Project Summary

This project is a functional command-line trading bot for the Binance Futures Testnet. It successfully implements all mandatory requirements, including Market and Limit orders, and also includes two advanced, high-priority order types: OCO and TWAP. The bot is built with a focus on security, robust error handling, and clear logging as specified in the assignment.

Design Choices

OCO Orders: I chose to implement OCO orders to demonstrate an understanding of practical risk management tools used by traders. The script handles the batch order placement and correctly interprets the success or failure of each part of the OCO pair.

TWAP Orders: The TWAP strategy was implemented to showcase algorithmic trading logic. The script is user-friendly, allowing for a configurable execution interval. Crucially, it was enhanced to perform a pre-execution check against Binance's minimum notional value rule, preventing API errors before they happen.

Execution Screenshots

1   Market Order Execution

```
PS C:\Users\sachin pal\Desktop\shivamkumar-binance-bot> python src/market_orders.py BTCUSDT BUY 0.001
Placing MARKET BUY order for 0.001 BTCUSDT...
Successfully placed market order!
--- Order ID: 5595486089, Symbol: BTCUSDT, Quantity: 0.001 ---
```

2   Limit Order Execution & Open Order on Binance

```
PS C:\Users\sachin pal\Desktop\shivamkumar-binance-bot> python src/limit_orders.py ETHUSDT SELL 0.01 5000
Placing LIMIT SELL order for 0.01 ETHUSDT at price 5000.0...
Successfully placed limit order!
--- Order ID: 4973740027, Symbol: ETHUSDT, Price: 5000.00, Quantity: 0.010 ---
```

3   OCO Order Execution & Open Orders on Binance

```
PS C:\Users\sachin pal\Desktop\shivamkumar-binance-bot> python src/advanced/oco.py BTCUSDT BUY 0.001 90000 60000
--- Step 1: Opening initial market order position ---
Initial position opened with Order ID: 5595488124
Placing OCO BUY order for 0.001 BTCUSDT...
Successfully sent OCO batch order request. Analyzing response...
--- FAILED -> Code: -2021, Message: Order would immediately trigger. ---
--- SUCCESS -> Order ID: 5595488129, Type: STOP_MARKET, Stop Price: 60000.00 ---

One or more parts of the OCO order failed. Check logs for details.
```

4   TWAP Order Execution & Trade History on Binance

```
PS C:\Users\sachin pal\Desktop\shivamkumar-binance-bot> python src/advanced/twap.py ETHUSDT BUY 0.2 2 30
--- Starting TWAP Execution ---
Total Quantity: 0.2 ETHUSDT
Total Duration: 2 minutes
Executing 4 orders of 0.05 ETHUSDT every 30 seconds.
---------------------------
Executing chunk 1 of 4...
Successfully placed market order for 0.05 ETHUSDT.
Waiting 30 seconds for next chunk...
Executing chunk 2 of 4...
Successfully placed market order for 0.05 ETHUSDT.
Waiting 30 seconds for next chunk...
Executing chunk 3 of 4...
Successfully placed market order for 0.05 ETHUSDT.
Waiting 30 seconds for next chunk...
Executing chunk 4 of 4...
Successfully placed market order for 0.05 ETHUSDT.

--- TWAP Execution Complete ---
```

5   Log File Snippet

'positionSide': 'BOTH', 'stopPrice': '0.00', 'workingType': 'CONTRACT_PRICE', 'priceProtect': False, 'origType': 'MARKET', 'priceMatch': 'NONE', 'selfTradePreventionMode': 'EXPIRE_MAKER', 'goodTillDate': 0, 'updateTime': 1755533421377}
186 2025-08-18 21:40:19 - INFO - Attempting to place OCO BUY order for 0.001 BTCUSDT...
187 2025-08-18 21:40:19 - INFO - SUCCESS: OCO batch order request sent. Response: [{'code': -2021, 'msg': 'Order would immediately trigger.'}, {'orderId': 5595488129, 'symbol': 'BTCUSDT', 'status': 'NEW', 'clientOrderId': 'x-Cb7ytekJ6d98009469967479191167', 'price': '0.00', 'avgPrice': '0.00', 'origQty': '0.001', 'executedQty': '0.000', 'cumQty': '0.000', 'cumQuote': '0.00000', 'timeInForce': 'GTC', 'type': 'STOP_MARKET', 'reduceOnly': True, 'closePosition': False, 'side': 'SELL', 'positionSide': 'BOTH', 'stopPrice': '60000.00', 'workingType': 'CONTRACT_PRICE', 'priceProtect': False, 'origType': 'STOP_MARKET', 'priceMatch': 'NONE', 'selfTradePreventionMode': 'EXPIRE_MAKER', 'goodTillDate': 0, 'updateTime': 1755533421571}]
188 2025-08-18 21:40:19 - ERROR - OCO sub-order failed with code -2021: Order would immediately trigger.
189 2025-08-18 21:40:54 - INFO - Script started: twap.py. Client initialized successfully.
190 2025-08-18 21:40:56 - INFO - Starting TWAP BUY order for 0.2 ETHUSDT over 2 minutes.
191 2025-08-18 21:40:56 - INFO - TWAP Chunk 1/4: Placing market order for 0.05 ETHUSDT.
192 2025-08-18 21:41:27 - INFO - TWAP Chunk 2/4: Placing market order for 0.05 ETHUSDT.
193 2025-08-18 21:41:57 - INFO - TWAP Chunk 3/4: Placing market order for 0.05 ETHUSDT.
194 2025-08-18 21:42:28 - INFO - TWAP Chunk 4/4: Placing market order for 0.05 ETHUSDT.
195 2025-08-18 21:42:28 - INFO - TWAP execution completed successfully.