Requirement

1. In-scope

According to the requirements of our client, there are several requirements that need to be finished and in-scope for the product in this project.

- Integrate the Planimation Module as a VSCODE Plugin

Planimation module should be integrated as a VSCODE plugin and comes preloaded with files to Planimation Blocks so that users could install the Planimation Module from the plugin menu of the online PDDL editor directly.

- PDDL editor Plugin

Plugin for PDDL Editor to Launch Planimation application inside PDDL webpage.

- Load and Use the Planimation Module

Users should be able to use the Planimation module in the online PDDL editor by installing the planimation plugin or they could access the stand-alone application directly by URL.

- Build Visualisation from Problem Files

Users should be able to upload the planning problem related files, including the Domain PDDL file (for predicates and actions), the Problem PDDL file (for objects, initial state and goal) and the Animation profile (object is representation), to generate the visualisation of the plan (i.e. solution) of this problem.

- Build Visualisation from Solution VFG File

Users should be able to upload the VFG file to generate visualisation directly.

- Planning Visualiser

Users could access this planning visualiser after uploading the files and building the visualisation to observe the visualised sequential solutions of planning problems specified in PDDL step by step. Planning visualiser should have an animation player to display the animation of solutions, and users could press the 'play/stop' button, 'next step' button, 'previous step' button, 'replay' button and 'speed' bar to control the play of visualisation representation of planning problems' sequential solutions. Planning visualiser should show the action and detailed step information of each step in a step panel. Users could also control the display of animation directly by selecting the specific step in the step panel. In addition, it should also show the sub-goal and final goal features of the planning problem.

- Export Animation Feature

Users could export the animation of planning problem as a file and users could also select the format of the export file such as VFG file, MP4 file, GIF file and so on.

- User Manual

Users could visit the user manual page to get a detailed guide and instructions for this planimation module.

- Demo Files

The planimation module provides the domain file, problem file and animation profile in PDDL of several typical planning problems and users could get and use them directly.

2. Out-of-scope

There are some extensions and further requirements to enhance and improve this application, which is out-of-scope for this development stage.

- Modification of the Backend

In this project, the main task is to develop a JavaScript frontend to substitute the existing Unity frontend using PixiJS. Hence, the team will mainly focus on the development of the frontend and will not modify the backend.

- Import Animation File in the Other Formats to Build Visualisation

The team will not provide the functionality to upload the animation file in the other formats (like MP4 file, GIF file) than VFG file to generate the visualisation directly.

3. Delivery Approach – Scrum/Agile

In this project, the team decides to choose Scrum approach, an Agile method, as the SDLC model to implement this project according to client's requirements, there are several reasons for that.

1. The client will get involved in the project, and he might change some of his requirements during the project. In the Scrum model, the project development will be processed by a series of short sprints. After each sprint, the function can be demonstrated at the review and the team will make a conclusion of the current sprint and prepare for the next one with the feedback of the client. Scrum approach provides a model that could adapt the changing requirements more smoothly and quickly [1], which is more flexible and more suitable for this project.
2. This project is expected to have a usable delivery within around two months. Scrum is an approach that could support rapid delivery and shorten the time for development by a series of short sprints [2].
3. This project requires a model that the client and the development team could communicate with each other frequently about the delivery of each sprint. Scrum model encourages teams to interact with clients and learn through experiences for a better outcome which is more appropriate for this project [3].
4. In this project, the development team is quite small with just five members. Compared with the Formal method such as waterfall and incremental model that need more people, Scrum approach has a more tight-knit team with just a few members which is more feasible in this project.
5. All the team members are in the major of Information Technology and have some experiences of developing. The Scrum team is self-organized that members could decide how to implement their work [4], which could let all members fully participate in the project's implementation and decision-making and use their knowledge and experience better.
6. FinallyConsidering the impact of the epidemic and lockdown on project development, it is almost impossible for team members to hold meetings or discuss development progress locally. Under the condition of limited time and space resources, Agile can better balance the development progress among the team members and make the project proceed steadily.

4. Constraints

This project is developed in the context of the capstone project in Software Project COMP90082 by a team of students of the Master in Information Technology at the University of Melbourne.

Constraint	Type	Description
Limited resources working on the project at any given time	Time constraint	It is expected for each member to work 20 hours weekly on the project.
Project delivery is bound to COMP90082	Time constraint	The project delivery date is not subject to change as it is mandated by COMP90082. The actual development time of this project is quite tight and just approximately two months from planning to the final product delivery. The development team needs to complete the development, test, and release the product in this very limited time, which might lead to imperfect testing and impact the robustness of the final product.
Project team to work using freely available technologies (Cost constraint)	Cost constraint	There is no budget set for the COMP90082 project, therefore all software functionality would have to utilize technologies that are available at no cost to the project team.
Fixed project team size	Cost constraint	This project is under the constraint that all teams are limited to five members. No additional resources can be hired to assist with the project deliverables.
A fixed set of requirements	Scope constraint	The requirements specified by the client are not negotiable, so changing the scope is not an option
Deployment environment requirements	Technical constraint	For deployment purposes, the development must be in docker containers and must be developed forking the current GitHub repository. Also, the main requirement of this project is that the development of a JavaScript frontend to substitute the existing Unity frontend, therefore, the team will mainly focus on the development of the frontend and continues to use the existing backend. The separate development of the frontend and backend might cause some challenges to the adaptation and integration of the frontend and backend.
Fixed working methodology is given by COMP90082	Organic const	Given by COMP90082 lecturers the SDLC will be Agile

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Architectural and integration	Te ch nic al co nst rai nt	The backend and Online PDDL editor plugin cannot be change
Lack of development experience	Or ga nic co nst rai nt	All members of the development team are students who might lack sufficient developing experience using the required developing tools (e.g. PixiJS and Django) although most of them are majoring in IT. The team may be unfamiliar with these tools at the beginning which might lead to low efficiency at the beginning stage.
Inconvenience communication among team members	Ti m e co nst rai nt	Due to the restriction under the current global pandemic circumstance, it is difficult for the whole team to implement this project together geographically and communicate with each other in a face-to-face way frequently, which would affect the efficiency of communication and development work.

5. User Story Table

Story ID	User	Story	Priority
1	Students/Researchers/Industry Partners	As a user, I could upload domain, problem, animation PDDL for generating the animation as an option.	Must have
2	Students/Researchers/Industry Partners	As a user, I could choose to upload VFG file for visualization.	Must have
3	Students/Researchers/Industry Partners	As a user, I could find a user manual to help me use this web-based application.	Should have
4	Students/Researchers/Industry Partners	As a user, I could find a demo video or doc demonstration to learn how to operate this animation.	Should have
5	Students/Researchers/Industry Partners	After uploading the file, I could check each step of the plan and the plan status on the page.	Must have
6	Students/Researchers/Industry Partners	Also, I could choose to play or pause the animation anytime in the plan.	Must have
7	Students/Researchers/Industry Partners	If I want, I could play it with a higher speed or lower speed.	Should have
8	Students/Researchers/Industry Partners	I could check the status of any step in the animation by selecting it from the step bar.	Should have
9	Students/Researchers/Industry Partners	The animation file could be saved as a video file like mp4 etc.	Could have
10	Students/Researchers/Industry Partners	And time during the animation. I could easily move to the previous or next step.	Should have

6. User Case

1. If a user wants to easily find the vertical order from a drag&dropproblem with many boxes, it will be hard to get it from a word expression of the plan. Use Planimation will easily show the box's position for each step.
2. If a user wants to check the best route of a maze problem and the item or monster status. He could use Planimation to intuitively find out the route and status for each box.

Reference

[1] Casandra, M. (2020). Top 20 Agile Scrum Master Interview Questions & Answers. Retrieved from https://www.simplilearn.com/agile-Scrum-master-interview-questions-article

[2] R. Simons, "Advantages and Disadvantages of Agile Project Management" Retrieved from https://activecollab.com/blog/project-management/agile-project-management-advantages-disadvantages

[3] Chandana, D. (2019). Scrum Project Management Article. Retrieved from https://www.simplilearn.com/Scrum-project-management-article

[4] Harry, D., & Marion, Z. (2020). Week3 Formal and Agile approaches [Lecture notes]. Retrieved from https://canvas.lms.unimelb.edu.au/courses/89089/pages/lecture-3?module_item_id=2215058