Virtual Environment construction:

My virtual environment contains a ground plane with a mipmapped texture and a displacement map to model a realistic bumpy cobble street. The rest of the scene is madeup of imported objects from sketchfab as well as directional light and spotlights. The scene also has characters walking and dancing. I have used a skybox to model an outdoor sky.

Application of multi-resolution modelling techniques:

This project uses LOD of detail modelling with each mesh in the scene being an LOD with three levels, the deformed meshes were generated in blender using 'decimate', I have also implemented a function that iterates through each material in the scene and changes the filtering based on distance to limit visual artifacts and blurred textures, all textures are mipmapped.

Application of parametric curves and surfaces techniques:

I have created a function which uses a CubicBezier curve to procedurally generate a terrain displacement map modelling a bumpy cobbled street. This function returns an image to be used as a displacement map with the colour values corresponding to y and z values of the Bezier curve.

Application of Skeletal animation techniques:

I have created human models with bones and skeletons using SkinnedMesh's, I have animated a dance routine for the human models to do with the help of an inverse kinematics solver. This dance routine is generated using trigonometric functions human bones. I have also created a walking animation for characters.

Application of visual quality control techniques:

I have implemented basic antialiasing as well as a ACES tone mapper (ACESFilmicToneMapping), I have also added a button which allows users to disable anti-aliasing.

Note:

All assets and textures have been downloaded and not created by myself with the exception of the human model which is created using geometries which can be seen in the JavaScript code.