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Assignment No. 2

Registration Number - 23652008

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Course Code - OBC103

Course Title - Mathematical Foundation of Computer Science

PART - A

Q1. What is prop probability theory primarily concerned with ?

Ans b. Uncertain outcomes

Q2. In probability theory, what does the term "random experiment" refer to ?

Ans b. An experiment with unpredictable outcomes

Q3. What is the set of all possible outcomes of a random experiment called ?

Ans c. Sample space

Q4. If two events cannot occur simultaneously, what is the term used to describe them ?

Ans a. Mutually exclusive

Q5. If event A and event B can both occur simultaneously, what is their relationship ?

Ans d. Dependent

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Q6. Which method involves making a matrix upper triangular to find its determinant?

Ans a. Elimination method

Q7. What is the sum of probabilities for all possible outcomes in a sample space?

Ans b. 1

Q8. If P(A) is the probability of event A and P(B) is the probability of event B, what is P(A|B)?

Ans c. P(A and B) / P(B)

Q9. If J is a 2x3 matrix and K is a 3x2 matrix, what is the order of the product JK?

Ans c. 2x2

Q10. What is the formula for Bayes' Theorem?

Ans a. $P(A|B) = P(B|A) * P(A) / P(B)$

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Q1. If the probability of event A is 0.3, what is the probability of the complement of A?

Ans 1 The probability of the complement of event A ((A^c)) is found by subtracting the probability of A from 1. Therefore, if the probability of event A is 0.3, the probability of the complement of A is:

$$P(A^c) = 1 - P(A)$$
$$P(A^c) = 1 - 0.3$$
$$P(A^c) = 0.7$$

So the probability of complement of A is 0.7

~~Q2.~~

Q4. Consider the matrix:

$$B = \begin{bmatrix} 2 & 4 & 6 \\ 1 & 3 & 5 \\ 7 & 8 & 9 \end{bmatrix}$$

Calculate the minor and cofactor of the element in the first row and second column.

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Ans 4

First row and second column of above matrix is

$B12 = 4$

Minor of element is :

$$B12 = \begin{bmatrix} 1 & 5 \\ 7 & 9 \end{bmatrix} = 1 \times 9 - 5 \times 7 = 9 - 35 = -26$$

Cofactor of element is :

$$B12 = (-1)^{1+2} \times (-26) = (-1) \times (-26) = 26$$

Q.5. Let $H = \begin{bmatrix} 2 & 4 \\ 1 & 3 \end{bmatrix}$. Find $2H$.

Ans 5

$$H = \begin{bmatrix} 2 & 4 \\ 1 & 3 \end{bmatrix}$$

$$2H = 2\begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$$

$$2H = \begin{bmatrix} 2 \times 2 & 2 \times 1 \\ 2 \times 3 & 2 \times 4 \end{bmatrix}$$

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$$2H = \begin{bmatrix} 4 & 2 \\ 6 & 8 \end{bmatrix}$$

Q7. Apply the Rules of Sarrus to find the determinant of the 3x3 matrix.

$$C = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

Ans7

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix} \begin{matrix} 1 & 2 \\ 4 & 5 \\ 7 & 8 \end{matrix}$$

$= 1\times5\times9 + 2\times6\times7 + 3\times4\times8 - 7\times5\times3 - 8\times6\times1 - 9\times4\times2$

$= 45 + 84 + 96 - 105 - 48 - 72$

$= 0$

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Q8. If K is a 2x3 matrix and L is a 3x2 matrix, what is the order of KL?

Ans 8 The product of two matrices, say K (mxn) and L(nxp), has an order determined by the dimensions of the matrices involved. In this case:

Matrix K is a 2x3 matrix (mxn).
Matrix L is a 3x2 matrix (nxp).

The number of columns in the first matrix (K) must be equal to the number of rows in the second matrix (L) for the product to be defined.

In this scenario, the number of columns in K(3) is equal to the number of rows in L(3). Therefore, the product KL is defined, and its resulting matrix will have dimensions 2x2.

So, the order of KL is 2x2.