Sailing Coursework Report

This report will seek to investigate and evaluate the fairness of a scoring system for a series of simulated sailing competitions.

The competition consists of six races, points are awarded based on the finishing position, 1 for 1st 2 for 2nd and so on, after six races the lowest score is discarded and the remaining points are totalled, the sailor with the lowest total is the winner.

Each sailor is assigned a mean performance and standard deviation value, these are used to calculate a random performance value that falls within the normal distribution for each sailor. The first case I will explore is of consistency. If we compare two of the contestants, Alice has a mean performance of 100 and a standard deviation of 0, Clare also has a mean performance of 100 but her standard deviation is 10. So Alice is totally consistent and her performance will be 100 points each race, whereas Clare is inconsistent and can have a much larger range of performance scores. Due to the random nature of the performance Clare has a chance to beat Alice whereas Alice cannot improve her performance. Given that these two particular contestants have an equal mean this would seem to favour consistency however we must also consider the sailor’s skill.

If we look at another contestant Dennis, like Alice, Dennis is very consistent but his mean performance is only 90, this means that Dennis has a chance to beat all the inconsistent contestants if they perform badly, he will however never be able to place in front of Alice. This suggests that the simulation accurately reflects a sailor’s level of skill.

The next point to consider is the number of participants in the race, for the simulation there are a total of 5 participants, this gives us a minimum score of 5 and a maximum score of 25 (after the lowest score is discarded.) If there were less participants, for example 3, this would give a minimum score of 5 but only a maximum of 15, making it harder for a competitor to maintain the lead, but again this is dependent on the individual skill level and consistency.

The final point to consider is discarding the lowest score (in this case referring to the highest number.) This would appear to add an element of fairness to the competition allowing a consideration for a competitor having a ‘bad day’. I ran ten simulations and compared the results, the final order only changed in 2/10 cases, however this is a small sample size to draw any valid conclusions. I then modified my code to run 100000 sets of 6 races and compare the final results which resulted in 77% of results being identical. I have used matplotlib to create a bar chart showing the differences in results.

In conclusion I believe that this scoring system is fair, a sailor’s position is strongly dependant on their skill level which is what you would expect. A sailor’s consistency can vary outcomes but a higher skill level and therefore mean performance will result in better positioning in the race. From my modified code I have determined that discarding the lowest score only causes a change in results in 23% of cases, while this is not a negligible amount I still believe that overall this does not skew the fairness of the results.