

EXPERMINT: 10

● Aim: Implementation of Page rank/HITS algorithm

● Theory:

PageRank algorithm

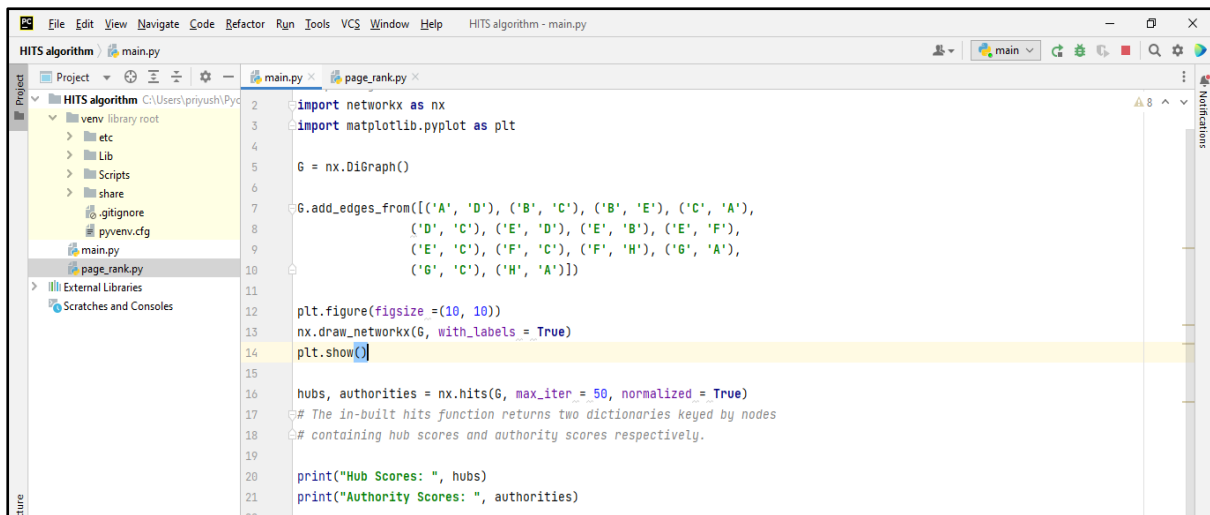
PageRank works by counting the number and quality of links to a page to determine a rough estimate of how important the website is. The underlying assumption is that more important websites are likely to receive more links from other websites.

PageRank (PR) is an algorithm used by Google Search to rank websites in their search engine results. PageRank was named after Larry Page, one of the founders of Google.

Algorithm:

The PageRank algorithm outputs a probability distribution used to represent the likelihood that a person randomly clicking on links will arrive at any particular page. PageRank can be calculated for collections of documents of any size. It is assumed in several research papers that the distribution is evenly divided among all documents in the collection at the beginning of the computational process. The PageRank computations require several passes, called “iterations”, through the collection to adjust approximate PageRank values to more closely reflect the theoretical true value.

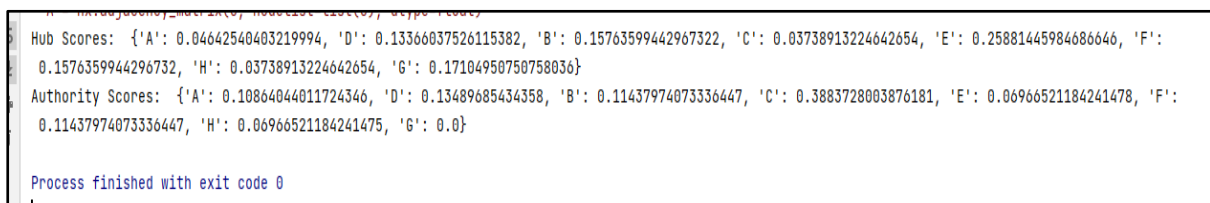
Source code:



```

1 import networkx as nx
2 import matplotlib.pyplot as plt
3
4 G = nx.DiGraph()
5
6 G.add_edges_from([('A', 'D'), ('B', 'C'), ('B', 'E'), ('C', 'A'),
7                  ('D', 'C'), ('E', 'D'), ('E', 'B'), ('E', 'F'),
8                  ('E', 'C'), ('F', 'C'), ('F', 'H'), ('G', 'A'),
9                  ('G', 'C'), ('H', 'A')])
10
11 plt.figure(figsize=(10, 10))
12 nx.draw_networkx(G, with_labels=True)
13 plt.show()
14
15 hubs, authorities = nx.hits(G, max_iter=50, normalized=True)
16 # The in-built hits function returns two dictionaries keyed by nodes
17 # containing hub scores and authority scores respectively.
18
19 print("Hub Scores: ", hubs)
20 print("Authority Scores: ", authorities)

```

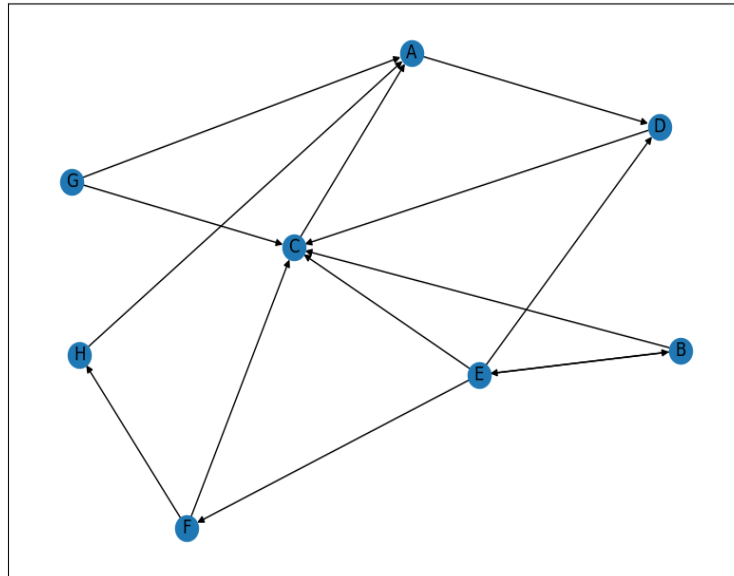


```

Hub Scores: {'A': 0.04642540403219994, 'D': 0.13366037526115382, 'B': 0.15763599442967322, 'C': 0.03738913224642654, 'E': 0.25881445984686646, 'F': 0.1576359944296732, 'H': 0.03738913224642654, 'G': 0.17104950750758036}
Authority Scores: {'A': 0.10864044011724346, 'D': 0.13489685434358, 'B': 0.11437974073336447, 'C': 0.3883728003876181, 'E': 0.06966521184241478, 'F': 0.11437974073336447, 'H': 0.06966521184241475, 'G': 0.0}

Process finished with exit code 0

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● **Conclusion:** We implemented Page rank/HITS algorithm and So various ranking algorithm such as PageRank, HITS are available that helps the users to navigate in the results. These ranking method uses by search engine that sort and displayed the result to users. So users can easily find the best result.