Summary of Chapter 2

1) Age structured models
   Leslie matrix, Euler-Lotka formula

2) Stage-class models
   More general projection matrix

3) Key tools:
   - Matrix-vector multiplication \( \hat{N}(t) = A^t \hat{N}(0) \)
   - Eigenvalues \( \lambda \): \( A \hat{w} = \lambda \hat{w} \)
   - Eigenvector \( \hat{w} \)
   - Solution in terms of eigs:
     \[
     \hat{N}(t) = \sum_{i=1}^{n} c_i \lambda_i^t \hat{w}_i.
     \]
     \[
     \hat{N}(0) = \sum_{i} c_i \hat{w}_i \quad \text{change of basis}
     \]
     \[
     = W^C
     \]
     \[
     \Rightarrow \hat{c} = W^{-1} \hat{N}(0)
     \]
     \[
     \hat{N}(t) \sim c_i \lambda_i^t \hat{w}_i
     \]
   - Sensitivity
     \[ VTW = \lambda V^T \]
     \[ \frac{\partial \lambda}{\partial a_{ij}} = \frac{v_i w_j}{V^T w} \]

Power Pos. Matrices guaranteed to do this
\[ \text{capable of more exotic dynamics} \]