Test 0 Computer Graphics

January 13, 2025

– State any simple, reasonable assumption used to arrive at your answer.
– A 'yes' or 'no' answer without reasoning is worth 0 points.
– Zero points if the writing is hard to decipher. Use a black pen if in doubt.
– Indicate with arrow if you use the back of the previous page (last page for page 1).

1 Linear Algebra

Compute the matrix products

$$\begin{bmatrix} 1 & 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \end{bmatrix} = \qquad\qquad \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 & 1 \end{bmatrix} =$$

2 Normals (important for rendering!)

- What object is described by the set $S := \{(x, y, z) : x^2 + y^2 - 1 + z^2 = 0\}$?

- What is the normal to S at $(1, 0, 0)$?

3 Rotation (ordering)

Given two matrices A and B that rotate a point $\mathbf{x} \in \mathbb{R}^3$, does it make a difference if we
first apply B to $\mathbf{x}$ and then A
rather than
first apply A to $\mathbf{x}$ and then B?

4 Programming

- In C++, define a pointer `p` to the 10th entry of an integer array `a[20]`.

- Use the pointer to return the value in `a[11]`.

- What is CMake?

Name the highest level computer graphics course you passed so far, or write none