Assignment Description: This assignment focuses on developing decision tables to model and analyze different eligibility conditions. It consists of two parts:

Part I: Retirement Pension Policy Decision Table

- We designed a decision table to determine the pension salary eligibility of Michigan public school teachers based on age, years of service, and salary thresholds.

- The analysis includes handling conflicts between conditions, ensuring completeness, and addressing ambiguity in the requirements.

Part II: Basketball Team Selection Decision Table

- A decision table was created to assess eligibility for university basketball team selection based on academic credits, weight, and height.

- The table was optimized by merging redundant rules and clarifying ambiguous cases.

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Summary:

Retirement Pension Policy: The decision table captures all relevant conditions, ensuring eligibility rules are clear and systematically applied. Ambiguous cases were resolved by prioritizing the highest multiplier for maximum pension benefits.

Basketball Team Selection: The decision table effectively classifies eligibility scenarios. Optimization techniques were applied to merge rules with identical outcomes, reducing redundancy. Ambiguities related to threshold values and missing data were identified, and handling mechanisms were suggested.

Reflection: This assignment reinforced the importance of decision tables in modeling complex conditions systematically. It highlighted challenges such as handling conflicting conditions and optimizing rule sets. Through this exercise, I learned how to improve decision clarity, manage ambiguity, and ensure logical completeness in rule-based decision-making.

Detailed Results:

Refer to Part I and Part II decision tables included in the submission.

Part I: Retirement Pension Policy Decision Table

Calculation Example:

For a 64-year-old teacher with 20 years of teaching experience and a salary of $95,000, meeting both retirement conditions:

Salary above $90,000: $(95,000-90,000)\times 1.5$

Salary up to $90,000: If using 1.6%: $90,000\times 1.6$, If using 1.55%: $90,000\times 1.55$

Completeness Analysis: The decision table effectively defines two retirement conditions and covers most scenarios.

Ambiguity Analysis: The "default rules" mentioned in the requirements are not clearly defined, which may require further clarification.

Priority Issue in Rules: The problem statement does not specify which condition should take precedence when both retirement criteria are met. Therefore, a rule must be selected to determine the applicable multiplier:

1, Choosing the higher multiplier (1.6%) ensures that the teacher receives the maximum possible pension, aligning with the intent of the retirement incentive policy.

2, This approach follows the common practice of applying the most advantageous rule when multiple conditions are satisfied, reducing potential confusion.

3,To eliminate ambiguity, it is recommended that 1.6% be used as the default multiplier, and this rule should be explicitly stated in the decision table.:

		Combinations							
Conditions	Values	1	2	3	4	5	6	7	8
Age $\geq$ 63	Y/N	Y	Y	Y	Y	N	N	N	N
Age + Teaching Years $\geq$ 80	Y/N	Y	Y	N	N	Y	Y	N	N
Salary $\leq$ $90,000	Y/N	Y	N	Y	N	Y	N	Y	N
Action									
Multiplier on Salary $\leq$ $90,000		Y/N	Y/N	1.60%	1.60%	1.55%	1.55%	N/A	N/A
Salary excess of $90,000		N/A	1.50%	N/A	1.50%	N/A	1.50%	N/A	N/A
N/A means not eligible									
Y/N means uncertain									

Part II: Basketball Team Selection Decision Table

		Combinations							
Conditions	Values	1	2	3	4	5	6	7	8
Credits$\geq$ 12	Y/N	Y	Y	Y	Y	N	N	N	N
Weight > 180	Y/N	Y	Y	N	N	Y	Y	N	N
Height >= 77	Y/N	Y	N	Y	N	Y	N	Y	N
Action									
	Y/N	Yes	No	No	No	No	No	No	No

To optimize the decision table, we identified rules that led to identical outcomes and grouped them accordingly. Since Rule 2, Rule 3, and Rule 4 resulted in the same action, they were consolidated by generalizing the differing condition with a placeholder ("-"). Likewise, Rule 5, Rule 6, and Rule 7 shared the same outcome and were also merged to eliminate redundancy.

Conditions	Values	1	2	3	4
Credits$\geq$ 12	Y/N	Y	Y	N	N
Weight > 180	Y/N	Y	N	Y	N
Height >= 77	Y/N	Y		Y	
Action					
	Y/N	Yes	No	No	No

Completeness Assessment:

The decision table comprehensively accounts for every possible combination of the three given criteria: (Credits $\geq$ 12, Weight > 180, Height $\geq$ 77). Each scenario is explicitly assigned an outcome, guaranteeing that no valid input case is overlooked. By incorporating both the university coach's and league's selection requirements, all cases—whether qualifying or disqualifying—are systematically covered.

Ambiguity Concerns:

1, Uncertainty in Threshold Values: The problem defines "Weight > 180" and "Height $\geq$ 77" but does not specify how to handle values that meet the threshold exactly, such as 180 lbs or 77 inches. Without clarification, these values might be misinterpreted as ineligible. To eliminate confusion, a clear definition of their inclusion or exclusion is necessary.

2, Lack of Flexibility for Borderline Cases: The decision table applies strict cutoffs (e.g., 180 lbs and 77 inches) but does not account for instances where a candidate is slightly below these limits (e.g., 179 lbs or 76 inches). Implementing a mechanism for exceptions or secondary considerations would improve the decision-making framework.

3, Unspecified Handling of Missing Information: The current specifications do not address how the system should manage incomplete or inconsistent data. For instance, if height or weight details are unavailable, it remains unclear whether the application should be rejected or processed with existing information. Establishing a predefined action—such as requesting additional details or temporarily holding the application—would enhance the system's robustness.

Default Handling Rules:

1, Incomplete or Inconsistent Data: If an applicant's weight or height information is missing or unclear, the system will categorize the application as "Pending" and prompt the appropriate individual to provide the necessary details.

2, Ambiguous Edge Cases: If an applicant's weight is exactly 180 lbs or their height is precisely 77 inches, the system will temporarily mark the application as "Pending" and require further verification before making a final decision.

Honor Pledge: I confirm that this submission is my own work and adheres to the academic integrity policies of my institution.