

Given:

$$P_1, P_2, Q, w, c, t$$

P_1 and P_2 are the two end points, Q is the point we want to get the color for, and w is the width of the line. c is the color of the line, and t is a fully transparent color.

$$\vec{v} = \overrightarrow{P_1P_2}$$

$$\vec{u} = \overrightarrow{P_1Q}$$

$$\vec{u}_{\vec{v}} = \frac{\vec{v} \cdot \vec{u}}{|\vec{v}|} \vec{v}$$

$$d = |\vec{u} - \vec{u}_{\vec{v}}|$$

$$d = \left| \vec{u} - \frac{\vec{v} \cdot \vec{u}}{|\vec{v}|} \vec{v} \right|$$

We are dealing with only two dimensions in a cartesian coordinate system:

$$l = \sqrt{\vec{v}_1^2 + \vec{v}_2^2}$$

$$m = \frac{x(\vec{v}) * x(\vec{u}) + y(\vec{v}) * y(\vec{u})}{l}$$

$$d = \left| \begin{pmatrix} \vec{u}_1 - m\vec{v}_1 \\ \vec{u}_2 - m\vec{v}_2 \end{pmatrix} \right|$$

$$d = \sqrt{(\vec{u}_1 - m\vec{v}_1)^2 + (\vec{u}_2 - m\vec{v}_2)^2}$$

→ The color of Q is the following:

$$\begin{cases} c & \text{if } d < w \wedge 0 \leq m \leq 1 \\ t & \text{else} \end{cases}$$