Math 206 Group Quiz 4

Names: _____

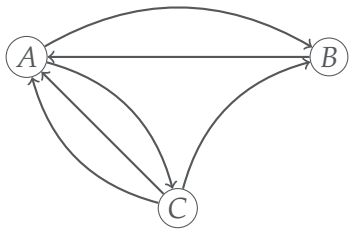
1. This sequence $0, 1, 1, 3, 5, \ldots$ is defined recursively by $r_0 = 0, r_1 = 1$ and $r_{n+1} = r_n + 2r_{n-1}$ for $n \geq 2$.

a. Let $A = \begin{bmatrix} 1 & 2 \\ 1 & 0 \end{bmatrix}$. Show that $A \begin{bmatrix} r_n \\ r_{n-1} \end{bmatrix} = \begin{bmatrix} r_{n+1} \\ r_n \end{bmatrix}$ and $A^n \begin{bmatrix} 1 \\ 0 \end{bmatrix} = \begin{bmatrix} r_{n+1} \\ r_n \end{bmatrix}$.

b. Diagonalize A.

c. Use the diagonalization and $A^n \begin{bmatrix} 1 \\ 0 \end{bmatrix} = \begin{bmatrix} r_{n+1} \\ r_n \end{bmatrix}$ to find a formula for r_n.

2. Basketball teams A, B, and C play each other, with the result of a game indicated with an arrow below:



Rank the teams using the random walk idea.