I'll help you build a comprehensive analysis in LibreOffice Calc, walking through each step with specific formulas and methodologies. Let's create a robust statistical and game theory framework for tech stock trading.

## Setting Up Your LibreOffice Calc Workbook

First, let's create a structured workbook:

1. **Sheet 1 - Raw Data**: Where you'll import historical price data
2. **Sheet 2 - Statistical Analysis**: For return calculations and volatility metrics
3. **Sheet 3 - Pattern Analysis**: For identifying recurring patterns
4. **Sheet 4 - Game Theory**: For participant analysis and matrices
5. **Sheet 5 - Trading Rules**: For defining entry/exit criteria
6. **Sheet 6 - Backtest**: For testing your strategy

### Sheet 1: Raw Data Setup

1. Download historical data from Yahoo Finance (2 years of daily data)
2. Import the CSV into LibreOffice Calc
3. Organize columns as: Date, Open, High, Low, Close, Adj Close, Volume

### Sheet 2: Statistical Analysis

Let's implement each statistical calculation step by step:

#### 1. Calculate Log Returns

In cell H2 (assuming price data starts in row 2), enter:

=LN(F2/F1)

Copy this formula down for all rows. Label this column "Log Return".

#### 2. Calculate Simple Returns (for comparison)

In cell I2, enter:

=(F2/F1)-1

Label this column "Simple Return".

#### 3. Descriptive Statistics

Create a section for key statistics:

* Mean Return: =AVERAGE(H2:H756) (adjust range as needed)
* Median Return: =MEDIAN(H2:H756)
* Standard Deviation: =STDEV(H2:H756)
* Annualized Volatility: =STDEV(H2:H756)\*SQRT(252) (252 trading days per year)
* Skewness: =SKEW(H2:H756) (if available, or calculate manually)
* Kurtosis: =KURT(H2:H756) (if available, or calculate manually)

#### 4. Rolling Volatility Calculation

For 20-day rolling volatility in column J:

=STDEV(H-19:H)\*SQRT(252)

Where H is your current row. This calculates annualized volatility based on the past 20 days.

#### 5. Volatility Percentile Rank

To identify the current volatility's relative position:

=PERCENTRANK(J$2:J$756,J2)

This shows where today's volatility ranks in the historical distribution.

#### 6. Daily Range Calculation

In column L:

=(C2-D2)/F1

This calculates today's range (High-Low) as a percentage of yesterday's close.

#### 7. Parkinson's Volatility Estimator

In column M:

=0.361\*(C2-D2)^2

This is a more sophisticated volatility estimate using the high-low range.

### Sheet 3: Pattern Analysis

#### 1. Day of Week Analysis

Create a column for weekday:

=WEEKDAY(A2,2)

This returns 1 for Monday through 5 for Friday.

Then create a summary table:

Days | Count | Avg Return | Win % | Avg Up | Avg Down

Monday | COUNTIF() | AVERAGEIF() | ... | ... | ...

Tuesday | ... | ... | ... | ... | ...

Use AVERAGEIF() and COUNTIF() functions to populate this table.

#### 2. Winning/Losing Streaks

To find consecutive positive days:

=IF(H2>0,IF(H1>0,N1+1,1),0)

For consecutive negative days:

=IF(H2<0,IF(H1<0,O1+1,1),0)

#### 3. Corrections After Strong Moves

Identify days with returns > 1.5 standard deviations:

=IF(ABS(H2)>1.5\*STDEV(H$2:H$756),"Strong Move","")

Then calculate subsequent 3-day returns:

=(F5/F2)-1

### Sheet 4: Game Theory Matrix

Create a 2x2 matrix for different scenarios:

**Support/Resistance Scenario:**

| Market Buys | Market Sells

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You Buy | +1.5 | -2.0

You Sell | -1.0 | +1.0

Fill in expected values based on your statistical analysis of what happens at key support/resistance levels.

**Post-Strong-Move Scenario:**

| Market Follows | Market Reverses

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Follow Trend | +0.8 | -1.5

Counter-Trend | -1.2 | +2.0

Fill with expected values based on your analysis of what typically happens after strong price movements.

### Practical Implementation Example

Let me walk you through an analysis of how to identify optimal entry points:

1. **Volatility Regime Classification**:

=IF(J2>PERCENTILE(J$2:J$756,0.75),"High",IF(J2<PERCENTILE(J$2:J$756,0.25),"Low","Normal"))

This categorizes each day into high, normal, or low volatility regimes.

1. **Moving Average Calculation**: For 20-day MA:

=AVERAGE(F-19:F)

1. **Volume Analysis**: Relative volume:

=G2/AVERAGE(G-20:G-1)

Values above 1 indicate above-average volume.

1. **RSI Calculation** (14-day): First calculate average gains and losses over 14 days, then:

=100 - (100/(1+AvgGain/AvgLoss))

1. **Entry Signal Formula** (Momentum Strategy):

=IF(AND(F2>MA20,VolPercentile<0.65,RelVolume>1.5,Return3Day>PERCENTILE(Return3Day\_Column,0.75)),1,0)

Value of 1 indicates a buy signal.

## Testing the Strategy

For each entry signal, record:

* Entry date and price
* Exit date and price (based on your exit rules)
* P&L
* Duration
* Maximum adverse excursion (largest drawdown during the trade)

Calculate key metrics:

* Win rate: =COUNTIF(wins)/COUNTIF(total\_trades)
* Average win: =AVERAGE(IF(profit\_column>0,profit\_column,""))
* Average loss: =AVERAGE(IF(profit\_column<0,profit\_column,""))
* Profit factor: =SUM(IF(profit\_column>0,profit\_column,""))/ABS(SUM(IF(profit\_column<0,profit\_column,"")))
* Maximum drawdown

Would you like me to go deeper into any specific part of this analysis? I can provide more detailed formulas or explain the statistical concepts behind any of these calculations.