

Design and Analysis of Algorithms(22AIE212)

Assignment - 2

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4TH SEM AIE

MATRIX MULTIPLICATION

Algorithm

```
plaintext
ALGORITHM: MatrixMultiplication(A, B):
// Multiplies two matrices A and B
// Input: Matrices A (size m x n) and B (size n x p)
// Output: Resulting matrix C (size m x p)

m = number of rows in matrix A
n = number of columns in matrix A (number of rows in matrix B)
p = number of columns in matrix B

// Initialize result matrix C with appropriate dimensions
C = new matrix with dimensions m x p

for i from 0 to m-1 do
    for j from 0 to p-1 do
        // Initialize the value at position (i, j) in C
        C[i][j] = 0
        for k from 0 to n-1 do
            // Update the value at position (i, j) in C
            C[i][j] += A[i][k] * B[k][j]
        end for
    end for
end for

return C
```

CODE

```
In [ ]: def matrix_multiplication(A, B):
        m = len(A)
        n = len(A[0])
        p = len(B[0])
        C = [[0] * p for _ in range(m)]
        for i in range(m):
            for j in range(p):
                C[i][j] = 0
                for k in range(n):
                    C[i][j] += A[i][k] * B[k][j]
        return C

# Example :
A = [[1, 2, 3],
      [4, 5, 6]]
B = [[7, 8],
      [9, 10],
      [11, 12]]

result = matrix_multiplication(A, B)
for row in result:
    print(row)
```

[58, 64]

[139, 154]