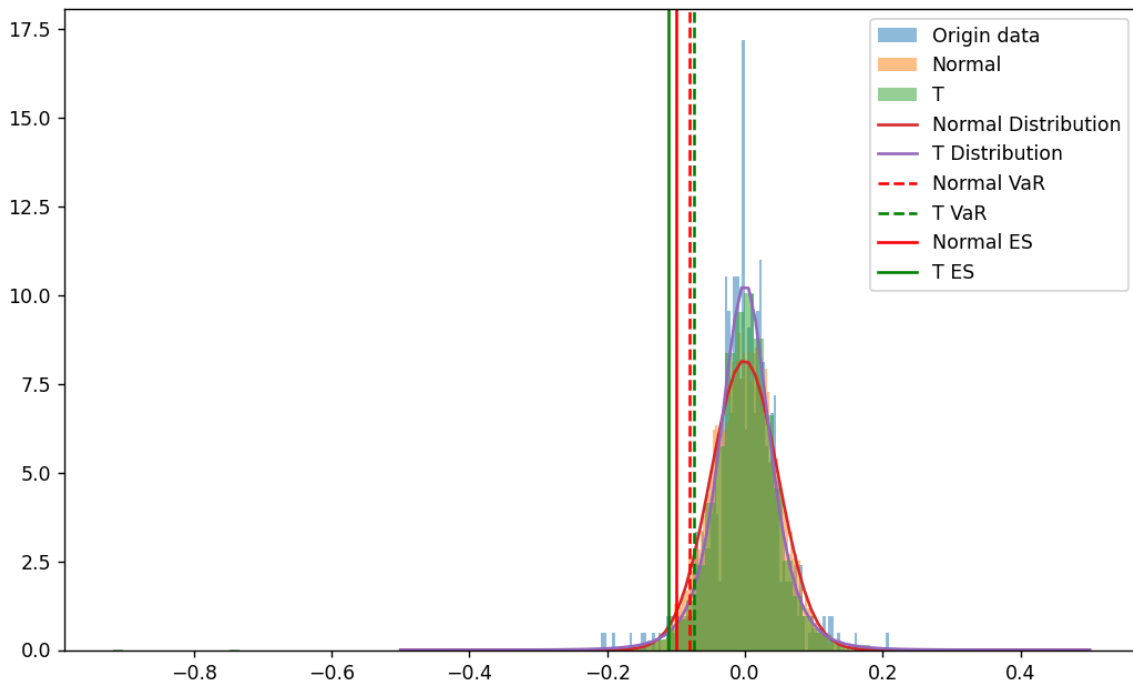Problem 1:

The graph vividly illustrates that the T-distribution outperforms the normal distribution as a statistical model in this context, effectively capturing the nuances of the original data. Notably, the T-distribution exhibits a significantly smaller Expected Shortfall (ES) compared to the ES of the normal distribution. However, it's worth mentioning that the VaR for the T-distribution slightly exceeds that of the normal distribution. Both distributions, unfortunately, struggle to accurately model the fat tail observed in the data.

Problem2:

All its results were in line with expectations.

Problem 3:

Week5 result:

portfolio A

VaR: 20377.916868119733

ES: 27462.37010012735

portfolio B

VaR: 11879.862713117851

ES: 16026.42294840194

portfolio C

VaR: 26005.573243161896

ES: 35845.7113264588

portfolio Total

VaR: 56510.85141381528

ES: 76792.65333753669

Comparison with last week's results: VaRs are typically larger under the t-distribution compared to VaRs under the normal distribution. This is because the t-distribution has heavier tails, indicating a higher tail risk, which results in a relatively more conservative VaR that tends to be larger. In contrast, the normal distribution has relatively lighter tails, resulting in a VaR that is generally smaller than the t-distribution.