

Game Design Functional Minimum Shattered

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1. Project Webpage

<https://github.com/superzanti/Shattered>

2. Project Status

Shattered is currently in a state where the main player can click around a screen and have their character walk to that point on the screen. The current map presented on launch shows all of the animations for the character model. Only 2 of these animations are currently in use: idle and walk. The camera has also been programmed to follow the character. In the final game the gamer will follow all 4 players and adjust the screen to the smallest possible value such that all 4 players are shown on a single screen.

The schedule presented in the initial project proposal has me almost finished with the 'glass block class'. Unfortunately due to challenges only the full character has been completed. While the character 3D design took shorter than expected, correct rigging and animation took much longer than expected such that realistic physics could be visualized.

The initial map is currently a demo of what the character will look like. The playable character can interact with one physics body to see the realistic rag-doll physics and weights that were used.

3. Challenges

While the full 3D design of the character didn't take as long as I expected, I quickly realized that there is a certain way that 3D modeling should be done in order to make texturing, rigging, and animation easy. After the first iteration of my model I noticed several bugs once I tried to add in some textures (which came after the animation process for me). First, the model had many double faces. When I corrected this the skin weights that I used for the skeleton broke. Since the skin weights needed to be re-done, so did the animation.

While rigging I also realized that rigging all 10 fingers and having it look realistic was a very difficult task. It increased the complexity of the model, and in the end isn't

even used. The character's fingers never move since they are always holding a hammer.

Animation also takes much longer than I had expected. Moving each individual joint in a realistic manner takes lots of precision work. This work is mitigated a bit by creating objects that link together various joints with functions. In Maya I used nurbs circles to link joints and IK bones together into one main control piece. While these controls certainly helped, it still meticulous patience in order for each animation to look realistic. There are 9 animations in all: a t-pose, idle, walking, running, jumping, hammering, charging, recovery, and landing.

After exporting to FBX and finally getting all my work properly into unreal, I faced my next challenge: creating the physics asset. First, the way that physics constraints for an asset are handled has changed from version to version, making the documentation very hard to follow. Much of this work was done by trial and error. I learned how to make only certain collision bodies interact with each other, learned how to constrain each joint so that it wouldn't move more than would be realistically possible, and I learned how to add weights to each part of the physics body so that it would 'crumple' in the correct manner when the character dies.

4. Game Revision

The first revision made was to simplify the model being used. Not only did the original design have too many vertices, but it also looked very horrible with basic Lambert textures. Since I want the game to be simple and not distracting, I had to scrap the more complicated design.

Next, I had to change the hands to be a static 'fist' instead of having a set of 4 individual bones for each finger. While this would have been cool, since the fingers never move in game, the extra effort would have been wasted on something that nobody would ever see.

Finally, I had to accept the fact that the elbows on the character would be able to bend backwards slightly. With the UE4.23 update, there seems to be a bug in which the constraints can't rotate to new positions. If I'm able to find a solution to this before the final project, then it will be fixed.

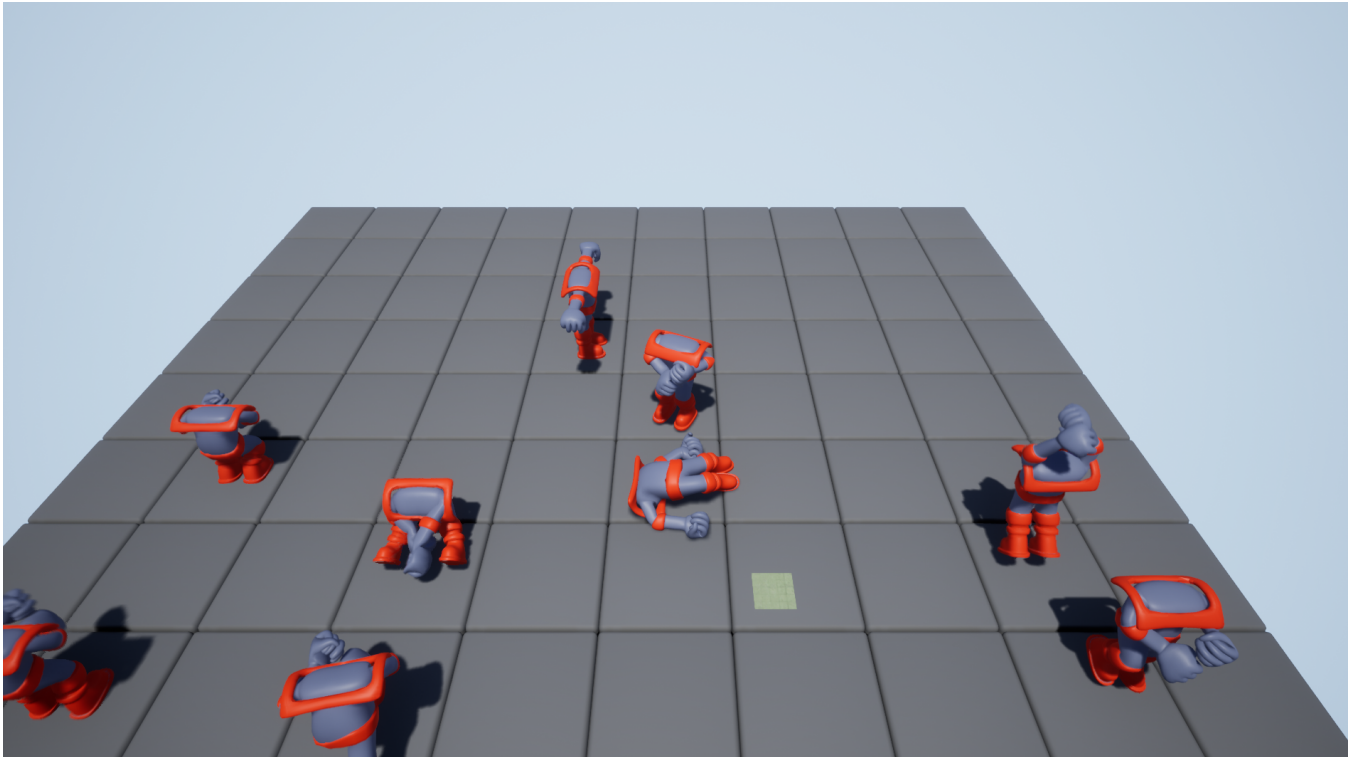


Figure 1. First demo release

5. Current Demo

The current state, as mentioned earlier, is more of a showcase than a demo. However, there are some key aspects to pay attention to in this build.

First, each animation can be seen playing out onscreen. Currently the character is blue, but the materials were set up such that they could be easily and quickly changed. This makes it so 4 (or more) characters have already been accounted for in the final game.

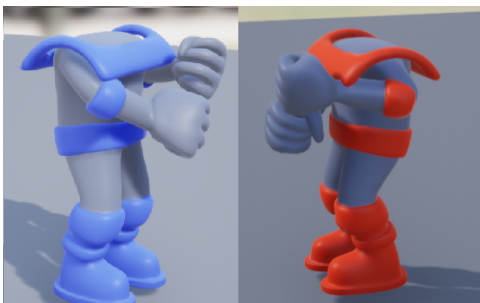


Figure 2. Quickly hot-swappable colors

The rag-doll is also a key item to look at. This rag-doll moves around realistically when bumped into, it also has the correct constraints for the joints, so that the back doesn't bend and twist in unconventional ways.



Figure 3. The body falls limp in a realistic way