Partitioning of students into equitable groups using SolverStudio

**Abstract**

Students in their final year of a Bachelor of Engineering at The University of Auckland are required to complete a course known as ENGGEN 403. As part of this course, students are partitioned into groups of around 25 students and given a single week to produce a large piece of work on a given topic. In order to make this fair and equitable, the students should be partitioned in a way to make the groups as similar as possible. This paper details the development, implementation, and results of an Excel based optimisation solution for this problem. A model was formulated to minimise a weighted combination of the greatest difference between the mean grade point average of each group, and the greatest difference between the variance of the grade point averages in each group. The model was also constrained to balance gender, ethnicity and engineering discipline. This model was then implemented in the PuLP modelling language using the SolverStudio modelling environment. The model was validated against 2013 data, and shown to improve all key metrics. The Excel spreadsheet was given to the course organiser who used the model to partition 571 students into 23 groups in the 2014 ENGGEN 403 class.