1. Consider the LPA model described on page 84. What are the dimensions of the various parameters (b, c_{ea}, c_{el}, c_{pa}, d_a, d_l) appearing in this model?

2. Write a model describing a situation analogous to that of the LPA model (with cannibalism), but such that the time for a pupa to become an adult is twice as long as the time it takes for a larva to pupate.

3. Write a model describing a population with two subgroups: juvenile and adults, assuming that adults eat some of their own eggs, and that it takes as long for a chick to be born as it takes for a chick to mature into an adult. You can use an exponential term similar to that appearing in the LPA model to describe cannibalism.

4. Consider the following model.

$$J(t+\Delta t) = bA(t)\exp(-cA(t))$$
$$A(t+\Delta t) = (1-d_J)J(t) + (1-d_A)A(t),$$

where b, d_J and d_A are positive parameters.

   a. Describe in words a situation modeled by the above equations.
   b. Under what condition is there a non-trivial fixed point for this model? What is the biological significance of this condition?
   c. Discuss the stability of the fixed points of this model.