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Assignment 4

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Download all python codes from

https://github.com/SavaranaDatta/AI1103/blob/main/Assignment4/codes/Assignment4.py

and latex-tikz codes from

https://github.com/SavaranaDatta/AI1103/blob/main/Assignment4/Assignment4.tex

1 Problem(CS 2010 Q.26)

Consider a company that assembles computers. The probability of a faulty assembly of any computer is p. The company therefore subjects each computer to testing process. This testing process gives the correct result for any computer with a probability of q. What is the probability of a computer being declared faulty?

- (A) pq+(1-p)(1-q)
- (B) (1-q)p
- (C) (1-p)q
- (D) pq

2 solution(CS 2010 Q.26)

Let $X_i \in \{0, 1\}$ where $X_1 = 1$ represents the computer is faulty before testing, $X_2 = 1$ represents the testing process gives the correct result.

TABLE 4

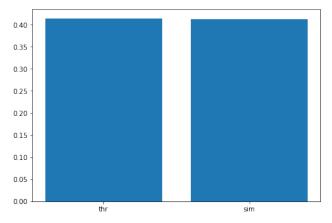
| | $X_1 = 0$ | $X_1 = 1$ |
|-----------|------------|-----------|
| $X_2 = 0$ | (1-p)(1-q) | (1-q)p |
| $X_2 = 1$ | (1-p)q | pq |

Table 4 represents the probabilities of all possible cases. The probability of a computer being declared as faulty is

=
$$Pr((X_2 = 1)(X_1 = 1)) + Pr((X_2 = 0)(X_1 = 0))$$
(2.0.1)

$$= pq + (1-p)(1-q) \tag{2.0.2}$$

The required option is (A).



The above plot is drawn for p = 0.2724825, q = 0.68752064