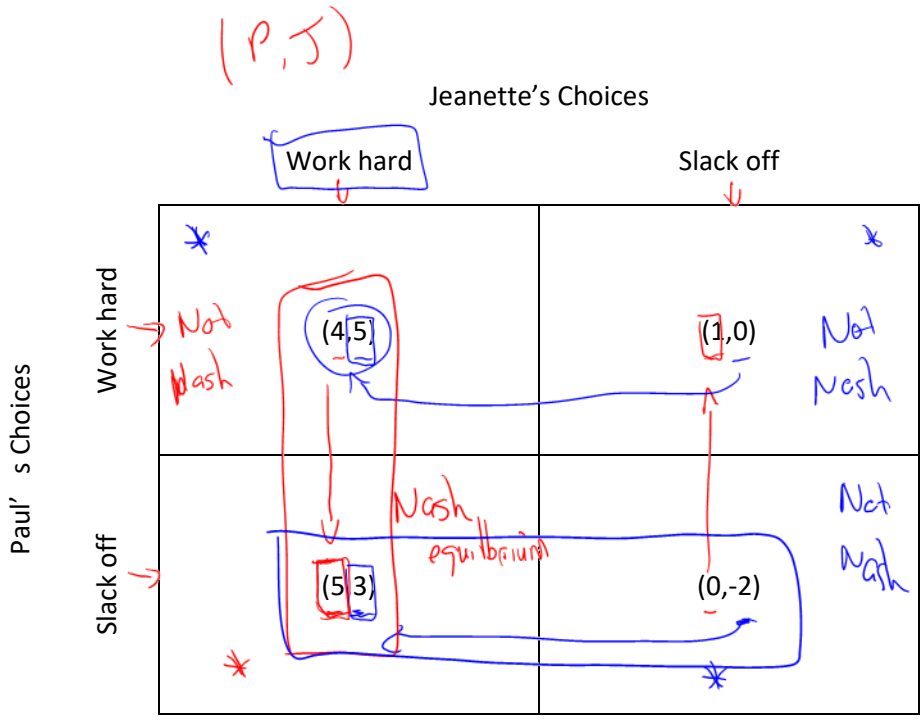
1. It's the end of term and Paul and Jeanette have a group assignment to do. Jeanette is very concerned about her grades, and Paul is less so. They each have the choice to either slack off or work hard on the assignment, and their combined efforts will result in a good grade. The payoffs to each are shown in the static game below as (Paul's Payoffs, Jeanette's Payoffs).



a) Does Jeanette have a dominant strategy?
Yes. In Jeanette's case, no matter what Paul decides to do, it will be better for here to work hard.

b) Does Paul have a dominant strategy?
No. If Jeanette were to slack off, he would chose to work hard, and vice versa.

c) What is/are the pure strategy Nash equilibrium/equilibria in this game?
Jeanette's dominant strategy is to work hard, so you know that will be part of any Nash equilibrium. Paul's choice, in that case, is to slack off. At that node (bottom left), Paul would not want to change his choice because he gets less payoff in the top left node. Similarly, if Paul is slacking off, Jeanette's best choice is to work hard. Therefore the bottom left node is (the unique) Nash equilibrium of this game.

d) Explain why each of the non-Nash equilibria (if any) nodes are not Nash equilibria
The top left is not because Paul would prefer to deviate to bottom left. Top right is not because Jeanette would deviate to work hard even if Paul is working hard. Bottom right is not because both Paul and Jeanette would be better off changing their strategies if this other slacks off.

e) If they repeat this game indefinitely, is a strategy where each does next period what the other did this period a Nash equilibrium strategy?

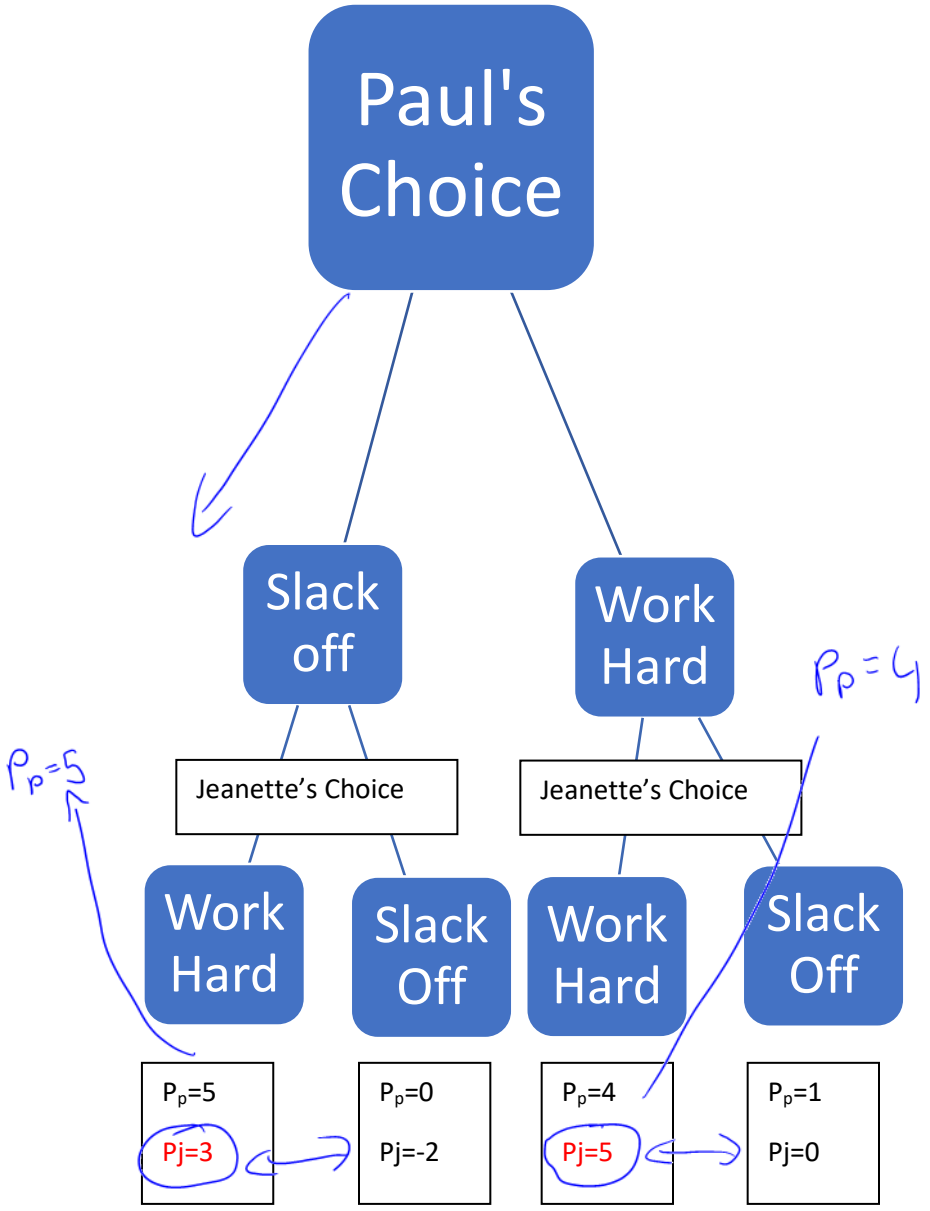
A Nash equilibrium is defined by a case where no player would want to deviate from their strategy given the strategy of the other.

If Jeanette starts this strategy working hard, Paul adopting the strategy would imply that he works hard each period, such that they both share payoffs (4,5) each period forever. Paul will do better in this case with a strategy of always slacking off. Jeanette does not have a credible threat to slack off if Paul does because it also makes her worse off.

f) Does the Nash equilibrium maximize their joint payoffs?
No. Their joint payoffs would be higher if they both worked hard, but that node makes Paul worse off. This differentiates it from the example we did in class where both the joint and individual payoffs we increased in the collusion outcome. That's what allowed it to be a Nash equilibrium in the repeated game – collusion was good for both of them as long as the strategy could sustain it. In this case, it's good for Jeanette, bad for Paul.

2) In the extensive form game where Paul reveals his share of the work first, and Jeanette has to decide whether or not to do enough work to fix it, is the equilibrium the same as in the static, simultaneous move game?

I won't ask you to do this part on an exam, but for practice, flip the game so that Jeanette is the leader and see if you get a different result.



If you look at the game tree above, Jeanette as the follower will always be better off with her dominant strategy, which is to work hard. Knowing that, Paul's payoff from working hard is 4, and from slacking off is 5. He'll choose to slack off.

If we reverse the game tree, we know that if Paul will choose the opposite of Jeanette's choice. He'll choose to work hard if she slacks off and vice versa. Jeanette, knowing this, will see that the choice to slack off will give her a payment of 0, while working hard (knowing that Paul will slack off if she works hard as the leader) will still be her choice because it offers a ~~larger~~ payoff of 3.