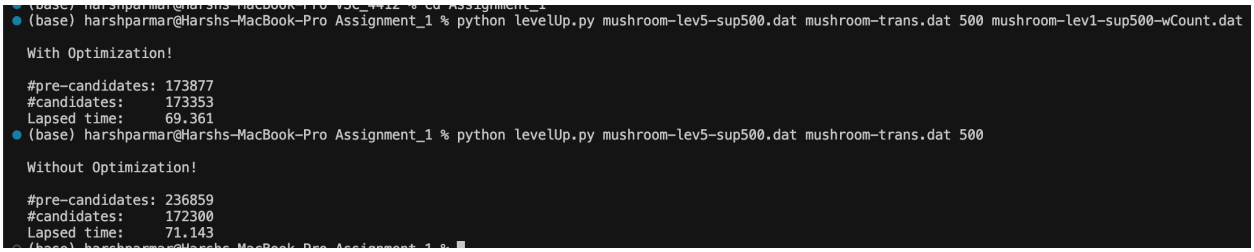
EECS 4412: Assignment 1 Solution

NAME: HARSH PARMAR | STUDENT ID: 218220038

Answer 1. A.



- The screenshot above shows the output of Apriori Algorithm when tested on Mushroom Dataset (Level 5).
- levelUp.py is capable of implementing both, i.e., Apriori Algorithm with optimization and without Optimization.
- Optimized algorithm handles an additional argument which sorts items by frequency. This resulted in reduction in number of pre-candidates generated so fewer candidate item-sets are present for validation.
- Optimization pruned the search space and also helped reduce runtime performance slightly.

Answer 1. B.

Solution code provided as arules.py

Answer 2. A.

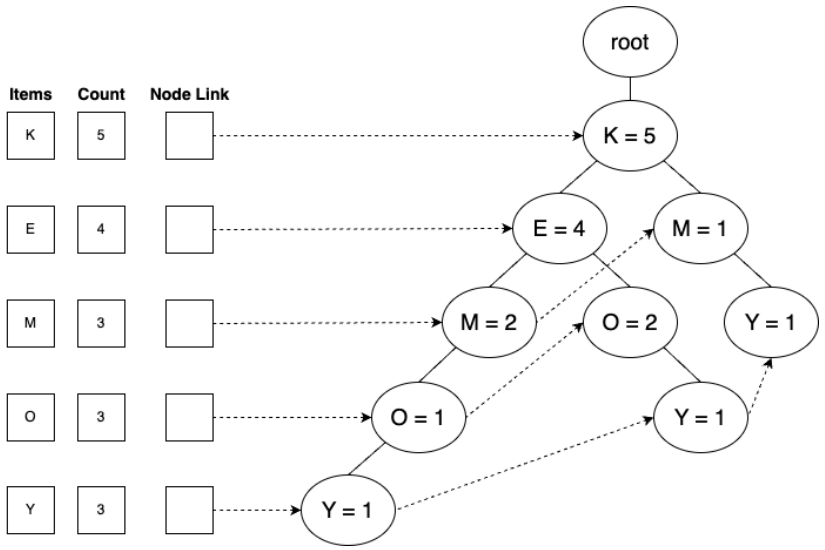
Given:

Transactions	Itemsets
T1	{ M, O, N, K, E, Y }
T2	{ D, O, N, K, E, Y }
T3	{ M, A, K, E }
T4	{ M, U, C, K, Y }
T5	{ C, O, K, I, E }

Items	Count	Support
M	3/5	60 %
O	3/5	60 %
N	2/5	40 %
K	5/5	100 %
E	4/5	80 %
Y	3/5	60 %
D	1/5	20 %
A	1/5	20 %
U	1/5	20 %
C	2/5	40 %
I	1/5	20 %

Frequent Items	Itemsets	Transformed Transactions
K	100 %	T1: { K, E, M, O, Y }
E	80 %	T2: { K, E, O, Y }
M	60 %	T3: { K, E, M }
O	60 %	T4: { K, M, Y }
Y	60 %	T5: { K, E, O }

FP-Tree:



Answer 2. B.

Patterns Generated Frequently:

Frequent Items	Count	Frequent Patterns	Count
K	5	{ K, Y }	3
E	4	{ K, O }	3
M	3	{ O, E, K }	3
O	3	{ E, O }	3
Y	3	{ K, M }	3
		{ K, E }	3

Association rules with respect to a support threshold of 60% and a confidence threshold of 80%:

Association	Support	Confidence
{ E } → { K }	80 %	100 %
{ M } → { K }	60 %	100 %
{ O } → { K }	60 %	100 %
{ O, E } → { K }	60 %	100 %
{ O } → { E, K }	60 %	100 %
{ Y } → { K }	60 %	100 %
{ O } → { E }	60 %	100 %
{ O, K } → { E }	60 %	100 %
{ K } → { E }	80 %	80 %