Requirements

Group 1 Cohort 1

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Introduction

Effective project requirements are pivotal for success, necessitating a thorough understanding of stakeholders' needs and clear specification translation. Our project, centred on developing a game simulating the final exam week for second-year computer science students, followed a systematic approach.

We began by brainstorming relevant questions to discern specific game requirements from the stakeholders, non-functional requirements and constraints, which were not fully detailed in the brief. We came up with a range of questions, including platform requirements, ethical considerations, and graphic style:

- ➢ Functional requirements:
  - Type of input/controls?
- ➢ Non-functional requirements:
  - Graphics style?
- ➢ Constraint requirements:
  - Systems it should run on?

The following stakeholder interview provided valuable insights, refining our understanding of their needs. Active engagement and questions improved our Single Statement of Needs (SSON) and identified clear user requirements.

The SSON, "To build a single-player game managing activities of a second-year computer science student in the final exam week", provided to us by the stakeholders, guided our requirement elicitation process, encapsulating core project objectives.

Drawing from resources such as the IEEE guide [1] on software requirements specifications, we formulated the requirements. After researching, we decided on the MoSCoW method [2] to decide the importance of each requirement.

To present requirements effectively, we utilised a tabular format for readability and adaptability, outlining constraints and use cases to align with stakeholders' goals. The following requirements have been reiterated throughout the development process, and now completely cover every aspect of the game. Each record has a unique ID, and represents a unique requirement.

User Requirements

ID	Description	Notes	Priority
UR_AVATAR_SELECT	The user should have the ability to select from a variety of avatars for aesthetic purposes.	The selection should include at least three diverse avatar options.	**Should**
UR_ACTIVITY_CHOICE	The user must be able to select from multiple activities to engage in at any time during the day.	The activities should cover a range of options relevant to a student's final week before exams.	**Must**
UR_MOVEMENT	The user must have the capability to move their character in all four directions (left, forward, right, back).	The control scheme (WASD) should be clearly communicated to the user prior to the game's start.	**Must**
UR_ACTIVITY_AMOUNT	The game should provide options to control the duration and frequency of study and relaxation periods.	The user has full control on what type of activities they do and when.	**Should**
UR_INTERACTION	The user must be able to interact with buildings and items to perform various activities.	Clear instructions regarding interaction controls must be provided to the user before the game starts.	**Must**
UR_GAME_LENGTH	The game duration should be between 5 to 10 minutes, with each in-game day lasting approximately 1 minute.	The game should automatically advance from 9pm to 9am, simulating sleep, after 16 hours of activity.	**Should**
UR_UX	The user experience should be enjoyable and engaging, promoting immersion and fun.	Subjective metric associated with user satisfaction and enjoyment. Associated with Risk 14.	**Must**
UR_GAME_END	The game ends after the completion of 7 in-game days.	The win condition should be clearly communicated to the user.	**Must**
UR_ACTIVITY_LENGTH	Each activity should have a duration ranging from 1 to 3 hours.	Users should be informed that different combinations of activities result in different scores.	**Should**
UR_SLEEP	The user should have the option to initiate sleep and skip to the	Access to the sleeping area must be provided to the user.	**Should**

	next day at any point during gameplay.		
UR_LEADERBOARDS	Users must be able to see the most successful scores and the name of the user who scored it.	You must be able to see the name and score of the top ten playthroughs of the game.	**Must**
UR_STREAKS	User must be able to collect streaks while they play the game.	At least 3 streaks must be present in the game for the user to aim to complete.	**Must**
UR_SCORE	User must study to pass his exams.	Users can catch up on missed days by studying more on other days.	**Must**
UR_COLLISIONS	User should not be able to walk through things that you can't in real life.	For example buildings walls should now cause collisions preventing the user from walking through it.	**Should**

Functional System Requirements

ID	Description	User Requirement
FR_CHOOSE_AVATAR	The system should allow the user to select an avatar from a set of options before starting the game.	**UR_AVATAR_SELECT**
FR_INPUT_DETECTION	The system must accurately detect and respond to user input, including key presses and selections.	**UR_MOVEMENT, UR_INTERACTION**
FR_GAME_DURATION	The game must run for a duration of 5 to 10 minutes.	**UR_GAME_LENGTH**
FR_SLEEP	The system must automatically simulate sleep between 9pm and 9am after 16 hours of activities.	**UR_ACTIVITY_LENGTH**
FR_ENERGY_ACTIVITY_COUNT	The system must adjust the energy level based on completed activities.	**UR_ACTIVITY_CHOICE**
FR_HAPPINESS_ACTIVITY_COUNT	The system must adjust the happiness level based on completed activities.	**UR_ACTIVITY_CHOICE**
FR_STUDY_ACTIVITY_COUNT	The system must adjust the happiness level based on completed activities.	**UR_ACTIVITY_CHOICE**

FR_UI	The user interface must meet user expectations in terms of clarity and usability.	**UR_UX**
FR_LEADERBOARDS	The system must store the score and the name of the top ten playthroughs of the game.	**UR_LEADERBOARDS**
FR_SCORE	The system must adjust the score by how many times you study and if you go more than one day without studying you will fail your exam.	**UR_SCORE**

Non-Functional System Requirements

ID	Description	User Requirement	Fit Criteria
NFR_GAME_LENGTH	The game should be played within a reasonable time frame.	**UR_GAME_LENGTH**	The average game duration should not exceed 10 minutes.
NFR_RESPONSIVE	The system should respond quickly and accurately to user input.	**FR_INPUT_DETECTION**	The system should register and respond to user inputs within 100 milliseconds.
NFR_ACCESIBLE	The system should be adaptable to accommodate accessibility needs in the future.		The game's user interface should comply with accessibility standards and support future enhancements.
NFR_PLAYABLE	The game should run smoothly without any technical issues or crashes.		The game should undergo thorough testing to ensure stability and reliability.

Constraints

ID	Description	Type
CR_PROJECT_LEGAL	The game development process must comply with all relevant legal regulations and requirements, including licensing agreements.	Project

CR_DESIGN_GOAL	The design of the game must align with the overall project goals and objectives.	Design
CR_PROJECT_FINANCE	The project budget (minimal spending) must be adhered to throughout development.	Project
CR_TIME	The project must be completed within the timeframe specified by the stakeholder.	Project
CR_DESIGN_TECH	The game design must utilise appropriate technology to meet performance and functionality requirements specified by the stakeholder.	Design
CR_LANGUAGE	The game must be developed using appropriate language to reach the target audience effectively.	Design
CR_ACCURATE	The game must realistically represent the experiences of a second-year computer science student.	Design
CR_APPROPRIATE	The game content must be appropriate for players aged 15+ and all cultural backgrounds.	Design

References:

[1] “IEEE guide for developing system requirements specifications,” IEEE Std 1233-1996, pp. 1–30, 1996, doi: https://doi.org/10.1109/IEEESTD.1996.81000.

[2] K. Brush, “What is the MoSCoW Method?,” TechTarget, Apr. 2020. https://www.techtarget.com/searchsoftwarequality/definition/MoSCoW-method

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