Advanced Computer Graphics

2) Virtual environment construction
I implemented novel, self-created surfaces and geometric models in Three.JS. Through using third party textures and models which I edited in Blender, I managed to create two scenes - a recognisable Durham marketplace and inside the local Tesco's. I manipulated camera and the main lighting techniques to extend scene environments.

3) Application / implementation of multi-resolution modelling techniques
Level of detail modelling was implemented on main objects within both scenes. This was extended through multi-texture resolution on buildings, followed by shadow analysis to prevent shadows rendering on objects when the camera is far away. Hence, a clear image is always provided. I also attempted adaptive LOD through ray-tracing.

4) Application / implementation of parametric curves and surfaces techniques
A parametric ground function was implemented creating the main ground surface, allowing precision and control. Phong meshes were used as basic LOD models, due to simplicity in computation. Custom textures and colours were applied, as well as shadow effects from lighting. Some meshes were merged and transformed, rotated and scaled.

5) Application / implementation of skeletal animation techniques Skeletal animation was carried out with a human model in Blender to create a brisk walking animation. This involved rigging and skinning a model, followed by key-framing and inbetweening. The resulting animation was applied to fifty other characters models to simulate the movement of around town.

6) Application / implementation of visual quality control techniques
Simple MSAA anti-aliasing was applied to ensure the accurate representation of content. SMAA generated a clearer image while maintaining efficiency, in comparison to FXAA. Further passes were applied, including a bloom and bokeh pass. Camera controls were extended with bounds and on-click scene transitions with ray-tracing.