CS 230, Quiz 1

Solutions

You will have 5 minutes to complete this quiz. There are three questions (one is on the back). No books, notes, or other aids are permitted.

Problem 1

Using the definitions below, compute $3\mathbf{u} \cdot \mathbf{v}$.

$$\mathbf{u} = \begin{pmatrix} 1 \\ -2 \\ 0 \end{pmatrix} \qquad\qquad \mathbf{v} = \begin{pmatrix} 4 \\ -1 \\ 1 \end{pmatrix}$$

$$3\mathbf{u} \cdot \mathbf{v} = 3((1)(4) + (-2)(-1) + (0)(1)) = 3(4 + 2 + 0) = 18$$

Problem 2

LED monitors use red, green, and blue lights to produce colors. Why three colors and not two or four? Why these three particular colors? (A one or two sencence explanation adressing both questions is fine.)

Your eyes have three types of cone cells that detect light at different frequencies. The three types of cells are most sensitive to red, green, and blue light. By using lights at those colors, you are targeting the cells one at a time.

Problem 3

Below is a simple 2D raytracing setup. The 1D image has five pixels. (1) Label the pixels R, G, B based on the color that the pixel would be after raytracing the scene. (2) Also draw the rays that would be cast in the process (ignore shadows, reflections, transmission, antialiasing, and other more advanced features).