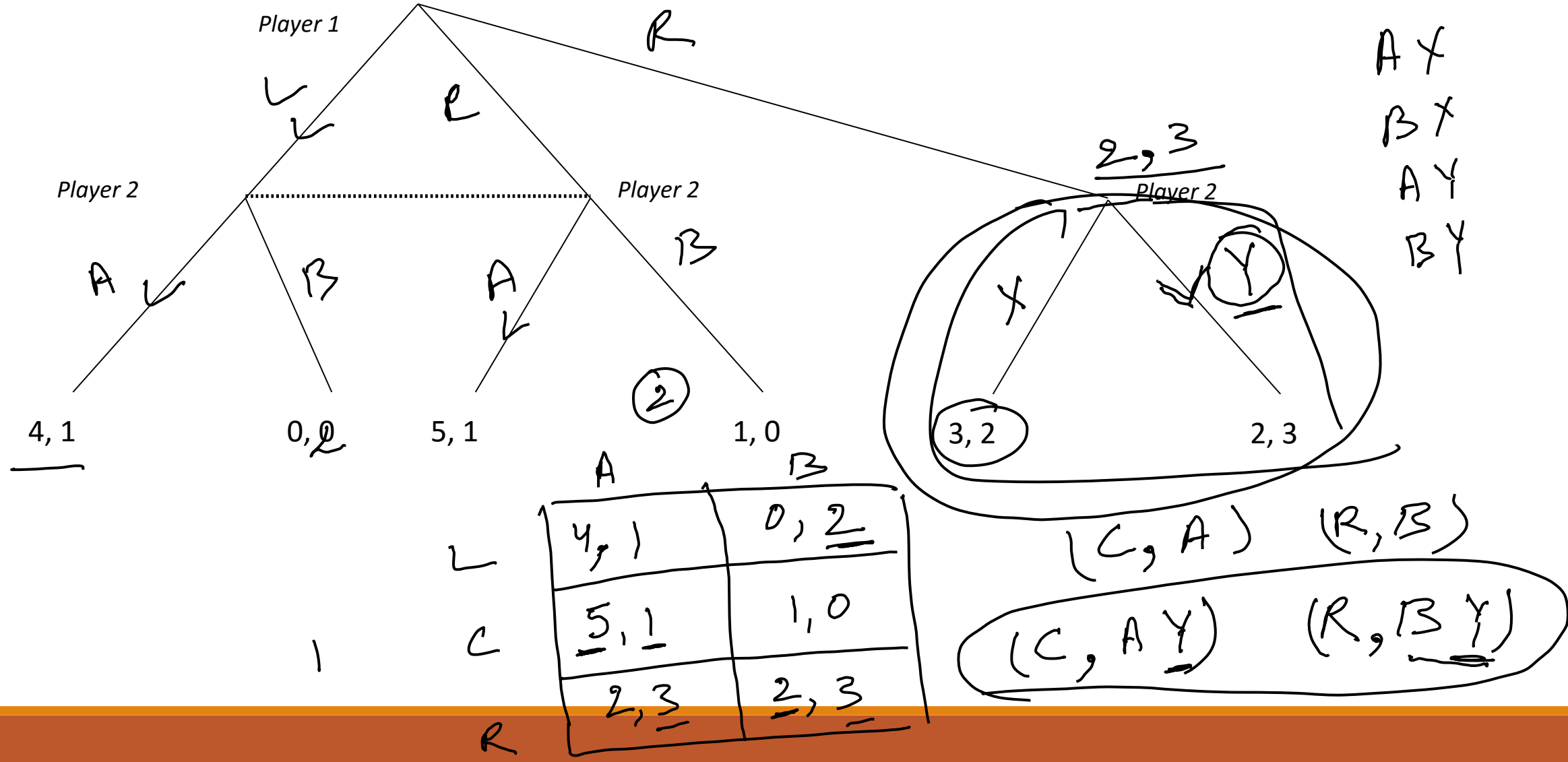
Modification in Backward induction

- Start from the smallest subgames containing the terminal nodes of the game tree
- Determine the action that a rational player would choose at that action node

Replace the subgame with the payoffs corresponding to the terminal node that would be reached if that action were played

- Repeat until there are no action nodes left

Continuing with the earlier Example



Continued

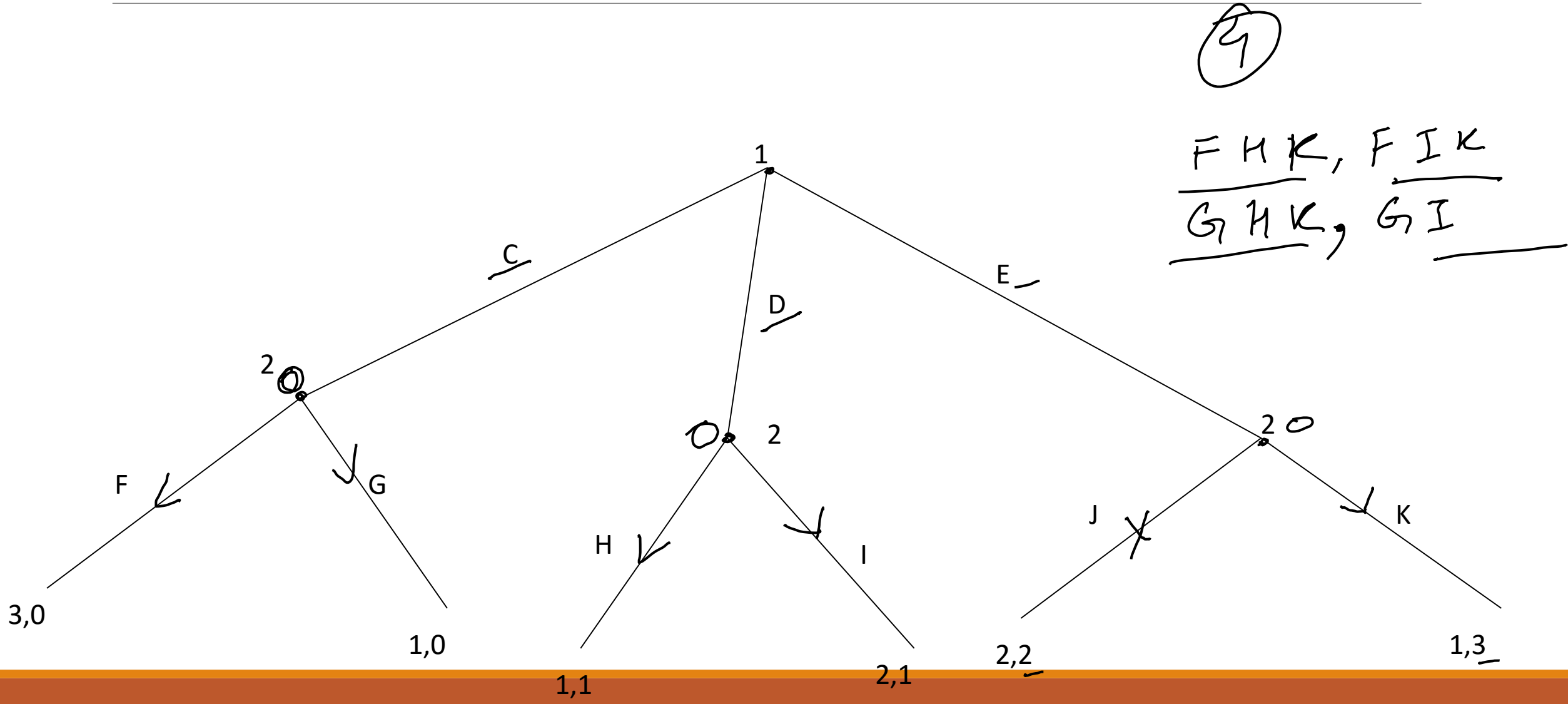
SubgamePerfect Equilibrium

- A strategy for the original game also defines a strategy for each of its subgames, sometimes called a continuation strategy.
- A strategy profile of a sequential game is a subgame perfect equilibrium if it induces a Nash equilbrium for every subgame of the original game. In other words, the strategy is perfect even if the play never goes to that part of the tree.
- An imperfect equilibrium is like a strategy that wouldn't be optimal if the other player did something different.

SPE (Coninued)

- A Nash equilibrium that fails to be subgame perfect is also known as Nash equilibrium supported by noncredible behavior.
- To find subgame perfect equilibrium,
  - use backward induction as far as possible.
  - If backward induction technique fails. Use techniques learned from the Normal form game in the remaining subgames

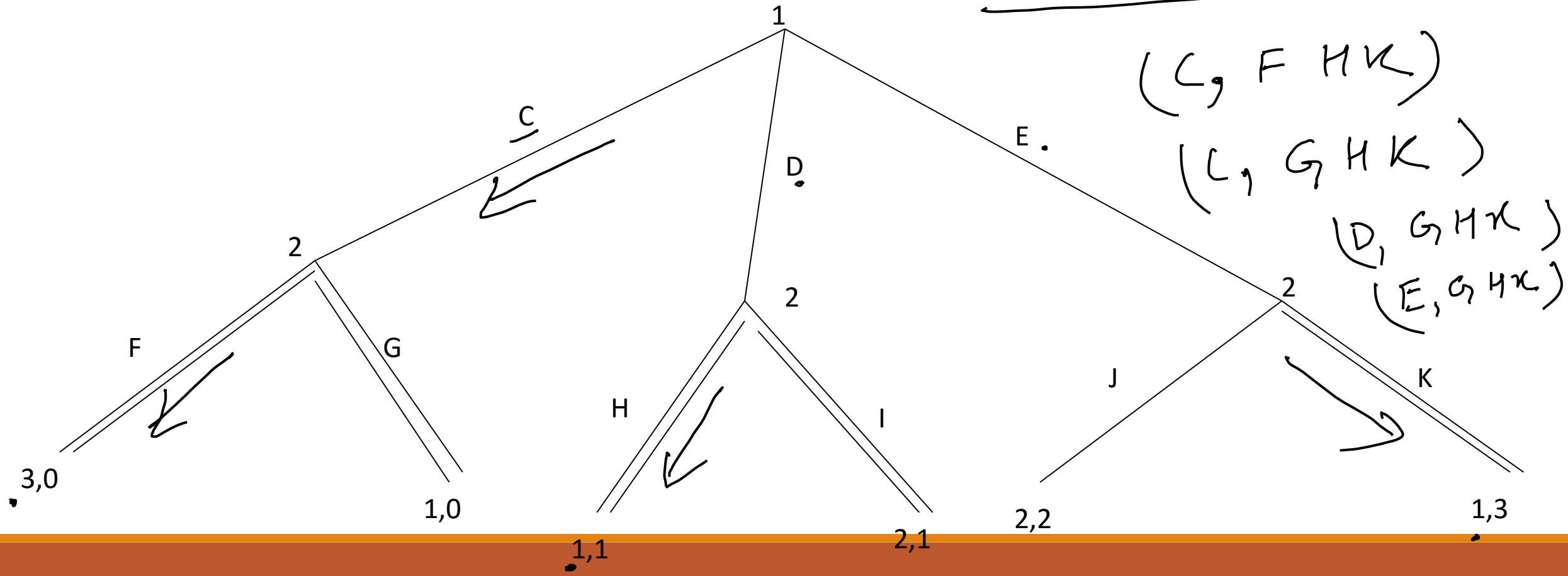
An Example from Osborne



FHK, FIK
GHK, GI

Continued

Player 2 Optimal Strategies:
(FHK),(FIK),(GHK),(GIK)

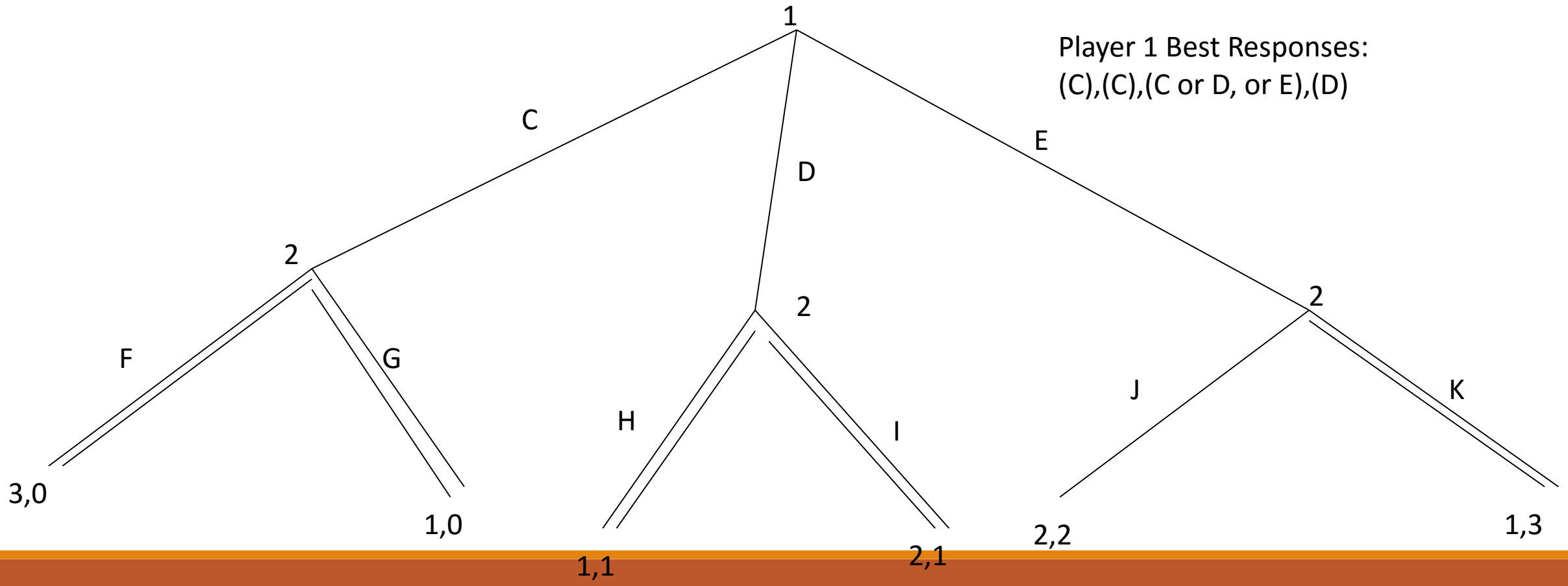


(C, F H K)
(C, G H K)
(D, G H K)
(E, G H K)

Continued

Player 2 Optimal Strategies:
(FHK),(FIK),(GHK),(GIK)

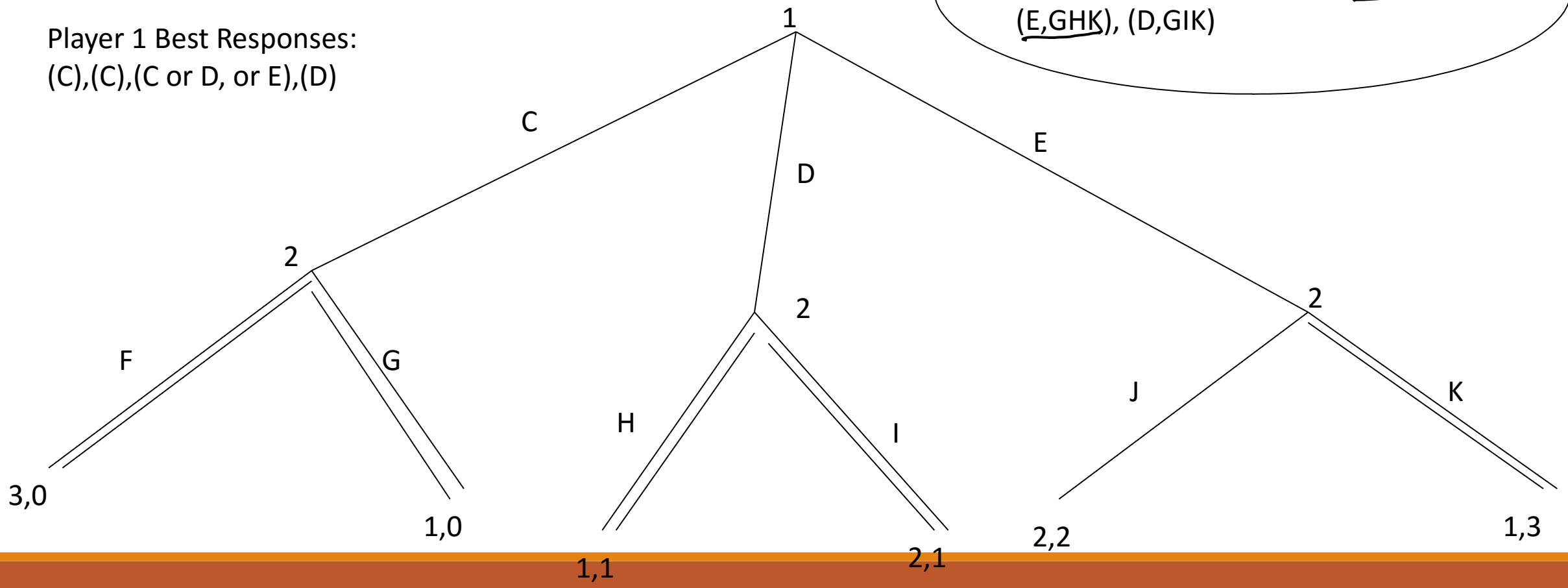
Player 1 Best Responses:
(C),(C),(C or D, or E),(D)



Continued

Player 2 Optimal Strategies:
(FHK),(FIK),(GHK),(GIK)

Player 1 Best Responses:
(C),(C),(C or D, or E),(D)

All SPE

Strategy Pairs:
(C,FHK), (C,FIK), (C,GHK), (D,GHK),
(E,GHK), (D,GIK)