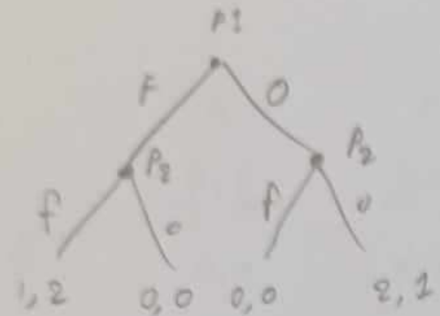
① A two-period battle of the sexes

The game is as follows:



1) Find the N.E.

2) Find the subgame perfect N.E.

We have two players (P1, P2).

P1 plays once so the strategies are (F, O).

For P2 we have two "choice" nodes so in order to write down the strategies, we need to pick an action for every node:

P2 can play f after F and f after O.

>> f >> o >> .

>> o >> f >> .

>> o >> o >> .

So the table containing the payoffs is:

		P2			
		o,o	o,f	f,o	f,f
P1	O	2,1	0,0	2,1	0,0
	F	0,0	0,0	1,2	1,2

②

Using one underline for the b.r. of P1,

>> two underlines >> P2 we have

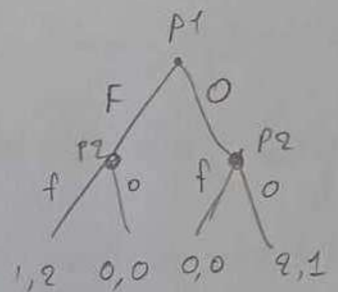
		P2			
		0,0	0,f	f,0	f,f
P1	O	$\underline{2},\underline{\underline{1}}$	$\underline{0},0$	$\underline{2},\underline{\underline{1}}$	0,0
	F	0,0	$\underline{0},0$	$1,\underline{\underline{2}}$	$\underline{1},\underline{\underline{2}}$

So there are 3 N.E. : O, 0,0

O, f,0

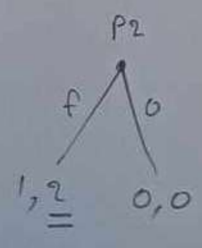
F, f,f.

Which one(s) are subgame perfect N.E.? Let's return to the tree:



We have three subgames in total. The first is the one starting at the left node of P2. The second is the one starting at the right node of P2. The third one is the game on its own.

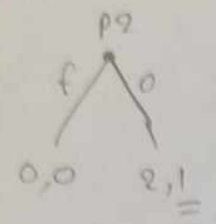
Starting with the first subgame we have:



since $2>0$, P2 chooses f after F.

③

As for the second subgame we have:



Since 1 > 0, P2 chooses o after O.

Since P2 chooses f after F and o after O the third subgame becomes:

Since 2 > 1, P1 chooses O. Any N.E. containing O and o can be subgame perfect. So F, f, f is definitely not one of them. What about O, o, o and O, f, o ?

The N.E. O, o, o is <u>not</u> subgame perfect since P2 claims to play o after P1 plays F. However, this is not a credible threat since, as we have seen in the end of p. 2, P2 plays f (not o) after F.

Hence, the single subgame perfect N.E. is O, f, o.