

MySpace – A socio-academic site for Students

SOFTWARE DESIGN DOCUMENT

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Version 1.0



विश्वजीवनामृतं ज्ञानम्

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1 Introduction

MySpace is a socio-academic portal for the students of ABV-IIITM Gwalior where students can not only get organized with their class schedule, get informed with the upcoming college events organized by various clubs, access helpful resources like books, notes, previous-year papers, etc., but also ask their academic, technical or career related doubts and get clarified by their seniors. Students can also read and post technical articles and rate them. MySpace attempts to make the life of students simpler by organizing all of the things they need in one place.

2 Design Considerations

This section describes many of the issues that are needs to be addressed or resolved before embarking on a complete design solution. This document is based on the SRS document version 1.0. There is a need for reference in case any part is not understood or felt incomplete.

2.1 Assumptions

MySpace Web System makes several assumptions about the software and hardware requirements as presented in the SRS document. It is assumed that the target users (IIITM Students) are internet literate and are able to use search engine. It is also expected from the students to use the provided institutional e-mail to Sign Up and Sign In. The students are assumed to be able to use e-mail attachments and have general understanding of using buttons, pull-down menus, and similar tools on the website.

It is also assumed that the traffic on the website will not exceed a couple thousand students and so a free server with presumably enough hardware resources will be used.

2.2 Technology Choices

MySpace Web System will be using the latest tools and technologies which are fast, open-source and pretty much standard tools. The technologies are:

1. HTML5
2. CSS3
3. JavaScript
4. JavaScript ES6
5. Mongo DB
6. React
7. Node.js
8. Express.js
9. EJS
10. Bootstrap
11. Tailwind CSS
12. Tailblocks

2.3 Design Methodology

MySpace Web System will be designed using Agile software development methodology, specifically the scrum and eXtreme Programming methodologies which promotes adaptive planning, evolutionary development and delivery, a time-boxed iterative approach, and encourages rapid and flexible response to changes. This decision is based on the small team and project size.

The design will take following approach:

1. Identifying Modules
2. Module Specification
3. Designing module interfaces and creating relationships
4. Designing user interfaces

3 System Architecture

3.1 System Design

Systems design implies a systematic approach to the design of a system. It may take a bottom-up or top-down approach, but either way the process is systematic wherein it takes into account all related variables of the system that needs to be created—from the architecture, to the required hardware and software, right down to the data and how it travels and transforms throughout its travel through the system. Systems design then overlaps with systems analysis, systems engineering and systems architecture. In this phase, the complex activity of system development is divided into several smaller sub-activities, which coordinate with each other to achieve the main objective of system development.

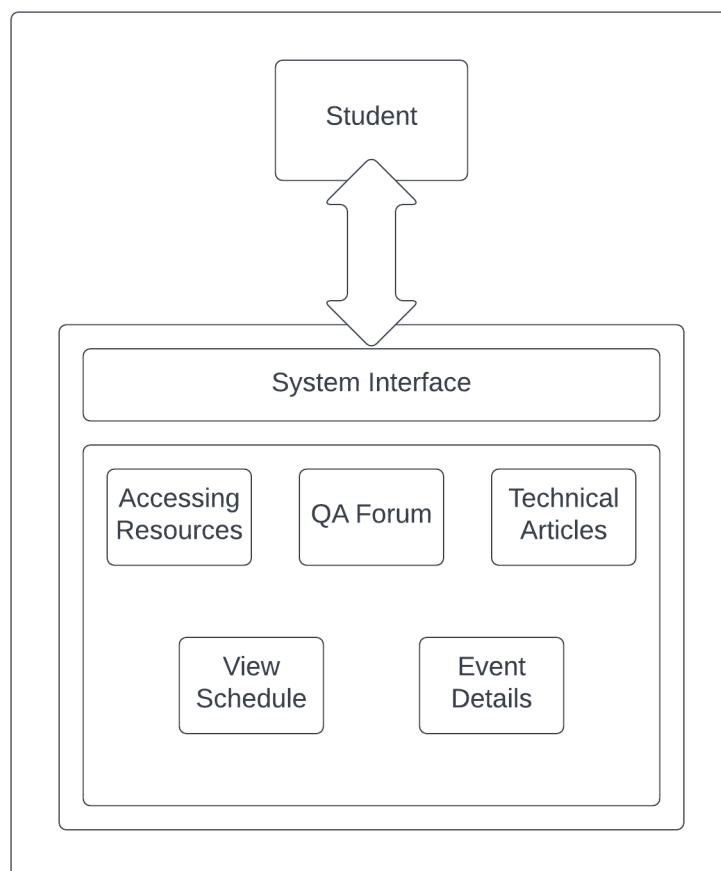


Fig 1: System Environment

3.2 Functional Decomposition Tree

The main functions of the system is decomposed into smaller sub functions or sub-modules and so on. The System shall take place following structure of organization after implementation. The decomposition is stable and functions should be made highly cohesive.

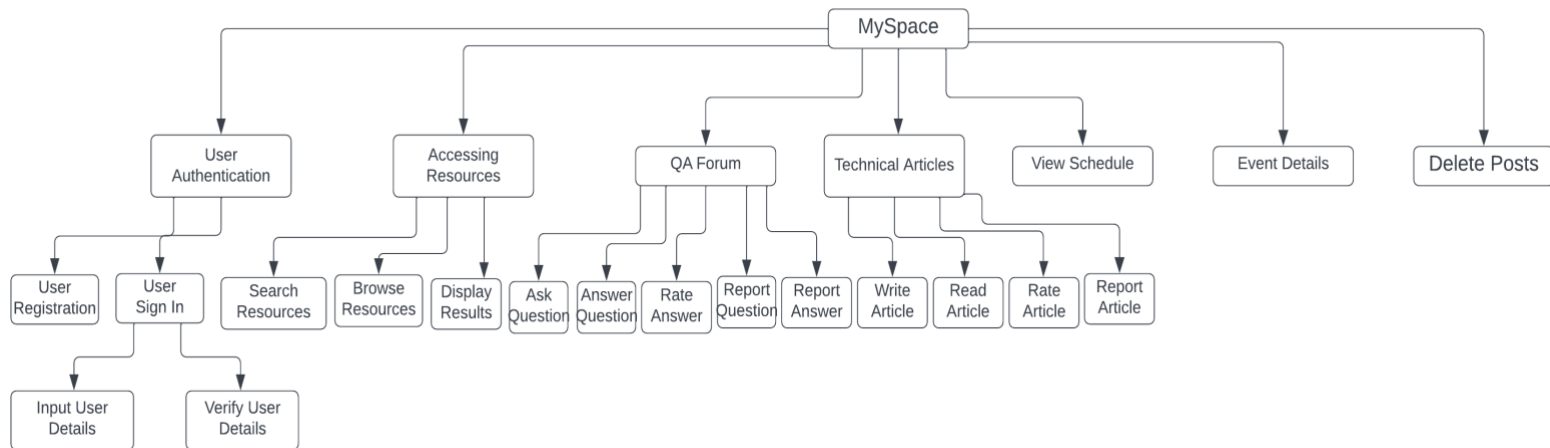


Fig 2: Functional Decomposition Tree

3.3 Modules Involved in the System

3.3.1 User Authentication

This module is required for the registration of new students or for the secure login of already registered students using their registered institutional e-mail. It has two submodules:

1. **User Registration:** It takes gives user, options of Google Sign In and Manual Sign Up. Based upon the user's choice it takes the user input or retrieves the user's data from Google OAuth 2.0 server and adds the user's account into the database. It also shows success or failure message to the user.
2. **User Sign In:** It verifies the user's account while one is trying to log in. It has two sub submodules:
 - **Input User Details:** It takes the user input (e-mail and password) and send the data to "Verify User Details" for verification and receives the response and shows the user appropriate message to students.
 - **Verify User Details:** It check if the entered user_info is available in the database or not and sends the appropriate response to calling function.

3.3.2 Accessing Resources

This module supports the resource access and download functionality. It comprises of three sub modules:

1. **Browse Resources:** It supports the searching of resources through a sequence of clicks. The resources are organised batch-wise and then semester wise. After a sequence of clicks it shows the resource links page.

2. **Search Resources:** It supports the resource search functionality using Google Custom Search Engine. It takes the keyword input from user and transfers the keyword to the “Display Results” module.
3. **Display Result:** It takes the keyword input feeds it into the Google custom search engine and shows the returned result in aesthetically formatted form.

3.3.3 QA Forum

This module supports the QA Forum functionality of MySpace website. It has following submodules:

1. **Ask Question:** This takes the Question Text from student and adds the new Question Details to the database and shows appropriate response to the student. It then also displays the question answer details in the QA Forum homepage and student dashboard.
2. **Answer Question:** : This takes the Answer Text from student and adds the new Answer Details to the database and shows appropriate response to the student. It then also displays the question answer details in the QA Forum homepage and student dashboard.
3. **Rate Answer:** It takes the student ratings for a specific answer and modifies the ratings in the database. It then takes the modified ratings and displays near the appropriate answer.
4. **Report Question:** It uses mailto link to redirect the user to his/her email account where (s)he can specify the content and reasons for reporting.
5. **Report Answer:** It uses mailto link to redirect the user to his/her email account where (s)he can specify the content and reasons for reporting.

3.3.4 Technical Articles

This module supports the QA Forum functionality of MySpace website. It has following submodules:

1. **Write Articles:** This takes the Article Text from student and adds the new article details to the database and shows appropriate responses to the student. It then displays the Articles in the Technical Article homepage and student dashboard.
2. **Read Articles:** It fetches article details from the database and displays the article excerpts in the Technical article homepage. It also provides the functionality of expanding article excerpts(expanding) that user can then read.
3. **Rate Articles:** It takes the student ratings for a specific article and modifies the ratings in the database. It then takes the modified ratings and displays near the appropriate article.
4. **Report Articles:** It uses mailto link to redirect the user to his/her email account where (s)he can specify the content and reasons for reporting.

3.3.5 View Schedule

The module supports the schedule functionality. Students can select the appropriate batch and they will be displayed the schedule links on a webpage semester-wise.

3.3.6 View Event Details

This module displays the club events details on a webpage in an organised way.

3.4 Data Flow Diagram

3.4.1 Level 0 DFD : Context Diagram

Level 0 DFD captures various external entities interacting with the system and the data flow occurring between the system and the external entities. Level 0 DFD is also called context diagram. A context diagram establishes the context of the system, i.e., data sinks and data sources.

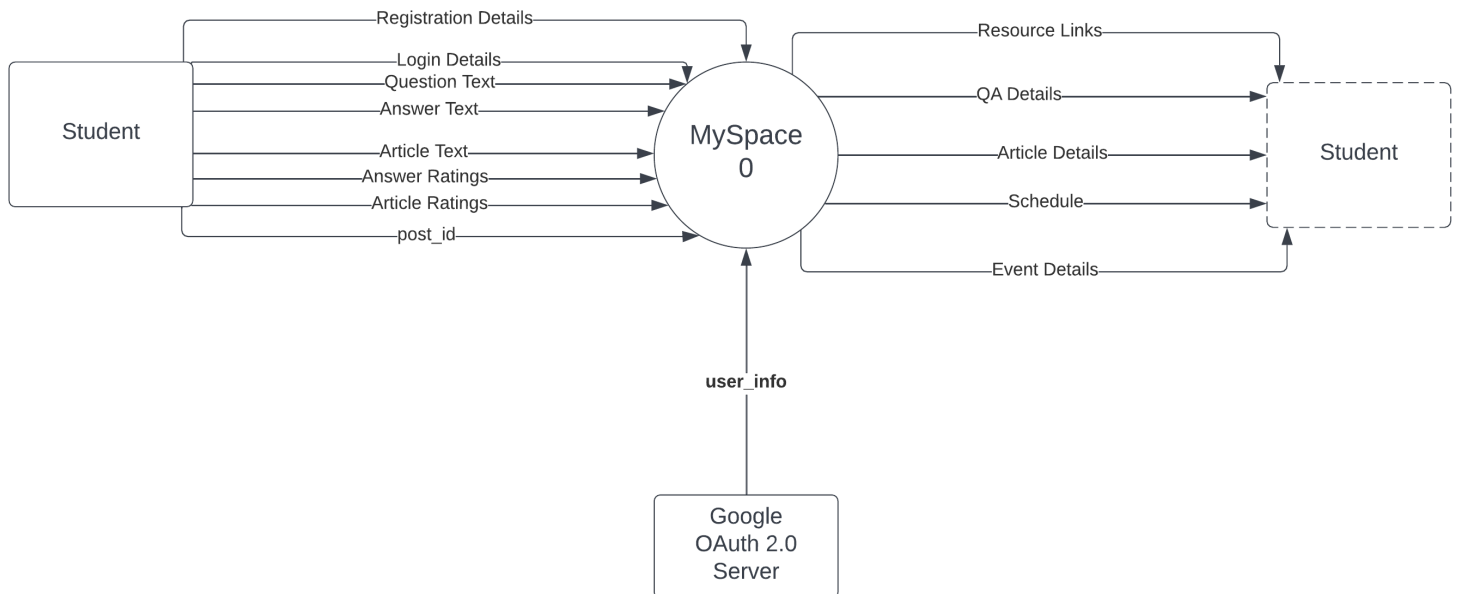


Fig 3: Context Diagram

Note: The dotted student entity is the same instance as the left-shown student entity. They are shown separately just for the clarity of diagram (so that data coming and data going can be visualised easily and neatly).

3.4.2 Level 1 DFD

The MySpace Web System is decomposed into various major modules.

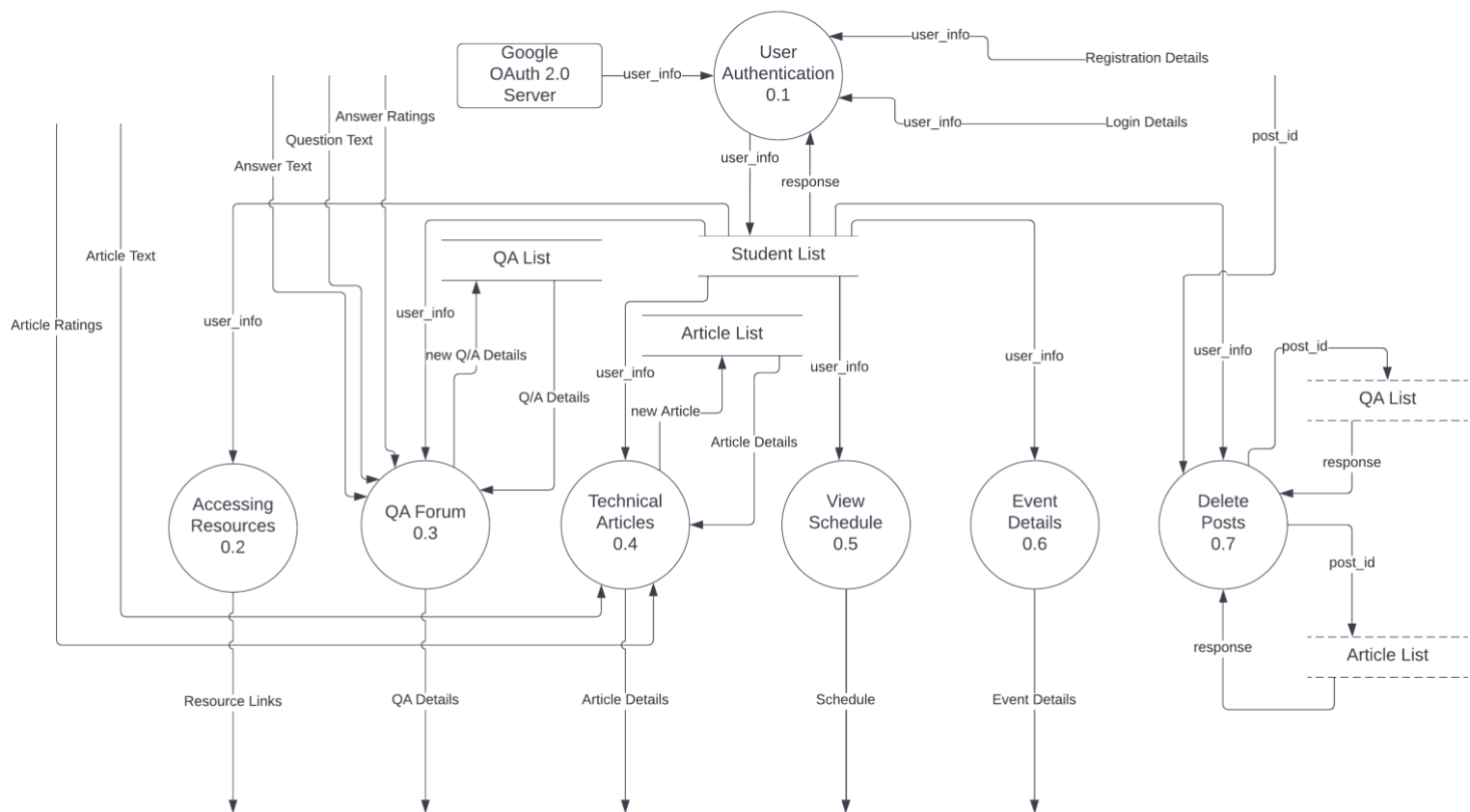


Fig 4: Level 1 DFD

Note: The dotted right databases(QA List and Article List) are the same instances of the databases which are shown in the left-side. They are drawn separately to make the neat diagram and less congested data flow arrows.

3.4.3 Level 2 DFD

Some of these modules are further decomposed into submodules as shown below.

3.4.3.1 User Authentication

User Authentication module is further exploded as shown below:

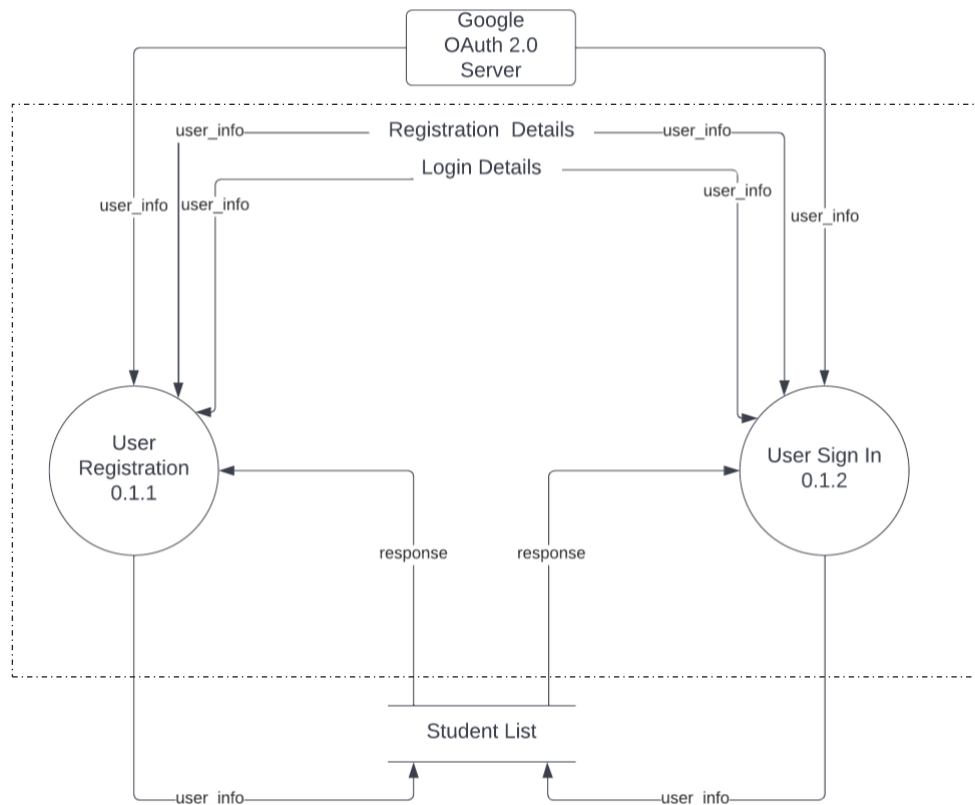


Fig 5: Level 2 DFD (User Authentication)

3.4.3.2 Accessing Resources

Accessing Resources module is further exploded as below:

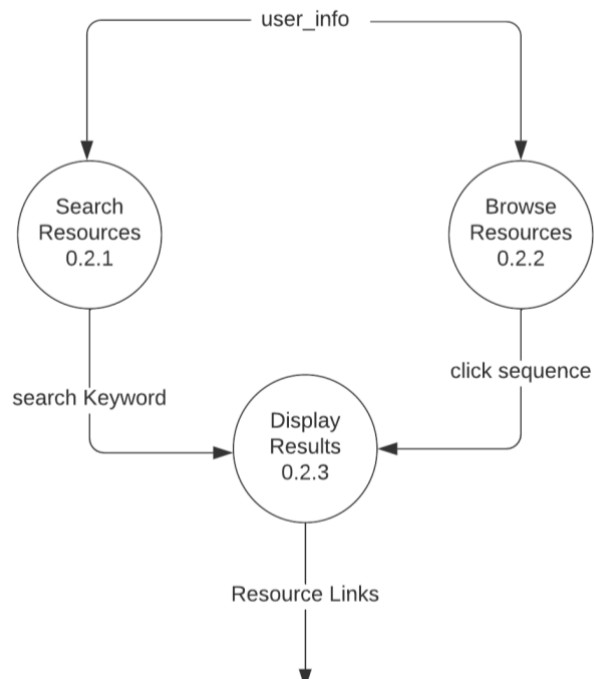
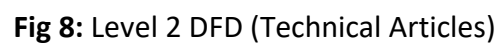


Fig 6: Level 2 DFD (Accessing Resources)

QA Forum module is further exploded as below:



Technical Articles module is further exploded as below:



3.4.4 Level 3 DFD

The User Sign In submodule(Level) is further decomposed as follows:

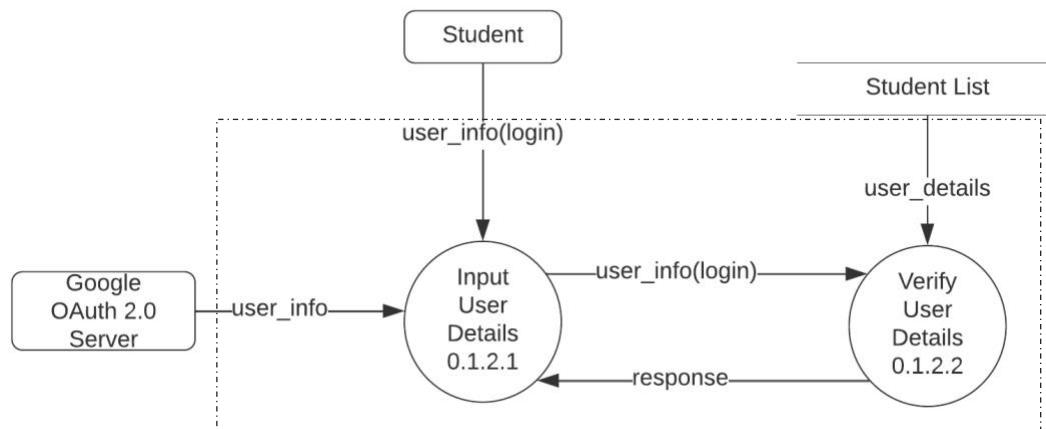


Fig 9: Level 3 DFD (User Sign In)

3.5 Data Dictionary

Data	Fields	Type	Description	NULL
Registration Details	fullName	integer	Unique user_id	No
	emailId	string	Unique email_id	No
	password	hash	Unique password	No
	batch	string	BCS/IMT/IMG	No
	profilePicture	image	Retrieved from Google or given standard profile picture.	
Login Details/ user_info(login)	emailId	string	Institutional email	No
	password	string	Stored after hashing	No
User_info	fullName	string		No
	emailId	string		
	batch	string	BCS/IMT/IMG	
Access_Resource	searchKeyword	string	Uses Google custom search to generate results	No

	resourceLink	URL	Downloadable links	No
QA Details	questionText	string	Contents of Question	No
	que_id		Automatically generated	
	answerText	string		No
	answerRating	integer		Yes
	views	integer		No
	user_info	object		No
Articles Details	articleText	string	Contents of Article	No
	article_id	integer	Automatically generated	No
	articleRating	integer		No
	Views	integer		No
Schedule	scheduleLinks	URLs		No
Event Details	eventPoster	image		No
post_id	post_id	string		No
response	responseValue	boolean		No
newQuestionDetails	questionText	string	Contents of Question	No
	user_info	object		No
newArticleDetails	articleText	string	Contents of article	No
	user_info	object		No

Table 1: Data Dictionary

4 Software Interface Design

4.1 User Interface Design

UI is designed according to standard UI design principles.

- **The simplicity principle:** Users can navigate through the website with relative ease. The UI is minimalistic and easy on the eye.
- **The visibility principle:** Every function is clearly visible to the user and can be easily accessed.
- **The structure principle:** Elements on the page are organized such that related elements are grouped together, and unrelated elements or/and a group of elements are kept separate, at a distance from each other.
- **The feedback principle:** The design ensures and validates users' actions and reply to queries posted by other users.
- **The reuse principle:** Certain names and elements have been reused to increase the ease of use and reduce ambiguity.
- **The user choice:** The application allows users to rate the post if informative and report if found inappropriate.

4.2 Description of Web Pages

- **"Landing"** page is the first page the user sees. This page displays the website features and provides links to either Sign Up or Sign In if already registered.
- **"Login/Register"** page is the webpage where existing users can login or new users can register themselves and make an account.
- **"Home/Dashboard"** page is where the user is redirected after logging in. From here, the user can access the resource section and from where users can navigate to other sections of the website. Navigation links to functionalities of the website i.e. posting articles, interactive QA Forum, details of different upcoming contests and events and class schedule. This page is the effective dashboard for the user from where they have access to all their academic resources, and other features of the website.
- **"Resources"** page is the where user can access the resources like past year papers books and notes semester wise, also the user has the accessibility to easily search their preferred material via navigation menu.
- **"QA Forum"** page is the where user can add questions related to academics and career. It is that one **interactive** section of the page where users can exchange information and clear doubts.
- **"Articles"** page is the where users interested in content writing can publish their articles that others can read and react to.
- **"Schedule"** page is the where user can access their class schedule.
- **"Events"** page is the page containing the posters and links of upcoming college events.

4.3 Web Page Tree

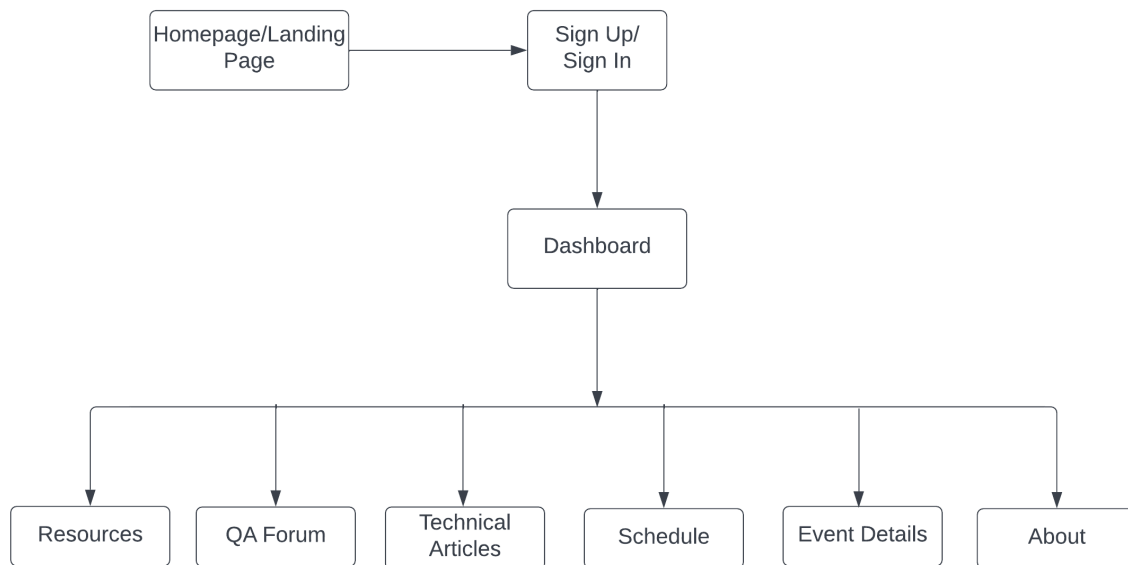
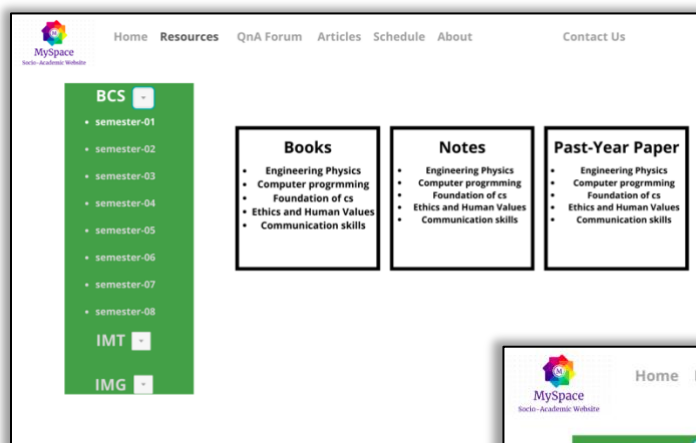


Fig 10: Web Pages in a Tree

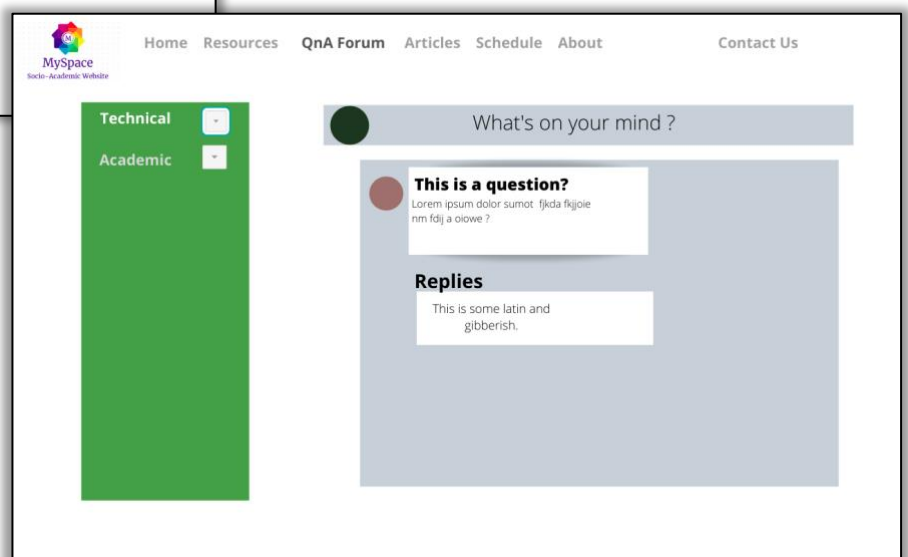
4.4 Sample UI Design

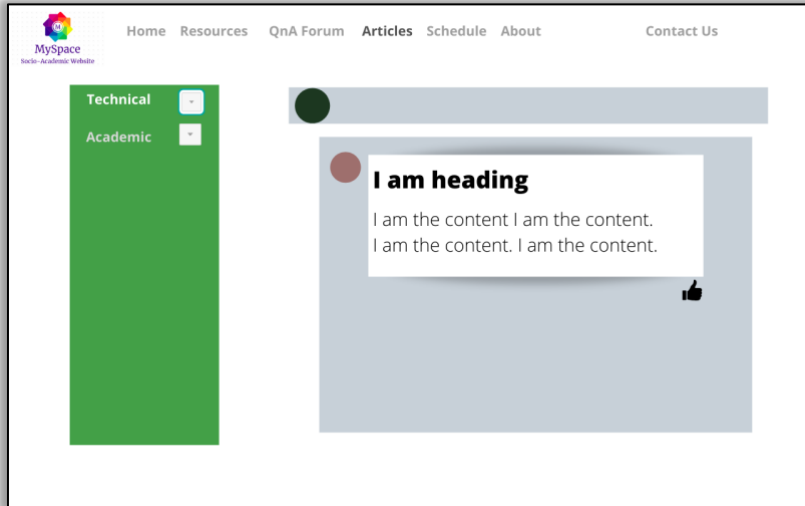
These are some of the sample UI designs (only intended for illustrating the organisation of various elements in a page).



Resources Page containing links of resources.

QA Forum – question and answers (replies)





Technical Article Section

Schedule Section

