

# Homework 6

CIS 160 FS2015

Due: Tuesday November 24th at the *beginning of lecture*

Points available: 50pts

**For this assignment you will turn in:**

In class(10pts):

1. A statement of the problem (typed)
2. An explanation of your solution (typed)
3. A flowchart (hand-drawn or computer generated)
4. Pseudocode (typed)

Via BlackBoard(40pts):

1. C program named `<username>_matrix_mult.c`

## Assignment:

Follow the steps that we have outlined in class for algorithm development to generate a program that takes in two matrices (A and B) and multiplies them, then outputs the result. Remember matrix multiplication is **NOT** just  $C[0][0] = A[0][0] * B[0][0]$ . To multiply two matrices (A and B) together first, the number of columns in A must equal the number of rows in B. So  $A (4 \times 2) \times B (2 \times 3) = C (4 \times 3)$ . Matrix multiplication works as follows:

$$A = \begin{pmatrix} a_{11} & \cdots & a_{1m} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nm} \end{pmatrix}, B = \begin{pmatrix} b_{11} & \cdots & b_{1p} \\ \vdots & \ddots & \vdots \\ b_{m1} & \cdots & b_{mp} \end{pmatrix}$$

$$A \times B = \begin{pmatrix} AB_{11} & \cdots & AB_{1p} \\ \vdots & \ddots & \vdots \\ AB_{n1} & \cdots & AB_{np} \end{pmatrix}$$

$$\text{where } AB_{ij} = \sum_{k=1}^m A_{ik} * B_{kj}$$

In short, you multiply each individual element of the row of A to the corresponding element of the column of B and then sum them.

**Specifications:**Inputs:

- Dimensions of each array (n x m)
- The elements of each matrix (A and B)

Outputs:

- The resulting matrix  $C=A \times B$

Functions:

1. `void printMatrix(int row, int col, float m[row][col])`
  - a. prints a nicely formatted matrix
2. `float calcEntry(float x[], float y[])`
  - a. Takes the  $i^{\text{th}}$  row of A and the  $j^{\text{th}}$  column from B in order to calculate  $C[i][j]$
  - b. Returns the value that will be put into  $C[i][j]$

\* This is the minimum functions that you must use. You may use others if you like.

**Other:**

1. This is individual work. You may NOT work in groups.
2. Please staple all work together.
3. You are expected to error check.
4. For code: No compile = No points, no exceptions!