ERROR in American Checkers: When the no promote move counter is at 39, the game is ended as a draw even if the move was a capture move.

Status: UNSOLVED – 28/09/2019

Error in:

```
Scenario Outline: Valid Jump Move
Given the game is played up to a certain point from file "<file_name>"
When the player picks a valid source coordinate
And the player picks a valid destination coordinate that is "two" squares away from the source coord
inate
Then the piece at the source coordinate is moved to the destination coordinate
And the opponent piece in between the source and destination coordinates are removed from the board
 >>>>>>>>>> And the next turn is given to the "<next_turn_player>" player

Examples:
| file_name       | next_turn_player |
| validJumpMove11 | other            |
```

The game set-up in AmericanCheckers.ini file is specified as follows:

```
[validJumpMove11]
boardSetUp=validJumpMoveBoard11
turn=black
playerMove=7,1>5,3
extras=noPromote-39

[validJumpMoveBoard11]
7,1=black-pawn
6,2=white-pawn
2,4=white-pawn
0,2=white-pawn
1,1=black-pawn
7,5=black-pawn
```

Test Outputs:

Before the move is conducted:

```
Player turn: black
Player move: (7,1)->(5,3)
No promote count: 39
No capture count: 0
B: Pawn of 'black' player
A: King of 'black' player
W: Pawn of 'white' player
Z: King of 'white' player
    0   1   2   3   4   5   6   7
   --- --- --- --- --- --- --- ---
7 |   |   |   |   |   |   |   |   | 7
   --- --- --- --- --- --- --- ---
6 |   |   |   |   |   |   |   |   | 6
   --- --- --- --- --- --- --- ---
5 |   |   |   |   |   |   |   | B | 5
   --- --- --- --- --- --- --- ---
4 |   |   | W |   |   |   |   |   | 4
   --- --- --- --- --- --- --- ---
3 |   |   |   |   |   |   |   |   | 3
   --- --- --- --- --- --- --- ---
2 | W |   |   |   |   |   | W |   | 2
   --- --- --- --- --- --- --- ---
1 |   | B |   |   |   |   |   | B | 1
   --- --- --- --- --- --- --- ---
0 |   |   |   |   |   |   |   |   | 0
   --- --- --- --- --- --- --- ---
    0   1   2   3   4   5   6   7
```

After the move is conducted:

```
Status: Test ended with a valid player move. The game ended.
Informers: [Player will NOT be asked for another destination coordinate (previous move was a
jump move) because there are no more possibilities for a jump move., The game ended as a
draw because there have been no promoting in the last 40 moves., DRAW
Player [id=0, color=java.awt.Color[r=0,g=0,b=0]]
Player [id=1, color=java.awt.Color[r=255,g=255,b=255]]
]
Was player going to make another move?: false
End of the game? true
isDraw?: true, Winner: null, Loser: null
Board:
    0   1   2   3   4   5   6   7
   --- --- --- --- --- --- --- ---
7 |   |   |   |   |   |   |   |   | 7
   --- --- --- --- --- --- --- ---
6 |   |   |   |   |   |   |   |   | 6
   --- --- --- --- --- --- --- ---
5 |   |   |   |   |   |   |   | B | 5
   --- --- --- --- --- --- --- ---
4 |   |   | W |   |   |   |   |   | 4
   --- --- --- --- --- --- --- ---
3 |   |   |   |   |   | B |   |   | 3
   --- --- --- --- --- --- --- ---
2 | W |   |   |   |   |   |   |   | 2
   --- --- --- --- --- --- --- ---
1 |   | B |   |   |   |   |   |   | 1
   --- --- --- --- --- --- --- ---
0 |   |   |   |   |   |   |   |   | 0
   --- --- --- --- --- --- --- ---
    0   1   2   3   4   5   6   7
```

Expected behavior:
After the move is conducted, the game should continue, and the next player should be given the turn.

Actual behavior:
After the move is conducted, the game DOES NOT continue, and the next player is NOT given the turn.

Error:
The game does not care that a jump/capture move has been made. It thinks that because no piece has been promoted to King in the last 40 moves, the game does not proceed to an end; thus the draw decision is made.

HOW DOES CUCUMBER HELP US FIND THE PROBLEM?

The following method in AmericanCheckersScenarioTester class fails in the 6th line:

```
1  @Override
2  public void theNextTurnIsGivenToTheP1Player(String p1) {
3      if (referee.gameEnded) {
4              output("Informers: " + referee.informers.toString());
5      }
6      assertFalse(referee.gameEnded);
7      if (p1.equals("other")) {
8              assertFalse(referee.playerWasGoingToMakeAnotherMove);
9              assertFalse(referee.getCurrentPlayer().equals(playerOfPlayerMove));
10     } else if (p1.equals("current")) {
11             assertTrue(referee.playerWasGoingToMakeAnotherMove);
12             assertTrue(referee.getCurrentPlayer().equals(playerOfPlayerMove));
13     }
14 }
```

We know the gameEnded variable is set to true even though it shouldn't be. The preceding 3 lines output the informers (see in Test Outputs page) to test output file which lets us know that the game thinks that since no piece has become king in the last 40 moves, the game must end as a draw regardless of a jump/capture move.

WHERE IS THE PROBLEM?

In Referee class' `public void conductGame()` method, in line 98, the `endOfGameDraw` gets evaluated like this:

```
endOfGameDraw = (isSatisfied(noPromoteRule, this)
        || isSatisfied(noPieceCapturedForFortyTurn, this));
```

This is semantically wrong. The game must be decided as a draw if there have been no promote AND no capture in the last 40 moves. Any one of these moves is sufficient enough to reset the imaginary “consecutive indecisive moves” counter.

Note: A similar error occurs in crowningTheEligiblePiece6 test. The game set-up there is noPromoteCounter=39 and noCaptureCounter=39. The player move is a “promoting” move where a Pawn becomes King. However, while the noPromoteCounter is reset, the noCaptureCounter reaches 40, and the game ends as a draw because of the above mistake.