Computer Science and Programming
Lab Class 12

Task 1 ***Multiplicaiton(10 min)***

Implement a method named $\_\_mul\_\_$ in your matrix class to multiply two matrices. The return value should be an object of the result matrix.

Task 2 ***Cofactor and determinant(20 min)***

Use cofactor to compute the determinant of the matrix. You are required to write two methods: **cofactor** and **determinant**. **cofactor** should recieve two parameters m and n, and return the result of cofacor corresponding to a_{mn}. **determinant** should utilize **cofactor** to compute the determinant of the matrix. You may need to use indirect recursion to solve this task, and notice that if the matrix is not square, **determinant** should immediatly return False.

Task 3 ***Inverse–through Cramer's law(10 min)***

Implement a method to use Cramer's law to compute the inverse matrix.

Task 4 ***Least squares(10min)***

Implement a method to find the least squares approximation result $\hat{x}$ of the equation $Ax = b$. The return value should be an object of a column vector, i.e., a matrix of 1 column.

Task 5 ***Gram Schmidt(30min)***

Implement a method to find the QR decomposition result of the matrix. This method should return a list contains two objects, Q and R.