

# Advanced Computer Graphics Summative Assignment - LLLL76

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## QUESTION ONE - 20 MARKS

Compare the main difference between applying appearance-based metric and geometric based metric to measure the quality difference between two polygon meshes. Analyse in which part of the graphics rendering pipeline each metric should be applied to perform quality measurement.

## QUESTION TWO - 10 MARKS

Explain how the Hausdorff distance can serve as a metric to determine the dissimilarity between two polygon meshes, even when these meshes are formed by different number vertices and connectivity.

## QUESTION THREE - 20 MARKS

Describe the data structure of progressive meshes. Analyse the rendering efficiency of progressive meshes visualisation, given that the user is allowed to freely rotate the viewpoint during the visualisation process.

## QUESTION FOUR - 10 MARKS

Explain how progressive meshes implement the refinement and decimation processes.

## QUESTION FIVE - 20 MARKS

Analyse how the incorporation of level-of-detail modeling impacts the rendering performance and network bandwidth consumption of a large distributed virtual environment system. Evaluate the suitability of using progressive meshes to implement the level-of-detail modeling in such a system.

Note that in the above distributed virtual environment system, all graphics models of the virtual environment are maintained by a remote server. During runtime, each client will download relevant graphics models on-demand from the server to support interaction and visualisation.

## QUESTION SIX - 20 MARKS

Explain the main issue of applying level-of-detail modeling to support interactive visualisation of a large 3D scene, given that the user is allowed to change the viewpoint from time to time. Describe two different methods to tackle such a challenge.