Pic2Model
Software Development Plan
Version 1.1

Revision History

Date	Version	Description	Author
07/11/2024	1.0	This version includes the initial overview of the project plan.	All group members
14/11/2024	1.1	Update information in "Project Estimates", "Project Plan" and "Project Monitoring and Control" sections based on TA's comments in PA1.	Nguyễn Trần Minh Thư, Nguyễn Hữu Gia Hiếu, Vũ Minh Phát

Table of Contents

Software Development Plan

1.   Introduction

The introduction of the **Software Development Plan** provides an overview of the entire document. It includes the purpose, scope, definitions, acronyms, abbreviations, references, and overview of this **Software Development Plan**.

1.1 Purpose

The purpose of the *Software Development Plan* is to gather all the necessary information to control the project. It describes the approach to the development of the software and is the top-level plan generated and used by managers to direct the development effort.

The following people use the *Software Development Plan*:

- The **project manager** uses it to plan the project schedule and resource needs, and to track progress against the schedule.

- **Project team members** use it to understand what they need to do, when they need to do it, and what other activities they are dependent upon.

1.2 Scope

This *Software Development Plan* describes the plan to be used by the **Pic2Model** project, including deployment of the product.

The plans outlined in this document are based upon the product requirements as defined in the *Vision Document*.

1.3 Overview

This *Software Development Plan* contains the following information:

Project Overview — provides a description of the project's purpose, scope, and objectives. It also defines the deliverables that the project is expected to deliver.

Project Organization — describes the organizational structure of the project team.

2.   Project Overview

2.1 Project Purpose, Scope, and Objectives

Purpose: The Pic2Model project aims to address the needs of various users across education, e-commerce, tourism, and design sectors. The reasons for undertaking this project include:

- **Enhancing Educational Quality**: Providing interactive 3D models to help teachers and students understand complex concepts more effectively.

- **Improving Online Shopping Experience**: Allowing customers to view products from all angles before making a purchase.

- **Creating Virtual Travel Experiences**: Enabling people to explore destinations without the need to travel physically.

- **Supporting Design Work**: Assisting designers in creating accurate and detailed 3D models quickly.

Scope: The scope of this project includes the development and deployment of the Pic2Model platform, which encompasses the following:

- **Development of AI-powered tools** for converting 2D images and textual descriptions into 3D models.

- **Creation of an interactive user interface** that allows users to engage with and manipulate 3D models.

- **Implementation of virtual travel experiences** with immersive and educational content.

- **Integration of e-commerce features** that enable detailed product views and customization options.

- **Deployment of design assistance tools** that support rapid and precise model creation.

Objectives:

- Develop and launch the Pic2Model platform on local website with basic functions.

- Ensure the platform is user-friendly and accessible to all target user groups.

2.2 Assumptions and Constraints

Assumptions:

- The project team will have continuous access to necessary development tools and resources.

- All team members are proficient in the required technologies and methodologies.

- Stakeholders will provide timely feedback and approvals throughout the project lifecycle.

- The platform will be accessible through major web browsers and mobile devices.

- Adequate documentation and guidelines will be provided for all third-party tools and libraries used.

- End users will be willing to engage with the platform and provide valuable feedback for improvements.

Constraints:

- The project timeline is tight, with only 12 short weeks for completion.

- The project's resources are limited to 5 members, with varying levels of expertise, and no additional support from other members.

- The product is being developed for free, which may impose certain limitations on its features.

- The working hours of each member differ, making it challenging to find a common time for group meetings, summaries, or organizing joint working sessions.

- Hardware and software must be compatible with existing systems, and any third-party tools or libraries used must be open-source or licensed for commercial use.
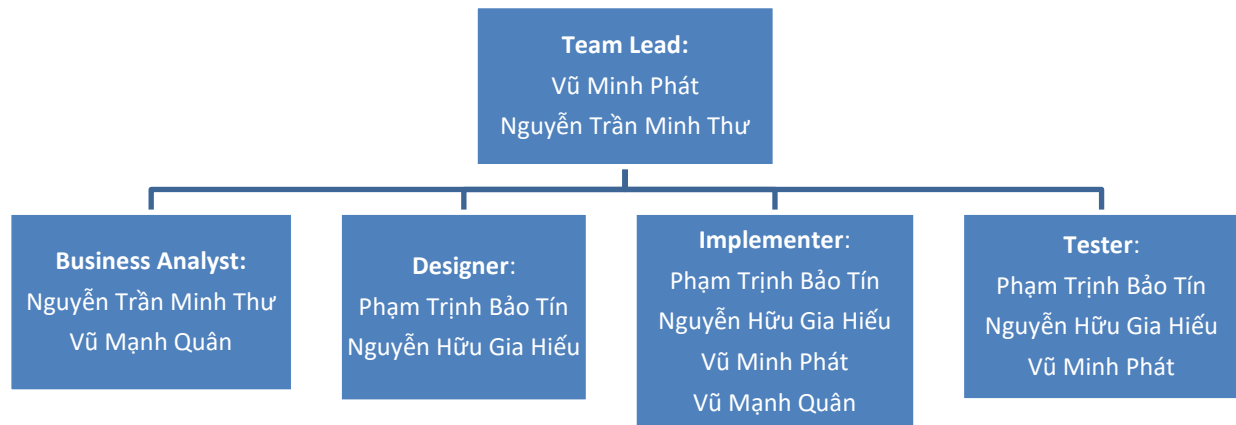
2.3 Project Deliverables

Deliverables for each project phase are identified in the Development Case. Deliverables are delivered towards the end of the iteration, as specified in section *4.2.3 Project Schedule*.

3.   Project Organization

3.1 Organizational Structure

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                    Team Lead:
                    Vũ Minh Phát
                Nguyễn Trần Minh Thư
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Business Analyst:	Designer:	Implementer:	Tester:
Nguyễn Trần Minh Thư	Phạm Trịnh Bảo Tín	Phạm Trịnh Bảo Tín	Phạm Trịnh Bảo Tín
Vũ Mạnh Quân	Nguyễn Hữu Gia Hiếu	Nguyễn Hữu Gia Hiếu	Nguyễn Hữu Gia Hiếu
		Vũ Minh Phát	Vũ Minh Phát
		Vũ Mạnh Quân	

3.2 Roles and Responsibilities

Member	Roles	Responsibilities
Vũ Minh Phát	Team Leader Implementer Tester	Write Project plan and assign task Write source code Perform unit test Review source code Develop test plans and test cases based on software requirements and specifications. Execute manual and automated test cases to verify the software's functionality. Create Test plan and Test case Document
Nguyễn Trần Minh Thư	Team Leader Business Analyst	Monitor and report status (weekly report) Coordinate meetings Connect point for the project Communicate with team members about the requirements Coordinate to review requirements
Vũ Mạnh Quân	Business Analyst Implementer	Document requirements (interview customers, etc.) Coordinate to review requirements Write source code Perform unit test Review source code
Nguyễn Hữu Gia Hiếu	Designer Implementer	Design the system (components, classes, databases, etc.)

	Tester	Create Software Architecture Document
		Write source code
		Perform unit test
		Review source code
		Develop test plans and test cases based on software requirements and specifications.
		Execute manual and automated test cases to verify the software's functionality.
		Create Test plan and Test case Document
Phạm Trịnh Bảo Tín	Designer	Write source code
	Implementer	Perform unit test
	Tester	Review source code
		Design user interface
		Creating Software Architecture Document
		Develop test plans and test cases based on software requirements and specifications.
		Execute manual and automated test cases to verify the software's functionality.
		Create Test plan and Test case Document

4. Management Process

4.1 Project Estimates

Implementation:

User Type	Feature	Implementation Time	Implementation Cost
All	Design Layout	5 days	
Premium User, Free User	Display Reports	2 days	
	Tutor	3 days	
	Access	7 days	
	View Profile	2 days	
	Edit Personal Information	3 days	$0
	Delete Account	1 day	
Free User	Upgrade	4 days	
	Generate 3D Model (Free)	7 days	
Premium User	Edit Stats	3 days	
	Buy Gift Code	2 days	

	Downgrade	2 days	
	Generate 3D Model (Premium)	14 days	
	Interact With 3D Models	7 days	
Admin	App hosting	2 days	
	Moniter	5 days	
	Display Ads to User	3 days	
	Block Unusual Accounts	2 days	

Tools:

Tool	Feature		Cost
Firebase	Hosting	Storage	$0.026/GB
		Data Transfer	$0.15/GB
		Custom Domain - SSL	Free
	Cloud Storage	GB stored	No-cost up to 5 GB Then $0.026/GB
		GB downloaded	No-cost up to 1 GB/day Then $0.12/GB
		Upload operations	No-cost up to 20K/day Then $0.05/10K
		Download operations	No-cost up to 50K/day Then $0.004/10K
	Cloud Firestore	Stored Data	No-cost up to 1 GiB total Then Google Cloud pricing
		Network egress	No-cost up to 10 GiB/month Then Google Cloud pricing
		Document writes	No-cost up to 20K writes/day Then Google Cloud pricing
		Document reads	No-cost up to 50K reads/day Then Google Cloud pricing
		Document deletes	No-cost up to 20K deletes/day Then Google Cloud pricing

4.2 Project Plan

4.2.1 Phase and Iteration Plan

One iteration or sprint = 3 weeks

- Phase 1: (1 Sprint)

    - Phase name: Inception

    - Starting date: 17/10/2024

    - Ending date: 07/11/2024

Sprint	Objectives

Sprint 1	- Project plan document - Vision document - 2 weekly reports

- Phase 2: (1 Sprint)

    - Phase name: Elaboration

    - Starting date: 08/11/2024

    - Ending date: 21/11/2024

Sprint	Objectives to achieve	Releases
Sprint 1	- Revised project plan document - Detailed vision document - Complete Use-case model document - Complete Use-case specification document - Draft software architecture document (SAD) - 2 weekly reports	- 3D Model Creation from 2D Images and Descriptions. - AI-Driven Image Generator

- Construction: (2 Sprint)

    - Starting date: 22/11/2024

    - Ending date: 12/12/2024

Sprint	Objectives to achieve	Releases
Sprint 1	- Revised software architecture document (SAD) - UI prototype - Test plan and test cases document - 2 weekly reports	- Object Segmentation (Demo) - Interactive 3D Experiences (Demo)
Sprint 2	- Final product - Project presentation - 2 weekly reports	

4.2.2 Releases

- 3D Model Creation from 2D Images and Descriptions: Transform 2D images or textual descriptions into detailed 3D models, catering to needs in education, shopping, tourism, and art-related activities. This allows users to visualize and interact with complex concepts and objects.

- AI-Driven Image Generator: Use AI to generate images from user-provided text descriptions. This feature helps users to easily visualize their ideas without needing extensive design skills, making the platform more accessible.

- Object Segmentation in Images: Enable object segmentation in images for instances where only specific elements need to be converted into 3D models. This allows users to isolate and focus on objects within an image, creating precise and targeted 3D representations. (Beta Release)

- Interactive 3D Experiences: Provide users with immersive experiences by interaction with generated 3D models on the website. This includes functionalities like rotating, zooming, and manipulating the models for an in-depth exploration, enhancing their understanding and engagement. (Demo)

4.2.3 Project Schedule

Phase	Interation	Start date - Due date	Task	Result	Releases
Inception	Sprint 1	24/10/2024 - 07/11/2024 (2 weeks)	• Idea for the project. • Discuss the environment to develop the project, programming languages, technology, etc. • Divide roles for each team member. • Write an initial version of the project plan. • Write an initial version of the vision document. • Write weekly reports and the description of project.	• Project plan. • Vision document. • Weekly report 1. • Weekly report 2. • Work division. • PA1.	
Elaboration	Sprint 1	07/11/2024 - 14/11/2024 (1 week)	• Write a revised project plan. • Write a detailed vision document. • Design use-case model. • Draft the use-case specification document. • Write a weekly report. • Learning and training technology: API, Server, Docker, MongoDB, Figma, ReactJS, etc.	• Revised project plan. • Detailed vision document. • Use-case model. • Use-case specification. • Weekly report. • PA2.	3D Model Creation from 2D Images and Descriptions.
		14/11/2024 - 21/11/2024	• Write a revised use-case specification document. • Draft the software architecture document	• Revised use-case specification. • Software architecture	AI-Driven Image Generator

		(1 week)	(SAD). • Design class diagrams. • Write a weekly report. • Learning technology and generating code.	document. • Class diagrams. • Weekly report. • PA3.	
Construction	**Sprint 2**	21/11/2024 - 28/11/2024 (1 week)	• Write a revised software architecture document. • Design UI prototype. • Write a weekly report. • Learning technology and generating code.	• Revised software architecture document. • UI prototype. • Weekly report. • PA4.	Object Segmentation (Demo)
		28/11/2024 - 5/12/2024 (1 week)	• Prepare test plan and test cases. • Write weekly reports.	• Test plan and test cases document • Weekly report.	Interactive 3D Experiences (Demo)
	Sprint 3	28/11/2024 - 12/12/2024 (2 weeks)	• Complete all functions of software and connect them together • Prepare project presentation. • Write weekly reports. • Learning technology and generating code.	• Final product • Project presentation slide. • Weekly report 1. • Weekly report 2. • PA5.	
	Sprint 4	12/12/2024 - 26/12/2024 (2 weeks)	• Prepare final submission.	• Final submission. • PA6.	

- **PA0**: 17/10/2024 – 24/10/2024

- **PA1**: 24/10/2024 - 07/11/2024 (2 weeks)

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- **PA2**: 7/11/2024 - 14/11/2024 (1 week)

- **PA3**: 14/11/2024 – 21/11/2024 (1 week)
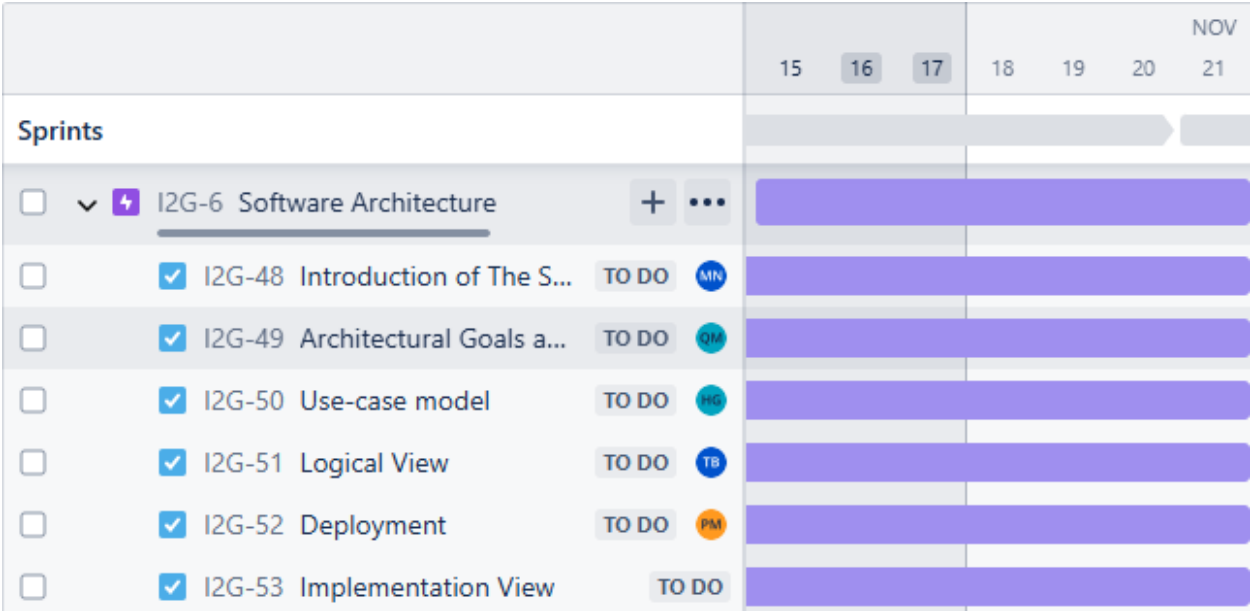
- **PA4**: 21/11/2024 – 28/11/2024 (1 week)
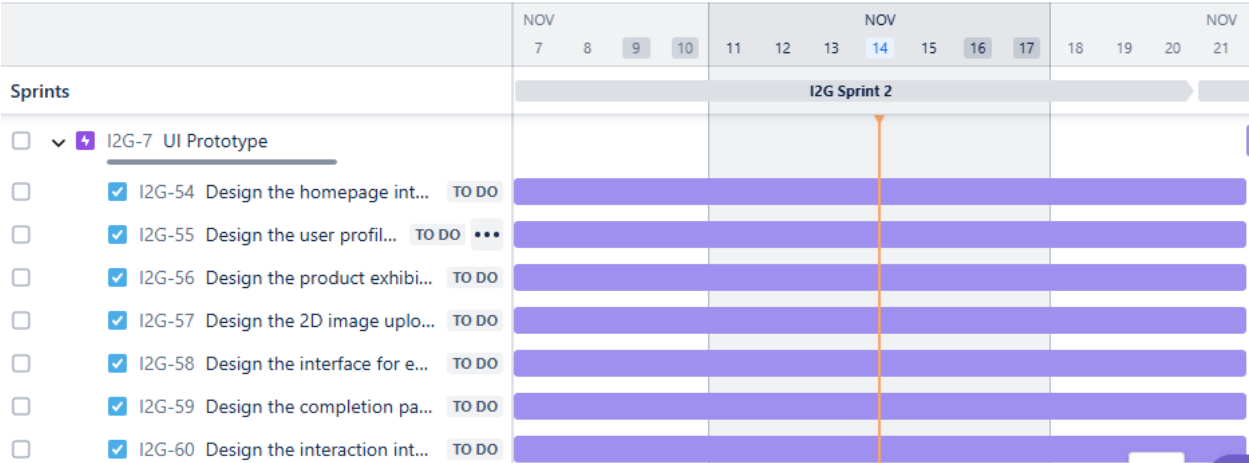
- **PA5**: 28/11/2024 – 12/12/2024 (2 weeks)

- **PA6**: 12/12/2024 – 26/12/2024 (2 weeks)

4.3 Project Monitoring and Control

4.3.1 Reporting

Effective and consistent reporting is essential to ensure that all team members and stakeholders remain informed about the Pic2Model project's progress. Our project uses a combination of structured meetings, formal reports, and informal check-ins to maintain transparent and regular communication. The following approaches are implemented to provide timely updates on project status:

- **Weekly Meetings**: Every week, the project team gathers for a structured meeting, where we review recent achievements, discuss any challenges, and plan for the upcoming week. These meetings serve as a platform for more in-depth discussions on progress, allowing team members to present their work, get feedback, and collaboratively resolve any issues. Weekly meetings also ensure alignment with the project's goals and allow us to adjust plans as needed based on current progress.

- **Weekly Status Reports**: Each team member submits a weekly status report summarizing their completed tasks, ongoing work, and any issues they encountered. These reports provide a written record of individual contributions and project progress, which allows for easy reference and tracking of the project timeline. The weekly reports are reviewed collectively to assess project health and ensure transparency with stakeholders, including the Teaching Assistant (TA).

- **Informal Chats**: Beyond formal meetings and reports, we use informal chats via Facebook Messenger to stay connected throughout the week. These chats provide an accessible channel for team members to quickly share updates, ask questions, or discuss minor issues as they arise. The informal chats encourage a collaborative environment where everyone can stay in the loop and maintain momentum between formal check-ins.

4.3.2 Risk Management

| Risk ID	Risk Description	Probability	Impact	Risk Exposure = Probability * Impact	Priority	Mitigation Strategy or Contingency Plan
R001	Intensive and new knowledge to learn at the same time.	75	90	6,750	High	Try to review and break down difficult knowledge into smaller parts and share them with team members. Each member will be responsible for learning the assigned parts. Then, the team will hold a meeting for members to present and share the parts they have learned. Through this, members can quickly grasp complex knowledge related to the subject and project, helping to save time in the product development process.
R002	Not identify the right scope of project.	70	90	6,300	High	The team could review and adjust the project plan and schedule to accommodate the additional work. The team could also conduct a root cause analysis to identify the reasons for the scope and take corrective actions to prevent it.
R003	Heavily dependent on third-party APIs to run current state-of-the-art machine learning models.	70	85	5,950	High	The development team will flexibly use APIs from lightweight versions of those state-of-the-art models.
R004	The time planned is not enough to complete the task.	65	85	5,525	Medium	Flexibly change the milestones in the product development process to match the progress of the project. At the same time, the team can choose to remove unimportant features to focus on developing the main features of the product. On the other hand, members who have completed their assigned tasks can help members who have not completed their tasks.
R005	The application may crash or freeze when processing images that are too large or have too much detail.	70	70	4,900	Medium	The testing team will conduct extensive testing on various inputs before the product is officially released. Additionally, the development team will prepare regular updates to address issues reported by customers.
R006	Change in project requirements (it is too difficult to implement).	55	85	4,675	Medium	The team must conduct impact assessments and risk analyses for change to evaluate its feasibility and consequences. Then, we find a way to adjust but still maintain main features.

| R007	Team members are busy or cannot work in a small amount of time (have flu, have family work, etc.).	50	80	4,000	Medium	Project manager can discuss and update to them later, team members can do another time when they are free which does not affect to the project.
R008	Team member turnover.	40	80	3,200	Low	If some key team members leave the project unexpectedly, the team could conduct a knowledge transfer session and document critical information and skills. Or our team must adjust the timeline and divide jobs again to minimize the bad effects to project.
R009	Poor UI/UX design.	50	50	2,500	Low	The design team will refer to competitor products on the market, then edit and redesign the interface to ensure that the team's product has a certain difference compared to competitors.
R010	Project costs exceed the given budget.	20	40	800	Low	The product development team will look for free APIs from some other providers in the market. Or the team can negotiate with customers to be able to expand the budget.

4.3.3 Configuration Management

To effectively manage and streamline communication, document sharing, and version control within the Pic2Model project, our team utilizes a range of tools tailored to specific collaboration needs:

- **Facebook Messenger**: Primarily used for quick, informal discussions among team members, Facebook Messenger facilitates direct communication within the team. It allows us to stay connected, discuss daily updates, and quickly share ideas or clarifications.

- **Telegram**: The team uses Telegram to communicate with the Teaching Assistant (TA).

  o *Here is the link to the Telegram channel* where our group can discuss with TA about project assignments.

- **Google Drive**: All essential documents and files are stored and shared using Google Drive, which provides secure, cloud-based storage. Google Drive enables version control for document sharing, making it easy to access previous versions and collaborate in real time.

  o The Google Drive folder will be organized as described in the "GoogleDriveFolderStructureRequirement.pdf" document provided by instructors. *Here is the link to our group's Google Drive folder*.

  o The Google Drive folder structure is as follows:

    ▪ File "README": contains schedule (time/date) for weekly scrum, sprint planning and sprint review meetings.

    ▪ Folder "PA": includes subfolders to store submissions. Each subfolder contains one PA submission.
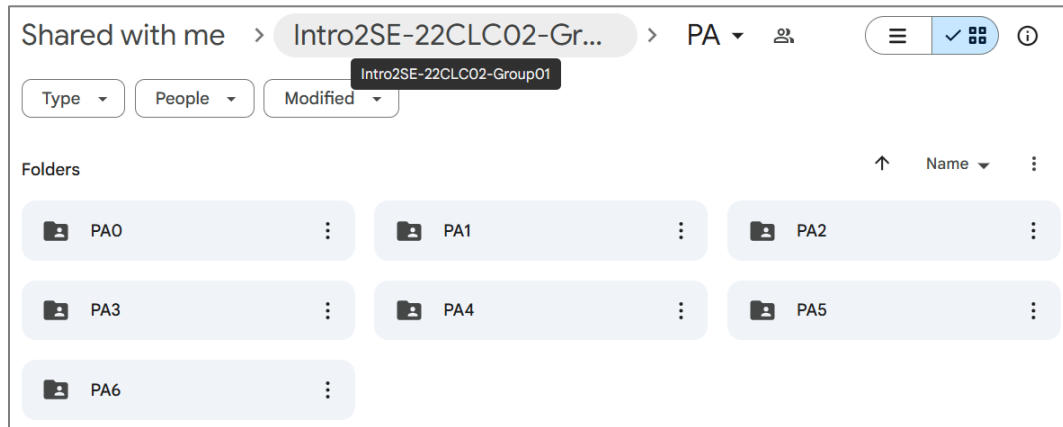
- Folder "Sprint": consists of multiple subfolders, each subfolder stores deliverables (optional), sprint planning meeting minutes, sprint review meeting minutes for each sprint.
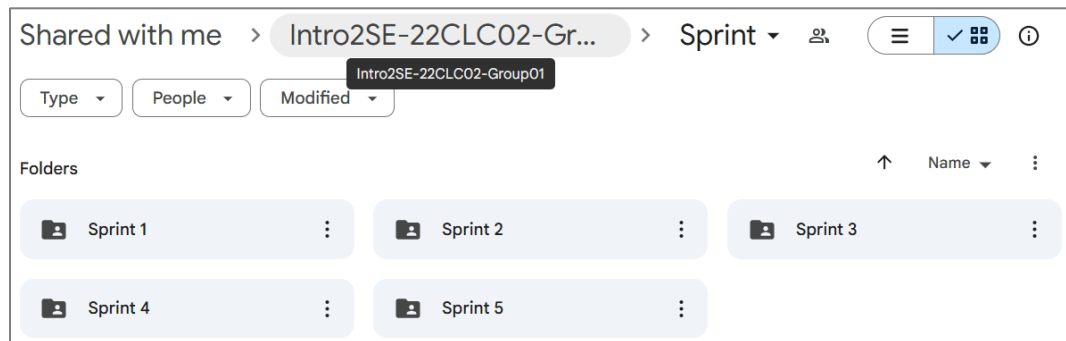

- **Google Meet**: Team meetings are conducted on Google Meet, which provides video conferencing capabilities. This tool allows for remote collaboration, enabling us to maintain regular check-ins and progress updates without being limited by physical location.

  o The Google Meet link will be sent to members via Facebook Messenger by the group leader before each meeting.

- **GitHub**: GitHub is used as the primary platform for managing source code and related files. It provides robust version control, ensuring that code updates are tracked and managed efficiently, allowing the team to collaborate on code changes in a structured manner.

  o Our team's GitHub repository will be organized as described in PA0, "Tools setup" section. *Here is the link to our GitHub repository*.

  o The GitHub repository structure is as follows:

    - Folder "src": used to store source code.

    - Folder "docs": used to store documentation, which has the following subfolders:

      - Subfolder "management": storing planning documents, reports (weekly report, project status report, etc.).

      - Subfolder "requirements": storing all requirements, including vision document and use cases.

      - Subfolder "analysis and design": storing all analysis and design related documents, including software architecture documents, UML models, UI design.

- Subfolder "test": storing all test documents such as test plans, test cases, test reports.

   ▪ Folder "pa": including subfolders to store submissions. Each subfolder contains one PA submission.

o Commit message guidelines:

   ▪ Summary: Provide a succinct description of the modification.

   ▪ Clarity: The purpose of the change should be explicit without the need for code inspection.

   ▪ Reference: Cite any associated issues or tasks, if necessary.

o Workflow:

   ▪ Each member will work, write source code to implement system functions, etc. and commit to each person's development branch.
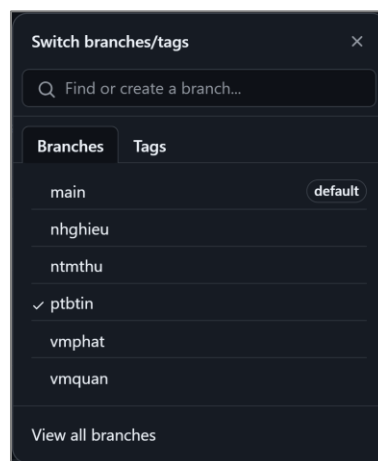
   ▪ After each member has completed their work, the team will hold a meeting to review and edit the results if necessary.
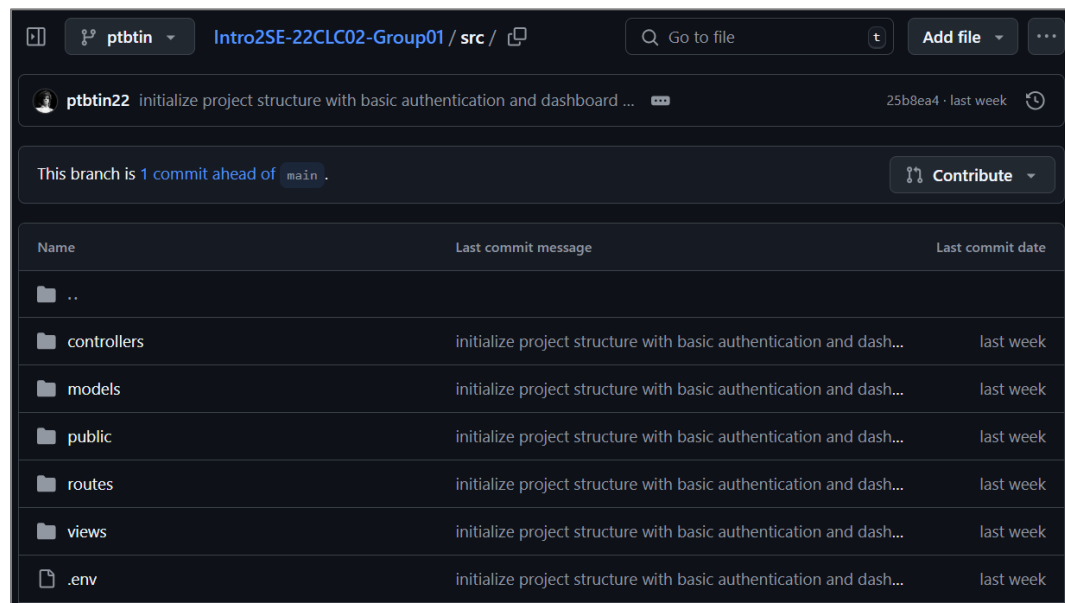
- Then, the team leader will merge changes (commits) from all development branches into the main branch. The main branch will contain all the complete source code of the whole team.

- After that, each member will pull changes from the main branch to the development branch and continue their work.

- **Jira**: Our project management and task tracking are managed in Jira, which enables us to organize, assign, and track project tasks following the Scrum methodology. With Jira, we can monitor progress, set deadlines, and manage sprints, ensuring that project milestones are met.