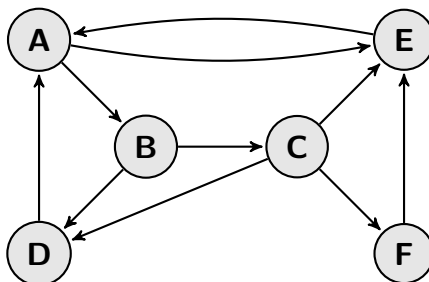Preparation problems for the discussion sections on December 4th and December 9th

1. *Suppose there is an epidemic in which, every month, half of those who are well become sick, and a quarter of those who are sick become dead. Set up a 3×3 transition matrix and find the long term equilibrium (steady state).*

2. *Find the PageRank vector for the following system of webpages, and rank the six webpages accordingly:*

3. *Solve the system of linear differential equations*
$$\frac{du}{dt} = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix} u$$

with initial condition $u(0) = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$.