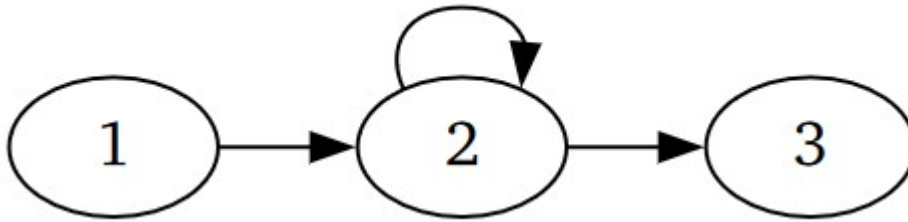**(4)** Let G be the directed snail below, Let A be the adjacency matrix of G. Describe all positive powers of A.

$$A^k = \begin{cases} \begin{pmatrix} 0 & 1 & 0 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{pmatrix} & k = 1 \\[1em] \begin{pmatrix} 0 & 1 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{pmatrix} & k \in \mathbb{Z}, k \geq 2 \end{cases}$$