Advanced programming

Lab-1

Matrix computers

Huzaifah Saleem

Bscs-5a

00000120371

## Introduction

In this lab, I have created a Java based matrix computer, which will take as input multiple matrices and apply user requested operations on them. I was also required create unit tests to ensure their code is working properly and within defined constraints and will use GitHub to manage their solution.

**Description**

In mathematics, a matrix (plural matrices) is a rectangular array of numbers, symbols, or expressions, arranged in rows and columns. Matrices are used in several fields (Physics, computer graphics, probability theory, etc) to study scientific phenomena’s. A major branch of numerical analysis is devoted to the development of efficient algorithms for matrix computations, a subject that is centuries old and is today an expanding area of research.

Applications of matrices are found in most scientific fields. In every branch of physics, including classical mechanics, optics, electromagnetism, quantum mechanics, and quantum electrodynamics, they are used to study physical phenomena, such as the motion of rigid bodies. In computer graphics, they are used to project a 3-dimensional image onto a 2-dimensional screen. In probability theory and statistics, stochastic matrices are used to describe sets of probabilities; for instance, they are used within the PageRank algorithm that ranks the pages in a Google search.

In this lab, I was required to build a Matrix Calculator that will allow the user to input named matrices (Allow the user to give names to his matrices like A, B, C, d, firstMatrix, secondMatrix, etc) followed by an equation with the matrix names and operations(Sum, Difference, Scalar Multiplication, Transpose, Matrix Multiplication, and Matrix Inverse). Your program should then replace the Matrix names with the Matrix, and apply the operations, finally producing the result.

**Learning:**

In this lab, I learned how to create a simple matrix computer in JAVA so basically I got a basic knowledge of how JAVA works and how to create a program in JAVA implementing basic concepts of OOP and some data structures.

I learned how to do a simple unit test in a program and get to know some basic things about GitHub.

**Profiling the whole project:**



