Addition of two matrices

ADDITION(Matrix1, Matrix2) (1)

Matrix3 ← [ ] (1)

FOR i ←1 IN length(Matrix1) (N)

Row ← [ ] (N)

FOR j ← 1 IN length(Matrix1[0]) (N\*N)

APPEND (Matrix1[i][j] add Matrix2[i][j]) to Row (N\*N)

APPEND row to Matrix3 (N)

RETURN Matrix3 (1)

Matrix3 ← ADDITION(Matrix1, Matrix2) (1)

(2N²+3N+4)

Subtraction of two matrices

SUBTRACTION (Matrix1, Matrix2) (1)

Matrix3 ← [ ] (1)

FOR i ←1 IN length(Matrix1): (N)

Row ← [ ] (N)

FOR j ← 1 IN length(Matrix1[0]): (N\*N)

APPEND(Matrix1[i][j] sub Matrix2[i][j]) to Row (N\*N)

APPEND row to Matrix3 (N)

RETURN Matrix3 (1)

Matrix3 ← SUBTRACTION(Matrix1, Matrix2) (1)

(2N²+3N+4)

Multiplication of two matrices

MULTIPLICATION (Matrix1, Matrix2) (1)

Matrix3 ← [ ] (1)

FOR i ←1 IN length(Matrix1): (N)

Row ← [ ] (N)

FOR j ← 1 IN length(Matrix1[0]): (N\*N)

APPEND(Matrix1[i][j] mult Matrix2[i][j]) to Row (N\*N)

APPEND row to Matrix3 (N)

RETURN Matrix3 (1)

Matrix3 ← MULTIPLICATION(Matrix1, Matrix2) (1)

(2N²+3N+4)

Run Time for A = B\*C-2\*(B+C)

Each function has similar run time as the only thing that changes is the operation that is being performed on the values.

To do this, we will first need to do B+C, using the addition function. Once we have done this, we will need to multiply the answer by two. We can just add B and C together again and then add the resulting matrices to give us 2\*(B+C). We then need to use the multiply function to times together matrices B and C. Finally to get our final matrix for the variable A, we would need to subtract the matrix for the calculation B\*C and the matrix from the calculation 2\*(B+C). To summarise, we are using the addition function twice, the multiplication function once and the subtraction function once.

(2N²+3N+4) + (2N²+3N+4) + (2N²+3N+4) + (2N²+3N+4) = 8N² + 12N + 16

To work out the upper limit of the run-time for this set of operations, we would first need to take away any constants, multipliers and lower-order terms from our result. Therefore 8N² + 12N + 16 would simply become N². In bigO notation, we would write this as O(N²)