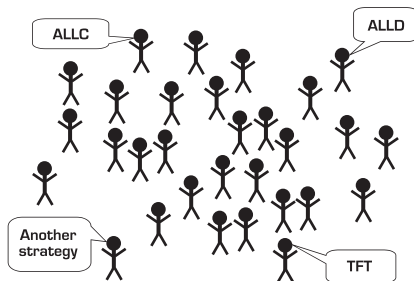


EVO-2x2 is a computer simulation modelling framework designed to formally investigate the evolution of strategies in 2-player 2-strategy (2x2) symmetric games under various competing assumptions. EVO-2x2 enables the user to explore the implications of alternative assumptions (all of which are fully consistent with the essence of the theory of evolution) in a coherent and systematic way. It thus provides a single framework within which results obtained using different assumptions can be contrasted and compared with analytical approaches.

POPULATION PARAMETERS



num-players is the number of players in the population. Each player has a strategy, defined by:

PC: Probability to cooperate in the first round.

PC/C: Probability to cooperate in round n ($n > 1$) given that the opponent has cooperated in round $n - 1$.

PC/D: Probability to cooperate in round n ($n > 1$) given that the opponent has defected in round $n - 1$.

infinite-strategies? defines the strategy space (possible values for **PC**, **PC/C**, **PC/D**).



infinite-strategies? = on

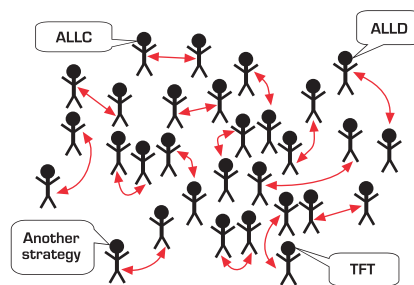


infinite-strategies? = off (num-strategies)

set-initial-players is used to set the initial population of strategies.

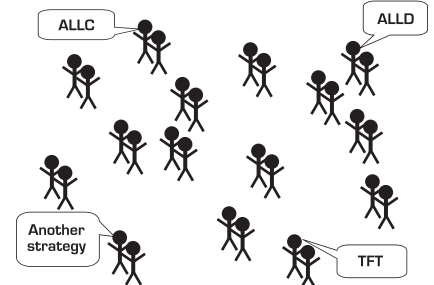
(initial-PC, initial-PC/C, initial-PC/D)

PAIRING SETTINGS



pairing-settings determines the algorithm used to form pairs of players. Each pair of players play one match, which consists of a series of rounds:

- **random pairings**: Pairs are made at random.
- **round robin**: Every player is paired with every other player once.
- **children together**: Players are paired preferably with their siblings (and at random among siblings).



THE GAME: ROUNDS AND PAYOFFS

rounds-per-match: Number of rounds in a match. Each round is a one-stage game in which each player plays according to its strategy (defined by the values of **PC**, **PC/C**, **PC/D**).

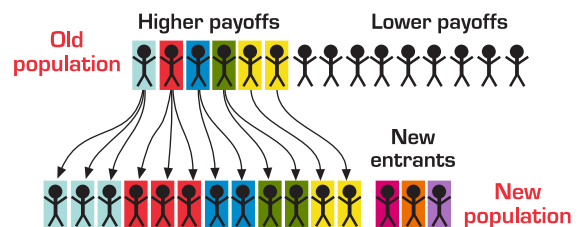


		Opponent	
		Cooperate	Defect
Player	Cooperate	CC-payoff	CD-payoff
	Defect	DC-payoff	DD-payoff

EVOLUTIONARY FORCES: THE FOLLOWING POPULATION

selection-mechanism determines the algorithm used to create the new generation.

- **roulette wheel**: **num-players** replications are conducted; in each replication, the probability of being selected for each player is proportional to its payoff.
- **Moran process**: In each generation, one player is chosen for replication with a probability proportional to its payoff. The offspring replaces a randomly chosen player.
- **winners take all**: The player(s) with the highest total payoff (i.e. the "winners") are identified. Then, for **num-players** times a random winner is chosen to be replicated.
- **tournament**: For **num-players** times, two players are selected at random and the one with the higher payoff is replicated. Ties are resolved at random.



mutation-rate: Probability that the strategy of any newly created player is determined at random.