Problem

In the proof of the Cook–Levin theorem, a window is a 2 × 3 rectangle of cells. Show why the proof would have failed if we had used 2 × 2 windows instead.

Step-by-step solution

Step 1 of 1

Cook – Levin theorem:

SAT is $NP-$Complete .This theorem restates that $SAT \in P$ iff $P = NP$.

• In the proof of the Cook-Levin theorem, a window size to be a 2×3 rectangle of cells.

• If we had used 2×2 windows that we can only use 2×2 sub windows of the ones, obtained by deleting the leftmost or the rightmost column.

• Legal window 2×3 is as follows.

a	q_1	b
q_2	a	c

• In the window of figure (head move left), the right two columns allow the head to move left.

• The left two columns allow the head to move left into a state q_2, but this state is no longer restricted by what symbol was scanned by the head.

• So if there is some state q_2 into which it is possible to move while moving left, this window allows switching into this state on any left move.

• This will allow typically many tableaux (and so many satisfying assignments) that do not correspond to computations of our nondeterministic Turing machine.

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