Minor Introduction: class2

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Matrix sum

To find the sum of 2 matrices A and B. Both the matrices should be of the same dimensions.
Mathematically ,
C[i][j] =A[i][j] + B[i][j]

Pseudo code

```
FUNCTION matrix_sum(A,B):
  Get the number of rows and columns of A
  Create an empty matrix C with same dimensions
  FOR each row i:
    FOR each column j:
      Set C[i][j] to the sum of A[i][j] and B[i][j]
  RETURN the matrix C
END FUNCTION
```

Matrix difference

To find the difference of 2 matrices A and B. Both the matrices should be of the same dimensions.
Mathematically ,
C[i][j] =A[i][j] - B[i][j]

Pseudo code

```
FUNCTION matrix_difference(A,B):
  Get the number of rows and columns of A
  Create an empty matrix C with same dimensions
  FOR each row i:
    FOR each column j:
      Set C[i][j] to the difference of A[i][j] and B[i][j]
  RETURN the matrix C
END FUNCTION
```

Matrix multiplication (Projection=> matrix multiplication)

```
FUNCTION matrix_product(A,B)
  Get the number of rows and columns in matrix A.
  Get the number of columns in matrix B  (no need for rows for matrix B as we have taken the value for the number of rows from matrix A)
  Create an empty matrix C with dimensions rows_A x cols_B
  FOR each row i in A:
    FOR each column in B:
      Initialise C[i][j] to 0
      FOR each element k in the common dimension
        Add the product of A[i][k] and B[k][j] to C[i][j]
  RETURN the matrix C
END FUNCTION
```

A[i x j]
B[j x k]

C[i][j] = $\sum_{i,j,k}$(A[i][j] . B[k][j])

Determinant(Laplace method)

```
FUNCTION determinant (A):
  IF the size of A is 2 x 2:
    RETURN the difference between the product of the diagonals
  END IF
  Initialise det to 0
  FOR each column C in the first row:
    Create a submatrix (basically a minor) by the first row and column c
    Add to det : product of (-1)^c, A[0][c] and determinant of the submatrix
  RETURN det
END FUNCTION
```

$$A = \begin{array}{ccc} 0 & 1 & 2 \\ \end{array}$$
$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

|A| = (-1)^0 x A[0][0] x submatrix ()
+ (-1)^1 x A[0][1] x submatrix ()
+ (-1)^2 x A[0][2] x submatrix ()

Rank

Number of independent rows and columns
Number of non zero rows of a matrix

Steps

- Convert to Row reduced echleon form
- Count the number of non zero rows available in the matrix

We did 3 problems regarding this
Questions => may be direct or indirect

My notes
proceed with
caution
Akhila Sunesh