Assignment # 2

Due Date: 19/12/2025
Maximum Points: 75
Section: BSCS, BSIT
Note: Plagiarism will result in zero marks for all assignments. Submit a hard copy in class. Apply all mathematical approaches for each algorithm discussed in class.

Q1: Apply unsupervised learning, specifically K-means clustering, for Customer Segmentation using the provided sample dataset? If K = 3

Age	Annual Income (k$)	Spending Score (1-100)
19	15	39
21	15	81
20	16	6
23	16	77
31	17	40
22	17	76
35	18	6
23	18	94
64	19	3
30	19	72

Q2: Train the given dataset using a Decision Tree Regressor and test it on the provided sample to predict the amount of emission of CO2. Perform all the mathematical steps as discussed and demonstrated in the lecture.

Train Set:

Vehicle Class	Engine Size(L)	Fuel Type	Fuel Consumption	CO2 Emissions
COMPACT	A	Z	H	196
COMPACT	A	E	M	221
COMPACT	B	E	L	136
SMALL	C	Z	L	255
SMALL	C	Z	M	244
MID	C	T	L	230
SMALL	B	E	M	212
SMALL	A	E	L	225
COMPACT	B	T	L	239
MID	A	Z	M	359
SMALL	A	E	L	359
SMALL	B	Z	L	338

Test Set:

Vehicle Class	Engine Size(L)	Fuel Type	Fuel Consumption	CO2 Emissions
SMALL	A	C	Z	?

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Q3: Train the given dataset using a Decision Tree classifier, and test it on the provided sample to predict the sale condition of house prices. Perform all the mathematical steps discussed and proven in the lecture.

Train Set

Exposure	GarageType	Mass	Type1	SaleCondition
No	Attchd	BrkFace	G	Partial
Gd	Attchd	Stone	A	Normal
Gd	Attchd	BrkFace	G	Normal
No	Detchd	Stone	A	Abnorml
Av	Attchd	BrkFace	G	Normal
Av	BuiltIn	Tile	G	Partial
Av	Attchd	Stone	G	Normal
Gd	Attchd	Stone	A	Normal
No	BuiltIn	BrkFace	A	Abnorml
No	Attchd	BrkFace	G	Normal
No	Detchd	Tile	G	Normal
No	BuiltIn	BrkFace	G	Partial
No	Detchd	Tile	G	Normal
Av	Attchd	Stone	A	Partial

Test Set:

Exposure	GarageType	Mass	Type1	SaleCondition
Gd	Detchd	Tile	A	?

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