

1.

$$1. \begin{pmatrix} 0 & 1 & 1 & 0 \\ 1 & 2 & 1 & 0 \\ 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 2 \end{pmatrix}$$

$$2. \begin{pmatrix} 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \end{pmatrix}$$

$$3. \begin{pmatrix} 0 & 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 2 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 3 & 0 & 0 \\ 0 & 0 & 5 & 0 & 0 & 0 \end{pmatrix}$$

2.

1. Vertices are basketball teams and edges are how many times they played each other.
2. Vertices are people on twitter and edges are whether one person follows another (but the one being followed does not necessarily follow back).
3. Vertices are countries and edges are whether the countries have fought in a war (civil wars cause self loops).
4. Vertices are people and edges are how many times person A has cited person B in a research paper.