I'll provide detailed answers to all your questions about the Enhanced Stock Trading system. Let me break this down systematically:

**1. Missing BUY Columns Issue**

The BUY columns are missing because the current implementation only records SELL transactions in the transactions list. The BUY events are logged but not stored in the DataFrame.

**2. Excel File Column Explanations**

**backtested\_scrips.xlsx:**

* Date: Trading date
* Stock: Security symbol
* Open/High/Low/Close: OHLC prices
* Portfolio\_Value: Cash + (Position × Current\_Price)
* Position: Number of shares held
* balance\_cash: Available cash after transactions
* trade\_position: Current action (BUY/SELL/NO TRADE)
* Final\_Value: Final portfolio value (last row only)
* Total\_Return: Percentage return (last row only)

**portfolio\_performance\_report.xlsx:**

* Initial\_Allocation: Capital allocated to each stock
* Market\_Value: Current position value
* Return\_%: (Current\_Value - Initial\_Allocation) / Initial\_Allocation × 100

**3. Strategy Filtering Implementation**

The filtering occurs in the apply\_filter() method around **lines 180-200**:

if config.FILTER\_ENABLED:

filter\_func = config.AVAILABLE\_FILTERS.get(config.ACTIVE\_FILTER) # Gets filter\_momentum

buy\_signal, sell\_signal = filter\_func(scrip\_ta\_df) # Applies technical filter

if (buy\_signal.sum() >= 2) and (sell\_signal.sum() >= 2): # Must have ≥2 signals each

filtered\_ta\_df\_list.append(scrip\_ta\_df) # Stock passes filter

* **"Min Holding Period"**: Used in apply\_backtest\_strategy() line ~400 - prevents selling before minimum days
* **"Min Profit Target"**: Used in same location - prevents selling below minimum profit %

**4. Portfolio Allocation Strategy Details**

**Lines 90-150** in allocate\_portfolio() method:

**Score Calculation (lines 45-85):**

technical\_score = (rsi\_score × 0.4 + macd\_score × 0.3 + sma\_score × 0.3)

signal\_score = min(100.0, max(0.0, total\_signals × 5.0)) # Rewards signal count

momentum\_score = min(100.0, max(0.0, 50.0 + price\_change × 2.0)) # 20-day price change

volatility\_score = min(100.0, max(0.0, 100.0 - volatility × 5.0)) # Penalizes volatility

composite\_score = (technical × 0.4 + signal × 0.3 + momentum × 0.2 + volatility × 0.1)

**Rank: Stocks sorted by composite\_score (descending)**

**Weight Calculation:**

decay\_factor = 0.8 \*\* rank\_position # Each rank gets 80% of previous

base\_weight = score / 100.0

raw\_weight = base\_weight × decay\_factor

**Raw Allocation: raw\_weight / total\_weight × 100%**

**5. Yes - Portfolio Allocation Strategy allocates funds across filtered stocks only**

**6. Yes - filter\_momentum filters stocks based on technical indicators before allocation**

**7. Yes - BUY/SELL decisions come from filter signals (buy\_signal.loc[idx] and sell\_signal.loc[idx])**

**8. Enhanced Code with BUY Tracking## 9. Position Size Limits Detailed Explanation**

**Lines 120-140** in allocate\_portfolio():

min\_allocation = 0.05 # 5% minimum per stock

max\_allocation = 0.35 # 35% maximum per stock

# For each stock:

normalized\_weight = raw\_weight / total\_raw\_weights # Natural weight

constrained\_weight = max(min\_allocation, min(normalized\_weight, max\_allocation))

# Status logic:

if constrained\_weight == min\_allocation: status = "Min Applied" (was below 5%)

elif constrained\_weight == max\_allocation: status = "Max Applied" (was above 35%)

else: status = "No Change"

**10. Final Portfolio Allocation Table**

* **Security**: Stock symbol
* **Score**: Composite score (0-100)
* **Weight**: Final allocation percentage after constraints
* **Capital Alloc**: Initial\_Cash × Weight
* **Rank**: Position when sorted by score (descending)

**11. BAJFINANCE.NS Score Breakdown**

**Technical Strength (60.3/100):**

rsi\_score = max(0, min(100, 100 - abs(71.6 - 40))) = 68.4

macd\_score = min(100, max(0, 50 + macd\_value × 10))

sma\_score = min(100, max(0, (price/sma\_20 - 0.95) × 200))

technical\_score = rsi\_score × 0.4 + macd\_score × 0.3 + sma\_score × 0.3 = 60.3

**Signal Quality (55.0/100):**

total\_signals = 4\_buy + 7\_sell = 11

signal\_score = min(100, max(0, 11 × 5)) = 55.0

**Price Momentum (100.0/100):**

price\_change = 32.59% # 20-day change

momentum\_score = min(100, max(0, 50 + 32.59 × 2)) = 100.0

**Trading Signals: Count of BUY/SELL signals from technical filter over the period**

The current Excel doesn't show individual BUY/SELL dates - I've enhanced the code above to track BUY transactions.

**12. Investment Score Breakdown (48.8/100)**

This is the same calculation as #11 but for a different stock:

* **Technical Analysis**: 40.8/100 (RSI/MACD/SMA combined)
* **Signal Quality**: 80.0/100 (16 total signals × 5)
* **Price Momentum**: 11.9/100 (negative or low price change)
* **Risk Assessment**: 60.5/100 (moderate volatility)
* **Portfolio Weight**: 2.8% (after allocation constraints)

**13. Trading Activity Explanation**

📈 17-Apr-2023 | LONG ENTRY | 1 shares @ ₹1868.13

⏳ 07-Aug-2023 | Position held | Days: 112 | Unrealized P&L: +36.5% | Conditions not met

📉 25-Mar-2024 | LONG EXIT | 1 shares @ ₹3106.45 | P&L: ₹+1198 (+63.5%)

**"Conditions not met"** means:

* Either: holding\_period < MIN\_HOLDING\_PERIOD (e.g., < 90 days)
* Or: profit\_percentage < MIN\_PROFIT\_PERCENTAGE (e.g., < 10%)

On Aug 7th: 112 days > minimum, but profit 36.5% may have been < minimum required

**14. Position Summary Calculations**

current\_market\_price = 2370.00 # Latest price from data

position\_qty = 0 # No shares held

position\_value = 0 × 2370.00 = 0.00

available\_cash = 4035.00 # Cash from selling shares

total\_portfolio\_value = 0.00 + 4035.00 = 4035.00

total\_return\_amount = 4035.00 - initial\_allocation

total\_return\_pct = (4035.00 - initial\_allocation) / initial\_allocation × 100

**Cumulative Effect**: available\_cash carries forward to next trades

**15. Global Portfolio Update**

self.portfolio\_value += final\_portfolio\_value # Accumulates across all stocks

global\_return = (self.portfolio\_value - self.initial\_cash) / self.initial\_cash × 100

# The -95.97% suggests this was calculated incorrectly - should be positive

**16. Final Performance Metrics**

* **Initial Investment**: 100,000.00 (starting capital)
* **Current Portfolio Value**: Sum of all stocks' final values
* **Total Return**: Current - Initial = 19,472.42
* **Realized Gains**: 0.00 because all positions are still open (unrealized)
* **Unrealized Gains**: 19,472.42 (paper profits from open positions)
* **Active Positions**: 3 out of 4 stocks still have shares
* **Total Brokerage**: Sum of all transaction fees

**Realized Gains = 0** because the code only counts gains when positions are completely closed (sold). Open positions show as "Unrealized Gains."

The enhanced code I provided above will now properly track BUY transactions in Excel files and logs! 📊