

ME685 HW1

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$$C = AB$$

We will refer to A as the left matrix of size $(i \times k)$ and B as the right matrix of size $(k \times j)$.

Pseudo-Code for Matrix Multiplication:

Algorithm 1: Matrix Multiplication Algorithm

Matrices A and B are passed to the subroutine

```
for l = 1,i do                                ▷ Looping through rows of left matrix
|   for m = 1,j do                            ▷ Looping through columns of right matrix
|   |   C(l,m) = 0                            ▷ Pre-setting value of result matrix as 0
|   |   for n = 1,k do                        ▷ Looping through elements of the row and column
|   |   |   C(l,m) += A(l,n) * B(n,m)
|   |   end
|   end
end
```

For the matrix given:

$$A = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$$

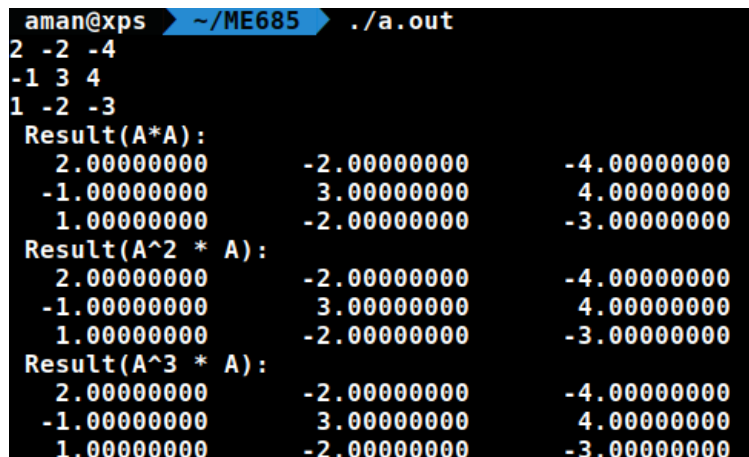
we find that $A^2 = A$.

$$\therefore A^3 = A^2 \times A = A \times A = A^2 = A$$

Similarly,

$$A = A^2 = A^3 = A^4 = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$$

A snapshot of the Result of $A \times A$:



```
aman@xps ~/ME685 ./a.out
2 -2 -4
-1 3 4
1 -2 -3
Result(A*A):
2.00000000 -2.00000000 -4.00000000
-1.00000000 3.00000000 4.00000000
1.00000000 -2.00000000 -3.00000000
Result(A^2 * A):
2.00000000 -2.00000000 -4.00000000
-1.00000000 3.00000000 4.00000000
1.00000000 -2.00000000 -3.00000000
Result(A^3 * A):
2.00000000 -2.00000000 -4.00000000
-1.00000000 3.00000000 4.00000000
1.00000000 -2.00000000 -3.00000000
```