The administration of A Better Class College (ABC) is concerned about grade inflation, since the average grade given out at this school is A-. It is impossible to use the traditional grade point average (GPA) to determine class rank. The terms of a scholarship allow only the top decile of students to be funded, so an accurate ranking system is required.

Several alternatives to GPA ranking are proposed, each based on computing an "ability score" for each student. The Standard Normalized GPA maps the grades in each course to a bell curve and replaces them by the number of standard deviations they fall above or below the mean. Students are then ordered by the average of their revised grades. The Iterated Normalized GPA compares the average grade given in a course to the average GPA of students taking it, thereby estimating how difficult the course is. It repeatedly adjusts the grades until average grade equals the average GPA and uses the corrected GPA to determine rank. The Least-Squares method assumes that the difference between two students' grades in a course is equal to the difference between their ability scores. It then sets up a large matrix of linear equations, with an optional handicap for courses taken outside a student's major, and solves for the ability scores with a least-squares algorithm.

The plain GPA method encourages students to take easy courses, a major cause of grade inflation. Plain GPA rankings also produce too many ties, especially when most of the grades are high. The three proposed methods attempt to eliminate these problems while ranking students sensibly.

A small sample student body was used to explore how the different methods work and to test the effects of chaning a single grade. The Least-Squares method was found to give the most intuitive and stable results, followed by the Iterated Normalized, the Standard Normalized, and finally the plain GPA. Under the Least-Squares and Iterated methods, when a certain student's grade was changed in one course, that student and other students in that course changed position, but most of the other students moved very little.

A larger student body generated by a computer program was used to compare the Iterated Normalized and Standard Normalized algorithms. They were found to agree on most of students in the top decile, around 89% if plus and minus grades are included. They did not agree well with the GPA ranking due to massive ties in the GPA ranking.

All four methods are more reliable when plus and minus grades are included, since a great deal of information is lost if only letter grades are given.

We most highly recommend the Least-Squares method since it is not very sensitive to small changes in grades and yields intuitive results. It can also be adapted to encourage well-roundedness, if the college chooses. However, if there are more than about 6000 students, it can be prohibitively difficult to compute. In that case, we recommend the Iterated Normalized GPA, which is eaiser to calculate and is the best of the remaining methods. We do not recommend the Standard Normalized GPA because it does not properly correct for course difficulty, makes assumptions which are inappropriate for small or specialized courses, and produces counterintuitive results. We also do not recommend the traditional GPA because it assumes all courses are graded on the same scale and results in too many ties when grades are inflated.