We prove that CricketBowlingFigures is not regular.
Let the language CricketBowlingFigures be a context free language. Then there exists a CFG which generates **L**. Let G represent the CFG in CNF with **k** non-terminal symbols and **w** is <u>any</u> word generated by G with length greater than 2^{k-1}. Let $n = 2^{k-1}$.

Let w be the string (1^n,1^n,,), representing the bowling figures (n,n,0,0) (for a bowler who bowls n overs without having any runs scored from the bowling at all, but without taking any wickets either).

It satisfies the definition of strings in CricketBowlingFigures, so it belongs to the language. Then <u>there exist</u> strings **u, v, x, y, and z** such that:

- w = uvxyz
- v and y are non-empty
- |vxy| <= n, and
- <u>all</u> of uxz, uvxyz, …, uv^ixy^iz are generated by G for all i >= 0

Since |vxy| <= n, the non-empty strings v and y must be in the initial portion of "(11...1", before the first comma.

If v contains the left parenthesis at the start, then by pumping, it destroys the pair of parentheses, and it therefore no longer belongs to the language CricketBowlingFigures.

If v does not contain the left parenthesis, then the string vxy only includes 1s from the section that represents the number of overs by the cricketer, n. If we pump down to string x, then the number of overs represented by this string is < n, as v and y are non-empty. The number of maiden overs is still n, however, and as such we have a violation of the constraint for the language CricketBowlingFigures that O >= M. Therefore, x no longer belongs to the language CricketBowlingFigures.

This contradicts the conclusion of the Pumping Lemma for context free languages.

Therefore, CricketBowlingFigures is not context-free.