# CollabChain

*Submitted in partial fulfillment of the*
*requirements for the degree*

*of*

**Bachelor of Technology**

*by*

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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**TECHNO MAIN SALT LAKE**
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Last but not the least we convey our gratitude to all the teachers for providing us the technical skill that will always remain as our asset and to all non-teaching staff for the gracious hospitality they offered us.

Place: Techno Main Salt Lake
Date:

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# APPROVAL

This is to certify that the project report entitled **CollabChain** prepared under my supervision by **Nahshal Manir** (Roll Number: *13000120095*), **Dhiraj Kumar Sharma** (Roll Number: *13000120098*), **Aniket Chakraborty** (Roll Number: *13000120124*) and **Meghadri Koley** (Roll Number: *13005320023*), be accepted in partial fulfillment for the degree of Bachelor of Technology in **Department of Computer Science and Engineering**.

It is to be understood that by this approval, the undersigned does not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn thereof, but approves the report only for the purpose for which it has been submitted.

Signature of
Internal Guide(s)

Signature of
the HOD

Signature of External Examiner

# Contents

# 1 Introduction

## 1.1 Abstract

CollabChain is a confidentiality based research collaboration platform. The platform allows interested individuals and researchers all around the world to collaborate on research works but at the main time maintaining confidentiality through block-chain technology. Online research and/or collaboration platforms existing till date, lack in the area of providing a proper medium for research content sharing and collaboration with confidentiality not only among different research teams but also within each team. CollabChain overcomes this limitation by bringing all these functionalities together into a single platform through the help of block-chain technology and at the mean time giving researchers the opportunity to choose their team members from an exceptionally large pool of candidates including school students to research workers themselves.

## 1.2 Problem Domain

The problem addressed by this project belongs to the research and development domain. The project aims to solve the problem through the integration of block-chain technology with online web application development.

## 1.3 Glossary

| **Abbrev.** | **Full Form** |
|---|---|
| R&D | Research & Development. |
| RCA | Research Collaboration Agreement. |
| IPR | Intellectual property rights. |
| API | Application Programming Interface. |
| FIPR | Foreground Intellectual property rights. |
| IRB | Institutional Review Board |
| CV | Curriculum Vitae. |
| T&Cs | Terms & Conditions. |

Table 1: *Table of Glossary*

# 2 Problem Definition

## 2.1 Scope

The project aims to promote research collaboration on-line through a single platform with the mechanism of confidentiality built-in. Allowing researchers to choose individuals for a project from a large pool of candidates, segregate tasks among selected Contributors without disclosing the actual aim of the project before publishing and user review on project completion, provides an unique package of functionalities within an on-line platform for R&D related work. Refer to [3] for more details on requirements and problems on research collaborations.

The platform offers two user types to choose from, Researcher & Contributor respectively. The "Researcher" user type allows an individual to host their own project and contribute to another project on the platform. The "Contributor" user type can be considered to be more suitable to individuals who are looking to only contribute to existing projects under the respective researchers.

Overall, the goal of the project is to provide researchers and contributors all around the world a common platform for collaboration keeping in check the confidentiality involved in the process. The project aims to provide motivation to researchers to perform at least a part of their research work on-line with the surety of non-disclosure of the actual project aim and problem statement before publication of their work. It also motivates individuals from different age groups and professional backgrounds to contribute to research work irrespective of their age groups.

## 2.2 Exclusions

State the exclusion.

### 2.2.1 Functional Exclusions

The section mentions the functionalities excluded i. e., not implemented due to their complexity or expense. Those functionalities are as follows:

1. *Mechanism to confirm the avoidance of RCA breach*: The mechanism/combination of functionalities required to assure the certainty of complying with the RCA of a project is too complex and too expensive in the sense that it involves different industries such as law, cyber-security, professional research communities

to have a completely separate platform to keep a track of the activity of each individual involved in a project.

2. *Keeping track of published & revised research papers*: The platform allows project *Researcher* to attach the published and/or revised research papers to the corresponding projects but does not provide a mechanism to guarantee that the revised papers will be made available at the respective project pages.

3. *Mechanism to draft RCA & IPR documents*: The platform does not provide functionalities to draft any agreement document required for a project to avoid situations which might make collaboration on the platform rigid and/or one-sided for a *Researcher* or a *Contributor*.

### 2.2.2 Technical Exclusions

This section mentions the technical supports excluded from the platform for time constraint, project expenses and/or unavailability of appropriate APIs:

1. The platform does not provide any third-party application implementation.

2. The platform does not provide support for proper presentation of the application accessed through web browsers on devices other than a proper laptop or desktop PC.

## 2.3 Assumptions

State the specific assumptions under which your project will work.

The assumptions stated below and the user types defined are to be followed through out the document and system:

1. **Type of research**: The aim of the platform is to maintain confidentiality in collaborative, mentor-mentee or peer-to-peer collaborative research work.

2. **User-Types**: The platform classifies a user as either a *Researcher* or a *Contributor*. The user-type *Researcher* resembles the *mentor or lead-researcher* role of a collaborative research project & the user-type *Contributor* resembles the role of a *mentee or associate-researcher*.

3. **Experience**: Either of the user-types of the platform are assumed to be familiar and/or aware about the process and tasks involving collaborative research work in the real world.

4. **IPR & NDA Agreements**: The *Researcher* and a *Contributor* of a project while drafting and authenticating the RCA & FIPR for the concerned project must include the mentioned platform dependent agreement T&Cs under non-functional requirements, platform_agreements [NFPDAT-1] and comply with them so as to avoid authenticity violation problems later during the research work.

# 3 Related Studies

## 3.1 Survey

A survey was conducted to understand the need of the platform proposed in this project. Following are the response statistics from the res-ponders:

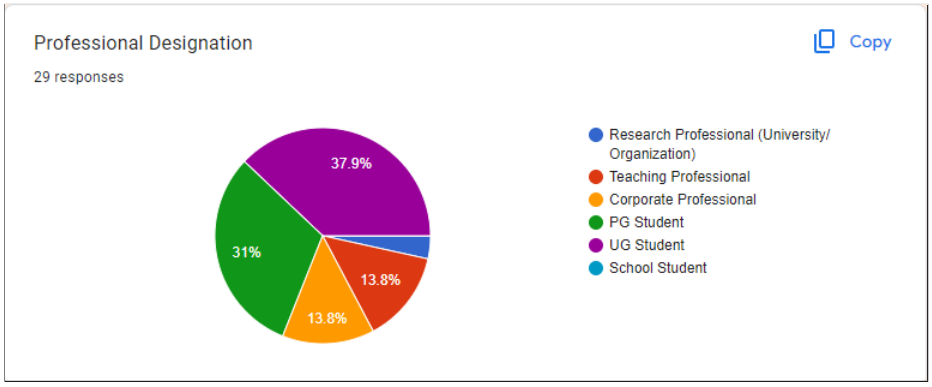


Figure 1: Survey Question 1

To contribute to the on-going survey, click here!

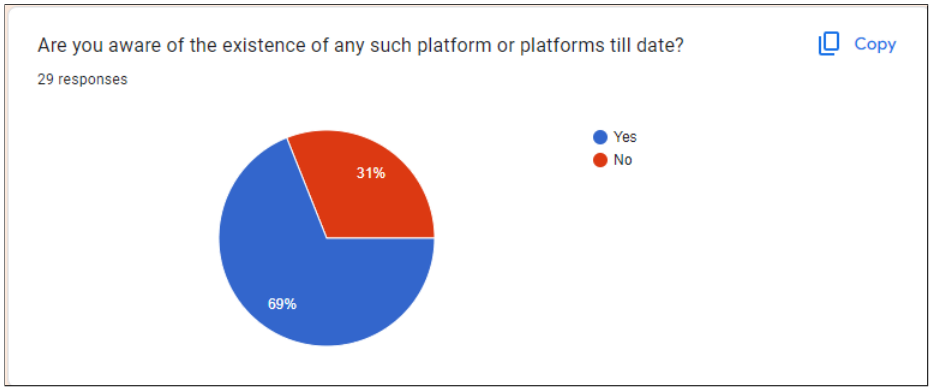


Figure 2: Survey Question 2

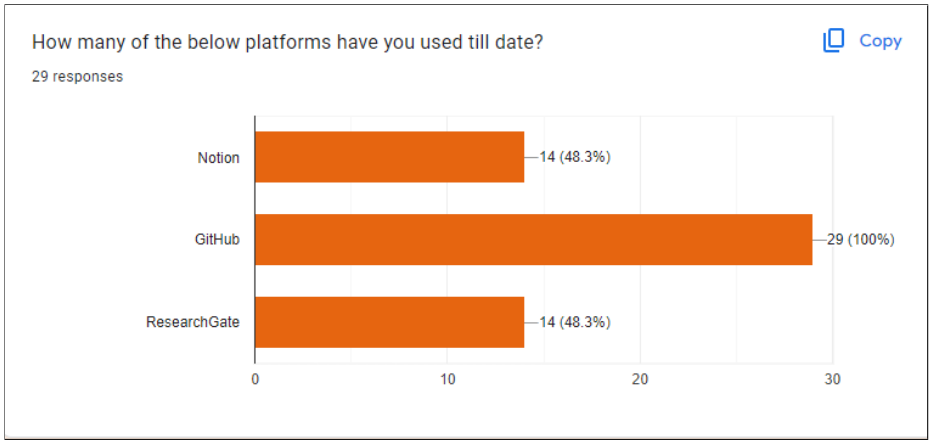


Figure 3: Survey Question 3

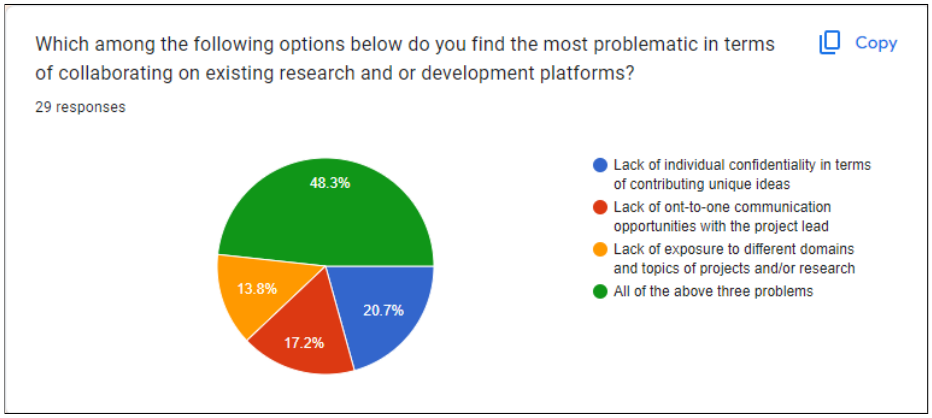


Figure 4: Survey Question 4

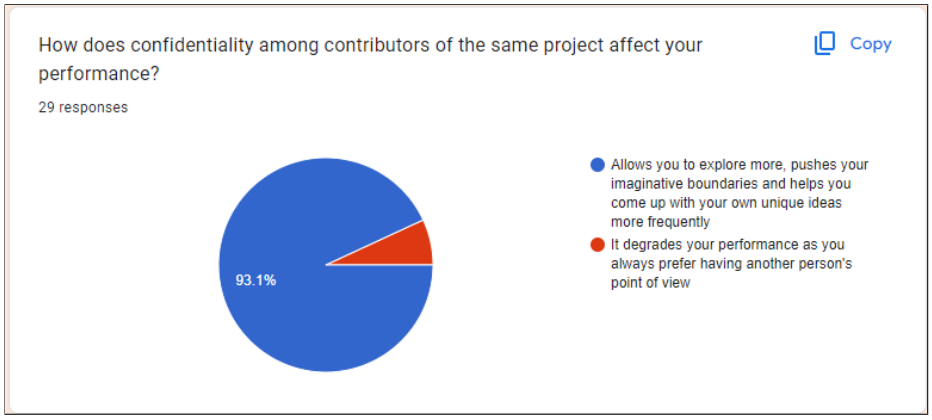


Figure 5: Survey Question 5

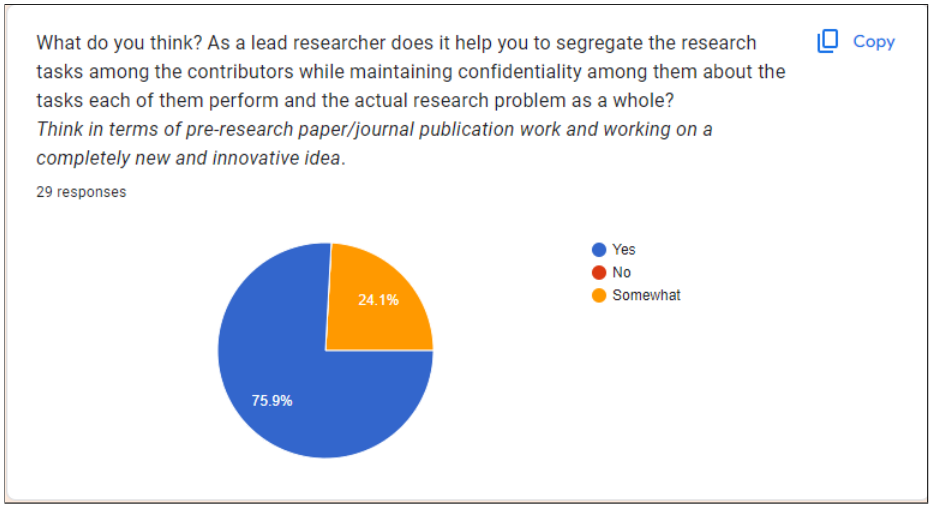


Figure 6: Survey Question 6

## 3.2 Related & Existing Platforms

The use of blockchain technology for protective, confidential collaboration work is a potential assumed by many. There are a no. of platforms existing online, while creating this document which represent certain similar functionalities as CollabChain. The list of the relevant platforms are provided below:

1. ***ResearchHub***: Facilitates seamless data sharing, transparent tracking of contributions, and auditable collaboration among researchers. [**Missing**: Collaborative-confidential research work to support publication of research paper i. e., only published research papers are available for peer-review and pre-printing reviews through open bounties]. For further reference click here!

2. ***ScienceOpen***: A discovery platform with interactive features for scholars to enhance their research in the open, make an impact, and receive credit for it. We provide context building services for publishers, to bring researchers closer to the content. [**Missing**: Unlike CollabChain, it provides researchers with post-publication paper-review functionalities.] For further reference click here!

   Other notable mentions who are working on collaborative blockchain platforms, tools and/or technologies are: Blockchain for Scientific Data Sharing (BCSD), Everledger, EnjinCoin, Storj.

## 3.3 Legitimacy of posted projects

The specific documents that serve as proof of legitimacy for conducting research work can vary depending on the type of research, the funding source, and the institution where the research is being conducted. However, some common documents that can serve as proof of legitimacy include:

1. Research Proposal: A well-structured research proposal outlines the research question, methodology, potential risks and benefits, and ethical considerations. It serves as a blueprint for the research project and demonstrates that the researcher has a clear plan for conducting the research [].

2. IRB Approval Letter: An IRB approval letter signifies that the research protocol has been reviewed and approved by an institutional review board (IRB), which ensures that the research adheres to ethical standards and protects the rights and welfare of human participants.

3. Data Management Plan: A data management plan outlines how the research data will be collected, stored, secured, and shared. It demonstrates the researcher's commitment to responsible data management practices and ensures the integrity and accessibility of the research findings [].

4. Citations by Other Researchers: Citations in scholarly publications indicate that the research has been recognized and valued by other researchers in the field. It demonstrates the impact and significance of the work.

5. Awards and Recognition: Receiving awards or recognition for the research further establishes its legitimacy and highlights its contributions to the field of study.

6. Publication in Peer-Reviewed Journals: Publication in reputable peer-reviewed journals is a strong indicator of research legitimacy. It signifies that the research has undergone rigorous scrutiny by experts in the field and has been deemed worthy of publication.

By taking the above information into account we can say that IRB approval letter serves as a legitimate proof for conducting a research work and is done under the sound knowledge of the institution providing the approval letter. For further information on documents that serve as proof for conducting research works, refer to [2] [6].

## 3.4 Use of CollabChain

The inference that can be drawn from the above two sub-sections is that CollabChain is a platform that comes into play when researchers and contributors are looking to work in a confidential environment for the sake of creation of insightful and original research work with the added advantages of document protection and peer-review after paper publication. The platforms mentioned above provide a means for commenting and reviewing published papers and indirectly and opportunity to come up with new ideas through those review and discussions. What they do not provide is an environment to conduct research work without the risk of data breach or any possible means of preventing plagiarism.
To see how the above platforms are a subset of CollabChain, assume the following: *You being a researcher working on a highly confidential but invaluably useful project want contributors to contribute to the project. There are no existing papers on the project title and you want to be the first to publish such an article. From finding contributors, to maintaining signed RCAs and IPRs for the project, assigning tasks to each contributor, segregating research tasks, tracking the work progress by each contributor, everything needs to be done in-order for the research to be successful. After publication, you are now ready to share the paper and put it out their for peer-review.* CollabChain can help you in this entire process, from the very

beginning, right up till the end. It provides all these functionalities within a single platform.

## 3.5 Hyperledger Fabric vs. Ethereum

Hyperledger Fabric is an open-source blockchain framework hosted by The Linux Foundation. It offers a modular architecture that supports a wide range of use cases, including supply chain management, trade finance, and healthcare.
Hyperledger Fabric is a permissioned blockchain, meaning that only authorized participants can join the network. This makes it ideal for businesses that need to share sensitive data with their partners. Hyperledger Fabric is a permissioned blockchain, which means that only authorized participants can join the network. This makes it ideal for businesses that need to share sensitive data with their partners [1].
Hyperledger Fabric is a scalable platform, which means that it can be used to support a large number of users and transactions. This makes it ideal for businesses that need to grow their network over time.
Ethereum is a decentralized, open-source blockchain platform that features its own cryptocurrency, Ether. It allows anyone to deploy permanent and immutable decentralized applications (dApps) onto it, with which users can interact. Decentralized finance (DeFi) applications provide financial instruments which do not directly rely on financial intermediaries like brokerages, exchanges, or banks [4].
*Use Cases of Ethereum*

1. Decentralized finance (DeFi): Ethereum is the leading platform for DeFi applications, which provide a wide range of financial services without the need for intermediaries.

2. Non-fungible tokens (NFTs): Ethereum is the most popular platform for NFTs, which are digital assets that represent ownership of unique items.

3. Supply chain management: Ethereum can be used to track the movement of goods and materials throughout a supply chain, making it more efficient and transparent.

4. Healthcare: Ethereum can be used to securely store and share medical records, making it easier for patients to access their information.

| Hyperledger Fabric | Ethereum |
|---|---|
| Hyperledger Fabric supports private transactions, where transaction details are visible only to the parties involved, not the entire network. This feature protects confidential information, such as research findings or intellectual property, from prying eyes. | Ethereum's public nature, while beneficial for openness and transparency, poses challenges for confidentiality. All transactions and data on the Ethereum blockchain are visible to the public, potentially exposing sensitive research information. |
| Hyperledger Fabric utilizes channels, private subnetworks within the blockchain, to compartmentalize data and restrict access to specific participants. This allows for fine-grained control over data sharing, ensuring that only authorized researchers can access relevant information. | While Ethereum offers some privacy-preserving mechanisms, such as zero-knowledge proofs, they are not as robust or widely adopted as Hyperledger Fabric's privacy features. |
| Hyperledger Fabric is designed as a permissioned blockchain, meaning that participants in the network must be identified and authenticated. This makes it suitable for enterprise applications where confidentiality and controlled access are crucial. | Ethereum, in contrast, is a permissionless blockchain, meaning that anyone can participate in the network without explicit permission. This openness is more suitable for public blockchain applications, like decentralized finance (DeFi) and token issuance. |

Table 2: *Comparison between hyperledger fabric & ethereum [project related]*

In conclusion, Hyperledger Fabric's focus on privacy, permissioned network structure, and modular design make it the ideal platform for developing confidentiality-based research collaboration platforms [5]. It empowers researchers to securely share sensitive data, foster collaboration, and advance their research endeavors while safeguarding their intellectual property and complying with data privacy regulations.

# 4 Project Planning

## 4.1 Software Life Cycle Model

State the suitable model you have chosen for your project development.
The project would be able to reach it's true potential when developed following the agile software life cycle model. Following this methodology the team can respond to changes in the marketplace or feedback from customers quickly without derailing a year's worth of plans. "Just enough" planning and shipping in small, frequent increments will let the team gather feedback on each change and integrate it into future plans at minimal cost.


Figure 7: Agile Methodology

## 4.2 Scheduling

For Project Planning/schedule, please paste suitably from MS Project. Gantt chart should be showed for major phases with highlighted milestones.

## 4.3 Cost Analysis

Apply Software Estimation techniques.

# 5 Requirement Analysis

## 5.1 Requirement Matrix

As for Requirement Matrix entries, copy and paste the latest excel with all functional, non-functional and interface requirements and format under this section.

| Rqmt Id | Requirement Item | Requirement Analysis Status |
|---|---|---|
| REG-1 | User Platform Registration | Completed |
| REG-1.1 | Allow user registration ([Select] UserType: Researcher/Contributor, Name, Organisation Name, Professional Designation, Updated CV to be uploaded (pdf format), MailID, Phone Number, Account password); CV should be stored with user record; | Completed |
| REG-1.2 | Verify user registration MailID | Completed |
| REG-1.3 | Verify user contact number | Completed |
| REG-1.4 | Send welcome message to registered MailID. | Completed |
| LGN-1 | Verify User Credentials | Completed |
| LGN-1.1 | Verify user type, user ID (the registered mail ID) & password | Completed |
| LGN-1.2 | Forgot password; Allow user to reset password | Completed |
| PRF-1 | Display User Profile Information & Status | Completed |
| PRF-1 | Display User Profile Information & Status | Completed |
| PRF-1.1 | Display user respective info. : 1. Full Name; 2. Current Organization; 3. Current Professional Designation; 4. Profile Picture (If any); 5. Uploaded CV Link; 6. User Ratings; | Completed |
| PRF-1.2 | Display the project(s): 1. The User has completed contributing; 2. The User is currently contributing to; 3. Saved Projects | Completed |
| PMNU-1 | Profile Menu | Completed |
| PMNU-1.1 | If the user is of UserType: Contributor then display the following menu options: 1. User Feed; 2. Account Settings; 3. LogOut | Completed |
| PMNU-1.2 | If the user is of UserType: Researcher then display the following menu options: 1. User Feed; 2. Post Project; 3. Account Settings; 4. LogOut | Completed |
| UF-1 | User Feed | Completed |
| UF-1.1 | List projects: 1. Currently accepting applicants; 2. Completed Projects (Up for review by the audience); | Completed |
| UF-1.2 | Projects Currently accepting applicants should direct the applicants to the respective Project-Post page. | Completed |
| LVW-1 | Completed Projects List View: Lists projects based on most-likes in: 1. Descending order from top to bottom; 2. Ascending order from top to bottom; 3. ProjectID; Allow view based on the following filters: 1. Project Domain Tag; 2. Project Title; etc. | Completed |
| PSTPRJ-1 | Post a new project on the platform (Only for UserType: Researcher): Fill up new project details (Project Title, [Select /Enter]Project Domain Tag(s), Initial No. of candidates required, Application Start & End Date, ProjectID (Autogenerated)); | Completed |
| PSTPRJ-1.1 | Uploading Research IRB Approval Letter & Researcher digital signature. | Completed |

Continued on next page

| Rqmt Id | Requirement Item | Requirement Analysis Status |
|---|---|---|
| OPVW-1 | [Project-View for UserType: Researcher & the user is also the project owner]: Display project respective info. : 1. Project Name & ID; 2. Project Domain & Topic; 3. Application Start & End Date [if still accepting application]; 4. Project Status: [Recruiting/In-Progress/Completed]; | Completed |
| OPVW-1.1 | Display the following only when [Project Status: Recruiting]: 1. Display total no. of applicants [if still accepting applications]; 2.Display Applicant-Specific Info: 2.1 Applicant Name (Full Name); 2.2 Applicant Organisation Name; 2.3 Applicant Professional Designation; 2.4 No. of applicant contributions (in the project-domain); 2.5 Applicant CV Link; 2.6 Accept [Option]: Stall, Yes, No; 3. No. of candidates remaining to be selected | Completed |
| OPVW-1.2 | Display the following only when [Project Status: In-Progress]: 1.1 Display the list of selected candidates in tile format i.e. clicking on a contributor's tile will lead the researcher to the specific contributor's Collaboration page; 1.2 Option to remove a contributor from the project; 2. No. Of Contributors "currently" working on the project ; 3. No. Of available spots [e.g. 0 in case required number of contributors are already present] | Completed |
| OPVW-1.3 | Display the following only when [Project Status: Completed]: 1. Display the list of selected candidates; 2. Researcher published document link; 3. Additional links [If any]; 4. Rate each contributor [e.g. on a scale of 1 to 10]; 4. The tasks done by each contributor; 5. The updated rating of each contributor; | Completed |
| CPVW-1 | [Project-View for UserType: Contributor/Researcher but the user is not the project owner, only a project-contributor]: Display project respective info. : 1. Project Name & ID; 2. Project Domain; 3. Application Start & End Date [if still accepting application]; 4. Project Start & End Date [if on-going]; 5. Project Status: [Recruiting/In-Progress/Completed]; 6. Researcher CV Link | Completed |
| CPVW-1.1 | Display the following only when [Project Status: Recruiting]: 1. No. of applicants; 2. Application Status: Pending, Accepted, Rejected; 3. IRB Approval Letter [If Application Status: Accepted] | Completed |
| CPVW-1.2 | [Application Status: Accepted]: A Contribuotr after receiving the IRB Letter must sign the document and mention start & end date of project as stated in the IRB to move forward with collaboration agreement. | Completed |
| CPVW-1.3 | Display the following only when [Project Status: In-Progress]: Display an option named "Collaborate" to direct contributor to the private Collaboration Page | Completed |

Continued on next page

| Rqmt Id | Requirement Item | Requirement Analysis Status |
|---|---|---|
| CPVW-1.4 | Display the following only when [Project Status: Completed]: 1. Researcher published document link of the project; 2. Additional links [if any]; 3. Rate Project & Researcher [e.g. on a scale of 1 to 10]; 4. The tasks done by the contributor; 5. The updated rating of each contributor; | Completed |
| PVW-1 | Project-View for UserType: Contributor/Researcher but the user is neither the project owner or a project-contributor [Displaying Project Title, Project Domain Tags and ID is a must] | Completed |
| PVW-1.1 | Display the following only when [Project Status: Recruiting]: 1. No. of applicants; 2. Option to apply; 3. Application Status[if applied]: Pending, Accepted, Rejected; 4. Option to Retract [if applied] | Completed |
| PVW-1.2 | Display the following only when [Project Status: In-Progress]: 1. Project Start & End Date; 2. Researcher CV Link; 3. Project Status: In-Progress; | Completed |
| PVW-1.3 | Display the following only when [Project Status: Completed]: 1. Researcher published document link of the project/ The document itself; 2. Additional comments/links [if any]; 3. Rate Project [e.g. on a scale of 1 to 10]; 4. The task done by each contributor; 5. The updated rating of each contributor; | Completed |
| SPVW-1 | [User-Type & ownership: Any]: Displaying Project Title, Project Domain Tags, Project ID and Project-Status: Agreement Violation [Stopped]; | Completed |
| RCOLLAB-1 | Collaboration Page Functionalities for [UserType: Researcher]: Display: 1. Contributor Name; 2.Tasks List with status (% completions); 3.Collaboration Menu; 4. Option for [CWARN-1] | Completed |
| RCOLLAB-1.1 | Collaboration Menu with 4 items: 1. Post Task; 2. Tasks & Sub-Tasks; 3. Notifications; 4. Contributor Info. & Agreement(s) | Completed |
| RCOLLAB-1.2 | Researcher can post a task with the following details: 1. Task Name; 2. Expected End-Date; 3. Priority: High, Medium, Low; 5. Remarks [If Any] | Completed |
| RCOLLAB-1.3 | Researcher can post a sub-task under a task with the following details: 1. Sub-Task Name; 2. Due Date; 3. Priority: High, Medium, Low; 4. Attach Files; | Completed |
| RCOLLAB-1.4 | [Confidential files]: The researcher needs to digitally sign the documents that are to be kept strictly confidential by the concerned contributor | Completed |
| RCOLLAB-1.5 | [For each contributor]: After the completion of the latest task by the contributor, the researcher is required to digitally sign the task for confirming task completion | Completed |

Continued on next page

| Rqmt Id | Requirement Item | Requirement Analysis Status |
|---|---|---|
| TMOD-1 | Researcher's possible modifications on an existing sub-task and/or task: 1. Update/Edit: Task Name; Due Date; Priority Level; Remarks; Task Status; 2. Attach/Remove files; 3. Delete task/sub-task; | Completed |
| RAS-1 | [(User-Type: Researcher) Research Collaboration Agreement: Between the Researcher and Contributor]: 1. Uploading the RCA by the researcher and review for the contributor 2. Digital signature of the researcher and contributor, both are required to save the document and proceed to collaboration with the concerned Contributor. | Completed |
| RWARN-1 | [User-Type: Contributor]: Contributor(s) warns Researcher on agreement violation. | Completed |
| CCOLLAB-1 | [Collaboration Page Functionalities for UserType: contributor]: Display: 1. Project Name & ID; 2. Researcher Info.; 3.Tasks List with status; 4.Collaboration Menu; 5. Researcher Info. & Agreement(s); | Completed |
| CCOLLAB-1.1 | Collaboration Menu with 2 items: 1. Tasks; 2. Chat; 3. RAS-1; | Completed |
| CCOLLAB-1.2 | View: 1. Task Name; 2. Due Date; 3. Priority Level; 4. Task Status | Completed |
| CCOLLAB-1.3 | Download Attached Files to the task; Submit a file under the task or Remove an already submitted file only by the current-user, within the due date of the task. | Completed |
| CWARN-1 | [User-Type: Researcher]: Researcher warns Contributor on agreement violation. | Completed |
| CAS-1 | [(User-Type: Contributor) Research Collaboration Agreement: Between the Researcher and contributor]: 1. Digital signature of the researcher and contributor, both are required to save the document and proceed to collaboration with the concerned contributor. | Completed |
| CHAT-1 | Chat conversations between the Researcher & a Contributor for discussion purposes. | Completed |
| CWARN-1 | [User-Type: Researcher]: Researcher warns Contributor on agreement violation | Completed |
| IRBUP-1 | [User-Type: Researcher]: Researcher can update the IRB Approval Letter | Completed |
| FIPR-1 | Foreground IPR: Researcher-Contributor agreement | Completed |
| XPRJ-1 | Remove contributor (UserType: Contributor & Researcher) : To be done by the consent of both the researcher and the contributor | Completed |
| XPRJ-1.1 | The researcher accepts project exit request from the contributor. | Completed |
| XPRJ-1.2 | The researcher denies project exit request from the contributor. | Completed |
| SPVW-1 | Stopped Project View: On agreement violation by the researcher. | Completed |
| UPF-1 | User can update the existing info. in the platform i.e., Name, Organization Name, Professional Designation, Upload updated CV, register a new mailID and/or replace existing one, register a new phone number and/or existing one. | Completed |

Continued on next page

| Rqmt Id | Requirement Item | Requirement Analysis Status |
|---|---|---|
| ACDEL-1 | Account Deletion. | Completed |
| ACDEL-1.1 | User account will be deleted after user re-confirms warning prompt for account deletion. | Completed |
| ACDEL-1.2 | All User data will be removed from the record | Completed |
| LGOUT-1 | LogOut from current session | Completed |
| LGOUT-1.1 | User to be displayed warning prompt to confirm logging out. | Completed |
| LGOUT-1.2 | User to be redirected to the platform LogIn Page. | Completed |
| NFS-1 | Security | Completed |
| NFCAP-1 | Capacity | Completed |
| NFCOMP-1 | Compatibility | Completed |
| NFRA-1 | Reliability & Availability | Completed |
| NFMM-1 | Mainatainanility & Manageability | Completed |
| NFU-1 | Usability | Completed |
| NFSC-1 | Scalability | Completed |
| NFPDAT-1 | Platform Dependent Agreement Terms | Completed |

Table 3: *Requirement Matrix [Traceability Matrix (Columns A-C)]*

*The beginning of each main requirement states the user-type and user role with respect to a project hosted in the platform [if applicable]. If none of them is mentioned, implies the fact that the functionality is available for any user of the platform irrespective of the role in any project.*

### 5.1.1 User Registration [REG-1]

**5.1.1.1 REG-1.1** User platform registration/account creation for a new user. A new user to the platform is first asked for filling the following details:

- Select User-Type: [Researcher/Contributor]
- Full name.
- Name of the institute/organization the user is currently part of.
- Professional designation/the position they hold at the institute/organization.
- Updated CV, to be uploaded in .pdf format.
- Profile Picture [optional].
- Mail ID.
- Contact no.
- Account password.

The uploaded CV is to be stored as part of user information in the database.

**5.1.1.2 REG-1.2** User mail verification is to be done by sending a verification mail to the user. The content of the mail should be an account creation confirmation message followed by a link to the login page of the platform.

**5.1.1.3 REG-1.3** User contact no. verification should be done by sending the user an account creation confirmation SMS with a link to the login page.

**5.1.1.4 REG-1.4** After the user has successfully logged into their account for the first time, send a welcome message to the user confirming their registration was successful and they are all set to use the platform from there on.

### 5.1.2 User Login [LGN-1]

**5.1.2.1 LGN-1.1** The user is asked for the following platform credentials for logging into their respective accounts:

- Select User-Type: [Researcher/Contributor].
- User ID which is the user registered mail id.
- Current Account password.

**Login Success:** On successfully entering the above credentials, the user is directed to their platform profile page.
**Login Failure:** Failing to enter the above credentials correctly, the user is asked to re-enter their user id and password. After each failed attempt a warning message is displayed, indicating *the no. of attempts remaining* before the account is blocked for a period of time. After *5 such failed attempts*, the user account is blocked for *20 minutes* and a warning mail is sent to the user, notifying the user of the activity.

**5.1.2.2 LGN-1.2** The user might have forgotten the login password for the account and therefore can choose to reset their account password through this option.
***The forgot password*** option asks for the user's *registered mail id or contact no.* to which a re-set password link is sent. After clicking on the link through either of the mediums, the user is *directed to a re-set password page.*
**Resetting password:** In the page the user is asked to *type and re-type the new password* and confirm their entry. After successfully completing the above step, the

account password for the platform will be *updated to the newly entered password* in this step and the user can login to the account through this password.

### 5.1.3 User Profile [PRF-1]

Display User Profile Information along with completed, in-progress and saved projects list by the user.

**5.1.3.1 PRF-1.1** The user after login to the platform is directed to the profile page where the following information regarding themselves is displayed:

- User Type
- Full Name
- Current Organization
- Current Professional Designation
- Profile Picture[if uploaded].
- Uploaded CV Link.
- Average User ratings: The total rating of the projects they have worked on received divided by the total no. of projects they have worked on ("Completed" projects).
- No. Of completed projects [including no. of Own projects if User-Type: Researcher].

**5.1.3.2 PRF-1.2** Three categories of project, based on status is displayed in this page well. The three categories being:

1. ***Completed:*** Display the list of projects the user has completed the respective contributions to along with the link to the task completed in each project.
2. ***In-Progress:*** Display the project that is the user is currently hosting/contributing to & the respective tasks completed till date (provided the user is a contributor).
3. ***Saved:*** The list of projects that the user had saved for later to review or for applying to contribute.

### 5.1.4 Profile Menu [PMNU-1]

**5.1.4.1 PMNU-1.1** If the user is of type: [Contributor] then display the following options:

1. *User Feed:* For checking the lists of projects in the platform (completed/current). [Refer to UF-1]
2. *Profile*: To view the platform profile page of the user.
3. *Account Settings:* For profile updating purposes/ registration of new mail ID and/or contact number. [Refer to UPF-1 & ACDEL-1]
4. *LogOut:* For ending the current session. [Refer to LGOUT-1]

**5.1.4.2 PMNU-1.2** If the user is of type: [Researcher] then display the following options:

1. *User Feed:* For checking the lists of projects in the platform (completed/current).
2. *Profile*: To view the platform profile page of the user.
3. *Post Project:* For hosting a new project on the platform.
4. *Account Settings:* For profile updating purposes/ registration of new mail ID and/or contact no.
5. *LogOut:* For ending the current session.

### 5.1.5 User Feed [UF-1]

**5.1.5.1 UF-1.1** User Feed allows the user to view all the projects currently existing on the platform. The projects are categorized as:

1. ***On-Going:*** The projects that are currently in progress i.e., either in the "Recruiting" state or in the "In-Progress" state.
2. ***Completed:*** The projects that have been completed and are now displayed for user review.

Project view of the projects that are currently under any of the above mentioned states fall under either of these requirements: PVW-1.3, CPVW-1.3 or OPVW-1.3.

**5.1.5.2 UF-1.2** The projects that are currently "Recruiting"/"In-Progress" should display contents based on either of the following requirements: PVW-1.2, OPVW-1.2 or CPVW-1.2 depending on the user type.

### 5.1.6 Completed Projects List View [LVW-1]

Completed projects are in general displayed in the ascending order of project creation (oldest project first). Other than that, projects can be listed and/or searched for in the following ways:

1. *Ascending & Descending Order of ratings.*
2. *Project ID*

Projects can also be filtered out in the following ways:

1. *Project Domain Tags. [E. g. Applied filters: Engineering, Computer Science, Electronics].*
2. *Project Title.*

### 5.1.7 Post Project [PSTPRJ-1]

*User-Type: [Researcher]*

**AND**

*The user is the project-owner.*

A *Researcher* can post a new project in the platform in the following way:

1. *Fill-Up project details.*
2. *Uploading IRB approval Letter & their own digital signature to be used for attesting project related documents through out the project.*
3. *Additional documents proving the projects legitimacy* (Refer to Legitimacy of posted projects [section 3.3] of this PRD).

**5.1.7.1 PSTPRJ-1.1** The projects details that needs to be mentioned by the *Researcher* are as follows:

1. *Project Title*
2. *Project Domain Tag(s): [Enter new domain tag or Select from existing tags].*
3. *Initial No. Of Candidates required.*
4. *Application Start & End Date.*
5. *Project-ID: [Auto-Filled, Auto-Generated].*
6. *Project Start & End Date: [Disable entry by the Researcher].*

### 5.1.8 Owner Project View [OPVW-1]

*User-Type: [Researcher]*

**AND**

*The user is the project-owner*

Display the following project respective info. on the project page under Project-Status: [Recruiting/In-Progress/Completed]:

1. *Project Title & ID.*
2. *Project Domain Tag(s).*
3. *Rating of the Researcher.*
4. *No. of projects the Researcher has worked on.*
5. *Other project status dependent information i. e., OPVW-1.1, OPVW-1.2 or OPVW-1.3.*
6. *Option to update no. of required applicants.*
7. *Option to update project status to [Recruiting, In-Progress, Completed].*
8. *Option to view Researcher CV*
9. *Option to delete project.* [Note: Only applicable if Project-Status: Recruiting]

10. *Option to End-Project.* [Note: Only applicable if all the *Contributor* under the project have performed the FIPR-1 functionality once]

*Note: The status of the project should be updated in the following way*:

Recruiting → In-Progress → Completed

*And, the project cannot go back to a previous state, once changed to a different state.*

**5.1.8.1 OPVW-1.1** The following details & options are to be viewed in the project view-page for *Project Status: [Recruiting]*:

1. *Total no. of applicants.*
2. *Applicant Full Name.*
3. *Applicant Organisation Name.*
4. *Applicant Professional Designation.*
5. *Rating of the applicant.*
6. *No. of projects applicant has worked on.*
7. *No. of applicant contributions (in each of the mentioned project-domain tag(s)).*
8. *Option to view Applicant CV.*
9. *Option to accept/reject applicant.*
10. *Applicant IRB Acceptance status: [Signed/Rejected].* [If applicant is accepted; Else, N/A]
11. *No. of candidates remaining to be selected.*
12. *Option to extend application end date.*
13. *Option to End Project: Remove project from the database.*

**5.1.8.2 OPVW-1.2** The following details & options are to be viewed in the project view-page for *Project Status: [In-Progress]*:

1. *Option to view & update IRB approval letter for extending the date of the project.* [IRBUP-1]
2. *List of the contributors of the project & their respective [RCOLLAB-1] pages.*
3. *The updated rating of each contributor.*
4. *No. of availabe spots [e.g. 0 in case required number of contributors are already present].*
5. *Project Start & End Dates.*
6. *Option to view CV of each Contributor.*
7. *Option to add a new contributor.* [When there are available spots and should follow the functionalities listed under OPVW-1.1].

**5.1.8.3 OPVW-1.3** The following details & options are to be viewed in the project view-page for *Project Status: [Completed]*:

1. *List of the contributors of the project & their respective [RCOLLAB-1] pages for only viewing purposes.*
2. *Researcher published paper.*
3. *Additional Comments/links [If any by the Researcher].*
4. *The full-name, organization, professional designation & updated platform rating of each contributor & the researcher after project completion.*
5. *Project Rating.*
6. *Updated No. of Paper Reviews: Based on the no. of ratings received*
7. *Project Start & End Dates.*

### 5.1.9 Contributor Project View[CPVW-1]

*User-Type: [Contributor]*
**AND**
*The user is one of the project-contributors*

Display the following project respective info. under the Project-Status: [Recruiting/In-Progress/Completed]:

1. *Project Title & ID.*
2. *Project Domain Tag(s).*
3. *Project Status: [Recruiting/In-Progress/Completed].*
4. *Rating of the Researcher.*
5. *No. of projects the Researcher has worked on.*
6. *Option to view Researcher CV.*

**5.1.9.1 CPVW-1.1** Display the following in the project page only when [Project Status: Recruiting]:

1. *No. of applicants.*
2. *Option to apply.*
3. *Application Status: [Pending/Accepted/Rejected].* [If applied]
4. *IRB Approval Letter [If Application Status: Accepted].* [Go to CPVW-1.2]

**5.1.9.2 CPVW-1.2** After receiving/being able to view the IRB Letter and Other legitimacy documents [if present], the user should digitally sign the document and mention the Project Start & Date in the prompt so as to confirm agreement to the legitimacy of the project being hosted. The user will then be allocated a CCOLLAB-1 page for the concerned project.
If the user denies/fails to do the needful the state of the project will return to the [Project-Status: Recruiting] as CPVW-1.1 but the user will no longer be able to re-apply to the project. Display a message for the same.

**5.1.9.3 CPVW-1.3** Display an option to go to the CCOLLAB-1 page for the concerned project. Additionally, mention the details under PVW-1, Project-Status: [In-Progress], Researcher CV, Option to access [IRBUP-1] & Project Start & End Dates.

**5.1.9.4 CPVW-1.4** Display the following only when [Project Status: Completed]: Everything under OPVW-1.3 excluding item 1. Instead, display the contributor specific CCLOAB-1 page for only viewing purposes. Also, provide an option to Rate Paper: On a scale of 1 to 10.

### 5.1.10 Project View [PVW-1]

*User-Type: [Contributor/Researcher]*

**AND**

*The user is neither the project-owner or project-contributor with respect to the concerned project.*

Displaying the following details is a must:

1. *Project Title.*
2. *Project Domain Name.*
3. *Project Category Name.*
4. *Project-ID.*
5. *Rating of the Researcher.*
6. *No. of projects the Researcher has worked on.*
7. *Option to view Researcher CV.*

**5.1.10.1 PVW-1.1** The user satisfying the conditions above are displayed the following content when the project being viewed is in the "Recruiting" status:

1. *No. of applicants for the project*
2. *Option for the viewer to apply*
3. *Application status:* ***Pending*** *for review,* ***Accepted*** *for contribution or* ***Rejected*** [if applied].
4. *Retract Application* [if applied].

**5.1.10.2 PVW-1.2** The following content is displayed when the projected is "In-Progress":

1. *Project Start & End Date*
2. *Project Status:* In-Progress.

**5.1.10.3 PVW-1.3** The following content is displayed when the projected is "Completed": Items 2, 3, 4, 5, 6 & 7. Also, an option to rate the project on a scale of 1 to 10.

### 5.1.11 Researcher-Collaboration Page [RCOLLAB-1]

*User-Type: [Researcher]*

**AND**

*The user is the project-owner*

This page is separate for each *Contributor* of a project i. e., each *Contributor* is assigned an RCOLLAB-1 page after agreeing to the legitimacy documents of the project posted by the *Researcher*. Display the following details on the page:

1. *Project Title & ID.*
2. *Contributor Full-Name, Organization, Professional Designation.*
3. *Task list with Status (% Completion of each Task).*
4. *Collaboration Menu [RCOLLAB-1.1].*
5. *Option for [CWARN-1].*
6. *Option to Complete Collaboration with the Contributor [FIPR-1].* Note: [Only applicable after all the tasks listed under RCOLLAB-1 have been marked completed.]

***Note:*** *Until the Researcher & Contributor have digitally signed the RCA between them, only items 1 & 4 will be visible and accessible by the concerned Researcher.*

**5.1.11.1 RCOLLAB-1.1** The RCOLLAB-1 page menu should list the following functionalities:

1. *Tasks*: To view the overall list of tasks assigned to the concerned Contributor along with %-completion of each them.
2. *Post Tasks*: To assign a new task to the concerned Contributor. [RCOLLAB-1.2]
3. *Chat*: Option to access [CHAT-1].
4. *Contributor Agreement(s)*: **[View/Update]** Project IRB Approval Letter & other legitimacy documents [if any], RCA & Foreground IPR [RAS-1]

***Note:*** *Until the Researcher & Contributor have digitally signed the RCA between them, only items 3 & 4 will be visible and accessible by the concerned Researcher.*

**5.1.11.2 RCOLLAB-1.2** The *Researcher* can post a task with the following details:

1. *Task Name/Title.*
2. *Expected End-Date.*
3. *Priority: [High/Moderate/Late].*
4. *Remarks [if any].*
5. *Option to delete task.* [Provided no submissions have been made by the concerned contributor under any sub-task.]

Each Task [RCOLLAB-1.2] i. e., can have multiple Sub-Tasks [RCOLLAB-1.3]. The %-completion of each task will be calculated based on no. of sub-task completions. *Note: Once a task is posted under any RCOLLAB-1, the Project-Status automatically becomes [InProgress].*

**5.1.11.3 RCOLLAB-1.3** A sub-task under a task needs to be posted with the following details and functionalities which is to be filled and can be accessed by the researcher at the time of sub-task creation and evaluation:

1. *Sub-Task Name/Title.*
2. *Due Date.*
3. *Priority: [High/Moderate/Late].*
4. *Option to Attach Files and classify the required ones as confidential.* [Refer to RCOLLAB-1.4]
5. *Option to View/Download contributor submitted files.* Note: [The files digitally signed and submitted by the contributor are the only files that will serve as sub-task submissions. All other files act as references or extras for the submitted files]
6. *Option to delete task.* [Provided no submissions have been made by the concerned contributor under the sub-task.]

**5.1.11.4 RCOLLAB-1.4** While uploading/attaching files to a sub-task [RCOLLAB-1.3], the *Researcher* is to be given an option to classify each file as confidential by digitally signing each of them if required. The same should reflect at the *Contributor's* end.

**5.1.11.5 RCOLLAB-1.5** After completion of each sub-task & task by the contributor, the researcher is required to digitally sign the same for confirming sub-task or task completion. The option to do so is to be reflected under the respective sub-tasks and tasks view [TMOD-1].

### 5.1.12 TMOD-1

*User-Type: [Researcher]*
**AND**
*The user is the project-owner*

The *Researcher* can modify an exiting task or sub-task in the following ways:

1. *Update/Edit: [Task/Sub-Task Name/Title, Expected End-Date/Due Date, Priority Level, Remarks, Task/Sub-Task Status(digital signature required for completion)].*

2. *Attach/Remove Files from a sub-task uploaded by the Researcher.*

3. *Delete a [task/sub-task.]* [Note: A task/sub-task marked as completed cannot be deleted by the *Researcher*

#### 5.1.13 Researcher Agreement Signing [RAS-1]

*User-Type: [Researcher]*

**AND**

*The user is the project-owner*

The functionalities of this page are as follows:

1. *Initial Agreement Signing*: The *Researcher* needs to upload the RCA with respect to the concerned Contributor, mentioning the terms & conditions stated in [NFAGR-1], which needs to be signed by the conerned contributor to proceed with collaboration activities. *If signed by the contributor*: the *Researcher* will be able to access the remaining disabled options mentioned under [RCOLLAB-1] & [RCOLLAB-1.1]. *Else If, the Contributor fails to sign*: the *Researcher* will be returned to OPVW-1 [corresponding to the current Project-Status] but [RCOLLAB-1] page for the Contributor will no longer be visible or accessible if no collaboration has taken place. Else, [RCOLLAB-1] page will not be modifiable by either the *Researcher* or the *Contributor*.

2. *Agreement(s) [View/Update]*: The *Researcher* will be able to view the signed RCA, IRB Apporval letter & Foreground IPR in this section and if the *Researcher* wants to update any of the above documents excluding the IRB Apporval letter, the functionalities/activities mentioned in the above item will follow.

### 5.1.14 Researcher Warning [RWARN-1]

*User-Type: [Contributor]*

**AND**

*The user is one of the project-contributors*

The *Contributor* wants to warn the *Researcher* about IRB, RCA and/or IPR violation(s). The effect of the warning(s) will be as follows:

1. After each warning, the rating of the *Researcher* will decrease by 50% of the current rating and the *Researcher* will be asked for reviewing the IRB, RCA and/or IPR and digitally sign them.

2. After 2 such warnings the *Project-Status* will changed to *Agreement Violation [Stopped]*. The *Contributor*(s) will be blocked from editing anything under CCOLLAB-1 with respect to the project and will only be able to view the project related tasks, documents and agreements. Similarly, *Researcher* will be able to access RCOLLAB-1 with respect to the *Contributor* without any permission for modification of tasks, documents/agreements under the respective RCOLLAB-1.

3. *SPVW-1* will apply.

### 5.1.15 Contributor-Collaboration Page[CCOLLAB-1]

*User-Type: [Contributor]*

**AND**

*The user is a project-contributor*

The following details and functionalities are to be mentioned in this page:

1. *Project Title & ID.*

2. *Researcher Full-Name, Organization, Professional Designation.*

3. *Tasks List with status and option to view sub-tasks within a task.*

4. *Collaboration Menu.* [CCOLLAB-1.1]

5. *Option for [RWARN-1].*

6. *Option to exit project.* [Refer to XPRJ-1]

**5.1.15.1 CCOLLAB-1.1** The CCOLLAB-1 page menu should list the following functionalities:

1. *Tasks: To view the overall list of tasks assigned to the concerned Contributor along with %-completion of each them. Option to access each sub-task under the mentioned tasks.* [CCOLLAB-1.2]
2. *Chat: Option to access [CHAT-1].*
3. *Researcher Agreement(s)*: **[View/Verify]** Project IRB Approval Letter & other legitimacy documents [if any], RCA & Foreground IPR [CAS-1]

**5.1.15.2 CCOLLAB-1.2** Each task is assigned a [CCOLLAB-1.2]. The *Contributor* can view the following details about a task on this page:

1. *Task Name/Title.*
2. *Expected End-Date.*
3. *Priority: [High/Moderate/Low].*
4. *Remarks [if any].*
5. *The list of sub-tasks and an option to access each of them.* [Refer to CCOLLAB-1.3]

**5.1.15.3 CCOLLAB-1.3** The *Contributor* can access each sub-task. Following functionalities are displayed in the page:

1. *View/Download the files attached to the sub-task.*
2. *Submit/Remove a file under the sub-task.* Note: [A signed & submitted file once signed by the researcher cannot be removed.]

***Note**: A sub-task/task once marked completed by the researcher cannot be modified i. e., files cannot be removed under the corresponding sub-task/task. Also, the Contributor cannot upload/remove a file under a sub-task after the due-date.*

### 5.1.16 Contributor Agreement Signing [CAS-1]

*User-Type: [Contributor]*
**AND**
*The user is a project-contributor*

The functionalities of this page are as follows:

1. *Initial Agreement Signing*: The *Contributor* needs to digitally sign the RCA uploaded by the *Researcher* to proceed with project-collaboration. *If successfully signed by the contributor*: The *Contributor* will be able to access the remaining disabled functionalities mentioned under [CCOLLAB-1.1]. *Else If, the contributor fails to sign*: the *Contributor* will be returned to PVW-1 [corresponding to the current Project-Status] but the user won't be able to re-apply to the project, provided no collaboration has taken place. Else, [CCOLLAB-1] page will not be modifiable by either the *Researcher* or *Contributor*.

2. *Agreement(s) [View/Verify]*: The *Contributor* will be able to view the signed RCA, IRB Apporval letter & Foreground IPR in this section and if the *Researcher* has updated any of the above documents excluding the IRB Apporval letter, the functionalities/activities mentioned in the above item will follow.

### 5.1.17 Researcher/Contributor Chat [CHAT-1]

*User-Type: [Researcher/Contributor]*
**AND**
*The user is the project-owner or a project-contributor*

The *Researcher* & each *Contributor* should be able have a simple asynchronous chat conversation with a contributor and keep track of past chat conversations through their respective RCOLLAB-1 & COLLAB-1 pages. The functionality to share documents and/or other forms of media may also be added (depending on resource availability of the project).

### 5.1.18 Contributor Warning [CWARN-1]

*User-Type: [Researcher]*
**AND**
*The user is the project-owner*

The *Researcher* wants to warn the *Contributor* about IRB, RCA and/or IPR violation(s). The effect of the warning(s) will be as follows:

1. After each warning, the rating of the *Contributor* will decrease by 50% of the current rating and the *Contributor* will be asked for reviewing the IRB, RCA and/or IPR and digitally sign them.

2. After 2 such warnings the *Contributor* will be blocked from editing anything under CCOLLAB-1 with respect to the project and will only be able to view the project related tasks, documents and agreements. Similarly, *Researcher* will be able to access RCOLLAB-1 with respect to the *Contributor* without any permission for modification of tasks, documents/agreements under the respective RCOLLAB-1.

3. *SPVW-1* will apply.

### 5.1.19 IRB Update [IRBUP-1]

**If the user is of type *Researcher***
The Researcher will be able to upload the new IRB Letter. A pop-up message in the respective RCOLLAB-1 pages will be sent to each Contributor notfying them about the same. The Contributors would have to enter the modified dates as would be mentioned in the IRB letter and their digital signature. Only after a the *Contributor* has signed the new IRB Approval Letter would the *Researcher* be able to modify the respective [RCOLLAB-1] page.
**If the user is of type *Contributor***
The user needs to sign the pop-up message for verifying the modification of the IRB Approval Letter only after which the user will be able to modify the respective [CCOLLAB-1] page.
***Note:***
*The digital signature uploaded/used for verifying the IRB Approval Letter will be used through out the project representing the corresponding contributor's authorization.*

#### 5.1.20 Foreground-IPR [FIPR-1]

***User-Type: [Researcher]***
The researcher must upload & digitally sign the Foreground IPR which will then be available under RAS-1 & CAS-1. The document being signed by the corresponding contributor will mark the end of collaboration with the same. The researcher will be re-directed to the OPVW-1 page [correspongding to the Project-Status] and only be able to view the corresponding RCOLLAB-1 page. If the contributor fails to sign the document, the researcher will be re-directed to the RCOLLAB-1 page.
***User-Type: [Contributor]***
The contributor will be notified about the availability of the Foreground-IPR through CAS-1 and will be asked to sign the document to end the project. On signing the document successfully, the contributor will be re-directed to the CPVW-1 [corresponding to the Project-Status] and will be able to only view the corresponding CCOLLAB-1 page. If the contributor fails to sign the document, the user will be directed to the corresponding CCOLLAB-1 page.

#### 5.1.21 Exit Project [XPRJ-1]

*User-Type: [Contributor & Researcher]*
**AND**
*The users are project-contributor [requesting] & project-owner [receiving]*

The contributor want's to exit the project. The *Researcher* will receive a pop-up message/notification stating that the *Contributor* wants to exit the project, which is digitally signed by the *Contributor*. The *Researcher* will be given two options:

1. *Agree & Sign* [XPRJ-1.1 will apply].
2. *Deny.* [XPRJ-1.2 will apply]

**5.1.21.1 XPRJ-1.1** Two scenarios are to be handled as follows:

1. *Contributor has contributed*: CPVW-1.2, CPVW-1.3 or CPVW-1.4 will apply depending on the current project-status. The *Contributor* will also be asked to rate the *Researcher*.

2. *Contributor has not contributed*: PVW-1 and all it's sub-functionalities will apply to the contributor for the concerned project.
   In either case the contributor cannot reapply or contribute to the project.
   Appropriate messages can be shown for clarification purposes.

**5.1.21.2 XPRJ-1.2** The contributor will not be removed from the platform. However, the *Researcher* & *Contributor* will be asked to review the project agreements i. e. IBR & RCA through RCOLLAB-1.2 [Menu-Item 4] and CCOLLAB-1.1 [Menu-Item 4] respectively. *Both the concerned parties should sign the prompted review(s) to continue with RCOLLAB-1 & CCOLLAB-1 with respect to the concerned Contributor for the project.* Else, the state of the CCOLLAB-1 would return to displaying the options representing XPRJ-1.1 & XPRJ-1.2.

### 5.1.22 Stopped Project View [SPVW-1]

Display project details as mentioned under PVW-1 and Project-Status:*Agreement Violation [Stopped]*.

### 5.1.23 Update Profile [UPF-1]

1. *Full Name.*
2. *Organization Name.*
3. *Professional Designation.*
4. *CV.*
5. *Register new contact number/Replace existing contact number.*
6. *Register new Mail-ID/Replace existing Mail-ID.*

### 5.1.24 Account Deletion [ACDEL-1]

User Account Deletion. The following requirements should be met under this action:

**5.1.24.1 ACDEL-1.1]** User should be prompted an interactive warning pop-up message. Two choices to be displayed:

1. *Yes:* Move to requirement ACDEL-1.2
2. *No:* No Changes to be made to the account.

**5.1.24.2 ACDEL-1.2]** All user data to be removed from the database. After this stage the platform should contain no data on the user. User profile will no longer be displayed.

### 5.1.25 Log-Out [LGOUT-1]]

User Log-Out from current session.

**5.1.25.1 LGOUT-1.1]** User should be prompted an iteractive warning pop-up message. Two choices to be displayed:

1. *Yes:* Move to requirement LGOUT-1.2
2. *No:* Current user session remains active.

**5.1.25.2 LGOUT-1.2]** User is logged out from the current session and re-directed to the platform log-in page.

### 5.1.26 Non-Functional Requirement: Security [NFS-1]]

The Database will store all the passwords and other critical information. The system should provide high security for its database & blockchain logs are to be maintained under a secure network.

### 5.1.27 Non-Functional Requirement: Capacity [NFCAP-1]]

The system should fall well within the limit of Atlas.

### 5.1.28 Non-Functional Requirement: Compatibility [NFCOMP-1]]

Should function properly on any consumer device with access to the internet and installed web browsing applications.

#### 5.1.29 Non-Functional Requirement: Reliability & Availability [**NFRA-1**]]

When deployed, the system should be up and running 24x7. Providing its users access whenever and wherever required, unless in the point of a technical failure.

#### 5.1.30 Non-Functional Requirement: Maintainability & Manageability [**NFMM-1**]]

In the event a technical failure occurs, the system should be back up within 1-2 days.

#### 5.1.31 Non-Functional Requirement: Usability [**NFU-1**]]

The platform should be simple to use, and anyone familiar with modern websites should be able to operate with ease.

#### 5.1.32 Non-Functional Requirement: Scalability [**NFSC-1**]]

The platforms used for the server, the blockchain network and the database all support various levels of scalability as per the needs of the businesses.

#### 5.1.33 Non-Functional Requirement: Platform Dependent Agreement [**NFPDAT-1**]]

The platform promises to provide an online environment for confidential collaborative-research work. However, the platform does not promise or state any responsibility of drafting the documents representing the terms & conditions of research collaboration between a *Researcher* & a *Contributor*. The functionalities [RAS-1] & [CAS-1] are to be used to convey/display the platform dependent terms & conditions for conducting collaborative-research work on the platform both to the *Researcher* and the concerned *Contributor* respectively. This would act as a suggestion to both the concerned *Researcher* & *Contributor* for mentioning & checking the below mentioned T&C in their contracts/agreements i., e, the IRB Approval Letter, the RCA & Foreground-IPR to avoid any complications or hurdles while working on a project hosted on the platform.
[**Note**: The T&Cs stated below are among the essential T&Cs to be included in the corresponding RCA & Foreground-IPR documents for a project but there are several other points that can/must be stated for the purpose mentioned above under

the proper consultancy of an attorney. The points below are just examples of what is to be displayed in the respective RAS-1 & CAS-1 pages]

*RCA*

***Terms & Conditions to be included by the Researcher***:

1. *Document Verification*: The agreement documents authorized & uploaded by the *Researcher*, visible to the *Contributor* under [CAS-1] should be verified by the user's digital signature for continuing to collaborate under the mentioned project-title in the platform. Failing to verifying the documents will result to consequences as stated under the respective platform functionalities. Once verified by the user's digital signature, the documents under [RAS-1] which are the same documents represented under [CAS-1] should serve as proof for the *Contributor's* conscious authorization to abide by the T&Cs mentioned in the documents under the stated section i. e., [CAS-1].

2. *Confidential Documents*: The documents attached to a sub-task [RCOLLAB 1.3 & 1.4] by the *Researcher* with the user's digital signature & reflected under [CCOLLAB-1.3] for the concerned contributor should be considered as confidential and should be dealt with utmost care by the *Contributor* failing to do which the user will be exposed to the consequences of [CWARN-1] when used by the corresponding *Researcher*.

3. *Breach Of Contract*: If the *Contributor* violates any of the T&Cs mentioned in any of the documents under [CAS-1] will run into the risk of getting a warning by the *Researcher* [CWARN-1].

***Terms & Conditions to be included by a Contributor***:

1. *Document Verification*: The agreement documents authorized & uploaded by the *Researcher*, visible to the *Contributor* under [CAS-1] should be verified by the user's digital signature for continuing to collaborate under the mentioned project-title in the platform. Failing to verifying the documents will result to consequences as stated under the respective platform functionalities. Once verified by the user's digital signature, the documents under [CAS-1] which are the same documents represented under [RAS-1] should serve as proof for the *Research's* conscious authorization to abide by the T&Cs mentioned in the documents under the stated section i. e., [RAS-1].

2. *Confidential Documents*: The documents signed & submitted by the *Contributor* is to be considered for evaluation of the Foreground-IPR. The *Researcher* should treat these submissions as confidential failing to do which, the user will be exposed to the consequences of [RWARN-1] when used by the concerned *Contributor*.

3. *Breach Of Contract*: If the *Researcher* violates any of the T&Cs mentioned in any of the documents under [RAS-1] will run into the risk of getting a warning by the *Contributor* [RWARN-1].

*Foreground-IPR*
***Terms & Conditions to be included by the Researcher***:

1. *Considered Submissions*: The files digitally signed and submitted under a sub-task are the only files which are to be taken into account while calculating the Foreground-IPR for the *Contributor*. Any other attachments submitted without the contributor's digital signature will be considered as extras.

2. *Breach of Trust*: The *Contributor* failing to sign a Foreground-IPR even after providing a justified accountability for the user's contribution(s) to the project will be subjected to [CWARN-1].

3. *End Of Collaboration (EoC)*: The *Contributor* wanting to exit a project should do so considering the consequences stated under [XPRJ-1].

***Terms & Conditions to be included by a Contributor***:

1. *Considered Submissions*: The files digitally signed and submitted under a sub-task by the *Contributor* are the files which have to be taken into account while calculating the Foreground-IPR for the user. Failing to consider these documents for evaluating the Foreground-IPR will potentially result to the consequences of [RWARN-1] when imposed by the corresponding *Contributor*. Any other attachments submitted without the contributor's digital signature will be considered as extras.

2. *Breach of Trust*: The *Researcher* failing to provide a properly evaluated & signed document to the *Contributor* for the corresponding signed submissions with respect to the project will be subjected to [CWARN-1].

3. *End Of Collaboration (EoC)*: The *Contributor* wanting to exit a project should be allowed to do so by *"Agree & Sign"* under [XPRJ-1] by the *Researcher* considering the fact that the *Contributor* has completed all sub-tasks and has successfully signed the Foreground-IPR. Failing to allow the *Contributor* to exit the project will result to a warning by the corresponding contributor [RWARN-1].

# 6 Design

## 6.1 Technical Environment

State the hardware, operating system and software.

## 6.2 Hierarchy of Modules

Provide a diagram.

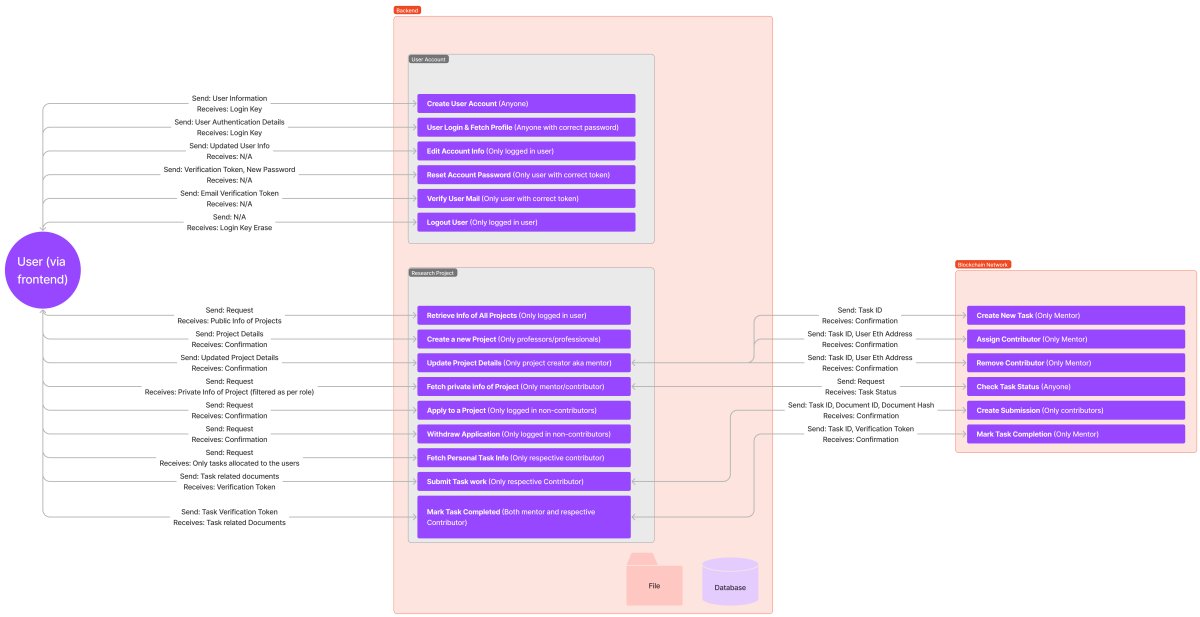


Figure 8: Platform Interaction Diagram

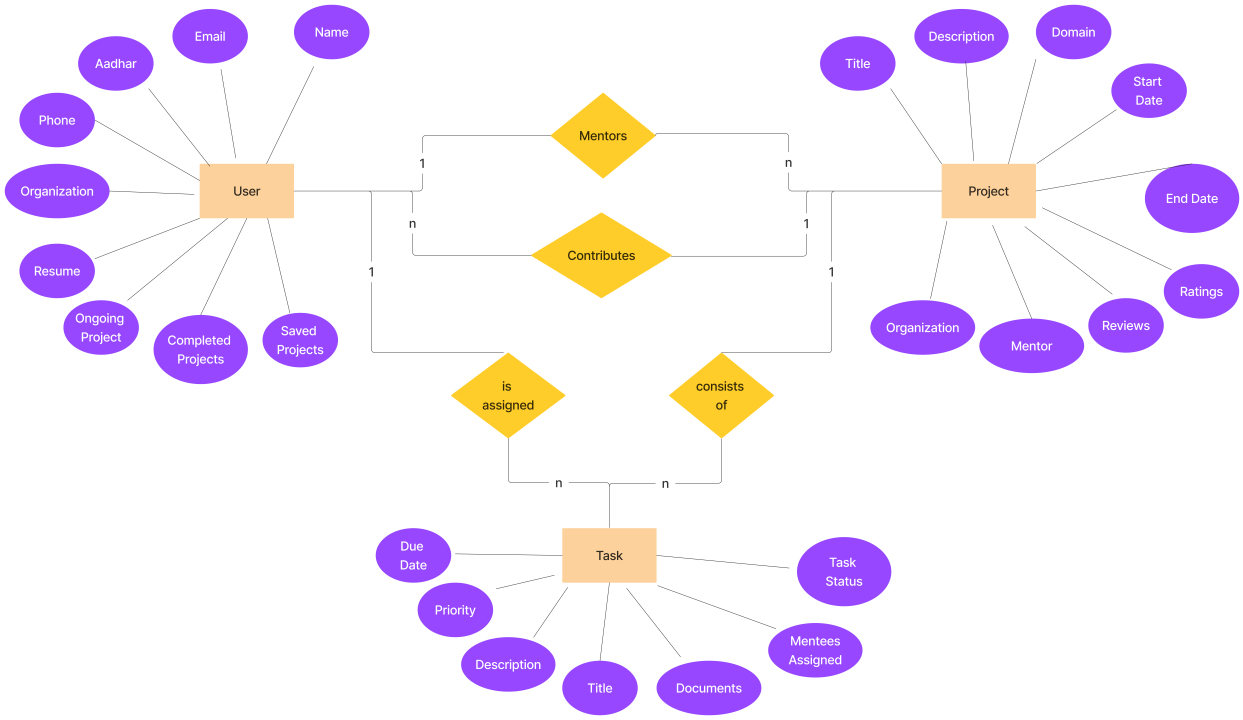


Figure 9: Platform Entity-Relationship (ER) Diagram

## 6.3 Detailed Design

For detailed design of each module, ensure to use appropriate tool, e.g., Component-level design (flowcharts, structure chart, activity diagrams, sequence diagrams etc.), Interface design, Architectural design and/or other appropriate tools as applicable. While elaborating these sections, you may create subsections (6.3.1.1, 6.3.1.2 etc). The focus will be on: "How the requirement will be implemented in the system?" Design Reference subsection numbers should be matching as stated in Requirement Matrix.

| Rqmt Sec. | Design Module | Design Section | Test Case No. | Technical Platform of Implementation | Prototype Prepared? |
|---|---|---|---|---|---|
| 5.1.1.1 | REG | 6.3.1 | - | Figma | No |
| 5.1.2.1 | LGN | 6.3.2 | T-LGN-1.1 | Figma | Yes |

Table 4: *Requirement Matrix [Traceability Matrix (Rqmt Sec. & Columns D-H)]*

#### 6.3.1 REG

#### 6.3.2 LGN

#### 6.3.3 PRF

Refer APPENDIX A – Prototypes 8.2 for prototype details.

# 7 Test plan

For Test Planning, s6.4 should contain the Test Plan in tabular format, where each Test Case should be represented with distinct id, prefixed with "T-<<module>>-", where module represents the short code of the respective design module. Test Case numbers should be matching as stated in Requirement Matrix.

# 8 Conclusion

## 8.1 Project Benefits

State the project benefits.

## 8.2 Future Scope for improvements

State the potential improvements that can be worked by future teams.

# References


[1] E. Androulaki, A. Barger, V. Bortnikov, C. Cachin, K. Christidis, A. D. Caro, D. Enyeart, C. Ferris, G. Laventman, Y. Manevich, S. Muralidharan, C. Murthy, B. Nguyen, M. Sethi, G. Singh, K. Smith, A. Sorniotti, C. Stathakopoulou, M. Vukolic, S. W. Cocco, and J. Yellick. Hyperledger fabric: A distributed operating system for permissioned blockchains. *CoRR*, abs/1801.10228, 2018.

[2] A. P. Association. *Publication manual of the American Psychological Association (6th ed.)*. American Psychological Association (APA), 2010.

[3] S. Bansal, S. Mahendiratta, S. Kumar, P. Sarma, A. Prakash, and B. Medhi. Collaborative research in modern era: Need and challenges, 2019.

[4] V. Buterin. Ethereum: A next generation smart contract & decentralized application platform. *Communications of the ACM*, 56.7, 2013.

[5] T. Farooq. Hyperledger fabric vs ethereum: Which should you choose?, 2023.

[6] N. I. of Health (NIH). Protection of human subjects, 2023.

# APPENDIX A - Prototypes

Provide the filtered part of RM showing prototype features. State the detailed steps of compilation, execution and setups.
To veiw the Figma prototype of the platform click here!

# APPENDIX B - Paper publications (optional)

State the paper references (if any).

# 9 Instructions (remove the following after your report is completed):

## 9.1 Edit and generate pdf

1. You need to create an account in overleaf
   `https://www.overleaf.com/project` (if not already created) and login.

2. Select 'New project' → 'Upload project' → select
   'LaTex_template_BTP_Report.zip' file. You need to do this step only once.
   Next time on-wards, you can directly access the folder in overleaf and make
   necessary changes.

3. Only one person from the group can upload the project and the share the link
   to other members of the group who can edit and view the report.

4. Once the folder is loaded, select 'BTP_report.tex' file and click the 'Recompile'
   option. On the right window, you can see the generated pdf where the LaTeX
   source code is available on the left window.

5. In the 'BTP_report.tex' file change

   - Project title
   - Supervisor name
   - Supervisor designation
   - Name of the HOD
   - Designation of the HOD
   - Names and roll numbers of the students

6. 'Recompile' again to check if the changes are reflected.

7. The PDF file can also be downloaded.

## 9.2 Adding citations, tables, figures, equations

**Equations:** Basic equations can be written using Inline math modes such as

- using `\(...\)`: `\(x^2 + y^2 = z^2\)` will generate $x^2 + y^2 = z^2$
- using `$...$`: `$(x^2 + y^2 = z^2)$` will generate $(x^2 + y^2 = z^2)$
- or, using `\begin{math}...\end{math}`:
  `\begin{math} x^2 + y^2 = z^2 \end{math}` will generate
  $(x^2 + y^2 = z^2)$

You can use `\begin{equation}...\end{equation}` for display modes such as `\begin{equation} x^2 + y^2 = z^2 \end{equation}` resulting to

$$x^2 + y^2 = z^2 \tag{1}$$

Other details such as adding subscript, superscript, fractions, you can refer to `https://www.overleaf.com/learn/latex/Mathematical_expressions`

**Adding tables:** For all tables, captions should be bold with centrally aligned and should be positioned above the tables. One such example is shown here.

```
\begin{table}[h!]
  \begin{center}
    \caption{Your first table with 3 columns and 5 rows}
    \label{tab:table1}

    \begin{tabular}{|c|r|l|} % <-- Alignments: 1st column middle,
    % 2nd right and 3rd left,
    % with vertical lines in between each column and row
    % \\
    \hline
      \textbf{Value 1} & \textbf{Value 2} & \textbf{Value 3}\\
      $\alpha$ & $\beta$ & $\gamma$ \\
      \hline
      1 & 1110.1 & a\\
      2 & 10.1 & b\\
      3 & 23.113231 & c\\
```

```
    \hline
   \end{tabular}
  \end{center}
\end{table}
```

Table 5: Your first table with 3 columns and 5 rows

| **Value 1** | **Value 2** | **Value 3** |
|---|---|---|
| $\alpha$ | $\beta$ | $\gamma$ |
| 1 | 1110.1 | a |
| 2 | 10.1 | b |
| 3 | 23.113231 | c |

This table can be referenced in the text as Table 5.

For more detailed examples refer to
`https://www.overleaf.com/learn/latex/Tables`

**Adding figures:** All image files are to be stored in the Images folder. For all figures, captions should be bold with centrally aligned and should be positioned below the figures. One such example is shown below:

```
\begin{figure}[ht]
  \centering
  \includegraphics[width=0.5\textwidth]{Brachistochrone-curve-plot.jpg}
  \caption{Sample Image}
  \label{fig:1a}
\end{figure}
```

This figure will be referenced in the text as Figure 10. For more detailed references for adding figures, refer to
`https://www.overleaf.com/learn/latex/Inserting_Images`.

## 9.3 Important

1. Already included ToC in this template. Font size and other styles are not be changed.

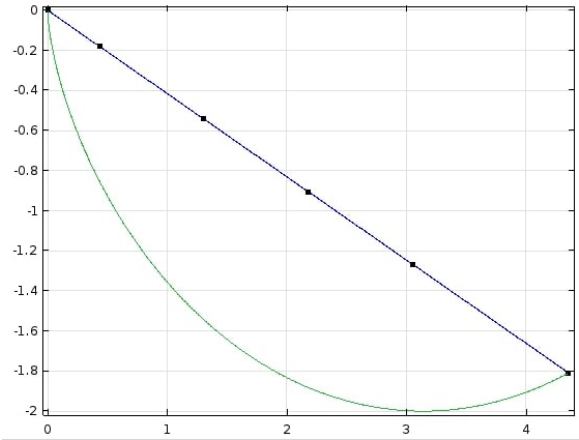


Figure 10: Sample Image

2. Depending on the type of your project, sections can be altered from this generic template.

3. Check for any spelling mistakes.

4. Team should perform reasonable numbers of proof reading for avoiding unintentional errors and factual discrepancies before appearing in project viva.

5. One spiral bound copy of the project report will have for submission at the time of the examination.

6. If you have already prepared a prototype, indicate the same under Requirement Matrix and Detailed design. Please also specify prototype details under Appendix 8.2 showing codes, screens, test data, sample output and detailed steps of compilation, execution and setups (if any).

7. If you have published related paper(s) in a standard journal / presented in a recognized conference, please ensure to refer the same under Section 8.2. References as well as including communication on your paper(s) acceptance / publishing note under the Appendix section. You should also show appropriate documentation at the time of project viva.