Artificial Intelligence

Homework Assignment 2.

1. Suppose that the data for analysis includes the attribute age. The age values for the data tuples are (in increasing order) 13, 15, 16, 16, 19, 20, 20, 21, 22, 22, 25, 25, 25, 25, 30, 33, 33, 35, 35, 35, 35, 36, 40, 45, 46, 52, 70. (1 pt each)

a) What is the mean of the data? What is the median?
b) What is the mode of the data? Comment on the data's modality (i.e., bimodal, trimodal, etc.).
c) Can you find (roughly) the first quartile (Q1) and the third quartile (Q3) of the data?
d) Give the five-number summary of the data.
e) Draw a boxplot of the data.
f) How is a quantile-quantile plot different from a quantile plot?

2. Suppose that the values for a given set of data are grouped into intervals. The intervals and corresponding frequencies are as follows:

age	*frequency*
1~5	200
6~15	450
16~20	300
21~50	1500
51~80	700
81~110	44

Compute an approximate median value for the data. (1 pt)

3. Given two objects represented by the tuples (22, 1, 42, 10) and (20, 0, 36, 8): (1 pt each)

a) Compute the Euclidean distance between the two objects.
b) Compute the Manhattan distance between the two objects.
c) Compute the supremum distance between the two objects.

4. Suppose we have the following 2-D data set:

	A_1	A_2
x_1	1.5	1.7
x_2	2	1.9
x_3	1.6	1.8
x_4	1.2	1.5
x_5	1.5	1.0

Consider the data as 2-D data points. Given a new data point, x = (1.4, 1.6) as a query, rank the database points based on similarity with the query using Euclidean distance, Manhattan distance, supremum distance, and cosine similarity. (4 pts)

Submitting your assignment :

- Due date: Zip your file and upload it at https://lms.mju.ac.kr/ by 24:00 Monday March 28th, 2022.
- Your homework cover page must be of the form provided by the https://lms.mju.ac.kr/.
- You must zip your homework with the homework cover page, and your homework file name must be of the form " hw2_StudentId_StudentName.zip", i.e., hw2_60063539_김다진.zip.
- You must protect your homework from others. Any form of academic dishonesty will not be tolerated. If you get caught, you will receive -14 points for this homework!
- This assignment is 14 points total and the late penalty is 3 points per day!