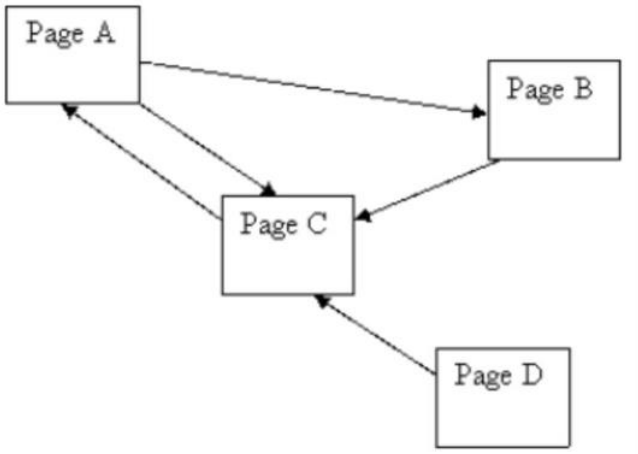
Subject: Data Mining and Warehousing **SAP ID: 60004220253 – Devansh Mehta**

Experiment 08

Aim: Write a program to implement page rank algorithm for the following graph.



Code:

```
import numpy as np

def page_rank(adjacency_matrix, damping_factor=0.85, max_iter=100, tol=1e-6):

    num_nodes = adjacency_matrix.shape[0]
    damping_factor=0.5
    page_rank_scores = np.ones(num_nodes) / num_nodes

    for _ in range(max_iter):

        new_page_rank_scores = (1 - damping_factor) / num_nodes + \
                               damping_factor * np.dot(adjacency_matrix.T, page_rank_scores)

        if np.linalg.norm(new_page_rank_scores - page_rank_scores, 2) < tol:
            break

        page_rank_scores = new_page_rank_scores

    return page_rank_scores

adjacency_matrix = np.array([
    [0, 1, 1, 0],
    [0, 0, 1, 0],
```

```
    [1, 0, 0, 0],
    [0, 0, 1, 0]
])

page_rank_scores = page_rank(adjacency_matrix)
print("PageRank :", page_rank_scores)
```

Output:

```
PageRank : [0.3999986  0.32499894 0.54999814 0.125      ]
```