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,

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

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

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