

# Discrete Mathematics Project (CS344)

## Progress Report

Feedback for 2109844

Mark: 70%

Grade: 1

### Feedback on your submission

Technical content (well read and good insight in project's subject area; effective analysis of problems and issues; quality of design; choice of methods and tools):

The report shows a deep understanding of the project. The choice of Java as a prototype language is very reasonable. The careful approach explained in 3.11 is exactly how it should be done. The student does not talk about the second symmetry group that should be studied in this project (i.e., conjugation with matrix( $\begin{bmatrix} 0 & -1 \\ 1 & -1 \end{bmatrix}$ )) and its 3x3 generalisation). I expect that this investigation has dropped from the project schedule.

Project management (well conceived project; unforeseen problems well detected and overcome; progress consistent with project specification; all necessary research, analysis and design work completed; work for next term well planned):

The project is well on track (apart from the second symmetry group). The student has already re-implemented the original Kauers-Moosbauer algorithm, and adapted it. The algorithm found a rank 7 algorithm for 2x2 matrix multiplication, which is optimal, and a rank 23 algorithm for 3x3 matrix multiplication, which is currently the world record. The adapted algorithm found the 3 summand 2x2 matrix multiplication algorithm, which is optimal.

Communication skills (basic written language skills; effective composition and exposition; report is of an appropriate length for project):

Example 2.1.1 is excellent. Section 2.2 needs more mathematical details. Example 2.2.3 is great, but the notion of a "Multiplication Scheme" is not defined. In Section 3.3, the logical flow of the sections is not very clear. Also, each proof needs a clean theorem or proposition statement, unlike in Section 3.3.2 or 3.3.9. In 3.3.7, 3.3.8, the theorem statements are written in the first line of the proof, but they should go before the proof. Minor point: The sums on page should start at 1, and not at 0.