The method used in the code is a **rule-based scoring system** combined with **normalization and weighted aggregation**. Here's a breakdown of each component:

1. Rule-Based Categorization

The players are categorized into different roles (batsman, bowler, or all-rounder) based on predefined rules. These rules are simple conditional checks based on the player's performance metrics:

Let R = Total runs scored, W = Total wickets, B = Total balls faced

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* **Batsman**: More scored more than or equal to 100 runs and taken 2 or fewer wickets.
* **Bowler**: More than 5 wickets and scored 100 or fewer runs.
* **All-rounder**: Taken more than or equal to 3 wickets and scored 100 runs or more.

This categorization helps in determining which metrics are relevant for calculating the player's score.

2. Normalization

Normalization is used to scale different performance metrics to a common range (0 to 1). This ensures that metrics with different units and ranges can be compared and combined meaningfully.

* **Min-Max Normalization**: For metrics where a higher value is better (e.g., runs scored, wickets taken), the formula used is:

Normalized Value=Actual Value−Min Value/Max Value−Min Value

* **Inverted Normalization for Economy Rate**: Since a lower economy rate is better, the normalization is inverted:

Normalized Economy=1− (Actual Economy−Min Economy/Max Economy−Min Economy)

3. Weighted Aggregation

Once the metrics are normalized, they are combined using a weighted sum to calculate a composite score. This involves:

* Assigning weights to each normalized metric based on its importance for the player's role.
* Calculating a weighted sum to produce a final score.

For example:

* **Batsmen**: The score is calculated using weights for runs scored, batting average, and strike rate.
* **Bowlers**: The score is calculated using weights for wickets taken and economy rate.
* **All-rounders**: Both batting and bowling scores are calculated and averaged.

4. Composite Score Calculation

The composite score is calculated differently based on the player's role:

* **Batsman**:

Batting Score=(Runsnorm×0.4+Avgnorm×0.3+SRnorm×0.3)×100

* **Bowler**:

Bowling Score=(Wicketsnorm×0.6+Economynorm×0.4)×100

* **All-rounder**:

Overall Score=Batting Score+Bowling Score/2

Summary

This method is a straightforward, interpretable approach to evaluate players based on their performance metrics. It combines rule-based logic for categorization, normalization for scaling, and weighted aggregation for scoring. This ensures that players are assessed fairly based on their roles and contributions, allowing for meaningful comparisons across different types of players.