ME685 HW1

Aman Parekh - 180073

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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 $(k \times j)$.

Psuedo-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
```