

Innovative Slackers

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Buy vs. Lease



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Background

- It is a common dilemma: Lease versus Buy — to lease a car or buy a car — which is better? Everyone who has ever considered leasing has had this question cross their mind.
- The answer is — it depends.
- When making a “lease or buy” decision you must look not only at financial comparisons but also at your own personal priorities — what is important to you.



Project Objective

- Create a model for comparing between buying and leasing based on personal preferences.
- Provide a EXCEL spread sheet to users to input their preferences and then get the comparison results.

OR Model Application

- Chose “Decision Analysis” Model to solve our problem.
- Apply a useful method : AHP (Analytic hierarchy process)

Why ↓

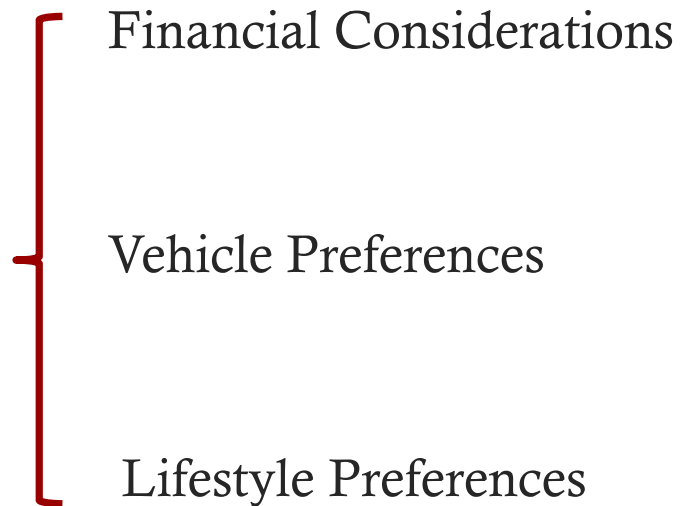
- Subjective judgment is quantified in a logical manner and used as a basis for reaching a decision.
- AHP is designed for situations in which ideas, feelings, and emotions affecting the decision process are quantified to provide a numeric scale for prioritizing the alternatives.

Decision Analysis

- Determined the criteria.
- Made the decision tree and completed the general structure of AHP including several hierarchies of criteria.
- Determined the weight of each criterion and established a comparison matrix to calculate the relative weights of criteria.
- Calculated the composite weight of each alternative criteria and ranked them to make the final decision.

Criteria

Hierarchy 1 Criteria



Criteria

Hierarchy 2 Criteria

Financial Considerations

Monthly payments

Long term cost savings

Ownership Equity

Taxes

Down payment

Warranty



Criteria

Hierarchy 2 Criteria

Vehicle Preferences

Latest Safety
Features

Dislike selling cars

New car novelty

Ownership

Customization

Car image



Criteria

Hierarchy 2 Criteria

Lifestyle Preferences

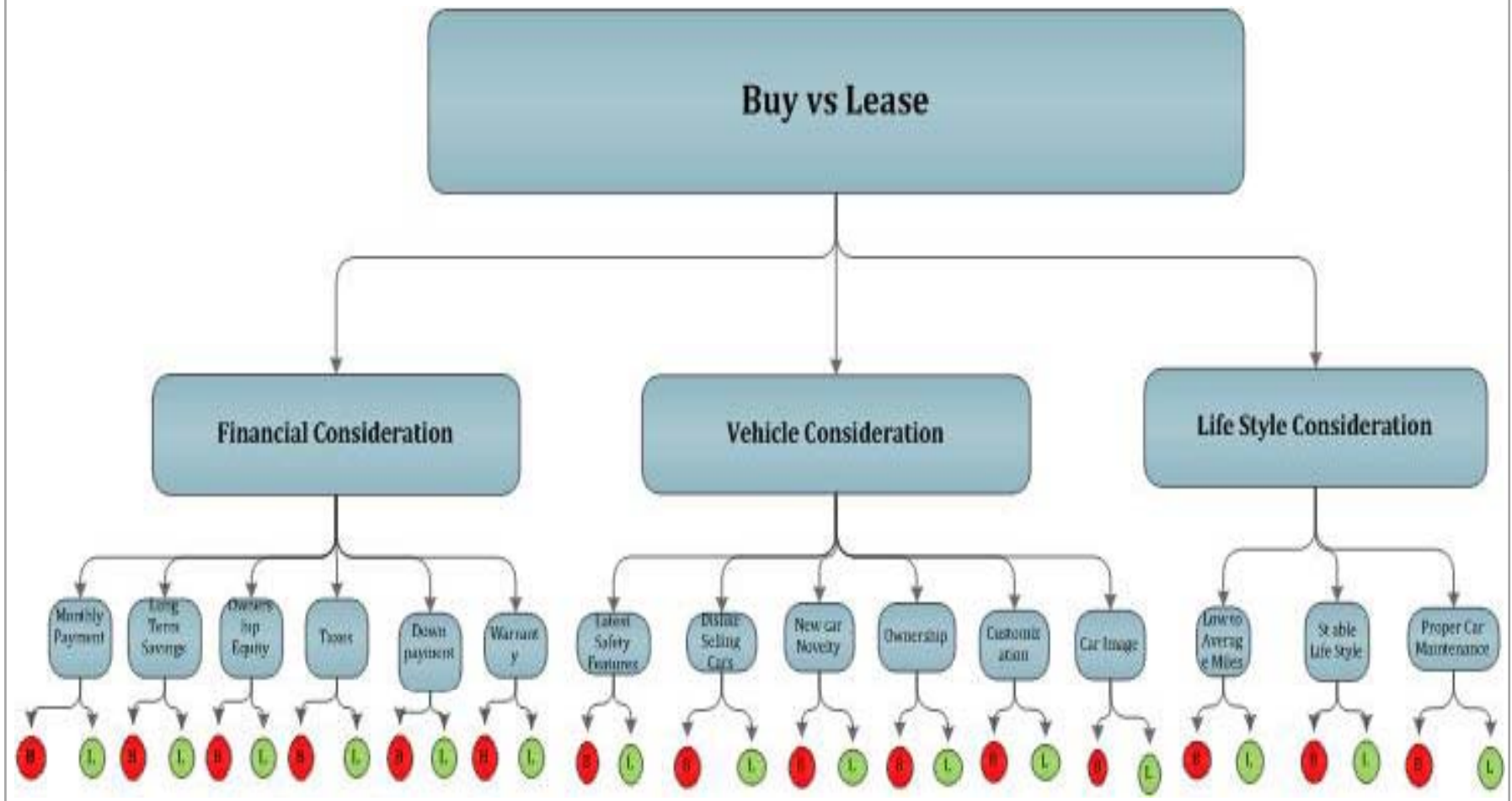
Low to Average Miles

Stable Life style

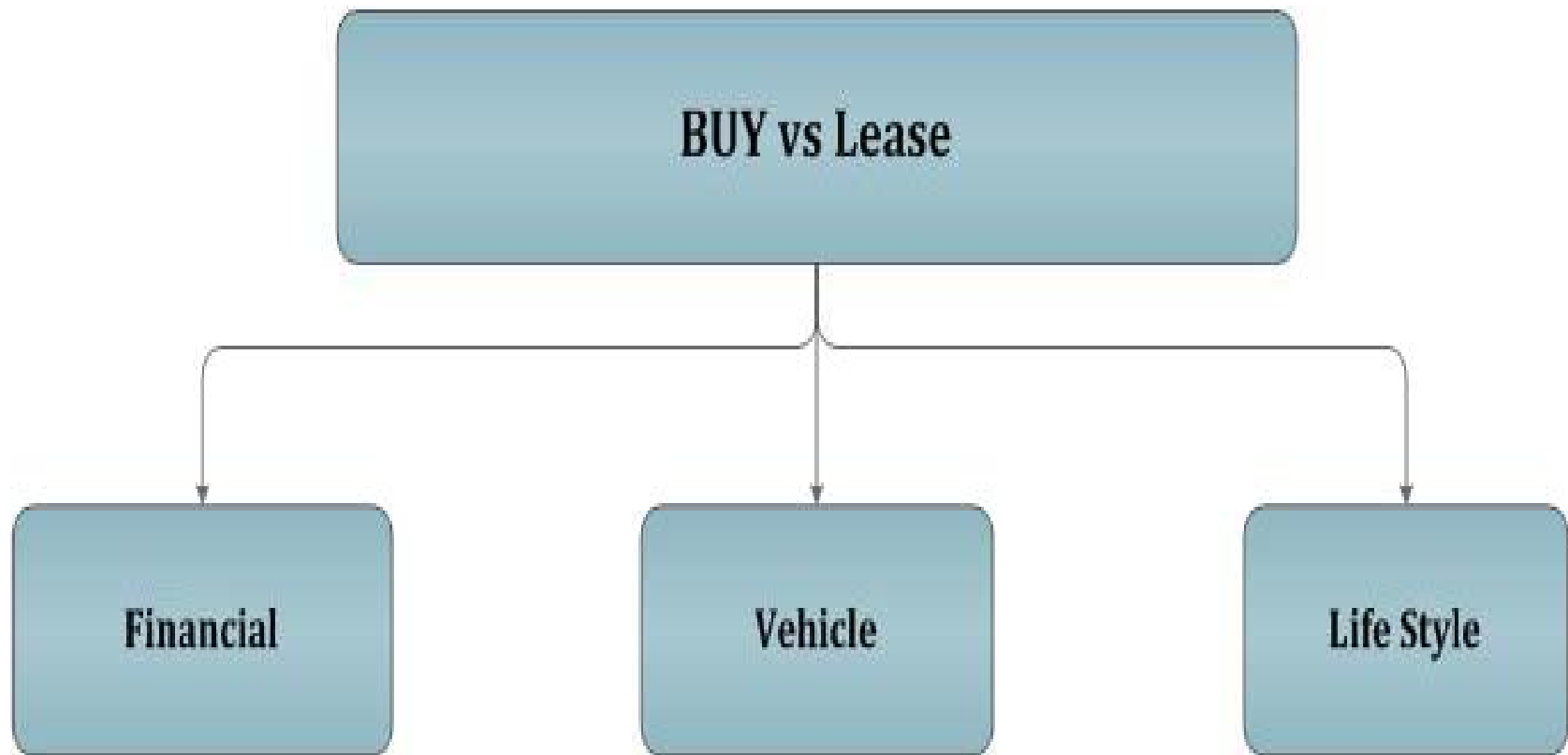
Proper Car Maintenance



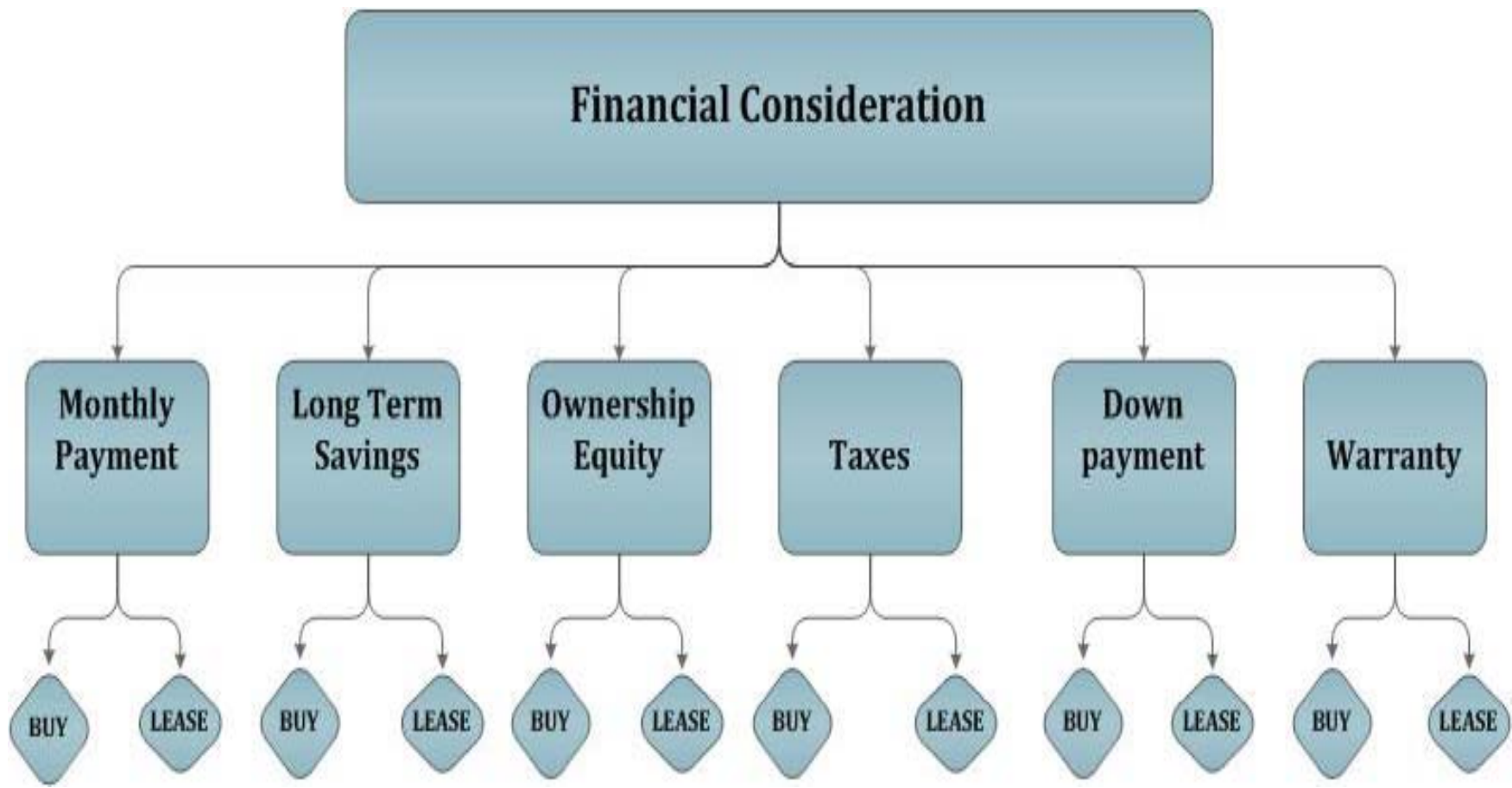
Decision Tree



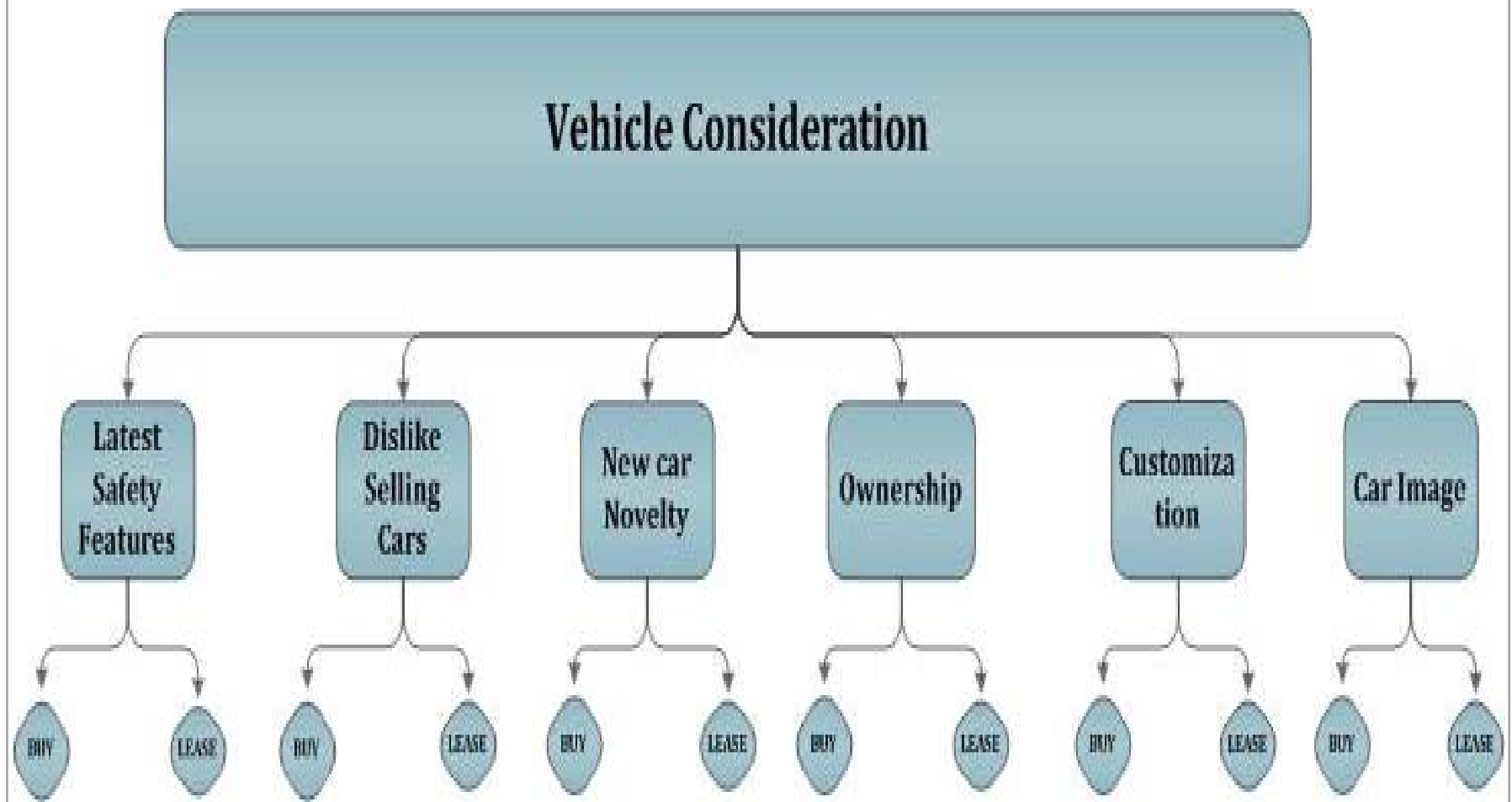
Decision Tree



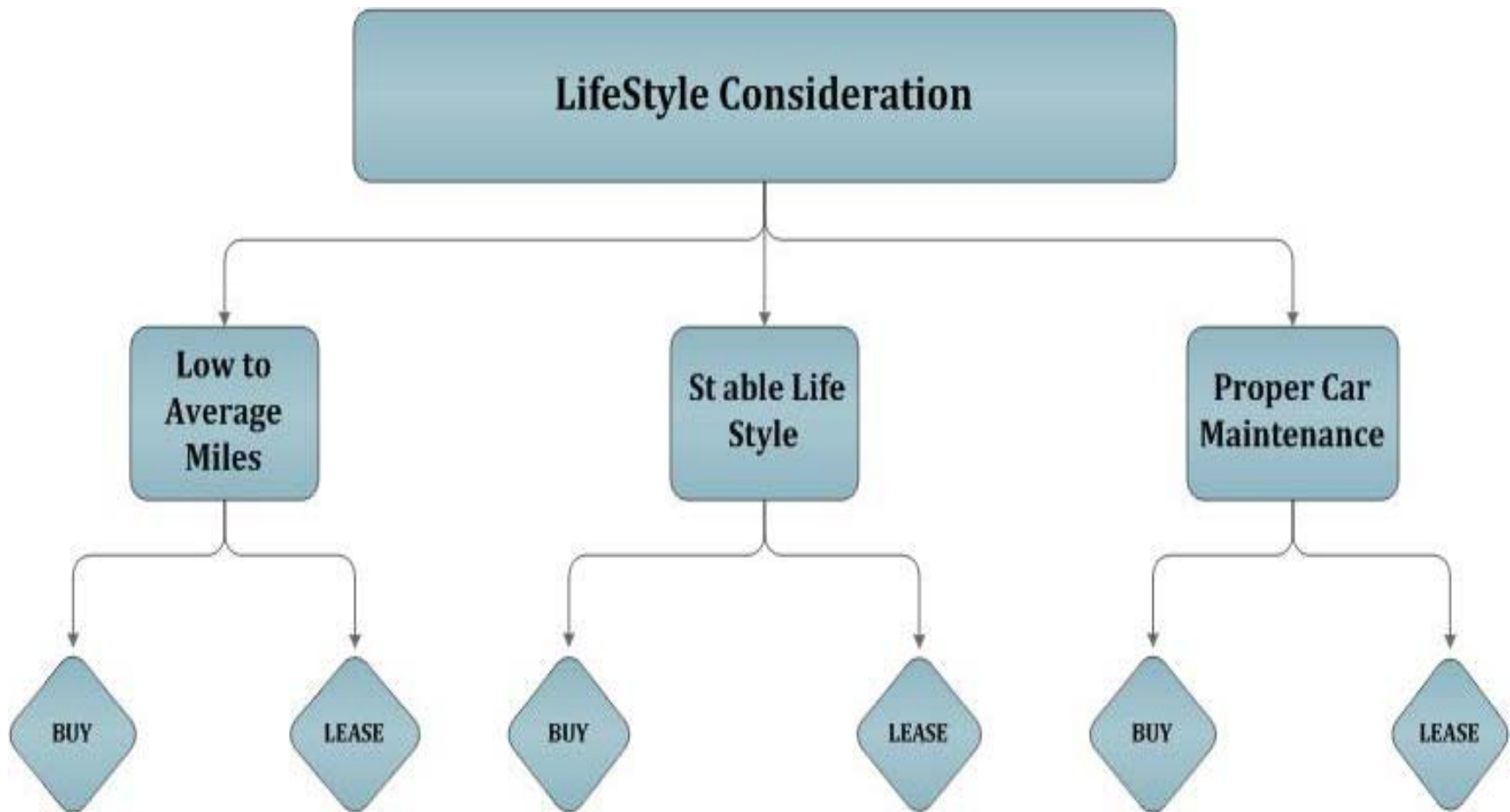
Decision Tree



Decision Tree



Decision Tree



Determine the weight

- The decision maker then provides responses in either numeric or linguistic fashion like:

Importance	Numerical Rating
Equally Important (preferred)	1
Moderately Important	3
Strongly Important	5
Very Strongly Important	7
Extremely Important	9

- The responses of the decision-maker are placed into a comparison matrix from which the local priorities are determined.

Determine the weight

- Determine the relative importance or priority of each element (e.g., criteria, sub criteria. and alternatives) at each level of the hierarchy.
- Achieved through a pair wise comparison of elements with respect to the element directly above. In general, this comparison takes the form of “How important is element 1 when compared to element 2 ?”
- Financial (F) = 9 , Vehicle (V) = 3 , Lifestyle (L) = 5

	Financial	Vehicle	Life
Financial	$9/9 = 1$	$9/3 = 3$	$9/5$
Vehicle	$3/9 = 1/3$	$3/3 = 1$	$3/5$
Life	$5/9$	$5/3$	$5/5 = 1$

Determine the weight

- Normalized Matrix:

	Financial	Vehicle	Life
Financial	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Vehicle	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$
Life	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$

- Relative Weight:

Criteria	Weights
Weighted Financial	$\frac{1}{2}$
Weighted Vehicle	$\frac{1}{7}$
Weighted Life Preference	$\frac{1}{3}$

EXCEL Solver

- We setup an EXECL Solver to calculate the relative weight and get the final composite value.

The screenshot displays a Microsoft Excel spreadsheet titled "Final Project Spreadsheets - Microsoft Excel". The active sheet is "Inputs". The spreadsheet is organized into three main sections: "Financial Considerations", "Vehicle Preferences", and "Lifestyle Preferences". Each section lists various factors and their corresponding rankings or values.

Input Preferences			
Overall			
	Ranking	Lifestyle	Ranking
Financials	9	Low to average miles	9
Inputs Vehicle	3	Stable life style	3
Lifestyle	5	Proper Car maintenance	3
Financial			
	Ranking	Vehicle	Ranking
Inputs Monthly Payment	7	Latest Safety Features	7
Long Term Savings	3	Dislike Selling cars	3
Ownership Equity	3	New Car Novelty	3
Taxes	7	Idea of ownership	7
Down Payment	9	Customization	9
Warranty	5	Car Image	5
Financial Consideration			
	Buying to leasing	(whole number if prefer buying, fraction if prefer leasing)	
M-Monthly Payment	5		
L-Long Term Savings	1/6		
O-Ownership Equity	1/9		
T-Taxes	3		
D-Down Payment	3		
W-Warranty	7		
Vehicle Preference			
L-Latest Safety Features	5		
D-Dislike Selling cars	1/6		

Conclusion

- Buy or Lease option can be determined by using AHP model.
- Buy or Lease option also strongly depends on the individual preferences.

Questions?

