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COP3530

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Page Rank Commentary

What data structure did you use for your table of URLs? Why did you choose it? If you could do the project over would you choose something different?

* I translated the input to an adjacency list using an unordered\_map<string, vector<string>> for my table of URLs. I chose this method because I wanted to track what urls the urls in the table were pointing to and their degrees. This allowed me to combine multiple vectors into one data structure. To get just the list of URLs I got the key set of the map in the form of a vector<string>. This made the project move along really well. I wouldn’t change anything about it if I were to start over.

What graph implementation did you choose? Why did you choose it? If you could do the project over would you choose something different?

* As I mentioned I initially had the graph stored as an adjacency list to save on making a ton of vectors and iterating through them. However, at a certain part in my logic I do convert the list to a matrix for the sake of easy matrix multiplication. Since I utilized both graph implementation methods, I wouldn’t do anything differently if I had to start over.

What is the computational complexity of the methods in your project?

* Step #1 – Taking Input & Creating the URL Table
  + O(n): n being the number of the number of lines following the first
* Step #2 – Representing the Graph
  + O(n^2): n being the number of URLs taken as input
* Step #3 – Performing a Power Iteration
  + O(n^2): n being the number of URLs taken in
    - (Multiple iterations would lead to a constant scalar)
* Step #4 – Printing the Output
  + O(n): n being the number of URLs taken in

What was the hardest part of this project?

* The hardest part of this project was figuring out the power iteration. This is because matrix multiplication is pretty challenging just on paper. When doing it with programming it took a lot of thinking to make sure it was right. Additionally, figuring out how to do multiple power iterations took some time and was challenging to actually implement.

What did you learn from this project? Try to be more specific than "I learned about page rank algorithm."

* While it was cool learning about the basics of what makes google work, the page rank algorithm, I also learned a lot about the map and vector data structures in C++. Previously, we have created our own structures, so actually using the premade ones was a good experience. Additionally, I learned how to do matrix multiplication, because I never really understood how, and how to test your code through multiple extraneous edge cases.