

## Assignment 5\_Q1

Consider a game between A and B players in a finite population of size **N=1000**.

Evolve the system according to the Moran process.

At any given time, pick a two players at random and make them compete with one another.

Calculate the payoff to each.

Update the population every generation by picking an individual for reproduction with a probability proportional to its fitness and an individual for death randomly.

Evolve the population till one of the strategies gets fixed.

**USE:  $a=3, b=0, c=5, d=1$ ; and # rounds  $m=4$**

1. If strategy A corresponds to **Cooperation** and B corresponds to **Defection**, obtain a plot of the time evolution of frequencies of **Cooperators** and **Defectors** in a repeated PD game starting from an initial state where the no of cooperators and defectors are 500 each.

2. If A=**TFT** and B=**ALLD**, obtain a plot of the time evolution of the frequencies of **TFT** and **ALLD** starting from an *initial* state in which (i) #TFT= 250 & #ALLD=750 (ii) #TFT=150 & #ALLD=850

Calculate the unstable equilibrium frequency of TFT and verify if the simulation results obtained in (ii) are consistent with the theoretical predictions.

***Submission Deadline: March 28, 2018***