X

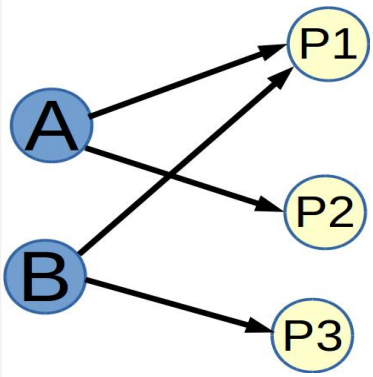


# Unit 12 - Week 8 : Link Analysis (Continued)



## Week 8 - Assignment 1

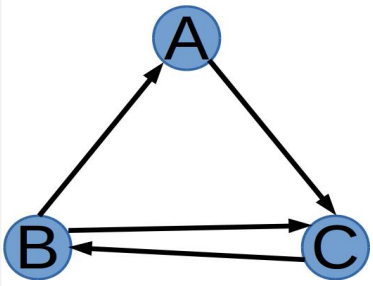
1) Observe the graph shown in the following figure. According to the principle of repeated improvement, which of the following is correct? ***1 point***




- $A = P1 \times P2, B = P1 \times P3, P1 = A + B, P2 = A, P3 = B$
- $A = P1 + P2, B = P1 + P3, P1 = A \times B, P2 = A, P3 = B$
- $A = P1 + P2, B = P1 + P3, P1 = A + B, P2 = A, P3 = B$
- $A = P1 + P2, B = P1 + P3, P1 = A \times B, P2 = 0, P3 = 0$

**Accepted Answers:**
$A = P1 + P2, B = P1 + P3, P1 = A + B, P2 = A, P3 = B$

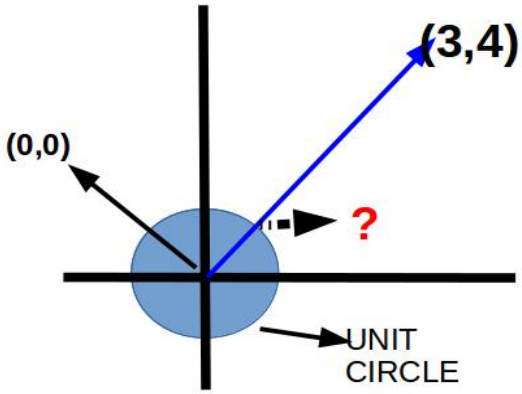
2) In the graph shown in the figure below, assume that the current pagerank values of A, B and C are 0.2, 0.4 and 0.4 respectively. What will be their pagerank values after one iteration? ***1 point***



- A : 0.4, B : 0.4, C : 0.4
- A : 0.2, B : 0.4, C : 0.4
- A : 0.4, B : 0.2, C : 0.4
- A : 0.4, B : 0.4, C : 0.2

**Accepted Answers:**
*A : 0.2, B : 0.4, C : 0.4*

3) Given a vector (3, 4) in the XY plane, what will this vector become after being pulled to the unit circle as shown in the the figure below? ***1 point***




- 4/5, 3/5
- 4/25, 3/25
- 3/5, 4/5
- 3/25, 4/25

**Accepted Answers:**
*3/5, 4/5*

4) When we normalise a vector by pulling it on the unit circle ***1 point***

- Its magnitude as well as the direction change.
- Its magnitude remains the same but the direction changes.
- Its magnitude might change but the direction remains the same.
- Both the magnitude as well as the direction remains the same.

**Accepted Answers:**
*Its magnitude might change but the direction remains the same.*

5) When we add two vectors in the XY plane, where one vector has a very high magnitude as compared to the other, then the resultant vector is closer towards (in terms of direction) to ***1 point***

- the bigger vector
- the smaller vector
- origin
- none of the above

**Accepted Answers:**
*the bigger vector*

6) Given two linearly independent vector v1 and v2, which of the following is true? ***1 point***

- Any other vector can be written as the linear combination of v1 and v2. i.e. z = α v1 + β v2.
- Any other vector can be written as sum of v1 and v2. i.e. z = v1 + v2.
- Any other vector can be written as difference of v1 and v2. i.e. z = |v1 − v2|.
- Any other vector can be written as multiplication of v1 and v2. i.e. z = v1 × v2.

**Accepted Answers:**

*Any other vector can be written as the linear combination of v1 and v2. i.e. z = α v1 + β v2.*

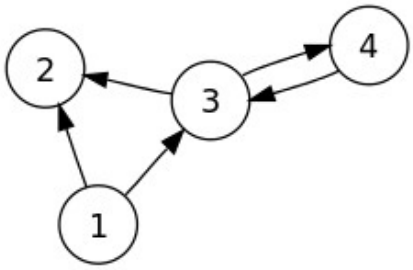
7) When we repeatedly apply a matrix $A$ to a vector $v$, $k$ times; we get $A^k v$ . For a very large value of $k$ ***1 point***

- $A^k v$ converges in the direction of the eigen vector corresponding to the bigger eigen value of the matrix $A$.
- $A^k v$ converges in the direction of the eigen vector corresponding to the smaller eigen value of the matrix $A$
- $A^k v$ converges to the origin.
- None of the above.

**Accepted Answers:**

*$A^k v$ converges in the direction of the eigen vector corresponding to the bigger eigen value of the matrix $A$*

8) Given the graph as shown in the figure below. ***1 point***




While calculating the pagerank using matrix multiplication method on this graph, how does the first matrix operation look like?

- $\begin{pmatrix} 0 & 0 & 0 & 0 \\ 1/2 & 1 & 1/2 & 0 \\ 1/2 & 0 & 0 & 1 \\ 0 & 0 & 1/2 & 0 \end{pmatrix}\begin{pmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{pmatrix}$
- $\begin{pmatrix} 0 & 0 & 0 & 0 \\ 1/2 & 0 & 1/2 & 0 \\ 1/2 & 0 & 0 & 1 \\ 0 & 0 & 1/2 & 0 \end{pmatrix}\begin{pmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{pmatrix}$
- $\begin{pmatrix} 0 & 0 & 0 & 0 \\ 1/2 & 0 & 0 & 0 \\ 1/2 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{pmatrix}\begin{pmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{pmatrix}$
- $\begin{pmatrix} 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 \\ 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{pmatrix}\begin{pmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{pmatrix}$

**Accepted Answers:**

$$\begin{pmatrix} 0 & 0 & 0 & 0 \\ 1/2 & 1 & 1/2 & 0 \\ 1/2 & 0 & 0 & 1 \\ 0 & 0 & 1/2 & 0 \end{pmatrix} \begin{pmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{pmatrix}$$

9) In a Markov matrix *1 point*

- The sum of elements in every row is 1.
- The sum of elements in every column is 1.
- The sum of diagonal elements is 1.
- None of the above.

**Accepted Answers:**

*The sum of elements in every column is 1.*

10) Highest eigen value of a Markov matrix is *1 point*

- -1
- 0
- 1
- None of the above.

**Accepted Answers:**

*1*

Previous Page End