📊 Part II: Wyckoff Stock Analysis Module

Complete Technical Documentation & Methodology Guide

🎯 What is Part II (Stock Analysis)?

Part II of the Wyckoff Trader project is the **Stock Analysis Module** that:

1. **Fetches real-time stock data** using yfinance API
2. **Detects Wyckoff events** (SC, BC, SP, UT, SOS, SOW, LPS, LPSY)
3. **Identifies the current Wyckoff phase** (A, B, C, D, E)
4. **Determines market bias** (Bullish, Bearish, Neutral)
5. **Runs backtesting** based on Wyckoff trading rules
6. **Visualizes everything** with interactive Plotly charts

📈 The Wyckoff Price Cycle

Richard Wyckoff identified that markets move in a **repeating cycle** controlled by large institutional operators (the "Composite Man"):

```
DISTRIBUTION
            ▔▔▔
```

ACCUMULATION MARKDOWN

The Four Market Phases:

Phase	Description	Who's in Control
Accumulation	Smart money quietly buying	Institutions (Strong Hands)
Markup	Price rising, public joins	Demand > Supply
Distribution	Smart money quietly selling	Institutions exiting
Markdown	Price falling, public panics	Supply > Demand

⚖️ Wyckoff's Three Fundamental Laws

Law 1: Supply and Demand

```
SUPPLY AND DEMAND LAW

When DEMAND > SUPPLY → Price RISES
When SUPPLY > DEMAND → Price FALLS
When SUPPLY = DEMAND → Price RANGES

This is the MOST fundamental law of price movement.
Everything else in Wyckoff analysis builds on this.
```

How we detect it: Compare buying volume vs selling volume, analyze price spread relative to volume.

Law 2: Cause and Effect

```
CAUSE AND EFFECT LAW

CAUSE (Trading Range) → EFFECT (Price Movement)

ACCUMULATION  =  MARKUP
(Building Cause)  (The Effect)
Time in range  Size of move

Longer accumulation = Larger subsequent move
```

```
│  The "cause" must be built before the "effect" can occur      │
└──────────────
```

```
│                                                │
│ Characteristics:                               │
│ • Moderate increase in volume                  │
│ • Price temporarily holds, then continues down │
│ • Early warning that downtrend is weakening    │
│                                                │
│ Chart Pattern:                                 │
│       │                                        │
│       │                                        │
│       │ \                                      │
│       │ \   Downtrend                          │
│       │  \                                     │
│       │   PS: Small bounce                     │
│       │    \                                   │
│       │     \  Continues down to SC            │
│                                                │
│ Trading Action: Do NOT buy yet. Just observe.  │
│                                                │
└────────────────────────────────────────────────┘
```

2. SC - Selling Climax ☆ (Key Event)

```
┌────────────────────────────────────────────────┐
│ SELLING CLIMAX (SC)                            │
└────────────────────────────────────────────────┘
│                                                │
│ Definition: Panic selling that exhausts supply and stops │
│ the downtrend. Smart money starts buying here. │
│                                                │
│ Detection Rules (our code):                    │
│ • Volume Ratio > 2.0 (very high volume spike)  │
│ • Price Change < -3% (significant drop)        │
│ • Close > Low + 30% of range (closes off the lows) │
│                                                │
│ Chart Pattern:                                 │
│       │                                        │
│       │ \                                      │
│       │ \                                      │
│       │  \                                     │
│       │   \                                    │
│       │    SC  Huge volume, wide spread        │
│       │     Volume spike                       │
│       │     Price recovers from lows           │
│                                                │
│ What's Happening:                              │
│ • Retail traders panic selling                 │
│ • Institutions absorbing all the selling       │
│ • Transfer from "weak hands" to "strong hands" │
│                                                │
│ Trading Action: Watch closely, but don't buy yet. │
│                                                │
└────────────────────────────────────────────────┘
```

3. AR - Automatic Rally

```
╔═══════════════════════════════════════════════════════════════╗
║ AUTOMATIC RALLY (AR)                                          ╒
╟───────────────────────────────────────────────────────────────╢
╒                                                               ╒
║ Definition: The natural bounce after Selling Climax.          ╒
║ Occurs because selling pressure is temporarily exhausted.     ╒
╒                                                               ╒
║ Characteristics:                                              ╒
║ • Follows immediately after SC                                ╒
║ • Short covering + new buying                                 ╒
║ • Sets the upper boundary of trading range                    ╒
╒                                                               ╒
║ Chart Pattern:                                                ╒
╒              ╒ ╒ ╒AR: Sets resistance                          ╒
╒             ╒ ╒                                               ╒
╒            ╒╒                                                 ╒
╒      ╒    ╒ ╒                                                 ╒
╒      ╒   ╒  ╒                                                 ╒
╒      ╒  ╒   ╒                                                 ╒
╒      ╒  SC╒ ╒ ╒ ╒ ╒Trading Range established                    ╒
╒                                                               ╒
║ Trading Action: Note the AR high as resistance level.         ╒
╒                                                               ╒
╚═══════════════════════════════════════════════════════════════╛
```

4. ST - Secondary Test

```
╔═══════════════════════════════════════════════════════════════╗
║ SECONDARY TEST (ST)                                           ╒
╟───────────────────────────────────────────────────────────────╢
╒                                                               ╒
║ Definition: Price returns to SC area to test if selling       ╒
║ pressure has truly been absorbed.                             ╒
╒                                                               ╒
║ Successful ST characteristics:                                ╒
║ • LESS volume than SC                                         ╒
║ • NARROWER price spread than SC                               ╒
║ • Stops at or above SC low                                    ╒
╒                                                               ╒
║ Chart Pattern:                                                ╒
╒            AR                                                 ╒
╒           ╒ ╒                                                 ╒
╒          ╒   ╒                                                ╒
╒      ╒ ╒    ╒                                                 ╒
╒      ╒╒      ST ║ Less volume, higher low = BULLISH           ╒
╒      ╒ SC╒ ╒ ╒ ╒ ╒ ╒ ╒ ╒ ╒ ╒                                  ╒
╒      ╒ ╒ ╒   ╒ ╒ Volume comparison                            ╒
╒                                                               ╒
║ What it tells us:                                             ╒
║ • If ST shows less selling = Accumulation confirmed           ╒
║ • If ST breaks below SC = More weakness, not ready yet        ╒
╒                                                               ╒
║ Trading Action: Confirms accumulation, but still wait.        ╒
```

5. SP - Spring ☆☆☆ (Most Important Entry Signal!)

```
SPRING (SP) - THE KEY ENTRY SIGNAL

Definition: A false breakdown below support that traps
sellers and provides the best entry opportunity.

Detection Rules (our code):
• Low breaks below support level
• Close recovers ABOVE support
• Volume Ratio < 1.5 (LOW volume = lack of real selling)

The Three Types of Springs:

Type 1 (Weak):     Type 2 (Moderate):   Type 3 (Strong):
Deep penetration    Moderate penetration  Shallow penetration
Higher volume      Lower volume         Lowest volume
Needs more testing  Good entry          BEST entry

Chart Pattern:
        Support Level
        SPRING: Shakes out weak holders
        LOW VOLUME = Real buyers absorb

Why Springs Work:
• Triggers stop losses of early bulls
• Traps new short sellers
• Smart money buys from panicked sellers
• Creates fuel for subsequent rally

Trading Action: PRIMARY BUY SIGNAL! Enter long positions.
```

6. SOS - Sign of Strength ☆ (Confirmation Signal)

```
SIGN OF STRENGTH (SOS)

Definition: A rally that breaks above resistance on
INCREASING volume, confirming accumulation is complete.

Detection Rules (our code):
• Close breaks above resistance
• Price change > 1.5%
```

• Volume Ratio > 1.3 (above average volume)

Chart Pattern:

SOS breaks above Creek/Resistance

Resistance (Creek)

Spring

Volume INCREASING on breakout

What it tells us:

• Demand has overcome supply
• Accumulation is complete
• Markup phase is beginning

Trading Action: Add to long positions or enter if missed Spring

7. LPS - Last Point of Support (Re-entry Signal)

LAST POINT OF SUPPORT (LPS)

Definition: A pullback after SOS on LOW volume that
provides another low-risk entry opportunity.

Detection Rules (our code):
• Recent SOS in last 10 bars
• Pullback (negative return)
• Volume Ratio < 0.8 (below average)
• Stays above support

Chart Pattern:

SOS

LPS: Low volume pullback

Volume DECREASES on pullback

Why LPS is a great entry:
• Confirms demand is in control
• Lower risk than buying at highs
• Stop loss can be placed below LPS

Trading Action: Excellent place to add or initiate positions

DISTRIBUTION Events (Bearish)

1. BC - Buying Climax

```
□ □ □ □
```

Resistance (ICE)
LOW VOLUME = Trap

Why Upthrusts Work (opposite of Spring):
• Triggers buy stops above resistance
• Traps breakout buyers
• Smart money sells to trapped buyers
• Creates selling fuel for markdown

Trading Action: EXIT longs / Enter SHORT positions

3. SOW - Sign of Weakness ☆ (Distribution Confirmation)

SIGN OF WEAKNESS (SOW)

Definition: A decline that breaks below support on
INCREASING volume, confirming distribution is complete.

Detection Rules (our code):
• Close breaks below support
• Price change < -1.5%
• Volume Ratio > 1.3

Chart Pattern:
UT
Support (ICE)
SOW breaks below ICE
Volume INCREASING

Trading Action: EXIT all longs. Consider shorts.

4. LPSY - Last Point of Supply

LAST POINT OF SUPPLY (LPSY)

Definition: A weak rally after SOW on LOW volume.
Marks the final opportunity to exit or short.

```
│ Detection Rules (our code):                          │
│ • Recent SOW in last 10 bars                         │
│ • Rally (positive return)                            │
│ • Volume Ratio < 0.8                                 │
│ • Stays below resistance                             │
│                                                      │
│ Chart Pattern:                                       │
│       │                                              │
│       │ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ Resistance ─ ─ ─ ─ ─ ─  │
│       │   ╱ ╲                                        │
│       │  ╱   ╲╱ LPSY: Weak rally, low volume         │
│       │ ╱     ╲                                      │
│       │╱       ╲                                     │
│       │         ╲                                    │
│       │  SOW     ╲╱ Markdown continues               │
│       │ ╱╲       ╲                                   │
│                                                      │
│ Trading Action: Short positions or add to shorts     │
│                                                      │
└──────────────────────────────────────────────────────┘
```

📅 The Five Wyckoff Phases

Phase A: Stopping the Previous Trend

```
┌──────────────────────────────────────────────────────┐
│ PHASE A: STOPPING THE TREND                          │
├──────────────────────────────────────────────────────┤
│                                                      │
│ Purpose: The prior trend (up or down) comes to a halt │
│                                                      │
│ In ACCUMULATION (stopping downtrend):                │
│ Events: PS → SC → AR → ST                            │
│                                                      │
│    │                                                 │
│    │ ╲                                               │
│    │  ╲  PS                                          │
│    │   ╲ ╲                                           │
│    │    ╲ ╲                                          │
│    │     ╲  SC                                       │
│    │      ╲╱╲  AR                                    │
│    │        ╲ ╲                                      │
│    │         ╲ ST                                    │
│    │                                                 │
│                                                      │
│ Key Signs:                                           │
│ • Climactic volume and wide price spread             │
│ • Preliminary support/supply fails                   │
│ • Automatic reaction sets range boundary             │
│ • Secondary test confirms range                      │
```

```
│                                                │
│ Trading: NO TRADING - Just observe and establish range        │
│                                                │
```

Phase B: Building the Cause

```
┌────────────────────────────────────────────────┐
│ PHASE B: BUILDING THE CAUSE                    │
└────────────────────────────────────────────────┘
│                                                │
│ Purpose: Institutions accumulate/distribute while price       │
│ oscillates within the established trading range               │
│                                                │
│ Duration: Can last weeks, months, or even years               │
│                                                │
│ Chart Pattern:                                 │
│    Resistance (Creek/AR)                       │
│                                                │
│                                                │
│                                                
```

```
│                                                │
│ In DISTRIBUTION: UPTHRUST (UTAD)                │
│    │              │ │└┘ UPTHRUST (false breakout)  │
│    │             │ │                  │
│    │└┘└┘└┘
```

```
┌─────────────
```

```
        phase = "Phase A/B - Accumulation Building"
        bias = "NEUTRAL"

    elif 'BC' in events or 'UT' in events:
        if price_trend < -2:
            phase = "Phase C/D - Distribution Test/Markdown"
            bias = "BEARISH"
        else:
            phase = "Phase A/B - Distribution Building"
            bias = "NEUTRAL"

    elif 'SOS' in events:
        phase = "Phase D/E - Markup"
        bias = "BULLISH"

    elif 'SOW' in events:
        phase = "Phase D/E - Markdown"
        bias = "BEARISH"

    else:
        phase = "Phase B - Trading Range"
        bias = "NEUTRAL"

    return {'phase': phase, 'bias': bias}
```

💰 Backtesting Strategy (Our Trading Rules)

Entry Rules

```
□ □ □ □
```

```
┌─────────────────────────────────────────────────────────────────────────────┐
│                                                                             │
│ Signal        │ Condition                 │ Action        │
├──────────────────────────────────────────────────────────────────────────────┤
│ UPTHRUST (UT) │ False breakout above res. │ EXIT          │
│ LPSY          │ Weak rally after SOW      │ EXIT          │
│ SOW           │ Break below support       │ EXIT          │
│ STOP LOSS     │ Price < Entry - 5%        │ EXIT          │
│ TAKE PROFIT   │ Price > Entry + 15%       │ EXIT          │
│                                                                             │
│ Code Logic:                                                                 │
│ if event in ['UT', 'LPSY', 'SOW']:                                          │
│     exit_trade()                                                            │
│ elif price < entry_price * 0.95:  # 5% stop                                 │
│     exit_trade(reason='stop_loss')                                          │
│ elif price > entry_price * 1.15:  # 15% profit                              │
│     exit_trade(reason='take_profit')                                        │
│                                                                             │
└─────────────────────────────────────────────────────────────────────────────┘
```

Backtest Metrics

```
┌─────────────────────────────────────────────────────────────────────────────┐
│                    BACKTEST OUTPUT METRICS                                  │
├──────────────────────────────────────────────────────────────────────────────┤
│                                                                             │
│ Metric            │ Description                                             │
├──────────────────────────────────────────────────────────────────────────────┤
│ Total Trades      │ Number of completed trades                              │
│ Win Rate          │ % of profitable trades                                  │
│ Total Return      │ Sum of all trade P&Ls                                   │
│ Average Return    │ Mean P&L per trade                                      │
│ Max Win           │ Largest winning trade                                   │
│ Max Loss          │ Largest losing trade                                    │
│ Profit Factor     │ Gross profit / Gross loss                               │
│ Avg Holding Days  │ Average trade duration                                  │
│                                                                             │
│ Example Output:                                                             │
│ {                                                                           │
│   'total_trades': 5,                                                        │
│   'win_rate': 60.0,                                                         │
│   'total_return': 12.5,                                                     │
│   'avg_return': 2.5,                                                        │
│   'max_win': 8.2,                                                           │
│   'max_loss': -5.0,                                                         │
│   'profit_factor': 2.1                                                      │
│   }                                                                         │
│                                                                             │
└─────────────────────────────────────────────────────────────────────────────┘
```

📈 What the User Sees After Stock Selection

When a user selects a stock (e.g., AAPL) and clicks "Analyze", they see:

1. Metric Cards (Top Row)

```
┌─────────────────┬─────────────────┬─────────────────┬─────────────────┬─────────────────┐
│  +5.2%  │  5  │  60%  │  +12.5%  │  8  │
│ Price Change │ Total Trades │ Win Rate │ Total Return │ Events │
└─────────────────┴─────────────────┴─────────────────┴─────────────────┴─────────────────┘
```

2. Phase Indicator

```
┌─────────────────────────────────────────────────────────────────────────────────────────┐
│ Current Market Phase │
├─────────────────────────────────────────────────────────────────────────────────────────┤
│ Phase C/D - Accumulation Test/Markup │
│ Spring detected with upward price action. Watch for Sign of │
│ Strength to confirm markup. │
│ Bias: BULLISH │
└─────────────────────────────────────────────────────────────────────────────────────────┘
```

3. Interactive Chart

```
┌─────────────────────────────────────────────────────────────────────────────────────────┐
│ AAPL - Wyckoff Analysis │
│ │
│ Price Chart with: │
│ • Candlesticks (green/red) │
│ • 20-day MA (blue line) │
│ • 50-day MA (purple line) │
│ • Support line (green dashed) │
│ • Resistance line (red dashed) │
│ • Event markers (SC, SP, SOS, etc.) │
│ │
│ Volume Panel: │
│ • Volume bars (green up days, red down days) │
│ • Volume MA line │
│ │
│ Volume Ratio Panel: │
│ • Volume ratio line (spikes = significant events) │
│ • 2.0 threshold line │
│ │
└─────────────────────────────────────────────────────────────────────────────────────────┘
```

4. Event Badges

```
┌─────────────────────────────────────────────────────────────────────────────────────────┐
│ Detected Wyckoff Events │
│ │
│ [SC: 2] [SP: 1] [SOS: 2] [LPS: 3] │
│ │
└─────────────────────────────────────────────────────────────────────────────────────────┘
```

5. Trade History

```
□ □ □ □
```

Markdown	Downtrend phase after distribution

---

*Document Version: 1.0**For GenAI Course - Wyckoff Team*