

## 2007/2008 Graphics Tutorial 8

**Problem 1** *Our textbook gives a function `stripe` that generates a stripe texture (see also the lecture notes on texture mapping). Adapt this function to generate a tile texture, giving square tiles any plane that is orthogonal to the  $X$ -,  $Y$ -, or  $Z$ -axis. The size of the square tiles must be controllable.*

**Problem 2** *For planes that are not orthogonal to the  $X$ -,  $Y$ -, or  $Z$ -axis, the texturing function from the previous problem will create non-square (but rectangular) tiles. What can we do to create a square tile texture for such planes?*

**Problem 3** *Explain what bilinear interpolation is (in the context of texture mapping), and explain why we would want to use it.*

**Problem 4** *What is mip-mapping?*

**Problem 5** *Explain the principles of Perlin noise.*

**Problem 6** *How do we map a rectangular image (of, say, a map of the world in mercator projection) onto a sphere?*

**Problem 7** *A 3D triangulated model can be represented by a triangle soup (i.e., a collection of individual triangles), or by a triangle mesh (in which case neighboring triangles share their common vertices). What is the advantage for texturing of the latter representation?*

**Problem 8** *What is the relation between bump mapping and displacement mapping?*