# Project introduction

We have made an exciting VR music game where the player must smash the oncoming obstacles and score points according to the rhythm of the game. Random obstacle generation and rhythmic music will give the player an immersive and interactive experience.

I was responsible for everything about the music and the UI of the game, and in the later stages of the project I used Touchdesigner to create a sound visualisation for the scenes of the game. In the Unity part, I was responsible for generating different obstacles according to the rhythm of the music, including the rhythm generation and the generation of different obstacles, in this part was in conjunction with the obstacle generator created by Jinglin Zhang.

First, for the music selection I referred to very many similar music games such as AVICCI INVECTOR, Muse Dash, Beat Saber etc. and their art effects and gameplay. I had a lot of conversations with our project leader, Jinglin Zhang, and we ended up with AVICCI INVECTOR's art scenes and effects, as well as beat saber's core gameplay. But to differentiate ourselves from these games we added more of our own design to the game. Throughout the process we often disagreed over the game's supper, for example if our game was too like beat saber or if we were technically unable to do something we really wanted to do. Our project was split into two versions, the first for the exhibition, the second iterated on the feedback we received from the exhibition and the second was our final project.
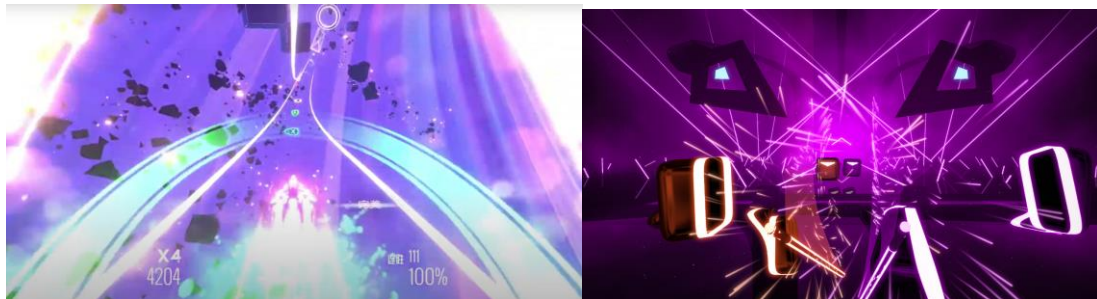

The working process

For the music I chose the song IVORY TOWER, a song by Japanese ACG composer Sawani Hiroyuki, which is a very upbeat song that was perfect for our game. I adjusted the levels and increased the volume of the stereo and the drums, to make the music work better in the game and to give it a more rhythmic feel. However, after the initial exhibition, I received a lot of feedback from players that the music had too much noise and lacked a sense of rhythm. So, through iterative design I re-chosen the music and used a better sounding source. 'Red Lotus' as the music we finally chose it was more suitable for our game song than IVORY TOWER, in terms of rhythm the song Red Lotus is faster and more passionate, and when processing its audio file, I could already imagine it would make our game even better.

After processing the music and audio I used the Koreagrapher plugin in unity, through which I was able to process the rhythm of the music directly and add separate unity events for each rhythm, I was able to generate hittable obstacles for the game in this way, however I neglected to think about the movement time of the obstacles ahead of time I wanted the timing of the player hitting the obstacle to match the rhythm of the drums, so I had to calculate the movement time of the obstacle and get the plugin to process the event and generate the obstacle in advance.
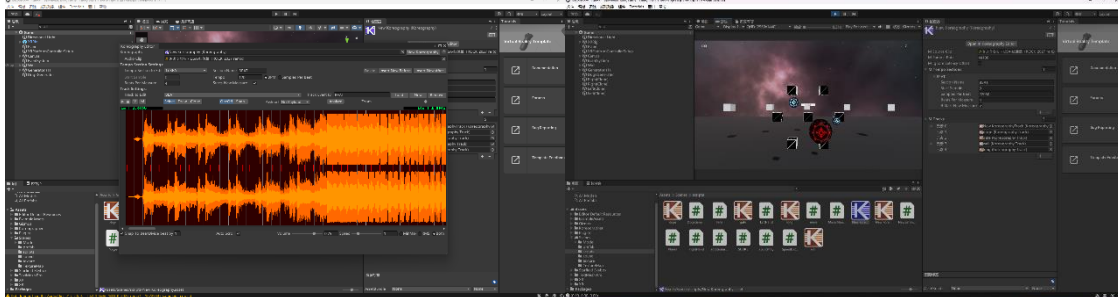
This was a huge amount of work as we had 5 different actions (hitting an obstacle, avoiding an obstacle, hitting a linear obstacle, entering a portal and moving a wall) I needed to create
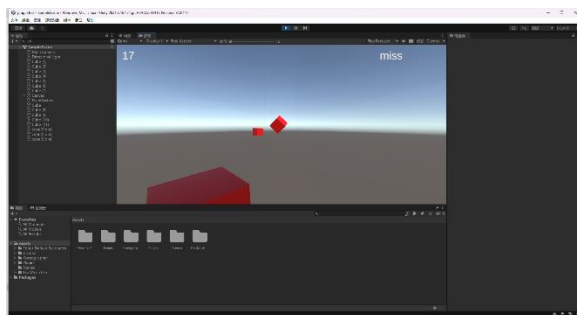
5 events in the Koreagrapher and not have them all appear at the same time in the game as if they did the player would not be able to hit all the obstacles at the same time, which would make for a This would make for a bad gameplay experience. After completing the drum editing and generation in Koreagrapher, I worked with Jinglin Zhang to add scripts for the obstacles in our game (movement scripts, obstacle disappearance scripts) I combined the obstacle generation scripts created by Jinglin Zhang and the obstacle models in the unity scene with my work and after a few tests and modifications have met the minimum requirements for the game were met after several tests and modifications.

In the meantime, while waiting for the rest of the group to progress I used Touchdesigner to create a music visualisation, I wanted to connect Touchdesigner to unity and import the artwork created in Touchdesigner into the unity scene. We were very disappointed that the artwork could not be imported into unity due to OSC issues, as we agreed that the artwork created with Touchdesigner would make our game more visually stunning. To create the

sound interaction using Touchdesigner, I first created a model using the SOP component and gave it a material and rendered it in the scene using the renderer, then used a 5×5 color block to create the color effects. For the music interaction I used Audio Analysis to extract the treble and bass levels from the audio file to control the image changes, I used the low level to control the scaling of the object and the high level to control the rotation of the object, I used the Math function to datatype this and transfer this data to the object properties.

After completing the Touchdesigner work, I started work on the ray detection of the linear obstacle. I wanted to have the VR controller detect the linear obstacle and detect the timing of the hit of the linear obstacle based on the VR controller, but because it was too complex I ended up using collision detection to complete the hit of the linear obstacle, this part was assisted by Chen Yang because he is very experienced in handling This part was done by Chen Yang, who is very experienced in handling obstacle collisions, and we collaborated on the script for linear obstacle collision detection.

At the end I created the UI for the game, including four pages and three functions. I used Midjourney to generate the illustrations for our game and based on them I created the UI in Photoshop and imported them into the Unity scene in PNG format. I do the transitions and interactions between each page by switching between scenarios.
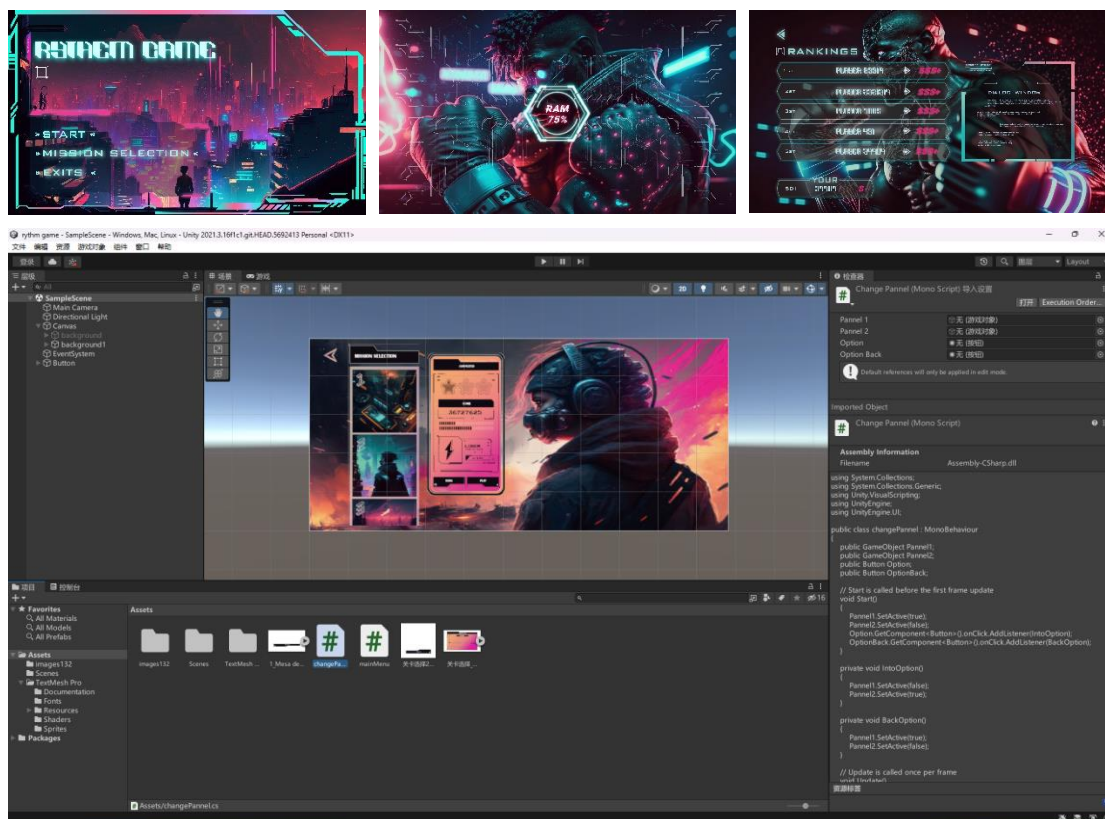
There are still some areas for improvement after the completion of the project. Firstly, the obstacles were flying so fast that it was very difficult to get the highest score, because in order to make the game more playable I used a script that randomly generates obstacles, which

makes every game different, but the downside of this is that if two obstacles are generated at the same location and they physically collide, it causes the impacted object to fly at a fast speed. Secondly, because of the increase in gameplay we need more time to refine specific features. We are not satisfied with the completeness of the game now, and we have the ability and confidence to finish it better. We have gained a lot from this module, firstly we have completed an iteration of the design and have been involved as gamers and stakeholders, we have encountered a lot of difficulties in the process and we have used a lot of methods to solve them, we have asked our teachers, we have used ChatGPT, we have enjoyed the problem solving and learning process and we are very happy with the progress we have made at this stage.