Example 4. J, cont. Moran stochastic process

Question: if the process starts at time \( n = 0 \) in state \( j \) with certainty
\( X_0 = j \) with certainty: \( j \) type A's
\( N - j \) type B's
what is the fixation probability:
the probability \( F_j \) that fixation \( X_n = N \) occurs eventually (for any \( n > 0 \) )?

If \( j = 0 \) then \( F_0 = 0 \)
If \( j = N \) then \( F_N = 1 \)
It can be shown that for \( 0 \leq j \leq N \)
\[
F_j = \frac{j}{N}
\]
e.g. \( N = 3 \), \( j = 1 \): 1 type A, 2 type Bs
at time \( n = 0 \)

\[ \boxed{A \quad B \quad B} \]
Fixation probability \( F_1 = \frac{1}{3} \)

Eventually

Notice there is no selection in this model.
The Moran process illustrates genetic drift: population evolves purely from random effects, without selection.

We could add selection to the Moran model: a random variable \( W \) that takes two values \( w_A, w_B \).
- "Information on the Final Examination" to be posted on Canvas, after editing (review of topics to be covered on exam)
- Dec 2015 exam, already posted on Canvas (discussion of questions)
  solutions will be posted on Canvas
- Office hrs TBA Dec 12, 13
  see course website (not Canvas)