Let $\mathcal{D}$ a transaction dataset with the following horizontal representation $\mathcal{H}_{\mathcal{D}}$:

trans.	Items					
t_1		B	C	D		
t_2	A	B	C		E	
t_3	A	B	C	D		F
t_4				D	E	
t_5	A	B				
t_6	A		C		E	F
t_7	A	B			E	F
t_8				D		F
t_9			C		E	
t_{10}	A	B				F

Exercice 1

- Give the vertical $\mathcal{V}_{\mathcal{D}}$ and the martix $\mathcal{M}_{\mathcal{D}}$ representations.
- Give the supports and the frequencies (absolute/relative) of the following itemsets list :

$$L = \{ACD, CE, BCE, ABCE, E, D, BC, F, CDF, EF\}$$

- Give the frequent itemsets of L with a minsup $\theta \in \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
- Give two comparable and two incomparable itemsets.

Exercice 2

- Give the size of the search space for an FIM task on $\mathcal{D}$.
- Give a proof of the anti-monotonicity property of the frequency on itemsets.
- Give a proof of the Apriori property on itemsets.

Exercice 3

- Give a discussion on the soundness, completness, termination and time/memory complexity of Apriori algorithm.
- Execute the Apriori algorithm on $\mathcal{D}$ with a minsup $\theta = 3$.
- Give a botton-up algorithm version for FIM problem.