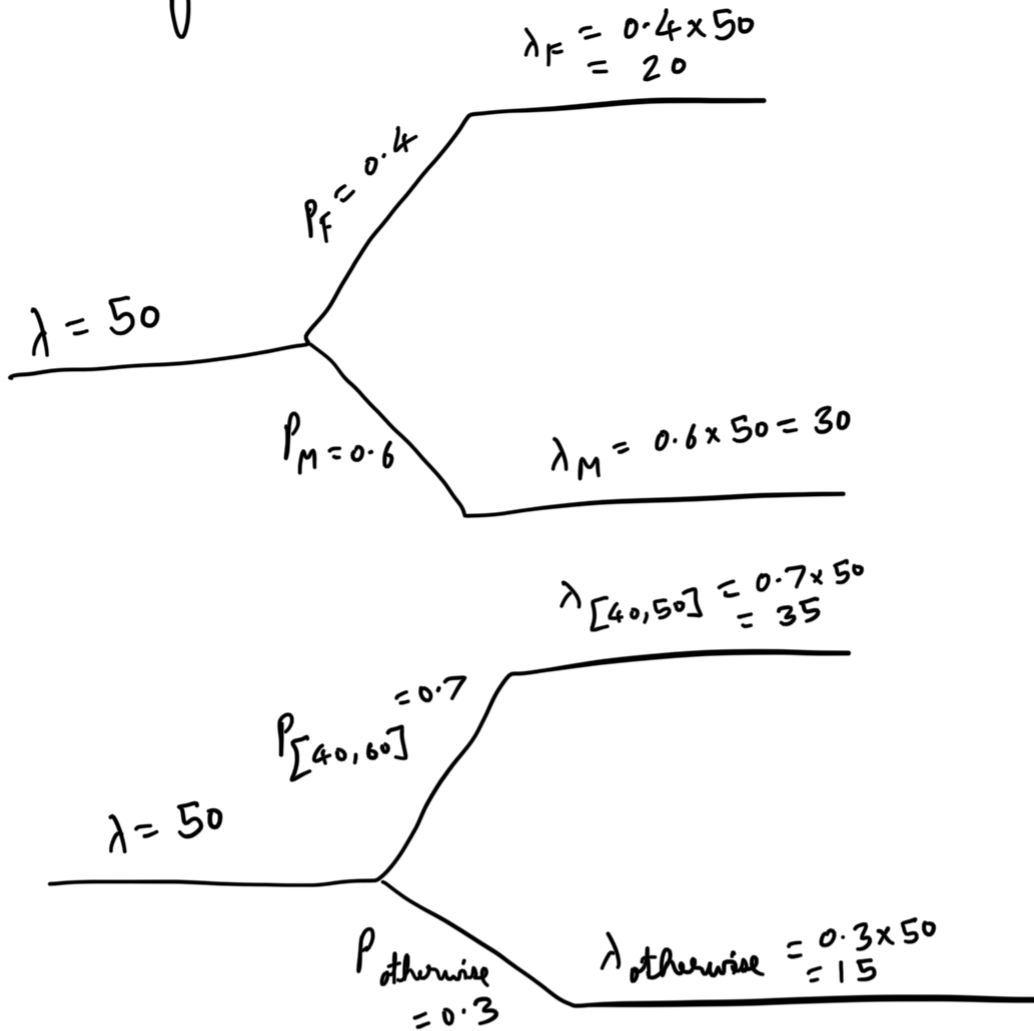


Simulation 3

40% female & 70% between [40, 60] years



To get the combined probability ,

$$\begin{aligned}
 P_{F \in [40,60]} &= P_F \times P_{[40,60]} \\
 &= 0.4 \times 0.7 \\
 &= 0.28 \\
 &= 0.28 \times 50
 \end{aligned}$$

$$\lambda = \lambda_{\text{combined}} = 0.28 \times 10^5 = 2.8 \times 5 = 14 \cdot 0 \quad \& \quad \lambda t = \frac{14 \times 5}{1} = 70$$

$$P(0 \leq N \leq 80) = \sum_{m=0}^{80} \frac{(70)^m e^{-70}}{m!}$$

$$= 0.8934$$

$$P(N > 80) = 1 - 0.8934$$

$$= 0.1066$$

In the simulation, I use the total number of females $= 14 \times 5 = 70$ as the mean in a poisson distribution and obtain samples from it and check if they are greater than 80. I run the simulation 10 000 times and got the probability of 0.1085 which is close to 0.1066.