Data Mining 2

CAT 4 - 2019/2020

Name _____ **Surname** _____ **ID:** _____ **Test id. AUTO**

Q1. Letting S_1 be a subsequence of a frequent sequence S_2, refresh why also S_1 is a frequent one.

A1. _____

Q2. Given the following sets of elements, run the GSP algorithm: once you find the candidate 3-sequences, write down which one/s is/are pruned and which one/s is/are the frequent sequences.

$\{DC\}\{CD\}\{D\}\{C\}\{A\}$
$\{A\}\{B\}\{C\}\{E\}$
$\{AD\}\{C\}\{C\}\{CE\}$
$\{C\}\{E\}\{E\}\{A\}$

A2. _____

Q3. Assume that in the following tracking sequence H=home, F=friend's house and X=other, then assume that the elements at time $t > 3$ (highlighted in red) occur after an imposed goverment lockdown aiming to limitate the $\{H\} \rightarrow \{F\}$ sequence. Is it better to impose $gap \geq 3$ or $gap \leq 3$ in order to focus on the forbidden sequence after the lockdown? Explain your answer.

$\{H, F\}\{H\}\{H, F, X\}\{H, X\}$ $\{H\}\{H\}\{H, X\}\{H, F\}$

A3. _____

Q4. Identify the wrong statements about the EM algorithm.

1) It computes the model parameters until convergence is reached

2) Probability of data to belong to each distribution is estimated during the E-step

3) Dependence of data is always assumed

4) It is not able to cluster points when more than two generative processes are involved

5) Cluster assignment is more flexible than kmeans-like approaches

A4. _____

N.B.: this question can have more than one correct answer

Q5. Given the following sets of elements, apply the ROCK clustering assuming a similarity threshold of 0.15 and 2 required clusters.

$P_1 = \{cap, sunglasses, shoes\}$
$P_2 = \{pants, shoes, shirt, sunglasses\}$
$P_3 = \{chicken, pants\}$
$P_4 = \{shoes, shirt, cap\}$

A5. _____

Q6. Given the following partitions, evaluate their goodness using the Profit as a fitness function ($r = 2$)

Partition 1
$C_1((c, c), (c, e), (c, c, e, e), (e, e)$
$C_2((d, e), (e, d), (h, e, d), (e, e))$

Partition 2
$C_1((c, e, c), (e, c, e))$
$C_2((d, e, h), (e, e, e))$

A6. _____

Q7. Which of the following assumptions/results allow to detect an outlier using ABOD?

1) A small variance of the angle spectrum

2) A power-law distribution of data

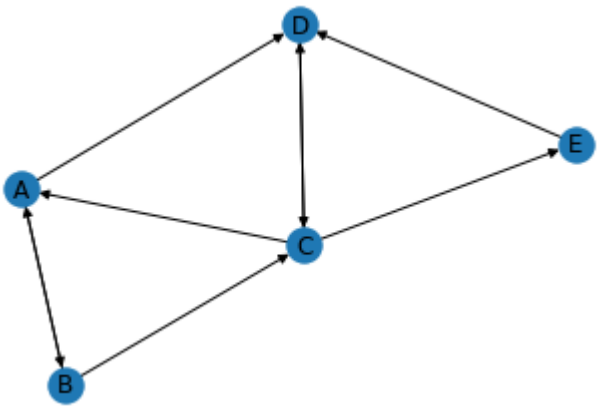
3) A preliminary clustering of data

4) A compass-like direction of the objects around the point

5) None of the others

A7. _____

Q8. Given the following KNN graph induced by a set of points and a threshold $t \geq 2$, identify the outliers using the in-degrees of the nodes.



A8. _____

Q9. Given a point p and the set of its o k-nearest neighbors $knn(p)$, write down the formula for calculating the LOF of point p.

A9. _____