

# HW 1 Nicholas D. Marzio

- 1)
- 1 year old females =  $p_1$
  - 2 year old females =  $p_2$
  - 3 year old females =  $p_3$

Assumptions:

$C_0$  females are born at  $n=0$

$C_1$  females are born at  $n=1$

$C_2$  females are born at  $n=2$

let  $R(n)$  = number of females born at time  $n$

$$\text{so, } R(0) = C_0$$

$$R(1) = C_1$$

$$R(2) = C_2$$

$$\text{so, } R(n) = (p_1 \cdot R_{n-1}) + (p_2 \cdot R_{n-2}) + (p_3 \cdot R_{n-3})$$

$$R(4) = (p_1 \cdot R(3)) + (p_2 \cdot R(2)) + (p_3 \cdot R(1))$$

$$R(3) = (p_1 \cdot R(2)) + (p_2 \cdot R(1)) + (p_3 \cdot R(0))$$

$$R(3) = p_1 C_2 + p_2 C_1 + p_3 C_0$$

$$R(4) = 2p_1 C_2 + p_1 p_2 C_1 + p_1 p_3 C_0 + p_2 C_2 + p_3 C_1$$