ASSIGNMENT COVER SHEET
[INDIVIDUAL SUBMISSION]

For submission to: Xueming Lin

Course code : 9311

Course name : Database system

Assignment : Assignment3

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Question 1
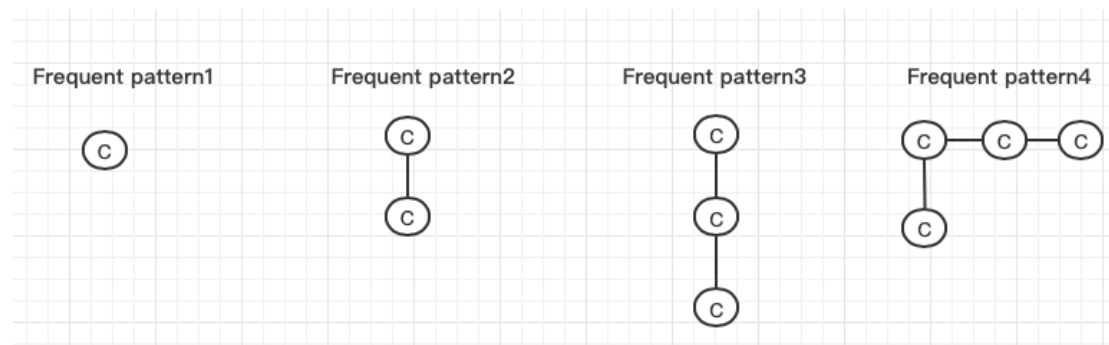
Frequent patterns:

Figure 1

For frequent pattern1, it appears 5 times in the graph database D.

For frequent pattern2, it occurs 5 times in the graph database D.

For frequent pattern3, it occurs 5 times in the graph database D.

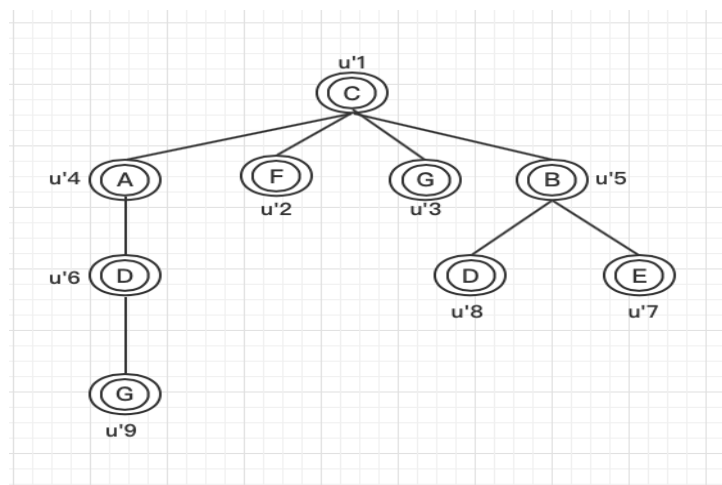For frequent pattern4, its occurrence frequency is 4.

Question2

(1)

$$Rank(u_0) = \frac{1}{3} = 0.3, \qquad Rank(u_1) = \frac{2}{4} = 0.5, Rank(u_2) = \frac{1}{4} = 0.25$$

$$Rank(u_3) = \frac{2}{2} = 1, Rank(u_4) = \frac{2}{2} = 1, Rank(u_5) = \frac{1}{2} = 0.5$$

$$Rank(u_6) = \frac{2}{1} = 2, Rank(u_7) = \frac{3}{1} = 3, Rank(u_8) = \frac{3}{1} = 3.$$
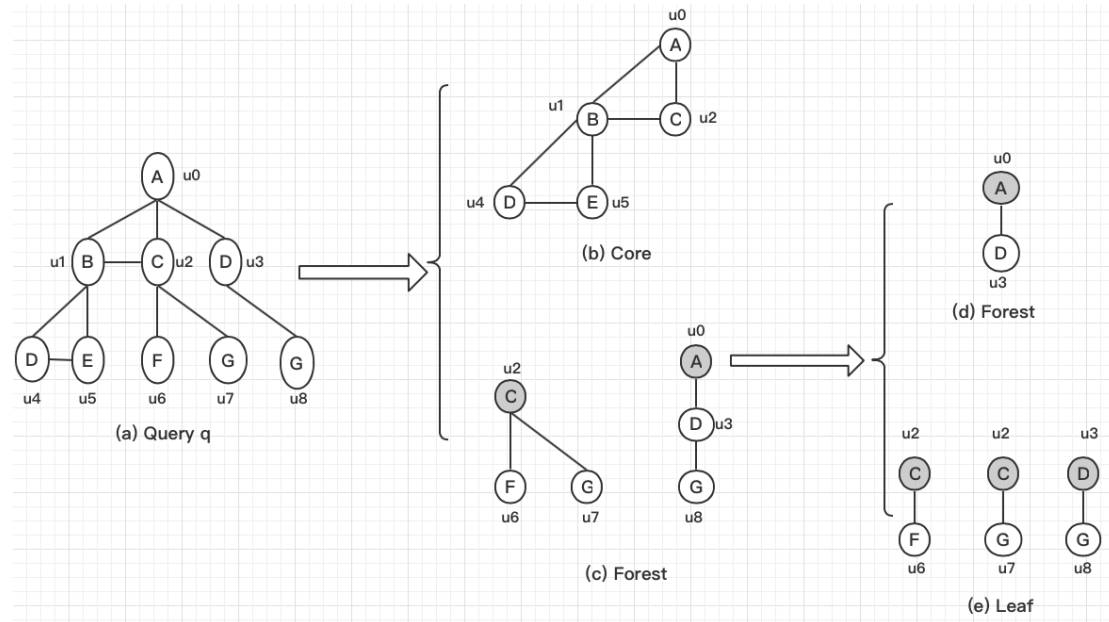
Hence, u_2 is selected as the root node.

NEC tree q'

u'_1 has been selected as the root node in the previous step, then performing BFS from root node and merging vertices from same NEC into a single vertex.

(2)

In query q, non-tree edges include AB, AC, BC, BD, DE, BE in any spanning tree.

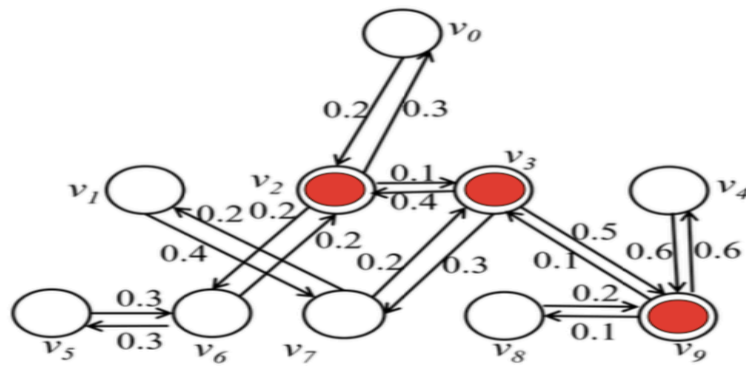

The Core-Forest-Leaf decomposition of query q

Question 3

Figure 2

Seed	v0	v1	v2	v3	v4	v5	v6	v7	v8	v9	SUM
v0	1	0.0012	0.2	0.02	0.006	0.012	0.04	0.006	0.001	0.01	1.2962
v1	0.0096	1	0.032	0.08	0.024	0.00192	0.0064	0.4	0.004	0.04	1.59792
v2	0.3	0.006	1	0.1	0.03	0.06	0.2	0.03	0.005	0.05	1.781
v3	0.12	0.06	0.4	1	0.3	0.024	0.08	0.3	0.05	0.5	2.834
v4	0.0048	0.0024	0.016	0.04	1	0.00096	0.0032	0.012	0.04	0.4	1.51936
v5	0.018	0.00036	0.06	0.006	0.0018	1	0.3	0.0018	0.0003	0.003	1.39126
v6	0.06	0.0012	0.2	0.02	0.006	0.3	1	0.006	0.001	0.01	1.6042
v7	0.036	0.2	0.12	0.3	0.09	0.0072	0.024	1	0.015	0.15	1.9422
v8	0.0024	0.0012	0.008	0.02	0.12	0.00048	0.0016	0.006	1	0.2	1.35968
v9	0.012	0.006	0.04	0.1	0.6	0.0024	0.008	0.03	0.1	1	1.8984

Table 1

As can be seen from table1, v3 as an activated seed would produce largest influence spreads. In fact, from figure 2, we could find that the vertex having more degree such as v2, v3, v9 and being regarded as seed would generate larger influence spreads. Moreover, the largest sum of factors derived from the vertex having the most degree after first expanding may produce the largest influence spreads.