

# CSCI572 Assignment 4 Report:

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## 1. Steps:

1. Operating System used: **MacOS (High Sierra)**. No need to install Linux VM

2. **Solr installation:** Followed the instructions on [http://lucene.apache.org/solr/guide/7\\_3/solr-tutorial.html](http://lucene.apache.org/solr/guide/7_3/solr-tutorial.html) and installed solr-7.3.0 by downloading solr-7.3.0.zip file from <http://www.apache.org/dyn/closer.lua/lucene/solr/7.3.0>

3. Unzipped the file on Desktop. This is the entire path to the directory  
**/Users/prerana/Desktop/solr-7.3.0**

4. **Solr setup:** cd into solr-7.3.0 directory. Followed instruction mentioned on <http://www-scf.usc.edu/~csci572/2018Spring/hw4/IndexingwithTIKA V3.pdf>

- a. **bin/solr** – start Solr server
- b. **bin/solr create -c assignment4** - creates new core named assignment4 inside  
**/Users/prerana/Desktop/solr-7.3.0/server/solr/**

5. Downloaded the NBC\_News data from google drive link provided <https://drive.google.com/drive/folders/1ZPWjQZMB7xeegjaeZfzqeJKq9oKuukio> and unzip the HTML files and store those in the following path  
**/Users/prerana/Desktop/solr-7.3.0/NBC\_News/**

Store the provided CSV file named UrlToHtml\_NBCNews.csv in this path  
**/Users/prerana/Desktop/solr-7.3.0/**

6. Use this command to index the HTML files in NBC\_News folder using Solr  
**bin/post -c assignment4 -filetypes html NBC\_News/**

7. You can view the indexing by going to this link <http://localhost:8983/solr/> and selecting your core i.e **assignment4** and to see how TIKa parser parsed the html pages and what fields were created by using TIKa. Select the query option, and just submit the default query (\*:\*). Click on overview option to view your core statistics. Before that to configure default querying using Solr, uncomment the str element with name “df”, and replace the value with `_text_`, where we specify that the default query field has to be “\_text\_”. Now when you click on Execute Query button on Solr Query page it returns the index results with “**numFound**”:15725 (i.e. number of documents).

8. **assignment4.php:** This file is created to send the form query to Solr through Apache server and retrieve the results. We also need to download solr-php-client in order to run solr service from php client (i.e. from our php file) by doing cloning this git repo using **git clone** <https://github.com/PTCInc/solr-php-client.git> command. We also need to download XAMPP for

running Apache server or you can also use the default server on Mac. I used XAMPP. After starting Apache on XAMPP, place the assignment4.php file and solar-php-client folder in htdocs folder of XAMPP i.e. /Applications/XAMPP/xamppfiles/htdocs/ .

**9. PageRank:** Wrote Java code to create edgelist.txt by providing NBC\_News folder containing HTML files and UrlToHtml\_NBCNews.csv file as input. Using JSoup, urlFileMap and fileUrlMap functions. Imported **JSoup jar** into eclipse and ran the java code.

**10.** Wrote python code to generate **external\_pageRankFile.txt** file from **edgelist.txt**.

**11.** Type **sudo pip install networkx** command in command line to install networkx python library. This is used to run the python file. I have named my python file as **networkX.py**. and used these parameters: alpha=0.85, personalization=None, max\_iter=30, tol=1e-06, nstart=None, weight='weight', dangling=None. Run this to generate external\_pageRankFile.txt.

**12.** After generating **external\_pageRankFile.txt** file place it in /Users/prerana/Desktop/solr-7.3.0/server/solr/assignment4/data/ folder.

**13.** Modify **managed-schema.xml** by adding the following lines:

```
<fieldType name="external" keyField="id" defVal="0" class="solr.ExternalFileField"
valType="pfloat" />
<field name="pageRankFile" type="external" stored="false" indexed="false" />
```

**14.** Define listeners for query in **solrconfig.xml** by modifying these lines **<listener event="newSearcher" class="org.apache.solr.schema.ExternalFileFieldReloader" />**  
**<listener event="firstSearcher"**  
**class="org.apache.solr.schema.ExternalFileFieldReloader" />**

**15.** Add the following inside **solrconfig.xml** for ANDing the query terms for better retrieval results. **<requestHandler name="/select" class="solr.SearchHandler"> <lst> tag <str name="q.op">AND</str>**

**16.** Now reload the index, by going to the **Solr Dashboard UI ->Core Admin** and clicking on the **“Reload”** button.

**17.** Go to this URL <http://localhost/assignment4.php> to view you search application. Now you can give any query term and retrieve results from Solr.

**18.** Run the queries given in assignment description.

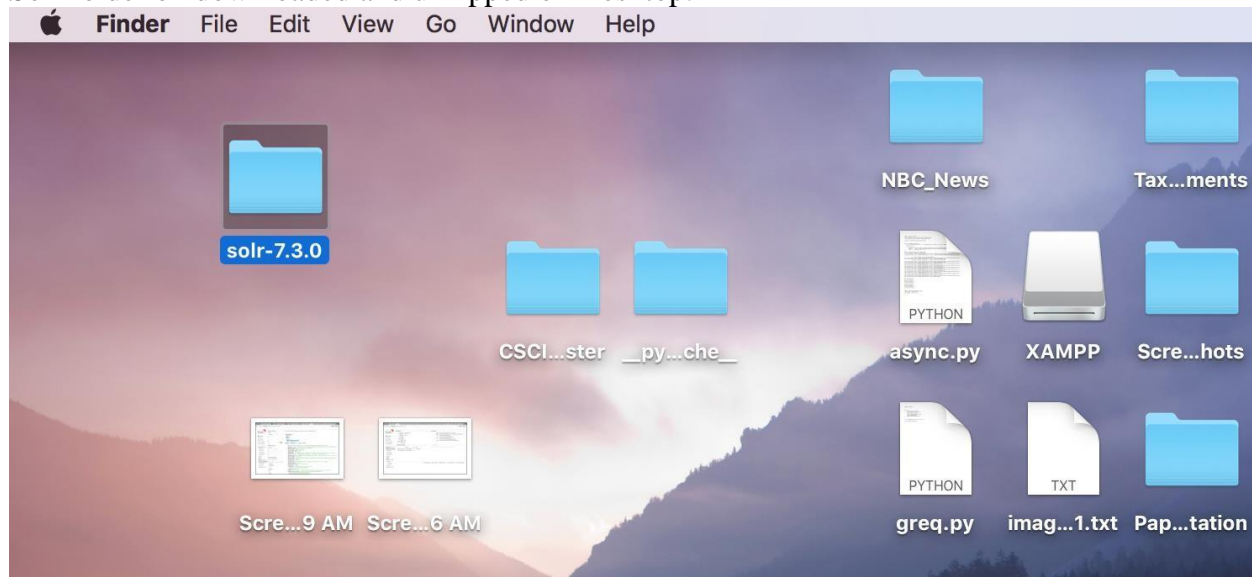
## **2. why some pages have higher PageRank values than others?**

- PageRank algorithm assigns a numeric weight to each link element of DOM in a webpage for measuring its relative importance. This is achieved by measuring the number of outgoing links for a particular website. We create a graph with the list of edges pointing to the page (i.e. edgeList.txt). We use this to find importance of any given page. PageRank determines the weight

of the page and then outputs it in given order (Highest first(descending)). Some pages have more weight than others and hence they have higher PageRank values than others.

### 3. Screenshots:

Solr folder on downloaded and unzipped on Desktop:



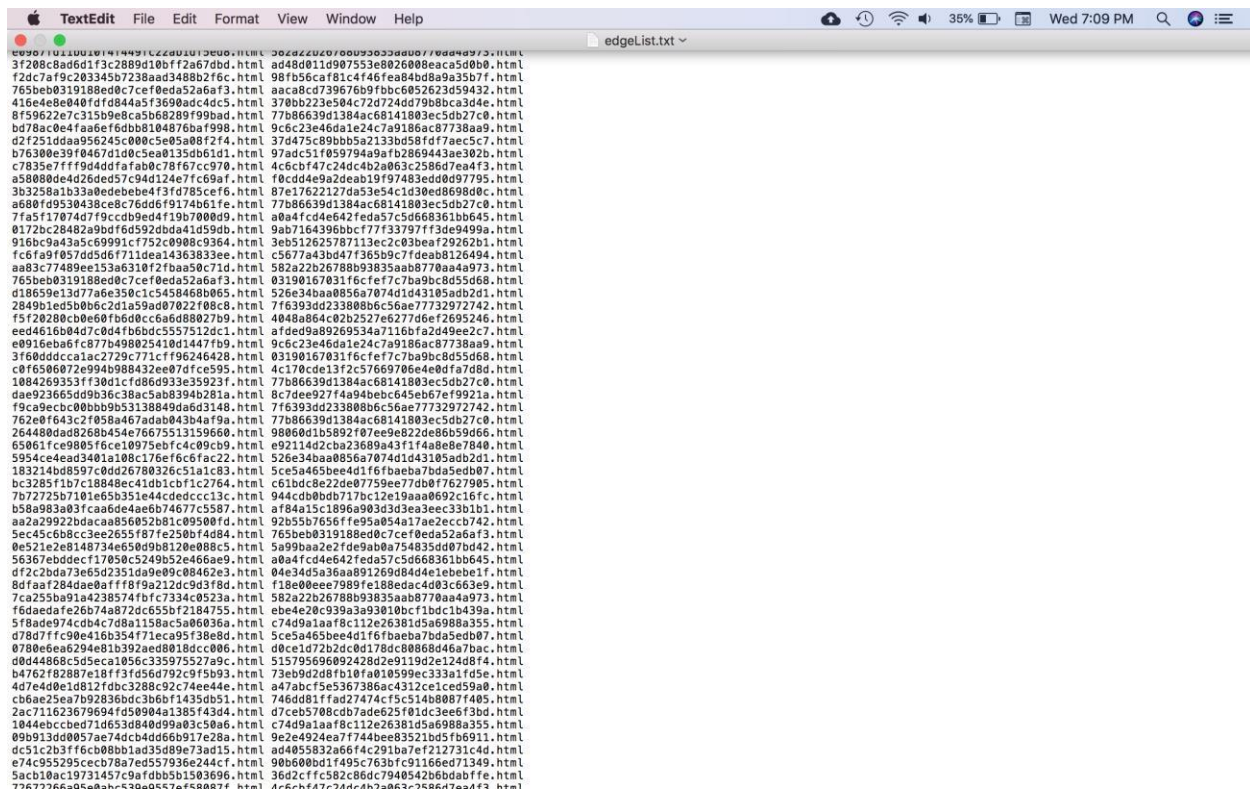
Solr indexing:

```
Created new core 'assignment4'
PreranaMacBook:solr-7.3.0 prerana$ bin/post -c assignment4 -filetypes html NBC_News/
java -classpath /Users/prerana/Desktop/solr-7.3.0/dist/solr-core-7.3.0.jar -Dautoyes -Dfiletypes=html -Dc=assignment4 -Ddata=files -Drecursive=yes org.apache.solr.util.SimplePostTool NBC_News/
SimplePostTool version 5.0.0
Posting files to [base] url http://localhost:8983/solr/assignment4/update...
Entering auto mode. File endings considered are html
Entering recursive mode, max depth=999, delay=0s
Indexing directory NBC_News (15727 files, depth=0)
POSTing file e0f7e425f5db5ea8f8616acea3d6d1c1.html (text/html) to [base]/extract
POSTing file 8497255cdad7a31c99ab48a5abf6574d7.html (text/html) to [base]/extract
POSTing file dc59dd9e54fcb0df24cf1817335fa88.html (text/html) to [base]/extract
POSTing file 4363a498d5d632c05431401189ecd98a.html (text/html) to [base]/extract
POSTing file 3261976e46ce2e0435261ad93211d2e9.html (text/html) to [base]/extract
POSTing file 9d548ee69e5a4f3dde86423abaa80a96.html (text/html) to [base]/extract
POSTing file e4d95edcd9b9e3394490f9b8e9cd6eb7.html (text/html) to [base]/extract
POSTing file 32715ee253494486c93c1b59af295cc4.html (text/html) to [base]/extract
POSTing file 235978a82194b79b99e59eac1c3579ae.html (text/html) to [base]/extract
POSTing file 20a49b7cba124aab28388e2b782d6421.html (text/html) to [base]/extract
POSTing file a8ccffbcab68f1ac64f39129a89c5b6f.html (text/html) to [base]/extract
POSTing file 6878f9cb498f92bd91e2c631db150bd4.html (text/html) to [base]/extract
POSTing file cf82d2bd23f5e201b2870196a311e3c8.html (text/html) to [base]/extract
POSTing file cbl36031d6ced0f0a2c8fa6b08c8dfcb7.html (text/html) to [base]/extract
POSTing file 40d48d55cc2674619387985f8bb7340.html (text/html) to [base]/extract
POSTing file ab01ce018464543ee652d2ad5eac2e.html (text/html) to [base]/extract
POSTing file 5cc882829f58c0869cdc141ca8f5145d.html (text/html) to [base]/extract
POSTing file b29c42b6ab14254ecccbaa14706ee09.html (text/html) to [base]/extract
POSTing file d517e35a140e246df79d0bed8428df15.html (text/html) to [base]/extract
POSTing file e3ecd43077b600efc9ca1c0ef31983e.html (text/html) to [base]/extract
POSTing file d1e2f8ac38d6b4618607231d239fc229.html (text/html) to [base]/extract
POSTing file 40abdb332629b0ba48488059f9db159.html (text/html) to [base]/extract
POSTing file 38a0ec448ba998e8f918c88af98bf.html (text/html) to [base]/extract
POSTing file 6addadab87de37a4eeb197609f488af.html (text/html) to [base]/extract
POSTing file 2b8e88da39cb1bc29834baba2cd3a81c.html (text/html) to [base]/extract
POSTing file fd82b2eadb79f8c7d47d5d73f966df7.html (text/html) to [base]/extract
POSTing file 25a67c6e1ac15d94737015a93598e508.html (text/html) to [base]/extract
POSTing file aa768f28371c4e4895a0899336205cd2.html (text/html) to [base]/extract
POSTing file 40b956f6ec34e19b08383f3e08fac2e9.html (text/html) to [base]/extract
POSTing file 152409513f6ce83a807d52af8d1b658e.html (text/html) to [base]/extract
POSTing file cbb4bf3316a4312f5d5b89d82253c12a.html (text/html) to [base]/extract
POSTing file b31737a560e3656791c9b5c7d606464.html (text/html) to [base]/extract
POSTing file e941828c923aaf96616c2ad19e1e0168.html (text/html) to [base]/extract
POSTing file df56dcee8768dc60a9172efe9ed9c3bd.html (text/html) to [base]/extract
POSTing file d5ba48877764a590e274ad799645d38b.html (text/html) to [base]/extract
POSTing file 2009f48632a265a4380a1145450aa57.html (text/html) to [base]/extract
POSTing file 47aa86ca5dbf87e3efaddb725a231c1.html (text/html) to [base]/extract
POSTing file e6583adbccbb2ab0b08555c35831725a.html (text/html) to [base]/extract
POSTing file 1997a2020ff14e9aa20b9a05b63bb6c.html (text/html) to [base]/extract
POSTing file c88622482356ba03961122d8e943681f.html (text/html) to [base]/extract
POSTing file 2b8f2b4cfb46348991f571edc65acc085.html (text/html) to [base]/extract
POSTing file a0ac2f0953c48e00ca732831ade46c.html (text/html) to [base]/extract
POSTing file a97e637167f5f5c564160a1727d9b7ec8.html (text/html) to [base]/extract
POSTing file 1f0ec99de9f5f938eff31d46f5f299cd.html (text/html) to [base]/extract
POSTing file 419d1d9c0c6b219b0c657640bdea618.html (text/html) to [base]/extract
POSTing file 5c3a39c00406ef43c354a19d4f9fb385.html (text/html) to [base]/extract
POSTing file ffc18b2c8bdd0e8f8ee5faeb8e6193b.html (text/html) to [base]/extract

POSTing file 11eb86a0b2876029040048293abf988.html (text/html) to [base]/extract
POSTing file d6d01e9d2087e6d9a47471cad21d2.html (text/html) to [base]/extract
POSTing file 4a754fcd50e7319c8f474ae1fde20a808.html (text/html) to [base]/extract
POSTing file 32969f4607528ca3cd69d612dc5a78a.html (text/html) to [base]/extract
POSTing file 81e77f155d65c8cf9fee4a52b0b2609.html (text/html) to [base]/extract
POSTing file 901de4945f9d0aa1ed0f7aafc636f254.html (text/html) to [base]/extract
POSTing file ed7c1e048286989ef0b0c1010744d0a4.html (text/html) to [base]/extract
POSTing file a26f33e198e348639787406e4221086.html (text/html) to [base]/extract
POSTing file 0bfa9d515d5b3cd6a3996ab181175.html (text/html) to [base]/extract
POSTing file c3d609e8c762ec04e6835af958e28a75.html (text/html) to [base]/extract
POSTing file 0080a8fcc5847d329a0b1d2a024bac6d4.html (text/html) to [base]/extract
POSTing file 408a72192ebfd7e671012cb4b380497a.html (text/html) to [base]/extract
POSTing file d3df37bb1e838385d3bc0f0fe45a33.html (text/html) to [base]/extract
POSTing file 774184390a95ce632a351cfc79d38bbc.html (text/html) to [base]/extract
POSTing file c3d3f72032f1bb279983e4f8f5d108d.html (text/html) to [base]/extract
POSTing file 14c2dfc0337025113f41a59380b2f08a.html (text/html) to [base]/extract
POSTing file bff7bea589d8b41a0bf0e8fde98b225.html (text/html) to [base]/extract
POSTing file 526d31cfc7330d8e2dd98ebe12249ee.html (text/html) to [base]/extract
POSTing file 7220bf3a4858fbc9d5eb549d56e366e8.html (text/html) to [base]/extract
POSTing file cb95a3212b1ec96a3075329b588a0cc6.html (text/html) to [base]/extract
POSTing file 00a5d6a45d082094243f64abe0c0d52c.html (text/html) to [base]/extract
POSTing file 4a8eb0e88258ae835a4ae4b16a8ae7c3.html (text/html) to [base]/extract
POSTing file fe2e524210b0d6e02447f9ca483ab92cf.html (text/html) to [base]/extract
POSTing file 6ff47a8ee303f06ecd57ad5dd474463d.html (text/html) to [base]/extract
POSTing file c453bd53e29aa021aa095d3e00712619.html (text/html) to [base]/extract
POSTing file 0342fd5ffc2e6e5fe09e2639fb8b64b0.html (text/html) to [base]/extract
POSTing file 2ee9fcdcc75e6430d5d5cc195d23ff9.html (text/html) to [base]/extract
POSTing file a0f27f59df0eb4d41842e782a5b2679a.html (text/html) to [base]/extract
POSTing file 4fa83580a93a7adc269440d5330dff.html (text/html) to [base]/extract
POSTing file 4094790167c9238269aeb08e40efed58.html (text/html) to [base]/extract
POSTing file e6177c837ea485765eea2400c0882700.html (text/html) to [base]/extract
POSTing file 347d991672d31572126e6fc7fe2f6c6c.html (text/html) to [base]/extract
POSTing file 8b8c06ef50831baff04a336a739770f64.html (text/html) to [base]/extract
POSTing file 7af2fd7b8830413f27a27839b30fe644.html (text/html) to [base]/extract
POSTing file f4883629734168caa3fd5444fe2366ed.html (text/html) to [base]/extract
POSTing file 96cd5a0161d27fa0f025240da5fdeed.html (text/html) to [base]/extract
POSTing file 0804757ce0e0f5626ba98aac2e221070.html (text/html) to [base]/extract
POSTing file cccb556384f76e788ec34b0e5a97a0e7.html (text/html) to [base]/extract
POSTing file 1fb992150a27a6393a33bf7762d4b52d.html (text/html) to [base]/extract
POSTing file c42295aab2187aef774cda97733a7cd9.html (text/html) to [base]/extract
POSTing file 6ff5c2eb96e77a24c895f3ffdf0e7c174.html (text/html) to [base]/extract
POSTing file a98e7d79065a1181f7edad040a11bc78.html (text/html) to [base]/extract
POSTing file 230df04e71230854fb4dc435b998bd1.html (text/html) to [base]/extract
POSTing file fd712227574affd31cd6093fb977a16a.html (text/html) to [base]/extract
POSTing file 22c2370387841ab539872f05f6f4e6f5.html (text/html) to [base]/extract
POSTing file 57ee11a7ba473570edd37b98468ddc2.html (text/html) to [base]/extract
POSTing file 22ca2e61e053c1d424442692cf7f3f808.html (text/html) to [base]/extract
POSTing file 604043369e9966031146458df2175363.html (text/html) to [base]/extract
POSTing file 077bc29240b08e68829fe430d28c12cf.html (text/html) to [base]/extract
POSTing file a85f2135c1d9fca7370c240a42de7a.html (text/html) to [base]/extract
POSTing file 9acc230a6e4a4d5b61c3307fe2006137.html (text/html) to [base]/extract
POSTing file 6f57b0fdded37a5e579665f583c0e724f.html (text/html) to [base]/extract
15727 files indexed.
COMMITting Solr index changes to http://localhost:8983/solr/assignment4/update...
Time spent: 0:00:02.585
PreranaMacBook:solr-7.3.0 prerana$ █
```

edgeList.txt:





## Solr Server running on Localhost:

Page displayed after selecting Core. i.e. assignment4:

**Solr**

Dashboard  
Logging  
Core Admin  
Java Properties  
Thread Dump

assignment4

Overview  
Analysis  
Dataimport  
Documents  
Files  
Ping  
Plugins / Stats  
Query  
Replication  
Schema  
Segments info

**Statistics**

Last Modified: 21 minutes ago  
Num Docs: 15725  
Max Doc: 15725  
Heap Memory: -1  
Usage:  
Deleted Docs: 0  
Version: 150  
Segment Count: 20  
Current: ✔

**Instance**

CWD: /Users/prerana/Desktop/solr-7.3.0/server  
Instance: /Users/prerana/Desktop/solr-7.3.0/server/solr/assignment4  
Data: /Users/prerana/Desktop/solr-7.3.0/server/solr/assignment4/data  
Index: /Users/prerana/Desktop/solr-7.3.0/server/solr/assignment4/data/index  
Impl: org.apache.solr.core.NRTCachingDirectoryFactory

**Replication (Master)**

	Version	Gen	Size
Master (Searching)	1523359266832	25	349.63 MB
Master (Replicable)	1523359266832	25	-

**Healthcheck**

Ping request handler is not configured with a healthcheck file.

Documentation Issue Tracker IRC Channel Community forum Solr Query Syntax

Executing \*.\* query:

**Solr**

Dashboard  
Logging  
Core Admin  
Java Properties  
Thread Dump

assignment4

Overview  
Analysis  
Dataimport  
Documents  
Files  
Ping  
Plugins / Stats  
Query  
Replication  
Schema  
Segments info

Request-Handler (qt)  
/select

common

q  
\*.\*

fq

sort

start, rows  
0 10

fl

df

Raw Query Parameters  
key1=val1&key2=val2

wt  
-----

☐ Indent off  
☐ debugQuery

☐ dismax  
☐ edismax  
☐ hl  
☐ facet  
☐ spatial  
☐ spellcheck

http://localhost:8983/solr/assignment4/select?q=\*.\*

```
{
  "responseHeader": {
    "status": 0,
    "QTime": 76,
    "params": {
      "q": " *.*",
      "_": "1523360599907"
    },
    "response": {
      "numFound": 15725, "start": 0, "docs": [
        {
          "id": "/Users/prerana/Desktop/solr-7.3.0/NBC_News/756b20a8dce5eae1275d485d61edb93.html",
          "og_image": [ "https://medial.s-nbcnews.com/j/newscom/2018_01/2278971/sk_3a52d33ec4ac1ff07ccb73dc67d08568." ],
          "apple_itunes_app": [ "app-id=319740707, app-argument=https://www.nbcnews.com/news/north-korea/north-korea" ],
          "twitter_card": [ "summary_large_image" ],
          "stream_content_type": [ "text/html" ],
          "og_site_name": [ "NBC News" ],
          "dc_date_issued": [ "2018-01-03T00:00:00Z" ],
          "description": [ "Delegations from North and South Korea could meet for the first official discussions bet" ],
          "title": [ "North Korea, South Korea could meet for talks ahead of Olympics - NBC News" ],
          "og_description": [ "Delegations from North and South Korea could meet for the first official discussions" ],
          "twitter_creator": [ "NBCNews" ],
          "twitter_image": [ "https://medial.s-nbcnews.com/j/newscom/2018_01/2278971/sk_3a52d33ec4ac1ff07ccb73dc67d0" ],
          "twitter_site": [ "NBCNews" ],
          "news_keywords": [ "News,Asia,Asian America,World,North Korea" ],
          "dc_title": [ "North Korea, South Korea could meet for talks ahead of Olympics - NBC News" ],
          "content_encoding": [ "UTF-8" ],
          "content_type": [ "text/html; charset=UTF-8" ],
          "stream_size": [ 102498 ],
          "x_parsed_by": [ "org.apache.tika.parser.DefaultParser", "org.apache.tika.parser.html.HtmlParser" ],
          "og_type": [ "article" ],
          "twitter_title": [ "Kim Jong Un's Olympic olive branch could see first talks in years" ],
          "google_site_verification": [ "dMf4ctcKlWchKvP1ULWdZ18XpI9-ARqe8j2mGm14Y", "K8bowvEbwWfPQ76x6f9SCxMvVwVcVXrh1C1Rg80ak82A", "G4SGIUDh2TcgDWNjuleQ-Humeb3JAZaQD9Vg42Stfn8" ],
          "og_title": [ "Kim Jong Un's Olympic olive branch could see first talks in years" ],
          "resourceName": [ "/Users/prerana/Desktop/solr-7.3.0/NBC_News/756b20a8dce5eae1275d485d61edb93.html*1." ]
        }
      ]
    }
  }
}
```

Executing query after sorting it in descending order using PageRank Algorithm:

Request-Handler (qt)

/select

common

q

fq

sort

pageRankFile desc

start, rows

0 10

fl

df

Raw Query Parameters

key1=val1&key2=val2

wt

indent off

debugQuery

dismax

edismax

hl

facet

snatial

http://localhost:8983/solr/assignment4/select?q=\*&sort=pageRankFile desc

```
{
  "responseHeader": {
    "status": 0,
    "QTime": 2,
    "params": {
      "q": "*",
      "sort": "pageRankFile desc",
      "_": "1523439431133"
    }
  },
  "response": {
    "numFound": 15725,
    "start": 0,
    "docs": [
      {
        "id": "/Users/prerana/Desktop/solr-7.3.0/NBC_News/77b86639d1384ac68141803ec5db27c0.html",
        "og_image": "https://nodeassets.nbcnews.com/cdnassets/projects/socialshareimages/og-nbcnews1200x630.png",
        "apple_itunes_app": {"app-id": 319740707, "app-argument": ""},
        "twitter_card": {"summary_large_image": ""},
        "stream_content_type": ["text/html"],
        "og_site_name": ["NBC News"],
        "description": ["Go to NBCNews.com for breaking news, videos, and the latest top stories in world news, b",
        "title": ["NBC News - Breaking News & Top Stories - Latest World, US & Local News"],
        "og_description": ["Go to NBCNews.com for breaking news, videos, and the latest top stories in world news",
        "twitter_creator": ["NBCNews"],
        "twitter_image": "https://nodeassets.nbcnews.com/cdnassets/projects/socialshareimages/og-nbcnews1024x512",
        "twitter_site": ["NBCNews"],
        "news_keywords": ["Cover"],
        "dc_title": ["NBC News - Breaking News & Top Stories - Latest World, US & Local News"],
        "content_encoding": ["UTF-8"],
        "content_type": ["text/html; charset=UTF-8"],
        "stream_size": [514862],
        "x_parsed_by": ["org.apache.tika.parser.DefaultParser",
        "org.apache.tika.parser.html.HtmlParser"],
        "og_type": ["article"],
        "twitter_title": ["NBC News - Breaking News & Top Stories - Latest World, US & Local News"],
        "google_site_verification": ["dMf4cxtcxKlWchKvP1ULwDZi8XpI9-ARqe8j2mGmi4Y",
        "K8bowvEbzWfPQ76x6f98CxmVvicVXrhICLRg80ak82A",
        "G4SGIUDh2TcgDVNjuleQ-Humwb3JAZaQD9Vg42Stfn8"]
      }
    ]
  }
}
```

Running assignment4.php file on localhost:

CSCI 572 : Assignment 4

Search :

Enter Search Query

Ranking Algorithm

☒ Lucene ☐ PageRank



Running Lucene (Default) search algorithm and retrieving results from Solr:

localhost/assignment4.php?q=Bitcoin+Blockchain&pageRankType=lucene

## CSCI 572 : Assignment 4

Search :

Enter Search Query

Ranking Algorithm

☒ Lucene ☐ PageRank

<b>TITLE:</b>	How Bitcoin and other cryptocurrencies could kill off cash
<b>FILE ID:</b>	27640bb3f3bb0345f023330f021248e0.html
<b>URL:</b>	<a href="https://www.nbcnews.com/mach/amp/ncna857036">https://www.nbcnews.com/mach/amp/ncna857036</a>
<b>DESCRIPTION:</b>	National governments are also looking into creating virtual currencies of their own.

<b>TITLE:</b>	Bitcoin pays for entire wedding as its price soars past \$16,000
<b>FILE ID:</b>	c346a4bb29558ea93d980d10cc15b5db.html
<b>URL:</b>	<a href="https://www.nbcnews.com/news/amp/ncna826776">https://www.nbcnews.com/news/amp/ncna826776</a>
<b>DESCRIPTION:</b>	With bitcoin hitting a record high of over \$16,000, one wedding in Indiana just got bigger.

<b>TITLE:</b>	What is Bitcoin? And should you invest in it?
<b>FILE ID:</b>	9ba27c9494397c038fe869bcb1e76a27.html
<b>URL:</b>	<a href="https://www.nbcnews.com/better/amp/ncna844106">https://www.nbcnews.com/better/amp/ncna844106</a>
<b>DESCRIPTION:</b>	Only 24 percent of Americans are familiar with Bitcoin. Here's what you need to know about this "cryptocurrency."

<b>TITLE:</b>	Middle America Is Crazy in Love With Bitcoin
<b>FILE ID:</b>	b4f26bcd9d8731708d5e1972ccf26fd7.html
<b>URL:</b>	<a href="https://www.nbcnews.com/news/amp/ncna789011">https://www.nbcnews.com/news/amp/ncna789011</a>
<b>DESCRIPTION:</b>	In May, there were more searches for Bitcoin than Beyonce. Cryptocoins are going mainstream as the middleclass wants in on the "Wild West" action.

Running PageRank search algorithm and retrieving results from Solr:

localhost/assignment4.php?q=Bitcoin+Blockchain&pageRankType=pageRankAlgo

## CSCI 572 : Assignment 4

Search :

Enter Search Query

Ranking Algorithm

☐ Lucene ☒ PageRank

<b>TITLE:</b>	Bitcoin heist: 600 powerful computers stolen in Iceland - NBC News
<b>FILE ID:</b>	8ae709c12a5f14d6ed1d255cc213db10.html
<b>URL:</b>	<a href="https://www.nbcnews.com/news/world/bitcoin-heist-600-powerful-computers-stolen-iceland-n852811">https://www.nbcnews.com/news/world/bitcoin-heist-600-powerful-computers-stolen-iceland-n852811</a>
<b>DESCRIPTION:</b>	Some 11 people were arrested, including a security guard, in what Icelandic media have dubbed the "Big Bitcoin Heist."

<b>TITLE:</b>	How Bitcoin and other cryptocurrencies could kill off cash
<b>FILE ID:</b>	27640bb3f3bb0345f023330f021248e0.html
<b>URL:</b>	<a href="https://www.nbcnews.com/mach/amp/ncna857036">https://www.nbcnews.com/mach/amp/ncna857036</a>
<b>DESCRIPTION:</b>	National governments are also looking into creating virtual currencies of their own.

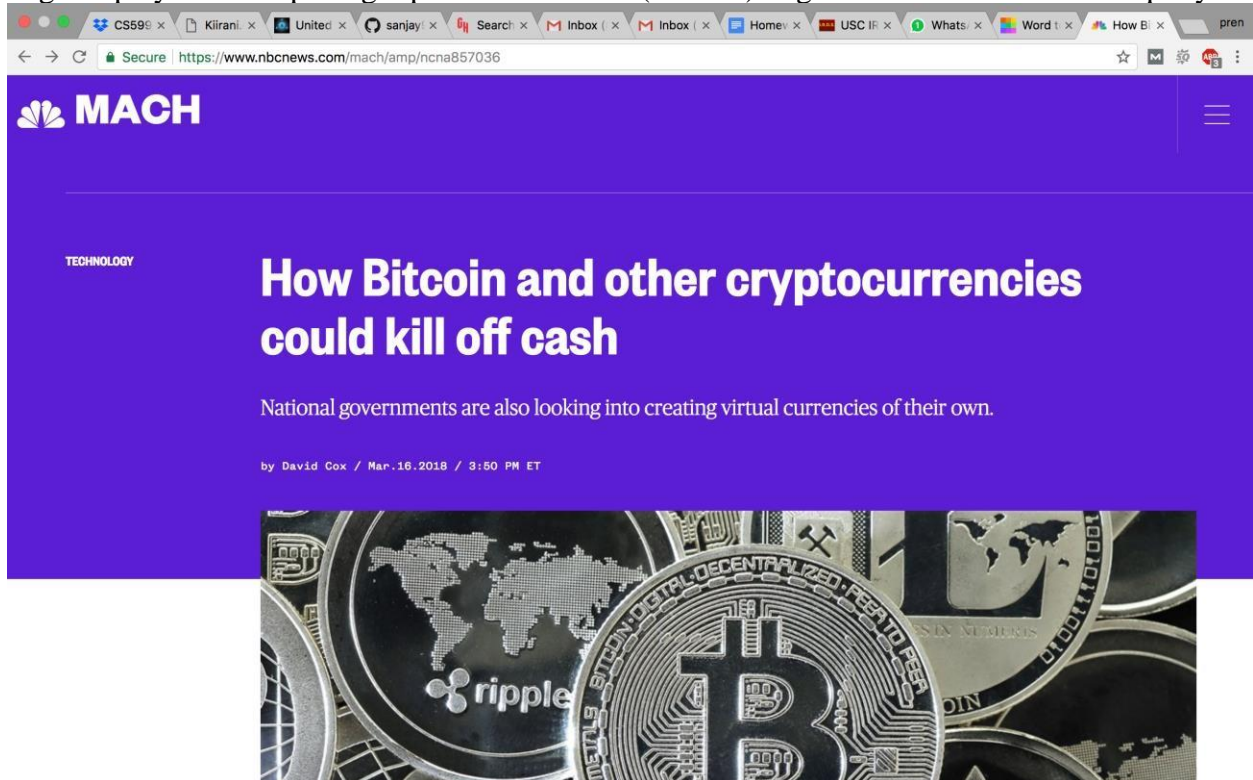
<b>TITLE:</b>	The hidden dangers of buying virtual currency go beyond a simple hack
<b>FILE ID:</b>	68fac26a85fda5d7984e109781f38e81.html
<b>URL:</b>	<a href="https://www.nbcnews.com/news/amp/ncna852706">https://www.nbcnews.com/news/amp/ncna852706</a>
<b>DESCRIPTION:</b>	Cyberthieves can break into crypto exchanges, drain crypto wallets, and infect computers with malware.

<b>TITLE:</b>	What is Bitcoin? And should you invest in it?
<b>FILE ID:</b>	eea75aac08fe9029b9cdfd6f1721d149.html
<b>URL:</b>	<a href="https://www.nbcnews.com/better/business/what-bitcoin-should-you-invest-it-ncna844106">https://www.nbcnews.com/better/business/what-bitcoin-should-you-invest-it-ncna844106</a>
<b>DESCRIPTION:</b>	Only 24 percent of Americans are familiar with Bitcoin. Here's what you need to know about this "cryptocurrency."

<b>TITLE:</b>	Bitcoin, other cryptocurrencies plunge as wave of bad news
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Page displayed after opening top link for Lucene (Default) Algo for Bitcoin Blockchain query:



#### 4. Results:

Bitcoin Blockchain	
Lucene	PageRank
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<a href="https://www.nbcnews.com/news/amp/ncna826776">https://www.nbcnews.com/news/amp/ncna826776</a>	<a href="https://www.nbcnews.com/mach/amp/ncna857036">https://www.nbcnews.com/mach/amp/ncna857036</a>
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<a href="https://www.nbcnews.com/news/amp/ncna789011">https://www.nbcnews.com/news/amp/ncna789011</a>	<a href="https://www.nbcnews.com/better/business/what-bitcoin-should-you-invest-it-ncna844106">https://www.nbcnews.com/better/business/what-bitcoin-should-you-invest-it-ncna844106</a>

<a href="https://www.nbcnews.com/mach/science/how-bitcoin-other-cryptocurrencies-could-kill-cash-ncna857036">https://www.nbcnews.com/mach/science/how-bitcoin-other-cryptocurrencies-could-kill-cash-ncna857036</a>	<a href="https://www.nbcnews.com/news/amp/ncna856821">https://www.nbcnews.com/news/amp/ncna856821</a>
<a href="https://www.nbcnews.com/news/amp/ncna852706">https://www.nbcnews.com/news/amp/ncna852706</a>	<a href="https://www.nbcnews.com/tech/tech-news/bitcoin-other-cryptocurrencies-plunge-wave-bad-news-n856821">https://www.nbcnews.com/tech/tech-news/bitcoin-other-cryptocurrencies-plunge-wave-bad-news-n856821</a>
<a href="https://www.nbcnews.com/tech/innovation/bitcoin-pays-entire-wedding-its-price-soars-past-16-000-n826776">https://www.nbcnews.com/tech/innovation/bitcoin-pays-entire-wedding-its-price-soars-past-16-000-n826776</a>	<a href="https://www.nbcnews.com/news/amp/ncna826776">https://www.nbcnews.com/news/amp/ncna826776</a>
<a href="https://www.nbcnews.com/business/economy/middle-america-crazy-love-bitcoin-n789011">https://www.nbcnews.com/business/economy/middle-america-crazy-love-bitcoin-n789011</a>	<a href="https://www.nbcnews.com/news/amp/ncna813351">https://www.nbcnews.com/news/amp/ncna813351</a>
<a href="https://www.nbcnews.com/better/business/what-bitcoin-should-you-invest-it-ncna844106">https://www.nbcnews.com/better/business/what-bitcoin-should-you-invest-it-ncna844106</a>	<a href="https://www.nbcnews.com/better/amp/ncna844106">https://www.nbcnews.com/better/amp/ncna844106</a>
<a href="https://www.nbcnews.com/business/business-news/hidden-dangers-buying-virtual-currency-go-beyond-simple-hack-n852706">https://www.nbcnews.com/business/business-news/hidden-dangers-buying-virtual-currency-go-beyond-simple-hack-n852706</a>	<a href="https://www.nbcnews.com/mach/science/how-bitcoin-other-cryptocurrencies-could-kill-cash-ncna857036">https://www.nbcnews.com/mach/science/how-bitcoin-other-cryptocurrencies-could-kill-cash-ncna857036</a>

Stephen Hawking	
Lucene	PageRank
<a href="https://www.nbcnews.com/mach/science/brief-history-stephen-hawking-cambridge-cultural-icon-ncsl856456">https://www.nbcnews.com/mach/science/brief-history-stephen-hawking-cambridge-cultural-icon-ncsl856456</a>	<a href="https://www.nbcnews.com/mach">https://www.nbcnews.com/mach</a>
<a href="https://www.nbcnews.com/news/world/british-physicist-stephen-hawking-among-world-s-greatest-minds-science-n702301">https://www.nbcnews.com/news/world/british-physicist-stephen-hawking-among-world-s-greatest-minds-science-n702301</a>	<a href="https://www.nbcnews.com/think">https://www.nbcnews.com/think</a>
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<a href="https://www.nbcnews.com/science/space/im-atheist-stephen-hawking-god-space-travel-n210076">https://www.nbcnews.com/science/space/im-atheist-stephen-hawking-god-space-travel-n210076</a>	<a href="https://www.nbcnews.com/mach/video/from-space-dream-to-space-junk-the-vanguard-1-satellite-completes-60-years-in-space-today-1188094531644">https://www.nbcnews.com/mach/video/from-space-dream-to-space-junk-the-vanguard-1-satellite-completes-60-years-in-space-today-1188094531644</a>

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<a href="https://www.nbcnews.com/mach/science/what-stephen-hawking-taught-us-about-black-holes-ncna857471">https://www.nbcnews.com/mach/science/what-stephen-hawking-taught-us-about-black-holes-ncna857471</a>	<a href="https://www.nbcnews.com/mach/science">https://www.nbcnews.com/mach/science</a>
<a href="https://www.nbcnews.com/mach/science/stephen-hawking-says-humans-must-leave-earth-within-600-years-ncna818926?cid=sm_npd_nn_fb_mc">https://www.nbcnews.com/mach/science/stephen-hawking-says-humans-must-leave-earth-within-600-years-ncna818926?cid=sm_npd_nn_fb_mc</a>	<a href="https://www.nbcnews.com/mach/video/-a-wrinkle-in-time-is-probably-right-about-multiple-dimensions-1182239299525">https://www.nbcnews.com/mach/video/-a-wrinkle-in-time-is-probably-right-about-multiple-dimensions-1182239299525</a>

Falcon Heavy	
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<a href="https://www.nbcnews.com/mach/science/month-space-pictures-cosmic-penguin-playing-mars-ncsl852081">https://www.nbcnews.com/mach/science/month-space-pictures-cosmic-penguin-playing-mars-ncsl852081</a>	<a href="https://www.nbcnews.com/mach/video/this-futuristic-jet-pack-that-lets-users-fly-up-to-10-000-feet-in-the-sky-1189436995946?playlist=mmlsnd_mach">https://www.nbcnews.com/mach/video/this-futuristic-jet-pack-that-lets-users-fly-up-to-10-000-feet-in-the-sky-1189436995946?playlist=mmlsnd_mach</a>
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Syrian War	
Lucene	PageRank
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<a href="https://www.nbcnews.com/news/mideast/syria-s-civil-war-has-been-raging-7-years-what-n849851">https://www.nbcnews.com/news/mideast/syria-s-civil-war-has-been-raging-7-years-what-n849851</a>	<a href="https://www.nbcnews.com/politics/white-house/saudi-crown-prince-if-iran-makes-nuclear-bomb-so-will-n857921">https://www.nbcnews.com/politics/white-house/saudi-crown-prince-if-iran-makes-nuclear-bomb-so-will-n857921</a>
<a href="https://www.nbcnews.com/news/mideast/syrias-civil-war-has-been-raging-7-years-whats-behind-n849851">https://www.nbcnews.com/news/mideast/syrias-civil-war-has-been-raging-7-years-whats-behind-n849851</a>	<a href="https://www.nbcnews.com/storyline/aleppos-children/aleppo-s-bana-al-abed-mother-take-questions-facebook-n700336">https://www.nbcnews.com/storyline/aleppos-children/aleppo-s-bana-al-abed-mother-take-questions-facebook-n700336</a>
<a href="https://www.nbcnews.com/news/other/barrel-bombs-just-another-symbol-brutality-syrian-civil-war-f2D11765640">https://www.nbcnews.com/news/other/barrel-bombs-just-another-symbol-brutality-syrian-civil-war-f2D11765640</a>	<a href="https://www.nbcnews.com/news/north-korea/north-korea-uses-pirate-tactics-earn-millions-sanction-busting-n856921">https://www.nbcnews.com/news/north-korea/north-korea-uses-pirate-tactics-earn-millions-sanction-busting-n856921</a>
<a href="https://www.nbcnews.com/slideshow/children-among-injured-besieged-damascus-suburb-n834526">https://www.nbcnews.com/slideshow/children-among-injured-besieged-damascus-suburb-n834526</a>	<a href="https://www.nbcnews.com/storyline/isis-terror/isis-will-remain-threat-2018-experts-warn-n828146">https://www.nbcnews.com/storyline/isis-terror/isis-will-remain-threat-2018-experts-warn-n828146</a>
<a href="https://www.nbcnews.com/slideshow/air-raids-cause-devastation-eastern-ghouta-region-syria-n834526">https://www.nbcnews.com/slideshow/air-raids-cause-devastation-eastern-ghouta-region-syria-n834526</a>	<a href="https://www.nbcnews.com/news/world/analysis-trump-s-america-first-foreign-policy-isolates-u-s-n833046">https://www.nbcnews.com/news/world/analysis-trump-s-america-first-foreign-policy-isolates-u-s-n833046</a>
<a href="https://www.nbcnews.com/news/mideast/amp/syria-s-civil-war-has-been-raging-7-years-what-n849851">https://www.nbcnews.com/news/mideast/amp/syria-s-civil-war-has-been-raging-7-years-what-n849851</a>	<a href="https://www.nbcnews.com/news/world/north-korea-s-kim-trump-meet-andrea-mitchell-weighs-risks-n855111">https://www.nbcnews.com/news/world/north-korea-s-kim-trump-meet-andrea-mitchell-weighs-risks-n855111</a>
<a href="https://www.nbcnews.com/storyline/syrias-children/amp/syrian-civil-war-photo-photographer-s-rescue-goes-viral-n748146">https://www.nbcnews.com/storyline/syrias-children/amp/syrian-civil-war-photo-photographer-s-rescue-goes-viral-n748146</a>	<a href="https://www.nbcnews.com/news/world/putin-s-bravado-over-russian-nuclear-weapons-emboldened-trump-analysts-n852301">https://www.nbcnews.com/news/world/putin-s-bravado-over-russian-nuclear-weapons-emboldened-trump-analysts-n852301</a>
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<a href="https://www.nbcnews.com/news/us-news/austin-texas-edge-after-spate-package-bombs-kill-two-n855956">https://www.nbcnews.com/news/us-news/austin-texas-edge-after-spate-package-bombs-kill-two-n855956</a>	<a href="https://www.nbcnews.com/news/us-news/deadly-austin-bombings-were-meant-send-message-police-chief-says-n857786">https://www.nbcnews.com/news/us-news/deadly-austin-bombings-were-meant-send-message-police-chief-says-n857786</a>
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<a href="https://www.nbcnews.com/storyline/trump-s-first-foreign-trip/amp/trump-declines-endorsing-paris-climate-change-deal-g7-summit-will-n765406">https://www.nbcnews.com/storyline/trump-s-first-foreign-trip/amp/trump-declines-endorsing-paris-climate-change-deal-g7-summit-will-n765406</a>	<a href="https://www.nbcnews.com/storyline/trump-s-first-foreign-trip/trump-message-during-overseas-trip-now-he-s-home-n765136">https://www.nbcnews.com/storyline/trump-s-first-foreign-trip/trump-message-during-overseas-trip-now-he-s-home-n765136</a>



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<a href="https://www.nbcnews.com/storyline/trump-s-first-foreign-trip/g-7-summit-leaders-brace-clash-trump-trade-climate-n764971">https://www.nbcnews.com/storyline/trump-s-first-foreign-trip/g-7-summit-leaders-brace-clash-trump-trade-climate-n764971</a>	<a href="https://www.nbcnews.com/mach/science/michio-kaku-sees-amazing-things-our-future-except-those-scary-ncna851226">https://www.nbcnews.com/mach/science/michio-kaku-sees-amazing-things-our-future-except-those-scary-ncna851226</a>
<a href="https://www.nbcnews.com/storyline/trump-s-first-foreign-trip/amp/trump-end-first-foreign-trip-pledges-unwavering-support-u-s-n765446">https://www.nbcnews.com/storyline/trump-s-first-foreign-trip/amp/trump-end-first-foreign-trip-pledges-unwavering-support-u-s-n765446</a>	<a href="https://www.nbcnews.com/storyline/trump-s-first-foreign-trip/donald-trump-nato-why-his-silence-article-5-big-deal-n765011">https://www.nbcnews.com/storyline/trump-s-first-foreign-trip/donald-trump-nato-why-his-silence-article-5-big-deal-n765011</a>

## 5. Overlap Table:



Query	Number of Overlaps
Bitcoin Blockchain	5
Stephen hawking	0
Falcon Heavy	0
Syrian War	0
LA Rams	4
Black Panther	0
Austin Bombings	1
Paris Climate Deal	1

**Overlap Chart:**

