

Name: _____

Evaluation 2

Introductory Programming Fall 2005

The Lotka-Volterra model describes the interactions between two species in an ecosystem, a predator and its prey. A common example is rabbits and foxes. In the discrete version of the model, time is measured in discrete units, like years, so the notation R_n represents the number of rabbits during year n , and F_n represents the number of foxes. The model predicts the number of rabbits and foxes next year as a function of this year's population, using these formulas:

$$\begin{aligned}R_{n+1} &= R_n + aR_n - bR_nF_n \\F_{n+1} &= F_n + ebR_n - cF_n\end{aligned}$$

where

- a is the natural growth rate of rabbits in the absence of predation,
- c is the natural death rate of foxes in the absence of prey,
- b is the death rate per encounter of rabbits due to predation,
- e is the efficiency of turning predated rabbits into foxes.

1. Write a MATLAB script that updates the values of **R** and **F** using the formulas above. Your script should assume that the variables **R** and **F** already exist and have values, as well as the parameters **a**, **b**, **c** and **e**. Your script should change the values of **R** and **F**, but it should not print anything.

2. What is the difference between a statement and an expression?