

4GP6A Design Doc Revision 1

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- <Core Gameplay Mechanic #1> : Player movement

Keep Warm is a 2D turn-based multiplayer game. Both players share a device and take turns moving their character. The players are able to control the characters by using keyboard: “left” key moves the character to the left, “right” key moves the character to the right. The speed at which the characters move will be consistent (i.e. no acceleration feature) and there is no lead-time before the movement begin. The players can jump by pressing the “Space” key, and climb up a ladder by pressing “up” key when the player is under the ladder.

The player will be limited to a slow speed (i.e. requiring multiple turns to navigate the level) to force the player to choose carefully how they navigate. To be precise, the players will be able to move around 10 player sized units per turn.

Jumping will also be limited so that certain chasms in levels will not be too easy cross. Therefore, players will only be allowed to jump $\frac{1}{2}$ their height upward. Boolean variable `isGrounded` is set to check if the player is on the air by checking the collision between the player and the ground. If the boolean is false, it means the player is in the air and no action is allowed to be performed until the boolean is set to true.

- <Core Gameplay Mechanic #2>: Game Pause

The pause function is implemented to meet the requirements of pausing the game by the player. The pausing menu scene will show up by pressing the pause button at top right of corner. On the menu, there are three options. “Resume” will allow players to continue their game. The game will be terminated when the “Exit” is pressed. The setting

page will show if the “Setting” button is pressed. The game will freeze if it is on the pause menu while the music keeps going. More details are under the section: Menu.

- <Core Gameplay Mechanic #3>: Player’s status

The players will have 3 status: Health, hunger and warmth. The player’s status is shown on status bar and all players’ status are full(health 100, warmth 100, hunger 100) when the game is started. These bars are stacked together, warmth on the very top, health on the bottom, they are on up-left of the P1 character and up-right of the P2 character. They have different color: Health is Green, hunger is yellow and warmth is red.

For health, it is a measurement of overall physical well-being. When the player’s health bar does not go down to 0, the player status is alive, and when the player’s health bar goes down to 0, the player is dead. Health does not drain over time, but it starts to drain when the player’s hunger bar or the player’s warmth bar goes to zero. Health also starts to drain when the players are outside of the “warm” area. Health is also lost instantly when the player hits a harmful trap.

Health	Starving	Out of warm area	Cold	Hurtful trap
100	-10 per round	-15 per round	-10 per round	-20

Hunger is the measurement which determines whether or not the character is starving and it can be increased by consuming food. Different food has different

effects on hunger(Check the list on the mechanic #5). The character loses 10 Hunger every round as soon as the game starts.

Warmth is the the measurement which determines whether or not the character is in a cold situation. The “weather” in the game gets colder every round, and the player loses 12 Warmth every round. Some items listed in the section of mechanic #5 will increase this status when the player is in the range of 300 units of them.

- <Core Gameplay Mechanic #4> Player's interaction

In most cases, players need to interact through a button on screen to pick up an item. When the player approaches an item and is directly on the item, the button for picking up the item will be shown. Players will not be able to interact with each other directly. They can only deploy traps or leave items on the ground to indirectly interact with the other player. The item or trap on the map will be intractable for both players. No matter which player leave a trap on the map, that trap will be triggered if a player step on it (Trap is the only item category that cannot be picked up by players).

There is another interaction that can be made by players at any time in game. The player can move his/her mouse to any item that is currently on the map and there will be a small window appearing beside the mouse showing the description of the item. The window will disappear after the mouse is moved away from the item. The player can perform his/her actions no matter where the mouse is. This means the player can still move while a description window is still open.

There will be a rigidbody for each item and character in the game. When the rigidbody of a character collides with another item's rigid body, the option for picking up the item will be displayed. By selecting that button, the item will be deleted in the map and then added to the player's inventory. The pick up button for the two players are different. This prevents one player from ending his turn on an item while leaving the pick up option not clicked. In player A's turn the button for Player B will never appear. The description window will

display if the coordinates of the mouse on camera are in the range of the coordinates of the item.

The rigid bodies of the player objects are rectangularly shaped and slightly bigger than the sprites of the players. The players will need their characters sprite to almost be touching objects in order to interact with them.

- <Core Gameplay Mechanic #5>Resources/Craftable items

There are 4 different categories of items in total including “food”, “crafting material”, “crafted items” and “Traps”. Each player can hold 12 blocks of items. If the item is stackable, then it can be stacked in one block up to a number of 20. Otherwise, each item costs one block of inventory. The player can hold 21 of the same stackable item. Players can pick up an item by standing on it and clicking the “Pick up” button appear on the HUD. If a player wants to use a food item, he shall open the inventory first and use the mouse to click on the certain block that contains the food he wants. The icon of the block will turn to gray for 2 seconds and then will not accessible in this time period, The player can use it again after the 2 seconds when the icon turns back to normal again. The number of food carried will be reduced by one and certain hunger and warmth values will be changed to the current value. This will then be displayed on the screen. There will be a pop out window ask if the player want to cook or eat. At this time, the player will not be able to move. If the player stand beside a campfire, the cook option will be selectable, otherwise, the cook option will be gray and player can only select eat or cancel. For each crafting material items, when a player clicks on it, there will be a pop out window showing the craftable items. If the player doesn't have enough required materials, that craftable item will be gray and not selectable. When a player select a trap, the player will be directed to the map.

Each item in the game has a unique ID number and all of items have a category label with values for “warmth” and “Hunger”. All items will be in a database. All player's status will also be recorded in another database. Every time players use or craft an item, there

will be an operation done in the database about the status, including warmth and hunger values, player's amount of items, etc.

The sprites for these items can be found in the "KeepWarm/assets/sprites" folder in the unity project.

List of Items

ID	Name	Warm	Hunger	Description	Stackable	Sprite	Category
1	Campfire	100	0	Crafted by 4 wood logs, last for 5 rounds	F	Campfire	Crafted Items
2	Wood log	20	0	Collectable from map, can be used to craft campfire or as torch for 1 round	T	Log	Material
3	Apple	0	10	Collectable from map, recover hunger	T	Apple	Food

4	Raw meat	0	15	Collectable from certain point on map, recover hunger	T	Raw	Food
5	Cooked Meat	10	40	Crafted beside a campfire with raw meat, reduce the life of campfire for 1 round,	T	Cooked	Food

				recover hunger a lot and provide some warmth value			
6	Banana	0	15	Collectable from map, recover hunger	T	Banana	Food
7	Gear	0	0	Collectable from map, material for items	T	Gear	Material

8	Spring	0	0	Collectable from map, material for items	T	Spring	Material
9	Bear trap	0	0	Craft by 2 gears and 2 springs, stop the player that step on it for 10 seconds and reduce that player's hp by 20	F	Trap	Trap
10	Trap Hole	0	0	Craft by 3 gears, 3 springs and a cooked meat, stop the turn of the player who step on it	F	Hole	Trap
11	Trap	0	0	Craft by 4	F	Tool	Craft

	removal tool			gears and 2 springs, can be used to remove a trap on map			edited item
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12	Tooth Trap	0	0	Craft by 2 gears and 2 springs, deals 10 damage to the player			
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- <Core Gameplay Mechanic #6> menus

There will be a main menu screen shown before the level is loaded. The menu includes audio and video settings. A start game option is provided here allowing players to choose which side to start on. In game, there is a pause menu button on the top right corner of the game. There will be a “Resume”, “Setting” and “Exit” option. This menu will act as a waiting room for the players before the game starts.

The main menu will be created as a separate scene in the game and it leads to different scenes depending on the player selection. The in-game menu will be a layer below the camera. When it is called, the game activity will be paused. A resume game option will hide the pause menu layer and resume all paused activity. A setting option will allow player to change game settings(Graphics/Sound). The exit option will make the scene end and take the player back to the main menu scene.

There will also be a help manual on the main menu which will aid players in understanding the rules and controls of the game. This manual will be presented as an image which pictures and text to help explain the game as clearly as possible.

- <Core Gameplay Mechanic #7> Crafting/Inventory

Crafting is a in-game mechanic that allows players to craft or make items. Crafting can be done by selecting an item to be crafted in one of the crafting tabs. The players are checked if there are sufficient materials in their inventory. They will receive 1 or more of the crafted item in the inventory instantly, by their choice of the craft number in the craft tabs and associated crafting materials will disappear in their inventory. All the items in the craft tabs are craftable(the requirement of crafting materials is displayed by putting the mouse on the item in the crafting tabs). No crafting recipe is needed since the average play time of a game is around 15 minutes and the crafting system should not be hard to understand by players. There is no restriction on the number of items a player can craft at once as long as the player has enough crafting materials.

Inventory is an in-game mechanic that allows players to hold items. The player can hold 12 different stacks of items. Most items can be stacked that allow the players to carry multiples of the same item. However, players can only hold one item in each slot if it is unstackable. Players cannot pick up/collect any more items if their inventory are full. Players are able to throw their item out to the ground by dragging the item out of the inventory. This is accomplished by using IDropHandler in C#. (Assets/Script/Slot for details)

- <Core Gameplay Mechanic #8> Traps

The players are able to place any traps in their inventory on the ground and the traps will only affect other players. Three kinds of traps has been designed at this moment.

BearTrap is a trap that can be placed on the ground and freeze any player that steps on it for 10 seconds in their own turn. Tooth Trap is another a trap that can be placed on the

ground and it deals 10 damage to any player that steps on it(Player's health status will decrease by 10). Trap hole will terminate the player's current turn when player steps on it. The traps will not be triggered if other players jump over it but they are not obvious to see on the map.

- <Core Gameplay Mechanic #9> Player's Turn

This game is a turn-based game and each player is only allowed to perform his actions in their own turn. The player who has the first turn will be randomly determined by using a random class in C#. Each turn has a fixed turn time of 10 seconds and the remaining time of each turn is shown in the left corner. Turn time is the amount of time the player has to perform actions during his/her turn. If the player's turn time expires, the player's turn will end and the player will not allowed to do any more actions until his/her next turn. There is no restriction on the number of actions a player can perform in one turn.

Action is a in-game mechanic that players can do to achieve the winning goals. Players are able to move, collect items, craft items and place traps but not simultaneously.

- <Core Gameplay Mechanic #10> Camera system

The game camera follows the general area of the player who has turn initiative. After a certain amount of time, the camera view switches to the area of next player's turn.

This is done by using a timer and several different variable checks. After a timer compares current time to previous logged time (time of turn switch), it decides whether or not to call a function which redefines the object(i.e. player) of the camera's focus. These camera

switches are interrupted when certain game states are reached (e.g. game win) or a menu is opened. These states are represented with booleans that trigger the logic path of main controller to avoid calling the camera update function.

The game camera is orthogonal giving the illusion that the objects are all on a 2D plane. There is only one camera and it can be controlled by moving the player sufficiently enough in a direction. The game camera is also responsible for displaying game screens and menus which are images the camera keeps in its view.

- <Core Gameplay Mechanic #11> Game Settings

The game settings are applied immediately and can be applied while in game. There is a button in the bottom right corner that is always visible and clickable. This button toggles the pause menu that gives various options to the player to select. Some of these options include: Resume, settings and exit. Under the settings player can change the sounds and music. These changes are persistent and will only be reset if the game is stopped and restarted. This is accomplished by using boolean variables for the state of the setting buttons. After a button is clicked, it executes a function and updates a variable that will dictate what operation it performs on the next click. These buttons are toggle buttons and not sliders for simplicity's sake.

The buttons on the settings menu will not perform any function unless, the condition that "the settings menu is visible" is true. This helps reduce the number of redundant variables in the program. This is important for making the overall game flow as clear as possible.

- <Core Gameplay Mechanic #12> MiniMap

The minimap was designed to give the player's a general sense of where they are relative to each other on the level. The minimap updates every time it's opened and shows the change of positions of the players relative to where they were. In order to view the minimap, you have to click the settings button which displays an image with markers representing the players. The game does not pause when they view this map and it will take time out of their turn if they want to see it.

The map does not fully show the environment as we wanted players to have explore the levels to find where traps and food are. The map represents a scaled down version of the level and gives a general area (player markers not exact scale) of where the players are.

- <Core Gameplay Mechanic #13> levels

The levels look like a 2D platformer in a jungle/forest setting. There are traps within the levels as well as food and supplies. The traps will hinder your movement and potentially kill the player if they not careful (prolonged exposure to traps causes death). The goal in the level's is to reach a certain amount of food thereby starving out your opponent. The levels have different layouts of platforms and traps which add to the game's playability.

A major obstacle in the game is the moving toxic gas that closes in on the players. As the game goes on, the fog moves inward on the level causing players to have to move towards each other. Our current plans are to have a singular comprehensive level.



Overview for Current Level