

# ECON 204 Sec 02

## Quiz 2

Dr. Kevin Hasker

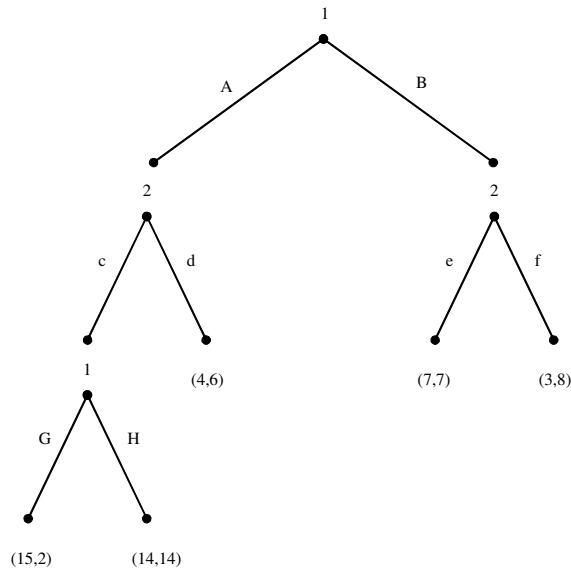
1. (2 Points) **Honor Code:** Please read and sign the following statement:

I promise that my answers to this test are based on my own work without reference to any notes, books, or the assistance of any other person during the test. As well, I will not assist others nor use a calculator or other electronic device.

Name and Surname: \_\_\_\_\_  
 Student ID: \_\_\_\_\_  
 Signature: \_\_\_\_\_  
 \_\_\_\_\_

2. (18 points total) Consider the following sequential game. First Player 1 chooses between the actions  $A$  and  $B$ , then if player 1 chooses  $A$  player 2 chooses between  $c$  and  $d$ . If player 1 chooses  $B$  player two chooses between  $e$  and  $f$ . Finally if player 2 chooses  $c$  player 1 chooses between  $G$  and  $H$ . After each string of actions we write the utilities  $(u_1, u_2)$ .

**Remark 1** Every variation has the same SPE, so I will just write the answers for this game.



- (a) (8 points) For each player write out that player's strategies.

$$\begin{aligned}
 S_1 &= \{A, B\} \times \{G, H\} \\
 &= \{(A, G), (A, H), (B, G), (B, H)\}
 \end{aligned}$$

$$\begin{aligned}
S_2 &= \{c, d\} \times \{e, f\} \\
&= \{(c, e), (c, f), (d, e), (d, f)\}
\end{aligned}$$

- (b) (4 points) Find the subgame perfect equilibrium strategies by backward induction. You may mark them on the table above, but you should also write them out below.

**Solution 2**  $BR_1(A, c) = G$ ,  $BR_2(B) = f$ ,  $BR_2(A) = d$ ,  $BR_1(\emptyset) = A$ .

- (c) (1 points) What is the equilibrium outcome or payoff for each player?

**Solution 3** This depends on the game, but it is  $u(A, d)$ . Be certain their answer agrees with the game they are given, if it does not let me know.

**Remark 4** Oh my! The unique subgame perfect equilibrium is not Pareto Efficient. It is easy to tell a student who has no idea what is going on because they often just choose a Pareto efficient payoff—especially one that is symmetric.

Did you fall for the trap? I told you so many times that equilibria are rarely Pareto Efficient.

- (d) (3 points) What are the subgame perfect equilibrium strategies?

**Solution 5**  $(A, G)(d, f)$  but as long as they write down all four actions I am fine with however they write it.

- (e) (2 points) Explain why writing down the outcome in this game is not enough, i.e. why the extra information in the strategies is necessary. (You only have to give one example, you do not have to go through every case.)

**Solution 6** There are basically two "Prisoner's Dilemma" traps in each game. If player 2 chooses  $e$  then P1 should not choose  $A$ , thus without knowing whether player two will choose  $e$  or  $f$  we can not be sure player 1 is doing the right thing.

Likewise if player 1 chooses  $H$  instead of  $G$  then P2 should choose  $c$ . Remember they only need to discuss one of these.

The other games for completeness:

