

Requirements and Analysis Document for Illegal Aliens

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1 Introduction

A Tower Defence game highly focused on the current political climate in the USA with satirical tendencies. The player's goal is to defend the White House from attacking Aliens by placing out and upgrading towers, as well as by calling in Superpowers from both previous and current American presidents. The player can also issue Executive Orders, a power that has both negative and positive effects. The Towers, Superpowers and Executive Orders are all divided into two political camps; Republicans and Democrats, and give different bonuses and benefits related to the real world ideologies.

1.1 Definitions

Map A map consisting of different roads in a grid layout.

Tower A tower that automatically attacks enemies within its radius.

Alien An enemy that wants to destroy the base (White House).

Superpower A special attack that's based on American historic events

Wall A placeable wall blocks the path to the White House

Nuke A nuke that kills all enemies on Map

Minutemen Four minutemen are called in to assist the Player in a time of need

Tower Booster Temporarily boosts the stats of all the owned towers

Executive Order A passive ability that affects the game in different ways based on Republican or Democrat

ObamaCare Towers get more expensive during a limited time, but stronger

Tax Cut Towers become cheaper, but weaker

Civil War Kills all towers of the opposite political party. Gives the player money and a lot of political points for the party it was used for

Declare War More money is gained, but the towers more expensive (limited time).

Open Borders More Aliens are spawned in a round.

White House A base that needs to be defended. If the base is lost, the game is over.

Political meter Meter that represents the Player's political position. Default value is 50% Republican and 50% Democrat. The sum is always 100%. Political position is affected by different executive orders and towers.

Money Money is acquired through killing enemies and is used to purchase Towers and upgrades for Towers.

Points Total amount of money accumulated.

Path Shortest way to White House.

Road Where the Aliens move toward the White House

Wave Each wave consists of a different amount of different Aliens.

2 Requirements

2.1 User interface sketch

Skiss på GUI



2.2 Functional requirements

- Select map
- Place tower
- Activate Superpower
 - Wall (Donald Trump)
 - Nuke (Harry S Truman)
 - Minute Men (George Washington)
 - Tower Booster (Theodore Roosevelt)
- Issue executive order
 - ObamaCare (Democrat)
 - Tax Cut (Republican)
 - Civil War (Democrat or Republican)
 - Declare War (Republican)
 - Open Borders (Democrat)
- Upgrade tower
- Sell tower
- Send next wave
- Lose game

2.3 Non-functional requirements

2.3.1 Game

The game should be user friendly, meaning it should be "plug and play". No unnecessary set-ups should be forced to the user.

2.3.2 Technical

The application must be built in a way to make it easily ported to other devices, such as android. It must also be implemented using object oriented programming and using the MVC design pattern. The application should be easily extended with more features and it should be easy to modify one thing, without affecting other things.

JUnit tests should be implemented to test and verify certain classes that are completely based on logic, such as help-/utility classes. UI tests are manually made without JUnit, and simpler use cases are verified using test driven design.

Performance is also an important aspect. The game must be developed with performance in mind, since many objects are created which could cause stuttering and lag. This is also connected to usability, the user must have a good experience when playing.

Some technical requirements that doesn't depend on user functionality:

- Find the shortest road for Aliens
- Time calculations (such as cooldowns) calculated with framerate instead of regular time.
- Algorithm to make sure the game never runs out of waves (instead of hardcoding an excessive amount).
- Texture handlers to prevent a new texture (object) is created every time it has to be used (reference all textures to one).

2.3.3 Legal

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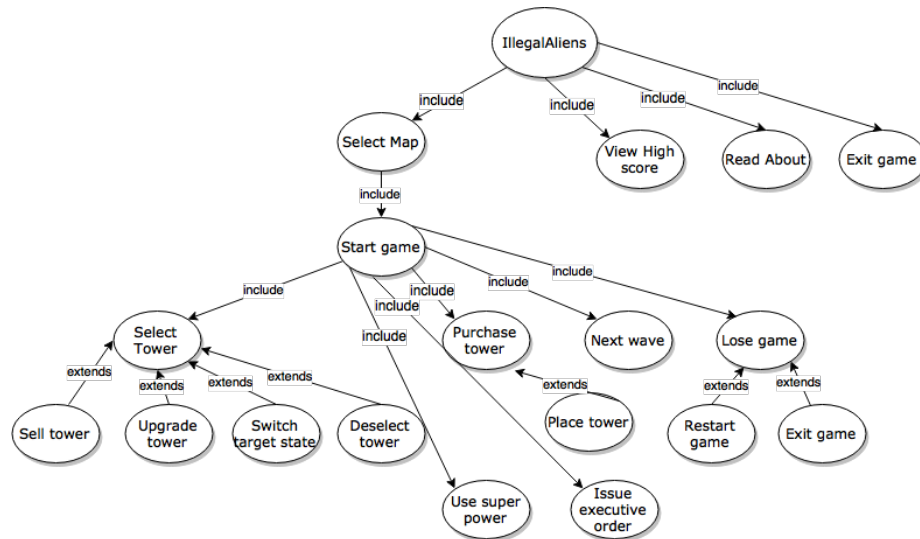
Harry Truman Public domain using Creative Commons CC0.

Theodore Roosevelt Public domain using Creative Commons CC0.

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3 Use cases

3.1 UML use case diagram



3.2 Use case listing

Menu related: <ul style="list-style-type: none"> • Lose Game(high) • Select Map(medium) • View Hiscore(medium) 	Game related: <ul style="list-style-type: none"> • Place Tower(high) • Next Wave(high) • Select Tower(medium) • Deselect Tower(medium) • Activate Superpower(low) • Issue Executive Order(low)
Tower related: <ul style="list-style-type: none"> • Sell Tower(medium) • Upgrade Tower(low) • Select Target State(low) 	

3.3 Use case: Select Map

Summary:	Player can choose between different default Maps
Priority:	Medium
Extends:	IllegalAliens
Includes:	Start Game
Participators:	Player

3.3.1 Normal flow of events

	Actor	System
1	Player launches the game	Presents a Main Menu
2	Player presses Start game	Presents a Stage for selecting Maps
3	Player selects Map	Map is marked as selected
4	Player presses Start game	Game is started

3.4 Use case: Lose Game

Summary:	Player has to lose because there is no wincondition
Priority:	High
Extends:	Start Game
Includes:	Restart Game , Exit Game
Participators:	Player

3.4.1 Normal flow of events

	Actor	System
1	Player loses game	Presents the gameover popup window
2	Player presses "Go to main-menu" button	Switches to mainmenu screen

3.5 Use case: View Hiscore

Summary:	View Hiscore
Priority:	Medium
Extends:	IllegalAliens
Includes:	
Participators:	Player

3.5.1 Normal flow of events

	Actor	System
1	Player launches game	Main Menu is presented
2	Player selects Hiscore	Hiscore is shown

3.5.2 Alternate flow of events

	Actor	System
1	Player loses game	
2	Player selects "return to Main Menu"	Main Menu is shown
3	Player selects Hiscore	Hiscore is shown

3.6 Use case: Activate Superpower

Summary:	Player can choose to activate for different super powers
Priority:	Medium
Extends:	Start Game
Includes:	
Participators:	Player

3.6.1 Normal flow of events

	Actor	System
1	Player clicks on a Superpower	Game checks if Superpower is affordable
2		Game uses the Superpower and corresponding effect is used.

3.6.2 Alternate flow of events

Event flow for "Wall" Superpower which is the only power that the user has to do any logic for.

	Actor	System
1	Player clicks on the wall Superpower	Game checks if Superpower is affordable
2		A transparent version of the wall graphics is stuck beneath the mouse pointer.
3	Player decides where to put the wall	Transparent wall is rendered while moving the mouse
4	Player places wall on road	Places wall on road

3.7 Use case: Place Tower

Summary:	Player places a tower on the map
Priority:	High
Extends:	Purchase tower
Includes:	
Participators:	Player

3.7.1 Normal flow of events

	Actor	System
1	Player selects Tower from available Towers	Tower is marked as selected beneath mouse pointer
2	Player hovers Tower on Map	Transparent Tower is rendered while moving
3	Player clicks on Map	Tower is added to the map

3.7.2 Alternate flow of events

	Actor	System
1	Player selects Tower from available Towers	Tower is marked as selected beneath mouse pointer
2	Player hovers Tower over a road	Transparent Tower is rendered while moving
3	Player clicks on road	Tower is not added to the map

3.7.3 Alternate flow of events

	Actor	System
1	Player selects Tower from available Towers	Tower is marked as selected beneath mouse pointer
2	Player hovers Tower over a road or another tower	Transparent Tower is rendered while moving
3	Player clicks another tower	Tower is not added to the map

3.8 Use case: Issue Executive Order

Summary:	Special attack
Priority:	Medium
Extends:	Start game
Includes:	
Participators:	Player

3.8.1 Normal flow of events

	Actor	System
1	Player clicks on Executive Order from available Executive Orders	Executive Order is activated
2		Cooldown timer for Executive Order is started

3.9 Use case: Next Wave

Summary:	Proceed to the next wave
Priority:	High
Extends:	Start game
Includes:	
Participators:	Player

3.9.1 Normal flow of events

	Actor	System
1	Player clicks on "next wave" button	
2		The next wave of Aliens are spawned and appears

3.10 Use case: Select Tower

Summary:	Player wants to select a specific Tower
Priority:	Medium
Extends:	Start game
Includes:	
Participators:	Player

3.10.1 Normal flow of events

	Actor	System
1	Player clicks on a Tower	Tower shows up as clicked and highlighted in the UI

3.11 Use case: Deselect Tower

Summary:	Player wants to deselect/unhighlight a selected Tower
Priority:	Medium
Extends:	Select Tower
Includes:	
Participators:	Player

3.11.1 Normal flow of events

	Actor	System
1	Player clicks (highlights) a tower	Tower shows up as clicked and highlighted in the UI
2	Player clicks on somewhere else on the map	Tower is no longer highlighted and the UI is updated

3.12 Use case: Upgrade Tower

Summary:	Upgrade a Tower stat
Priority:	Medium
Extends:	Select tower
Includes:	
Participators:	Player

3.12.1 Normal flow of events

	Actor	System
1	Player selects one of the placed Towers on the map	Information as well as Upgrade and Sell buttons appear on the panel to the right
2	Player clicks the upgrade button	The Tower is upgraded

3.12.2 Alternate flow of events

Event flow if the upgrade is not affordable.

	Actor	System
1	Player selects one of the placed towers on the map	Information as well as Upgrade and Sell buttons appear on the panel to the right
2		The upgrade is not affordable, button is disabled
3	Player clicks the upgrade button	Nothing happens

3.13 Use case: Sell Tower

Summary:	Sell a tower to get money
Priority:	Medium
Extends:	Select tower
Includes:	
Participators:	Player

3.13.1 Normal flow of events

	Actor	System
1	Player selects one of the placed towers on the map	The right UI-panel is updated with information about the current selected Tower, as well as Upgrade, Target and Remove-buttons.
2	Player clicks Sell button	The Tower is removed from the Map and the player gets money

3.14 Use case: Select Target

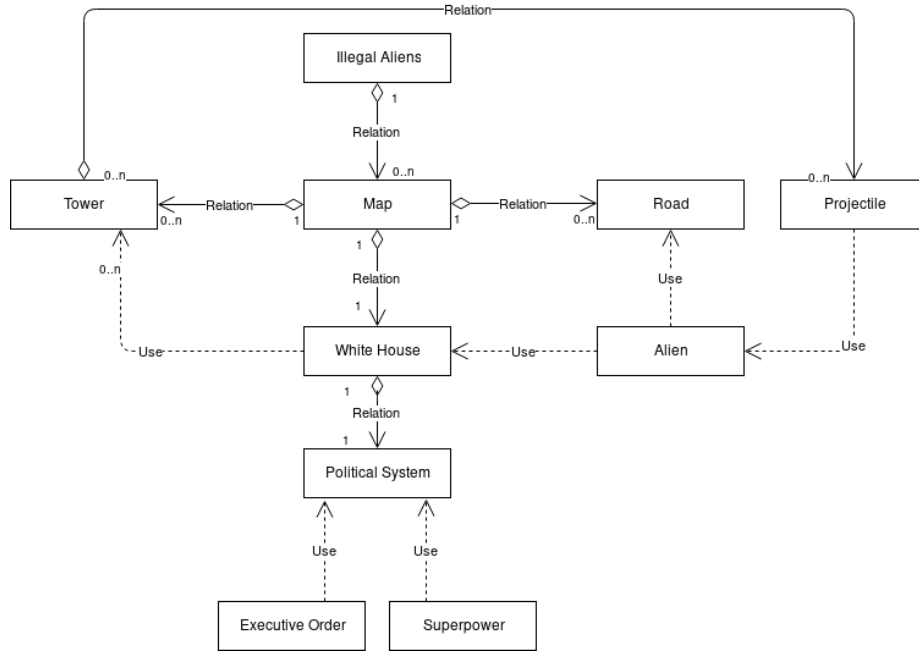
Summary:	Notify a tower to select a certain enemy
Priority:	Low
Extends:	Select tower
Includes:	
Participators:	Player

3.14.1 Normal flow of events

	Actor	System
1	Player selects one of the placed towers on the map	The right UI-panel is updated with information about the current selected Tower, as well as Upgrade, Target and Remove-buttons.
2	Player clicks one of the targeting buttons	Tower updates it targeting state to target the new type of enemy

4 Domain model

4.1 Domain Model



Illegal Aliens The overall representation of the game

Map The representation of where you play the game, holds White House, Road, Tower and Alien

Alien Alien represents the enemies that try to attack White House

Road A road is placed on a map. The road is used by Alien to walk towards White House.

Tower Tower creates Projectile.

Projectile Projectiles kill Alien.

White House Only one and exists in Map. White House places Tower.

Political System Choices made by the Player affects the Political System.

Executive Orders Represents the executive orders that take use of the political system.

Superpower Represent Superpowers that take use of the political system.

5 References

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