

1. Which statement best describes the Moran process?

- ☐ The Moran process models how a population evolves by replacing multiple individuals at each step based on a fitness-weighted lottery.
- ☐ The Moran process models evolutionary dynamics in a finite population where individuals are chosen for reproduction proportional to their fitness, and the offspring replace a randomly selected individual.
- ☐ The Moran process describes the evolution of a population where all individuals reproduce simultaneously, and their offspring compete for a limited number of vacant spots.
- ☐ The Moran process assumes that individuals reproduce at rates inversely proportional to their fitness, leading to the eventual extinction of the fittest strategy.

2. What is the probability of selection of each type in the Moran Process with a population vector  $v = (3, 2, 4)$  for the following payoff matrix:

$$\begin{pmatrix} 1 & 15 & 1 \\ 4 & 10 & 2 \\ 2 & 9 & 8 \end{pmatrix}$$

- ☐ First type:  $1/5$ , second type:  $2/5$ , third type:  $4/5$ .
- ☐ First type:  $1/3$ , second type:  $1/3$ , third type:  $1/3$ .
- ☐ First type:  $3/10$ , second type:  $1/6$ , third type:  $8/15$ .
- ☐ First type:  $2/5$ , second type:  $1/6$ , third type:  $13/30$ .

3. What is the probability of fixation  $x_1$  for the following game:

$$\begin{pmatrix} 1 & 9 \\ 4 & 8 \end{pmatrix}$$

- ☐  $12/43$
- ☐  $1/5$
- ☐  $1/4$
- ☐  $22/7$