# Binance Futures Trading Bot (USDT-M Testnet)

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https://github.com/shivolen/primetrade_ai_tradingbot

**Objective** : This project implements a CLI-based trading bot for Binance USDT-M Futures Testnet.
 The bot supports core order types (Market, Limit) and an advanced order type (Stop-Limit), with input validation, structured logging, and error handling.

**Key Features**

- Market order placement via Binance Futures REST API

- Limit order placement with exchange-level price validation

- Stop-Limit order support (advanced)

- Command-line interface (CLI)

- Structured logging of requests, responses, and errors

## Architecture & Design

The bot is structured as independent CLI scripts, each responsible for a specific order type:

- market_orders.py – Market order logic

- limit_orders.py – Limit order logic

- advanced/stop_limit.py – Stop-Limit order logic

Each script:

- Accepts user input via CLI

- Validates inputs before order placement

- Sends signed REST requests to Binance Futures Testnet

- Logs all API responses and errors to a shared log file

API Choice

The Binance Futures REST API was used for order placement.
 REST calls were chosen to ensure deterministic request/response behavior on the Futures Testnet while remaining fully compliant with Binance's official API.

# Validation & Error Handling

Input Validation

The following validations are implemented:

- Order side must be BUY or SELL

- Order notional must meet the minimum Futures requirement ($\geq 100$ USDT)

- Required parameters must be provided via CLI

Exchange-Level Validation

Binance Futures enforces additional business rules such as:

- Minimum order notional

- Dynamic price bands for limit orders

- Stop-Limit trigger conditions

Invalid orders are rejected by the exchange with descriptive error messages, which are logged and displayed to the user.

# Logging

All actions are logged to bot.log, including:

- API request responses

- Order acceptance or rejection messages

- Error traces

Each log entry includes a timestamp and log level to support debugging and traceability.

## Results & Screenshots

### Market Order Execution

```
(venv) PS C:\Users\mshiv\Desktop\Internship Grind\binance_trading_bot> python src/market_orders.py BTCUSDT BUY 0.003
RAW RESPONSE ↓
{"orderId":11530629983,"symbol":"BTCUSDT","status":"NEW","clientOrderId":"hSA6ivZcOLdpetRX2D6uQ4","price":"0.00","avgPrice":"0.00","origQty":"0.003","executedQty":"0.000","cumQty":"0.000","cumQuote":"0.00000","timeInForce":"GTC","type":"MARKET","reduceOnly":false,"closePosition":false,"side":"BUY","positionSide":"BOTH","stopPrice":"0.00","workingType":"CONTRACT_PRICE","priceProtect":false,"origType":"MARKET","priceMatch":"NONE","selfTradePreventionMode":"EXPIRE_MAKER","goodTillDate":0,"updateTime":1767940532295}
(venv) PS C:\Users\mshiv\Desktop\Internship Grind\binance_trading_bot>
```

### Limit Order Validation

```
(venv) PS C:\Users\mshiv\Desktop\Internship Grind\binance_trading_bot> python src/limit_orders.py BTCUSDT SELL 0.003 90000
RAW RESPONSE ↓
{"orderId":11530656447,"symbol":"BTCUSDT","status":"NEW","clientOrderId":"RsvKmqzE4GF3CkYEfkJwmx","price":"90000.00","avgPrice":"0.00","origQty":"0.003","executedQty":"0.000","cumQty":"0.000","cumQuote":"0.00000","timeInForce":"GTC","type":"LIMIT","reduceOnly":false,"closePosition":false,"side":"SELL","positionSide":"BOTH","stopPrice":"0.00","workingType":"CONTRACT_PRICE","priceProtect":false,"origType":"LIMIT","priceMatch":"NONE","selfTradePreventionMode":"EXPIRE_MAKER","goodTillDate":0,"updateTime":1767940610369}
(venv) PS C:\Users\mshiv\Desktop\Internship Grind\binance_trading_bot>
```

### Stop-Limit Order Execution

```
(venv) PS C:\Users\mshiv\Desktop\Internship Grind\binance_trading_bot> python src/advanced/stop_limit.py BTCUSDT BUY 0.003 95000 94000
RAW RESPONSE ↓
{"orderId":11530685516,"symbol":"BTCUSDT","status":"NEW","clientOrderId":"lhQcEndbR9gu45ojwzFgSh","price":"95000.00","avgPrice":"0.00","origQty":"0.003","executedQty":"0.000","cumQty":"0.000","cumQuote":"0.00000","timeInForce":"GTC","type":"STOP","reduceOnly":false,"closePosition":false,"side":"BUY","positionSide":"BOTH","stopPrice":"94000.00","workingType":"CONTRACT_PRICE","priceProtect":false,"origType":"STOP","priceMatch":"NONE","selfTradePreventionMode":"EXPIRE_MAKER","goodTillDate":0,"updateTime":1767940695880}
(venv) PS C:\Users\mshiv\Desktop\Internship Grind\binance_trading_bot>
```

```
(venv) PS C:\Users\mshiv\Desktop\Internship Grind\binance_trading_bot> python src/market_orders.py BTCUSDT BUY 0.003
RAW RESPONSE ↓
{"orderId":11530629983,"symbol":"BTCUSDT","status":"NEW","clientOrderId":"hSA6ivZcOLdpetRX2D6uQ4","price":"0.00","avgPrice":"0.00","origQty":"0.003","executedQty":"0.000","cumQty":"0.000","cumQuote":"0.00000","timeInForce":"GTC","type":"MARKET","reduceOnly":false,"closePosition":false,"side":"BUY","positionSide":"BOTH","stopPrice":"0.00","workingType":"CONTRACT_PRICE","priceProtect":false,"origType":"MARKET","priceMatch":"NONE","selfTradePreventionMode":"EXPIRE_MAKER","goodTillDate":0,"updateTime":1767940532295}
(venv) PS C:\Users\mshiv\Desktop\Internship Grind\binance_trading_bot> python src/limit_orders.py BTCUSDT SELL 0.003 90000
RAW RESPONSE ↓
{"orderId":11530656447,"symbol":"BTCUSDT","status":"NEW","clientOrderId":"RsvKmqzE4GF3CkYEfkJwmx","price":"90000.00","avgPrice":"0.00","origQty":"0.003","executedQty":"0.000","cumQty":"0.000","cumQuote":"0.00000","timeInForce":"GTC","type":"LIMIT","reduceOnly":false,"closePosition":false,"side":"SELL","positionSide":"BOTH","stopPrice":"0.00","workingType":"CONTRACT_PRICE","priceProtect":false,"origType":"LIMIT","priceMatch":"NONE","selfTradePreventionMode":"EXPIRE_MAKER","goodTillDate":0,"updateTime":1767940610369}
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(venv) PS C:\Users\mshiv\Desktop\Internship Grind\binance_trading_bot>
```

## Conclusion

The trading bot successfully demonstrates:

- Correct usage of the Binance USDT-M Futures Testnet

- Support for core and advanced order types

- Robust input validation and error handling

- Structured logging for transparency and debugging

This implementation meets all mandatory requirements and includes an advanced order type as an enhancement.