

Problem 2

VaR Normal (EWMA): -9.1% VaR with 11.4% ES. **Normal Distribution with EWMA** tends to smooth volatility over time, giving more weight to recent returns, which could lead to higher VaR and ES compared to historical simulation, as it captures recent market volatility more strongly.

VaR T-distribution: $+7.6\%$ VaR with 0.57% ES. **T-distribution** typically accounts for heavier tails (larger losses) compared to the normal distribution. However, in this case, the fitted T-distribution resulted in a **positive VaR** value, suggesting that the distribution fitting might have captured skewed or unusual return characteristics. This can occur if the data has an upward bias or the fitted distribution is overfitting to recent gains.

VaR Historical: -7.6% VaR with -11.7% ES. **Historical Simulation** directly reflects what has happened in the past, without assumptions about distribution. It tends to reflect actual observed market extremes, which can explain why the **Historical ES** is the most negative (indicating the most severe losses in extreme scenarios).

Problem 3

By comparison, the VaR in this week problem are smaller than that in week 4. The smaller VaR in Week 5 is likely due to reduced exposure to riskier assets, increased diversification, and/or a shift toward lower-volatility assets, making the portfolio less prone to extreme losses compared to Week 4.