

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:

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

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

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

*Iteration 4:

$$S_4 = \{MK, KY, EKO\}, \overline{S_4} = \{ACEDNOUY, ACEDMNOU, ACDMNUY\}$$

$$Tr(\overline{S_4}) = \{A, C, D, N, U, E, M, O, Y\}$$

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 = $\{MO, ME, MY, OY, EY, N, Y, D, A, U, C\}$