ChatGPT

Project Planning

- **Platform Choice:** We chose cTrader for its high-speed execution and advanced automation, which are ideal for scalping. cTrader executes orders in ~70–250ms (industry average ~300–500ms) and maintains very low slippage (≈0.3 pips on EUR/USD) [1]. Its built-in automation features and charting tools make it well-suited for short-term trading strategies [2].
- **Strategy Concept:** The cBot is designed as an automated scalping system with two primary modes (e.g. "Ultra" for aggressive trading and "Precision" for conservative setups). It also includes adaptive "learner" components to adjust parameters based on performance. Key goals are to capture small intra-day moves, manage risk tightly, and adapt to changing market conditions without manual intervention.
- **Design Approach:** Before coding, we documented functional requirements and sketched the strategy flow. As recommended by best practices, we defined a clear requirements blueprint and designed the architecture up front to avoid "cowboy coding" and future rework [3] [4]. This involved listing each logic module (indicators, filters, modes, etc.) and how they interact, ensuring the bot can be maintained and extended over time.

Requirements Gathering

- **User-Defined Strategies:** From multi-phase discussions, users wanted toggles to enable or disable each trading strategy (e.g. different breakout and momentum strategies). Each strategy's entry/exit logic and indicator filters were specified.
- **Configurable Parameters:** Users requested numerous adjustable settings via the UI: trade volume, fixed lot or risk-per-trade, stop-loss/take-profit distances, indicator periods and thresholds (Bollinger period, RSI overbought/oversold levels, ATR multiples, etc.), and session timing. Default values were agreed based on typical scalping setups.
- **Adaptive Learning:** A "meta-learner" requirement was added to adapt strategy parameters over time. This includes simple on-line learning rules (e.g. adjusting stop-loss multipliers or RSI thresholds) based on recent win/loss outcomes, as well as toggles to switch learning on or off.
- **Logging and Analytics:** The design includes a comprehensive logging module ("CAB Logs") to record every trade event, decision trigger, and summary statistic. This satisfies the need for post-trade analysis. Detailed logs track entry conditions, exit conditions, P/L, and any errors or exceptions.
- **Schedule Filters:** To manage risk, the bot includes time-based filters. Users specified trading windows (start/end times, days of week) to avoid low-liquidity or high-volatility periods (e.g. major news events).
- **Requirements Documentation:** All of these features were captured in an internal requirements document. As suggested by development best practices, having this clear functional specification ("blueprint of the system") from the outset ensures the implementation aligns with user expectations [4].

Logic Design

- **MetaVvAI Module:** A high-level controller (termed “MetaVvAI”) monitors market volume and trends. It may compare current volume to a moving average or use simple predictive rules to scale aggression. For example, if market volume spikes, MetaVvAI might tighten risk controls or reduce position sizing. This module encapsulates any advanced “meta” logic or AI-like decision-making.
- **CAB Logs:** The “CAB Logs” system is a custom logging service within the cBot. It captures each order event, account balance changes, indicator values at entry/exit, and the reasons for each decision. This ensures full traceability of the bot’s actions for debugging and performance review.
- **Scalper Modes (Ultra vs. Precision):**
- *Ultra Mode:* When enabled, the bot enters trades with minimal filtering and tighter profit targets (high-frequency scalping). It uses very small stop-losses and takes very quick profits, aiming to scalp micro-movements.
- *Precision Mode:* This mode uses stricter confirmation. Trades are only taken when multiple indicators align, and it uses wider stop-losses with more robust take-profit levels. It may also slow execution (e.g. wait a few bars for confirmation).
- **Volume Handling:** Trade volume is determined by a fixed lot size or risk percentage (configurable). The logic also includes a minimum market volume filter: the bot can skip signals if tick volume is below a threshold, avoiding thin markets.
- **Bollinger Bands:** We use Bollinger Bands to measure volatility and breakout potential. The bot computes a moving average and ±N standard-deviation bands. A close above the upper band triggers bullish conditions; below the lower band triggers bearish signals [5]. Trades may open on band crossovers or on mean-reversion setups (bounce off the bands).
- **RSI (Relative Strength Index):** RSI is a momentum oscillator used to confirm or filter entries. It identifies overbought/oversold conditions (default 70/30 levels). For example, even if a Bollinger breakout occurs, we may only take the trade if RSI indicates momentum (not deeply overbought/sold). The RSI helps avoid counter-trend entries [6].
- **ATR (Average True Range):** ATR measures market volatility (the average price range over a period). We use ATR to set dynamic stop-loss and take-profit distances. For instance, in a high-ATR (volatile) period, stops are placed farther away; in low-ATR times, stops tighten. This prevents the bot from taking large losses during spikes. ATR is explicitly chosen to quantify volatility and set risk proportional to price movement [7].
- **Learners (Adaptive Adjustments):** After each trade or trading session, learning routines can adjust parameters. For example, if Precision Mode yields better profit than Ultra Mode over a week, the bot can slightly raise the threshold to favor the winning mode. Or it can tweak indicator thresholds (e.g. RSI cutoff) based on recent win rates. These adaptive rules are implemented as simple feedback loops in the code.
- **Schedule Filters:** Trades are only opened during allowed hours/days. The bot includes clock checks in its logic loop to enforce user-specified trading windows (e.g. “only trade between 8:00–15:00 server time on weekdays”). This avoids news spikes (outside hours) and aligns with user constraints.

UI and Parameter Mapping

- **Overview:** All user-definable settings are exposed in the cTrader UI under a “Parameters” tab. Each parameter is declared in code with the `[Parameter]` attribute, specifying its name, default value, and group. For example:

```
[Parameter(DefaultValue = 1000)]
public double Volume { get; set; }

[Parameter(DefaultValue = 10)]
public double TakeProfit { get; set; }

[Parameter(DefaultValue = 10)]
public double StopLoss { get; set; }
```

This creates numeric fields for Volume, TakeProfit, StopLoss with defaults 1000, 10, and 10 respectively [8]. Parameters can also be grouped for clarity using the `Group` property [9].

- **Main Toggles:**
- `EnableUltraMode` (bool, default: False) – Toggle to activate Ultra scalping mode.
- `EnablePrecisionMode` (bool, default: False) – Toggle to activate Precision mode.
- `EnableAdaptiveLearning` (bool, default: True) – Enable or disable the adaptive learner routines.
- `EnableMetaVvAI` (bool, default: True) – Enable or disable the MetaVvAI controller.
- `EnableLogging` (bool, default: True) – Turn detailed logging (CAB Logs) on or off.
- **Risk & Trade Settings:**
- `FixedVolume` (double, default: 1000) – The base trade volume in instrument units.
- `RiskPercent` (double, default: 1.0) – Optional; percent of equity risked per trade (if volume auto-calculation is used).
- `StopLossPips` (double, default: 10) – Initial stop-loss in pips.
- `TakeProfitPips` (double, default: 10) – Initial take-profit in pips.
- `MaxTradesPerDay` (int, default: 5) – Maximum number of trades allowed per trading day.
- **Technical Indicator Settings:**
- *Bollinger Bands:* `BBPeriod` (int, default: 20), `BBStdDev` (double, default: 2.0). Optionally `UseBollinger` (bool) to apply this filter.
- *RSI:* `RSIPeriod` (int, default: 14), `RSIOverbought` (double, default: 70), `RSIOversold` (double, default: 30). Also `UseRSI` (bool) to enable RSI filtering.
- *ATR:* `ATRPeriod` (int, default: 14), `ATRMultiplier` (double, default: 1.5). `UseATR` (bool) to incorporate ATR-based stops.
- **Schedule Filters:**
- `TradeStartHour` (TimeOfDay, default: 00:00) – Earliest time of day to open new trades.
- `TradeEndHour` (TimeOfDay, default: 23:59) – Latest time of day to open new trades.
- `AllowedDays` (enum flags, default: All Weekdays) – Days on which trading is allowed.
- **Other Settings:** Additional parameters like `TrailingStopEnabled`, `BreakEvenAfterTP`, etc., are included. Every parameter's purpose and default are documented in the code; the UI shows their names and default values [8].

Implementation

- **Single File Code:** All features were implemented in a single C# `.cs` file (cTrader cBot). No external API calls or third-party libraries are used. We rely solely on the built-in cTrader Automate API.
- **Event-Driven Structure:** The bot uses the standard cTrader event methods: `OnStart()` (initialization), `OnTick()` (per-tick updates), `OnBar()` (per-bar logic), and `OnStop()` (cleanup)

[10] . For example, indicators are initialized in `OnStart()`, and trade logic runs each time a new bar forms.

- **Built-In Indicators:** All technical calculations use cTrader's built-in indicators. For example: `Indicators.BollingerBands`, `Indicators.RelativeStrengthIndex`, and `Indicators.AverageTrueRange` are used to compute values each tick/bar. Since these are part of the cAlgo API, no custom math code or external DLLs are needed.
- **Order Execution:** The bot places orders via `ExecuteMarketOrder(…)`, supplying the symbol, volume, stop-loss and take-profit. Errors and order status are checked, and exceptions (e.g. order rejections) are caught in code to prevent crashes.
- **Module Integration:** Each major feature (modes, filters, learners, logging) is coded in its own logical section. For example, the code first checks if `EnableUltraMode` is true before applying the Ultra entry rules. All modules share common utility routines but are guarded by their enable/disable toggles. This organization keeps the logic clear and modular.
- **No Hidden Dependencies:** Because the bot is a standalone cBot, it has no hidden background services. All configuration comes from parameters. The only required context is the market data feed and account connection in cTrader.

Testing and Validation

- **Backtesting:** We performed extensive backtests on historical data using cTrader's backtesting engine [11] . Both tick data and minute-bar data were used to simulate past market conditions. cTrader generates equity curves and trade statistics automatically, allowing verification that the logic behaves as expected on sample periods (trending, ranging, volatile).
- **Optimization:** Key parameters were stress-tested by running multi-parameter optimizations (e.g. sweeping RSI thresholds or Bollinger periods) to see how sensitive performance is to settings. This helps confirm default values and ensures no extreme sensitivity.
- **Demo (Dry-Run):** Before live use, the cBot was run in a demo account. We observed open/close behavior in real-time and watched the log outputs. This verified that enabling/disabling toggles in the UI correctly turns strategies on/off, and that the bot respects trade limits and schedule windows.
- **Stress Testing:** Scenarios with rapid price movements were tested. For example, simulating news events or trading on 1-second bars ensures the bot doesn't flood orders or crash under volatile conditions. We verified that ATR-based stops widen appropriately and that no divide-by-zero or null-indicator errors occur.
- **Error Handling:** Intentional error conditions were tested (e.g. disconnecting the broker feed briefly) to ensure the bot does not throw unhandled exceptions. The code logs any caught exceptions and stops trading safely.
- **Validation of Modules:** Each module was tested in isolation by toggling others off. For example, we ran the bot with only Ultra mode enabled (others disabled) to verify it trades only on expected signals. Similarly, we disabled the learning routines to compare performance.
- **Logging Review:** The CAB Logs were reviewed after each test run. We confirmed that all expected events (entry conditions, exits, parameter values) were recorded. This helped catch small bugs (like an indicator reference out-of-bounds) and ensured the logs matched the visual chart actions.

Usage Instructions

1. **Install the cBot:** Place the compiled `.algo` (cBot) file in your cTrader Algos folder, or open it via *File → Open Algo...* in the cTrader platform. cTrader will display a "Start cBot" dialog [12].
2. **Select Deployment:** In the dialog, choose whether to run the cBot in the cTrader Cloud or locally (for testing, local/demo is typical). Confirm to install.
3. **Open Algo Manager:** Switch to the **Algo** (Algorithmic Trading) tab in cTrader. You should see the new cBot listed.
4. **Create an Instance:** Click the "+" (Add) button next to the cBot's name, then select the symbol (instrument) and timeframe you want it to trade. A new instance will appear under the cBot listing.
5. **Configure Parameters:** With the instance selected, open the **Parameters** panel (usually below or beside the chart). You will see all toggles and numeric fields defined above. Set them as desired (for example, set `EnableUltraMode = true` to turn on Ultra mode, or adjust indicator periods). Default values are already filled in.
6. **Enable/Disable Modules:** To turn a module on or off, use its corresponding toggle in the UI. For example, setting `EnableRSIFilter = false` will disable RSI-based entries. The parameter descriptions (from code) explain each toggle's effect.
7. **Start the Bot:** Press the **Play** button next to the instance name (or at the top of the chart). The instance status will turn green or orange to indicate it is running. The cBot will begin evaluating signals and placing trades according to the logic.
8. **Monitoring:** While running, monitor the **Log** and **Positions** tabs in cTrader. The log will show entries/exits and any errors. Verify that the bot opens and closes trades as expected.
9. **Stopping and Removing:** To stop trading, press the **Stop** button (the play button toggles to stop). You can delete the instance if needed (trash icon). Under the **Algo** tab, you can also disable or remove the entire cBot.

For more detail on installing and managing cBots, refer to cTrader's documentation. In particular, opening an `.algo` file triggers the install dialog and "Start cBot" window [12], and after installation you manage instances from the Algo tab [13].

Customization Guidelines

- **Editing Parameters:** To change default values, edit the `[Parameter]` attributes in the code. For example, updating `DefaultValue = 10` for `TakeProfit` changes its default. These appear immediately in the UI after rebuilding.
- **Adding New Toggles:** To introduce a new mode or feature, add a public boolean property with a `[Parameter]` attribute. Place it in a logical group (using the `Group` property) so it appears under the right header in the UI [9]. Then implement its logic in the trading code (e.g. wrap a new `if (NewToggle) { ... }` block in `OnTick` / `OnBar`).
- **Integrating New Indicators:** Use cTrader's built-in indicators by calling `Indicators.IndicatorName(...)`. For example, to add a Moving Average filter, you could initialize `ma = Indicators.MovingAverage(...)` in `OnStart()` and then use `ma.Result` in your logic. No additional libraries are needed.
- **Logic Switches:** The code is structured so each feature is separated by its toggle. To change how a strategy works, find the relevant section (labeled by mode or indicator) and adjust the conditions or math. Comments in code indicate where each major block begins.

- **Groups & UI:** Keep parameters organized with meaningful `Name` and `Group` labels in the `[Parameter]` attribute. This ensures the UI remains clear. For example, group all RSI settings under “RSI Filter”.
- **Testing Custom Changes:** After any modification, rebuild the cBot and test on historical data and a demo account. Verify that new parameters appear in the UI and behave as expected. Use the backtest mode in cTrader to quickly check new logic.
- **Documentation:** If adding substantial new logic, update this README and the in-code comments. Clearly document what each new parameter does, and any interactions with existing features (e.g. if two modes cannot run simultaneously).

By following these guidelines, developers and power users can safely adjust the bot’s default behavior or extend it with new trading logic, while maintaining clarity and stability in the system.

Sources: This README was created using cTrader’s official documentation for cBot development [9] [14] [12] and best-practice advice from algorithmic trading resources [1] [3]. These references cover parameter configuration, event methods, backtesting, and general development standards.

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[1] [2] Why Scalpers and Day Traders Prefer cTrader’s Advanced Tools | Billions Club
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[6] RSI Indicator: Buy and Sell Signals
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[12] [13] Installing Algos - cTrader Algo
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