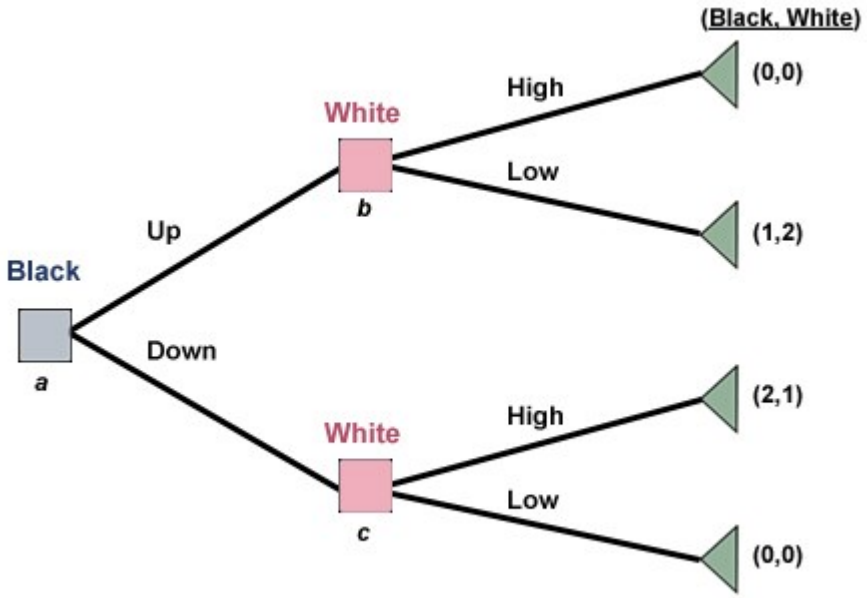
Department of International & European Studies
University of Piraeus

Introduction to Games of Sequential Moves: The Street Garden Game



John A. Paravantis
Associate Professor
April 2018

Scenario

Three neighbors are willing to volunteer work on building a small street garden (Dixit and Skeath, 2004) in which children in the neighborhood may play safely:

1. **Emily**
2. **Nina**
3. **Talia**.

All three neighbors want the park to be built.

For the garden to be constructed satisfactorily, at least 2 people have to work.

If one person works, the park will not be as good.

However, offering volunteer work is a cost that the three neighbors would rather avoid.

Alternative strategies

We will construct a game theoretic model of this scenario, observing that we have three players.

Each one of the three neighbors has the following two alternative moves:

1. Contribute
2. Do not contribute.

It is assumed that at least one neighbor will be working for the street garden.

In this case, we assume that the moves will be sequential (rather than simultaneous) in the order presented previously.

In sequential games, a strategy may be composed of one or more move(s).

Finding the equilibrium

In the following pages, the game is resolved (i.e. its equilibrium is found) by the *rollback* method (Dixit & Skeath, 2004; also called *backwards induction*).

As they explain in their classic book (Dixit & Nalebuff, 2008) the *"Look ahead and reason back"* rule applies.

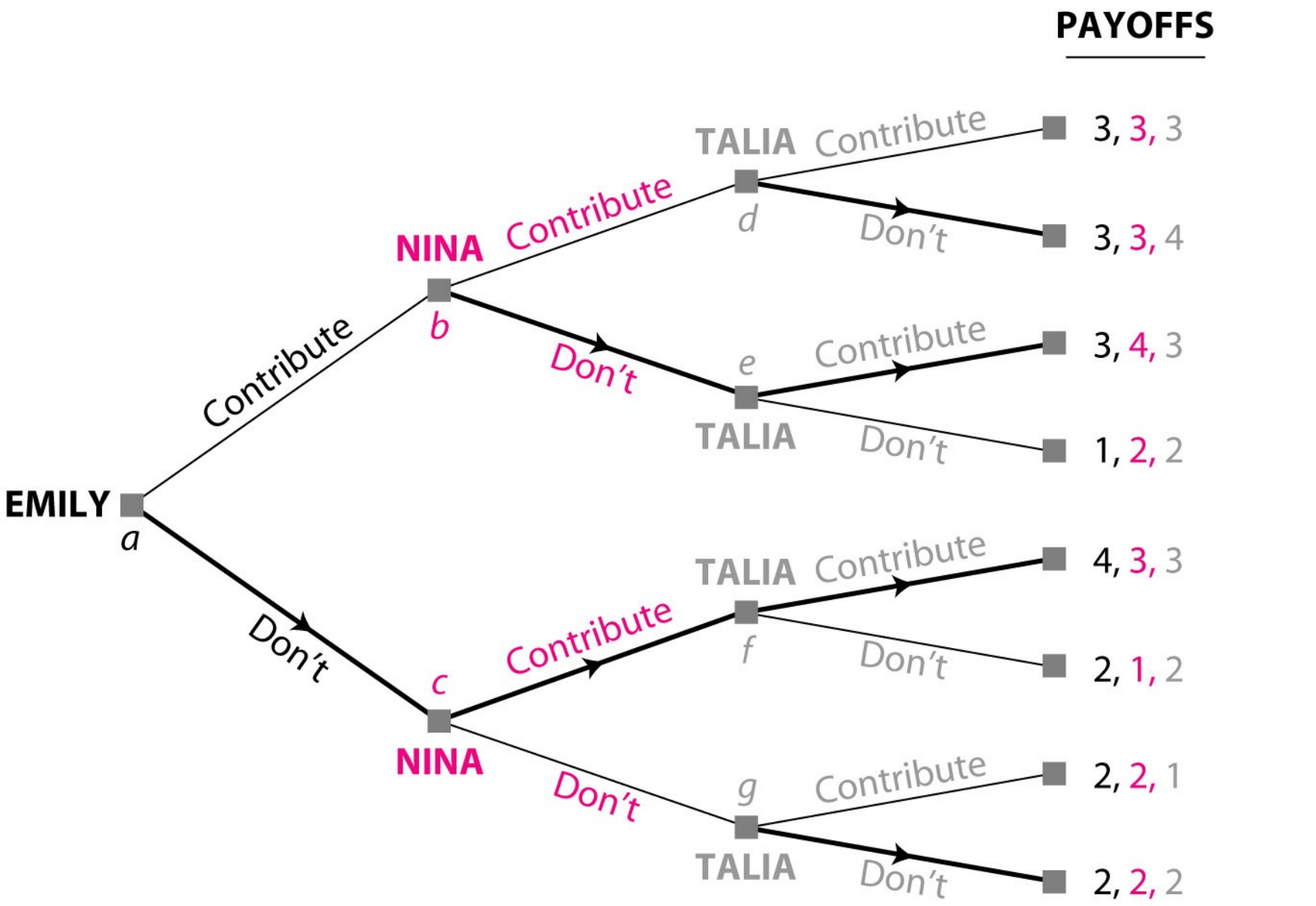


FIGURE 3.6 The Street Garden Game

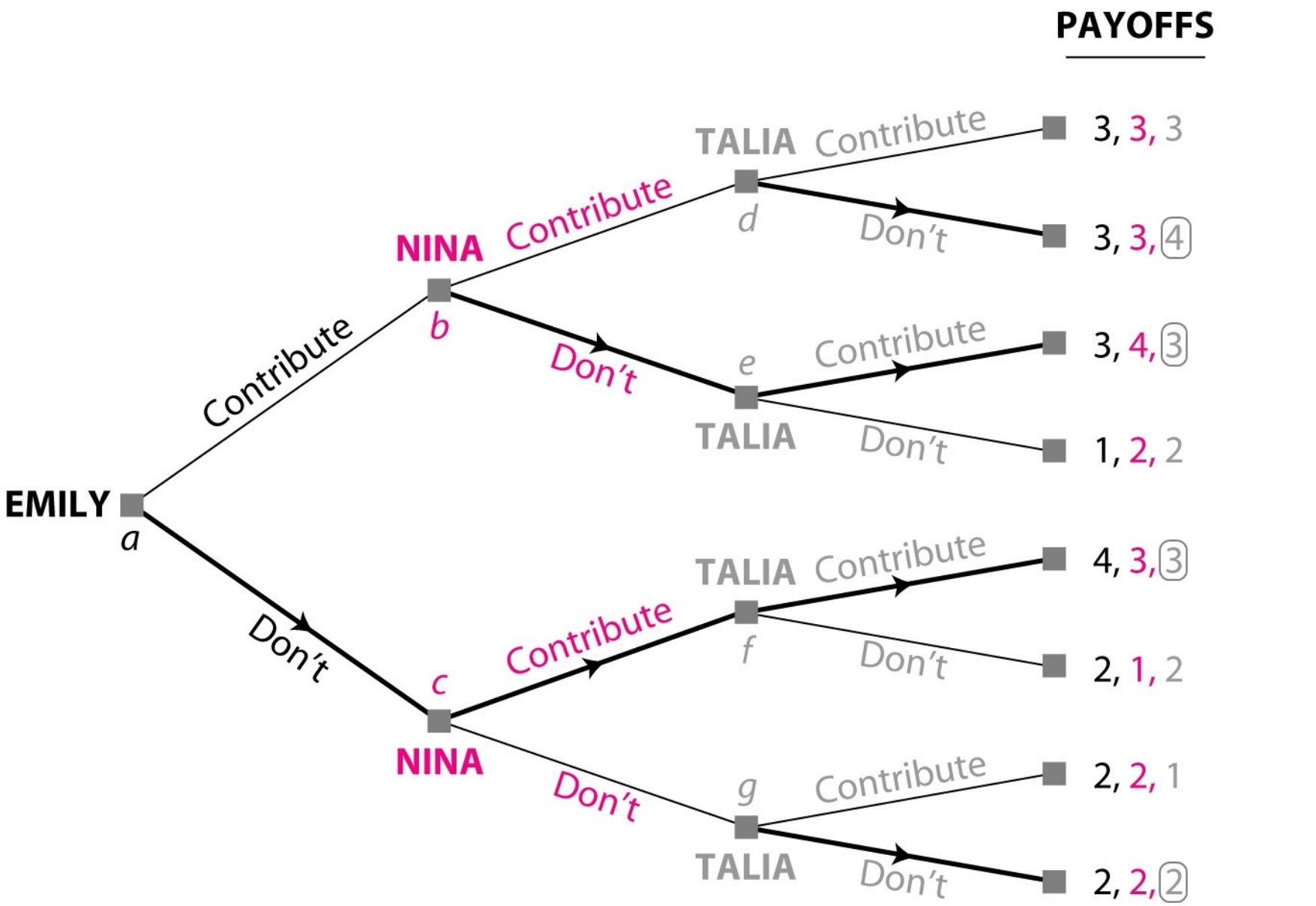


FIGURE 3.6 The Street Garden Game

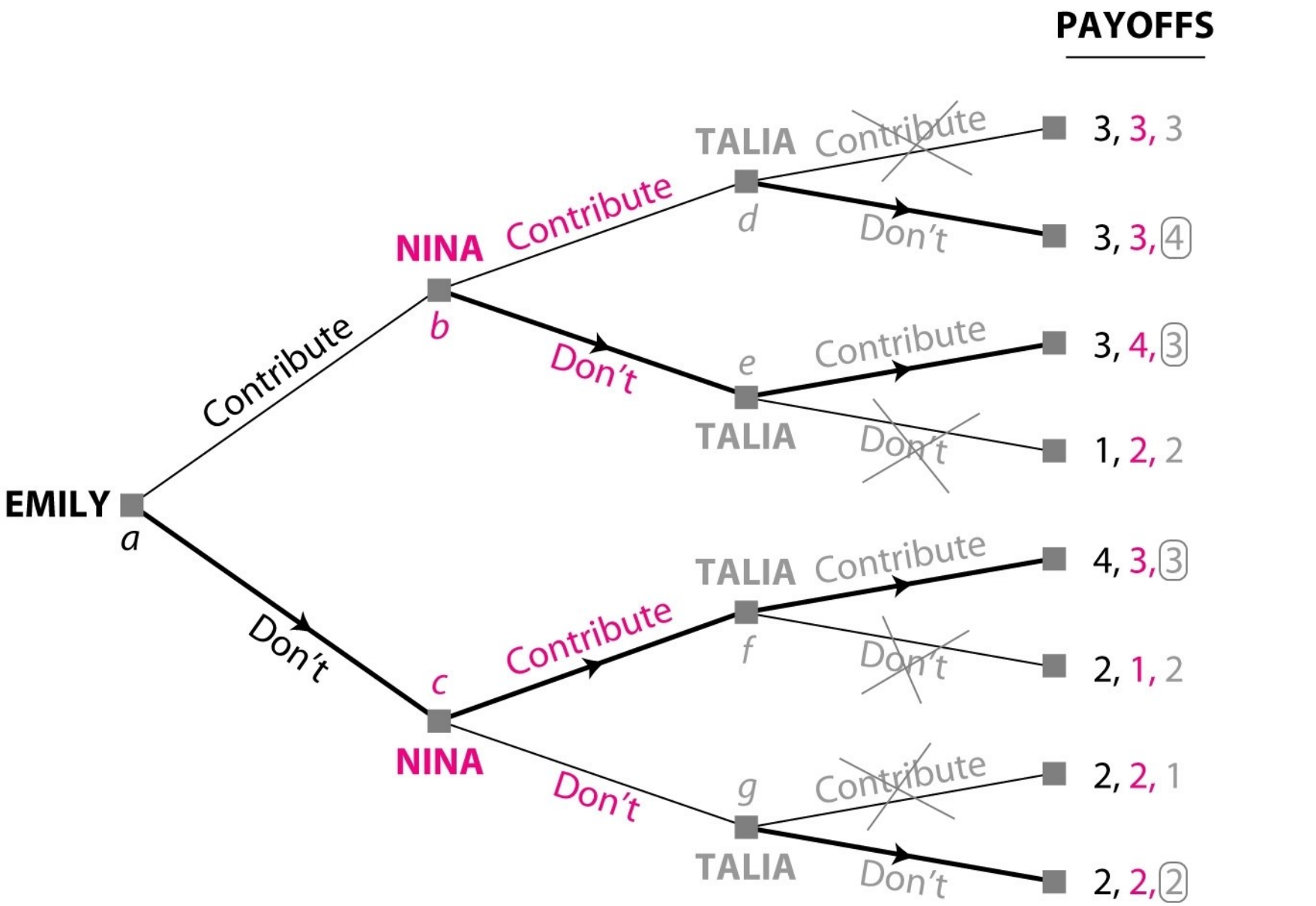


FIGURE 3.6 The Street Garden Game

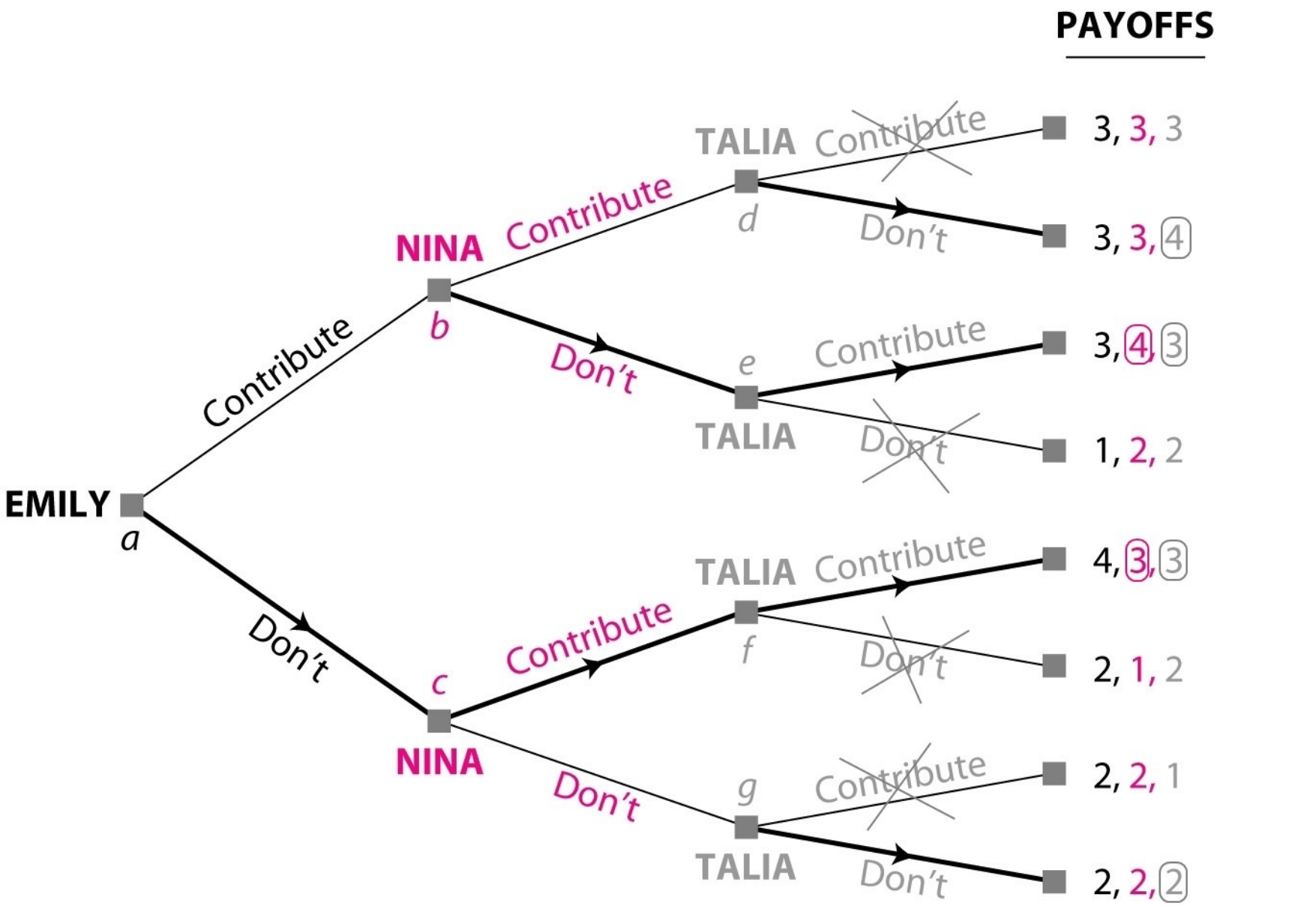


FIGURE 3.6 The Street Garden Game

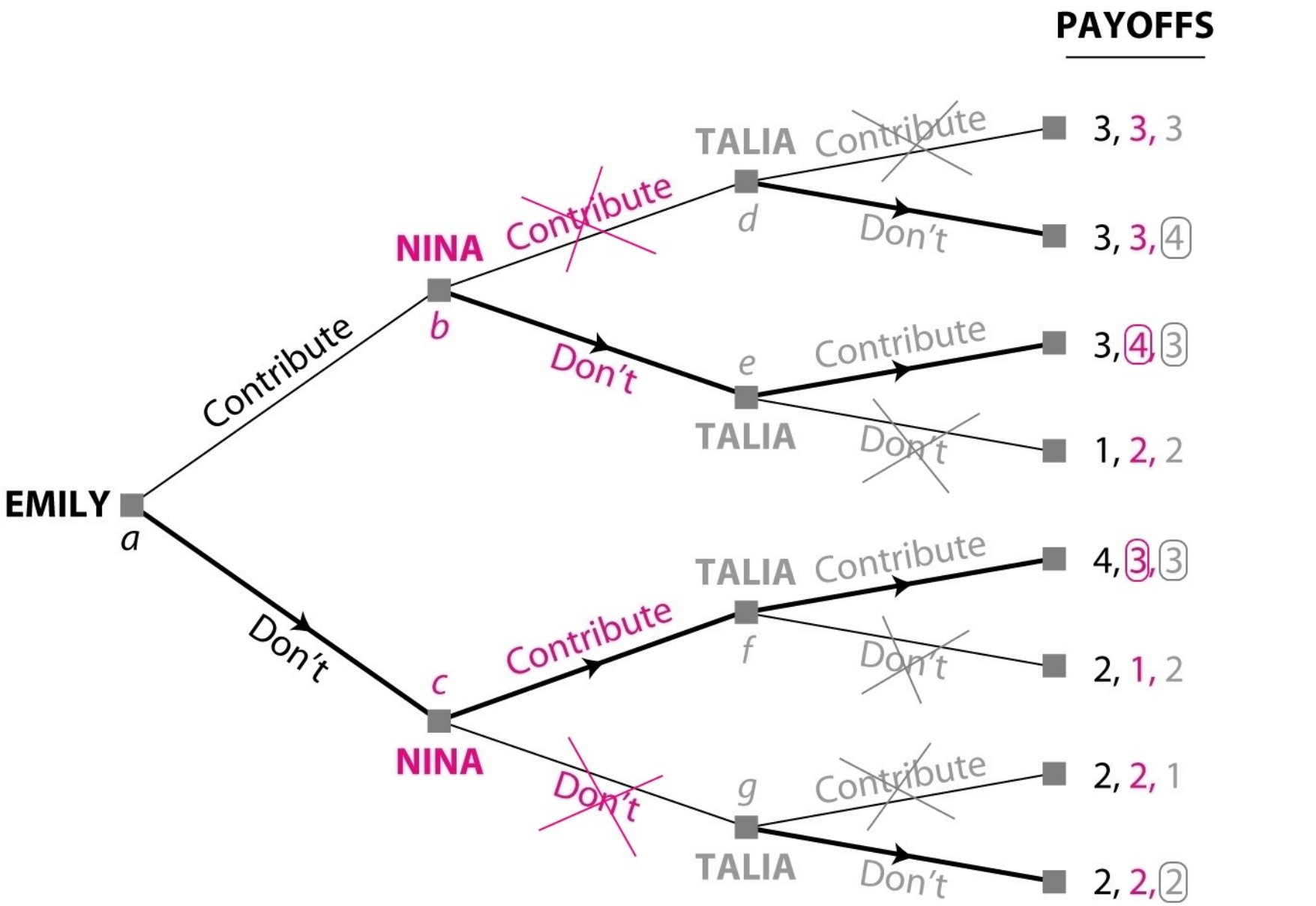


FIGURE 3.6 The Street Garden Game

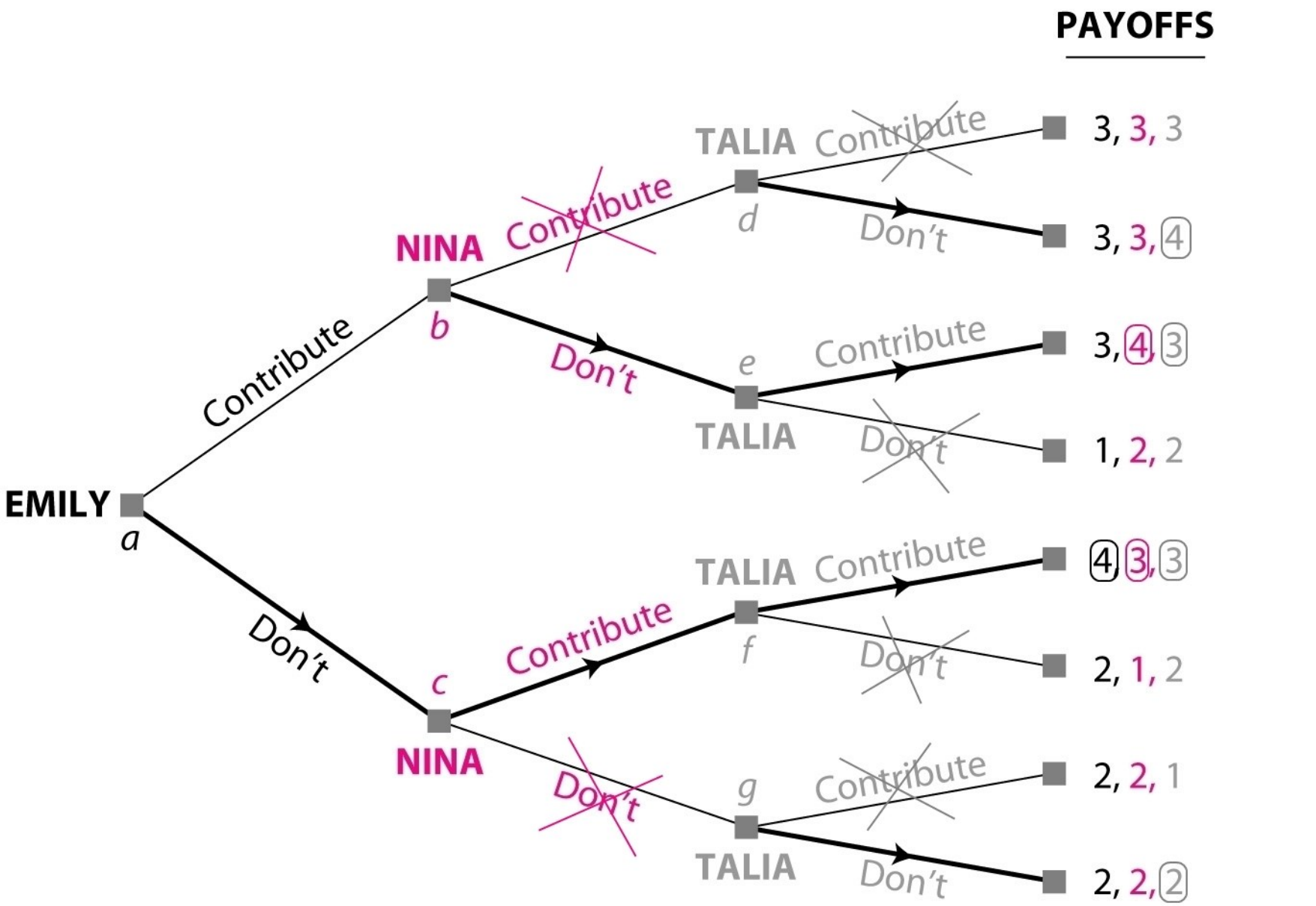


FIGURE 3.6 The Street Garden Game

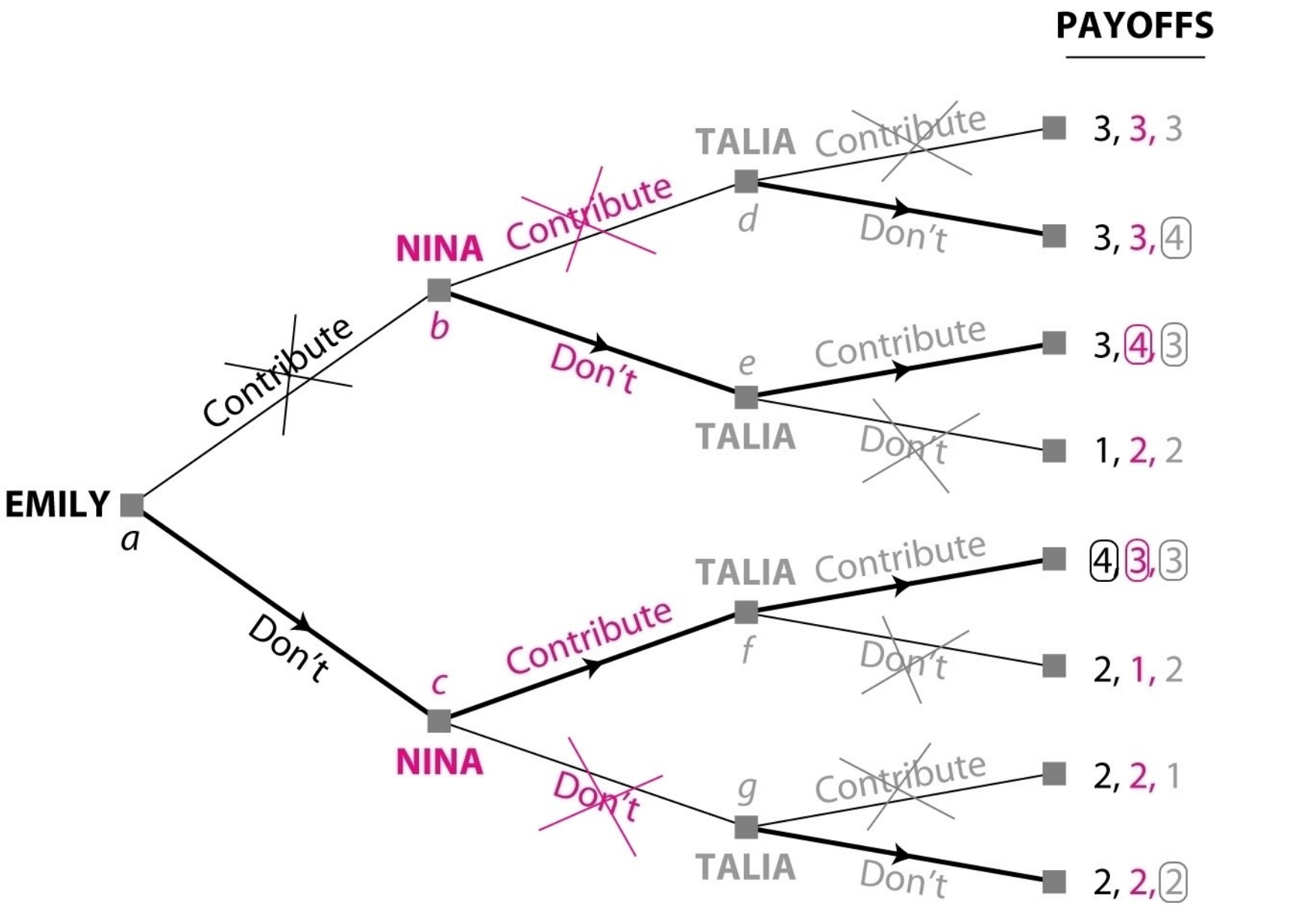


FIGURE 3.6 The Street Garden Game

Discussion

In games of sequential moves, the difference between *moves* and *strategies* is clear.

For more than two players, the strategies of the players towards the end may become quite complex.

This game is characterized by a first mover advantage.

References

Dixit, A.K. & B.J. Nalebuff (2008): *The Art of Strategy – A Game Theorist's Guide to Success in Business and Life*, Norton.

Dixit, A. & S. Skeath (2004): *Games of Strategy*, 2nd edition, W.W. Norton and Company.