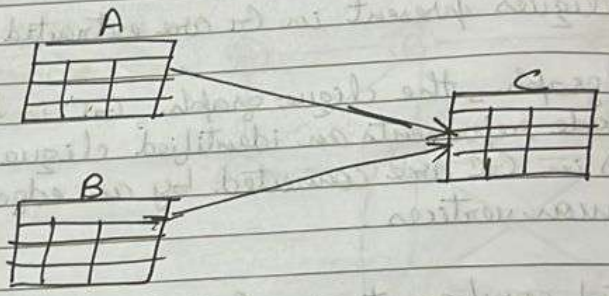
Page Rank -

- The term page ranking can be defined as a classical method used to arrange web pages acc. to its obj. & usage of terms involved in it on the world wide web by using any link data str.
- We have 3 pages A, B, C in a given domain of websites.



- No. of ~~bad~~ links that exist blw 2 pages can be categorized as:

i) Back links:
- Wrt. to fig. A & B are back links for web page 'C'.
- Back link indicates given web page is referred by how many no. of other web pages.

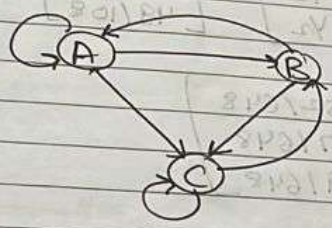
ii) Forward links:
- Represents the fact that, how many web pages will be referred by given web pages.
- Back links are very imp. from Ranking of docs. pov perspective.
- A web page that contains no. of backlinks is said to

be imp. webpage & will get upper pos. in ranking.

~~Example:~~ Algo:

1. Consider a website with n diff. web pages.
2. Set vector r_0 as $1/n$ for each web page.
3. Compute transition matrix M.
4. For calc. next vector r_1: $r_1 = M * (r_0)$
5. ——— " r_2: $r_2 = M * (r_1)$
6. Hence, in general next vector can be calc. as:
   $r_{i+1} = M * (r_i)$
7. Distribution vector r is PageRank of each webpage.

Example:



$$r_0 = \begin{bmatrix} 1/3 \\ 1/3 \\ 1/3 \end{bmatrix}$$

Compute PageRank of each page in foll. graph after 3 iters →.

Transition mat. (M) =

	A	B	C
A	1/3	1/2	0
B	1/3	0	1/2
C	1/3	1/2	1/2

$r_{i+1} = M * r_i$

- Iter 1:

$$\begin{array}{c} \\ A \\ B \\ C \end{array} \begin{array}{c} \begin{array}{ccc} A & B & C \end{array} \\ \begin{bmatrix} 1/3 & 1/2 & 0 \\ 1/3 & 0 & 1/2 \\ 1/3 & 1/2 & 1/2 \end{bmatrix} \end{array} \times \begin{bmatrix} 1/3 \\ 1/3 \\ 1/3 \end{bmatrix} = \begin{bmatrix} 5/18 \\ 5/18 \\ 8/18 \end{bmatrix}$$

M r_0 r_1

Iter 2:

$$M = \begin{array}{c} \\ A \\ B \\ C \end{array}\begin{array}{c} \begin{array}{ccc} A & B & C \end{array} \\ \begin{bmatrix} 1/3 & 1/2 & 0 \\ 1/3 & 0 & 1/2 \\ 1/3 & 1/2 & 1/2 \end{bmatrix} \end{array} \quad r_1 = \begin{bmatrix} 5/18 \\ 5/18 \\ 8/18 \end{bmatrix}$$

$$M \times r_1 = r_2 = \begin{bmatrix} 25/108 \\ 34/108 \\ 49/108 \end{bmatrix}$$

Iter 3:

$$M \times r_2 = r_3 = \begin{bmatrix} 152/648 \\ 197/648 \\ 299/648 \end{bmatrix}$$

$$r_3 = \begin{bmatrix} 152/648 \\ 197/648 \\ 299/648 \end{bmatrix}$$

∴ Node C (Page C) has highest PageRank valu