**Danmaku Project Documentation**

This is more of a cliff notes version, feel free to change it however you want.

There are multiple engines out there that we can use to make a Touhou Danmaku, the obvious ones being **Danmakufu**, because it's the official way of creating fan made Touhou boss-battles / games, and **Unity**, because of our experience with the engine. For the sake of keeping things simple for us, I will refrain from listing all the other possible engines.

* There are pros and cons for both Unity and Danmakufu. Here's the cliff notes:
  + **Bullet Hell Support**: Danmakufu was made for this shit, with a lot of existing functionality, like spell cards / bombs, whereas with Unity things would have to be made from the ground up by us (me).
  + **Performance**: Again, Danmakufu wins this one, Unity would require a lot of optimisations (make sure these are included in the official documentation you make for this project):
    - Each bullet would be its own separate game object with a Monobehaviour script, which is very costly when there are literally thousands of bullets being instantiated. This is solved by implementing an object pooling system, so bullets would essentially be reused, not created and destroyed. Again, more work for us.
    - Physics overhead: If each bullet had its own rigidbody2D and collider2D, it would add a lot of CPU strain. Instead, I would have to store positions and do distance calculations to determine if a bullet hits the player, can't use the systems already implemented in Unity.
    - Bullet patterns: Creating complex bullet patterns / lasers like in our beloved Touhou would be very, VERY difficult without some additional APIs. Again, Danmakufu has some of this stuff built in, plus example code from other developers.
    - These are the main issues. For more information on this topic, refer to this link: <https://danmaku.jamessliu.com/index.html> and the AI conversations I will send you. The link sends you to the documentation for DanmakU, a unity package from 2018 that aimed at solving all these problems with a custom API. Problem is, the only documentation I found is that link, and it is very old (2018), meaning it's incompatible with modern Unity. I have already tried running it in a new project and it doesn't work, and reverting to pre-2020 Unity is more trouble than it's worth.
* **Extending / Custom Mechanics**: This is the main thing Unity has over Danmakufu. Even though the latest version of Danmakufu (Ph3) is stable and has quite a bit of documentation from fellow fan developers, it cannot do anything beyond what we are already familiar with in Touhou games. We can only create an exact copy of a Touhou game, at least in terms of functionality.
* **Coding**: This will be my main responsibility, of course. The documentation for it looks something like this, the dreaded wall of text:

A computer screen shot of text

AI-generated content may be incorrect.

This is the main issue of Danmakufu, learning to write the scripts. These are written in .txt files, and they use a sort of C/Java blend. There’s a lot to learn and a lot of experimentation that I need to do. Nevertheless, it can’t be harder than learning Unity.

* Licensing: Due to ZUN’s guidelines about fan-made Touhou games, we are not allowed to sell it for profit, even if the game ends up as good as an original Touhou game. We can only put it up for free on Steam. Official Touhou guidelines for “二次創作” (nijisousaku), meaning “derivative work” can be found here: <https://touhou-project.news/guideline/>.

AI convos links:

Bigger ChatGPT inquiry: <https://chatgpt.com/share/68760846-50a0-8005-bb0b-0b963a7c5e6e>

Smaller Claude inquiry, ChatGPT seemed to give more info on the matter, so I stopped asking Claude: <https://claude.ai/chat/af779b14-d951-4ba7-958e-3736ec9cdd19>