

2. Exercise

(i)

Iteration 1:

$$S_1 = \{\}, \overline{S_1} = \{ACEDKMNOUY\}$$

$$Tr(\overline{S_K}) = \{A,C,E,D,K,M,N,O,U,Y\}$$

From the previous set we have that only M,O,K,E,Y are frequent and let M be the first element the algorithm returns so

M is frequent and we extend it to O but MO isn't frequent so we extend M with K

Mk is frequent and we extend them with E, and MKE is infrequent so we extend MK with Y and we have MKY which is infrequent and we stop here

Iteration 2:

$$S_2 = \{MK\}, \overline{S_2} = \{ACEDNOUY\}$$

$$Tr(\overline{S_K}) = \{A,C,E,D,N,O,U,Y\}$$

From the previous set we have that only O,E,Y are frequent and let O be the first element the algorithm returns so

O is frequent and we extend it with E then OE is frequent so we extend with Y but OEY is infrequent and then we extend OE with K and OEK is frequent

Iteration 3:

$$S_3 = \{MK,OEK\}, \overline{S_3} = \{ACEDNOUY,ACDMNUY\}$$

$$Tr(\overline{S_K}) = \{A,C,EM,MO,D,N,U,Y\}$$

From the previous set we have only Y that is frequent and so

we extend Y to M and we have MY which is infrequent, then we extend Y

with O and YO is infrequent, and we try with E then YE is infrequent , now

we try with K and we have KY which is frequent and we stop

$$\text{Iteration 4: } S_4 = \{MK,KY,EKO\}, \overline{S_4} = \{ACEDNOUY,ACEDMNOU,ACDMNUY\}$$

$$Tr(\overline{S_4}) = \{A,C,D,N,U,EM,OM,OY\}$$

and all of the itemsets in $Tr(\overline{S_4})$ are infrequent so we stop and all maximal frequent itemsets = $\{MK,KY,EKO\}$

(ii)

we have to find all itemsets that are infrequent and all of their subsets are frequent

we know that the frequent itemsets are $\{M,O,K,E,Y,MK,EO,KY,KO,EK,EKO\}$

so $\{MO,ME,MY,OY,EY\}$ are infrequent but each subset for each itemset of them is frequent

so all minimal infrequent itemset = $\{MO,ME,MY,OY,EY,N,Y,D,A,U,C\}$