

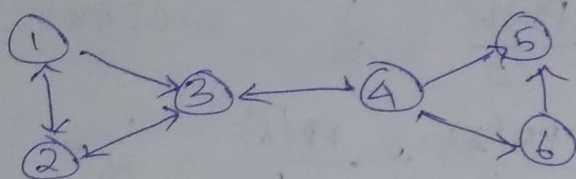
SNA Assignment

V. Subash Praveen

205001085

CSE-B

①



Consider page rank distributed evenly for each node initially as $1/n$.

$$PR(1) = PR(2) = PR(3) = PR(4) = PR(5) = PR(6) = \frac{1}{6} = 0.167$$

Iteration 1:

$$PR(1) = \frac{PR(2)}{2} = \frac{1}{12} = 0.0833$$

$$PR(2) = \frac{PR(1)}{2} + PR(3) = \frac{1}{12} + \frac{1}{6} = 0.25$$

$$PR(3) = \frac{PR(1)}{2} + \frac{PR(2)}{2} + \frac{PR(4)}{3} = \frac{1}{12} + \frac{1}{12} + \frac{1}{18} = \frac{2}{9} = 0.2223$$

$$PR(4) = \frac{PR(6)}{2} = \frac{1}{12} = 0.0833$$

$$PR(5) = \frac{PR(4)}{3} + \frac{PR(6)}{2} = \frac{1}{18} + \frac{1}{12} = \frac{5}{36} = 0.138$$

$$PR(6) = \frac{PR(4)}{3} = \frac{1}{18} = 0.0556$$

Iteration 2

$$PR(1) = PR(2)/2 = 1/8 = 0.125$$

$$PR(2) = PR(1)/2 + PR(3) = \frac{1}{24} + \frac{2}{9} = \frac{19}{72} = 0.2638$$

$$PR(3) = \frac{PR(1)}{2} + \frac{PR(2)}{2} + \frac{PR(4)}{3} = \frac{1}{24} + \frac{1}{8} + \frac{1}{36}$$

$$= 7/36 = 0.1944$$

$$PR(4) = \frac{PR(6)}{2} = \frac{1}{36} = 0.0278$$

$$PR(5) = \frac{PR(4)}{3} + \frac{PR(6)}{2} = \frac{1}{36} + \frac{1}{36} = \frac{1}{18} = 0.0556$$

$$PR(6) = \frac{PR(4)}{3} = \frac{1}{36} = 0.0278$$

Iteration 3

$$PR(1) = \frac{PR(2)}{2} = \frac{19}{144} = 0.1319$$

$$PR(2) = \frac{PR(1)}{2} + \frac{PR(3)}{1} = \frac{1}{16} + \frac{7}{36} = 0.2569$$

$$PR(3) = \frac{PR(1)}{2} + \frac{PR(2)}{2} + \frac{PR(6)}{3} = \frac{1}{16} + \frac{19}{144}$$

$$+ \frac{1}{108} = \frac{4}{54} = 0.2037 //$$

$$PR(4) = \frac{PR(6)}{2} = \frac{1}{72} = 0.01389$$

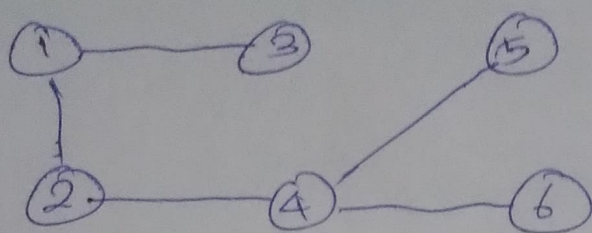
$$PR(5) = \frac{PR(4)}{3} + \frac{PR(6)}{2} = \frac{1}{108} + \frac{1}{72} = \frac{5}{216}$$

$$= 0.0231 //$$

$$PR(6) = \frac{PR(4)}{3} = \frac{1}{108} = 0.0092$$

The algorithm converges to a stable form after which the value at each node do not change with further iterations.

2



Consider importance of each nodes as
 $\text{Importance}(1) = \text{Imp}(2) = \text{Imp}(3) = \text{Imp}(4)$
 $= \text{Imp}(5) = \text{Imp}(6) = 1$

In iteration 1,

$$\text{Imp}(1) = \text{Imp}(2)/2 + \text{Imp}(3)/1$$

$$= 0.5 + 1 = 1.5 //$$

~~$$\text{Imp}(2) = \text{Imp}(1)/2 + \text{Imp}(4) = \text{Imp}(5)$$~~

~~$$\text{Imp}(6) = 1$$~~

$$\text{Imp}(2) = \frac{\text{Imp}(1)}{2} + \frac{\text{Imp}(4)}{3}$$

$$= 0.5 + 0.34 = 0.84$$

$$\text{Imp}(3) = \text{Imp}(1)/2 = 0.5$$

$$\text{Imp}(4) = \text{Imp}(2)/2 + \text{Imp}(5)/1 + \frac{\text{Imp}(6)}{1}$$

$$= 0.5 + 1 + 1 = 2.5$$

$$\text{Imp}(5) = \text{Imp}(4)/3 = 0.34$$

$$\text{Imp}(6) = \text{Imp}(4)/3 = 0.34$$

⇒ Node 4 has highest importance of
 2.5 //