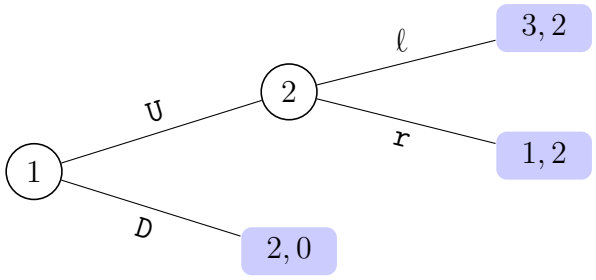
MH 4320 Computational Economics

Assignment 5 September 16, 2024

Question 1

Consider the extensive-form game with perfect information shown below. For such games, we know the subgame perfect equilibria are exactly those equilibria that can be produced by the backward induction.

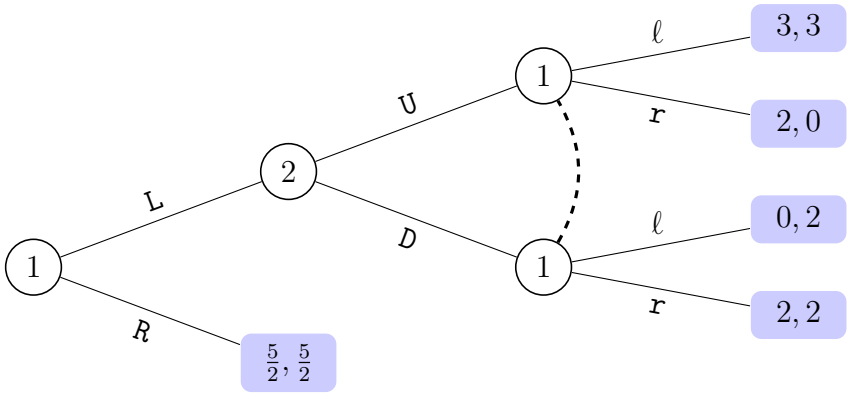


(a) Find the set of all subgame perfect equilibria in pure strategies.

(b) Find the set of all subgame perfect equilibria in mixed strategies.

Question 2

Consider the extensive-form game with inperfect information shown below.



(a) Give the strategic-form representation of this game.

(b) How many subgames are there in this game? Identify the starting node of each subgame.

(c) Compute all subgame perfect equilibria of this game.

Question 3: War of Attrition

In the *two-stage* war of attrition we studied in class, we focussed on the case where $v > c$. For the converse case $c > v$, **find** all the sub-game perfect equilibria, pure and mixed, including equilibria in which players mix in the first stage but do not mix in the second.

[Hint: be careful when calculating the mixing probabilities to take account of what will happen in stage 2].

Question 4

Alice and Bob (a.k.a. the couple we hoped to set up in class) are still trying to go out on their date. Bob is at the movie theatre. Alice can choose either to stay at home and read a book, or to go to the movies and perhaps meet up with Bob.

- If she reads a book, her payoff is $\frac{3}{4}$ and Bob's payoff is 0.
- If she chooses to go to the movies then Bob observes that Alice is going to the movies but does not observe which movie Alice chooses. The two possible movies are "Oppenheimer" and "Barbie". If Alice goes to the movies, the payoffs are as follows: where $k > 1$.

		Bob	
		Oppenheimer	Barbie
Alice	Oppenheimer	$1, 2$	$0, 0$
	Barbie	$0, 0$	$k, 1$

(a) Draw the extensive form (game tree) and strategic form (matrix) of this game.

(b) For what values of k [recall, $k > 1$], will all the subgame-perfect equilibria involve Alice's going to the movies?