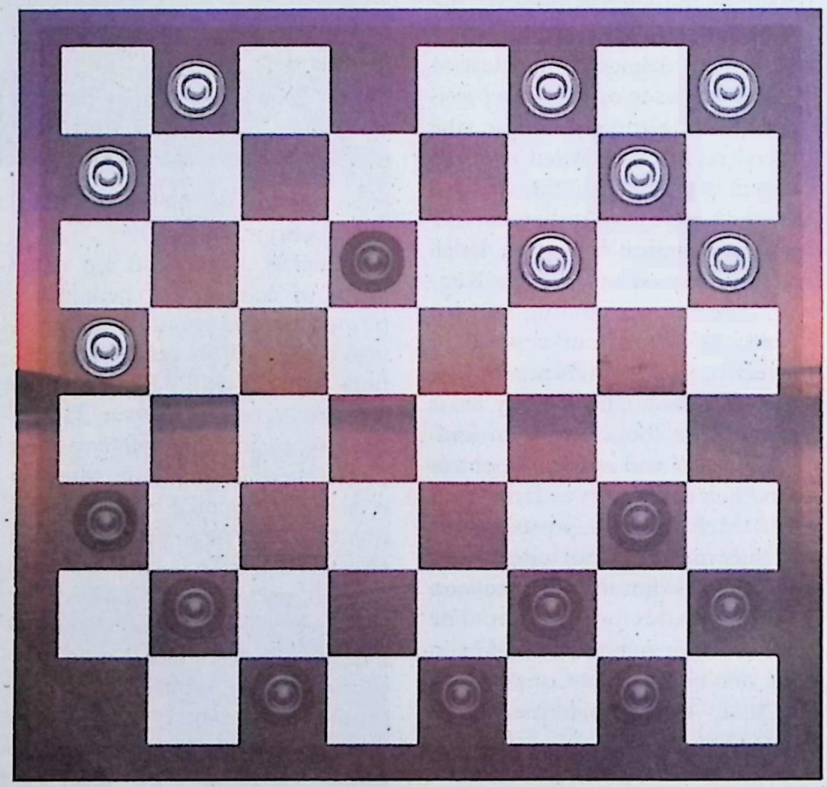
Checkered in a billion billion moves?

The game of English draughts, or American checkers, is more complex than it may seem at first sight. Rashida Ahmad takes a look at what it takes to solve a game with 500 billion billion variations

WE have a good claim to having invented chess in this part of the world, which is perhaps why the game of English draughts, or American checkers, is seen somewhat as the poorer cousin in the subcontinent. After all, the rules of draughts could hardly be simpler, could they? But, that's not to say we should look on it as a simplistic game. Draughts has roughly 500 billion billion ($5x10^{20}$) possible positions, which means "solving the game" is no mean task. In fact one computer program has been trying to do so almost continuously for nearly two decades.

Now, computer scientists at the University of Alberta in Canada have announced that draughts has finally been solved. But what exactly does that mean? Well, solving a game like draughts means "determining the final result in a game with no mistakes made by either player," according to professor of computer science, Jonathan Schaeffer and his team. Their paper, published last month in the journal *Science*, claims that "perfect play by both sides leads to a draw."

The computer program that allows them to make this claim is called Chinook, and was first developed in 1989 by Dr Schaeffer to try and beat the world's best draughts players. Running on as many as 200 computers simultaneously at times, it first began beating champion players in 1994. But Schaeffer and his team of computer scientists claim that no one can possibly beat Chinook at draughts today -- the best human player can only ever draw.



CLASSIC CHECKERS FOR THE PC

Simply put, the program reduces draughts to something resembling a vast game of noughts and crosses, for which the perfect strategy for a win or draw (that is, for never losing) can be explained to a child. But draughts, with its 500 billion billion possibilities compared with only 765 in noughts and crosses, is the most complex game that has been solved to date. Even for Chinook, however, it would have been impossible in practical terms to process moves for all $5x10^{20}$ board positions.

"It's a computational proof," says Schaeffer. "It's certainly not a formal mathematical proof."

That means there is no set of equations that can be applied for every possible play, and at the same it would be impossible to check every calculation Chinook might make. Chinook did not in fact need to go through every single one of the 500 billion billion possible moves -- not all losing plays needed to be analysed, for example. In the end, only 1/5,000,000 of the moves