Data Cleaning & Visualization

using futures market trading data

- This project will consist of the start-to-finish conversion of raw data into a legible and interactive Excel dashboard.

- To create a scenario, we will be evaluating the performance of an S&P500 day trader with a $10,000 simulation account. Data was pulled from historical simulation orders on a real trading platform.

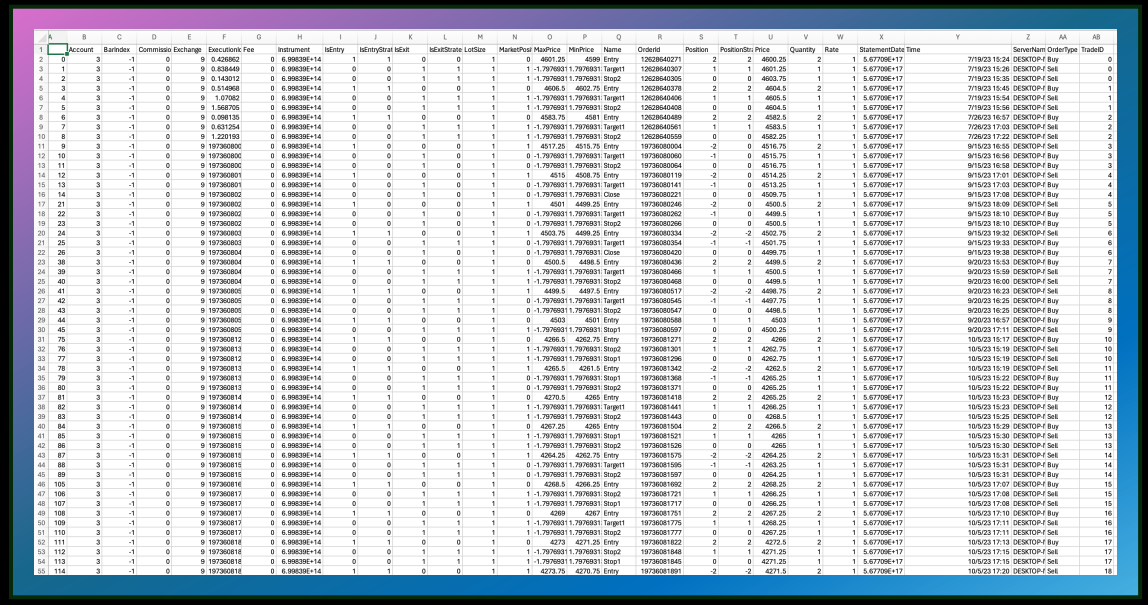
- We will use the dashboard to develop insights and recommend changes to the trader's approach.

raw data and scripts used available here: https://github.com/Ruben-LC/Futures-Trading-Log

Raw Data & Cleaning

.SQLite & Python

- 63 trade orders are downloaded as a .SQLite file and converted into a .csv file readable by Python and Excel.
- With Python, the data is cleaned to group individual orders into clusters which make up each trade so the trades themselves could be analyzed.
- Unneeded information is removed and raw 18-digit timestamps are converted to M-DD-YYYY HH:MM format.
- The data is then exported to a new .csv file to be sent to Excel.

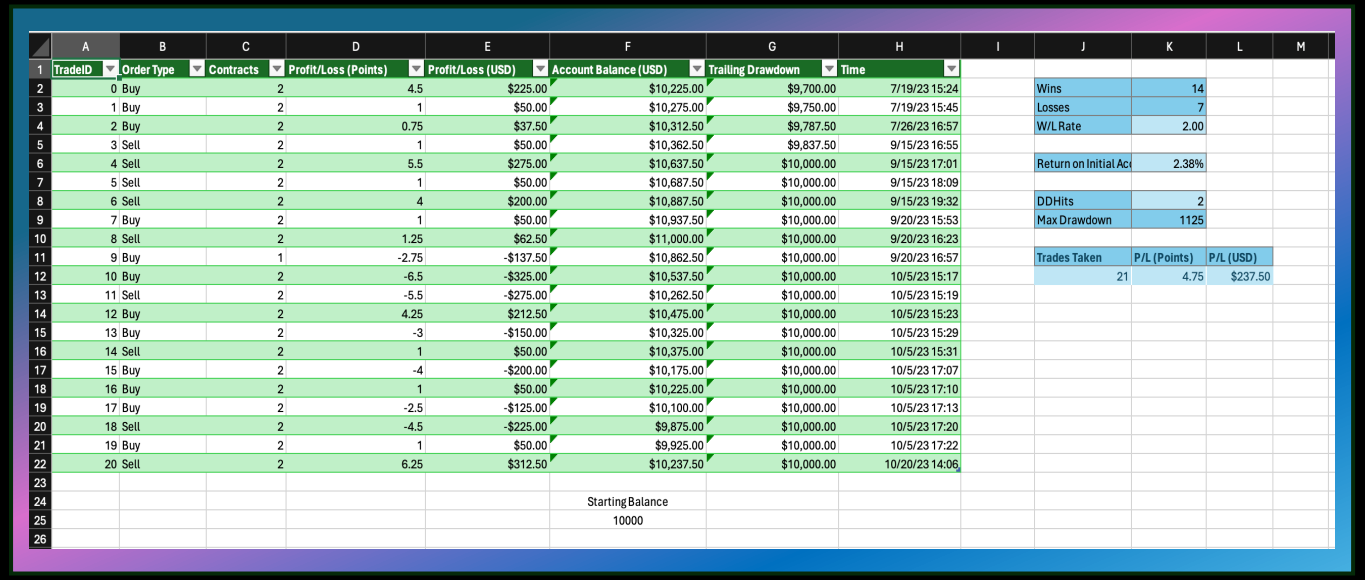


	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB
1		Account	BarIndex	Commissio	Exchange	ExecutionI	Fee	Instrument	IsEntry	IsEntryStrat	IsExit	IsExitStrate	LotSize	MarketPosi	MaxPrice	MinPrice	Name	OrderId	Position	PositionStri	Price	Quantity	Rate	StatementDate	Time	ServerNam	OrderType	TradeID
2	0	3	-1	0	9	0.426862	0	6.99839E+14	1	1	0	0	1	0	4601.25	4599	Entry	12628640271	2	2	4600.25	2	1	5.67709E+17	7/19/23 15:24	DESKTOP-F	Buy	0
3	1	3	-1	0	9	0.838449	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Target1	12628640307	1	1	4601.25	1	1	5.67709E+17	7/19/23 15:26	DESKTOP-F	Sell	0
4	2	3	-1	0	9	0.140312	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Stop2	12628640305	0	0	4603.75	1	1	5.67709E+17	7/19/23 15:35	DESKTOP-F	Sell	0
5	3	3	-1	0	9	0.514968	0	6.99839E+14	1	1	0	0	1	0	4606.5	4602.75	Entry	12628640378	2	2	4604.5	2	1	5.67709E+17	7/19/23 15:45	DESKTOP-F	Buy	1
6	4	3	-1	0	9	1.07082	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Target1	12628640406	1	1	4605.5	1	1	5.67709E+17	7/19/23 15:54	DESKTOP-F	Sell	1
7	5	3	-1	0	9	1.568705	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Stop2	12628640408	0	0	4604.5	1	1	5.67709E+17	7/19/23 15:56	DESKTOP-F	Sell	1
8	6	3	-1	0	9	0.098135	0	6.99839E+14	1	1	0	0	1	0	4583.75	4581	Entry	12628640489	2	2	4582.5	2	1	5.67709E+17	7/26/23 16:57	DESKTOP-F	Buy	2
9	7	3	-1	0	9	0.631254	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Target1	12628640561	1	1	4583.5	1	1	5.67709E+17	7/26/23 17:03	DESKTOP-F	Sell	2
10	8	3	-1	0	9	1.220193	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Stop2	12628640559	0	0	4582.25	1	1	5.67709E+17	7/26/23 17:22	DESKTOP-F	Sell	2
11	9	3	-1	0	9	19736080	0	6.99839E+14	1	0	0	0	1	1	4517.25	4515.75	Entry	19736080004	-2	0	4516.75	2	1	5.67709E+17	9/15/23 16:55	DESKTOP-F	Buy	3
12	10	3	-1	0	9	19736080	0	6.99839E+14	0	0	1	0	1	0	-1.7976931	1.7976931	Target1	19736080060	-1	0	4515.75	1	1	5.67709E+17	9/15/23 16:56	DESKTOP-F	Buy	3
13	11	3	-1	0	9	19736080	0	6.99839E+14	0	0	1	0	1	0	-1.7976931	1.7976931	Stop2	19736080064	0	0	4516.75	1	1	5.67709E+17	9/15/23 16:58	DESKTOP-F	Buy	3
14	12	3	-1	0	9	19736080	0	6.99839E+14	1	0	0	0	1	1	4515	4508.75	Entry	19736080119	-2	0	4514.25	2	1	5.67709E+17	9/15/23 17:01	DESKTOP-F	Sell	4
15	13	3	-1	0	9	19736080	0	6.99839E+14	0	0	1	0	1	0	-1.7976931	1.7976931	Target1	19736080141	-1	0	4513.25	1	1	5.67709E+17	9/15/23 17:03	DESKTOP-F	Buy	4
16	14	3	-1	0	9	19736080	0	6.99839E+14	0	0	1	0	1	0	-1.7976931	1.7976931	Close	19736080221	0	0	4509.75	1	1	5.67709E+17	9/15/23 17:08	DESKTOP-F	Buy	4
17	21	3	-1	0	9	19736080	0	6.99839E+14	1	0	0	0	1	1	4501	4499.25	Entry	19736080246	-2	0	4500.5	2	1	5.67709E+17	9/15/23 18:09	DESKTOP-F	Sell	5
18	22	3	-1	0	9	19736080	0	6.99839E+14	0	0	1	0	1	0	-1.7976931	1.7976931	Target1	19736080262	-1	0	4499.5	1	1	5.67709E+17	9/15/23 18:10	DESKTOP-F	Buy	5
19	23	3	-1	0	9	19736080	0	6.99839E+14	0	0	1	0	1	0	-1.7976931	1.7976931	Stop2	19736080266	0	0	4500.5	1	1	5.67709E+17	9/15/23 18:10	DESKTOP-F	Buy	5
20	24	3	-1	0	9	19736080	0	6.99839E+14	1	1	0	0	1	1	4503.75	4499.25	Entry	19736080334	-2	-2	4502.75	2	1	5.67709E+17	9/15/23 19:32	DESKTOP-F	Sell	6
21	25	3	-1	0	9	19736080	0	6.99839E+14	0	0	1	1	1	0	-1.7976931	1.7976931	Target1	19736080354	-1	-1	4501.75	1	1	5.67709E+17	9/15/23 19:33	DESKTOP-F	Buy	6
22	26	3	-1	0	9	19736080	0	6.99839E+14	0	0	1	0	1	0	-1.7976931	1.7976931	Close	19736080420	0	0	4498.75	1	1	5.67709E+17	9/15/23 19:38	DESKTOP-F	Buy	6
23	38	3	-1	0	9	19736080	0	6.99839E+14	1	1	0	0	1	0	4500.5	4498.5	Entry	19736080436	2	2	4499.5	2	1	5.67709E+17	9/20/23 15:53	DESKTOP-F	Buy	7
24	39	3	-1	0	9	19736080	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Target1	19736080466	1	1	4500.5	1	1	5.67709E+17	9/20/23 15:59	DESKTOP-F	Sell	7
25	40	3	-1	0	9	19736080	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Stop2	19736080468	0	0	4499.5	1	1	5.67709E+17	9/20/23 16:00	DESKTOP-F	Sell	7
26	41	3	-1	0	9	19736080	0	6.99839E+14	1	1	0	0	1	1	4499.5	4497.5	Entry	19736080517	-2	-2	4498.75	2	1	5.67709E+17	9/20/23 16:23	DESKTOP-F	Sell	8
27	42	3	-1	0	9	19736080	0	6.99839E+14	0	0	1	1	1	0	-1.7976931	1.7976931	Target1	19736080545	-1	-1	4497.75	1	1	5.67709E+17	9/20/23 16:25	DESKTOP-F	Buy	8
28	43	3	-1	0	9	19736080	0	6.99839E+14	0	0	1	1	1	0	-1.7976931	1.7976931	Stop2	19736080547	0	0	4498.5	1	1	5.67709E+17	9/20/23 16:25	DESKTOP-F	Buy	8
29	44	3	-1	0	9	19736080	0	6.99839E+14	1	1	0	0	1	0	4503	4501	Entry	19736080588	1	1	4503	1	1	5.67709E+17	9/20/23 16:57	DESKTOP-F	Buy	9
30	45	3	-1	0	9	19736080	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Stop1	19736080597	0	0	4500.25	1	1	5.67709E+17	9/20/23 17:11	DESKTOP-F	Sell	9
31	75	3	-1	0	9	19736081	0	6.99839E+14	1	1	0	0	1	0	4266.5	4262.75	Entry	19736081271	2	2	4266	2	1	5.67709E+17	10/5/23 15:17	DESKTOP-F	Buy	10
32	76	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Stop2	19736081301	1	1	4262.75	1	1	5.67709E+17	10/5/23 15:19	DESKTOP-F	Sell	10
33	77	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Stop1	19736081296	0	0	4262.75	1	1	5.67709E+17	10/5/23 15:19	DESKTOP-F	Sell	10
34	78	3	-1	0	9	19736081	0	6.99839E+14	1	1	0	0	1	1	4265.5	4261.5	Entry	19736081342	-2	-2	4262.5	2	1	5.67709E+17	10/5/23 15:19	DESKTOP-F	Sell	11
35	79	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	0	-1.7976931	1.7976931	Stop1	19736081368	-1	-1	4265.25	1	1	5.67709E+17	10/5/23 15:22	DESKTOP-F	Buy	11
36	80	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	0	-1.7976931	1.7976931	Stop2	19736081371	0	0	4265.25	1	1	5.67709E+17	10/5/23 15:22	DESKTOP-F	Buy	11
37	81	3	-1	0	9	19736081	0	6.99839E+14	1	1	0	0	1	0	4270.5	4265	Entry	19736081418	2	2	4265.25	2	1	5.67709E+17	10/5/23 15:23	DESKTOP-F	Buy	12
38	82	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Target1	19736081441	1	1	4266.25	1	1	5.67709E+17	10/5/23 15:23	DESKTOP-F	Sell	12
39	83	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Stop2	19736081443	0	0	4268.5	1	1	5.67709E+17	10/5/23 15:25	DESKTOP-F	Sell	12
40	84	3	-1	0	9	19736081	0	6.99839E+14	1	1	0	0	1	0	4267.25	4265	Entry	19736081504	2	2	4266.5	2	1	5.67709E+17	10/5/23 15:29	DESKTOP-F	Buy	13
41	85	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Stop1	19736081521	1	1	4265	1	1	5.67709E+17	10/5/23 15:30	DESKTOP-F	Sell	13
42	86	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Stop2	19736081526	0	0	4265	1	1	5.67709E+17	10/5/23 15:30	DESKTOP-F	Sell	13
43	87	3	-1	0	9	19736081	0	6.99839E+14	1	1	0	0	1	1	4264.25	4262.75	Entry	19736081575	-2	-2	4264.25	2	1	5.67709E+17	10/5/23 15:31	DESKTOP-F	Sell	14
44	88	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	0	-1.7976931	1.7976931	Target1	19736081595	-1	-1	4263.25	1	1	5.67709E+17	10/5/23 15:31	DESKTOP-F	Buy	14
45	89	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	0	-1.7976931	1.7976931	Stop2	19736081597	0	0	4264.25	1	1	5.67709E+17	10/5/23 15:31	DESKTOP-F	Buy	14
46	105	3	-1	0	9	19736081	0	6.99839E+14	1	1	0	0	1	0	4268.5	4266.25	Entry	19736081692	2	2	4268.25	2	1	5.67709E+17	10/5/23 17:07	DESKTOP-F	Buy	15
47	106	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Stop2	19736081721	1	1	4266.25	1	1	5.67709E+17	10/5/23 17:08	DESKTOP-F	Sell	15
48	107	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Stop1	19736081717	0	0	4266.25	1	1	5.67709E+17	10/5/23 17:08	DESKTOP-F	Sell	15
49	108	3	-1	0	9	19736081	0	6.99839E+14	1	1	0	0	1	0	4269	4267	Entry	19736081751	2	2	4267.25	2	1	5.67709E+17	10/5/23 17:10	DESKTOP-F	Buy	16
50	109	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Target1	19736081775	1	1	4268.25	1	1	5.67709E+17	10/5/23 17:11	DESKTOP-F	Sell	16
51	110	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Stop2	19736081777	0	0	4267.25	1	1	5.67709E+17	10/5/23 17:11	DESKTOP-F	Sell	16
52	111	3	-1	0	9	19736081	0	6.99839E+14	1	1	0	0	1	0	4273	4271.25	Entry	19736081822	2	2	4272.5	2	1	5.67709E+17	10/5/23 17:13	DESKTOP-F	Buy	17
53	112	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Stop2	19736081848	1	1	4271.25	1	1	5.67709E+17	10/5/23 17:15	DESKTOP-F	Sell	17
54	113	3	-1	0	9	19736081	0	6.99839E+14	0	0	1	1	1	1	-1.7976931	1.7976931	Stop1	19736081845	0	0	4271.25	1	1	5.67709E+17	10/5/23 17:15	DESKTOP-F	Sell	17
55	114	3	-1	0	9	19736081	0	6.99839E+14	1	1	0	0	1	1	4273.75	4270.75	Entry	19736081891	-2	-2	4271.5	2	1	5.67709E+17	10/5/23 17:20	DESKTOP-F	Sell	18

Analyzing Data & Building Metrics

Excel

- Cleaned data is organized and analyzed in excel, with contextual information being created from existing data to complete the picture of the trader's performance.
- Important trading metrics are derived from the new information, such as win/loss rate and number of trades executed.
- Pivot tables are created to build charts which will be included in the final dashboard.



TradeID	Order Type	Contracts	Profit/Loss (Points)	Profit/Loss (USD)	Account Balance (USD)	Trailing Drawdown	Time
0	Buy	2	4.5	$225.00	$10,225.00	$9,700.00	7/19/23 15:24
1	Buy	2	1	$50.00	$10,275.00	$9,750.00	7/19/23 15:45
2	Buy	2	0.75	$37.50	$10,312.50	$9,787.50	7/26/23 16:57
3	Sell	2	1	$50.00	$10,362.50	$9,837.50	9/15/23 16:55
4	Sell	2	5.5	$275.00	$10,637.50	$10,000.00	9/15/23 17:01
5	Sell	2	1	$50.00	$10,687.50	$10,000.00	9/15/23 18:09
6	Sell	2	4	$200.00	$10,887.50	$10,000.00	9/15/23 19:32
7	Buy	2	1	$50.00	$10,937.50	$10,000.00	9/20/23 15:53
8	Sell	2	1.25	$62.50	$11,000.00	$10,000.00	9/20/23 16:23
9	Buy	1	-2.75	-$137.50	$10,862.50	$10,000.00	9/20/23 16:57
10	Buy	2	-6.5	-$325.00	$10,537.50	$10,000.00	10/5/23 15:17
11	Sell	2	-5.5	-$275.00	$10,262.50	$10,000.00	10/5/23 15:19
12	Buy	2	4.25	$212.50	$10,475.00	$10,000.00	10/5/23 15:23
13	Buy	2	-3	-$150.00	$10,325.00	$10,000.00	10/5/23 15:29
14	Sell	2	1	$50.00	$10,375.00	$10,000.00	10/5/23 15:31
15	Buy	2	-4	-$200.00	$10,175.00	$10,000.00	10/5/23 17:07
16	Buy	2	1	$50.00	$10,225.00	$10,000.00	10/5/23 17:10
17	Buy	2	-2.5	-$125.00	$10,100.00	$10,000.00	10/5/23 17:13
18	Sell	2	-4.5	-$225.00	$9,875.00	$10,000.00	10/5/23 17:20
19	Buy	2	1	$50.00	$9,925.00	$10,000.00	10/5/23 17:22
20	Sell	2	6.25	$312.50	$10,237.50	$10,000.00	10/20/23 14:06

Starting Balance
10000

Wins	14
Losses	7
W/L Rate	2.00
Return on Initial Ac	2.38%
DDHits	2
Max Drawdown	1125

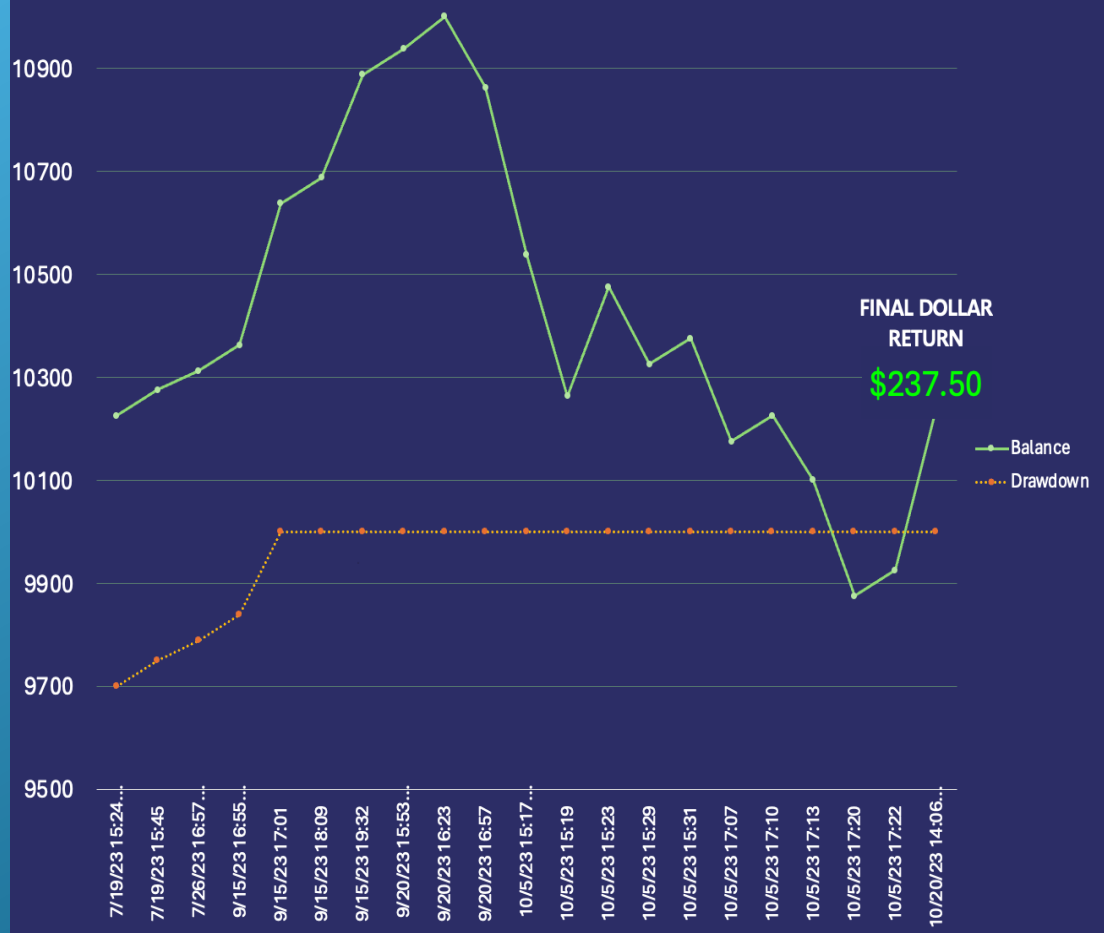
Trades Taken	P/L (Points)	P/L (USD)
21	4.75	$237.50

Building Dashboard

Excel

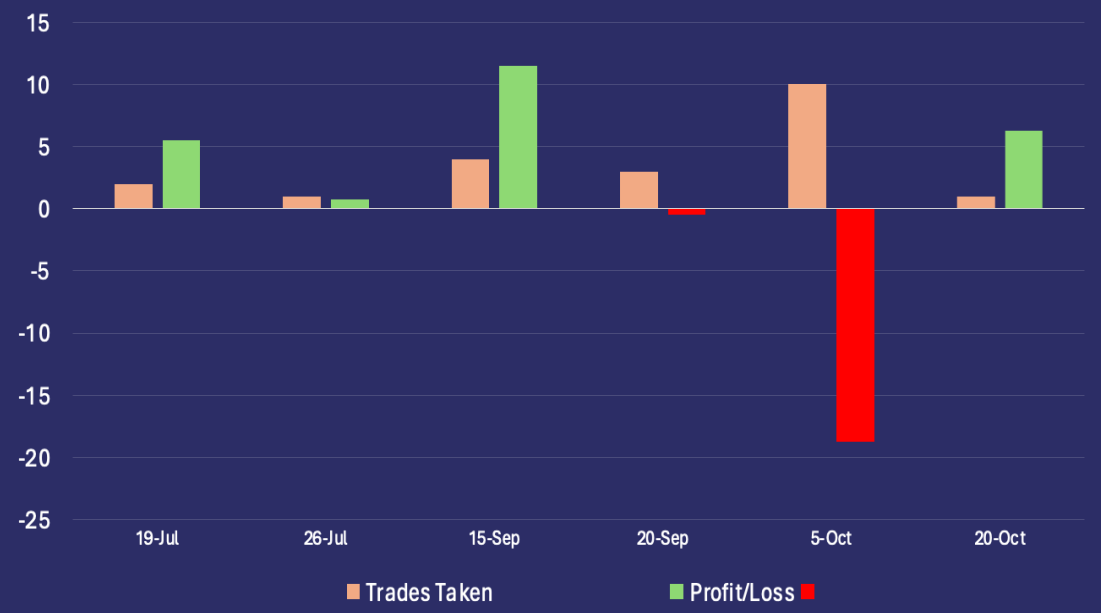
- Using charts already made from pivot tables, visuals are organized into dashboard. Slicers are added for appropriate charts to allow closer examination of dates, order types, and individual trades.
- Key trading metrics are linked from our trade log to summarize performance.

Account Balance (USD)



Profit-to-Trades (points)

1 pt : 50 USD

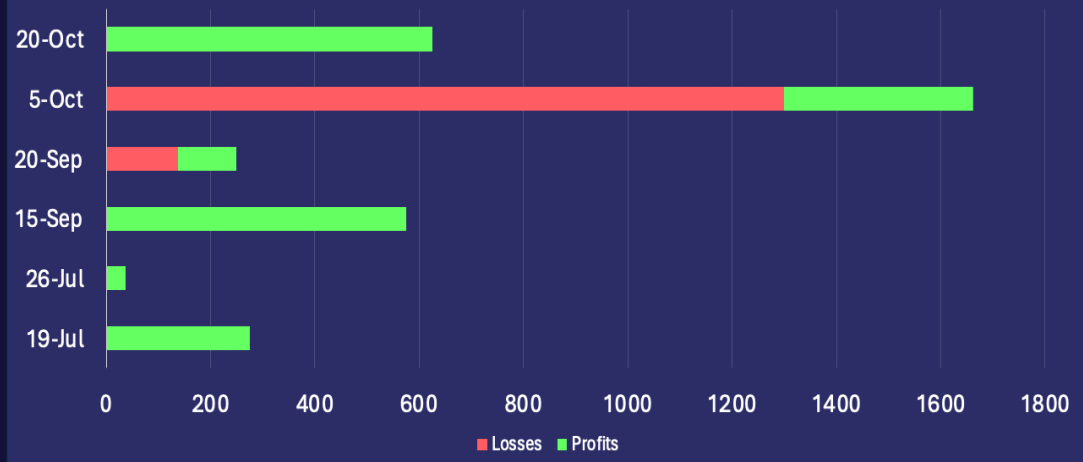


All

Month
- Jul
- Sep
- Oct

Day
- 15-Sep
- 19-Jul
- 20-Oct
- 20-Sep
- 26-Jul
- 5-Oct

Daily Profit:Loss Ratio



TRADER PERFORMANCE

WIN RATE	RETURN	DRAWDOWN HITS
2.00	2.38%	2

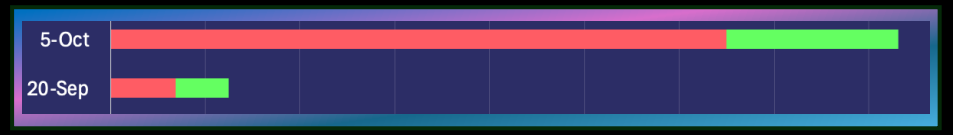
Order Type
- Buy
- Sell

Trade Instance
- 9/20/23 15:53
- 9/20/23 16:23
- 9/20/23 16:57
- 10/5/23 15:17
- 10/5/23 15:19
- 10/5/23 15:23
- 10/5/23 15:29
- 10/5/23 15:31

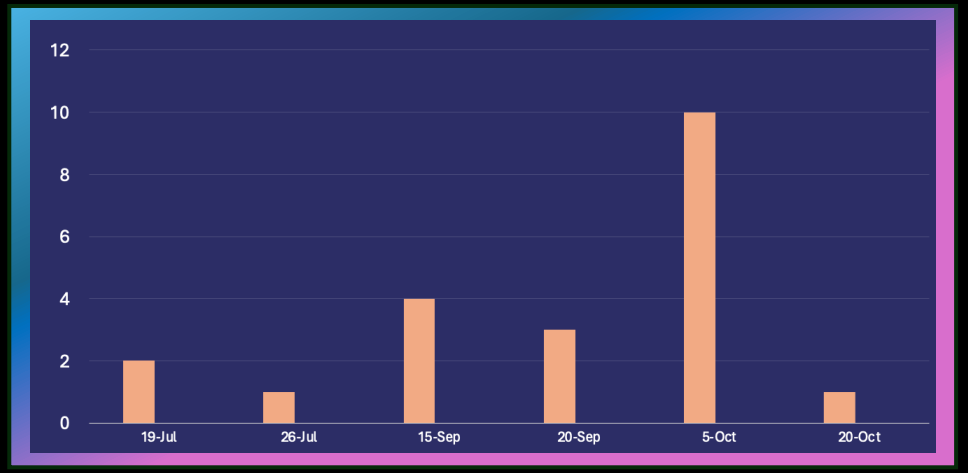
Insights & Recommendations
analysis

- From the final results, this trader's performance seems a success:
  - A final return of +2.38% or $237.50 on a $10,000 account in 6 trading days
  - A 2.00 or 200% win ratio (trader won twice as many trades as they lost)

- Within the context of the data we analyzed, however, these figures suggest inconsistency:
  - The height of the trader's account was almost **$800** more than their final balance, an 8% fluctuation on the initial account in just over a week (**the maximum drawdown of the dataset being over** 10%).
  - Almost half of the total trades were taken in one day (Oct 5), resulting in the highest losses by far, wiping out the success of earlier trading days and hindering the success of subsequent trading days.
  - Losses that day were roughly 10x those of the next highest-loss day.



Highest loss day (Oct 5) compared to next highest loss day (Sept 20)



Number of trades executed by day

Insights & Recommendations

analysis

- Any trader's goals should be to minimize losses and take profits in a consistent manner to secure long-term gains.
- From these outliers we can suggest some amendments to the trader's approach.
  - Limit losses per day to 1 or 2. Despite a 200% win rate, the trader has had substantial losses, suggesting win-side trades are much less significant than loss-side trades in their strategy. When the loss limit is hit, stop trading.
  - Limit trades per day to 1-3. Profitable days had between 1 and 4 trades. As we can see from our outlier, more trades could lead to the extinguishing of any profits made. A streak of too many winning trades can also lead to recklessness.
  - Stop trading for the day if the next loss could put you below the minimum account balance. The first dip below the minimum balance could have been avoided if the trader had stopped at 2, even 3 losses that day.