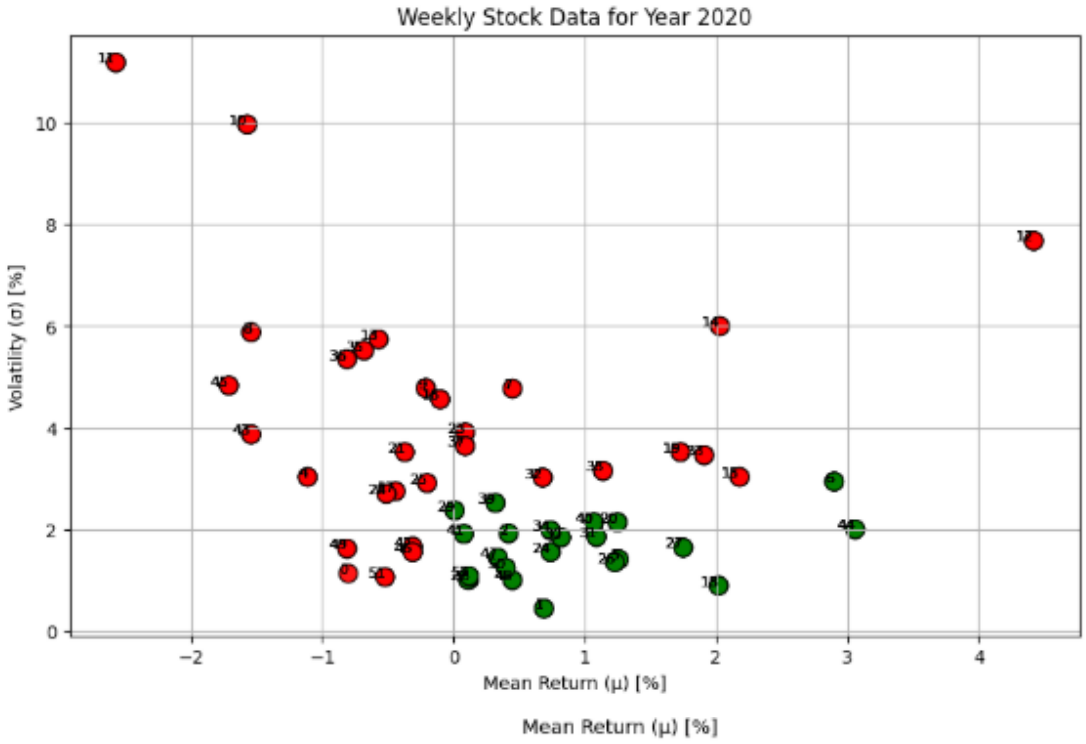
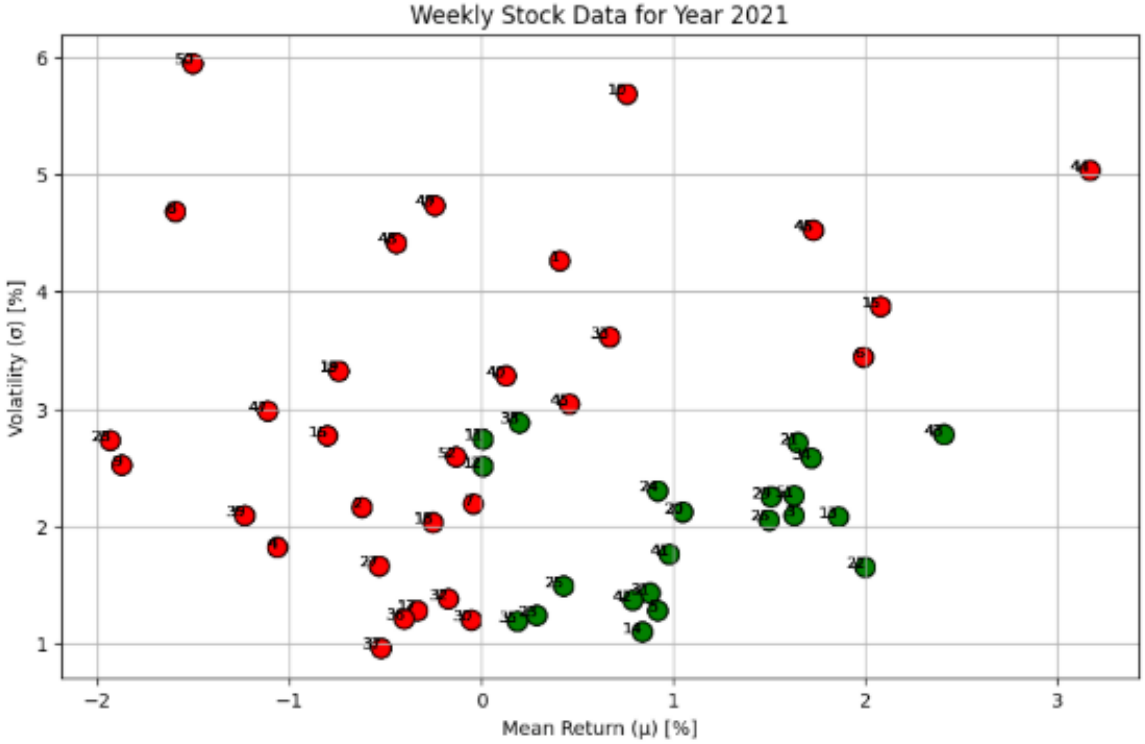
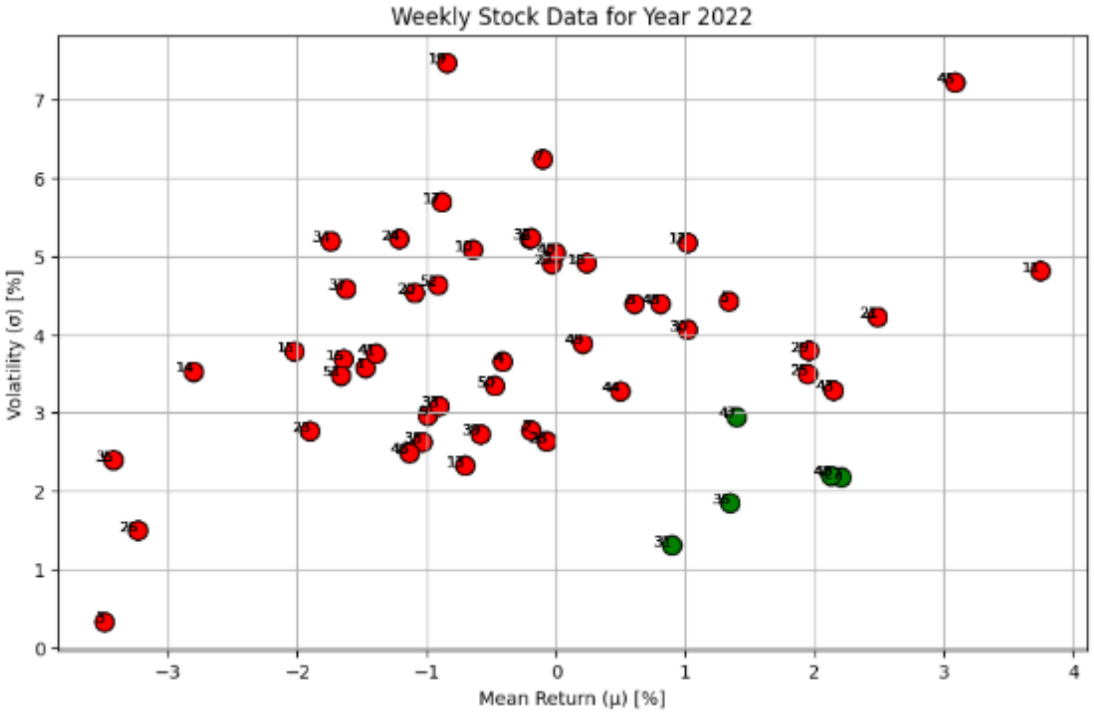
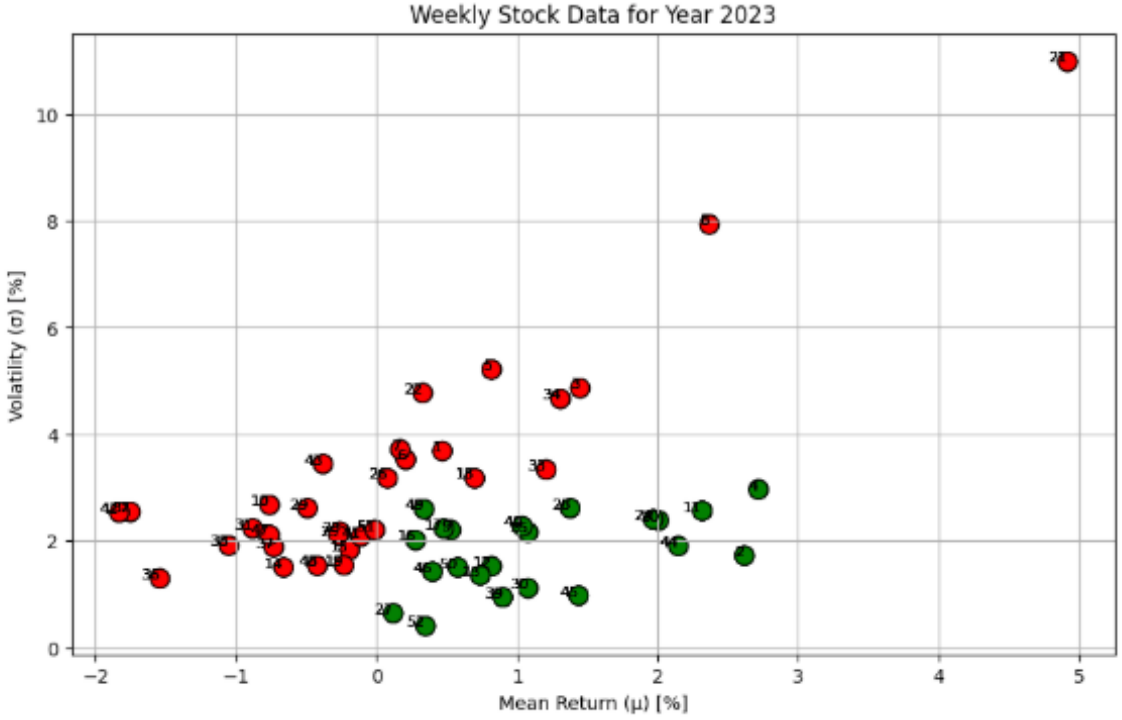
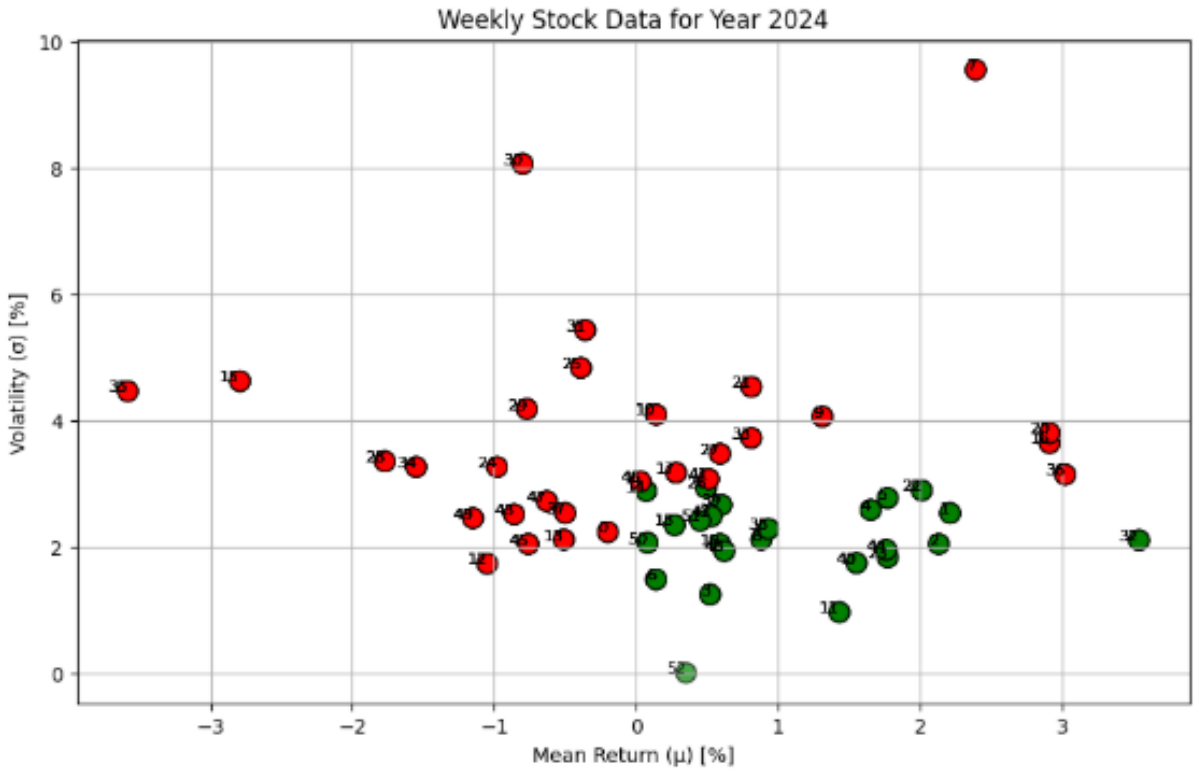

Weekly Stock Data for Year 2020
Volatility (σ) [%]
Mean Return (μ) [%]
Mean Return (μ) [%]


Weekly Stock Data for Year 2021
Volatility (σ) [%]
Mean Return (μ) [%]


Weekly Stock Data for Year 2022
Volatility (σ) [%]
Mean Return (μ) [%]


Weekly Stock Data for Year 2023
Volatility (σ) [%]
Mean Return (μ) [%]

CS677(A2) DSP (Atharva Deepak Sharma)



1. Are there obvious patterns?

- The highest volatility (σ) and mean return (μ) values are mostly labeled as Red.
- Many high μ and σ values correspond to negative returns, meaning big losses are often more volatile.
- Few weeks have extreme positive returns, and most of them are also Red.

2. Are same-colored points located close to each other?

- Not always. While there are some clusters of red or green points, many red points appear scattered.

3. Are there more green or red points in the first half of the year?

- Red points dominate in high volatility scenarios across all years.
- In some years, there is a balance, but volatility spikes often correlate with red weeks.

4. Extreme Points (for each year)

- Three farthest points from the origin (largest distance from (0,0)):
  - Almost all are labeled Red, meaning extreme market movements are often negative.
- Point farthest on the x-axis (highest mean return, μ):
  - Most cases are Red, suggesting that even large upward swings are unstable.
- Point farthest on the y-axis (highest volatility, σ):
  - Almost always Red, which confirms the correlation between volatility and downturns.

5. Do patterns repeat across years?

- Yes. High volatility weeks tend to be red across years.
- Green points tend to cluster around lower volatility.
- The same weeks in different years don't always behave the same way.

6. Would a nearest-neighbor classifier have trained on one year work well in the next?

- Not necessarily.
  - Since high volatility events occur randomly and red/green labels are not always grouped together, a nearest-neighbor approach might struggle with prediction.
  - If green and red points were better separated, KNN would work well.
  - Some patterns repeat (like high volatility corresponding to red), but individual week behavior is unpredictable.