**Data Analysis and Matrix Operations**

1. Create a matrix with 2 rows and 3 columns and fill it with random numeric data

A =

1. Identify the data type of the matrix and calculate the mean, mode and median of the data

Data type is numerical data

Mean = 4 + 2+1+2+3+5 = 2.83

6

Mode = 2

Median= 2.5

1. Perform basic matrix operations (addition, subtraction, transpose and scalar multiplication) on the matrix.

A = B=A+B=

A-B= A2 =

AT=

1. Research and find a real-world application of matrices in data analysis and explain how it is used.

Matrices are invaluable in data analysis because they provide an efficient way to represent and analyze graphs. A graph consists of nodes (points, such as cities, devices, or individuals) connected by edges (lines, which represent relationships or interactions). Common examples of graphs include network diagrams (e.g., internet connections), family trees, and logistics systems (e.g., routes between warehouses).

Every graph can be translated into a matrix representation, often called an adjacency matrix. The rows and columns of the matrix represent the graph's nodes,the value at the intersection of a row and column shows the strength or type of connection between the corresponding nodes. For example:

* A value of 1 might indicate a connection (e.g., a direct road between two cities).
* A value of 0 could mean no connection exists.
* Larger values can represent stronger or weighted connections (e.g., a high-speed internet link or a shorter distance).

Matrices make it easier to perform calculations and transformations on graphs, especially when they have many nodes and edges. For example, finding the shortest path between nodes, detecting cycles, or identifying clusters in a network is more efficient when the graph is in matrix form.

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