Requirements

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Requirements

Single statement of need: Build a single-player game suitable for prospective students and their guardians to play on open days, that involves moving fire engines between a Fire Station and alien fortresses, avoiding alien patrols on the way, and attacking alien fortresses when the fire engines' water cannons are within shooting range.

The description of the requirements engineering process, elicitation of requirements, requirements change management, validation of requirements, requirement presentation and our use case can be found at:
https://emhodges.github.io/SEPR-game/assessment1/Req1.pdf

Colour Coding Key

	Shall
	Should
	May

User requirements

User ID	Description	Source	Priority	
UR_WIN	The player wins if they flood the ET fortresses before the ET fortresses and ET patrols destroy all of the player's fire trucks	Product brief	Shall	
UR_LOSE	The game is lost if all the player's fire trucks have been destroyed before the player has flooded all of the ET fortresses	Product brief	Shall	
UR_MINI_GAME	The game should include a minigame	Product brief	Should	
UR_MINI_GAME_THEME	The minigame should be different in style, but aligned to the theme of the main game	Product brief	Should	
UR_REPAIR	Fire trucks can be repaired and refilled at the fire station	Product brief	Should	
UR_FIRE_TRUCKS	There must be at least four fire trucks	Product brief	Shall	
UR_FORTRESS	There must be at least six fortresses	Product brief	Should	

UR_ SCALABILITY	The game should be able to be played on other platforms	Product brief	May	
UR_PATROLS	There should be at least 2 ET patrols that the user aims to avoid	Product brief	Should	
UR_DESTROY _STATION	At a point in the game the fire station should be destroyed	Product brief	Should	
UR_ENJOYABI LITY	The game should be enjoyable to play	Product brief	May	
UR_PLAYABLE	The game must be playable Dependent on environmental assumptions (see bottom of document)	Product brief	Shall	
UR_PLAYER	The game must be a single-player game	Product brief	Shall	
UR_CODE	The game must be coded in Java	Interview	Shall	
UR_PC	It must be a PC game	Interview	Shall	
UR_TRUCK_ SPACE	Fire trucks should not drive over each other or be able to occupy the same space.	Email Communic ation with Customer	Shall	

Functional requirements

ID	Description	Source	Priority	User ID
FR_FIRE_ TRUCKS	Each fire truck must have a unique spec in terms of its speed, amount of damage it can take before being destroyed, the volume of water it can carry, the range and delivery rate of its water cannon	Product brief	Shall	UR_FIRE_ TRUCKS
FR_ FORTRESS	Each ET fortress must have a unique spec in terms of the range of its defensive weapons, the amount of damage these weapons can deal to Fire trucks over a period of time, and the volume of water it takes to flood	Product brief	Should	UR_ FORTRESS
FR_WATER	Over time the amount of water needed to flood a fortress should increase	Interview	Should	UR_WIN
FR_ MOBILITY	The user can move the fire trucks. Patrols and fire engines should be	Product brief	Shall	UR_ PLAYABLE

	mobile; fortresses should be immobile			
FR_AI	The ET patrols and ET fortresses are controlled by the computer AI	Product brief	Shall	UR_ PLAYER
FR_TRUCK_ ATTACK	Fire trucks can flood ET fortresses	Product brief	Shall	UR_FIRE_ TRUCKS
~~FR_PATROL_ ATTACK~~	~~ET patrols can attack trucks~~	~~Product brief~~	~~Shall~~	~~UR_ PATROLS~~
FR_FORTRES S_ATTACK	ET fortresses attack trucks	Product brief	Shall	UR_ FORTRESS
~~FR_VIEW _TIMER~~	~~The player must see the amount of time until the fire station is destroyed~~	~~Interview~~	~~Should~~	~~UR_ DESTROY _STATION~~
~~FR_PATROL _INCREASE~~	~~The number of patrols should increase throughout the game~~	~~Interview~~	~~Should~~	~~UR_ PATROLS~~
~~FR_PATROL _DAMAGE~~	~~Patrols should damage fire trucks that enter a predefined circumference around them, however the damage should be to a lesser extent than the fortresses~~	~~Interview~~	~~Should~~	~~UR_ PATROLS~~
~~FR_PATROL _SIGHT~~	~~Patrols should chase fire trucks that are within their range of sight~~	~~Interview~~	~~May~~	~~UR_ PATROLS~~
FR_ACCESS _MINIGAME	The mini game should be accessed from within the main game	Interview	Should	UR_MINI _GAME
FR_ CONTROLS	There should be a screen that explains the controls	Interview	May	UR_ PLAYABLE
FR_ STATION _DESTROY	Fire trucks cannot be repaired or refilled after the fire station has been destroyed	Product brief	Should	UR_ DESTROY _STATION
FR_MENU	There should be a menu screen from which the user has the option to start the game, see the controls or quit.	Email Communi cation with Customer	May	UR_PLAYAB LE
FR_GAME_ OVER	There should be a ‘game over’ screen once the game is ended telling the player if the game is won or lost.	Email Communi cation with Customer	May	UR_ENJOYA BILITY

FR_SOUND	There could be sound effects with the game	Email Communication with Customer	May	UR_ENJOYABILITY
FR_SOUND_OFF	If there are sound effects, it should be possible to turn these off	Email Communication with Customer	Shall	UR_ENJOYABILITY
FR_ ANIMATION	The fortresses and fire trucks should change appearance as they are destroyed	Email Communication with Customer	Should	UR_ENJOYABILITY
FR_REPAIR_REFILL	The fire trucks should repair and refill when at the fire station	Product Brief	Shall	UR_REPAIR

Non-functional requirements

ID	Description	Rational	Fit criteria	User ID
NF_PC	The game must be playable on engines/things that can be played on PC	Product brief	The game must use libraries /function that could be used on other platforms	UR_ PLAYABLE
NF_ RESPONSE	The game must respond quickly to user input	Improved user experience	Average response time >1 second, maximum response time >2 second	UR_ ENJOYABILITY
NF_ CONTROLS	The controls should be easy to learn	Prospective students should be able to play the game	The player should be able to grasp the controls in under 2 minutes	UR_ ENJOYABILITY

Environmental assumptions: 1) The player is assumed to be playing on a modern computer that is of reasonable specifications. 2) The user will have standard hardware such as a keyboard and mouse. 3) The user will have java installed to run the program.

Risks: The main risks relevant to the requirements are R4 & R7 (see risk assessment table in risk management section).

Use Cases:

Use case 1:

- Name: “FortressDestroy”
- Context: The user destroys a fortress
- Primary Actor: The user
- Stakeholders: Us - with our interests being the user enjoying the game
- Precondition: The system is working as intended
- Minimal Postcondition: The fortress disappears
- Trigger: The fortress health becomes 0
- Main Success Scenario: 1.The user attacks a fortress using a fire truck
    - 2.The fortress health depletes
    - 3.The fortress health becomes 0
    - 4.The fortress disappears
- Secondary scenarios:
    - The fortress’s health doesn’t deteriorate, leading to the user being unable to destroy it
    - The fire truck does not attack the fortress, leading to the game being unplayable
- Success Postcondition: The user enjoyed attacking the fortress (UR_ENJOYABILITY) and the fortress was successfully destroyed by the user flooding it with a fire truck (FR_TRUCK_ATTACK).

Use case 2:

- Name: “Win”
- Context: The user destroys all fortresses (see Use Case 1) before all of their fire trucks have been destroyed
- Primary Actor: The user
- Stakeholders: Us - with our interests being the user enjoying the game
- Precondition: The system is working as intended
- Minimal Postcondition: The user destroys all the fortresses
- Trigger: The user destroys the last fortress
- Main Success Scenario: 1.The user destroys the last fortress
    - 2.The win state is displayed
    - 3.The game ends
    - 4.Goes back to the game menu
- Secondary scenarios:
    - 2.1 The game continues to run as if the end isn’t reached, e.g the
    - fire station timer continues to run so the fire station is destroyed
    - 4.1 The game starts again
- Success Postcondition: The user enjoyed the game (UR_ENJOYABILITY) and did not find it too easy