

**Angel: Interactive Computer Graphics, Fourth Edition**  
Chapter 9 Solutions

9.17 Actually if the map were digitized to a high resolution bump map, it would be difficult to tell it was not correct. In practice, we could probably notice the artifacts at the edges between the quadrilaterals created from the height map.

9.21 The main problem is to compute the proper rotation matrix by computing the normal, binormal and tangent vectors for each polygon in the mesh.

9.23 Obviously there is a point where the displacements are large enough that the approximations we made in our derivation are no longer valid. Bump maps look best when viewed from the normal direction since the geometric surface is not altered. As we look from the side or at the silhouette edge, we can see that the surface is unaltered. Also, anisotropic displacements such as scratches may not be modeled well as displacements in the normal direction.