



System requirement document

Revision 0

Team Roshambo

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Professor: Dr. Jacques Carette

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1. The Purpose of the project

a. Background

Keep Warm is a game capstone project for Software Engineering (Game Design) final year undergraduate students. In order to design this project successfully, the creativity and professional technical skills of students are needed. The great capstone project is a graduation requirement.

b. Goals of the Project

The professional technical skills and creativity of students determines how well the demonstration of the game is going to be. The final demonstration should have great player experience and interesting gameplay for people who play this game, and the introduction of the game should impress audience, let them want to play the game.

2. The Stakeholders

a. Clients

- i. Dr. Jacques Carette, McMaster University

Software Engineering (Game Design) professor for capstone course (SE4GP6). Dr. Jacques Carette examines and approves of the final grades of the project. Any requirements that he provide must be considered.

- ii. Dan Szymczak, McMaster University

Software Engineering (Game Design) teaching assistant for capstone course (SE4GP6). Mr. Szymczak grades the project

content and provides feedback for improvement. he reports directly to Dr. Jacques Carette.

b. Customers

The basic game set is for any players (the age recommended 10 years or older). And this game targets at players who enjoy playing PC games and enjoy playing the games that often autonomous decision-making skills have a high significance in determining the outcome. The game is also target at friends or couples to enjoy the game together or competitively.

c. Other Stakeholders

- i. Academic Integrity Officer, McMaster University

The future game development will be stopped, if Academic Integrity officer finds the the project is academically dishonest, they ensure that the project is original work.

d. Play Tester

People who have great video game experience and game skill will be selected to be a play tester. they are not only to get a better idea of how people will play the game and also testing the bugs of the game and enjoyment of itself. And team roshambo will get feedback from these people before it released.

3. Constraints

a. Solution Constraints

Any requirements that given by Dr. Carette must be met. Currently, he has announced the game engine must be Unity and any game genres are going to be acceptable.

b. Implementation Environment of the System

The Unity environment is available for both Windows and Mac operating system, Students develop PC game must have these two operating system installed.

c. Partner or Collaborative Applications

i. Unity

Any constraints specified by the Unity Engine used for the game must be met. A computer or a laptop with technical specifications that meet the minimum system requirements for the Unity must be used to run this game.

ii. Microsoft Windows

Any constraints specified by the Windows operating system used to run the game must be met. A computer or a laptop with technical specifications that is able to run Windows must be used to run this game.

d. Off-the-Shelf Software

i. Unity

The personal free version is Usable for individual and educational work. if your company currently makes more than \$100k in annual gross revenues or has raised funds in excess of \$100k, you are not permitted to use Unity Personal.

e. Anticipated Workplace Environment

The game is going to be played on a personal computer or a laptop with Windows operating system. The player will be sit at their room in front of their monitor and holds the input devices (keyboard/Mouse or Controller).

f. Schedule Constraints

There are approximately six months to develop the capstone project. It must be finished by late April 2018, This mandatory to pass the course as stated by Dr. Carette and Mr. Szymczak.

g. Budget Constraints

N/A

h. Enterprise Constraints

N/A

4. Naming Conventions and Terminology

a. Unity

Unity is a cross-platform game engine developed by Unity Technologies, it is primarily used to develop games, and it available for both Windows and Mac operating system.

b. Microsoft Windows

Micorsoft Windows is a metafamily of graphical operating systems, and it supports game runs on it.

c. Product Use Case (PUC)

A product use case elaborates on a scenario, showing event name, trigger, preconditions, system requirements and outcome.

d. Input (IN)

e. Output (OUT)

f. Resources

Foods, water etc. things are randomly placed in the game, the player can collect them and use them to keep them alive. As well as supplies (woods, rocks, ropes, poisonous weeds) things that the player can use them to make traps, to help them win the game.

g. 2D (Two-dimensional)

Two-dimensional is a geometric model of the planar projection of the physical universe. The two-dimensions are commonly called length and width, both directions lie in the same plane.

5. Relevant Facts and Assumptions

a. Relevant Facts

- i. A typical 2D game, the Player is able to see all the important objects and the enemies at beginning. However, how the player plan to do is the reason the game becomes fun.
- ii. There are several online sources for texture, objects, assets etc. that are free to use in the Unity online asset shop.
- iii. Almost all types of strategy games require internal decision tree style thinking and typically very high situational awareness. and the time that the player spend on the game will also determine how well they will do in the game.

b. Business Rules

- i. All requirements described by Dr. Carette must be met.
- ii. A demonstraion of the game must be present on April 2017

c. Assumptions

- i. *Keep worm* will not commercially released.
- ii. The game must be original, it can not be added from the other exist games.
- iii. The game will be demonstrated on a computer or a laptop.
- iv. Some of the assets can be borrowed from Unity asset shop.

6. Scope of Work

a. The Current Situation

- i. Similar games to the product already exist.
 - 1. *Keep worm* is an individual game, it is not intended to replace these games nor add to them.

b. The Context of the Work

- i. This game is final year capstone project for the professor and the teaching assistant.
- ii. The gameplay and player experience of the game will be demonstrated and graded.
- iii. The targets for the game are people who loves to play games of all skill levels.

c. Work Partitioning

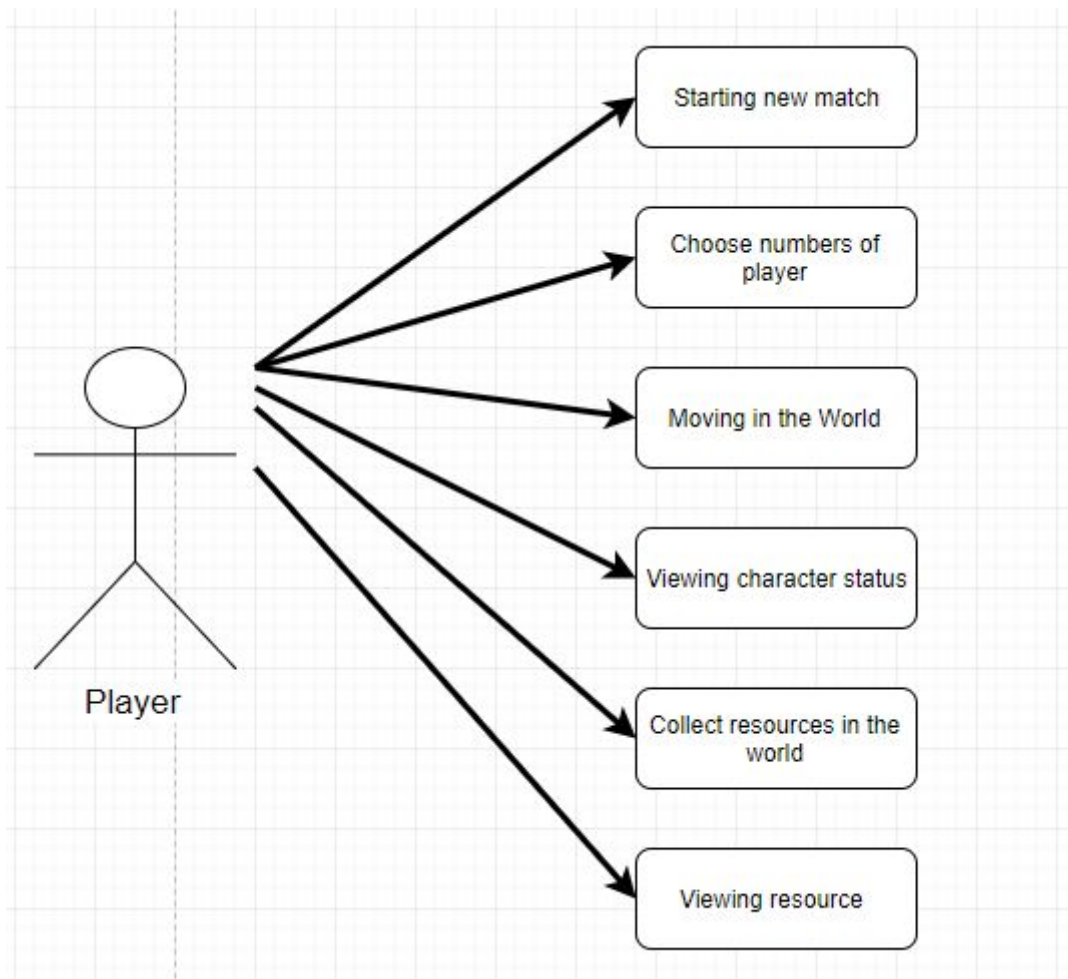
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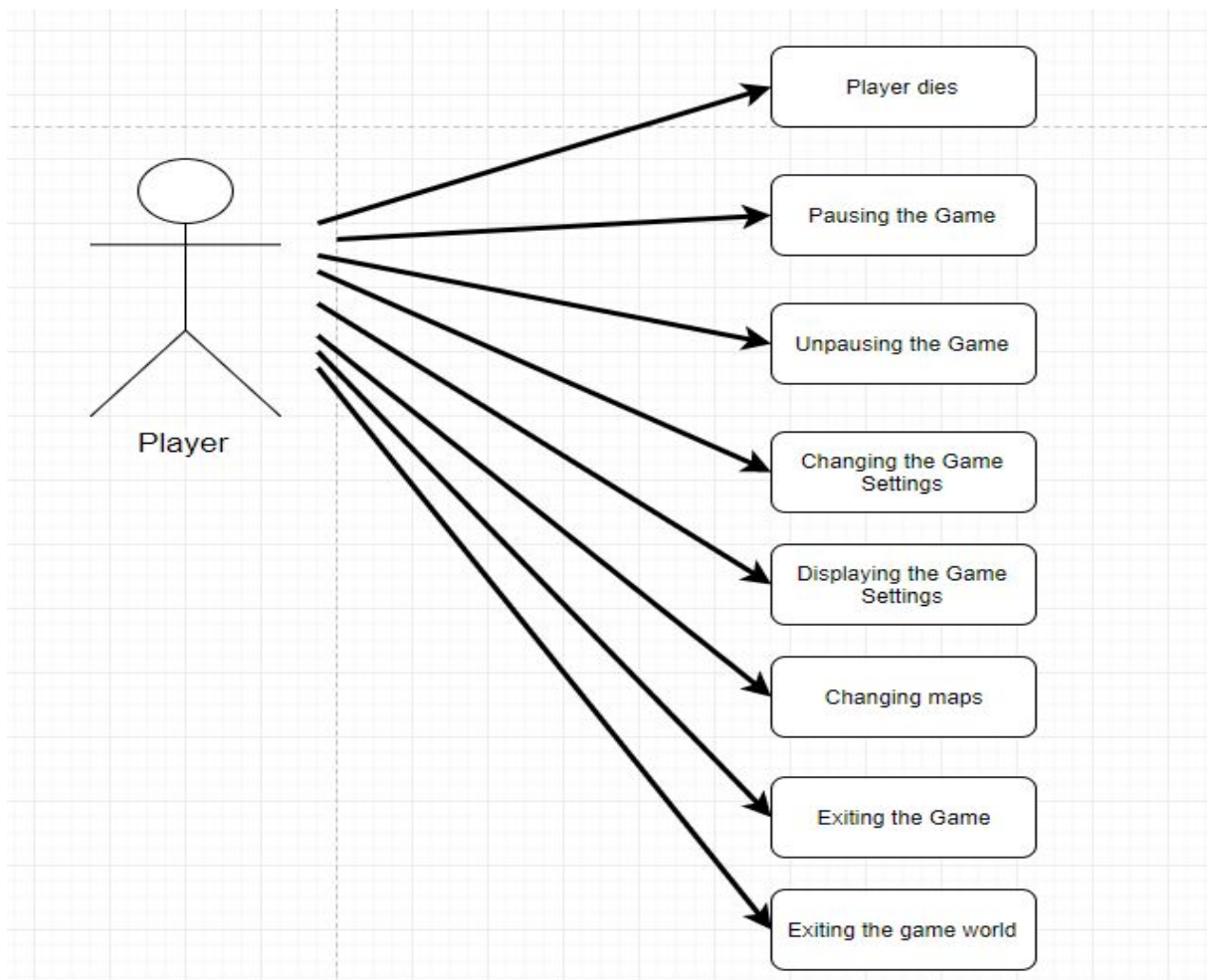
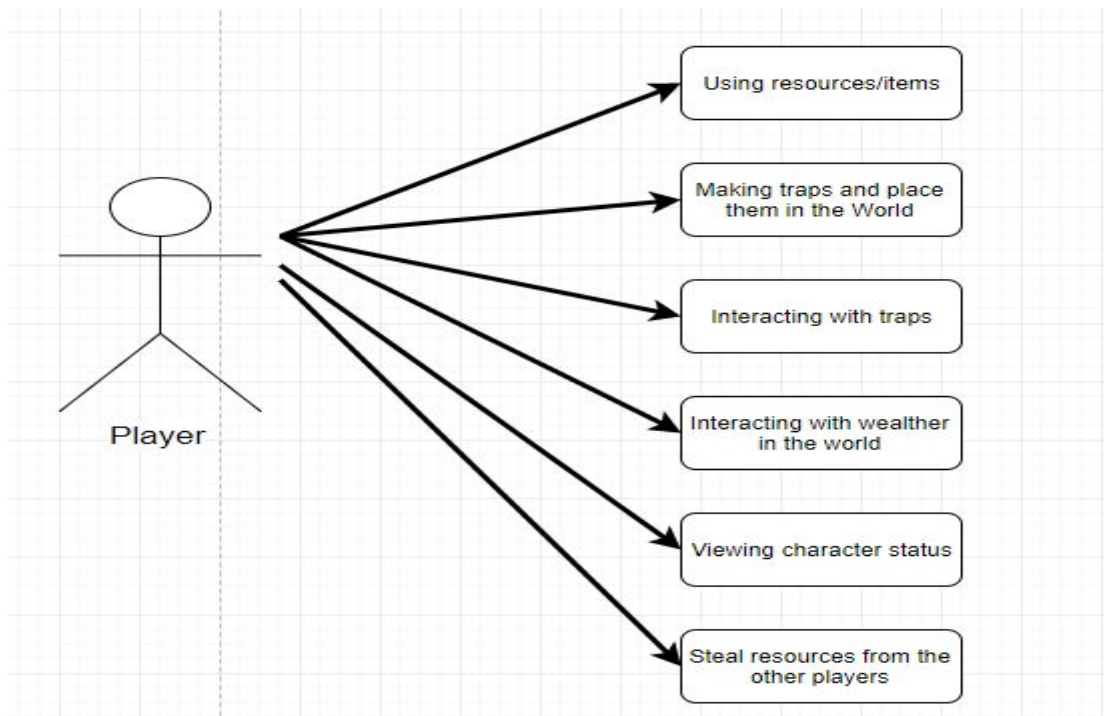
d. Specifying a Business Use Case

N/A

7. Scope of the Product

a. Use Case Table





PUC. No.	PUC Name	Actors	Input/Output
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1	Starting the new game	Player	Key input(IN), initial game condition(OUT)
2	Choosing the number of players	Player	Key input(IN), Different type of players(OUT)
3	Moving in the world	Player	Key input (IN), Character action(OUT)
4	Viewing character status	Player	Key input(IN), Player information(OUT)
5	Collecting resources	Player	Key input(IN), Resources action(OUT)
6	Viewing resources	Player	Key input(IN), Resources information
7	Using resources	Player	Key input(IN), Success boolean(OUT)
8	Making/placing traps	Player	Key input(IN), choose resources command(IN),success boolean(OUT), traps action(OUT)
9	Interacting with traps	Player	Player status(OUT)
10	Interacting with weather	Player	Player status(OUT)
11	Stealing from the other player	Player	Key input(IN), Success boolean(OUT)

12	Player dies	Player	death message(OUT)
13	Defeating an enemy with traps	Player	Success message(OUT)
14	Pausing the game	Player	Key input(IN), pause message(OUT)
15	Unpausing the game	Player	Key input(IN)
16	Changing the game settings	Player	Key input(IN), success boolean(OUT), game settings (OUT)
17	Displaying the game settings	Player	Key input(IN), Game settings(OUT)
18	Changing game world	Player	Key input(IN), game world conditions(OUT)
19	Exiting the game	Player	Key input(IN)
20	Exiting the in-game world	Player	Key input (IN)
21	Winning the game	Player	Winning message(OUT)

b. Individual Product Use Cases

PUC No.1	Starting the new game
Trigger	The player chooses the “new game” option from main menu.
Preconditions	The Player is not currently in an active game session.
Procedure	Loading the game.
Outcome	The player has control of the character in a new game.

PUC No.2	Choosing the number of players
Trigger	The main player selects how many player in pop-up menu.
Preconditions	The main Player has started a new game.
Procedure	Menu pops. choose the number.
Outcome	The numbers of player have control of their character in a new game.

PUC No.3	Moving the character
Trigger	The player clicks/presses the moving buttons.
Preconditions	The player is in control of the character. The player is in their turn.
Procedure	Get the direction and moving the character.
Outcome	The character moves from the original point at the direction given by player.

PUC No.4	Viewing character status
Trigger	The game displays the character's healthy/energy bar.
Preconditions	The game is started, The player is in control of their character.
Procedure	Display health and energy of player.
Outcome	The status of the player is displayed.

PUC No.5	Collecting resources
Trigger	The player collects resources in the game world.
Preconditions	The player is in control of their character, The player is in their turn.
Procedure	Close to the resources. Collect the resources. Update the resources to characters' bag.
Outcome	The resources disappear from the game world.

PUC No.6	Viewing inventory
Trigger	The player opens their bag.
Preconditions	The player is in control of their character.
Procedure	Determine what item the player wants to look at Display the information of that item when game pointer is on that item.
Outcome	The player can see the information of items in their bag.

PUC No.7	Crafting items
Trigger	The player crafts items.
Preconditions	The player is in control of their character and the player has proper resources to craft particular item, The player is in their turn.
Procedure	The player determine what item they want to craft Craft that item by clicking craft button. The item will appear in the player's inventory.
Outcome	The player crafts the item.

PUC No.8	Placing traps
Trigger	The player places traps on the ground.
Preconditions	The player is in control of their character, The player is in their turn.
Procedure	Determine what resources the player wants to use to make traps. Update the traps to the player's bag. Place the traps in the game world. Determine if the traps placed successful.
Outcome	The traps are placed in the game world.

PUC No.9	Interacting with traps
Trigger	The player moves onto the traps.
Preconditions	The player is in control of their character. The player is in their turn.
Procedure	Determine if the player step on the traps. The traps damage to the player. Update the player status.
Outcome	The player's healthy/energy bar goes down, the player's status is changed because of the traps.

PUC No.10	Interacting with weather
Trigger	Time runs out.
Preconditions	The player is in control of their character, the player is still alive.
Procedure	As time runs down, weather condition will get worse and worse for the player to stay alive.
Outcome	The player's healthy/energy bar goes down as the weather condition getting worse, environment of the world will change.

PUC No.11	Stealing from the other player
Trigger	The player comes within range of an enemy.
Preconditions	The player is in control of their character, The player is in their turn.
Procedure	Determine what resources the player wants to steal Update the other player's bag's status who gets steal from.
Outcome	The resources in the player's bag who gets steal from disappear.

PUC No.12	Player dies
Trigger	The player's health/ energy bar goes to zero.
Preconditions	The player is in control of their character.
Procedure	Determine what the player loses.
Outcome	Display a message that says "you lose".

PUC No.13	Defeating an enemy with traps
Trigger	The enemy's health or energy goes to zero because the traps.
Preconditions	The player is in control of their character, the traps have to be made by the player not someone else.
Procedure	Determine if the enemy drop any resources. Determine if the game ends.
Outcome	Display a message that says "You has slain an enemy ".

PUC No.21	Winning the game
Trigger	There is only one player stay alive in the map.
Preconditions	The player is in control of their character.
Procedure	Calculate how long the player has been alived. Calculate how many enemies the player has been slained.
Outcome	Display a message that says "You are the king of survival".

PUC No.14	Pausing the game
Trigger	The player clicks the pause button.
Preconditions	The player is in control of their character, the player can not be in pause mode.
Procedure	Freeze real-time play. Enable the unpaue button.
Outcome	The game is paused.

PUC No.15	Unpausing the game
Trigger	The player clicks the unpause button.
Preconditions	The player is in control of their character, the player must be in pause mode.
Procedure	Resume real-time play. Disable the unpause button.
Outcome	The game resumes play.

PUC No.16	Displaying the game settings
Trigger	The player selects the menu to display the game setting.
Preconditions	Menu is available.
Procedure	Determine and display the current game setting.
Outcome	The game settings are display.

PUC No.17	Changing the game settings
Trigger	The player selects the menu to display the game setting and changes the setting.
Preconditions	The player is viewing the Game Setting menu.
Procedure	Determine the new settings. Change the settings. Display the new settings.
Outcome	The new game settings are display.

PUC No.18	Changing the game world
Trigger	The player selects the option menu and menu shows all the game world.
Preconditions	The player is not currently in the game and option menu is available.
Procedure	Determine what the game world the player is going to play. Display the new game world.
Outcome	The new game world is displayed.

PUC No.19	Exit to the desktop
Trigger	The player clicks the exit button from the title screen.
Preconditions	The player is in the title screen.
Procedure	The game process will end and the player will return to desktop screen.
Outcome	The player quited the game.

PUC No.20	Exititng the In-Game World
Trigger	The player selects the "quit game" option from the pause menu.
Preconditions	The player is in control of the character. The pause menu is open.
Procedure	Warn the player they are going to leave the game Return to the main screen.
Outcome	The player is returned to the main screen.

PUC No.21	Winning the game
Trigger	There is only one player stay alive in the map.
Preconditions	The player is in control of their character.
Procedure	Calculate how long the player has been alived. Calculate how many enemies the player has been slained.
Outcome	Display a message that says “You are the king of survival”

PUC No.22	Displaying the mini map
Trigger	The game is in progress.
Preconditions	Game world has been generated.
Procedure	Calculate player’s current location. Update their location onto the mini map.
Outcome	Display player’s location on mini map.

PUC No.23	Exiting menu
Trigger	The menu is open
Preconditions	The player is in the menu page.
Procedure	Provide a button for player to close the menu. Close the menu when player click that button..
Outcome	Menu is closed.

PUC No.24	Toggling the sound
Trigger	The game is in progress.
Preconditions	It is not in the loading page.
Procedure	Provide a button for player to toggle the sound. Player clicks the button.
Outcome	Sound is toggled.

8. Functional requirements

Requirement: 1	Requirement Type: Functional
Priority: Very High	PUC: 1
Description:	The player must be able to click the start button on the game title screen to start the game.
Rationale:	If the player cannot interact with the game menu, they will not be able to play the game.
Fit Criterion:	If the player selects the start button, the game will start.
Originator:	Jin Liu

Requirement: 2	Requirement Type: Functional
Priority: Very High	PUC: 20
Description:	The player must be able to click the quit button on the menu to return to the game title screen.
Rationale:	If the player cannot interact with the game menu, they will not be able to quit the game.
Fit Criterion:	If the player selects the quit button, the game will end and back to the start menu.
Originator:	Jin Liu

Requirement: 3	Requirement Type: Functional
Priority: Medium	PUC: 15
Description:	The player must be able to pause the game by clicking the pause button.
Rationale:	The player should be able to pause the game if they want to take a break.
Fit Criterion:	If the player selects the pause button, the game will be freezed.
Originator:	Jin Liu

Requirement: 4	Requirement Type: Functional
Priority: Medium	PUC: 16
Description:	The player must be able to unpause the game by clicking the unpause button.
Rationale:	The player should be able to continue the game if the game is paused.
Fit Criterion:	If the player selects the unpause button, the game will continue.
Originator:	Jin Liu

Requirement: 5	Requirement Type: Functional
Priority: Very High	PUC: 18
Description:	The player must be able to moving the character
Rationale:	The player should be able to move the character to explore the game world.
Fit Criterion:	The character will move in response to the player's control input.
Originator:	Jin Liu

Requirement: 6	Requirement Type: Functional
Priority: Very High	PUC: 4
Description:	The player must be able to view their own character's current status(hunger, temperature, etc.)
Rationale:	The player need to check their current status to plan what they need to do later.
Fit Criterion:	The player will be able to see their current status by numbers(example: hunger(50/100), temperature(30°)) directly on the UI system.
Originator:	Jin Liu

Requirement: 7	Requirement Type: Functional
Priority: Very High	PUC: 5
Description:	The player must be able to collect resources.
Rationale:	The player need to collect resources such as logs and foods to survive.
Fit Criterion:	The player will be able to collect the resource when the character is closed to the resource.
Originator:	Jin Liu

Requirement: 8	Requirement Type: Functional
Priority: High	PUC: 6
Description:	The player must be able to view the introduction of items in their inventory.
Rationale:	The player need to know the usage of items in their inventory.
Fit Criterion:	The player will be able to view the introduction of the item by putting the game pointer on that specific item.
Originator:	Jin Liu

Requirement: 9	Requirement Type: Functional
Priority: High	PUC: 7
Description:	The player must be able to craft items that show on the craftable lists.
Rationale:	The player need to craft different items to survive.
Fit Criterion:	The player will be able to craft item on the craftable list by clicking craft button besides that particular item. If the player does not have enough resource, the craft button will be disabled.
Originator:	Jin Liu

Requirement: 10	Requirement Type: Functional
Priority: Medium	PUC: 8
Description:	The player must be able to placing traps.
Rationale:	To be the winnter, the player can use traps to harm other players.
Fit Criterion:	The player will be able to place traps in their inventory at the position of the character.
Originator:	Jin Liu

Requirement: 11	Requirement Type: Functional
Priority: Medium	PUC: 19
Description:	The player must be able to exit the game to the desktop from the title screen.
Rationale:	The player need to close the game if they don't want to play anymore.
Fit Criterion:	The player will be able to exit the game by clicking the exit menu on the title screen.
Originator:	Jin Liu

Requirement: 12	Requirement Type: Functional
Priority: High	PUC: 8
Description:	The player must be able to view that his/hers turn is over and see that the next player's turn is coming
Rationale:	The players can not know whose turn is it is to play by looking at the game alone.
Fit Criterion:	The player can identify on the screen whose turn it is to play.
Originator:	Samuel Scargall

Requirement: 13	Requirement Type: Functional
Priority: Medium	PUC: 20
Description:	The player must be able to climb certain objects
Rationale:	The player needs to maneuver vertically to reach objects above or below them.
Fit Criterion:	The player can interact with special objects that move them vertically.
Originator:	Samuel Scargall

Requirement: 14	Requirement Type: Functional
Priority: High	PUC: 9
Description:	The player must be able to lose.
Rationale:	The player understands they have failed and must try again.
Fit Criterion:	The player knows when they have lost and thereby eliminated from the game.
Originator:	Samuel Scargall

Requirement: 15	Requirement Type: Functional
Priority: High	PUC: 10
Description:	The player must be able to choose the number of players they to be in the game.
Rationale:	The player wants to play the game with a certain number of people only.
Fit Criterion:	The player can select the number of people playing before the game starts.
Originator:	Samuel Scargall

Requirement: 16	Requirement Type: Functional
Priority: High	PUC: 11
Description:	The player can win the game.
Rationale:	The player wants a goal to acheive.
Fit Criterion:	The player, after passing all challenges, is notified.
Originator:	Samuel Scargall

Requirement: 17	Requirement Type: Functional
Priority: Medium	PUC: 21
Description:	The player can view the controls.
Rationale:	The player does not know how to operate the game.
Fit Criterion:	The player is offered controller isntuctions.
Originator:	Samuel Scargall

Requirement: 18	Requirement Type: Functional
Priority: Low	PUC: 24
Description:	The player can toggle the sound
Rationale:	The player does not want to hear sound
Fit Criterion:	The player can interact with a sound setting.
Originator:	Samuel Scargall

Requirement: 19	Requirement Type: Functional
Priority: Medium	PUC: 22
Description:	The system must be able to display player's current location on the mini map.
Rationale:	The minimap provides the players their current location on the minimap
Fit Criterion:	System will calculate and display the updated mini map after every turn.
Originator:	Jin Liu

Requirement: 20	Requirement Type: Functional
Priority: Medium	PUC: 5
Description:	The system must be able to display sources in the game world.
Rationale:	The player need to gather various sources to survive in the game world.
Fit Criterion:	System will random generate sources and display them on the game world.
Originator:	Jin Liu

Requirement: 21	Requirement Type: Functional
Priority: Medium	PUC: 5
Description:	The system must be able to calculate the effect of items in the game world.
Rationale:	The system should able to calculate and apply the effect of various items when player uses them.
Fit Criterion:	The system will calculate and apply the effect of item on the target when player uses an item.
Originator:	Jin Liu

Requirement: 22	Requirement Type: Functional
Priority: High	PUC: 12
Description:	The system must be able to determine if the player dies.
Rationale:	The system should able to calculate and display proper message when the player is in the death condition.
Fit Criterion:	The system will calculate and display proper message when the player dies.
Originator:	Jin Liu

Requirement: 23	Requirement Type: Functional
Priority: Medium	PUC: 5
Description:	The system must be able to determine if the player wins.
Rationale:	The system should able to calculate and display proper message when the player is in the winning condition.
Fit Criterion:	The system will calculate and display proper message when the player wins.
Originator:	Jin Liu

Requirement: 24	Requirement Type: Functional
Priority: High	PUC: 8
Description:	The system must be able to determine if a trap is triggered.
Rationale:	The system should able to monitor and update player's status when a trap is triggered.
Fit Criterion:	The system will update player's status when a trap is triggered.
Originator:	Jin Liu

Requirement: 25	Requirement Type: Functional
Priority: High	PUC: 1
Description:	The system must be able to randomly generate the spawn position of players at the beginning.
Rationale:	The players start their game in the spawn position.
Fit Criterion:	The system will randomly generate the spawn location of each player and apply them correctly.
Originator:	Jin Liu

Requirement: 26	Requirement Type: Functional
Priority: High	PUC: 23
Description:	The player must be able to exit the menu.
Rationale:	The players need to exit the menu to continue the game.
Fit Criterion:	A option will be provided when a menu is open.
Originator:	Jin Liu

Requirement: 27	Requirement Type: Functional
Priority: Low	PUC: 20
Description:	The system must confirm that the player want to exit the game.
Rationale:	It is important to confirm that exit is player's desired action.
Fit Criterion:	A confirmation message will appear when player try to exit the game.
Originator:	Jin Liu

9. Non-Functional requirements

9.1. Look and feel requirements

9.1.1. Appearance Requirements

Requirement: 28	Requirement Type: Non-Functional
Priority: Very High	PUC:N/A
Description:	The game should follow industry standard for turn base Strategy game.
Rationale:	The player must feel easy to play and access the game
Fit Criterion:	The game will include a title screen, menu for different maps and menu for options
Originator:	Wenbin Yuan

Requirement: 29	Requirement Type: Non-Functional
Priority: High	PUC:N/A
Description:	The game apperance should be cartoon-like
Rationale:	In order to generate a dark but acceptable scene the game must use a cartoon and humour appearance
Fit Criterion:	
Originator:	Wenbin Yuan

9.1.2. Style Requirements

Requirement: 30	Requirement Type: Non-Functional
Priority: High	PUC:N/A
Description:	The game should have a Black comedy feel
Rationale:	The game is about players struggle to survive but the player should also be able to enjoy the game instead of just thinking about how to live
Fit Criterion:	The game scene must be dark but interesting, it must let the user realize this is a game, not real life
Originator:	Wenbin Yuan

Requirement: 31	Requirement Type: Non-Functional
Priority: Very High	PUC:1-11
Description:	The UI should be easy to use and intuitive
Rationale:	The player should be able to play the game without training to the interface
Fit Criterion:	The game must display distinct and meaningful label and icon to navigate the player
Originator:	Wenbin Yuan

9.2. Usability and Humanity Requirements

9.2.1. Ease of Use Requirements

Requirement: 32	Requirement Type: Non-Functional
Priority: High	PUC:1-11
Description:	Player must be able to control the game easily in a few turns after getting into game
Rationale:	The game should be easy to learn the basic controls but they need to discover strategy for the game in a much longer time.
Fit Criterion:	The user should be able to control the game within 2 turns of game
Originator:	Wenbin Yuan

9.2.2. Personalization Requirements

Requirement: 33	Requirement Type: Non-Functional
Priority: High	PUC:4, 16, 17
Description:	Player must be able to change the graphic/audio and control settings
Rationale:	The player should be able to change the setting of the game if they wish to do so
Fit Criterion:	When the game option menu is open, the player must be able to make change to the setting values
Originator:	Wenbin Yuan

Requirement: 34	Requirement Type: Non-Functional
Priority: Medium	PUC:16
Description:	Player must be able to choose between a keyboard or a mouse as an input device(or both)
Rationale:	Players may have different preference on controlling device
Fit Criterion:	The game should be able to fully control in one keyboard or one mouse
Originator:	Wenbin Yuan

9.2.3. Learning Requirements

Requirement: 35	Requirement Type: Non-Functional
Priority: High	PUC:N/A
Description:	The game should be attractive to gamers of all skill levels
Rationale:	In order to satisfy the most customers, the game should be fun enough for all players
Fit Criterion:	All players should be able to play the game in a very short time after they get on to the game
Originator:	Wenbin Yuan

9.2.4. Understandability and Politeness Requirements

Requirement: 36	Requirement Type: Non-Functional
Priority: Medium	PUC:17
Description:	The game will use English as main language
Rationale:	The user should be able to understand everything in the game without extra learning on other language since our target market is in Canada.
Fit Criterion:	Player should be able to read and understand the game without training
Originator:	Wenbin Yuan

9.2.5. Accessibility Requirements

This game does not have accessibility requirements.

9.3. Performance Requirements

9.3.1. Speed and Latency Requirements

Requirement: 37	Requirement Type: Non-Functional
Priority: Very High	PUC:1
Description:	The game should be able to run in at least 30 fps
Rationale:	30 frame per second is a basic requirement for a video game
Fit Criterion:	The game must run in at least 30 fps
Originator:	Wenbin Yuan

Requirement: 38	Requirement Type: Non-Functional
Priority: High	PUC:3-11
Description:	The game must calculate player input in realtime
Rationale:	The game is time limited turn base, if the game cannot process player in realtime, it will decrease the playability in a very large scale.
Fit Criterion:	The player's input must be processed with in 30ms
Originator:	Wenbin Yuan

Requirement: 39	Requirement Type: Non-Functional
Priority: High	PUC:6-11
Description:	The item player obtain or use should be displayed properly within 1 second
Rationale:	The game is time limited turn base, if the game cannot process player in realtime, it will decrease the playability in a very large scale.
Fit Criterion:	The item player obtain or use should be displayed properly within 1 second
Originator:	Wenbin Yuan

9.3.2. Reliability and Availability Requirements

This game does not have reliability and availability requirements.

9.3.3. Robustness or Fault Tolerance Requirements

This game does not have Robustness or fault tolerance requirements

9.3.4. Capacity Requirements

Requirement: 40	Requirement Type: Non-Functional
Priority: Very High	PUC:5
Description:	The game should be able to generate at least 50 different supply items in 1 round of game
Rationale:	The number of items constrains the length of each round. The game should last for at least 15 mins for each round so there must be enough item for player to collect
Fit Criterion:	The items should be generated while loading the level and should not show significant delay
Originator:	Wenbin Yuan

9.3.5. Scalability and Extensibility Requirements

This game does not have scalability and extensibility requirements

9.3.6. Longevity Requirements

Requirement: 41	Requirement Type: Non-Functional
Priority: Very High	PUC:N/A
Description:	The game must be able for players to play for at least 15 minutes
Rationale:	The final product must be able to be played for at least 15 minutes.
Fit Criterion:	The 15 minutes includes all player's actions
Originator:	Wenbin Yuan

9.4. Operational and Environmental Requirements

9.4.1. Release Requirements

Requirement: 42	Requirement Type: Non-Functional
Priority: Very High	PUC:N/A
Description:	The game will be released to a set of stakeholders
Rationale:	The goal of the product is to present the game for 15 minutes to all the persons related to the capstone course
Fit Criterion:	The game will be able to play for at least 15 minutes
Originator:	Wenbin Yuan

9.4.2. Expected Physical Environment

Requirement: 43	Requirement Type: Non-Functional
Priority: Very High	PUC:N/A
Description:	The game should be able to run on most Windows and Mac OS computer with Unity installed
Rationale:	The game must be able to run on most computers in campus
Fit Criterion:	The game must be able to run on most computers in campus
Originator:	Wenbin Yuan

9.5. Maintainability and Support Requirements

This game does not have maintainability and support requirements.

9.6. Security Requirements

Requirement: 44	Requirement Type: Non-Functional
Priority: Very High	PUC:N/A
Description:	The game must not access and record any player's personal information
Rationale:	The game does not need any personal information
Fit Criterion:	Player will never be asked to input any personal information in game
Originator:	Wenbin Yuan

9.7. Cultural Requirements

Requirement: 45	Requirement Type: Non-Functional
Priority: High	PUC:N/A
Description:	The game shall not be offensive to any religious or ethnic group
Rationale:	Insulting any group of user results controversy.
Fit Criterion:	The game will not be offensive to any religious or ethnic group
Originator:	Wenbin Yuan

9.8. Legal Requirements

9.8.1. Compliance Requirements

Requirement: 46	Requirement Type: Non-Functional
Priority: Very High	PUC:N/A
Description:	The game shall adhere to all terms and conditions set by UDK
Rationale:	The game is created based on Unity and it must follow the UDK license
Fit Criterion:	The game is created based on Unity and it must follow the UDK license
Originator:	Wenbin Yuan

Requirement: 47	Requirement Type: Non-Functional
Priority: Very High	PUC:N/A
Description:	The game shall adhere to all terms and conditions set by the course and McMaster University's Academic Integrity Regulations
Rationale:	The game must follow the McMaster University's Academic Integrity Regulations
Fit Criterion:	The game must follow the McMaster University's Academic Integrity Regulations
Originator:	Wenbin Yuan

9.8.2. Standards Requirements

Requirement: 48	Requirement Type: Non-Functional
Priority: High	PUC:N/A
Description:	The game shall adhere to all terms and conditions set by the course and McMaster University's Academic Integrity Regulations
Rationale:	The game must follow the McMaster University's Academic Integrity Regulations
Fit Criterion:	The game must follow the McMaster University's Academic Integrity Regulations
Originator:	Wenbin Yuan

10. Open Issues

There are no known open issues so far.

11. Off-The-Shelf Solutions

a. Ready-Made Products

- Unity has various assets for different elements that can be used for the game development.

b. Reusable Components

- Unknown

c. Products that can be copied

- Assets gathered under proper license can be reused and modified in the game development.

12. New Problems

a. Effect on the current environment

The product has no effect on the current environment.

b. Potential User Problem

The product will not raise any potential user problem.

c. Limitations in the Anticipated Implementation Environments That May Inhibit the New Product

It is possible that some workstation is not able to run some assets in the game that is created by other workstation due to the hardware or software discrepancies.

d. Follow-Up Problems

There is no follow-up problems so far.

13. Project Schedule

Deliverable	Date Required	Components
High Concept Document(Rev 0)	September 26, 2017	First revision of the game concept
System Requirements (Rev 0)	October 17, 2017	First revision of the system requirements
Sales Pitch Demo	October 17, 2017	Presenting the overall idea of the project, and demonstration of the demo(Not necessarily)
Game requirements	November 1, 2017	The requirements of the game
First demo	November 20, 2017	The short demonstration of the game, visual and audio art assets are not necessary, the basic idea of how the game is going to run
Implementation (Rev 0)	December 7, 2017	First revision of the game implementation
Verification and Validation (Rev 0)	January 4, 2017	First revision of a verification and validation
Concept and all requirements (Rev 1)	February 27, 2017	Second revision of the high concept document and requirements
Implementation (Rev 1)	March 29, 2017	Second revision of the game implemetation
Verification and Validation (Rev 1)	April 6, 2017	Second revision of a verifivation and validation
Demo	April 20. 2017	A presentation and demonstration of the game

All the date subject to change

14. Migration to the New Product

There is no migration issue related to this product.

15. Risks

- a. If the project is not completed on time, the grade of the project will be affected.
- b. If the project is completed with lower quality, the grade of the project will be affected.
- c. If the project is copied from the other game, all the members of the group will be marked as academic dishonesty.

16. Costs

- a. This capstone project will take about 6 months to build, and April 2018 is the deadline.
- b. This capstone project is used for McMaster University education purpose, money will not be a factor. the free version of Unity will be used for building the game.

17. User Documentation and Training

- a. A document includes the Unity version, operating system and game controls is required.
- b. No training required, the game uses the same interaction devices as other PC 2Dgames.