strategic form of this subgame. Thus any subgame-perfect equilibrium must have (L;u) for its last two moves. For example, (U,R;u) is not subgame perfect because the restriction of it to either of the proper subgames is not a Nash equilibrium of that subgame, R is not a Nash equilibrium of the subgame of just the third move, and (R;u) is not a Nash equilibrium of the subgame of the last two moves. Thus there are two subgame-perfect equilibria in pure strategies, (D,L;u) and (U,L;u).

Exercise 5.2: Find the Nash equilibria of the games in Figures 5.13 through 5.17. You do not need to search for mixed equilibria, except in Figure 5.17. Determine which of these Nash equilibria are subgame perfect and which are not.

a) Find the Nash equilibria for the game in Figure 5.13. Which ones are subgame perfect?

b) Find the Nash equilibria for the game in Figure 5.14. Which ones are subgame perfect?

c) Find the Nash equilibria for the game in Figure 5.15. Which ones are subgame perfect? Does your analysis change if Player 2 cannot tell what Player 1's move has been when she must decide? (Hint: What game is this?)

d) Find the Nash equilibria for the game in Figure 5.16. Which ones are subgame perfect?

e) Find the Nash equilibria for the game in Figure 5.17. Which ones are subgame perfect? (Hint: Start by finding the Nash equilibria for the subgame that Players 3 and 4 play in the last two moves. Extra Hint: What well-known game are Players 3 and 4 playing? For each of those equilibria, calculate the values of Players 1 and 2.

Backwards induction is a special case of subgame perfection. Games with perfect information decompose into proper subgames from every node. Backwards induction, like subgame perfection, requires equilibrium play in each of those subgames. But subgame perfection is stronger than backwards induction. It can eliminate Nash equilibria where backwards induction is powerless by ruling out equilibria where a player makes an noncredible threat in a subgame containing an information set with multiple nodes.