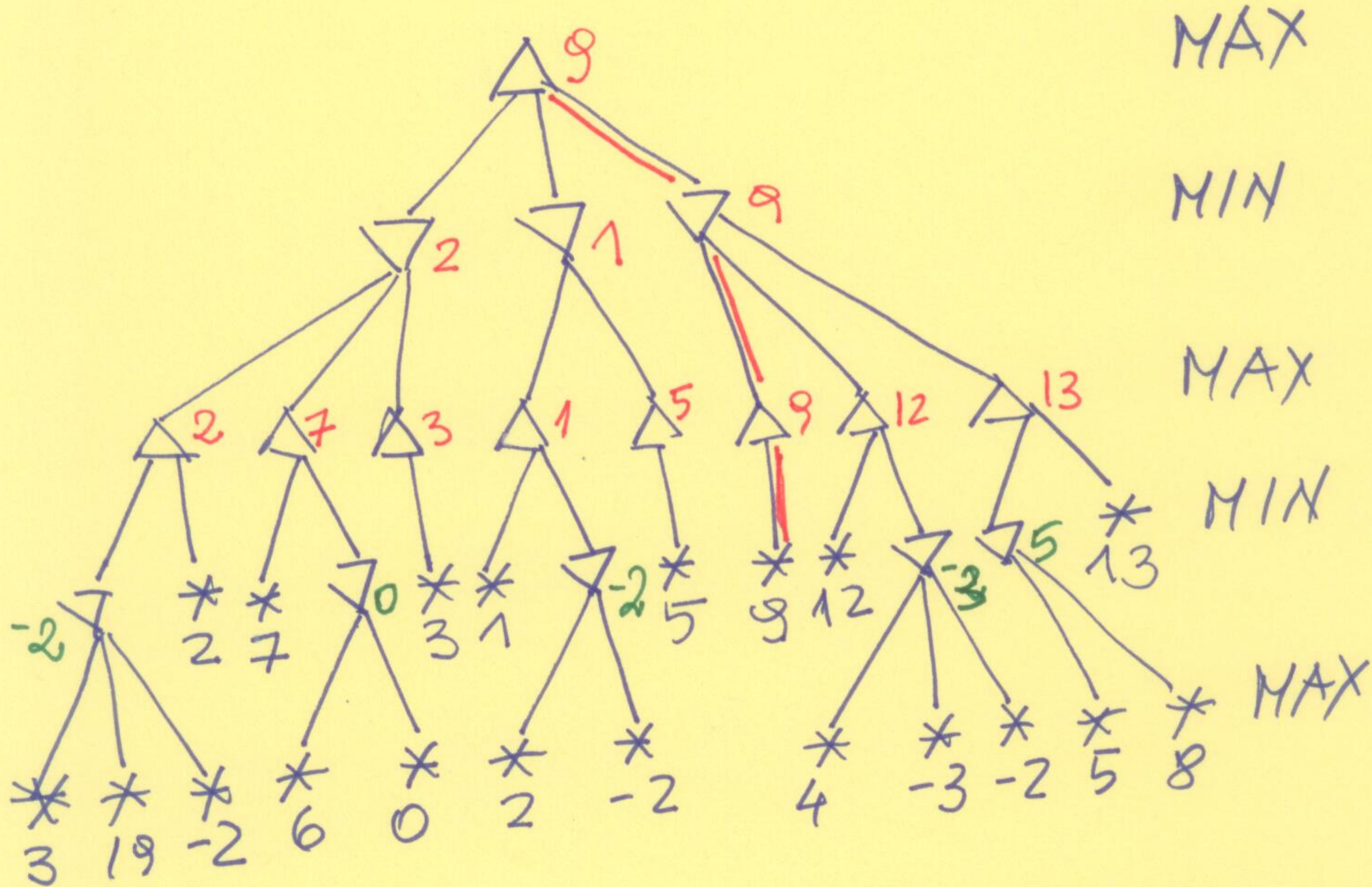


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MINIMAX example #1



Minimax Example #2

① Joan

② Mary

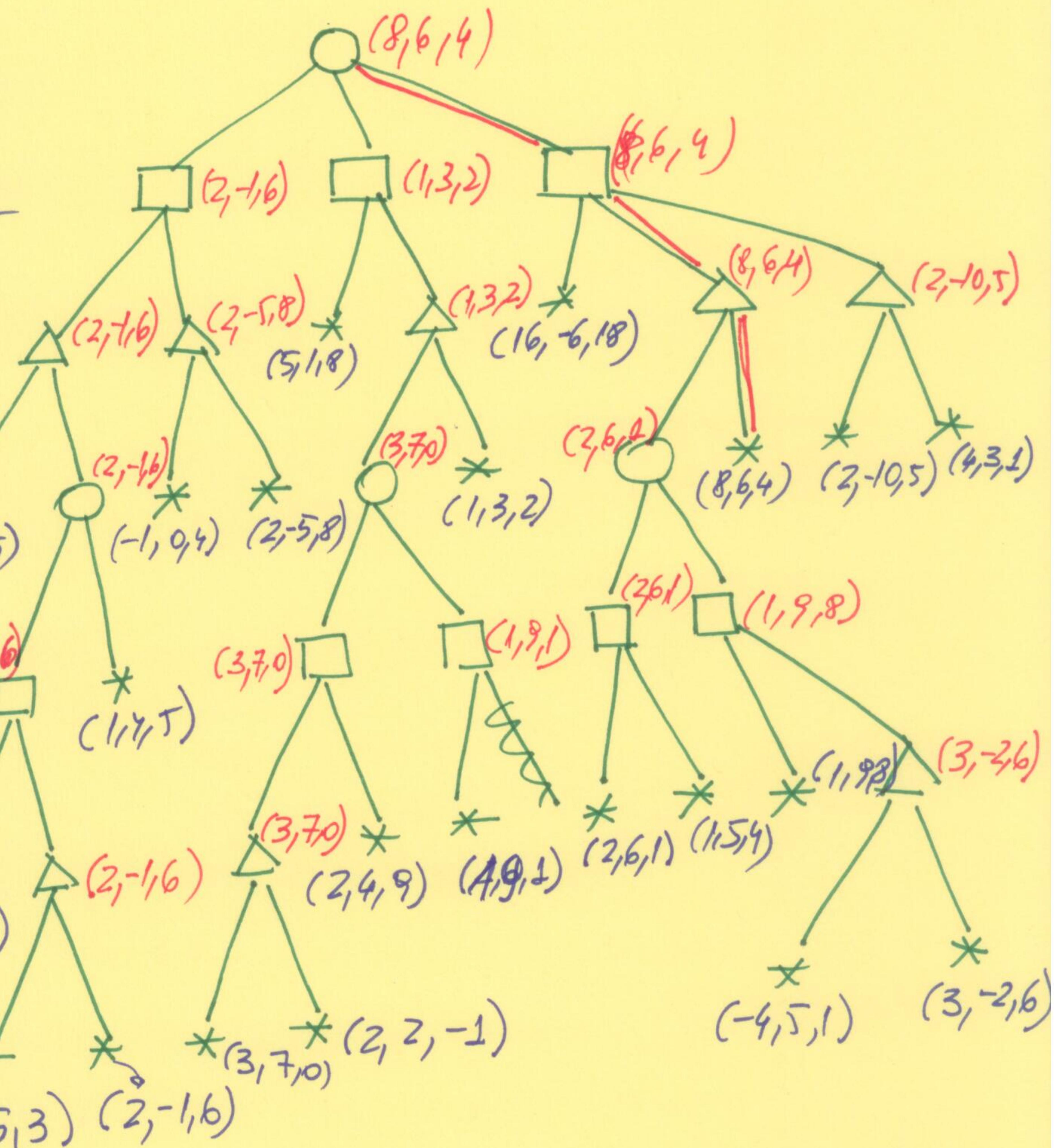
③ Alex

Joan *

Mary *

Alex *

Joan *



Minimax Example #3

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Consider the following 2-player game:
↓
A and B

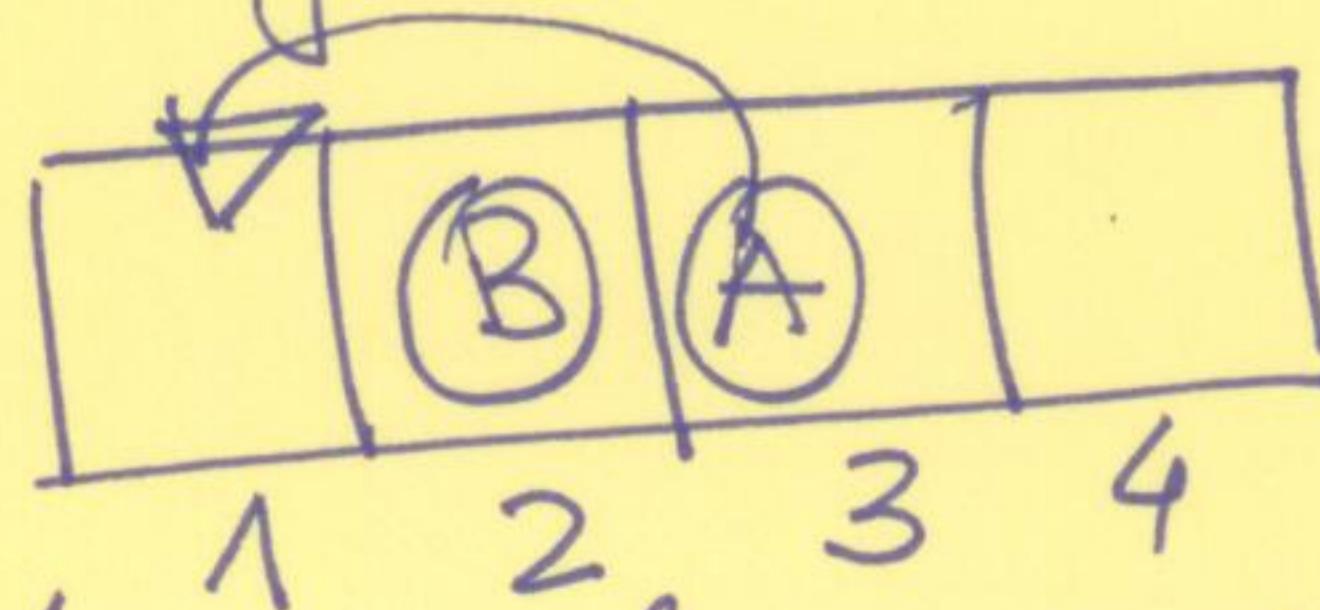


Starting of the game: player A moves first!

How do they play?

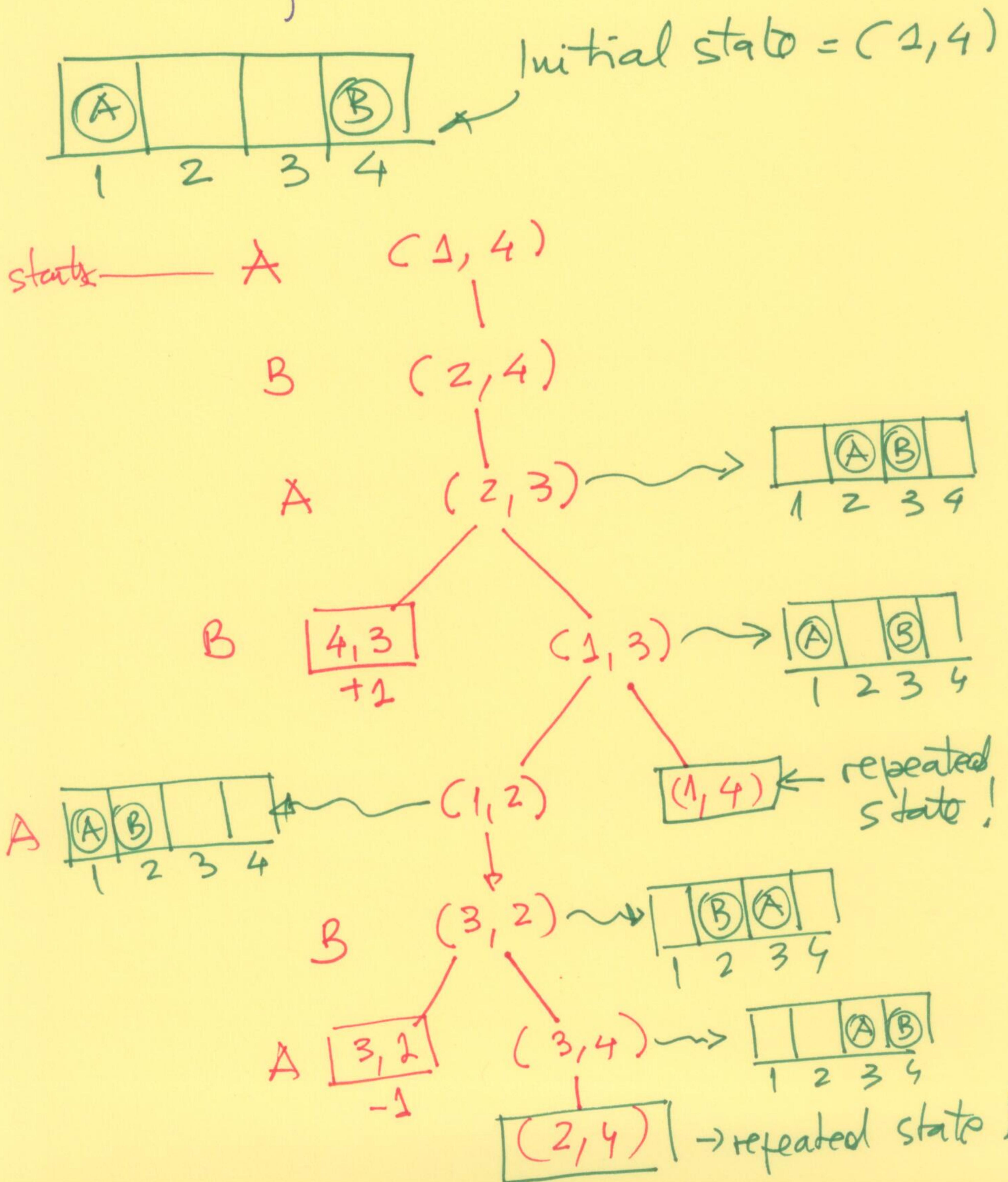
- Each player must move his/her token to an open adjacent space in either direction. (\rightarrow or \leftarrow)
- If the opponent occupies an adjacent space, then the player may jump over the opponent to the next open space, if any.

Example



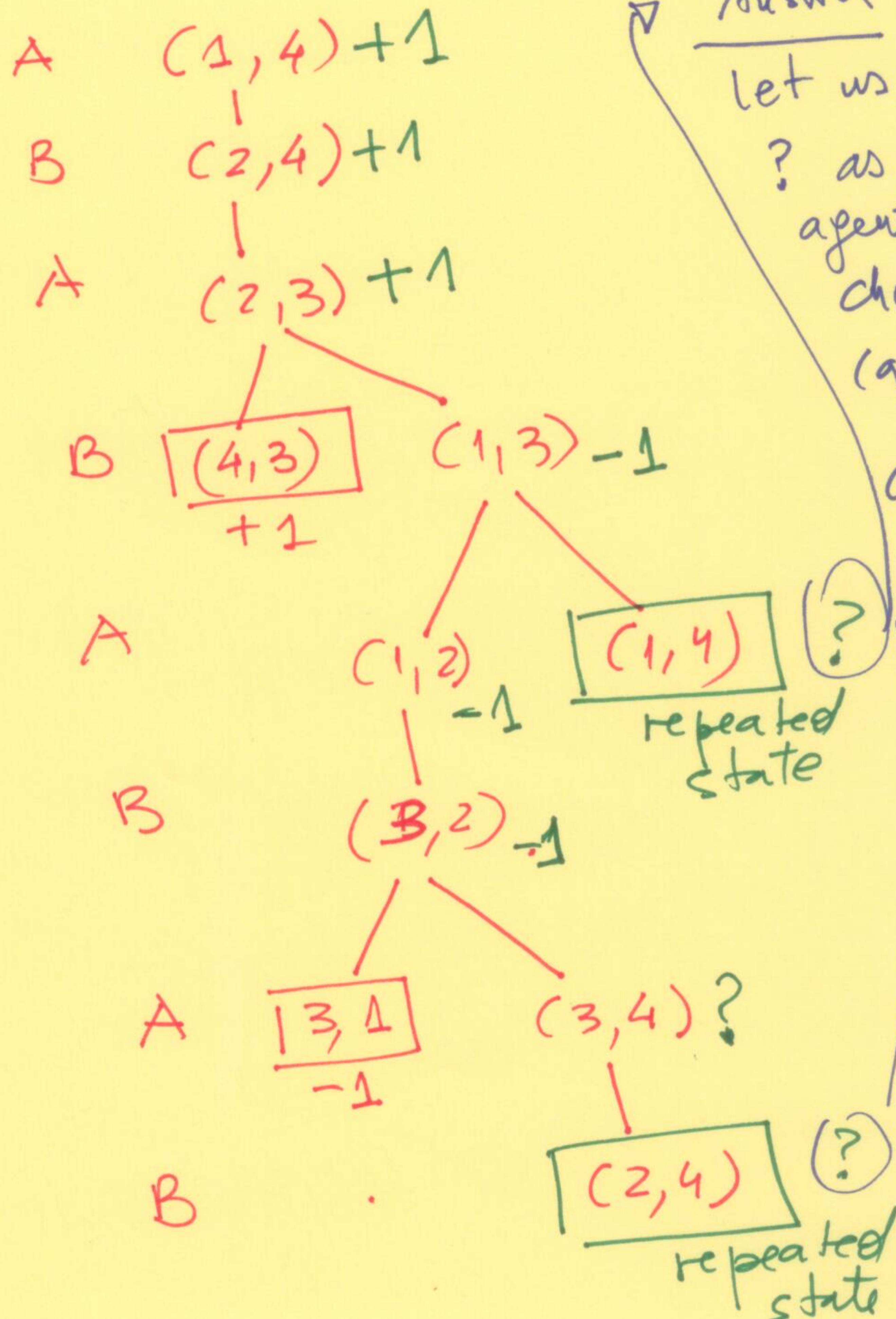
→ The game ends when one reaches the opposite end.

Question 1) Draw the complete game tree by representing the game state as (S_A, S_B) 4



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Question 2 Mark each node from the game tree with its backed-up MINIMAX value.



Question 3 let us extend this 4-square game to an n -square game, for $n > 2$
 Prove that A wins if n is even and
 B wins if n is odd.

Answer Proof by induction

$$n = 3$$



\Rightarrow the tree of the game is

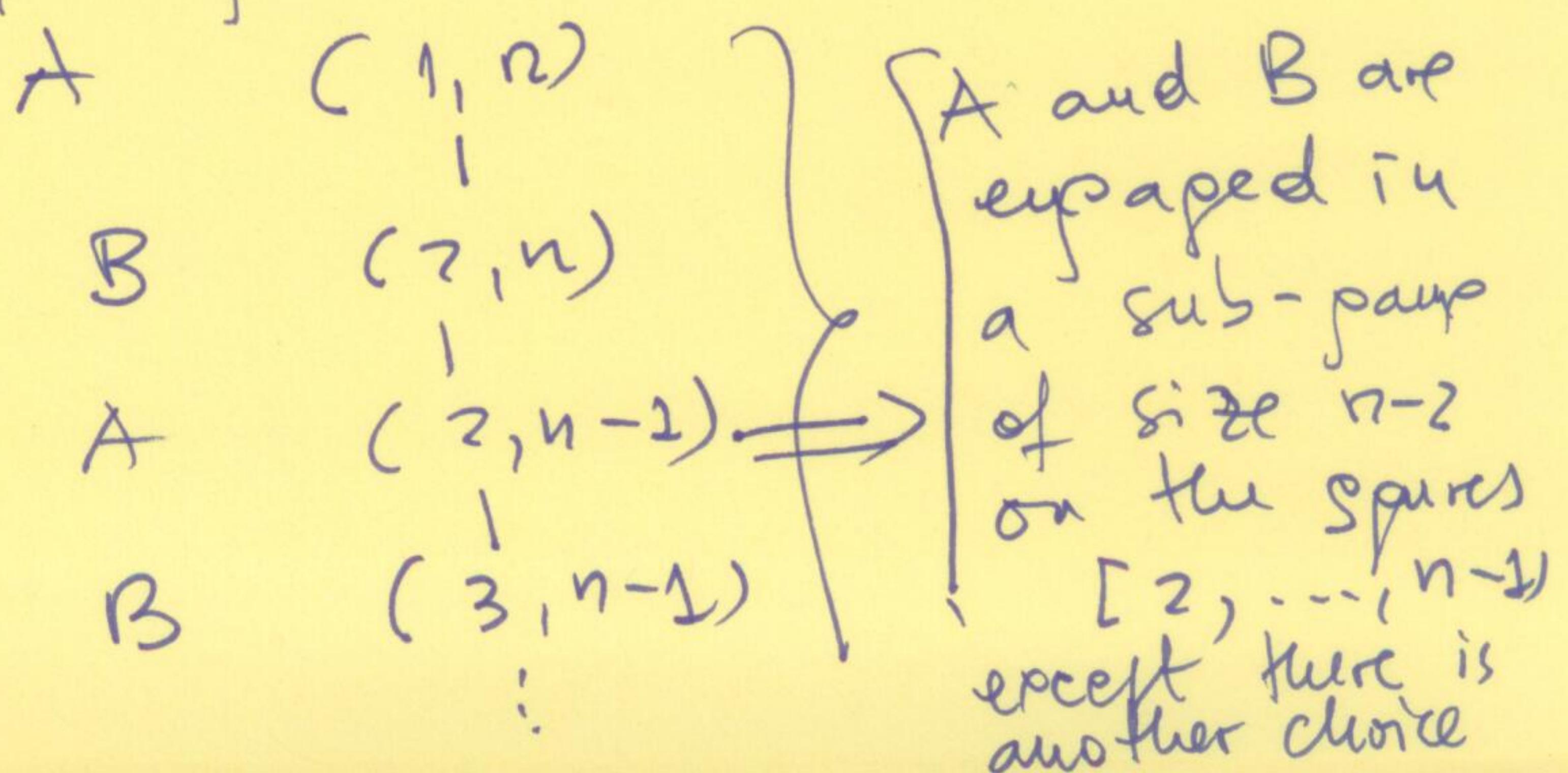
$$(1, 3) \quad A$$

$$\begin{array}{c} | \\ (2, 3) \end{array} \quad B$$

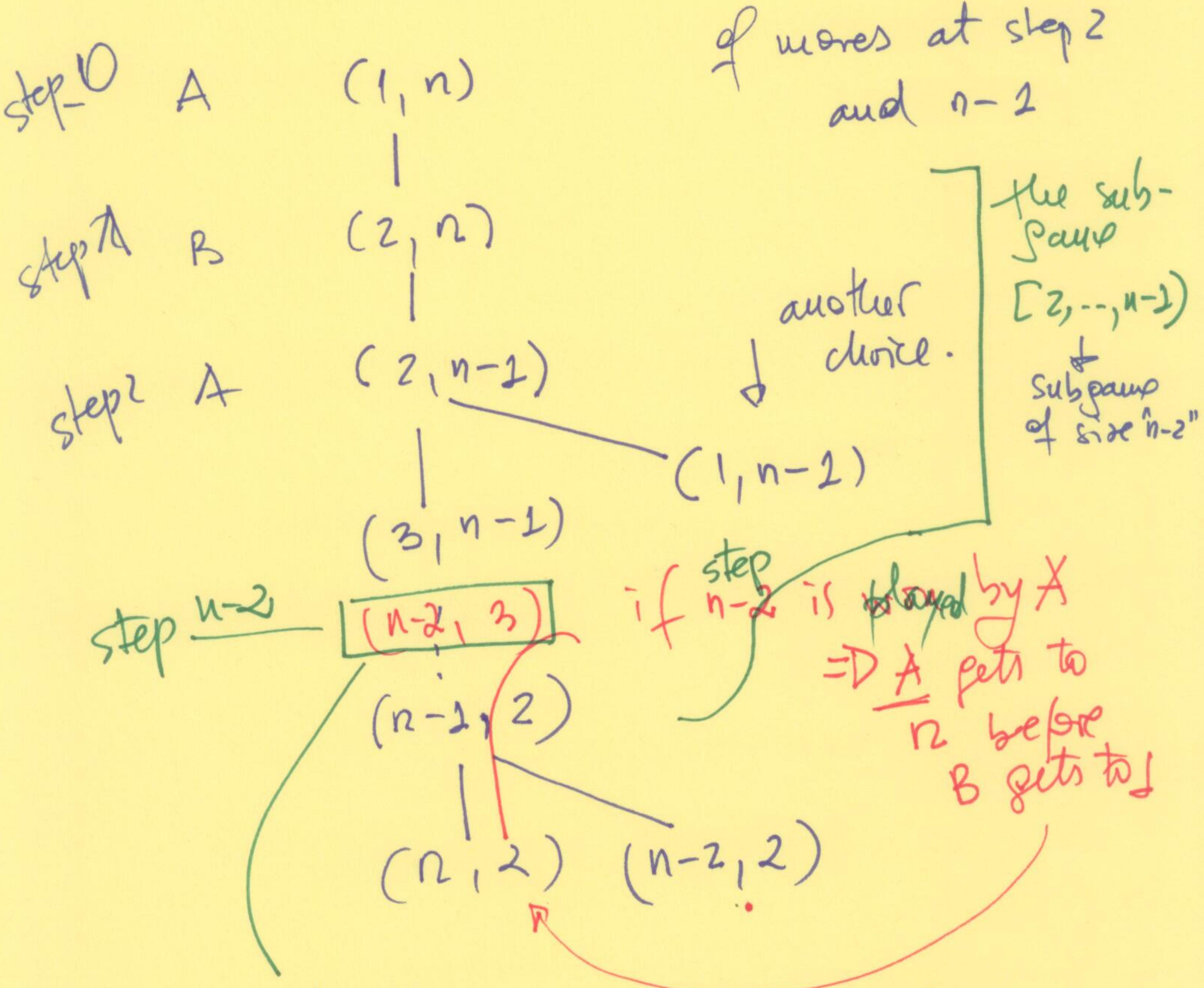
$$\begin{array}{c} | \\ \boxed{(2, 1)} \\ -1 \end{array} \quad A \quad \Rightarrow \begin{array}{l} A \text{ loses} \\ B \text{ wins.} \end{array}$$

$n = 4$ we have seen that A wins.

for $n > 4$ the initial node is $(1, n)$
 therefore we shall have



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If step $n-2$ is played by B
 $\Rightarrow B$ will win

But there are 2 extra moves:

- If the player that is scheduled to lose wins the sub-game $[2, \dots, n-1]$ he never moves back to his/her home square
- If the player that is scheduled to lose the sub-game does so \Rightarrow he will lose

If the sub-game $\{2, \dots, n-1\}$ will lead to a step " $n-2$ " which is won by A \Rightarrow A gets to the square $n-1$ before B gets to square 1.)

If n is even
 \Downarrow
 $n-1$ is odd.

then A wins the
sub-game
and will win also
the game.

if n is odd.

\Downarrow
 $n-1$ is even A wins the
sub-game
But then B gets to square 1
 \Rightarrow B wins the game.