In commonly played games today, it is not yet possible to feel the temperature of objects in the game world. One way to represent temperature in games is to use condensation. Condensation is the process by which water vapor in the air turns into liquid water droplets. This happens when the air is cooled below its dew point. Condensation can be used to show that an object has a low temperature. For example, person's breath might condense in the air when they exhale in a cold environment, or cold beverage might have condensation on its surface. Using condensation to represent temperature in games can make the gaming experience more realistic.

The ID map is a two-dimensional array that stores the presence of water droplets at each coordinate. The size of the array is the same as the size of the height map. Each element in the array is either 0 or 1, where 0 represents the absence of a water droplet and 1 represents the presence of a water droplet.

The height map is a grayscale image that represents the height of a water droplet. It is generated using OpenCV and loaded as a 2D texture to calculate the normal map. The height map is based on the shape of a hemisphere, which means that the height gradually decreases from the center of the droplet to the edges.

The normal map is used to represent the normal vector for each pixel on the surface of a water droplet. The normal vector is perpendicular to the surface and points outwards. The normal map is created by calculating the derivative from the height map. This calculation is done in GLSL (OpenGL Shading Language) and the result is not stored, but instead used to calculate the refraction of light using Snell's law.

An environment map is a panoramic image that is used to represent the surrounding environment. It is used in simulation to show the refraction result of the water droplets　(ref). The environment map is loaded into the GPU and used to calculate the refraction of light at the surface of the water droplets. This results in a more realistic and visually appealing simulation of condensation.

Although the current implementation successfully creates water droplets with correct refraction, the result is pixelated due to the use of a 2D image texture for the height map. Increasing the resolution of the texture image would improve the quality of the result, but would also increase the execution time.

In future work, we plan to implement the following: (point)

* Calculate the Fresnel effect to add more realism to the result.
* Update the height map texture per frame to create an animated condensation effect.

These improvements will make the condensation simulation more realistic and visually appealing.

This method simulates the condensation effect relatively efficiently by using only textures. However, to achieve a more realistic result, I believe that using a 3D model of a water droplet would give the rendered scene more depth.