

Antwoorden voorbeeld toets

Vraag1

$$P = \begin{pmatrix} 1 \\ 1 \\ 0 \\ 1 \end{pmatrix} \quad Q = \begin{pmatrix} 3 \\ 1 \\ 0 \\ 1 \end{pmatrix} \quad R = \begin{pmatrix} 2 \\ 3 \\ 0 \\ 1 \end{pmatrix} \quad S = \begin{pmatrix} 2 \\ 2 \\ 4 \\ 1 \end{pmatrix} \quad I = \begin{pmatrix} 0 \\ 1 \\ 0 \\ 0 \end{pmatrix}$$

Vraag2

$$\text{Transformatie matrix} = \begin{pmatrix} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & 4 \\ 0 & 0 & 1 & 5 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$
$$\text{Beeld P is } \begin{pmatrix} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & 4 \\ 0 & 0 & 1 & 5 \\ 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 1 \\ 1 \\ 0 \\ 1 \end{pmatrix} = \begin{pmatrix} 4 \\ 5 \\ 5 \\ 1 \end{pmatrix}$$

Vraag3

$$\text{Rotatie matrix} = \begin{pmatrix} 0.87 & -0.50 & 0 & 0 \\ 0.50 & 0.87 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$
$$\text{Beeld Q is } \begin{pmatrix} 0.87 & -0.50 & 0 & 0 \\ 0.50 & 0.87 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 3 \\ 1 \\ 0 \\ 1 \end{pmatrix} = \begin{pmatrix} 2.10 \\ 2.37 \\ 0 \\ 1 \end{pmatrix}$$

Vraag4

$$M = \begin{pmatrix} -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & -1 & -1 & 0 \\ 0 & -1 & 0 & -1 \end{pmatrix}$$

Vraag5

$$G = \begin{pmatrix} 1 & 0 & 1 \\ 0 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{pmatrix}$$

$$G^T = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 \end{pmatrix}$$

$$G^T G = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 \end{pmatrix} \begin{pmatrix} 1 & 0 & 1 \\ 0 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 3 \end{pmatrix}$$

$$(G^T G)^{-1} = \begin{pmatrix} 2.00 & 1.00 & -1.00 \\ 1.00 & 2.00 & -1.00 \\ -1.00 & -1.00 & 1.00 \end{pmatrix}$$

$$K = (G^T G)^{-1} G^T = \begin{pmatrix} 2.00 & 1.00 & -1.00 \\ 1.00 & 2.00 & -1.00 \\ -1.00 & -1.00 & 1.00 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 \end{pmatrix} = \begin{pmatrix} 1.00 & 0 & -0.00 & -1.00 \\ 0 & 0 & 1 & -1.00 \\ 0.00 & 0 & 0.00 & 1.00 \end{pmatrix}$$

Vraag6

$$\text{Schalen } S = \begin{pmatrix} 80 & 0 & 0 \\ 0 & 80 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$\text{Verplaatsen oorsprong naar midden scherm is } T_1 = \begin{pmatrix} 1 & 0 & 400 \\ 0 & 1 & 300 \\ 0 & 0 & 1 \end{pmatrix}$$

$$\text{Spiegelen in X-as is } S_x = \begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$\text{Verplaatsen over schermhoogte } T_2 = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 600 \\ 0 & 0 & 1 \end{pmatrix}$$

$$B = T_2 S_x T_1 S = \begin{pmatrix} 80 & 0 & 400 \\ 0 & -80 & 300 \\ 0 & 0 & 1 \end{pmatrix}$$

Vraag7

$$\text{Beeld } Q \text{ is } B K M Q = \begin{pmatrix} 80 & 0 & 400 \\ 0 & -80 & 300 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 1.00 & 0 & -0.00 & -1.00 \\ 0 & 0 & 1 & -1.00 \\ 0.00 & 0 & 0.00 & 1.00 \end{pmatrix} \begin{pmatrix} -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & -1 & -1 & 0 \\ 0 & -1 & 0 & -1 \end{pmatrix} \begin{pmatrix} 3 \\ 1 \\ 0 \\ 1 \end{pmatrix} =$$

$$\begin{pmatrix} -880 \\ -680.00 \\ -2 \end{pmatrix}$$