

Assignment 2

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Download all python codes from

<https://github.com/AmulyaTallamraju/Assignment-2/blob/main/Assignment2/codes/Assignment-2.py>

and latex-tikz codes from

<https://github.com/AmulyaTallamraju/Assignment-2/blob/main/Assignment2/Assignment-2.tex>

GATE- PROBLEM NO.3

The probability that a k-digit number does NOT contain the digits 0, 5 or 9 is

- A) $(0.3)^k$
- B) $(0.6)^k$
- C) $(0.7)^k$
- D) $(0.9)^k$

SOLUTION

Let

$$X_i \in \{0, 1, 2, \dots, 9\} \quad (0.0.1)$$

represent the digit at the i^{th} place.

$$\Pr(X_i \notin \{0, 5, 9\}) = \frac{7}{10} = 0.7 \quad (0.0.2)$$

If the k-digit number does not contain 0,5 or 9,

$$\Pr(X_1 \notin \{0, 5, 9\}, X_2 \notin \{0, 5, 9\}, \dots, X_k \notin \{0, 5, 9\}) \quad (0.0.3)$$

Since the events are independent,

$$\begin{aligned} &\Pr(X_1 \notin \{0, 5, 9\}, X_2 \notin \{0, 5, 9\}, \dots, X_k \notin \{0, 5, 9\}) \\ &= \Pr(X_1 \notin \{0, 5, 9\}) \dots \Pr(X_k \notin \{0, 5, 9\}) \quad (0.0.4) \end{aligned}$$

$$= \prod_{i=1}^k 0.7 \quad (0.0.5)$$

$$= (0.7)^k \quad (0.0.6)$$

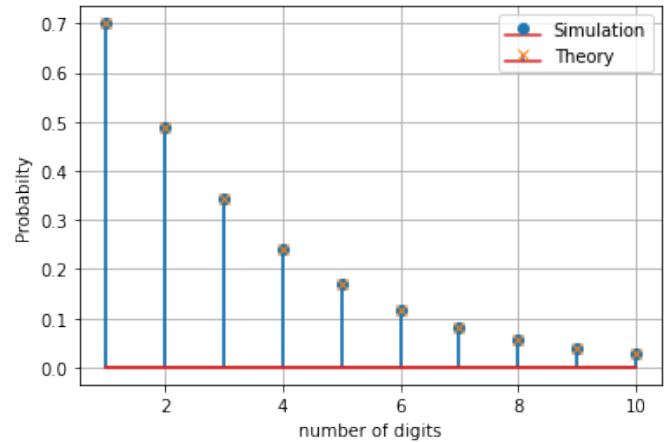


Fig. 4: Plot