3.2 Matrix-vector mutiplication

Due 23 Sep 2019 by 23:59 **Points** 0 **Submitting** an external tool

The zyBook has shown two-dimensional arrays. While they seem to conveniently deal with matrices, they still bear the risk of unchecked index values.

In this assignment, you implement a 2D-matrix as a *vector* of *vector*s, and only use *at()* to access its elements.

Write a program that multiplies a 2D matrix with a vector. If you need to see the math, follow this link: **https://mathinsight.org/matrix_vector_multiplication (https://mathinsight.org/matrix_vector_multiplication)**

For simplicity, our matrix will be of size 3 x 3. Initialize the matrix as shown in zyBook Chapter 5.2 to become

1.0 2.0 3.0
4.0 5.0 6.0
7.0 8.0 9.0

Caveat: This initialization is a feature of C++ 2014. If your compiler gives you an error message like ***non-aggregate type 'vector<vector<double> >' cannot be initialized with an initializer list***, then you have to call *g++* as follows:

- g++ -std=c++14 -o matrix-vector matrix-vector.cpp

Read the three values of the vector to be multiplied on the right of the matrix from the user input. Then, multiply it and print the resulting vector to *cout*. The interaction should look like this:

```
Please enter the three vector coefficients

1 1 1

The result vector is [6, 15, 24]
```

Write a function that takes the matrix and the right-side vector as parameters and that returns the vector resulting from the multiplication.

The program must not use arrays, only vectors.

There is no need for handling bad user input. If you wish, you can add it, but we have handled that already with Assignment 3.1.

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