Let $L \subset \mathbb{R}^3$ be a lattice with bases $\mathcal{B}_1 = \{\vec{\mathbf{v_1}}, \vec{\mathbf{v_2}}, \vec{\mathbf{v_3}}\}$ and $\mathcal{B}_2 = \{\vec{\mathbf{w_1}}, \vec{\mathbf{w_2}}, \vec{\mathbf{w_3}}\}$ where

$$\begin{aligned} \vec{\mathbf{v_1}} &= \langle 1, 3, 1 \rangle & \vec{\mathbf{w_1}} &= \langle 18, -5, -5 \rangle \\ \vec{\mathbf{v_2}} &= \langle -2, 1, 1 \rangle & \vec{\mathbf{w_2}} &= \langle -59, -24, 2 \rangle \\ \vec{\mathbf{v_3}} &= \langle 3, -2, -4 \rangle & \vec{\mathbf{w_3}} &= \langle -27, -8, 2 \rangle \end{aligned}$$

1. Verify that $\mathcal{B}_1$ and $\mathcal{B}_2$ are bases for the same lattice by placing $\mathcal{B}_1$ in the rows of a matrix A, $\mathcal{B}_2$ in the rows of a matrix B and verify that there is a matrix U with determinant 1 such that $UA = B$.
2. Compute the Hadamard Ratio for $\mathcal{B}_1$ and $\mathcal{B}_2$.
3. Use Babai's Algorithm to solve the CVP for $\vec{\mathbf{w}} = (13, -3, 7)$ using $\mathcal{B}_1$. Repeat using $\mathcal{B}_2$.
4. What is the value of $\|\vec{\mathbf{v}} - \vec{\mathbf{w}}\|$ for your answers from 3?