

Lab 1

1 3-D Array Multiplication

To obtain each element in matrix C , matrix A and B are divided into two dimensional matrices, A' and B' as can be seen in figure 1. For each two dimensional matrix, a single row and column is multiplied to get the corresponding element in the C matrix. This leads to a single value which is the element in the C matrix. This is done for all elements in the C matrix.

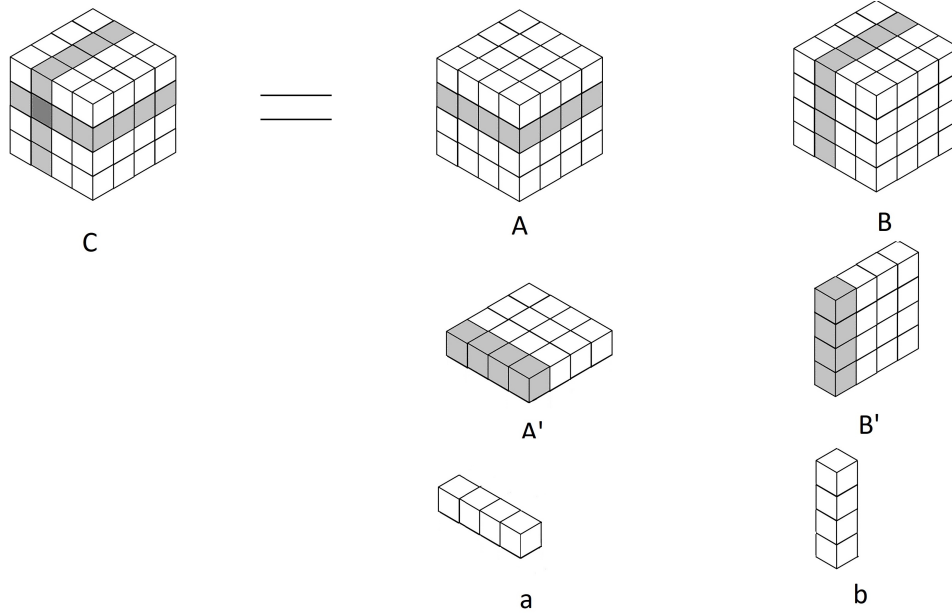


Figure 1: How each element in C was obtained from matrices A and B .

Two **for** loops were used to maintain the row and column of the current element in matrix C . Another **for** loop was used to traverse the depth of the matrix C . The row a and column b were then obtained from matrices A and B as seen in figure 1. Vector multiplication was then used on vectors a and b . The resulting value is the corresponding element of C .

This was repeated for all elements in matrix C . It was assumed matrix A and B are cubes.

2 Pseudocode

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input : Matrix A and B
output: Matrix C

for each row in matrix C do
  for each column in matrix C do
    for each depth in matrix C do
      Get corresponding row at depth from matrix A;
      Get corresponding column at depth from matrix B;
      Multiply the obtained row and column to get the value of matrix C at the current row,
      column and depth.
    end
  end
end

```

Algorithm 1: rank3TensorMult pseudocode