Describe the data structure you used to implement the graph and why?

For the project PageRank I have used Adjacency List data structure. This data structure doesn’t store the value of all different pairs instead it stores only the neighbor nodes. In contrast to Adjacency Matrix data structure O ( Adjacency List require lot less space O (V + E). Adding vertex and edges on Adjacency List data is O (1) and on the other hand Matrix requires O (|).

What is the computational complexity of each method in your implementation? Reflect for each scenario: Best, Worst and Average.

Text

Description automatically generated

Best: O (1)

Average: O (1)

Worst: O (1)

Graphical user interface, application

Description automatically generated

Best: O (|V|)

Average: O (|V|)

Worst: O (|V|)

Text

Description automatically generated

Best: O (1)

Average: O (|V| + |E|)

Worst: O (|V| + |E|)

Text

Description automatically generated

Best: O (1)

Average: O (n)

Worst: O (n)

Text

Description automatically generated

Best: O (|)

Average: O (|)

Worst: O (|)

Text

Description automatically generated

Best: O (|V| + |E|)

Average: O (|V| + |E|)

Worst: O (|V| + |E|)

Text

Description automatically generated

Best: O (|V|)

Average: O (|V|)

Worst: O (|V|)

What is the computational complexity of your main method in your implementation? Reflect for each scenario: Best, Worst and Average.

Text

Description automatically generated

Best: O (n + m)

Average: O (n + m)

Worst: O (n + m)

What did you learn from this assignment and what would you do differently if you had to start over?

This is probably the most interesting and challenging project ever I have done as computer science student. I have enjoyed the whole time from understanding the core problem to the implementation of my solution into coding. It fascinates me that how an algorithm like PageRank helped to build a world renowned and one of the most valued tech company. PageRank algorithm on itself is very interesting and understanding the algorithm has widened my knowledge on how to approach a problem and produce a solution. Initially, the concepts of graph were little challenging to grasp but as I began to do the project, got better understanding and feel much more confident on graph. Now, I have clear understanding on adjacency matrix and adjacency list, having a clear understanding on those data structure gave me edge and made my life much easier to implement my solution. My first implementation of the project was very clustered, and I implemented many functions that seemed later unnecessary. I believe, my second implementation is much better and efficient approach than the first implantation. During the brainstorming and coding implementation period I have learned that writing codes doesn’t take much time if I have better understanding of a problem and have knowledge how to solve. I believe, spending time on understanding the problem and writing down the solution in plain English helps to minimize the time of implementing codes which I have learned from the project verry well. I have implemented a function called isPairValid() which returns weather a pair of websites exists or not. This function uses linear search function to find a pair. If I had to start over, I would have implemented the function as a binary search after sorting instead of linear search.