socrative

3D Geometry Objects

10 Questions

1. What is the name of 2 presenters today?

1 POINT

0/11 **A** Nguyen Duc Anh Phuc & Ngo Van Tan Luu

0/11 **B** Ngo Van Tan Luu & Huynh Viet Tuan Kiet

0/11 **C** Nguyen Duc Anh Phuc & Truong Thanh Thang

11/11 **D** Huynh Viet Tuan Kiet & Nguyen Duc Anh Phuc

0/11 **E** Ngo Van Tan Luu & Truong Thanh Thang

2. Which is a correct statement?

2 POINTS

2/12 **A** 3 collinear points are 3 points in only one plane

2/12 **B** There is only one plane going through 3 collinear points

5/12 **C** 3 coplanar points may not be collinear

3/12 **D** 3 points that are not collinear are definitely not coplanar

3. Why must use matrices in order to represent linear transformations?

3 POINTS

0/11 **A** Matrices allow arbitrary linear transformations to be displayed in a consistent format suitable for computation

0/11 **B** Matrices are easily represented as a computer data structure

0/11 **C** The transformation represented as a matrix M can be undone by applying the inverse of the matrix M^{-1}

0/11 **D** Every linear transformation is a matrix transformation

0/11 **E** Both A, B, D are correct

1/11 **F** A and C are correct

5/11 **G** Both A, B, C are correct

5/11 **H** Both A, B, C, D are correct

0/11 **I** B and C are correct

4. Square matrices are used so that we can perform all transformations using matrix **multiplications.**

1 POINT

10/11 T True

1/11 F False

$$\begin{bmatrix} 1 & 0 & 0 & T_X \\ 0 & 1 & 0 & T_Y \\ 0 & 0 & 1 & T_Z \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

5. Based on the equation, which is the matrix that rotates around the Oy axis?

3 POINTS

$$X' = X \times \cos\theta + Z \times \sin\theta$$

$$Y' = Y$$

$$Z' = -X \times \sin\theta + Z \times \cos\theta$$

$$\rightarrow \begin{bmatrix} X' \\ Y' \\ Z' \\ 1 \end{bmatrix} = [?] \times \begin{bmatrix} X \\ Y \\ Z \\ 1 \end{bmatrix}$$

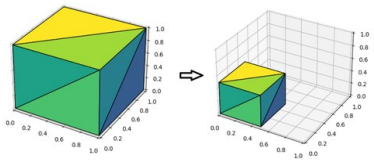
1/11 A $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & \cos\theta & -\sin\theta & 0 \\ 0 & \sin\theta & \cos\theta & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

10/11 B $\begin{bmatrix} \cos\theta & 0 & \sin\theta & 0 \\ 0 & 1 & 0 & 0 \\ -\sin\theta & 0 & \cos\theta & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

0/11 C $\begin{bmatrix} \cos\theta & 0 & -\sin\theta & 0 \\ 0 & 1 & 0 & 0 \\ -\sin\theta & 0 & \cos\theta & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

0/11 D $\begin{bmatrix} \sin\theta & 0 & \cos\theta & 0 \\ 0 & 1 & 0 & 0 \\ -\cos\theta & 0 & \sin\theta & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

6. Which matrix represents this 3D scaling transformation visualization?



3 POINTS

2/11 **A**
$$S = \begin{bmatrix} \frac{1}{2}, 0, 0, 0 \\ 0, \frac{1}{2}, 0, 0 \\ 0, 0, \frac{1}{2}, 0 \\ 0, 0, 0, 0 \end{bmatrix}$$

3/11 **B**
$$S = \begin{bmatrix} 2, 0, 0, 0 \\ 0, 2, 0, 0 \\ 0, 0, 2, 0 \\ 0, 0, 0, 1 \end{bmatrix}$$

1/11 **C**
$$S = \begin{bmatrix} 1, 0, 0, 0 \\ 0, 1, 0, 0 \\ 0, 0, 1, 0 \\ 0, 0, 0, \frac{1}{2} \end{bmatrix}$$

4/11 **D**
$$S = \begin{bmatrix} \frac{1}{2}, 0, 0, 0 \\ 0, \frac{1}{2}, 0, 0 \\ 0, 0, \frac{1}{2}, 0 \\ 0, 0, 0, \frac{1}{2} \end{bmatrix}$$

1/11 **E**
$$S = \begin{bmatrix} 1, 0, 0, 0 \\ 0, 1, 0, 0 \\ 0, 0, 1, 0 \\ 0, 0, 0, 2 \end{bmatrix}$$

0/11 **F**
$$S = \begin{bmatrix} 2, 0, 0, 0 \\ 0, 2, 0, 0 \\ 0, 0, 2, 0 \\ 0, 0, 0, \frac{1}{2} \end{bmatrix}$$

7. What transformation does this matrix perform?

$$\begin{bmatrix} X' \\ Y' \\ Z' \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} X \\ Y \\ Z \\ 1 \end{bmatrix}$$

2 POINTS

0/11 **A** Reflection through the XY plane

0/11 **B** Reflection through the YZ plane

11/11 **C** Reflection through the XZ plane

8. What transformation does this matrix perform?

$$\begin{bmatrix} X' \\ Y' \\ Z' \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} X \\ Y \\ Z \\ 1 \end{bmatrix}$$

3 POINTS

5/11 **A** Rotation around the Ox axis 90 degrees

3/11 **B** Rotation around the Oy axis 90 degrees

3/11 **C** Rotation around the Oz axis 90 degrees

9. Which of the following coordinate performs the translation $(2, 4, 5)$ and rotates about the z-axis at an angle of 90 degrees at the point $(1, 1, 1)$?

3 POINTS

1/11 **A** $(5, 3 - 6)$

7/11 **B** $(-5, 3, 6)$

1/11 **C** $(-3, 3, 6)$

2/11 **D** $(3, 3, -6)$

10. Which of the following matrices performs the reflection $(2, 4, 5)$through the YZ plane and shear in the X directions with the parameter $(0, 4, 7)$ degrees at any point?

5 POINTS

6/11 **A**
$$S = \begin{bmatrix} -1, 0, 0, 0 \\ -4, 1, 0, 0 \\ -7, 0, 1, 0 \\ 0, 0, 0, 1 \end{bmatrix}$$

3/11 **B**
$$S = \begin{bmatrix} -1, 0, 0, 0 \\ 4, 1, 0, 0 \\ 7, 0, 1, 0 \\ 0, 0, 0, 1 \end{bmatrix}$$

1/11 **C**
$$S = \begin{bmatrix} -1, 0, 0, 0 \\ -4, 1, 0, 0 \\ 7, 0, 1, 0 \\ 0, 0, 0, 1 \end{bmatrix}$$

1/11 **D**
$$S = \begin{bmatrix} -1, 0, 0, 0 \\ 4, 1, 0, 0 \\ -7, 0, 1, 0 \\ 0, 0, 0, 1 \end{bmatrix}$$