CS549-I02 **ASSIGNMENT 4** School of Computer Science
5 points Western Illinois University
Professor: Byoung Jik Lee Due: 11:59 AM, 11/28/2022

This is a programming assignment. Training Data are given. There are 10 animals (d1, d2, d3, d4, d5, d6, d7, d8, d9, and d10). Each animal is described by its features (6 attributes: a1, a2, a3, a4, a5, and a6) and belongs to one of three groups Group1, Group2, and Group3. We want to build a system to cluster the given animal data into one of three groups using **unsupervised simple competitive learning**. After training is done, we want to test the given three Testing Data (test1, test2, and test3).

- You will need three output units (for three groups) and six input units (for six input attributes). Initialize the random weights and normalize them. Implement the system so that the following 10 data can be correctly clustered into corresponding 3 groups from data itself.

<TRAINING DATA>

	a1	a2	a3	a4	a5	a6
d1	1	0	0	0	0	0
d2	1	0	0	1	0	0
d3	1	0	0	0	1	0
d4	0	0	1	1	0	1
d5	0	0	1	1	0	1
d6	0	0	1	0	0	1
d7	0	1	0	0	0	1
d8	0	1	0	0	0	1
d9	0	1	0	0	1	1
d10	1	0	0	0	0	0

<TESTING DATA>

- After you build the system, test the new data (t1, t2, and t3) to check the clustering results based on the training.

	a1	a2	a3	a4	a5	a6
test1	0	0	1	1	1	1
test2	1	0	0	0	1	1
test3	0	1	0	1	0	1

You should submit the followings to have full score:

(1) your program source file
(2) your program text file
(3) **the result what your program prints by running your program**. Screenshots are accepted.
(3-1) After training, print the final weights of each output unit (output unit1, output unit2, and output unit3) connected to six input units.
(3-2) Print the clustering result of 10 training data. For each training data, print the net (weighted sum) of each output unit. Also print the group each training data belongs to.
(3-3) Print the clustering result of 3 testing data. For each testing data, print the net (weighted sum) of each output unit. Also print the group each testing data belongs to.
(4) Complete and submit the Assignment-4-Result Report.docx file.