Q: The probability that a person is not a swimmer is 0.3. The probability that out of 5 persons 4 are swimmers is

Solution:

Parameter	Values	Description
n	5	Number of draws
p	0.3	Probability that person is not a swimmer
q	0.7	Probability that person is a swimmer
μ	3.5	Mean
σ	1.024	Variance
X	0	Swimmer
	1	Not a swimmer
Y	$\sum_{i=1}^{n} X_i$	Bernoulli Random Variable

Here, probability that out of 5 persons 4 are swimmers using gaussian approximation is

$$\Pr(Y = 4) = \Pr(3.5 < Y < 4.5) \tag{1}$$

$$= \int_{0}^{0.976} \frac{1}{\sqrt{2\pi}} \times e^{-\frac{x^2}{2}} dx \tag{2}$$

$$\tag{3}$$

$$= 0.335 \tag{4}$$

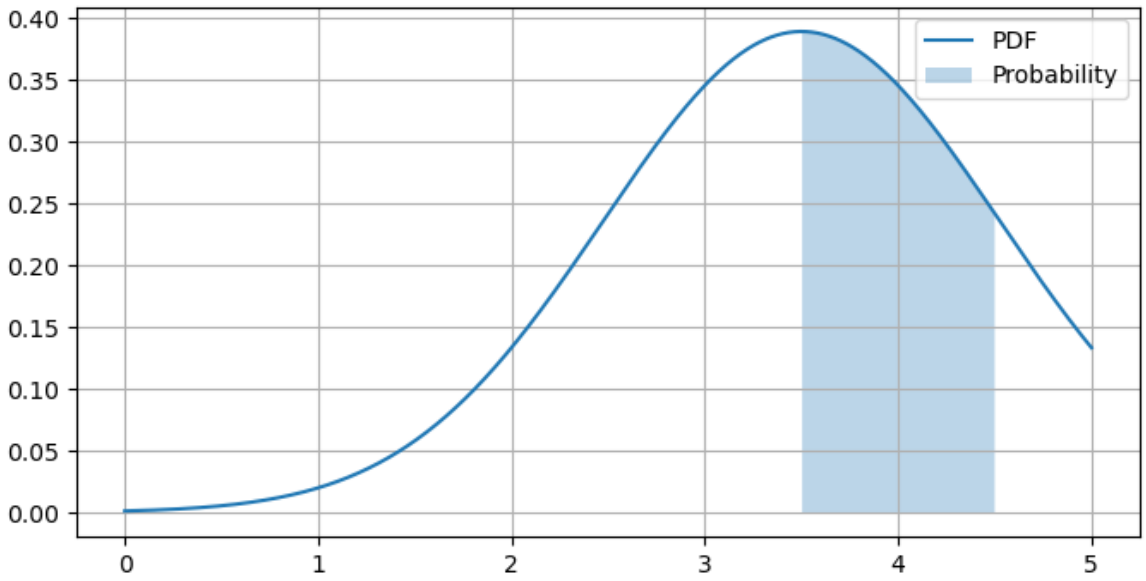

Fig. 0. PDF for 4 out of 5 Persons Being Swimmers (Gaussian Approximation)

Probability that out of 5 persons 4 are swimmers using bernoulli distribution is

$$\Pr(Y = 4) = p_Y(4) \tag{5}$$

$$= {}^{n}C_k p^k (1-p)^{n-k} \tag{6}$$

$$= 0.360 \tag{7}$$

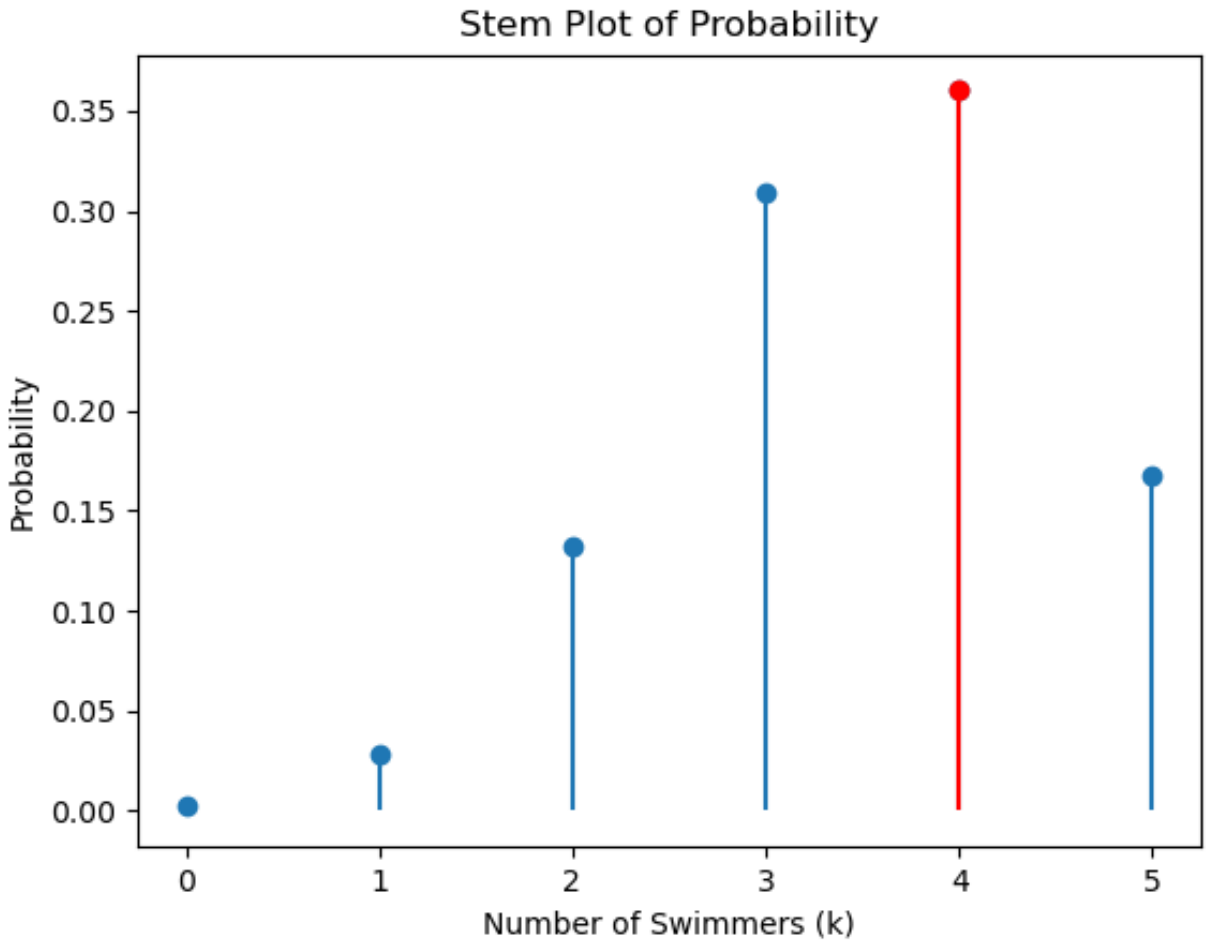

Fig. 0. PDF for 4 out of 5 Persons Being Swimmers