**Write-up -> COP Submission #1**

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* The name of our file is: Submission.cpp
* This file consists of all the functions (combined into one) mentioned in the problem statement and needs to be executed.
* To run on the terminal use following command-

make (to compile)

./Submission (to run)

* The different functions and their descriptions are given as follow (Be sure that valid existing files are given as inputs):
  + convoWithoutPadding-matrix1.txt-dim\_matrix1-matrix2.txt-dim\_matrix2
    - Here, dim\_matrix1 and dim\_matrix2 should be valid integers, else an error will be thrown (For eg. If dim\_matrix1 \* dim\_matrix1 is greater than the total number of floats in matrix1.txt, then an error is thrown.)
    - It implements the Convolution of the two given square matrices, without using the matrix multiplication. Here, no padding is added.
    - Here, matrix1 is the Input and matrix2 is the kernel, thus error if dim\_matrix2 >= dim\_matrix1
  + convoWithPadding-matrix1.txt-dim\_matrix1-matrix2.txt-dim\_matrix2
    - Here, dim\_matrix1 and dim\_matrix2 should be valid integers, else an error will be thrown (For eg. If dim\_matrix1 \* dim\_matrix1 is greater than the total number of floats in matrix1.txt, then an error is thrown.)
    - It implements the Convolution of the two given square matrices, without using the matrix multiplication. Here, a padding is added so that the output matrix is of the same size as input so that no information in the corners gets lost. The program calculates the padding value and it returns an error if the size of the kernel is even, since in that case, the size of the output can never be equal to the size of the input.
    - Here, matrix1 is the Input and matrix2 is the kernel, thus error if dim\_matrix2 >= dim\_matrix1
  + multWithoutPadding-matrix1.txt-dim\_matrix1-matrix2.txt-dim\_matrix2
    - Here, dim\_matrix1 and dim\_matrix2 should be valid integers, else an error will be thrown (For eg. If dim\_matrix1 \* dim\_matrix1 is greater than the total number of floats in matrix1.txt, then an error is thrown.)
    - It implements the Convolution of the two given square matrices, using the matrix multiplication. Here, no padding is added.
    - Here, matrix1 is the Input and matrix2 is the kernel, thus error if dim\_matrix2 >= dim\_matrix1
  + multWithPadding-matrix1.txt-dim\_matrix1-matrix2.txt-dim\_matrix2
    - Here, dim\_matrix1 and dim\_matrix2 should be valid integers, else an error will be thrown (For eg. If dim\_matrix1 \* dim\_matrix1 is greater than the total number of floats in matrix1.txt, then an error is thrown.)
    - It implements the Convolution of the two given square matrices, using the matrix multiplication. Here, a padding is added so that the output matrix is of the same size as input so that no information in the corners gets lost. The program calculates the padding value and it returns an error if the size of the kernel is even, since in that case, the size of the output can never be equal to the size of the input.
    - Here, matrix1 is the Input and matrix2 is the kernel, thus error if dim\_matrix2 >= dim\_matrix1
  + maxPool-matrix1.txt-rows\_matrix1
    - Here, rows\_matrix1 should be a valid integer, else error (For eg. The total no. of floats in matrix1.txt is NOT equal to rows\_matrix1 \* rows\_matrix1, showing that the dimensions of the matrix are wrong)
    - It implements the max pooling function for the given input matrix.
  + avgPool-matrix1.txt-rows\_matrix1
    - Here, rows\_matrix1 should be a valid integer, else error (For eg. The total no. of floats in matrix1.txtis NOT equal to rows\_matrix1 \* rows\_matrix1, showing that the dimensions of the matrix are wrong)
    - It implements the average pooling function for the given input matrix.
  + sigmoid-vector.txt-array\_size
    - Implementing sigmoid function for the given vector.
  + softmax-vector.txt-array\_size
    - Implementing softmax function for the given vector.
  + relu-matrix1.txt-rows
* Implementing relu function on given input matrix.
  + tanh-matrix1.txt-rows
* Implementing tanh function on given input matrix.