

Binance Futures Testnet CLI Trading Bot

Project Report

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1. Objective

To build a Python-based trading bot that works with Binance Futures Testnet (USDT-M), enabling users to place Market, Limit, Simulated OCO, TWAP, and Grid Trading orders securely through a command-line interface.

2. Tools & Technologies

- **Language:** Python 3
- **API:** Binance Futures Testnet
- **Library:** python-binance
- **Environment Config:** python-dotenv
- **Interface:** Command-line (CLI)
- **Logging:** Python logging module

3. Features Implemented

Feature	Status
Market Orders	✓
Limit Orders	✓
Simulated OCO Orders	✓
TWAP Orders	✓
Grid Trading Orders	✓
CLI Interaction	✓
Input Validation	✓
Error Handling	✓
API Logging	✓
Testnet Integration	✓

4. Architecture Overview

- `binance_client.py` → Initializes Binance Testnet client
- `cli_main.py` → CLI-based menu interface
- `market_orders.py`, `limit_orders.py` → Market and Limit order logic
- `oco_orders.py`, `twap_order.py`, `grid_trading.py` → Advanced order strategies
- `logger_config.py` → Centralized structured logging
- `.env` → Secured API key storage
- `bot.log` → Logs all API actions and errors

5. Screenshots

- CLI Menu in terminal

```
===== Binance Futures CLI Bot =====
1. Place Market Order
2. Place Limit Order
3. Place OCO Order
4. Place TWAP Order
5. Place Grid Orders
6. Exit
Choose an option: [
```

- Successful Market Order

===== Binance Futures CLI Bot =====											
1. Place Market Order											
2. Place Limit Order											
3. Place OCO Order											
4. Place TWAP Order											
5. Place Grid Orders											
6. Exit											
Choose an option: [

- Limit Order placement

===== Binance Futures CLI Bot =====											
1. Place Market Order											
2. Place Limit Order											
3. Place OCO Order											
4. Place TWAP Order											
5. Place Grid Orders											
6. Exit											
Choose an option: 2											
Enter symbol (e.g. BTCUSDT): BTCUSDT											
Enter side (BUY or SELL): SELL											
Enter quantity: 0.02											
Enter limit price: 120000											
Limit Order placed successfully:											
{'orderId': 5226777291, 'symbol': 'BTCUSDT', 'status': 'NEW', 'clientOrderId': 'x-cb7ytekJ43c6bc76698c547bfde30a', 'price': '0.00', 'avgPrice': '0.00', 'origQty': '0.010', 'executedQty': '0.000', 'cumQty': '0.000', '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': 1752003291395}											

===== Binance Futures CLI Bot =====											
Open Orders(13)											
Positions(1)	Open Orders(13)	Order History	Trade History	Transaction History	Position History	API Key	Bots	Assets	Hide Other Symbols	...	
Basic(13) Conditional(0)											
Time	Symbol	Type	Side	Price	Amount	Filled	Reduce Only	Post Only	Trigger Conditions	TP/SL	TIF
2025-07-09 01:07:35	BTCUSDT Perp	Limit	Sell	120,000.00	0.020 BTC	0.000 BTC	No	No	-	--	GTC
2025-07-09 00:38:37	BTCUSDT Perp	Limit	Sell	110,071.00	0.010 BTC	0.000 BTC	No	No	-	--	GTC
2025-07-09 00:38:37	BTCUSDT Perp	Limit	Buy	107,071.00	0.010 BTC	0.000 BTC	No	No	-	--	GTC

- Simulated OCO Order placement

```
===== Binance Futures CLI Bot =====
1. Place Market Order
2. Place Limit Order
3. Place OCO Order
4. Place TWAP Order
5. Place Grid Orders
6. Exit
Choose an option: 3
Enter symbol (e.g. BTCUSDT): BTCUSDT
Enter side (BUY or SELL): SELL
Enter quantity: 0.01
Enter Take-Profit price: 121000
Enter Stop price: 118000
Current market price: 108620.0
Invalid TP/SL prices for SELL. TP must be > market price, SL must be < market price.
```



```
===== Binance Futures CLI Bot =====
1. Place Market Order
2. Place Limit Order
3. Place OCO Order
4. Place TWAP Order
5. Place Grid Orders
6. Exit
Choose an option: 3
Enter symbol (e.g. BTCUSDT): BTCUSDT
Enter side (BUY or SELL): SELL
Enter quantity: 0.01
Enter Take-Profit price: 121000
Enter Stop price: 107000
Current market price: 108620.0
Current market price: 108620.0
OCO simulated: Take-Profit @ 121000, Stop @ 107000
```

- TWAP Orders being placed

```
===== Binance Futures CLI Bot =====
1. Place Market Order
2. Place Limit Order
3. Place OCO Order
4. Place TWAP Order
5. Place Grid Orders
6. Exit
Choose an option: 4
Enter symbol (e.g. BTCUSDT): BTCUSDT
Enter side (BUY or SELL): BUY
Enter total quantity: 0.05
Enter interval in seconds: 10
Enter number of parts: 5
Placing 5 orders of 0.01 BTCUSDT every 10 seconds.
Order 1 placed successfully.
Order 2 placed successfully.
Order 3 placed successfully.
Order 4 placed successfully.
Order 5 placed successfully.
All TWAP orders completed.
```

Order History												<input type="checkbox"/> Hide Other Symbols
Basic		Conditional <small>?</small>										
1 Day	1 Week	1 Month	3 Months	Time	2025-07-08 → 2025-07-09	Search	Reset					Status ▾
Time	Symbol	Type	Side	Average	Price	Executed	Amount	Reduce Only	Post Only	Trigger Conditions		Filled
2025-07-09 01:14:24	BTCUSDT Perp	Market	Buy	108,620.09	—	0.010 BTC	0.010 BTC	No	No	—		Filled
2025-07-09 01:14:13	BTCUSDT Perp	Market	Buy	108,620.09	—	0.010 BTC	0.010 BTC	No	No	—		Filled
2025-07-09 01:14:03	BTCUSDT Perp	Market	Buy	108,620.09	—	0.010 BTC	0.010 BTC	No	No	—		Filled
2025-07-09 01:13:53	BTCUSDT Perp	Market	Buy	108,620.00	—	0.010 BTC	0.010 BTC	No	No	—		Filled
2025-07-09 01:13:42	BTCUSDT Perp	Market	Buy	108,620.10	—	0.010 BTC	0.010 BTC	No	No	—		Filled
2025-07-09 01:04:51	BTCUSDT Perp	Market	Buy	108,620.09	—	0.010 BTC	0.010 BTC	No	No	—		Filled

- Grid Orders being placed

Binance Futures CLI Bot												
Time	Symbol	Type	Side	Price	Amount	Filled	Reduce Only	Post Only	Trigger Conditions	TP/SL	TIF	Cancel All
2025-07-09 01:16:30	BTCUSDT Perp	Limit	Sell	110,120.00	0.010 BTC	0.000 BTC	No	No	—	--	GTC	Chase
2025-07-09 01:16:30	BTCUSDT Perp	Limit	Buy	107,120.00	0.010 BTC	0.000 BTC	No	No	—	--	GTC	Chase
2025-07-09 01:16:29	BTCUSDT Perp	Limit	Sell	109,620.00	0.010 BTC	0.000 BTC	No	No	—	--	GTC	Chase
2025-07-09 01:16:29	BTCUSDT Perp	Limit	Buy	107,620.00	0.010 BTC	0.000 BTC	No	No	—	--	GTC	Chase
2025-07-09 01:16:29	BTCUSDT Perp	Limit	Sell	109,120.00	0.010 BTC	0.000 BTC	No	No	—	--	GTC	Chase
2025-07-09 01:16:28	BTCUSDT Perp	Limit	Buy	108,120.00	0.010 BTC	0.000 BTC	No	No	—	--	GTC	Chase
2025-07-09 01:12:17	BTCUSDT Perp	Stop Market	Sell	—	0.010 BTC	0.000 BTC	No	No	Last Price <= 107,000.00	--	GTC	
2025-07-09 01:12:17	BTCUSDT Perp	Take Profit Market	Sell	—	0.010 BTC	0.000 BTC	No	No	Last Price >= 121,000.00	--	GTC	

===== Binance Futures CLI Bot =====

1. Place Market Order
2. Place Limit Order
3. Place OCO Order
4. Place TWAP Order
5. Place Grid Orders
6. Exit

Choose an option: 5

Enter symbol (e.g. BTCUSDT): BTCUSDT

Enter quantity per order: 0.01

Enter grid spacing in USDT: 500

Enter number of grid levels: 3

Current market price: 108620.0

Buy limit placed at 108120.0

Sell limit placed at 109120.0

Buy limit placed at 107620.0

Sell limit placed at 109620.0

Buy limit placed at 107120.0

Sell limit placed at 110120.0

All grid orders placed.

- bot.log Log File

```
bot.log
1 2025-07-08 21:55:24,714 - ERROR - Error placing market order: API Secret required for private endpoints
2 2025-07-08 21:57:17,561 - ERROR - Error placing market order: API Secret required for private endpoints
3 2025-07-08 22:15:29,302 - ERROR - Error placing market order: API Secret required for private endpoints
4 2025-07-08 22:16:22,791 - ERROR - Error placing market order: API Secret required for private endpoints
5 2025-07-08 22:16:56,496 - ERROR - Error placing market order: API Secret required for private endpoints
6 2025-07-08 22:17:10,504 - ERROR - Error placing market order: API Secret required for private endpoints
7 2025-07-08 22:18:02,925 - ERROR - Error placing market order: APIError(code=-1021): Timestamp for this request
8 2025-07-08 22:20:38,061 - INFO - Market Order executed successfully: {'orderId': 5225632514, 'symbol': 'BTCUSDT'}
9 2025-07-08 22:23:03,020 - ERROR - Error placing limit order: APIError(code=-4164): Order's notional must be
10 2025-07-08 22:23:43,353 - INFO - Limit Order executed successfully: {'orderId': 5225651729, 'symbol': 'BTCUSDT'}
11 2025-07-08 22:27:15,972 - INFO - Market Order executed successfully: {'orderId': 5225680686, 'symbol': 'BTCUSDT'}
12 2025-07-08 22:27:54,844 - ERROR - Error placing limit order: APIError(code=-1022): Signature for this request
13 2025-07-08 22:29:49,715 - INFO - Limit Order executed successfully: {'orderId': 5225702007, 'symbol': 'BTCUSDT'}
14 2025-07-08 22:31:59,824 - INFO - Market Order executed successfully: {'orderId': 5225723997, 'symbol': 'BTCUSDT'}
15 2025-07-08 22:32:16,573 - INFO - Limit Order executed successfully: {'orderId': 5225726662, 'symbol': 'BTCUSDT'}
16 2025-07-08 23:48:09,769 - ERROR - Error placing OCO simulated orders: APIError(code=-2021): Order would immediately
17 2025-07-08 23:49:27,736 - ERROR - Error placing OCO simulated orders: APIError(code=-2021): Order would immediately
18 2025-07-08 23:52:10,177 - INFO - OCO simulated orders placed: TP {'orderId': 5226429755, 'symbol': 'BTCUSDT'}
19 2025-07-08 23:56:42,845 - INFO - OCO simulated orders placed: TP {'orderId': 5226448539, 'symbol': 'BTCUSDT'}
20 2025-07-09 00:36:22,303 - INFO - TWAP Order 1/5 executed: {'orderId': 5226639426, 'symbol': 'BTCUSDT', 'status': 'PENDING'}
21 2025-07-09 00:36:52,508 - INFO - TWAP Order 2/5 executed: {'orderId': 5226642110, 'symbol': 'BTCUSDT', 'status': 'PENDING'}
22 2025-07-09 00:37:22,698 - INFO - TWAP Order 3/5 executed: {'orderId': 5226644566, 'symbol': 'BTCUSDT', 'status': 'PENDING'}
23 2025-07-09 00:37:53,299 - INFO - TWAP Order 4/5 executed: {'orderId': 5226646400, 'symbol': 'BTCUSDT', 'status': 'PENDING'}
24 2025-07-09 00:38:23,650 - INFO - TWAP Order 5/5 executed: {'orderId': 5226649185, 'symbol': 'BTCUSDT', 'status': 'PENDING'}
25 2025-07-09 01:04:20,037 - ERROR - Error placing market order: APIError(code=-1022): Signature for this request
26 2025-07-09 01:04:58,272 - INFO - Market Order executed successfully: {'orderId': 5226777291, 'symbol': 'BTCUSDT'}
27 2025-07-09 01:07:42,114 - INFO - Limit Order executed successfully: {'orderId': 5226791924, 'symbol': 'BTCUSDT'}
28 2025-07-09 01:12:24,709 - INFO - OCO simulated orders placed: TP {'orderId': 5226812466, 'symbol': 'BTCUSDT'}
29 2025-07-09 01:13:49,842 - INFO - TWAP Order 1/5 executed: {'orderId': 5226818473, 'symbol': 'BTCUSDT', 'status': 'PENDING'}
30 2025-07-09 01:14:00,284 - INFO - TWAP Order 2/5 executed: {'orderId': 5226819242, 'symbol': 'BTCUSDT', 'status': 'PENDING'}
31 2025-07-09 01:14:10,521 - INFO - TWAP Order 3/5 executed: {'orderId': 5226819941, 'symbol': 'BTCUSDT', 'status': 'PENDING'}
32 2025-07-09 01:14:20,766 - INFO - TWAP Order 4/5 executed: {'orderId': 5226820575, 'symbol': 'BTCUSDT', 'status': 'PENDING'}
33 2025-07-09 01:14:30,979 - INFO - TWAP Order 5/5 executed: {'orderId': 5226821333, 'symbol': 'BTCUSDT', 'status': 'PENDING'}
```

6. Conclusion

Successfully built a **Binance Futures Testnet trading bot** fulfilling all assignment requirements.

Implemented structured error handling, secure API key management, CLI interaction, order validation, and advanced strategies like **OCO**, **TWAP**, and **Grid Trading**.

Bot fully tested on Binance Futures Testnet and logs API interactions in bot.log.

7. Bonus Suggestions

- Real-time OCO order management (auto-cancel when one fills)
- WebSocket-based real-time position monitoring
- Telegram/Discord trade alerts integration
- Web dashboard UI to monitor live trades and P&L
- Market sentiment analysis integration (e.g., Fear & Greed Index API)