Assessment II
CS551K – Software Agent & Multiagent Systems
2020-2021

Instructions to students:

- Your solution should be one single PDF file which you should upload onto MyAberdeen by the established time/deadline. Please do not email us your solution.
- Your file should be named our PDF file should be named "CS551K-ASMNT1-Day-X-YourSurname-YourName-YourIDNo". For instance, "CS551K-ASMNT1-Day-1-Smith-John-999999.pdf", where Day 1-5 should be the day of the class test in question, and 999999 is your student ID. Please try to make your submission file less than 10MB as you may have issues uploading large files onto MyAberdeen.
- Indicate clearly in your submission which item each solution is for. If we cannot identify this, you may be marked down.

Trust

1. A group of four students is trying to compute the trust they should give each other. They have previously interacted with each other in group works and have recorded all their interactions in the table below.

	A_1	A_2	A_3	A_4
A_1	(0,0)	(3,4)	(6,4)	(0,5)
A_2	(3,9)	(0,0)	(3,5)	(3,9)
A_3	(8,5)	(1,4)	(0,0)	(3,1)
A_4	(10,9)	(5,1)	(4,6)	(0,0)

For instance, the entry (10,9) at row A_4 and column A_1 means that student A_4 had 10 successful interactions with A_1 and 9 unsuccessful interactions with A_1 (thus totalling 19 interactions with A_1).

a) Students A_1, A_2 and A_3 want to compute the trust that they should place in A_4 by combining the direct interactions they each had with A_4. Use the Beta Reputation System and give an answer between -1 and 1 (rounded to two decimal places). Your answer should contain a short explanation and highlight the formula you used. (**1.5 Marks**)

b) Using subjective logic, compute the opinions $\omega_{A_3}^{A_4}, \omega_{A_1}^{A_3}$ and $\omega_{A_2}^{A_1}$. Use the result to compute the discounted opinion $\omega_{A_3}^{A_4} \otimes \omega_{A_1}^{A_3} \otimes \omega_{A_2}^{A_1}$. All answers should be rounded to two decimal places. (**1.5 Marks**)

c) Compute the matrix containing the local trust values for all the students. Then, normalise the matrix to obtain a matrix C with values c_{ij} $(i, j \in \{A_1, A_2, A_3, A_4\})$ between 0 and 1. Please note that for every $i, j \in \{A, B, C, D\}, c_{ij} = 1$. (**2 Marks**)

d) Use the matrix C to compute the transitive trust A_3 should place in A_2 by using how much the other agents trust A_2 and how much A_3 trusts the other agents ($t_{A_3A_2}$). This will correspond to the first level of reputation. (**1 Mark**)

e) Using your own words, briefly explain how you can compute the trust value of each student in the system using Eigentrust. Provide the trust values by rounding the values to four decimal places and using $\epsilon = 0.001$ in the algorithm studied in our lectures. (**3 Marks**)