

## **Assignment 1 – Question 2: Trading Strategy Using Technical Indicators**

For this question, I designed and implemented a simple trading strategy using Bitcoin daily price data from 1st January 2022 to 1st January 2025. The same technical indicators implemented in Question 1 were used to maintain consistency in analysis.

### **Indicators Used**

The strategy uses three indicators: Rate of Change (RoC) to measure price momentum, Negative Volume Index (NVI) to observe price movements during low-volume days, and Parabolic SAR to identify the overall market trend and possible trend reversals.

### **Trading Logic**

A buy signal is generated when the Rate of Change is positive and the closing price is above the Parabolic SAR value, indicating positive momentum in an upward trend. A sell signal is generated when the Rate of Change becomes negative and the closing price falls below the Parabolic SAR, indicating weakening momentum and a possible downtrend.

### **Risk Management and Execution**

The strategy starts with an initial capital of ■100,000. At any point, the entire capital is either invested in Bitcoin or held as cash. No leverage or short selling is used, which helps in keeping the strategy simple and reduces excessive risk. Positions are exited strictly based on sell signals from the indicators.

### **Backtesting and Performance Evaluation**

The strategy was backtested on historical data by simulating trades based on the generated signals. Portfolio value was calculated daily. To evaluate performance, Sharpe Ratio and Sortino Ratio were used to measure risk-adjusted returns, while Maximum Drawdown was calculated to understand the worst peak-to-trough loss during the trading period. The number of winning and losing trades, along with total and net profit, were also calculated to evaluate overall performance.

### **Algorithm Explanation**

In this algorithm, the indicators work together to control trade execution. RoC confirms price momentum, NVI provides confirmation from low-volume market behavior, and Parabolic SAR defines the trend direction. Trades are executed only when momentum and trend conditions align, which helps reduce false signals. The strategy enters a full position on a buy signal and exits completely on a sell signal, allowing portfolio value to be tracked clearly over time.

### **Conclusion**

This strategy combines momentum, volume behavior, and trend-following indicators to generate trading signals. While simple, it demonstrates how multiple technical indicators can be combined to design, execute, and evaluate a trading strategy using Python.