There are various ways that texture samples are actually computed. This question asks about two different sampling modes

1) Compare the GL\_NEAREST sampling mode with the GL\_LINEAR in two ways: which gives better results; which takes more time to compute.

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Accessing a specific sample from a texture is done through filtering. There are two cases for filtering: minification and magnification. When a texture fragment is magnified, it has a texture space area smaller than a texel, and when it is minified, it has a texture space area larger than a texel. Filtering for these two cases can be set independently.

Explanation

The magnification filter is controlled by the GL TEXTURE MAG FILTER texture parameter. This value can be GL LINEAR or GL NEAREST. If GL NEAREST is used, then the implementation will select the texel nearest the texture coordinate; this is commonly called "point sampling". If GL LINEAR is used, the implementation will perform a weighted linear blend between the nearest adjacent samples.

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Texture coordinates do not depend on resolution but can be any floating point value, thus OpenGL has to figure out which texture pixel (also known as a texel ) to map the texture coordinate to. If you have a very large object and a low resolution texture, this becomes especially crucial. You probably know by now that OpenGL includes options for this texture filtering as well. There are several options available but for now we'll discuss the most important options: GL NEAREST and GL LINEAR.

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GL NEAREST (also known as the nearest neighbour or point filtering) is the default texture filtering method of OpenGL. When set to GL NEAREST, OpenGL selects the texel that the centre is closest to the texture coordinate.

GL LINEAR also referred to as (bi)linear filtering, approximates a colour between the texels by using an interpolated value from the texture coordinate's surrounding texels. The amount that a texel's colour contributes to the sampled colour depends on how close its texture coordinate is to its centre.

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**Comparison between the GL\_NEAREST sampling mode with the GL\_LINEAR**

GL NEAREST given value of the texture component that is located the nearest thing to the center of the patterned pixel (measured in Manhattan distance)

The weighted average of the four texture parts closer to the center of the textured pixel is returned by the GL LINEAR feature. These can include elements of the border texture.

Although GL NEAREST is typically faster than GL LINEAR, the transition between texture elements is less seamless, which can result in textured images with sharper edges.

GL NEAREST results in blocked styles in which we can see the images that form the texture while GL LINEAR creates a smoother pattern where the individual pixels are less viewable. Although GL LINEAR provides a more accurate output, some developers choose an  8-bit appearance and opt for GL NEAREST instead.

**Final Answer**

Thus, the quickest and most straightforward filtering technique is nearest neighbour filtering. A texture is plotted against the coordinates of the texture.

Linear Filtering demands more labour. It works by applying the weighted average of the texels surrounding the texture coordinates. GL LINEAR offers a more accurate result, however