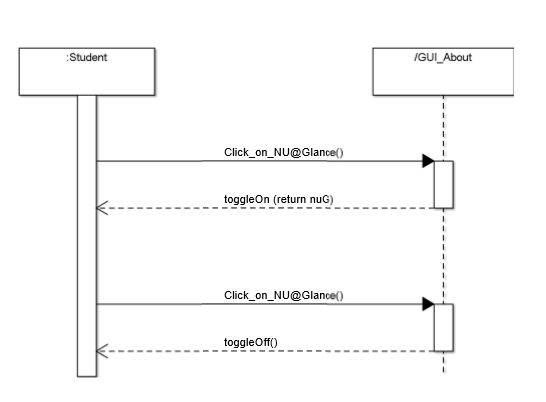
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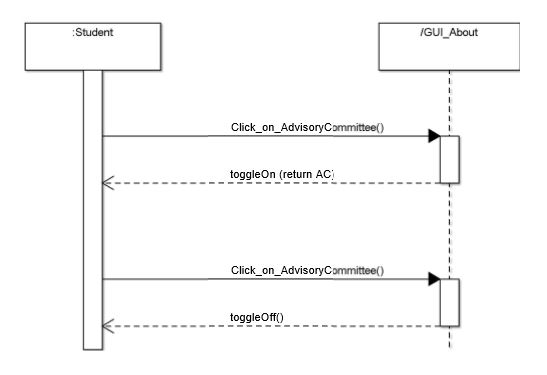
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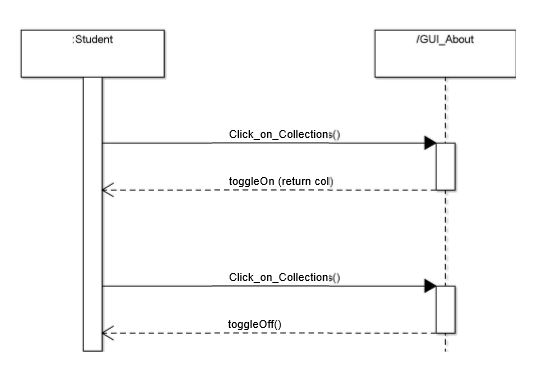
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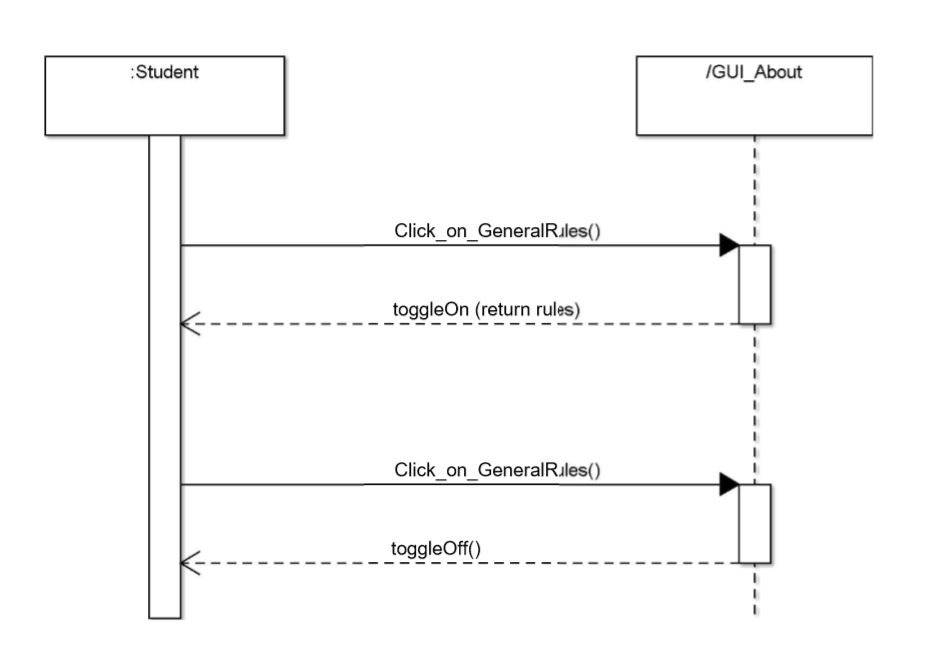
**ABOUT – ADVISORY COMMITTEE**

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**ABOUT - COLLECTIONS**

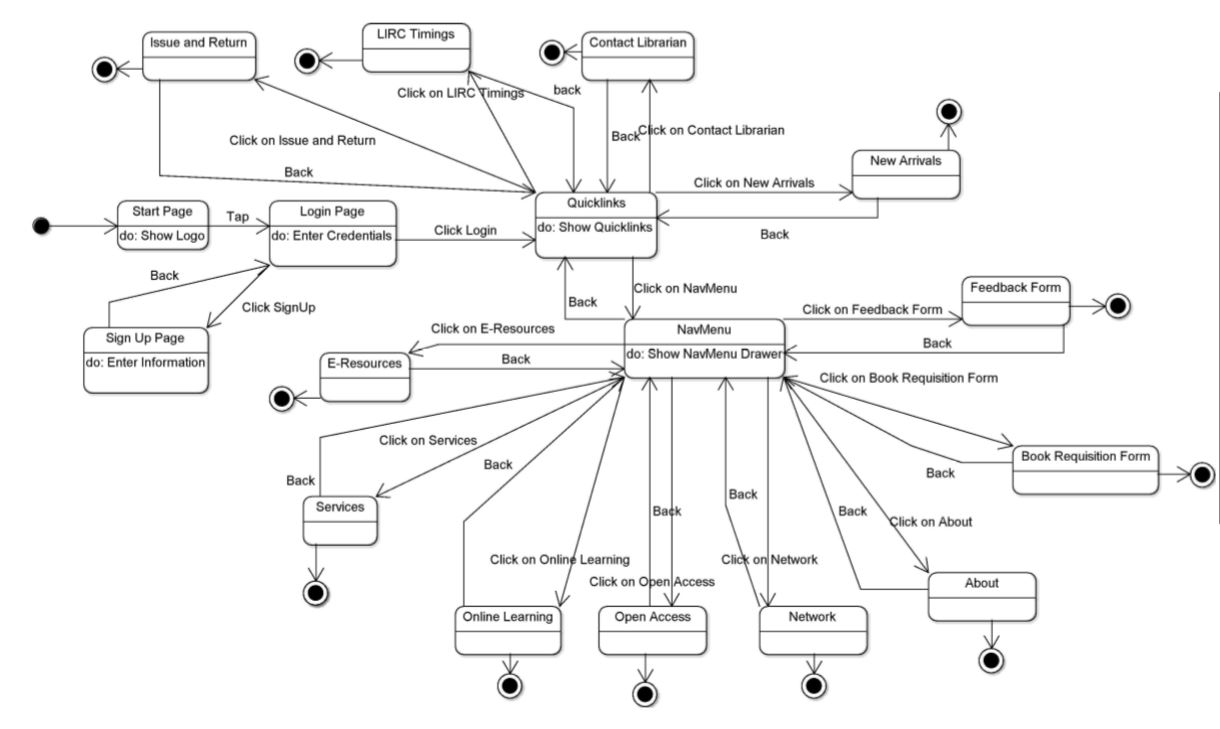
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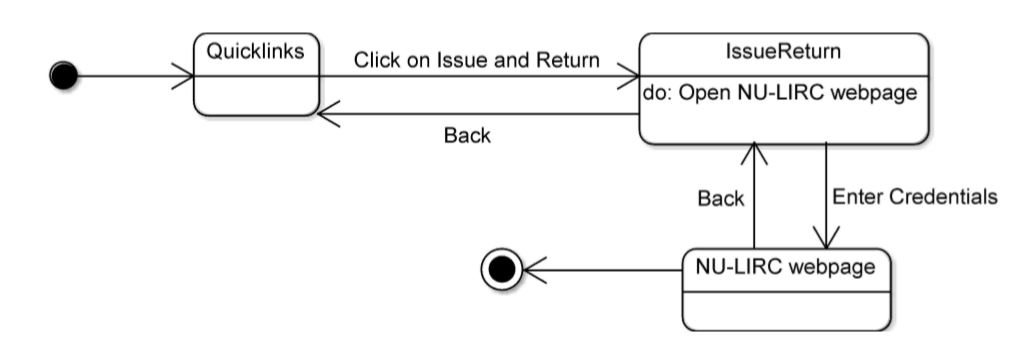
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**State Diagrams**

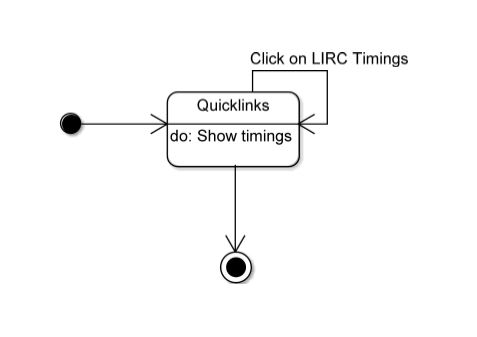
**LOGIN AND SIGN UP**

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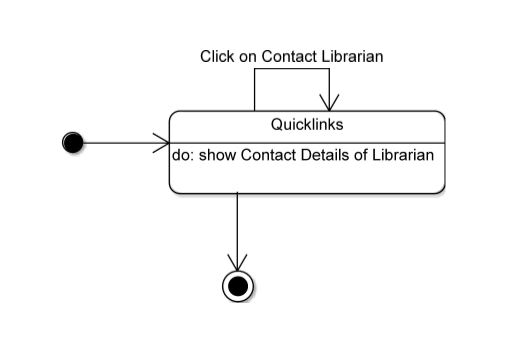
**ISSUE AND RETURN**

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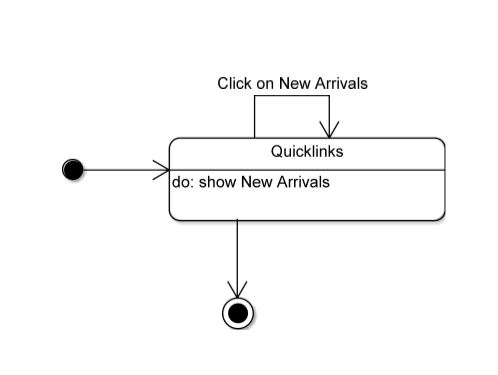
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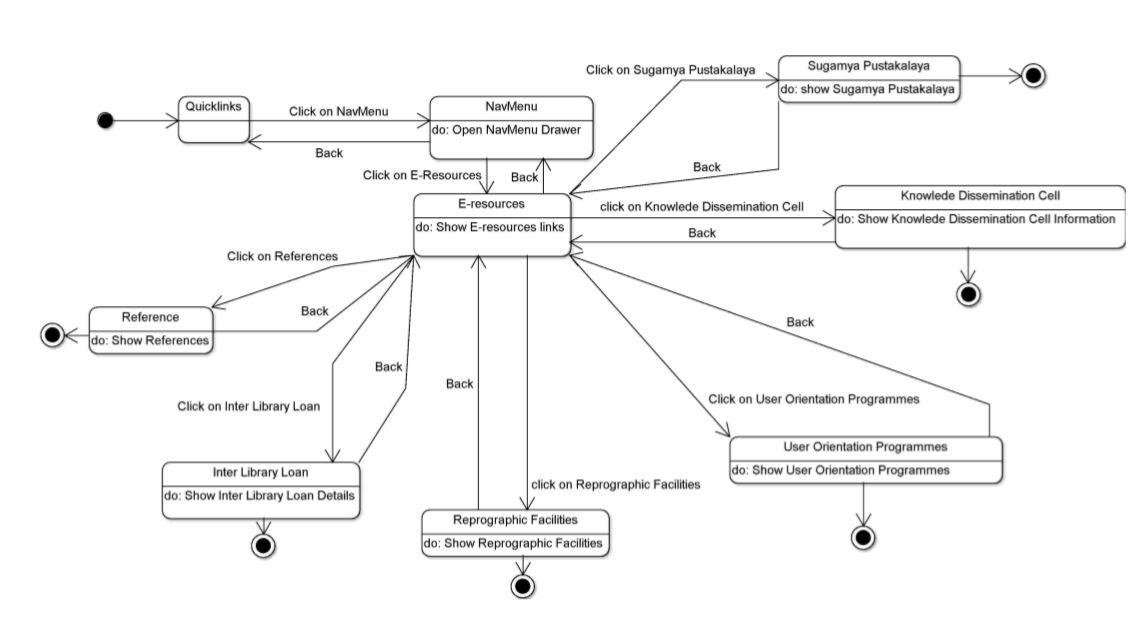
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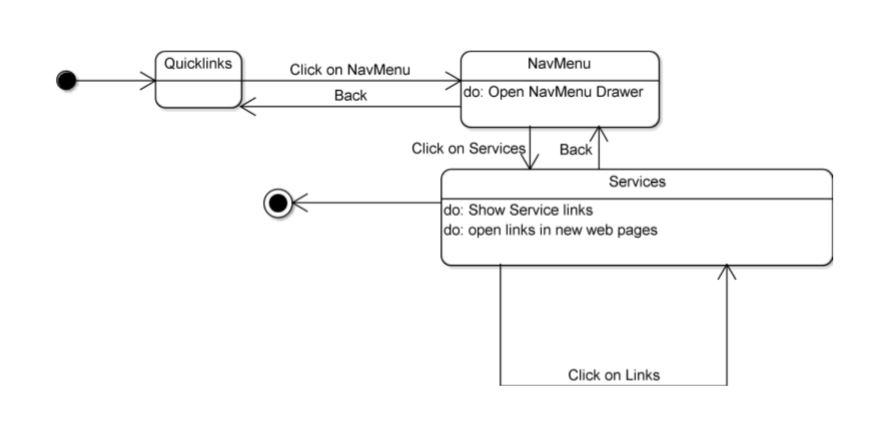
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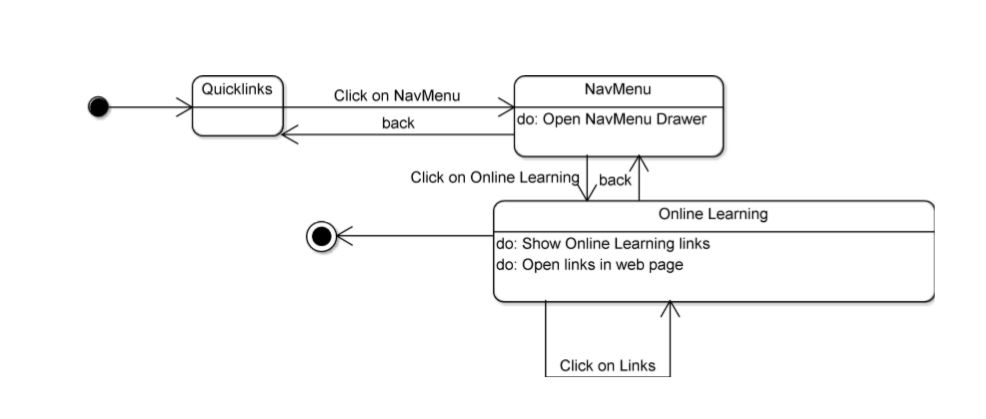
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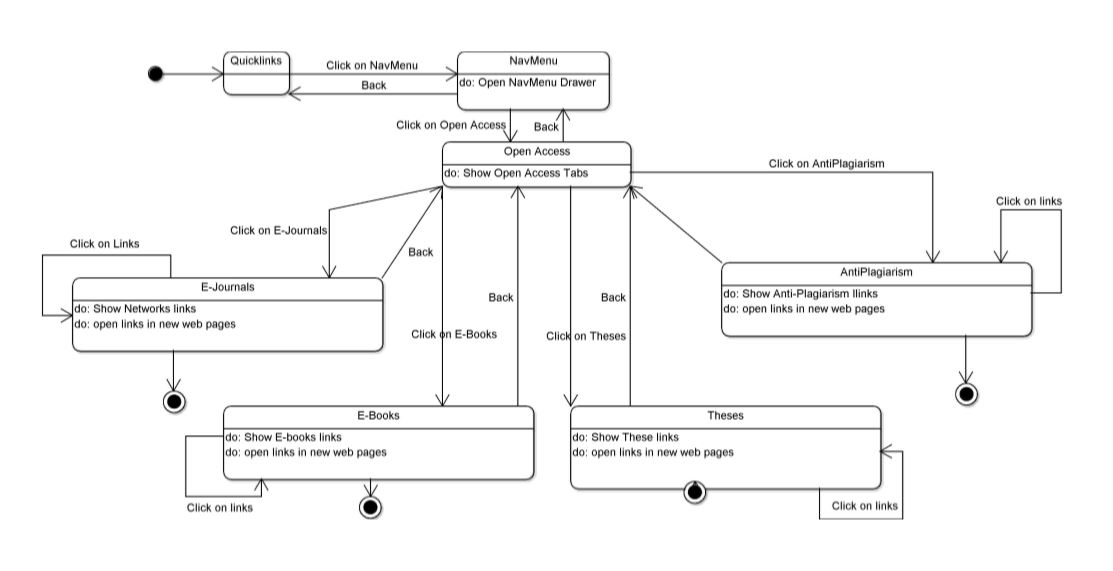
**SERVICES**

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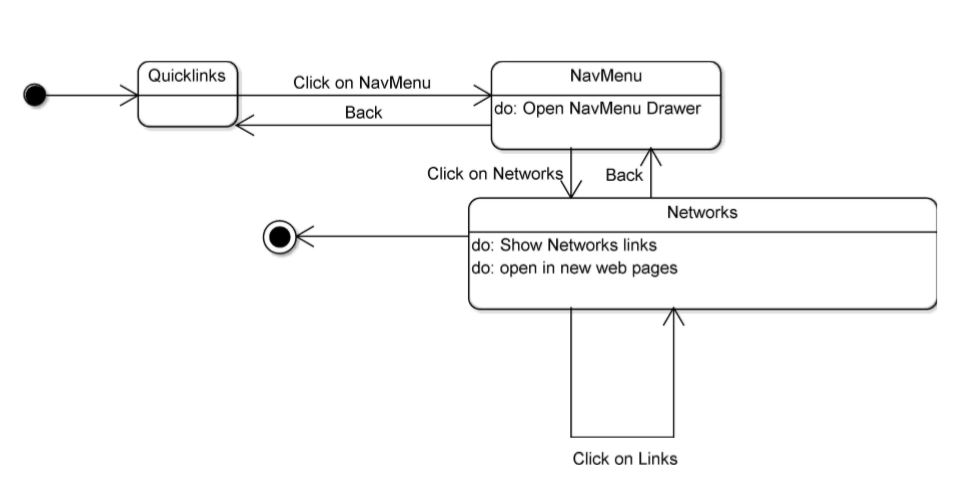
**ONLINE LEARNING**

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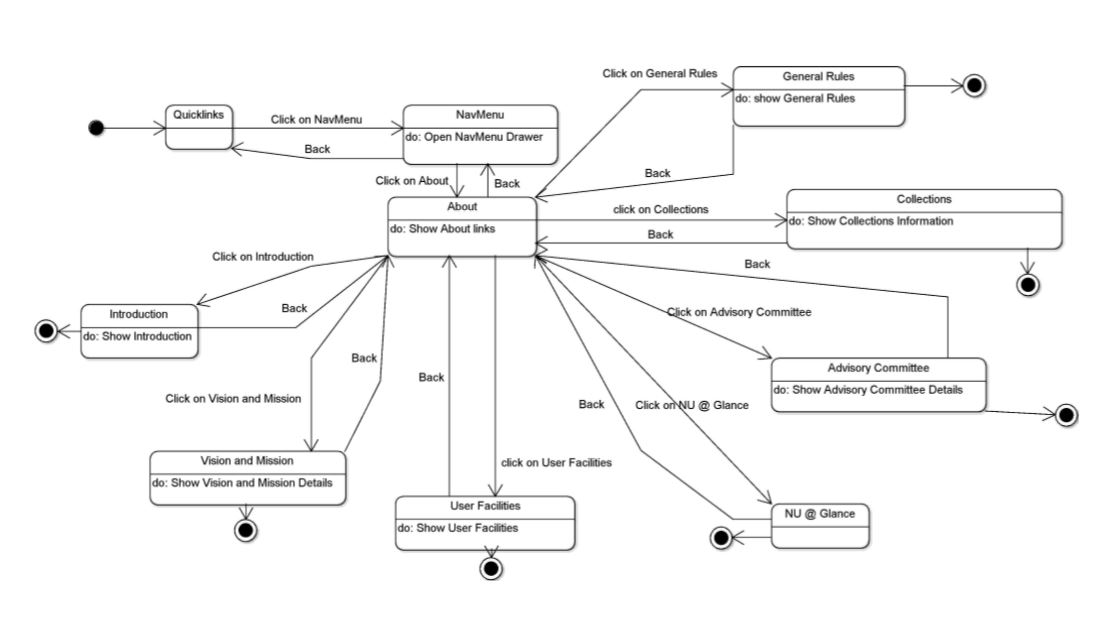
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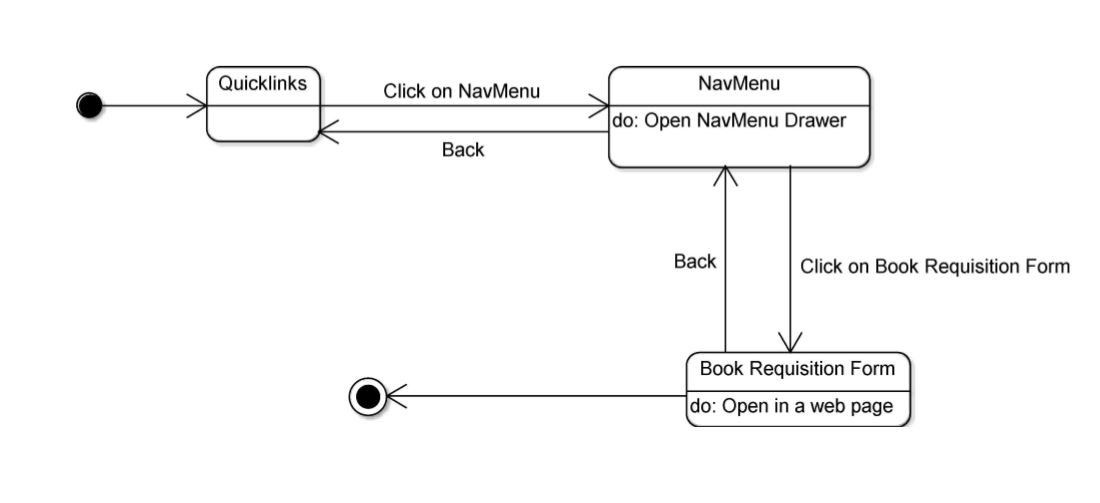
**NETWORK**

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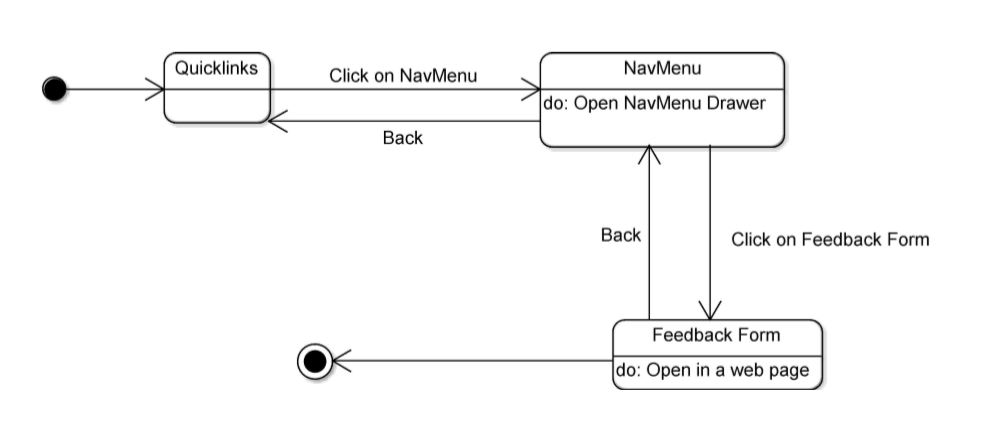
**ABOUT**

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**BOOK REQUISITION FORM**

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**FEEDBACK FORM**

****

**3.1 Logical Architecture Description**

**3.1.1 Explanation of class diagram**

Most of the classes extends AppCompatActivity class and implements the Navigation View interface which is being shown by association linkage.

**3.1.2 Explanation of sequence diagram**

Arrow line signifies there is a send message taken place. Response is being shown by dotted arrows.

**3.1.2.1 LOGIN:** It allows students to login with the username and password that are being registered in the database already. It loops being on same page until the correct information is not given.

**3.1.2.2 SIGN UP:** It allows students to sign up for this application.

**3.1.2.3 NAVMENU WITH BOOK REQUISITION FORM AND FEEDBACK FORM:** It allows students to navigate to different tabs – E-Resources, Services, Online Learning, Open Access, Network, About, Book Requisition Form and Feedback.

**3.1.2.4 ISSUE AND RETURN:** It allows students to go the NU-LIRC web site through the web view of the app to check their issued book status and penalties.

**3.1.2.5 LIRC TIMINGS:** It allows students to view the timings of the library.

**3.1.2.6 CONTACT LIBRARIAN:** Shows contact details of the librarian.

**3.1.2.7 NEW ARRIVALS:** Shows new arrivals in the library.

**3.1.2.8-3.1.2.13 E-RESOURCES:** It allows students to view E-resources available through the library.

**3.1.2.14 SERVICES:** It allows students to view Services provided by the library.

**3.1.2.15 ONLINE LEARNING:** It allows students to access online learning links provided by the library.

**3.1.2.16 NETWORK:** It allows students to view the Network of the library.

**3.1.2.17-3.1.2.20 OPEN ACCESS:** It allows students to view E-Journals, E-Books, Anti-Plagiarism and Theses available in the library.

**3.1.2.21-3.1.2.27 ABOUT:** It allows students to information about the library.

**3.2. Class Name : Login**

This class allows the user to enter the system by authenticating the entered credentials.

**3.2.1. Method Name : checkLogin()**

This verifies the credentials with the firebase database.

**3.3. Class Name : SignUpPage**

This class allows the user to sign up for the app by entering the required information.

**3.3.1 Method Name : startRegister()**

This save the information entered to the firebase authentication page.

**3.3.2 Method Name : saveToDatabase()**

This save the information entered to the firebase realtime database page.

**3.4. Class Name : AppCompactActivity**

This is the android studio class that all the other Activities extends (inherits) to be able to display the application on the android system.

**3.4.1. Method Name : onCreate()**

This method is responsible to create the activity when the application is launched on the system.

**3.4.2. Method Name : onStart()**

This is the first method to be executed when the activity opens/reopens.

**3.4.3. Method Name : onBackPressed()**

This method is executed when the back button is pressed o the android system.

**3.4.4. Method Name : onCreateOptionsMenu()**

Output :: This method returns a boolean value

This Method is called upon when the option menu on the top right corner on the app is pressen and any item from the menu is selected.

**3.5. Class Name : MainActivity**

This class is the first activity that is shown every time the application is launched.

**3.6. Class Name : IssueReturn**

This is the Activity that contains the web view to show the library site on the app itself. This Activity is launched whenever we click o the IssueReturn on the Main QuickLinks page.

**3.7. Class Name : EresourcesActivity**

This is the Activity from the Navgation menu which contains the data for the e-resourses of the app.

**3.7.1. Method Name : getData()**

This method extracts the data from the external text files saved in the app itself and displays it on the screen.

**3.8. Class Name : NetworkActivity**

This is the Activity from the Navgation menu which contains the data for the network resources of the app.

**3.9. Class Name : OnlineLearning**

This is the Activity from the Navgation menu which contains the links for the online learning resources of the app.

**3.10. Class Name : AboutActivity**

This is the Activity from the Navgation menu which contains the data of the app and what it contains as well as what are the number of books in the library.

**3.10.1. Method Name : getData()**

This method extracts the data from the external text files saved in the app itself and displays it on the screen.

**3.11. Class Name : ServicesActivity**

This is the Activity from the Navgation menu which contains the data for the services resources of the app.

**3.12. Class Name : OpenAccess**

This is the Activity from the Navgation menu which contains the data for the open access resources of the app.

**3.13. Class Name : QuickLinks**

This is the main page of the application after the login is done. It contains the links to other activities of the app. It also shows the LIRC timings, contact info., new arrivals and a link to IssueReturn.

**3.14. Interface Name : NavigationView**

This is an android implemented interface which we implemment in almost all the class which contains a navgation drawer.

**3.14.1. Method Name : onNavigationItemSelected()**

Output :: This method returns a boolean value

This method contind all the links to the other Activities of the app like the Eresources, Services, etc.

**3.15. Class Name : Application**

Inbuilt Android class.

**3.15.1. Method Name : onCreate()**

This method is responsible to create the activity when the application is launched on the system.

**3.16. Class Name : NULIRCApp**

This class is the base class for the Initialization of Firebase database and authentication.

**3.17. Class Name : Fragment**

This is like a miniature version of an Activity which can be pushed up in an activity as many as you want.

**3.17.1. Method Name : onCreate()**

This method is responsible to create the fragment when the activity is launched on the system.

**3.17.2. Method Name : onCreateView()**

This method is responsible to create the View of the screen when the activity is launched on the system.

**3.17.3. Method Name : onViewCreated()**

This method is responsible for the remaining execution afte the fragment is created.

**3.17. Class Name : FragmentPageAdapter**

This class is extended by TabPageAdapter to be able to display the fragment in a form of a list.

**3.17.1. Method Name : getItem()**

Output :: This returns the fragment selected

This method selects a fragment and displays it to the screen, one at a time.

**3.17.2. Method Name : getCount()**

Output :: This returns the number of fragments

**3.17.3. Method Name : getPageTitle()**

Output :: This returns the title of the fragment

**3.18. Class Name : TabPageAdapter**

This class extend the FragmentPageAdapter and displays the fragments on the screen.

**3.19. Class Name : EBooks**

This is the Fragment which contains the links for the Ebooks resources of the app.

**3.20. Class Name : EJournals**

This is the Fragment which contains the links for the Ejournals resources of the app.

**3.21. Class Name : Theses**

This is the Fragment which contains the links for the Theses resources of the app.

**3.22. Class Name :** **AntiPlagiarism**

This is the Fragment which contains the links for the AntiPlagiarism resources of the app.

**4.0 Execution Architecture**

Runtime environment required is any device supporting Android Operating System with the minimum version of KitKat (API 19), Android Studio as a deployment platform.

**4.1 Reuse and relationships to other products**

This is a new Android application made on the upcoming NU-LIRC website.

**5.0 Design decisions and tradeoffs**

The website could not be integrated properly with the application so the website data is stored on a Firebase database. When a student logs in to the application, all the data from the Firebase database is extracted and loaded into the application. Due to this, the app may take time to load up after the login.

**6.0 Pseudocode for components**

**7.0 Appendices (if any)**

**NA**