8.

(a) Use the frequent itemset ranking method to recommend a page to the user who made T3.

Given Item sets S, and a collection of user browsing histories U, for each history U_i $=\{p1,p2,\ldots,pm\} \in U$ and itemset $S_j =\{p1',p2',..,pm'\} \in S$. We define rank $(S_i,Ui) =|S_i \cap U_i|$

Rank(T3,{p1,p2})	1
Rank (T3,{p1,p3})	1
Rank (T3,{p1,p4})	2
Rank (T3,{p1,p5})	1
Rank (T3,{p1,p6})	2
Rank (T3,{p1,p7})	1
Rank (T3,{p2,p3})	0
Rank (T3,{P2,p7})	0
Rank(T3,{P3,p7})	0
Rank (T3,{P4,p6})	2
Rank (t3,{P4,p7})	1
Rank (T 3,{P5,p7})	0
Rank (T3,{P6,p7})	1
Rank (T3,{p1,p2,p3})	1
Rank (T3,{p1,p2,p7})	1
Rank (T3,{p1,p3,p7})	1
Rank (T3,{p1,p4,p6})	3
Rank (T3,{p1,p4,p7})	2
Rank(T3,{p1,p5,p7})	1
Rank(T3,{p1,p6,p7})	2

Rank (T3,{p2,p3,p7})	0
Rank (T3,{p4,p6,p7})	2
Rank (T3,{p1,p2,p3,p7})	1
Rank(T3,{p1,p4,p6,p7})	3

the highest ranked frequent item sets are {p1,p4,p6,p7} and {p1,p4,p6}

P7 is recommended for T3

(b) Use the closest neighbor method to recommend a page to the user who made T3.

Find the *closest neighbor* of this user (i.e. the user who is most similar to this user), and recommend the pages visited by the closest neighbor to this user.

T1: {P1,P2,P3,P5,P7}
T2: {P1,P4,P5,P6,P7}

T4: {P1,P4,P5,P6,P7}
T5: {P3,P5}
T6: {P1,P2,P3,P7}
T7: {P2,P7}
T8: {P1,P2,P3,P4,P6,P7}

T3: {P1,P4,P6}

The Jaccard coefficient measures similarity between sample sets, and is defined as the size of the intersection divided by the size of the union of the sample sets:

$$J(A,B) = \frac{|A \cap B|}{|A \cup B|}.$$

J(T3,T1) = 1/7 = 0.14

J(T3,T2) = 3/5 = 0.6

J(T3,T4) = 3/5 = 0.6

J(T3,T5) = 0/5 = 0

J(T3,T6)= 1/6 =0.16

J(T3,T7)= 0/5 =0

J(T3,T8)= 3/6 =0.5

User T2 and T4 are similar to T3. Page p5 and p7 are recommended to User T3