3) $A = \frac{1}{2}(e_1 e_1^T + e_2 e_2^T + e_1 e_1^T + e_2 e_1^T)$

Check if - $A = A^2$ ✓

- $A = A^T$ ✓

if good, find eigenvalues and eigenvectors

$$J = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{pmatrix}, \quad Q = \begin{pmatrix} \cdot & 1/2 & 0 \\ \cdot & 1/2 & 0 \\ \cdot & 0 & 1 \end{pmatrix}$$

→ no subspace in $\begin{pmatrix} 1 \\ 1 \\ 0 \\ 0 \\ \vdots \end{pmatrix}$ m times