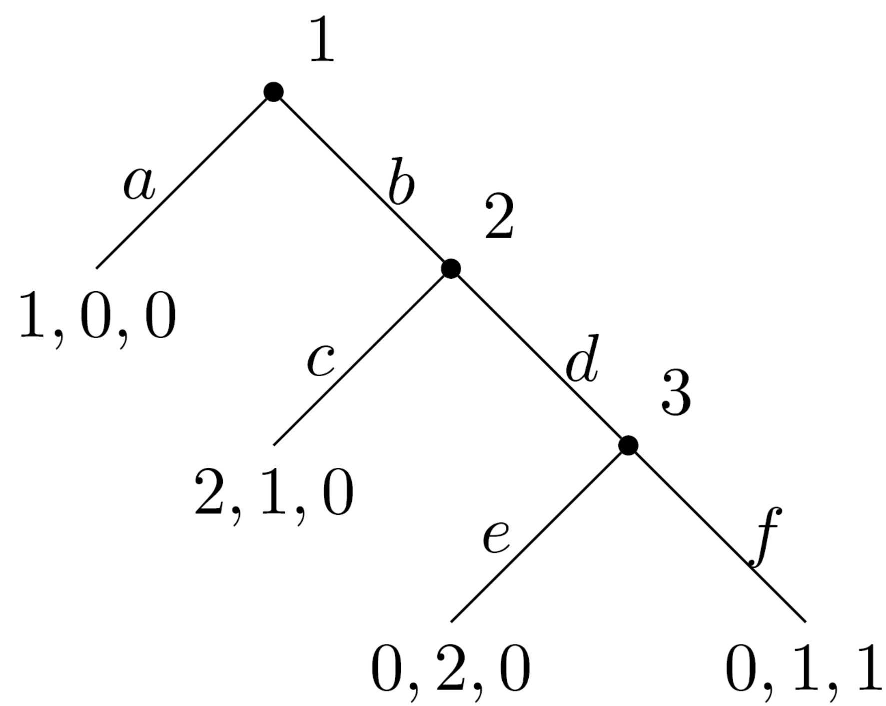
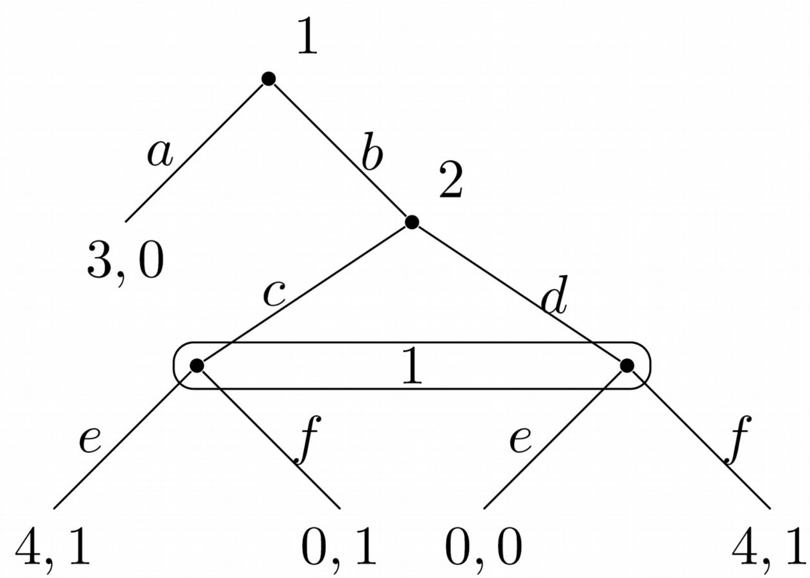
Exercise 1

Find the pure-strategy subgame perfect equilibria of the game below:



Exercise 2

Consider the following extensive form game:



(a) Find the corresponding strategic (i.e., normal form) game.
(b) Find all pure-strategy Nash equilibria.
(c) What is the outcome of iterated elimination of weakly dominated (pure) strategies?

Exercise 3

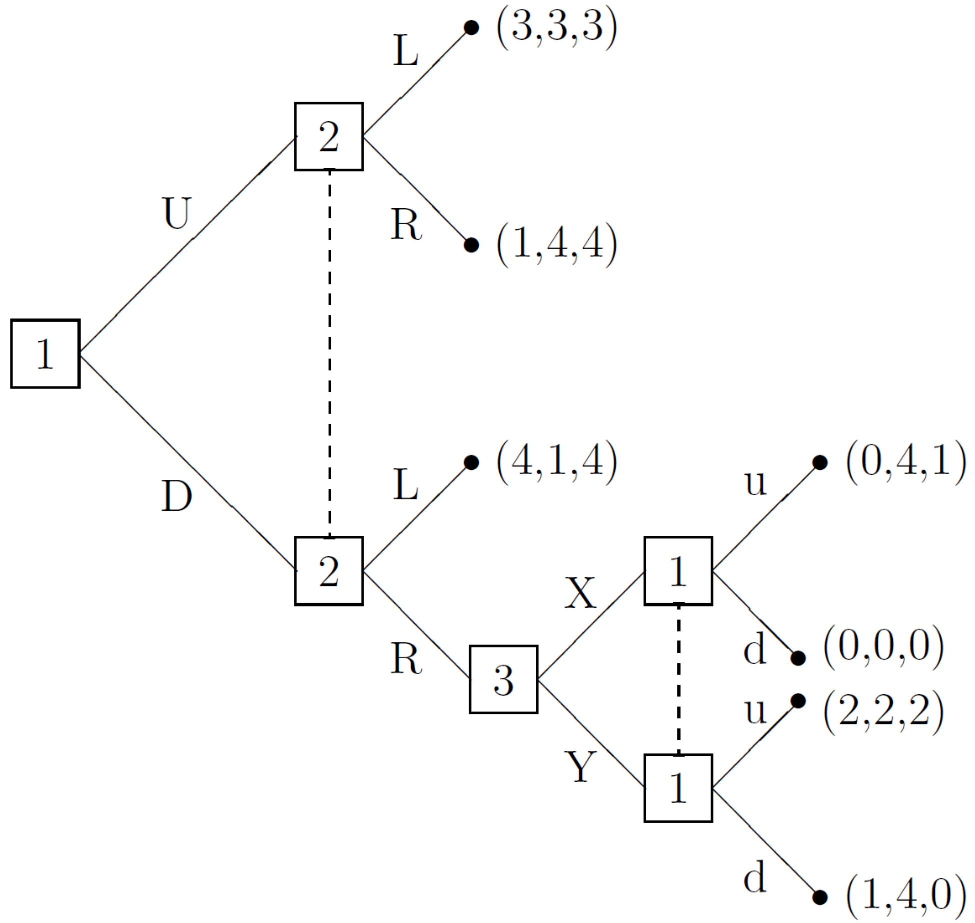
Two players, A and B play the following game. First A must choose IN or OUT. If A chooses OUT the game ends, and the payoffs are A gets 2, and B gets 0. If A chooses IN then B observes this and must then choose in or out. If B chooses out the game ends, and the payoffs are B gets 2, and A gets 0. If A chooses IN and B chooses in then they play the following simultaneous move game:

		B	
		left	right
A	up	$3, 1$	$0, -2$
	down	$-1, 2$	$1, 3$

a)Draw the tree that represents this game.

b) Find all the pure strategy SPE of the game.

Exercise 4



a) Find the equivalent strategic game of this extensive form game. Tip: https://www.youtube.com/watch?v=P7Dg5FRH0cc

b) Find all the subgame perfect Nash equilibria of this extensive form game. (Please give equilibrium strategies as well as payoffs.)

Exercise 5

Two farmers, Joe and Giles, graze their animals on a common land. They can choose to use the common resource lightly or heavily and the resulting strategic interaction may be described as a simultaneous-move game. The payoff matrix is the following:

		Giles	
		light	heavy
Joe	light	40, 40	20, 55
	heavy	55, 20	30, 30

1. *Find the Nash equilibrium of the game and show that it is an example of "Prisoners' Dilemma" games.*

2. *Suppose that the same game is repeated infinitely.*
   Is the {light, light} outcome a Nash equilibrium if both players play a Grim strategy and have a discount factor of 0.7?

Exercise 6

The absent-minded driver. Alice está sentada tarde da noite em um restaurante planejando sua viagem de meia-noite para casa. A fim de chegar em casa, ela tem que tomar a estrada e virar na segunda saída. Virando na primeira saída a leva a uma área desastrosa, com muitos assaltos e acidentes (*payoff* de 0). Virando na segunda saída ela terá a mais alta recompensa, pois chega em casa (*payoff* de 4). Se ela continuar para além da segunda saída, ela não pode voltar atrás, encontrando no final da estrada um motel onde ela pode passar a noite (*payoff* de 1). Alice é altamente distraída e é ciente deste fato. Em um cruzamento, ela não pode dizer se é o primeiro ou o segundo, ou seja, ela não se lembra de quantos cruzamentos já passaram.

a. Desenhe a árvore deste jogo na forma extensiva.

b. Qual é equilíbrio de estratégias puras deste jogo?

c. Qual o perfil de estratégias comportamentais que lhe dá o maior *payoff* esperado?

d. Suponha que Alice é casada com Bob e este é um marido muito amoroso, preocupado e medroso. Neste novo cenário, Bob pode tomar duas decisões: esperar por Alice em casa ou ir até o motel procurar por ela. Desenhe a árvore deste jogo na forma extensiva.

Exercise 7

For the Battle of the sexes game, what is the set of feasible payoffs if it is infinitely repeated? What is the highest feasible symmetric payoff? Let $\delta = \frac{9}{10}$ and find a deterministic strategy profile for the repeated game with payoffs $(\frac{3}{2}, \frac{3}{2})$.

	Bach	*Stravinsky*
Bach	$2, 1$	$0, 0$
Strv	$0, 0$	$1, 2$

Exercise 8

- Consider the following stage game:

1\2	L	C	R
T	1,-1	2,1	1,0
M	3,4	0,1	-3,2
B	4,-5	-1,3	1,1

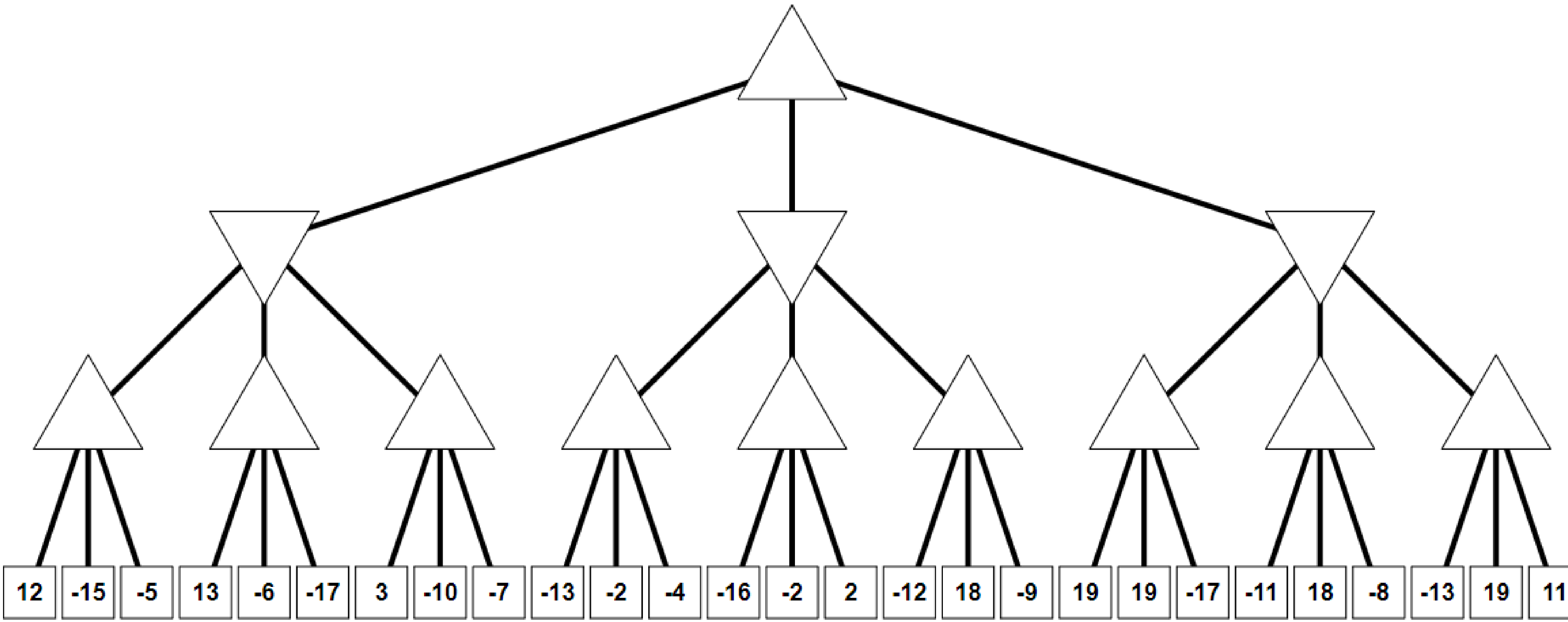
a. Find the unique pure strategy Nash equilibrium.

b. Write down a trigger strategy where the outcome of the game is (M, L).

c. Find a lower bound on δ_i that is sufficient to insure that player i will not deviate from his trigger strategy given that the other player uses his trigger strategy.

Exercise 9

Solve the game bellow using the alpha-beta pruning procedure.



Exercise 10

Solve the following game using the Lemke-howson algorithm

$p1 \backslash p2$	4	5	6
1	1,2	3,1	0,0
2	0,1	0,3	2,1
3	2,0	1,0	1,3