AI1103-Assignment 1

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Download all python codes from

https://github.com/siri003/AI1103−PROBABILITY−AND−RANDOM−VARIABLES/blob/main/Assigment_1.py

and latex codes from

https://github.com/siri003/AI1103−PROBABILITY−AND−RANDOM−VARIABLES/blob/main/main.tex

Problem Statement: The probability that a student is not a swimmer is $\frac{1}{5}$. Then the probability that out of five students, four are swimmers is

Solution: Let X be the number of students who can swim.
n=5(total number of students)
p= $\frac{4}{5}$(probability that a student can swim)
q=$\frac{1}{5}$(probability that a student cannot swim)

From Bernoulli's distribution we know that,

$$P(X = r) = {}^{n}C_{r}(p)^{r}(q)^{n-r} \tag{0.0.1}$$

$$\begin{aligned} P(X = 4) &= {}^{5}C_{4}(p)^{4}(q)^{1} \\ &= {}^{5}C_{4}\left(\frac{4}{5}\right)^{4}\left(\frac{1}{5}\right)^{1} \\ &= {}^{5}C_{1}\left(\frac{4}{5}\right)^{4}\left(\frac{1}{5}\right) \end{aligned} \tag{0.0.2}$$

Therefore, the desired probability is ${}^{5}C_{1}\left(\frac{4}{5}\right)^{4}\left(\frac{1}{5}\right)$= 0.4096.