

# Assignment 1

AI1110: Probability and Random Variables  
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**12.13.6.13: Question.** 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?

**Answer:**  $\left(\frac{9}{10}\right)^4$ .

**Solution:**

X : number of balls marked with the digit 0 among the 4 balls drawn.

A : drawing a ball marked with the digit 0.

B : drawing a ball not marked with 0.

According to the question:

$$P(A) = \frac{1}{10}$$

Then,

$$P(B) = 1 - \frac{1}{10}$$

$$P(B) = \frac{9}{10}$$

Here, we need that none of the balls are marked 0, i.e.  $X = 0$

$$P(X = 0) = \frac{9}{10} \times \frac{9}{10} \times \frac{9}{10} \times \frac{9}{10}$$

$$P(X = 0) = \left(\frac{9}{10}\right)^4$$