Homework 4

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A. We construct an inverted index for the terms in the documents by listing the documents that contain a given term for every term in every document. If you query "new times", you will get back all three documents as each document contains at least one of the searched terms.

B. When using the vector space model to search for "new times", the results are ordered C1, C3, C2 using the following calculations.

Query = "new times"

C1	TF_c1	WF_c1	DF	IDF	TF-IDF_c1	TF_q	WF_q	TF-IDF_q	SCORE	0.062016263
new	1	1	2	0.176091259	0.176091259	1	1	0.176091259		
york	1	1	2	0.176091259	0.176091259	0	0	0		
times	1	1	2	0.176091259	0.176091259	1	1	0.176091259		

C2	TF_c2	WF_c2	DF	IDF	TF-IDF_c2	TF_q	WF_q	TF-IDF_q	SCORE	0.031008132
new	1	1	2	0.176091259	0.176091259	1	1	0.176091259		
york	1	1	2	0.176091259	0.176091259	0	0	0		
post	1	1	1	0.477121255	0.477121255	0	0	0		

C3	TF_c3	WF_c3	DF	IDF	TF-IDF_c3	TF_q	WF_q	TF-IDF_q	SCORE	0.031008132
london	1	1	1	0.477121255	0.477121255	0	0	0		
times	1	1	2	0.176091259	0.176091259	1	1	0.176091259		

C.

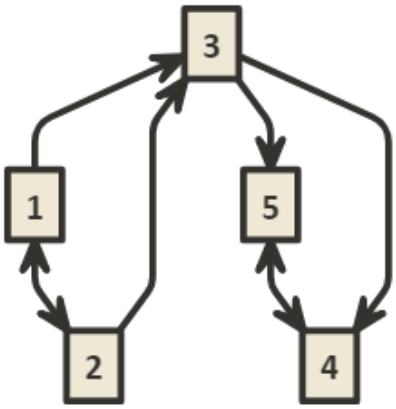
Engine	**Precision**	**MAP**
G	k1=1/1; k2=2/2, k3=2/3	8/9
Y	k1=1/1; k2=1/2, k3=2/3	13/18

2

P(USA | 0) = 5/12; P(USA | 1) = 2/11
P(Boston | 0) = 2/12; P(Boston | 1) = 1/11
P(Osaka | 0) = 1/12; P(Osaka | 1) = 2/11
P(Newyork | 0) = 2/12; P(Newyork | 1) = 1/11
P(Tokyo | 0) = 1/12; P(Tokyo | 1) = 2/11
P(Japan | 0) = 1/12; P(Japan | 1) = 2/11

P(0 | d5) = 6.697e-6 P(1 | d5) = 9.031e-6

3



A. Page rank equation: `sum(0.7 * ri / di + 0.3 / 5)`

4

A.

B.

Average node degree: 0.896
This is the average amount of connections each node has.

Graph diameter: 6 Of the two nodes with the greatest degree of separation, how many degrees of separation are there.

Average path length: 1.682 Average of all shortest paths between all nodes.

C.

Movie	Rank
76341	1
241554	2
260346	3
27576	4
106646	5