



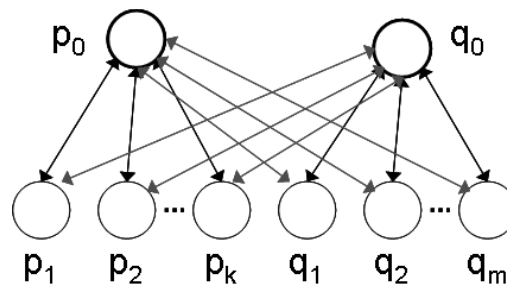
Web Dynamics (SS 10)  
Assignment 6

Handout on: June 24, 2010

Due on: July 1, 2010 (before lecture)

**Exercise 6.1: PageRank of Target Pages in a Web Spam Alliance**

Consider the following Web Spam Alliance of two farms:



Calculate the resulting PageRank of the target pages  $p_0$  and  $q_0$ !

**Exercise 6.2: Total PageRank in Web Spam Alliances of Two Farms**

In the lecture, three topologies of Web Spam Alliances of two farms

- “Intuitive”
- “Better”
- “Optimal”

have been introduced. What is the total (!) PageRank for each of the three farms? Which observation can be made from the comparison of the results?

### Exercise 6.3: Joining a Web Spam Alliance

In the lecture it has been mentioned that a Web Spam Alliance is not necessarily beneficial for all partners.

- a) Consider two optimal, non-interconnected Web Spam farms (Farm A and Farm B) without leakage. Their target pages have the following PageRank scores:

$$\bar{p}_0 = \frac{ck+1}{(1+c)N} \text{ (Farm A) and } \bar{q}_0 = \frac{cm+1}{(1+c)N} \text{ (Farm B).}$$

Both farms will now contribute their boosting pages to an optimally connected Web Spam Alliance of two. In Farm A,  $k$  pages link to target page  $p_0$ , while in Farm B  $m$  pages link to target page  $q_0$ . What will be the gain of Farm A's and Farm B's target pages  $p_0$  resp.  $q_0$ ?

- b) Consider now the two farms of part a) already being an optimally connected Web Spam Alliance of two. Farm A has 20 boosting pages while Farm B has 10 boosting pages. Now, a third farm (Farm C,  $n$  boosting pages with target page  $r_0$ ) proposes to join the alliance by creating a Web Ring topology. Farm C proposes to link from its target page  $r_0$  to  $q_0$ , while being linked to  $r_0$  from  $p_0$ . Farm C wants to join the alliance with 15 boosting pages. Is this beneficial for the target pages of Farm A and/or Farm B, given a damping factor of  $c = 0.85$ ?