System Development Checklist

Signal Pilot Education Hub

⚙️ Trading System Development Checklist

Lesson 34: System Development

This checklist guides you through building, testing, and deploying a robust trading system from concept to live execution.

📋 Phase 1: System Design

Define Strategy Concept

- [ ] **State hypothesis clearly** - "Liquidity sweeps followed by reversal offer 2.5R edge"
- [ ] **Identify edge source** - What inefficiency are you exploiting? (stop hunts, mean reversion, momentum)
- [ ] **Define market applicability** - Which assets? SPY, QQQ, ES futures? Stocks? Crypto?

- [ ] **Specify timeframe** - Intraday (1/5/15 min) or swing (Daily/Weekly)?

Define Entry Rules (Objective & Mechanical)

- [ ] **List all entry conditions** - Must be 100% objective (no "looks good")
- [ ] **Example:** Price sweeps below swing low + reclaims above + volume > 1.5x avg
- [ ] **Require multi-timeframe confluence** - HTF trend aligned? (Yes/No filter)
- [ ] **Add regime filter** - Only trade in trending regime (ADX > 25)
- [ ] **Include time filters** - Only trade 10 AM - 3 PM? Avoid first 30 min?

Define Exit Rules

- [ ] **Profit target** - Fixed R (2R, 3R) or trailing stop?
- [ ] **Stop loss** - Fixed distance (1 ATR below entry) or structure-based (below swing low)?
- [ ] **Time-based exit** - Close at EOD? Hold overnight?
- [ ] **Partial profit-taking** - Take 50% at 1.5R, let 50% run to 3R?

Position Sizing & Risk Management

- [ ] **Max risk per trade** - 1%, 1.5%, or 2%?
- [ ] **Position size formula** - (Account × Risk%) / Stop distance = shares
- [ ] **Max portfolio heat** - Total risk across all positions ≤ 8%
- [ ] **Max positions** - 3 simultaneous positions max?
- [ ] **Correlation check** - Avoid 2+ correlated positions (diversify)

🎯 Phase 2: Backtesting

Data Preparation

- [ ] **Source historical data** - Yahoo Finance, Alpha Vantage, broker API
- [ ] **Data quality check** - Remove gaps, split-adjusted, dividend-adjusted
- [ ] **Minimum data length** - 3+ years (cover multiple regimes)
- [ ] **Timeframe consistency** - If trading 15-min, backtest on 15-min data

Backtest Execution

- [ ] **Code entry/exit logic** - Python (pandas/backtrader), Excel, or platform (TradingView)
- [ ] **Include slippage** - Assume 0.05% slippage per trade (realistic costs)
- [ ] **Include commissions** - $0.005/share or broker's actual rate
- [ ] **No lookahead bias** - Only use data available at entry time
- [ ] **Walk-forward testing** - Test on out-of-sample data (last 20% of dataset)

Performance Metrics Analysis

- [ ] **Win rate** - Aim for 55%+ (strategy-dependent)
- [ ] **Average R-multiple** - Avg win / avg loss ratio (target 2.0+)
- [ ] **Expectancy** - (Win rate × Avg win) - (Loss rate × Avg loss) > 0.5R
- [ ] **Max drawdown** - Should be < 25% (preferably < 15%)
- [ ] **Sharpe ratio** - > 1.5 (risk-adjusted return quality)
- [ ] **Number of trades** - 100+ trades minimum (statistical significance)

Sensitivity Analysis

- [ ] **Vary stop distance** - Test 0.5 ATR, 1 ATR, 1.5 ATR (which optimal?)
- [ ] **Vary profit target** - Test 1.5R, 2R, 2.5R, 3R (diminishing returns?)
- [ ] **Test different regimes** - Trending vs. ranging performance split
- [ ] **Check parameter robustness** - Small changes shouldn't destroy results

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📊 Phase 3: Paper Trading (Forward Testing)

Paper Trade Setup

- [ ] **Use broker paper account** - TD Ameritrade, Alpaca, TradingView paper
- [ ] **Trade actual market hours** - Same conditions as live
- [ ] **Follow system rules 100%** - No discretion, no skipping signals
- [ ] **Log every trade** - Entry, exit, reason, P&L, emotions

Paper Trading Duration

- [ ] **Minimum 3 months** - Or 30+ trades (whichever comes first)
- [ ] **Track performance metrics** - Win rate, avg R, drawdown
- [ ] **Compare to backtest** - Within 5-10% of backtest results? (realistic)
- [ ] **Identify execution challenges** - Slippage higher than expected?

Go/No-Go Decision

- [ ] **Win rate within 10% of backtest?** - If backtest 65%, paper should be 58-72%
- [ ] **Drawdown within tolerance?** - Max DD < 15-20%?
- [ ] **Can you follow rules?** - Emotional discipline intact?
- [ ] **Is edge still present?** - Positive expectancy maintained?

📊 Phase 4: Live Trading (Deployment)

Live Pilot Phase (Start Small)

- [ ] **Risk 0.5-1% per trade** - Half of target risk (scale in slowly)
- [ ] **Trade for 1-3 months** - Prove consistency before scaling
- [ ] **Track live vs. paper performance** - Slippage, execution quality
- [ ] **Monitor emotional impact** - Real money = different psychology

Full Deployment

- [ ] **Increase to full risk (2%)** - After 20+ successful live trades
- [ ] **Monitor monthly performance** - Compare to backtest/paper
- [ ] **Set kill-switch thresholds** - Stop trading if DD > 20% or 5 consecutive losses
- [ ] **Review quarterly** - Is edge persisting? Market regime changed?

Ongoing System Maintenance

- [ ] **Weekly trade review** - Journal every trade (winners + losers)

- [ ] **Monthly performance attribution** - Which setups worked? Which didn't?
- [ ] **Quarterly system audit** - Backtest on last 3 months (edge still present?)
- [ ] **Regime adjustment** - If regime shifted, pause or adjust filters

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💡 Pro Tips

System Development Mastery

- **Keep it simple** - Complex ≠ better (3-5 entry conditions max)
- **Optimize for robustness, not returns** - Slight parameter changes shouldn't break system
- **Test across regimes** - Great in trending ≠ great in all conditions (know when to trade)
- **Paper trade LONGER than you want** - 3-6 months minimum (build confidence)

Common Mistakes to Avoid

- ❌ Curve-fitting (over-optimizing on historical data)
- ❌ Insufficient trades in backtest (< 100 trades = not statistically significant)
- ❌ Ignoring slippage/commissions (destroys edge in real trading)
- ❌ Skipping paper trading (going live too fast = account killer)
- ❌ No kill-switch rules (letting losing system bleed account)

Red Flags in Backtests

- **Win rate > 80%** - Likely curve-fit or lookahead bias

- **Sharpe > 3.0** - Too good to be true (check for errors)
- **Max DD < 5%** - Unrealistic (expect 15-25% in live trading)
- **Returns > 200%/year** - Probably won't hold in live markets
- **Few trades (< 50)** - Not statistically significant

Kill-Switch Rules (Non-Negotiable)

- **Stop trading if:**
- Daily drawdown > -3%
- 5 consecutive losses
- Max drawdown > 20%
- 3 weeks of negative performance
- System rules violated 3+ times (emotional control lost)

📚 Related Resources

- **Lesson 35:** Machine Learning Trading (advanced system development with ML)
- **Lesson 37:** Trading Automation APIs (automate your system)
- **Lesson 39:** Performance Attribution (analyze which parts of system work)
- **Recommended Tools:** Python (backtrader, zipline), TradingView (Pine Script), Amibroker

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Remember: A trading system without testing is gambling. Test rigorously. Trade small. Scale slowly. Survive first, optimize later.
