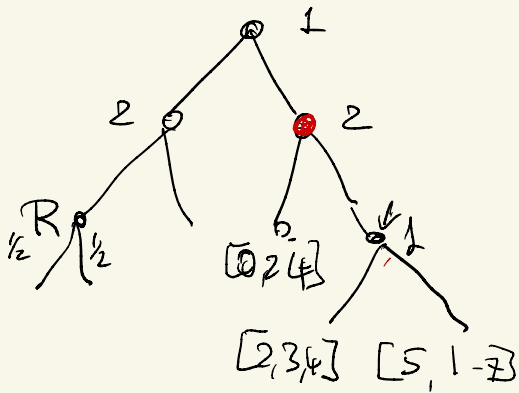


# Extensive form games

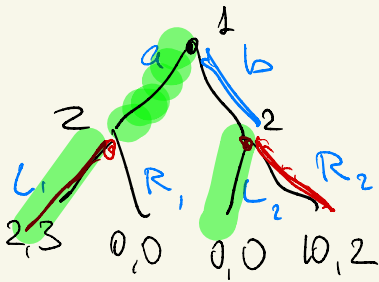
game tree



perfect info  
= all players know  
state of game

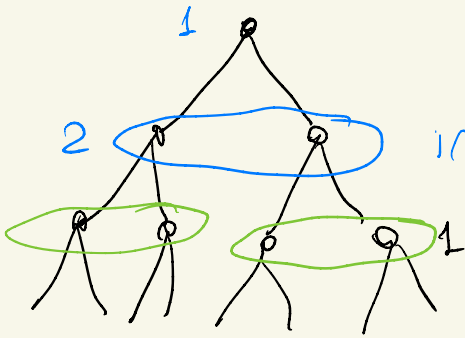
Can be "solved" starting from bottom  
up, assuming no ties in payoff

Subgame perfect Nash  
after any prefix  
Nash of remaining game



Nash  
 $a, (L_1, R_2)$   
not subgame perfect

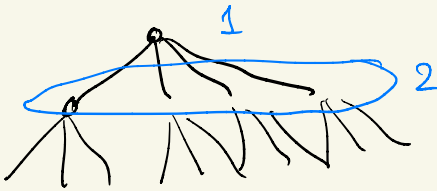
# Imperfect information



information set for player 2

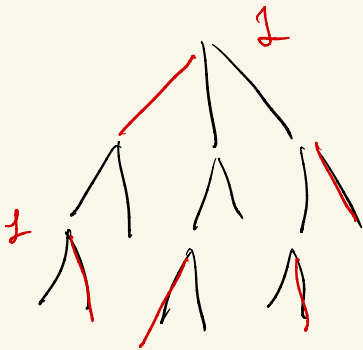
assume perfect recall

game we discussed so far



Converting to simultaneous move game:

pure strategy = choice at every information set



# pure strategies

$n_i$  info sets for player  $i$

$k_i$  options each set

$k^u$  pure strategies

better description:

each info set:  $v$

player move there

needs to choose  $x_{vi}$  prob  
for choosing option  $i$

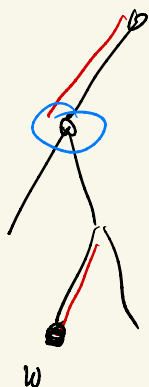
$$x_{vi} \geq 0$$

$$\sum_i x_{vi} = 1$$

$k \cdot n_1$  variables for  
player 1

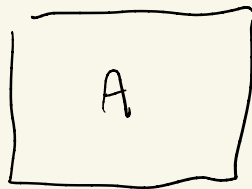
---

$y$  decision by player 2.



prob of reaching a leaf

$x_{..} y_{..} x_{..} y_{..} x_{..} \dots$



$x^T A y$  payoff

---

new  $p$  variables

$$z_{vi} = \prod x_{wj}$$

$\uparrow$  path from root to  $vi$

$$z_w = \prod x_{wi} \quad \text{on path from root to } w$$