AI 1103 Assignment-1

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Download all python codes from here

```
https://github.com/Shantanu467/
AI1103/blob/main/Assignemt_1/codes/
Assignemt1.py
```

and latex-tikz codes from

```
https://github.com/Shantanu467/
AI1103/blob/main/Assignemt_1/codes/
Assignmet-1.tex
```

QUESTION-4.7

A bag consists of 10 balls each marked with one of the digits 0 to 9. If four balls are drawn successively with replacement from the bag, what is the probability that none is marked with the digit 0?

SOLUTION

Let X be number marked on ball drawn. Since the balls are drawn with replacement, the trials are Bernoulli trials.
So X has Binomial Distribution

$$P(X = x) = \binom{n}{x} q^{n-x} p^x \qquad (1)$$

Here,

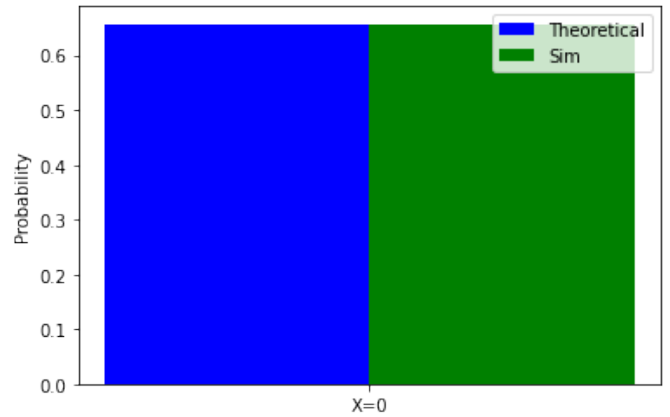| Variables	n	p	q	x
Values	4	1/10	9/10	0

Now,

$$P(X = 0) = \binom{4}{0} \left(\frac{9}{10}\right)^{(4-0)} \left(\frac{1}{10}\right)^0 \qquad (2)$$

$$= \frac{4!}{(4-0)!0!} \times 1 \times \left(\frac{9}{10}\right)^4 \qquad (3)$$

$$= \left(\frac{9}{10}\right)^4 \qquad (4)$$

$$= 0.6561 \qquad (5)$$

Therefore, The probability that none of ball is marked with 0 is **0.6561**

The above graph shows the close relation between Theoretical and simulated results.