# Quiz 7 Answer Key

A

The normal-form game is shown below. Best-responses are highlighted in red. The Nash equilibrium is (Not, Not). This game is dominance solvable. It is not a prisoners' dilemma because neither player can improve their payoff —without harming the other's payoff —by moving to the cooperative strategy.

		Khris	
		$Wash$	Not
Korey	$Wash$	$(-6,-6)$	$(-15,4)$
	Not	$(4,-15)$	$(0,0)$

B

The extensive-form representation of the previous game repeated once is shown below.
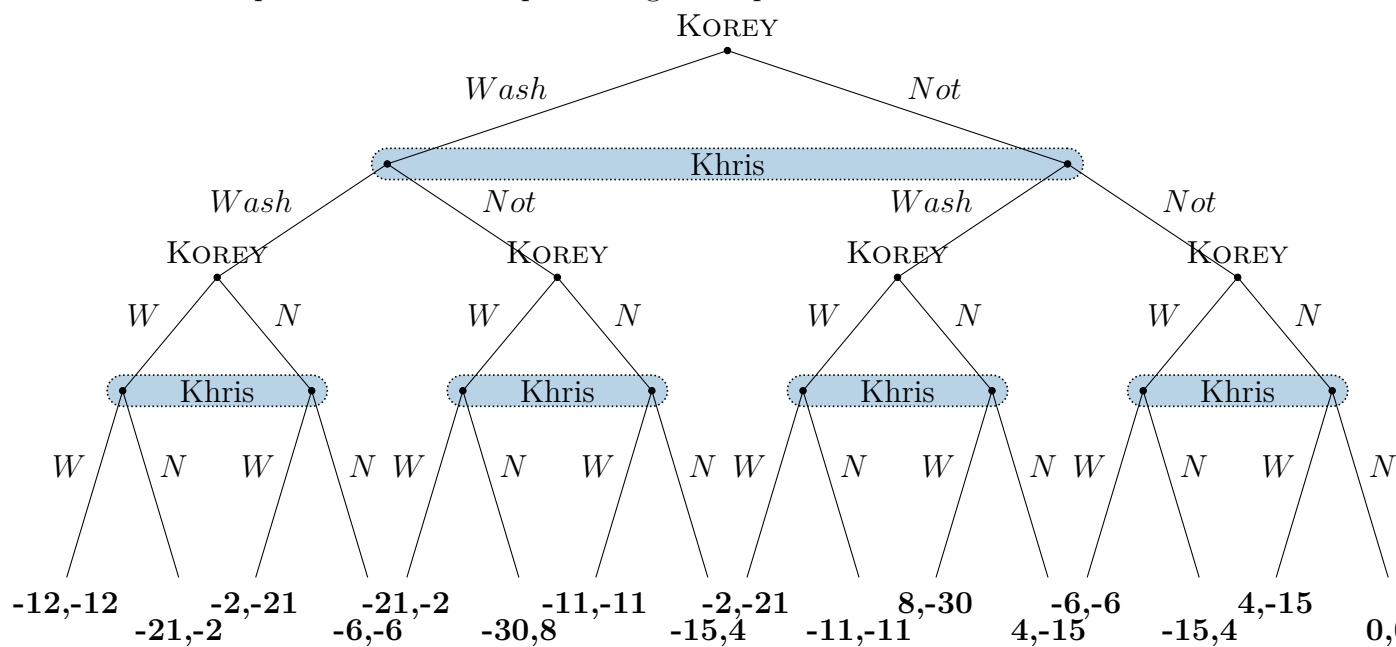
C

Korey moves at 5 information sets and has two choices available at each. He has $2 \times 2 \times 2 \times 2 \times 2 = 2^5 = 32$ strategies. Khris moves at 5 information sets and has two choices available at each. He has $2 \times 2 \times 2 \times 2 \times 2 = 2^5 = 32$ strategies.

D

In order for a set of strategies, one for each person to be a SPNE, it must be true that each player plays a NE in every subgame. Because there is a unique NE for the one-shot game, each player plays that equilibrium strategy in every subgame. The SPNE is, thus, $(NNNNN, NNNNN)$

E

It's important to note that I say they begin in the cooperative cell & return there after deviating, so I've imposed some counterintuitive structure on the game. The one-time gain from a departure from the cooperative strategy is $H - C = 4 - (-6) = 10$. The one-time loss from departing from the strategy is $C - L = -6 - (-15) = 11$.

F

Both players will cooperate if the following holds,

$$\text{Present Value of Gain} < \text{Present Value of Loss}$$
$$10 < 11\delta$$
$$\Rightarrow \delta > 10/11$$

Therefore any $\delta > 10/11$ will sustain cooperation. $\frac{1}{1+r} = \delta$ therefore this corresponds to $r < \frac{1}{10}$. Because $\delta = 0.75$, Korey and Khris will not cooperate.

Note

The game I actually wanted you to explore is a "taking turns" strategy. Suppose Korey and Khris start out at $(Wash, Not)$. Then using a tit-for-tat strategy which δs support cooperation for Korey. The interesting piece is if I ask this from Korey's direction the answer is different.