CS 230, Quiz 3

Solutions

You will have 5 minutes to complete this quiz. No books, notes, or other aids are permitted.

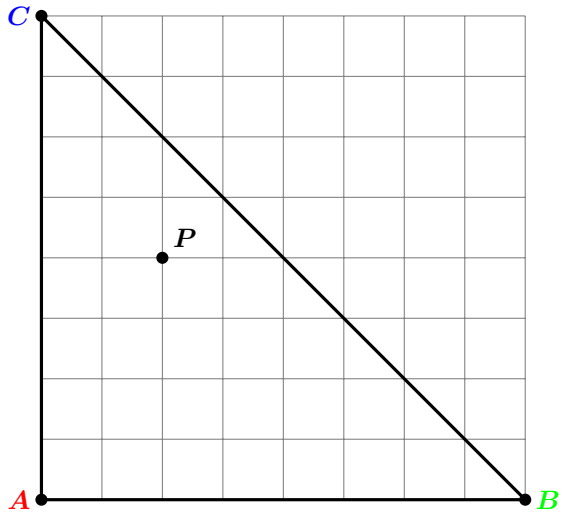
Problem 1

Fill in the missing parts of the triangle rasterization algorithm

for all $x \in [x_{min}, x_{max}]$ do
  for all $y \in [y_{min}, y_{max}]$ do
    Compute (α, β, γ) for (x, y)
    if $0 \leq \alpha, \beta, \gamma$ then
      $\mathbf{c} = \alpha \mathbf{c_0} + \beta \mathbf{c_1} + \gamma \mathbf{c_2}$
      Draw pixel (x, y) with color c

Problem 2

The triangle below is to be rasterized. The colors of the vertices are A = red = $(1, 0, 0)$, B = green = $(0, 1, 0)$ and, C = blue = $(0, 0, 1)$. (1) Compute the barycentric weights of P, and (2) compute the color of the point P.



$$\text{area}(ABC) = 32 \qquad \text{area}(APC) = 8 \qquad \text{area}(ABP) = 16$$
$$\text{area}(PBC) = \text{area}(ABC) - \text{area}(APC) - \text{area}(ABP) = 8$$
$$\alpha = \frac{\text{area}(PBC)}{\text{area}(ABC)} = \frac{1}{4} \qquad \beta = \frac{\text{area}(APC)}{\text{area}(ABC)} = \frac{1}{4} \qquad \gamma = \frac{\text{area}(ABP)}{\text{area}(ABC)} = \frac{1}{2}$$
$$C_P = \alpha C_A + \beta C_B + \gamma C_C = \left(\frac{1}{4}, \frac{1}{4}, \frac{1}{2}\right)$$