$\boxed{\text{Stackelberg equilibrium}}$

Linear inverse demand: $P = a - bQ$, linear cost function $C(q) = cq \qquad (0 < c < a)$

Monopoly: $\Pi(Q) = Q(a - bQ) - cQ$. Solve $\dfrac{\partial \Pi}{\partial Q} = 0$: $\boxed{Q_M = \dfrac{1}{2}\left(\dfrac{a-c}{b}\right)}$ $\boxed{\Pi_M = \dfrac{(a-c)^2}{4b}}$

Duopoly: $\begin{cases} \pi_1(q_1, q_2) = [a - b(q_1 + q_2)]q_1 - cq_1 \\ \pi_2(q_1, q_2) = [a - b(q_1 + q_2)]q_2 - cq_2 \end{cases}$ Solve $\dfrac{\partial \pi_1}{\partial q_1} = 0, \dfrac{\partial \pi_2}{\partial q_2} = 0$

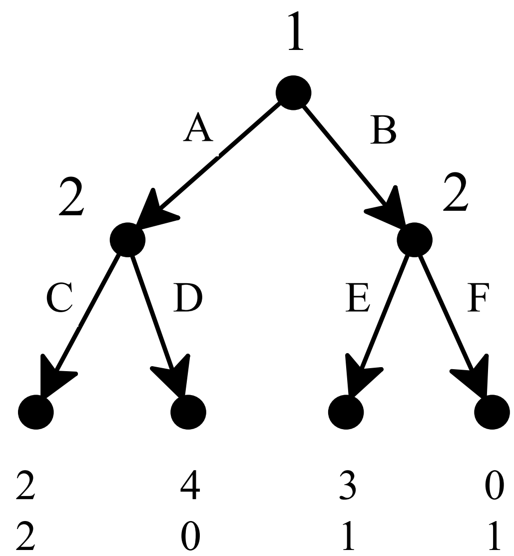
Cournot-Nash equilibrium: $q_1^* = q_2^* = \dfrac{a-c}{3b}$ so $\boxed{Q_d^* = \dfrac{2}{3}\left(\dfrac{a-c}{b}\right)}$ and $\boxed{\Pi_1^* = \Pi_2^* = \dfrac{(a-c)^2}{9b}}$

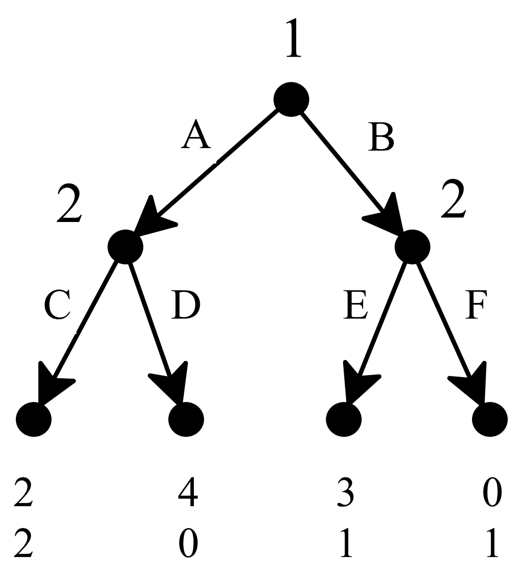
Stackelberg. Perfect-information game where Firm 1 choose its output first and **commits to it** moves first and Firm 2 moves second.

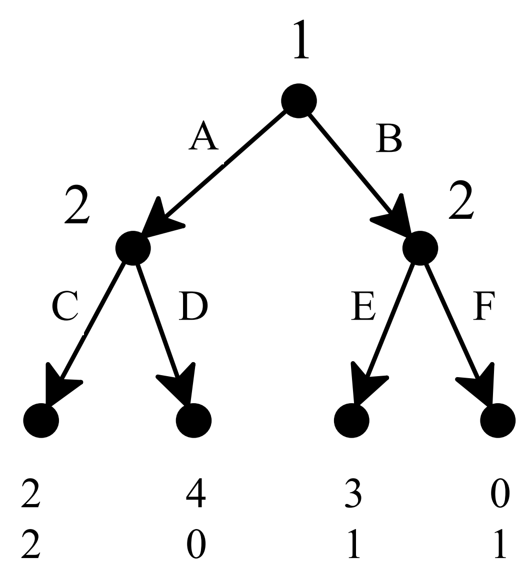
Introduce a fixed cost.

$$\boxed{P = 25 - Q} \quad \text{and} \quad \boxed{C(q) = \begin{cases} 0 & if\ \ q = 0 \\ q + 25 & if\ \ q > 0 \end{cases}}$$

Multiple backward-induction solutions

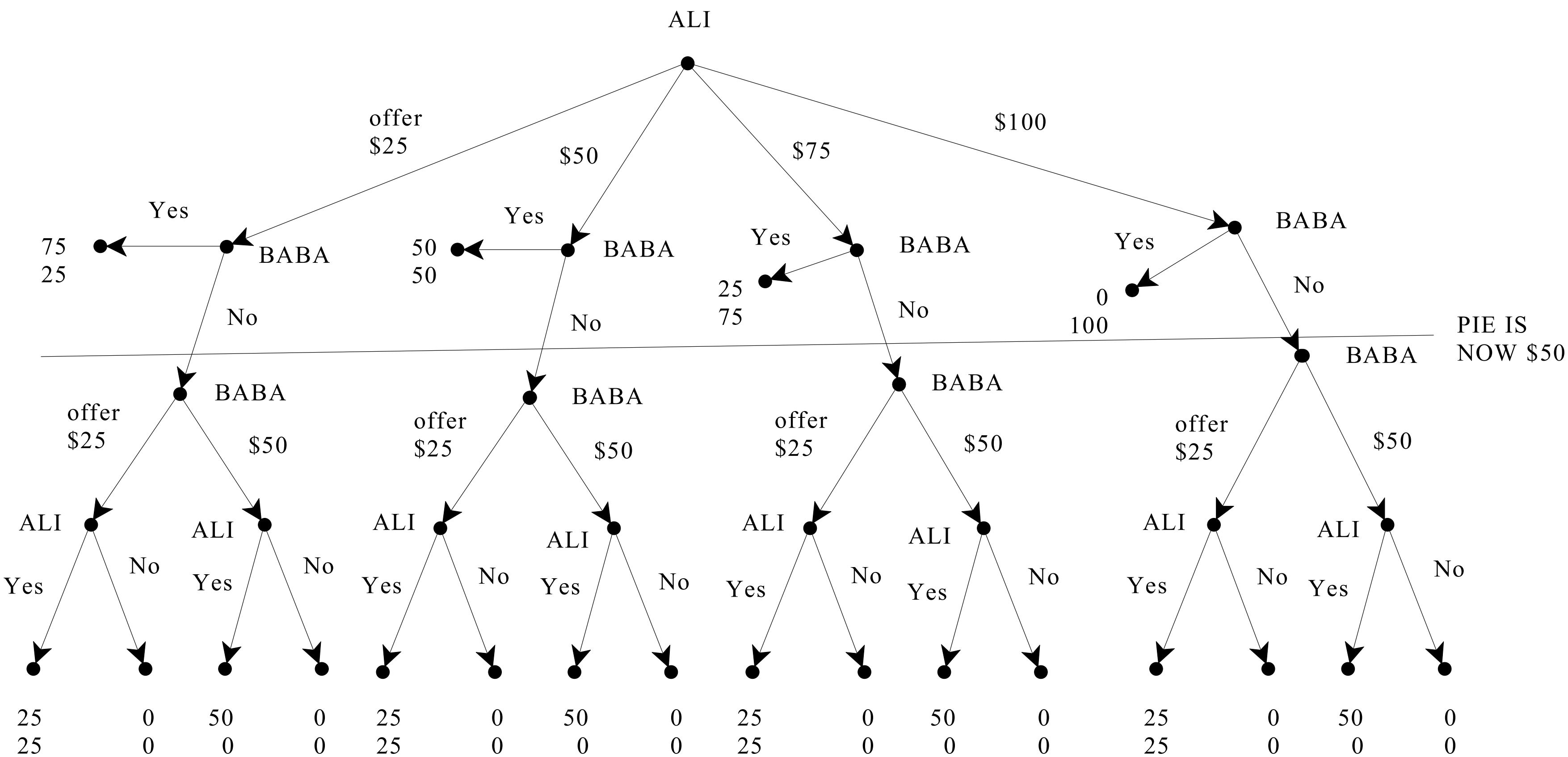






Bargaining game between Ali and Baba.

They have $100 to divide. Ali makes an offer to Baba. Offers can only be multiples of $25. The minimum offer is $25. Baba can accept or reject. If he rejects the money to be divided shrinks to $50 and he makes an offer. If Ali rejects then they both get nothing. Thus only two rounds of offers.



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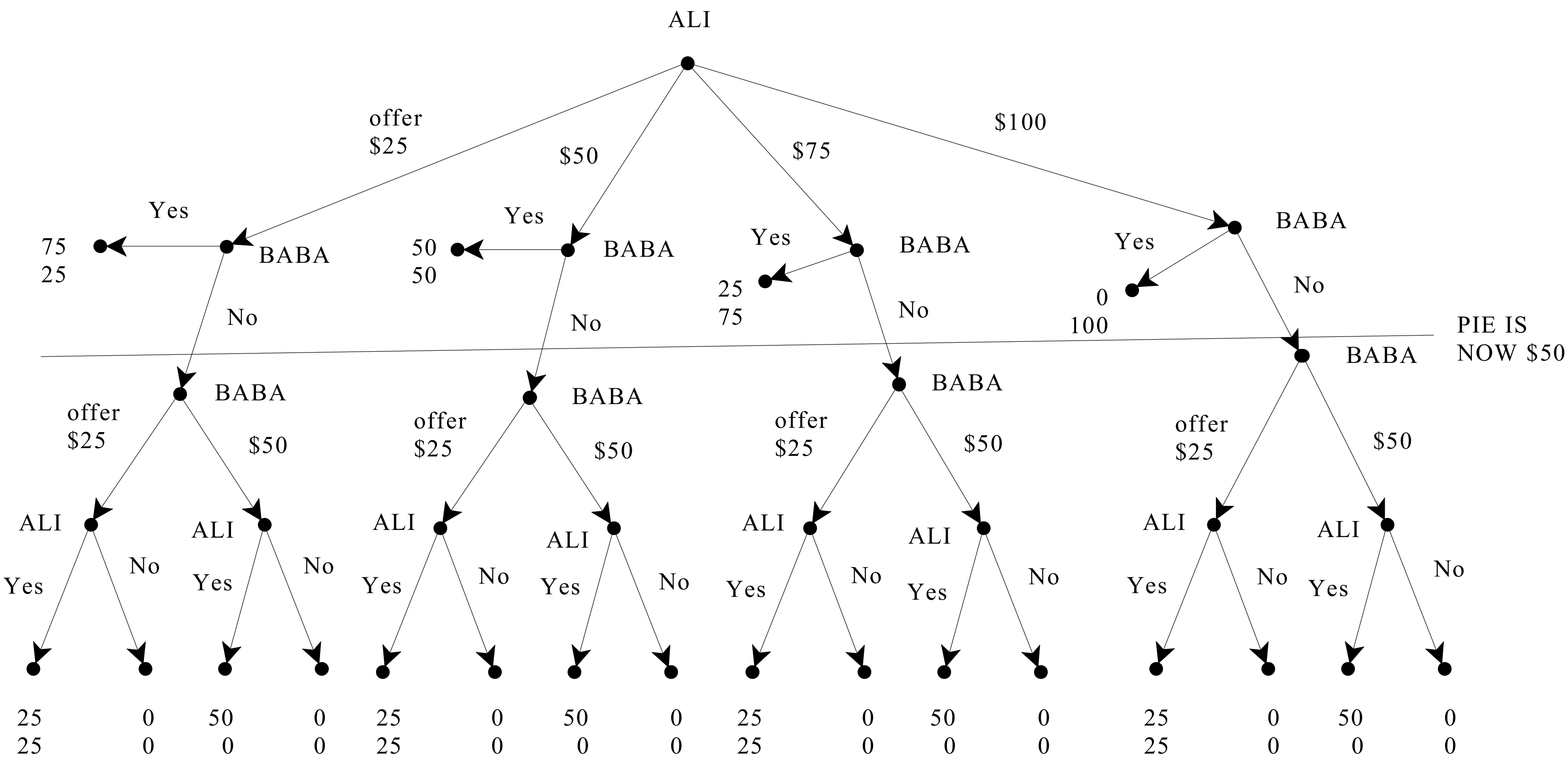
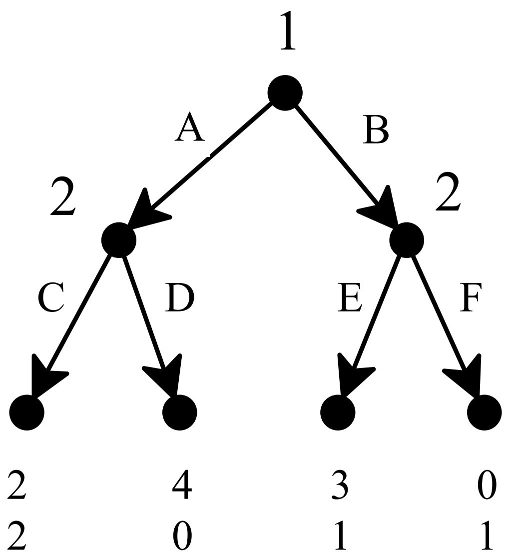
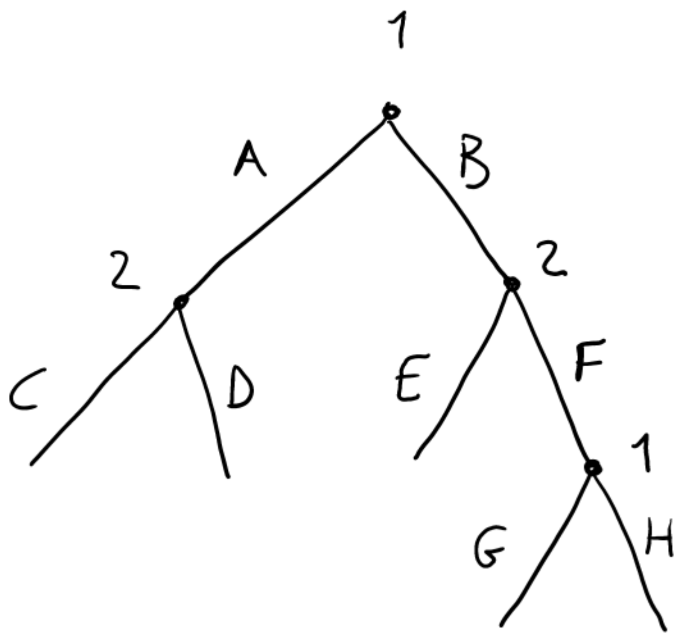
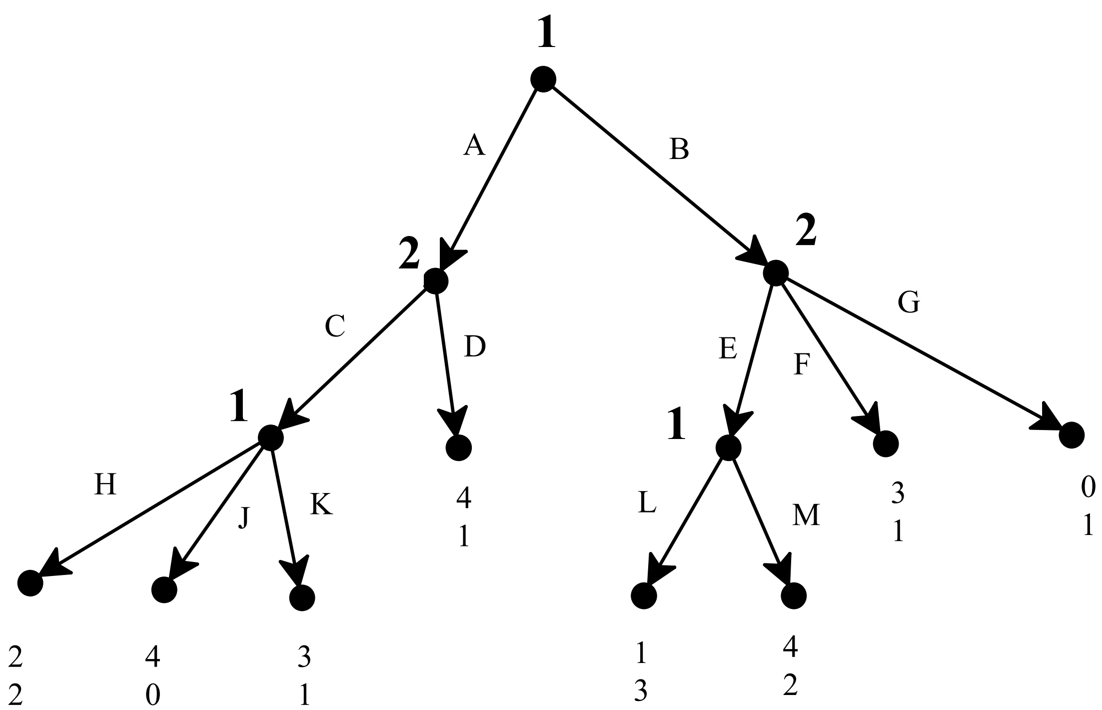


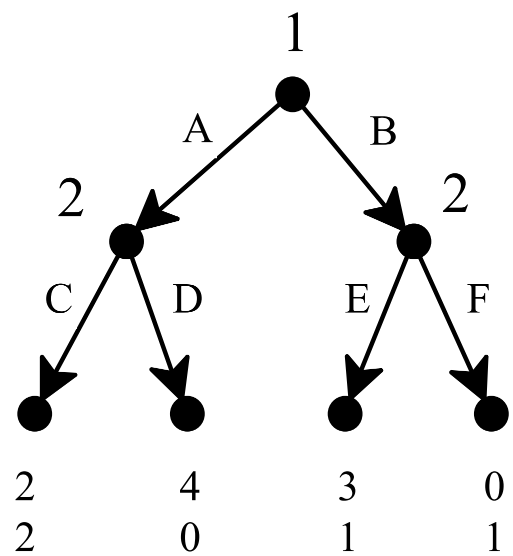
Definition: A *strategy* for player i in a perfect-information game is a list of choices, one for each node that belongs to player i .

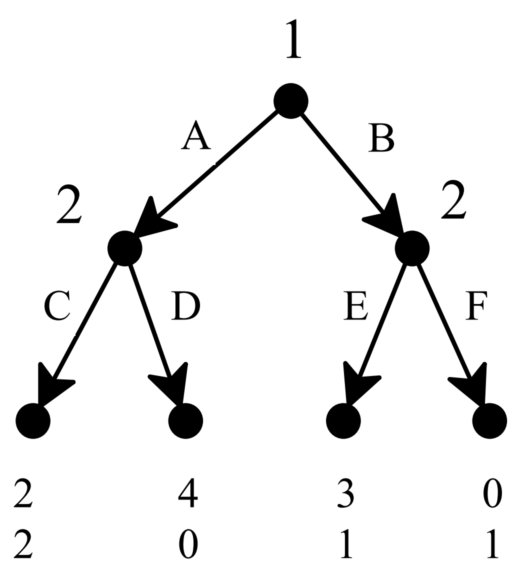


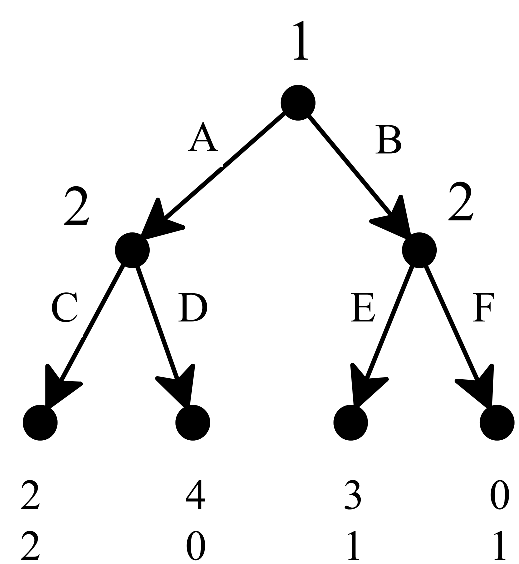

1
A
B
2
2
C
D
E
F
1
G
H


1
A
B
2
2
C
D
E
F
G
1
1
H
J
K
4
1
L
M
3
1
0
1
2
2
4
0
3
1
1
3
4
2

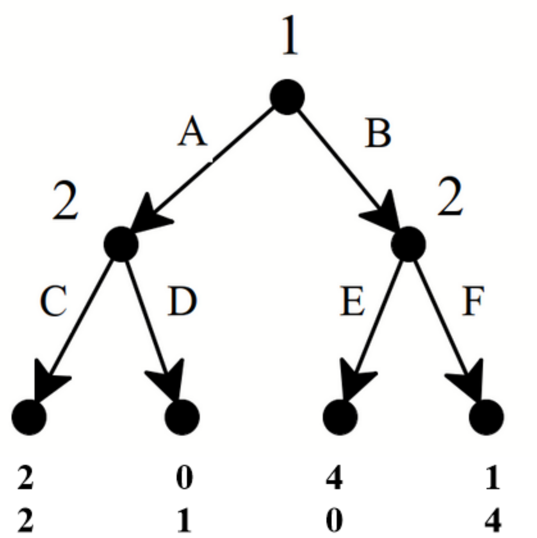
NOTE: Backward-induction solutions must be given in terms of *strategy profiles*, not in terms of actual choices.







Relationship between backward induction and Nash equilibrium



2

1		CE	CF	DE	DF
	A				
	B				