

Part 1: Written Problem

The state given in the question can be reached by backtracking the list of possible solutions and some deductions based on the rules of chess.

Based on the final state given in the question, we can deduce the following:

- 1) White has made 4 moves and Black has made 4 moves
- 2) White has moved only the Knight from b1
 - i) The reason why we arrive at this conclusion is because, from the board we can observe that white couldn't have moved any other coin except the Knights because the pawns are intact.
 - ii) White has captured 2 coins.
 - iii) If the white had moved knight at g1, and it came back to its initial position, it would have costed 2 moves and in the remaining 2 moves, it should have captured the 2 coins with the other Knight which is impossible.
 - iv) Hence White moves the Knight at b1 for all its moves
- 3) Black has to lose 1 pawn and 1 knight and it has to capture the White knight. Also the white knight has to be captured on the last move by black.
- 4) So the white knight could have been at the following places on its last move.
a8, c8, d8, e8, f8, g8, h8, d6
 - i) We can eliminate the moves a8, c8, d8, e8, f8, h8 because the pieces that should have been in the places are still intact and it would have been costly for black to move the piece and move it back which it cannot afford to do as it had done only 4 moves.
 - ii) The two possible positions white knight could have been are c6 and g8.
- 5) If the knight was at c6, it should have cut the pawn that had moved from d7 and the pawn from e7 captured the knight at e6.
 - i) When we work out this possible path, white knight has to take 4 moves to reach d6 from b1 and it cannot use more or less moves and exactly 4.
 - ii) Working out all the possible paths, we arrive at the conclusion that it is not possible. Hence white knight's last position was g8 and it had captured black knight at g8 which was replaced by the knight from b8
- 6) Traversing back from g8, white knight could have been at 3 positions on its 3 moves - e7, f6, h6
 - i) h6 could be ignored because it is impossible to reach h6 in 3 moves.
 - ii) On similar grounds, f6 can also be ignored since there is no possible way of reaching f6 from b1 in 3 moves
 - iii) Hence white knight's third position was e7
- 7) The only way the pawn at e7 would have been captured was by the white knight at e7. So the pawn at e7 didn't move.
- 8) Black Knight from b8 should replace the black knight at g8. This has to happen in a maximum of 3 moves.
 - i) The possible path for this traversal is b8 - d7 - f6 - g8
 - ii) In order to make this move possible the black pawn has to move from d7 - d6. This should have been black's first move.

By working out the logic the above way, we arrive at the solution:

Whites moves:

1st move ->	Knight at	b1	to	c3
2nd move ->	Knight at	c3	to	d5
3rd move ->	Knight at	d5	to	e7
4th move ->	Knight at	e7	to	g8

Black moves:

1st move ->	Pawn at	d7	to	d8
2nd move ->	Knight at	b8	to	d7
3rd move ->	Knight at	d7	to	f6
4th move ->	Knight at	f6	to	g8

The solution can be better represented by the following board:

Initial State



White 1st Move



Black 1st Move



White 2nd Move



Black 2nd Move



White 3rd Move



Black 3rd Move



White 4th Move



Black 4th Move

