PROJECT REPORT FOR THE IMPLEMENTATION OF SHUT THE BOX GAME USING MATLAB

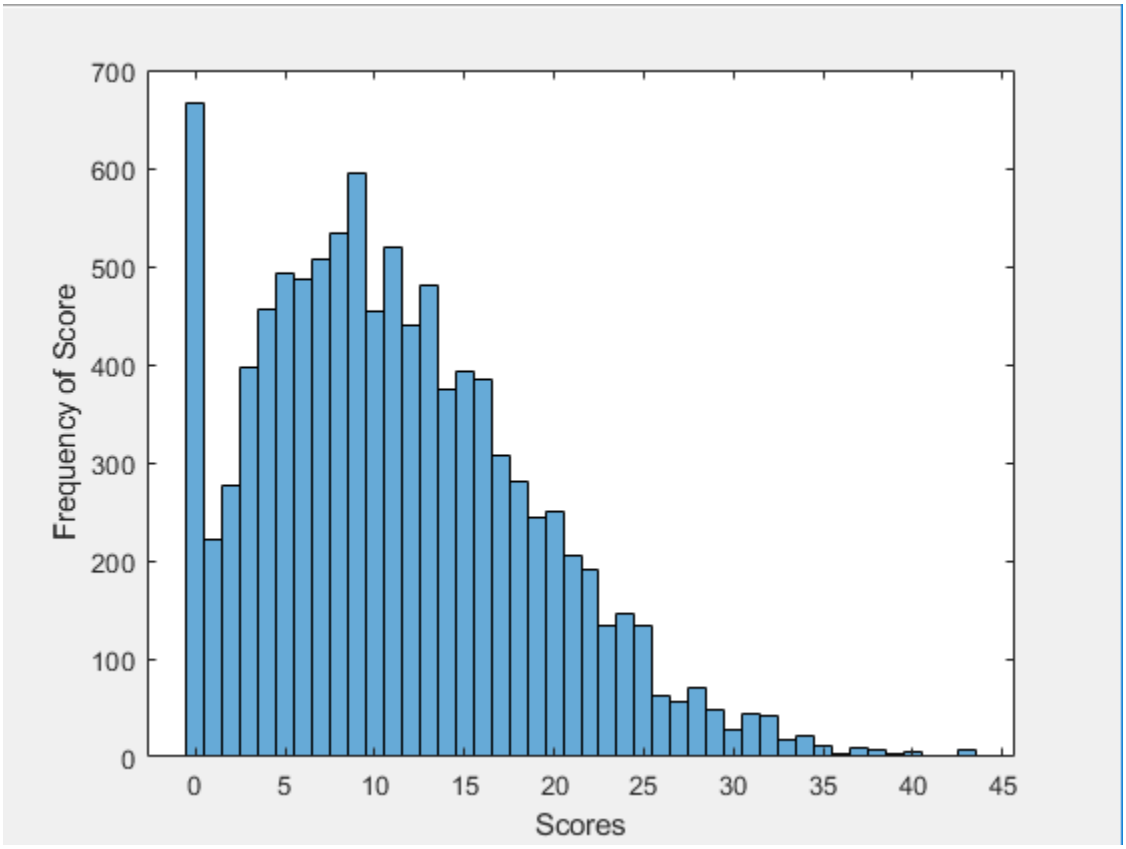
INTRODUCTION

This project is to design, develop, simulate and make proper conclusions of the shut the box game played with two dice and an array of tiles. The game removes every tile that is equivalent to a random outcome from the combination of two dice based on the defined procedures in each of the strategy. The game ends as long as no combination of tiles equal the total dice outcomes. In line with the assignment requirements, at least 3 strategies were to be executed in obtaining the expected score and standard deviation of this game. The project was fully developed with MATLAB software.

DISCUSSION

The use of three different strategies to compute the expected score were adopted as outlined below:

1. **Strategy 1**: This method allows the program remove any **single tile** equivalent to the dice combination or **any two combination** of tiles or any **combination of three tiles**. The histogram plot gives an overview of the results obtained in 10000 trials.



Expected Score: 11.3 – 11.4

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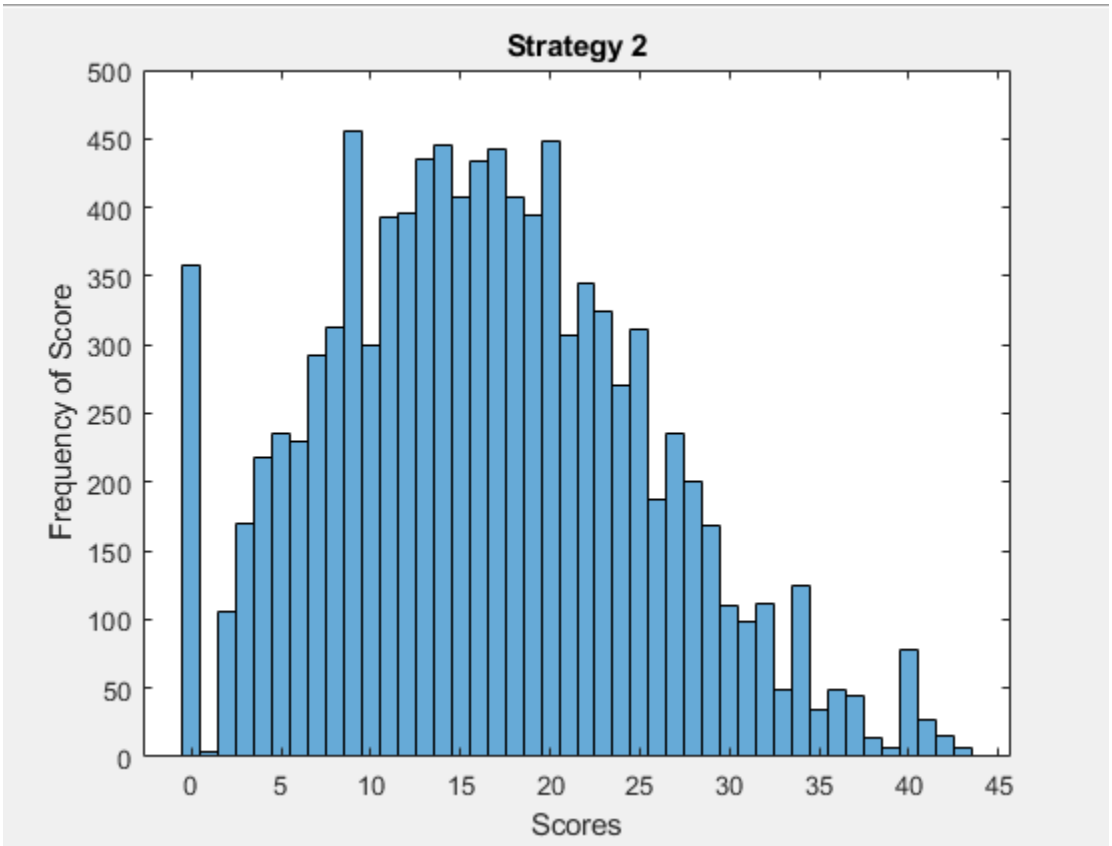
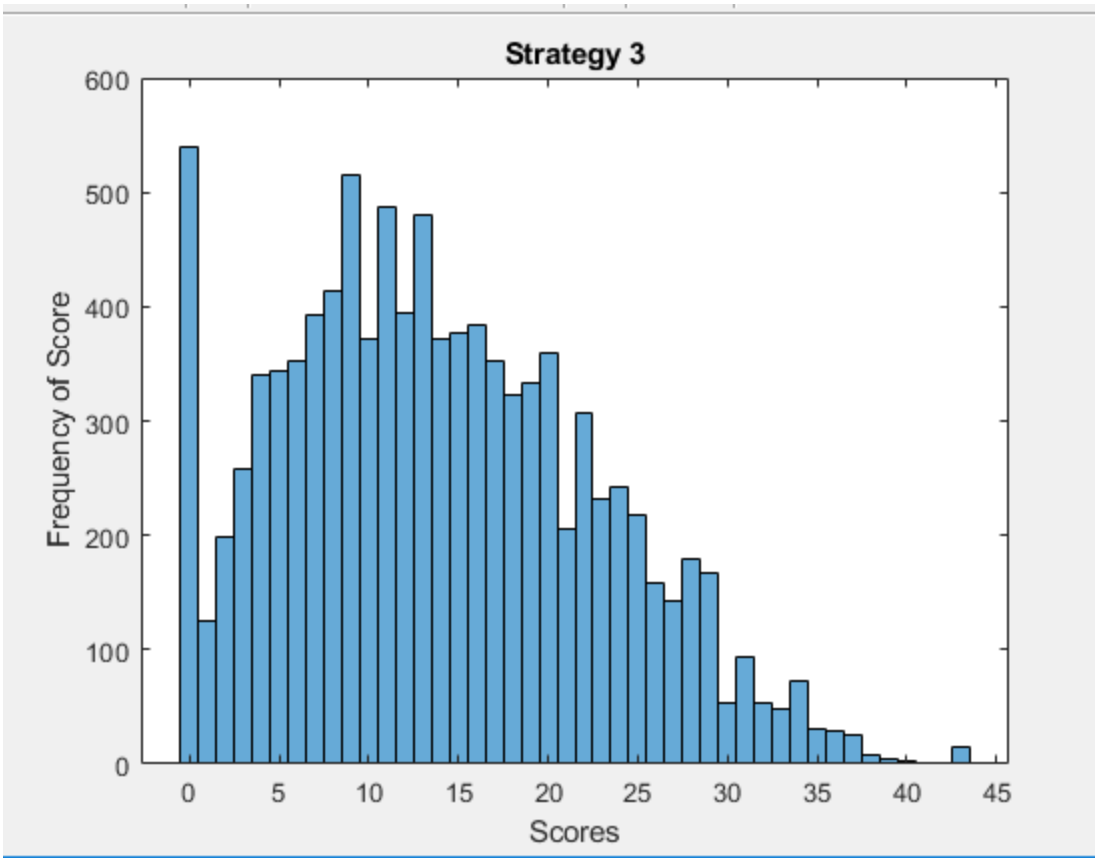
Standard Deviation: 7.61 – 7.79
Elapsed Time: 0.32 – 0.36 seconds

2. **Strategy 2**: This method is almost similar to the first strategy but the tiles are arranged in **ascending order**. It has a faster computational time as the loop breaks earlier than expected because of not having any tiles combination after some few trials.



Expected Score: 16.3 – 16.6
Standard Deviation: 8.8 – 9.15
Elapsed Time: 0.21 – 0.26 seconds

3. **Strategy 3**: This method allows the program remove **any single tile** equivalent to the dice combination or **any three combination** of tiles. Evidently, given that the program requires the addition of 3 tile elements, this results in higher resource utilization.



Expected Score: 13.8 – 14.1
Standard Deviation: 8.53 – 8.63
Elapsed Time: 0.34 – 0.35 seconds

CONCLUSION

Based on the results obtained after examining the three strategies for the shut the box game, the first strategy had very high relative frequency over a given score, lower standard deviation and reduced contours at the extreme which reflects a level of convergence in the expected score with minimal errors as compared to the other two strategies. Interestingly, the time to compute the expected score was within a reasonable limit for the number of trials. Consequently, I would recommend the first strategy for this game.

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