

Homework 08

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Due Mar 23 by 11:59pm **Points** 10 **Submitting** a file upload

Develop a function that defines a 2-dimensional array of type 'double'. Also develop a function to destroy the array.

Two functions should make following test code to work.

```
// test routine
int main(int argc, const char * argv[]) {
    const int size1 = 3;
    const int size2 = 4;
    double *vect;
    double **mat2d = makeDoubleArray2D(vect,size1,size2);

    // set
    for (int i = 0 ; i < size1 ; i++){
        for (int j = 0 ; j < size2 ; j++){
            mat2d[i][j] = static_cast<double>(i + 1) / (j + 1);
        }
    }

    // print
    std::cout << "matrix\n";
    std::cout.setf(std::ios::scientific);
    std::cout.precision(2);
    for (int i = 0 ; i < size1 ; i++){
        for (int j = 0 ; j < size2 ; j++){
            std::cout << std::setw(9) << mat2d[i][j];
        }
        std::cout << std::endl;
    }
    std::cout << "vector\n";
    for (int i = 0 ; i < size1 * size2 ; i++){
        std::cout << vect[i] << std::endl;
    }

    destroyDoubleArray2D(vect,mat2d);
    return 0;
}
```

Example output:

```
matrix
1.00e+00 5.00e-01 3.33e-01 2.50e-01
2.00e+00 1.00e+00 6.67e-01 5.00e-01
```

```
3.00e+00 1.50e+00 1.00e+00 7.50e-01
vector
1.00e+00
5.00e-01
3.33e-01
2.50e-01
2.00e+00
1.00e+00
6.67e-01
5.00e-01
3.00e+00
1.50e+00
1.00e+00
7.50e-01
```

As you see in the code, it assigns numbers to `mat2d[i][j]`, but doesn't assign anything to `vect[i]`. As you see in the example output, 'mat2d' and 'vect' have same values; 'vect' is a reshaped array of 'mat2d' in row-order. This is because 'mat2d' and 'vect' share a same memory block. Your function, `makeDoubleArray2D()` should provide this mechanism. Your function, `destroyDoubleArray2D()` frees the arrays allocated by `makeDoubleArray2D()`.