COMP4097 Advanced Computer Graphics Coursework Submission Form

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Information about how marking criteria is met is provided below, each criterion is described in at most 50 words.

Virtual Environment Construction (15%)	Most models custom made (classrooms, chairs, tables) including custom level of detail models made in SketchUp Mix of polygon models and parametric surfaces Custom surface implementation and construction using parametric geometry Direct interaction with WebGL buffers for efficiency via Three Models imported as GLTF for efficiency and improved using gltfpack
Application of Multi-Resolution Modelling (20%)	Custom level of detail models (e.g. tables, computers) Applied level of detail to parametric surfaces (bike shed, curved roofs) Custom implementation of mesh simplification using quadric error with edge collapse Progressive meshes with network streaming, automatically rebuild the mesh as incremental data is received Billboarding (e.g. trees) at long range
Application of Parametric Curves and Surfaces (20%)	Custom implementation of Bezier Surfaces (classroom roofs), B-Spline Surfaces (sports hall roof), NURBS Surfaces (trampoline, pond) using basis functions Efficient updating of NURBS surface when control points moved using incremental rendering method Combined with level of detail (no. of samples increases/decreases with distance) Parametric curves to define skeletal animations

Application of Skeletal Animation (20%)	Custom humanoid rigged using Blender manually Implemented SkinnedMesh manipulator with Inverse Kinematics and Forward Kinematics Implemented Forward Kinematics with direct bone manipulation Rigged people on trampolines with surface deformation Skeletal animations combined with level of detail and billboarding (trees) Variable skeletal animation quality Skeletal animation paths defined using Bezier curves
Visual Quality Control (15%)	Render distance Model billboarding with level of detail Configurable level of detail (trigger distance and parametric surface samples) Configurable parametric surface sample count Configurable animation quality Optimisation of GLTF models using gltfpack Multiple Anti-Aliasing modes (None, FXAA, SMAA) Real-time dynamic optimisation using target FPS