# Requirements

## Cohort 1 Group 10

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Our approach to requirements elicitation consisted of three stages:
- Preliminary list - prior to the stakeholders interview, we brainstormed as a team and came up with a preliminary list of requirements containing most user requirements we could extract from the product brief alone and included any FR and NFR we could think of. These were, of course, rather general and in need of refining, but they helped us come up with questions for our interview with the stakeholders.
- Stakeholder interview - At the stakeholders meeting we presented our initial ideas, seeking feedback and missed requirements.Prior to that, We came up with features which we thought would improve the gameplay which were not included in the product brief, such as allowing the player to complete minigames at each activity to boost their score, obstacles, NPC`s and gaining energy. However, we were advised to keep it simple and focus on having a functioning game. Hence, we removed some of our unnecessary requirements. The stakeholders told us that the audience they had in mind were 16-20 year olds, the objective is to give them a glimpse into the daily life of a university student in a fun and interactive way. This tells us that the game needs to be catchy, appealing and family friendly. We also want the game to resemble a popular game which is similar. The stakeholder said that the game could take inspiration from popular 2D platformers such as Stardew Valley and Pokemon. We also asked the stakeholder about including a feature to allow users to choose time to spend on activity, we were told only for things that make sense, hence studying. We asked what activity interaction should feature, we were told only to interact and done for now.
- Requirements refining - following this valuable meeting with the stakeholders, our team was ready to refine our requirements into a more detailed and complete list. We removed all unnecessary features, added any we missed and improved the detail of any vague requirements. We grouped the preliminary listed requirements into user, functional, non-functional and constraint requirements and dug deeper to list down all FR and NFR's. We did this by holding each user requirement one-by-one and researching and brainstorming FR's for each one. then presented everything in a requirements table, recording priorities, fit criterias and relating functional requirements to the user and stakeholders needs . The structured presentation of requirements, including use cases, system operations, class diagrams, attributes, and gameplay rules demonstrates a deep understanding of the game's design needs. Research into industry standards such as UML methodologies, UX design principles, recording requirements ensured that the requirements captured essential features, behaviours, and constraints for successful game development, enhancing player experience and game performance.

**Table 1. USER REQUIREMENTS TABLE**

| ID | Description | Priority |
|---|---|---|
| UR_SEAMLESS_START | User can start game effortlessly | SHALL |
| UR_GUIDANCE | User receives step-by-step guidance throughout game | SHOULD |
| UR_MOVEMENT | The user can move around the map | SHALL |
| UR_INTERACTION | User can interact with map elements | SHALL |
| UR_RESOURCES | Users track/manage time/energy strategically | SHOULD |
| UR_DAY_COUNT | User experiences and tracks 7 in game days | SHOULD |
| UR_OBJECTIVES | The user shall have clear objectives with studying being compulsory, and be able to keep track of completed ones. | SHALL |
| UR_WINNING_CRITERIA | The user wins the game by completing studying objectives daily, while maintaining a healthy lifestyle. | SHALL |
| UR_GAME_DURATION | The user should complete the game in 5-15 mins. | SHALL |
| UR_REALISTIC_EXCITING_EXPERIEN | CE Users enjoy a realistic and engaging simulation ensuring a catchy start and ending. | SHALL |
| UR_GAME_OPTIONS | Users can pause, restart or exit the game. | SHOULD |
| UR_SATISFACTION | Users experience a smooth and pleasant game. | SHALL |
| UR_COMPATIBLE_W_EVERYONE | Game is playable by various user types. | SHALL |
| UR_VIEW_LEADERBOARD | The user can view and leaderboard of player names and high scores | SHALL |
| UR_HIDDEN_ACHIEVEMENTS | The user scores higher for accomplishing streaks of doing the same activity a certain number of days in a row | SHALL |

**Table 2. FUNCTIONAL REQUIREMENTS TABLE**

| ID | Description | User Requirement(s) |
|---|---|---|
| **Invariant** | | |
| FR_START_PAGE | Start page with game options. | UR_SEAMLESS_START |
| FR_NEW_GAME | Option to start new game from day 1 | UR_SEAMLESS_START |
| FR_MOVEMENT_CONTROLS | Controls for avatar movement | UR_MOVEMENT |
| FR_MAP | Map of all required buildings for player activities | UR_MOVEMENT + UR_INTERACTION |
| FR_INTERACTION_CONTROLS | Controls for map interactions | UR_INTERACTION |
| FR_CLOCK | Keep track of game time, making sure each day isn't longer than 2-2.5 minutes. Display the current time for the player to see. | UR_RESOURCES |
| FR_ENERGY_BAR | Display current energy levels | UR_RESOURCES |
| FR_TIME | Assign time and energy costs to activities such that game duration is appropriate. | UR_RESOURCES + UR_GAME_DURATION |
| FR_GRADE_TRACKER | Track studying and lifestyle performance and increase score appropriately | UR_OBJECTIVES |
| FR_PASSING_GRADE | Assign minimum score as a 'passing grade' for the game | UR_OBJECTIVES |
| FR_PAUSE | Game pause feature | UR_GAME_OPTIONS |
| FR_DAY_NUMBER | Display current in-game day | UR_DAY_COUNT |
| FR_RESTART | Option to restart game | UR_GAME_OPTIONS |
| FR_DAYLIGHT | Simulate realistic time changes | UR_REALISTIC_EXCITING_EXPERIENCE |
| FR_OBJECTIVES_SHOWCASING | Display + track objectives, ensure its made clear studying is compulsory | UR_OBJECTIVES |

| | | |
|---|---|---|
| FR_SKIP_A_DAY | Option to skip studying for a day | UR_REALISTIC_EXCITING_EXPERIENCE |
| FR_LOADING_PAGE | Loading screens between stages | UR_SEAMLESS_START |
| FR_STARTING_PAGE | Eye catching start page with clear options | UR_SEAMLESS_START + UR_REALISTIC_EXCITING EXPERIENCE + UR_GUIDANCE |
| FR_END_PAGE | Display end game info | UR_REALISTIC_EXCITING_EXPERIENCE + UR_GUIDANCE |
| FR_POP_UPS | In-game instructional pop ups | UR_GUIDANCE |
| FR_LEADERBOARD | The game locally stores the names of players and their scores to form a top-10 on-device leaderboard | UR_VIEW_LEADERBOARD |
| FR_ACHIEVEMENTS | Activities each day are tracked to establish streaks, that score extra points and pop up at the end game screen as achievements | UR_HIDDEN_ACHIEVEMENTS |
| **Transformational** | | |
| FR_NEW_GAME | Start new game from day 1 with 0 score | UR_SEAMLESS_START |
| FR_SLEEP | Interaction with accommodation starts new day at 7 am | UR_DAY_COUNT + UR_WINNING CRITERIA + UR_REALISTIC_EXCITING_EXPERIENCE |
| FR_STUDY | Interaction with CS and piazza prompts choices for study hours. | UR_WINNING_CRITERIA |

| | | |
|---|---|---|
| FR_RECREATIONAL_ACCTIVITY_ | 1 Interaction w/ lake feeds ducks | UR_REALISTIC_EXCITING_EXPERIENCE + UR_WINNING_CRITERIA |
| FR_EAT | Interaction w/ piazza prompts eat/study | UR_REALISTIC_EXCITING_EXPERIENCE + UR_WINNING_CRITERIA |
| FR_STUDY_TIME | Study hours pass based on user input | UR_RESOURCES + UR_GAME_DURATION |
| FR_RECR_ACTIVITY_1_TIME | Feeding duck = 1 hour | UR_RESOURCES + UR_GAME_DURATION |
| FR_EATING_TIME | Eating = 30 mins | UR_RESOURCES + UR_GAME_DURATION |
| FR_ACTIVITY_1_ENERGY | Feeding duck = -1 energy | UR_RESOURCES |
| FR_SLEEP_ENERGY | Sleeping refills energy, late sleep reduces next day energy | UR_RESOURCES |
| FR_STUDY_POINTS | 1 hour study = 5 points | UR_WINNING_CRITERIA |
| FR_EATING_BONUSES | Eat 3x = 1.5x points for day | UR_WINNING_CRITERIA |
| FR_STUDY_BONUSES | Study >3 hrs = 2x points | UR_WINNING_CRITERIA |
| FR_OVERSTUDYING | Lose 10 pts/hr after 5 hours study | UR_WINNING_CRITERIA |
| FR_RECREATIONAL_ACTIVITY_BONUS | 2 activities/day = 1.5x points | UR_WINNING_CRITERIA |
| FR_STREAK_BONUS | Appropriately scale bonus points with achievements | UR_HIDDEN_ACHIEVEMENTS |

| Permissible Transformations | | |
| --- | --- | --- |
| FR_DEPLETED_ENERGY | Prompt error when interacting with no energy, except eat+sleep | UR_RESOURCES |
| FR_DOUBLE_STUDY | Study twice only if skip day option used prior | UR_RESOURCES |
| FR_EARLY_SLEEP | No sleep before 11 pm | UR_RESOURCES |
| FR_MOVEMENT_RESTRICTIONS | No movement through obstacles | UR_MOVEMENT |
| FR_MAP_BOUNDARY | Cannot cross map boundary | UR_MOVEMENT |
| FR_COMPULSORY_STUDYING | Must study daily to sleep, 1 day exception | UR_OBJECTIVES |

**Table 3. NON-FUNCTIONAL REQUIREMENTS TABLE**

| ID | DESCRIPTION | USER REQUIREMENTS | FIT CRITERIA |
|---|---|---|---|
| NFR_SECURITY | Ensure user data and progress security | UR_SATISFACTION | Users should not face any data leaks |
| NFR_QUICK_START | Fast game launch | UR_SEAMLESS_START | <5 sec |
| NFR_PRECISE_SCORE_COUNT | Accurate score calculation | UR_OBJECTIVES | No error |
| NFR_CLEAR_INSTRUCTIONS | Clear game instructions, playable without training | UR_GUIDANCE +UR_COMPATIBLE_W_EVERYONE | All users can learn game mechanics very quickly |
| NFR_DISABILITY_FRIENDLY | The game shall be accessible to players with disabilities. | COMPATIBLE_W_EVERYONE | Accessible for people with various disabilities |
| NFR_COMPATIBLE_DEVICES | The ame shall be accessible through desktop computers. | COMPATIBLE_W_EVERYONE | Any desktop (running Linux, Windows, or MacOS) should be able to run the game |
| NFR_AGE_COMPATIBILITY | The game shall be playable by anyone over the age of 12. | COMPATIBLE_W_EVERYONE | Game should be intuitive to play |
| NFR_AVAILABILITY | Game shall be accessible most of the time | UR_SATISFACTION | Game should be run locally, accessible all the time |
| NFR_PRECISE_TIME | Clock and time passing shall be highly accurate to ensure fairness and consistency | UR_RESOURCES | In-game time shall be tracked accurately using in-built functions |
| NFR_RESPONSE_TIME | System shall ensure fast responses to user input | UR_SATISFACTION | Game shall respond to user input with minimal delay to ensure a smooth user experience |

| | | | |
|---|---|---|---|
| NFR_ANIMATIONS | System shall ensure visual continuity for users | UR_SATISFACTION + UR_REALISTIC_EXCITING_EXPERIENCE | Animations shall transition smoothly between states |
| NFR_NPC_REGULARITY | System shall ensure statistically uniform distribution of NPC's. | UR_REALISTIC_EXCITING_EXPERIENCE | NPC's shall be generated with precision such that no more than 3 appear at the same time |
| NFR_GRAPHICS | Game shall ensure visually appealing graphics. | UR_REALISTIC_EXCITING_EXPERIENCE | Game shall render graphics with at least 40 FPS on average hardware (i.e a slim laptop that most students have) |