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| Special Input / Output RPG game documentation 2020 |
|  |
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# Preface

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| This document is meant to inform you about why we chose to use the Godot engine for this game and the experiences we had with the engine and the game and the mechanics of our game.  The game we came up with is a turn-based RPG based on Octopath Traveler and For Honor. Octopath Traveler because the gameplay is a bit like that and I always had that game in my mind while thinking of the mechanics. Octopath Traveler has an weakness mechanic. We decided to use this mechanic in our game, because now you have to figure out which weakness the enemies have. For Honor because in the game you can choose in which direction you want to attack and block an attack. We wanted to implement this mechanic in our game as well, because it is something new. For Honor also has an stamina mechanic. We decided we could use that as special points found in most RPG games. You can use stamina points to use special skills. Every character has 4 special skills and all unique to that character. With the voice recognition were developing you can do everything with just your voice. We thought it would be fitting for this game as special input. |
| Mechanics Specials  Every character has 4 special moves (also the enemies). They all have unique attributes and those are displayed in the description at the top of the game. These moves use Stamina (see Stamina for details). Some Specials do damage and some heal and some make stats better for the team or worsen the stats of the enemy.  Weakness  Every attack has an element or weapon type. If the enemy or player receives damage by an element or weapon that’s one of their weaknesses then they’ll receive 50% more damage from the attack and they’ll flash red. If you or the enemy got hit by a weakness then they’ll have a low chance to be stunned.  Critical hit  If you are lucky with an attack you do 100% more damage to the enemy and they’ll flash brighter then normal. The enemy has this too so if you’re unlucky you can get damaged quite a bit.  Guarding  Every attack you do will let you choose which direction you want to attack in. The enemy can block an attack by choosing the same direction as you attack in. The same happens if the enemy attacks you. If you or the enemy blocks the attack they will receive 50% less damage from the attack.  Stamina  Every special you do, you lose stamina. You gain stamina every turn and it depletes with almost every action. You can use stamina points to use special skills. If you lose all stamina then you do 40% less damage than normal and changing direction of attacking and guarding is a lot slower.  Items  You have 4 items that you can use. Health Potion restores some health, Stamina Potion restores some stamina, Revive brings someone back from the dead and gives them 100 HP and Neutralizer puts all you’re negative stat changes to normal.  Defend  You can choose to defend instead of attacking. If you defend you’ll end you’re turn and will receive 40% less damage then normal until this character receives their turn again.  Choice accountability  Engine  We couldn’t use Unity and that’s my primary engine I’ve used at my school so I had to search for something else. My first engine that I wanted to choose was the Unreal Engine because it’s a widely used engine and Octopath Traveler (the game I based this game on) was also made in this engine. Unfortunately I am not yet skilled in C++ and when I searched up a tutorial on the Unreal Engine I really didn’t understand what was happening so I thought that this was not the best pick. Game maker was my other pick but the engine is not free so I also didn’t choose that engine. I then thought about making the game without an engine but that would be a lot harder and pretty time consuming. I found an engine while browsing on Steam for some games and found an engine that’s called the Godot engine. It had really good reviews and the transition from Unity is easy and it also has C# support so I thought that this would be a pretty good choice. |

Documentation

I had to make Godot have C# support, so I followed a tutorial on how to have C# support in Godot. I downloaded the necessary things like mono support Godot and Visual studio code and in Visual studio code C# support. First, I added some place holder sprites and gave them placeholder animations to get the feel of the engine and how the engine works with sprites and animations. This proved to be more difficult than I thought because Godot wants pixel perfect spacing between every sprite in a sprite sheet to make an animation. So, what I did was I took a GIF from the internet and converted that GIF into an sprite sheet with an website called ez-gif (website URL in sources) because this site spaces every sprite pixel perfectly next to each other. So, I implemented all the sprites and added a background that I found online. Then I did research on how Godot works because it works differently than Unity does. I searched up some documentation and found that there is a document about Transition from Unity into Godot. When I read it, I began to understand the engine a lot better. So, then I began with the first thing to implement in almost any RPG a turn-order. I based this order on the speed stat that I gave so first I had to make stats for every character like Attack, Magic, Defense and Speed etc. so I made a script for that. The stats are based on stats from Octopath Traveler. Then I made a battle manager and this script manages the turn order and when an it’s someone’s turn. So, I gave the script 3 lists and they were the turn order, every player and one for every enemy. Then I made a for loop that puts everyone in the right list. In Unity there is a function named Sort for lists and basic C# has it too but in Unity it was a lot easier. I searched online about how to sort a list in Godot but there were no good results because very forum is about their own language GD script. So, I searched up how you would do it in C# no engine and found out that I had to make a new class to compare such a variable. So, I did that, and it now works great. I wanted to show which character’s turn it is so I made that the character which has the current turn will walk towards the middle. I made a simple script with a target and the character will walk towards the position. Then I made some UI displaying what you can do like attack, special etc. I searched up and tutorial because UI in Godot is different. After that I used this new knowledge to make some UI and buttons. Godot was working a bit against me at times because it resets sometimes my changes to the UI, but I finally managed to get it working. I duplicated the boss so that I can work on a target select. When I was done with duplicating, I began with creating my target select system so I began with it but there was an problem when I pressed enter to attack it immediately chose the first target. Then I thought maybe it sees that enter is still pressed from the attack menu, so I made a timer that goes up with the delta time. When the timer is higher than 0.25 seconds then it can register your input. Then I made some functions so that you can choose different targets. I also added a marker so that you could see which character you’re currently choosing. Because the boss is the first one in the enemy list so I made the input in reverse because normally when you press down the counter goes from 0 to 1 but because the next enemy is above you you’ll have to reverse the input. I wanted to add different weapons and that every weapon has different stats, so I made a script named WeaponStats. I then made every weapon a new scene (prefab in Godot) and gave them to the corresponding character. When that was done, I made a guarding image for every direction you can guard in. I wanted to change the sprite to a new sprite with the other directions, so I made an array with the different sprites in it. However, there was a problem because there was an error every time, I changed the direction. The images couldn’t be loaded in from the array. I searched up some solutions like not dragging it in, but it kept giving problems, so I found another solution and that was using an Animated sprite. I made every direction into an separate animation with just 1 frame. I would play the corresponding animation when I would change the direction of my guard. I then made the attack with a new script named CharacterDamage. This script would handle damage you take and telling the battle manager when the next turn would happen. When you press enter on a target it would calculate the damage with something pretty simple and that is attack – defense or magic – resistance depending on if the move uses magic or not. But I gave some luck factor to it and that is that the character that is being attacked (the defender) can dodge the attack based on how much luck they have. The calculation was just Luck / 10. Then the game generates a random number and I then check if the number is lower or equals to the luck calculation. If they dodge the attack, then they’ll receive no damage. I then added to the calculation that if you and the defender have the same guard direction (if the defender successfully guarded the attack) then the damage would be halved. All the calculations are printed to the console so that I would know what happens in the code. When the calculations are done, I give the turn to the next person in the list. I had a problem with the weapons because they would not count up on my attack calculation. I didn’t know why it happened, but I thought this game is only 1 boss fight, so I don’t need extra weapons. I always code like I’m making a full game because if I would make a full game, I already have code made for that and that I don’t have to change code all the time. I then added a script for all the attributes a special move has like extra Attack or Magic, if it’s a support move for your team or changes the stats of a character etc. Then I added the UI for the skills and there were no troubles with that. Then I made every attacking special work and buffing and debuffing specials it just does all your stats that you have and does their extra stats + your current stats. I made Attack & Magic for example 2 buffs (Every buff or debuff is 2 stats) because it otherwise would waste a lot of special moves slots (It is also based on the Persona games). I found out that you shouldn’t multiply the movement with delta time so that it would be consistent. I then added a special move that attacks every enemy by just having a for loop for every enemy and start all their guard sequences. There was a problem with that, because it would skip 3 turns when I would do that (there were 3 enemies). So, I thought I should make a counter for every enemy and if every enemy is done calculating then the next turn would happen. I then added to every skill a stamina penalty so that you won’t spam a move. You can spam a move, but it does a lot less damage if it reaches 0. I then made the enemy AI because otherwise we can only attack. I gave them a search skill function that lest them search a skill and if their stamina is high enough then they’ll use it otherwise search for another skill. I then cleaned up the code a bit by making some things a bit faster like instead of searching the Node for specials every time I just have a variable attached to it. Ian and I discussed about the AI and we decided that we would make it copy your movements and try to do the same thing as you, because then we can make a good AI that is hard and difficult to defeat. So, the plan is that every move you do will be put in the list and put like an Enum. The move that does the highest damage gets the HIGHEST ATTACK name and a support move will get SUPPORT and a normal attack gets ATTACK and a move that does damage to everyone gets the EVERYONE name. The AI then picks a random attack from the list (the moves do stack in the list so the more you do one move the higher chance it gets to be used by the AI). Then I added UI for the stamina and health every character has. It also displays the name. Then I added the minions that are not clones of the boss. An attacking minion named: Minion and a Magic minion named: Magic minion and a Debuff Minion named: Debuff Minion. I gave them unique moves and have them heal or buff the Boss. Then I made a move named Guard which lets attackers only choose the enemy or player who is guarding and nobody else. I just turned off the target select code and made them select the one who is guarding. I gave the guard 5 turns to be active but I decided later that 3 turns would be better. The game crashed then when you would use a normal attack so I and a normal attack is just in code a skill that equals to null. So, I gave an extra check to see if it isn’t null. Then I added a move that stuns the opponent and has 40% less accuracy then a normal move has. If you or the enemy gets stunned, they’ll have 50% chance to do a move or otherwise they skip their turn. Then I added a counter move that is very simple code a lot easier that I thought. Just if the defender receives damage before they lose HP, they start the guard function of the enemy and stop the rest of the function. Then I made a multiplier for the time of guarding because saying something is a lot slower that pressing something on the keyboard, so I did the time \* 4. Then I made the boss spawn his minions again when they die, because the minions die fast, and a boss normally has a lot of people as minions. I made that every turn he gets he receives 15% chance extra to spawn a minion so eventually he will spawn one 100%. When he does spawn a minion the percentage drops to 0 again. The position of the spawned minion is based on if there is a minion already above the boss or not. Then I saw a bug with the spawning position because I didn’t check if a minion is under the boss so the boss would spawn a minion at the same position as another minion. When that was done, I created the ability to cancel the move you chose. Then I gave the enemy a stun skill and made sure that the player can get stunned. Then I made weaknesses. Every character has a set weakness except for the boss who has 2 weaknesses and always has 2 random weaknesses. Then I implemented the BuggySpeech app (Voice recognition app). There was a problem however and that was that BuggySpeech presses a key on your keyboard based on which command you say and in Godot it didn’t work correctly. I finally found a solution by testing different theories on what is was and it was that BuggySpeech releases the key or Godot doesn’t read Simulated key presses correctly. Either way I had to check if the key was released and not pressed. Ian couldn’t make the sprites and images in time for the game, so I took some from Fire Emblem 7. I found a site that has gifs of every attack in FE7. I downloaded 1 attack for every character, because there wasn’t that much time left to make a lot of animations. I also took Magic effects from FE7 and made the lightning bolt flash the entire screen. Then I added visual feedback like a white flash if the character gets hit or darken the character if they dodge. I added background music that Ian found, and I added some sound effects, and these are from FE7 and Fire Emblem Awakening on everything like hitting someone and giving a critical hit etc. The files were mp3’s but Godot doesn’t support that so used an online converter to change it to ogg. Then I added icons for every stat change you get, because you couldn’t see it you just knew it happened. I had a lot of problems here with Godot’s UI because I wanted it next to the name of every character, but it wouldn’t work It reset my progress every time. Then suddenly when I tried to resize the images in my drawing software the icons suddenly disappeared from my PC. I remade the icons and put them above the head of the players instead of next to their names. Sometimes a character wouldn’t go to the middle when their turn was up so the game couldn’t continue, because it waits until the character is in the middle, so I made a fail-safe timer. If the character isn’t there in 5 seconds the game teleports them to the target location. Then I added a description at the top which displays a description of every special move you use as well as the name of the skill the enemy and you use during combat. It also displays how much damage you do because I couldn’t get a pop up of the damage to work, because the animation wouldn’t play and the text wouldn’t spawn and I didn’t have too much time so I put it in the description above. The names of the minions were too long because the Magic Minion would always display the text outside of the box when she does an attack on everyone. Now the names are: Brute, Mage and Debuffer. The boss’s weaknesses weren’t fair because he could have a weakness element and no one of your team would have an attack with that element, so you couldn’t hit his weakness like this. He could also have a double weakness and the damage doesn’t stack on a double weakness. So, I fixed it by making sure that he doesn’t have the same weakness twice, because every time he does then he’ll choose a different weakness and I made the random number not reach the last weakness (the element which no one has of your team). I then made a menu so that the player can choose the difficulty and if they want voice control enabled. I then let my little brother user test the game while recording and found a lot of bugs. The items didn’t go to the first character always so I fixed that problem and the debuffer used an special fire attack which isn’t supposed to happen, so I checked what it was, and I saw that there wasn’t a check for if the move is attacking everyone and changes the stats. So, it would call the damage function instead of the debuff function. The tester said that the stamina should go negative and I discussed it with my teammate, and we decided to change it so that it would be better for the players.

That is the development of this game.

Sources

From Unity to Godot documentation

<https://docs.godotengine.org/en/3.2/getting_started/editor/unity_to_godot.html>

Godot C# tutorial:

<https://www.youtube.com/watch?v=ra-BJ-fJ6Qo&t=654s>

GIF to sprite:

<https://ezgif.com/gif-to-sprite>

MP3 to OGG

<https://audio.online-convert.com/convert-to-ogg>

Fire emblem awakening sound effects

<https://www.reddit.com/r/fireemblem/comments/4eihdd/fe_awakening_sound_effectsnotifications/>

Fire emblem 7 sound effects

<http://www.feshrine.net/music/sfx/>

Fire emblem 7 sprites

<http://www.feplanet.net/games/7>

Agony (Background music)

<https://www.youtube.com/watch?v=tn5zf9WQWEM>

GitHub commit history

<https://github.com/JordanGamen/SIO-RPG/commits/Jordan?before=7c7c68a4850a11bebf3d4a8ee05d67f2b4374b31+35>