9311 Assignment3

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Question 1

1) `When minFreq = 3, then pattern 'c', 'c-c', 'c-c-c' and 'c-c-c-c' are *frequent*.

Question 2

1) Ranking function:

Rank(u_0)	Rank(u_1)	Rank(u_2)	Rank(u_3)	Rank(u_4)	Rank(u_5)	Rank(u_6)	Rank(u_7)	Rank(u_8)
1/3	2/4	1/4	2/2	2/2	1/2	2/1	3/1	3/1

The rank of u_2 is 1/4 which is the smallest rank and makes u'_2 become the root of NEC tree. The u_3 and u_4, u_7 and u_8 have the same rank respectively, so maybe they can be merged. However, after performing BFS from the root node, no matter merge u_3 and u_4, or u_7 and u_8, we cannot get an equivalence of merging graph. So here is the NEC tree of query q:
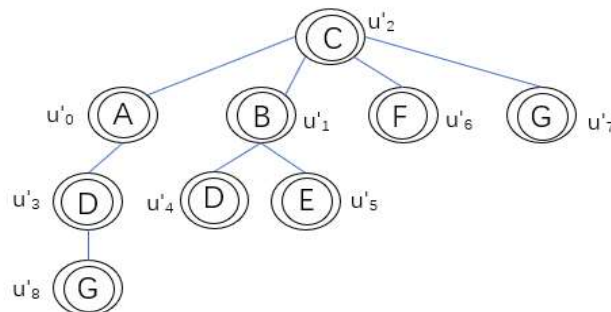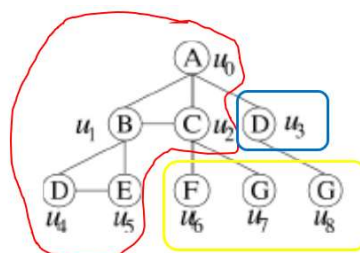

2) According to query q, the minimal connected subgraph containing all non-tree edges of q are u_0, u_1, u_2, u_4, u_5. Counting the leaf vertices, we can conclude that u_6, u_7, u_8 belongs to V_l. Finally, only u_3 is not in $V_c \cup V_l$. So, we can decompose the vertex set of q into:

The core set: u_0, u_1, u_2, u_4, u_5.

The forest set: u_3.

The leaf set: u_6, u_7, u_8.

Question 3

1) Calculate all the possible methods and here are the results:

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if s = v0 and let w(v0) = 1, then the influence spreads = 1.2962
if s = v1 and let w(v1) = 1, then the influence spreads = 1.59792
if s = v2 and let w(v2) = 1, then the influence spreads = 1.7810000000000001
if s = v3 and let w(v3) = 1, then the influence spreads = 2.834
if s = v4 and let w(v4) = 1, then the influence spreads = 1.7790400000000004
if s = v5 and let w(v5) = 1, then the influence spreads = 1.39126
if s = v6 and let w(v6) = 1, then the influence spreads = 1.6042
if s = v7 and let w(v7) = 1, then the influence spreads = 1.6948
if s = v8 and let w(v8) = 1, then the influence spreads = 1.35968
if s = v9 and let w(v9) = 1, then the influence spreads = 1.8984000000000003
```

We can draw the conclusion from the screenshot above that if v_3 is the activated seed (i.e. $s=v_3$) and let $w(v_3) = 1$, then we can get the largest influence spreads which is 2.834.