

FE-515 Homework 3

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2023-04-13

```
# 1. Download option prices of ticker VIX for all expiration dates and name it VIX.options  
library(quantmod)
```

```
## Loading required package: xts
```

```
## Loading required package: zoo
```

```
##
```

```
## Attaching package: 'zoo'
```

```
## The following objects are masked from 'package:base':
```

```
##
```

```
##      as.Date, as.Date.numeric
```

```
##
```

```
## ##### WARNING #####
```

```
## # We noticed you have dplyr installed. The dplyr lag() function breaks how #
```

```
## # base R's lag() function is supposed to work, which breaks lag(my_xts). #
```

```
## # #
```

```
## # If you call library(dplyr) later in this session, then calls to lag(my_xts) #
```

```
## # that you enter or source() into this session won't work correctly. #
```

```
## # #
```

```
## # All package code is unaffected because it is protected by the R namespace #
```

```
## # mechanism. #
```

```
## # #
```

```
## # Set 'options(xts.warn_dplyr_breaks_lag = FALSE)' to suppress this warning. #
```

```
## # #
```

```
## # You can use stats::lag() to make sure you're not using dplyr::lag(), or you #
```

```
## # can add conflictRules('dplyr', exclude = 'lag') to your .Rprofile to stop #
```

```
## # dplyr from breaking base R's lag() function. #
```

```
## ##### WARNING #####
```

```
## Loading required package: TTR
```

```
## Registered S3 method overwritten by 'quantmod':
```

```
##      method      from
```

```
##      as.zoo.data.frame zoo
```

```
VIX.options<- getOptionChain("^VIX")
print(head(VIX.options))
```

```
## $calls
##      ContractID ConractSize Currency Expiration Strike Last Chg
## 1 VIX230419C00010000 REGULAR USD 2023-04-19 10.0 8.35 -0.46999930
## 2 VIX230419C00010500 REGULAR USD 2023-04-19 10.5 10.39 0.00000000
## 3 VIX230419C00011000 REGULAR USD 2023-04-19 11.0 7.45 -0.65000060
## 4 VIX230419C00011500 REGULAR USD 2023-04-19 11.5 9.39 0.00000000
## 5 VIX230419C00012000 REGULAR USD 2023-04-19 12.0 7.05 0.00000000
## 6 VIX230419C00012500 REGULAR USD 2023-04-19 12.5 9.05 0.00000000
## 7 VIX230419C00013000 REGULAR USD 2023-04-19 13.0 5.51 -1.43999960
## 8 VIX230419C00013500 REGULAR USD 2023-04-19 13.5 5.95 0.00000000
## 9 VIX230419C00014000 REGULAR USD 2023-04-19 14.0 4.90 -0.54999970
## 10 VIX230419C00014500 REGULAR USD 2023-04-19 14.5 4.85 0.00000000
## 11 VIX230419C00015000 REGULAR USD 2023-04-19 15.0 3.40 -0.44999980
## 12 VIX230419C00016000 REGULAR USD 2023-04-19 16.0 2.30 -0.58000016
## 13 VIX230419C00017000 REGULAR USD 2023-04-19 17.0 1.35 -0.50000000
## 14 VIX230419C00018000 REGULAR USD 2023-04-19 18.0 0.67 -0.38999993
## 15 VIX230419C00019000 REGULAR USD 2023-04-19 19.0 0.35 -0.25000003
## 16 VIX230419C00020000 REGULAR USD 2023-04-19 20.0 0.21 -0.15000002
## 17 VIX230419C00021000 REGULAR USD 2023-04-19 21.0 0.15 -0.08999999
## 18 VIX230419C00022000 REGULAR USD 2023-04-19 22.0 0.10 -0.07000000
## 19 VIX230419C00023000 REGULAR USD 2023-04-19 23.0 0.09 -0.02000000
## 20 VIX230419C00024000 REGULAR USD 2023-04-19 24.0 0.05 -0.04000000
## 21 VIX230419C00025000 REGULAR USD 2023-04-19 25.0 0.06 -0.03000000
## 22 VIX230419C00026000 REGULAR USD 2023-04-19 26.0 0.05 -0.02000000
## 23 VIX230419C00027000 REGULAR USD 2023-04-19 27.0 0.03 0.00000000
## 24 VIX230419C00028000 REGULAR USD 2023-04-19 28.0 0.04 0.00000000
## 25 VIX230419C00029000 REGULAR USD 2023-04-19 29.0 0.03 0.00000000
## 26 VIX230419C00030000 REGULAR USD 2023-04-19 30.0 0.03 0.00000000
## 27 VIX230419C00031000 REGULAR USD 2023-04-19 31.0 0.02 0.01000000
## 28 VIX230419C00032000 REGULAR USD 2023-04-19 32.0 0.01 -0.01000000
## 29 VIX230419C00032500 REGULAR USD 2023-04-19 32.5 0.01 -0.01000000
## 30 VIX230419C00033000 REGULAR USD 2023-04-19 33.0 0.01 -0.01000000
## 31 VIX230419C00034000 REGULAR USD 2023-04-19 34.0 0.02 0.01000000
## 32 VIX230419C00035000 REGULAR USD 2023-04-19 35.0 0.02 0.00000000
## 33 VIX230419C00036000 REGULAR USD 2023-04-19 36.0 0.02 0.01000000
## 34 VIX230419C00037000 REGULAR USD 2023-04-19 37.0 0.02 0.00000000
## 35 VIX230419C00037500 REGULAR USD 2023-04-19 37.5 0.02 0.00000000
## 36 VIX230419C00038000 REGULAR USD 2023-04-19 38.0 0.01 0.00000000
## 37 VIX230419C00039000 REGULAR USD 2023-04-19 39.0 0.02 0.00000000
## 38 VIX230419C00040000 REGULAR USD 2023-04-19 40.0 0.01 0.00000000
## 39 VIX230419C00042500 REGULAR USD 2023-04-19 42.5 0.01 0.00000000
## 40 VIX230419C00045000 REGULAR USD 2023-04-19 45.0 0.01 0.00000000
## 41 VIX230419C00047500 REGULAR USD 2023-04-19 47.5 0.01 -0.01000000
## 42 VIX230419C00050000 REGULAR USD 2023-04-19 50.0 0.02 0.01000000
## 43 VIX230419C00055000 REGULAR USD 2023-04-19 55.0 0.01 0.00000000
## 44 VIX230419C00060000 REGULAR USD 2023-04-19 60.0 0.01 0.00000000
## 45 VIX230419C00065000 REGULAR USD 2023-04-19 65.0 0.01 0.00000000
## 46 VIX230419C00070000 REGULAR USD 2023-04-19 70.0 0.01 0.00000000
## 47 VIX230419C00075000 REGULAR USD 2023-04-19 75.0 0.01 0.00000000
## 48 VIX230419C00080000 REGULAR USD 2023-04-19 80.0 0.01 0.00000000
```

## 49	VIX230419C00085000	REGULAR	USD	2023-04-19	85.0	0.01	0.00000000	
## 50	VIX230419C00090000	REGULAR	USD	2023-04-19	90.0	0.01	0.00000000	
## 51	VIX230419C00095000	REGULAR	USD	2023-04-19	95.0	0.02	0.00000000	
## 52	VIX230419C00100000	REGULAR	USD	2023-04-19	100.0	0.01	0.00000000	
## 53	VIX230419C00110000	REGULAR	USD	2023-04-19	110.0	0.04	0.00000000	
## 54	VIX230419C00120000	REGULAR	USD	2023-04-19	120.0	0.02	0.00000000	
## 55	VIX230419C00130000	REGULAR	USD	2023-04-19	130.0	0.02	0.00000000	
## 56	VIX230419C00140000	REGULAR	USD	2023-04-19	140.0	0.04	0.00000000	
## 57	VIX230419C00150000	REGULAR	USD	2023-04-19	150.0	0.02	0.00000000	
## 58	VIX230419C00160000	REGULAR	USD	2023-04-19	160.0	0.01	0.00000000	
## 59	VIX230419C00170000	REGULAR	USD	2023-04-19	170.0	0.01	0.00000000	
## 60	VIX230419C00180000	REGULAR	USD	2023-04-19	180.0	0.01	0.00000000	
##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM
## 1	-5.328791	8.05	8.35	27	3029	2023-04-14 14:16:43	6.687502	TRUE
## 2	0.000000	7.55	7.85	20	21	2023-04-04 15:48:06	6.253908	TRUE
## 3	-8.024697	7.05	7.35	4	464	2023-04-14 14:02:29	5.843753	TRUE
## 4	0.000000	6.55	6.85	10	210	2023-04-04 15:48:08	5.449222	TRUE
## 5	0.000000	6.05	6.35	1	595	2023-04-13 13:11:41	5.070316	TRUE
## 6	0.000000	5.55	5.85	150	185	2023-03-30 13:43:31	4.703129	TRUE
## 7	-20.719420	5.05	5.35	3	273	2023-04-14 09:45:41	4.347661	TRUE
## 8	0.000000	4.55	4.85	1	28	2023-04-11 11:49:59	4.000005	TRUE
## 9	-10.091739	4.05	4.35	7	769	2023-04-14 12:58:26	3.660157	TRUE
## 10	0.000000	3.55	3.85	6	12	2023-04-12 09:39:06	3.328127	TRUE
## 11	-11.688307	3.10	3.35	127	2348	2023-04-14 14:11:24	3.039065	TRUE
## 12	-20.138893	2.10	2.33	134	1581	2023-04-14 15:58:45	2.359379	TRUE
## 13	-27.027025	1.18	1.37	485	1208	2023-04-14 16:14:59	1.746095	TRUE
## 14	-36.792450	0.58	0.71	12686	15439	2023-04-14 16:14:07	1.429690	FALSE
## 15	-41.666668	0.27	0.38	5194	23590	2023-04-14 16:14:18	1.343753	FALSE
## 16	-41.666670	0.14	0.24	8074	78224	2023-04-14 16:11:09	1.394534	FALSE
## 17	-37.499996	0.08	0.16	16430	148988	2023-04-14 16:00:54	1.468753	FALSE
## 18	-41.176470	0.05	0.12	31154	81842	2023-04-14 16:00:46	1.570315	FALSE
## 19	-18.181814	0.03	0.09	17642	104516	2023-04-14 15:49:14	1.656252	FALSE
## 20	-44.444447	0.02	0.08	49165	139485	2023-04-14 16:00:58	1.781251	FALSE
## 21	-33.333336	0.01	0.06	26395	220718	2023-04-14 16:06:27	1.843751	FALSE
## 22	-28.571426	0.00	0.06	4253	91049	2023-04-14 16:09:13	1.937500	FALSE
## 23	0.000000	0.00	0.05	67	70093	2023-04-14 16:01:54	2.031255	FALSE
## 24	0.000000	0.01	0.05	9972	55123	2023-04-14 15:39:49	2.218754	FALSE
## 25	0.000000	0.00	0.04	27	59881	2023-04-14 16:04:10	2.218754	FALSE
## 26	0.000000	0.01	0.04	13590	271880	2023-04-14 16:04:15	2.406254	FALSE
## 27	100.000000	0.00	0.03	2	41301	2023-04-14 15:19:00	2.375004	FALSE
## 28	-50.000000	0.00	0.03	2513	35771	2023-04-14 15:38:40	2.468754	FALSE
## 29	-50.000000	0.00	0.03	2952	39367	2023-04-14 15:31:32	2.531254	FALSE
## 30	-50.000000	0.00	0.03	273	31016	2023-04-14 09:56:24	2.562504	FALSE
## 31	100.000000	0.00	0.03	800	30123	2023-04-14 15:37:10	2.687503	FALSE
## 32	0.000000	0.00	0.03	130	166294	2023-04-14 16:14:51	2.750003	FALSE
## 33	100.000000	0.00	0.03	1400	30245	2023-04-14 15:19:27	2.875003	FALSE
## 34	0.000000	0.00	0.02	4000	42075	2023-04-13 15:23:40	2.812503	FALSE
## 35	0.000000	0.00	0.02	1002	11313	2023-04-14 15:45:50	2.875003	FALSE
## 36	0.000000	0.00	0.02	4	12323	2023-04-12 13:41:08	2.875003	FALSE
## 37	0.000000	0.00	0.02	50	38578	2023-04-13 11:01:22	3.000002	FALSE
## 38	0.000000	0.00	0.02	92	125507	2023-04-14 15:42:27	3.062502	FALSE
## 39	0.000000	0.00	0.03	30	17005	2023-04-14 15:18:07	3.375002	FALSE
## 40	0.000000	0.00	0.03	3	61013	2023-04-14 15:18:12	3.562501	FALSE
## 41	-50.000000	0.00	0.03	80	25090	2023-04-14 15:18:48	3.750001	FALSE

## 42	100.000000	0.00	0.03	80	85041	2023-04-14	11:45:03	3.875000	FALSE
## 43	0.000000	0.00	0.03	100	36257	2023-04-14	10:41:54	4.187505	FALSE
## 44	0.000000	0.00	0.02	200	100799	2023-04-14	13:41:51	4.250005	FALSE
## 45	0.000000	0.00	0.02	150	69489	2023-04-14	13:42:39	4.500004	FALSE
## 46	0.000000	0.00	0.02	100	91297	2023-04-14	13:42:57	4.687504	FALSE
## 47	0.000000	0.00	0.02	100	76048	2023-04-14	13:43:22	4.875004	FALSE
## 48	0.000000	0.00	0.02	200	33334	2023-04-14	13:43:46	5.062504	FALSE
## 49	0.000000	0.00	0.02	2	26166	2023-04-05	15:58:07	5.250003	FALSE
## 50	0.000000	0.00	0.02	3	12932	2023-04-10	15:31:31	5.375003	FALSE
## 51	0.000000	0.00	0.02	56	4028	2023-03-28	15:25:32	5.500003	FALSE
## 52	0.000000	0.00	0.02	1	76474	2023-04-10	09:39:21	5.687503	FALSE
## 53	0.000000	0.00	0.02	2	2026	2023-03-21	09:39:29	5.937503	FALSE
## 54	0.000000	0.00	0.02	10	3527	2023-03-31	15:47:57	6.125002	FALSE
## 55	0.000000	0.00	0.02	4	3453	2023-03-22	12:15:04	6.375002	FALSE
## 56	0.000000	0.00	0.02	6	7179	2023-03-20	10:01:08	6.625002	FALSE
## 57	0.000000	0.00	0.02	15	1702	2023-03-22	10:20:07	6.750002	FALSE
## 58	0.000000	0.00	0.02	240	4457	2023-03-21	16:13:00	6.875001	FALSE
## 59	0.000000	0.00	0.02	4	844	2023-03-23	13:58:15	7.125001	FALSE
## 60	0.000000	0.00	0.02	50	15392	2023-03-30	14:10:59	7.250001	FALSE

##

\$puts

##	ContractID	ContractSize	Currency	Expiration	Strike	Last	Chg
## 1	VIX230419P00010000	REGULAR	USD	2023-04-19	10.0	0.01	0.0000000
## 2	VIX230419P00011000	REGULAR	USD	2023-04-19	11.0	0.01	0.0000000
## 3	VIX230419P00011500	REGULAR	USD	2023-04-19	11.5	0.01	0.0000000
## 4	VIX230419P00012000	REGULAR	USD	2023-04-19	12.0	0.01	0.0000000
## 5	VIX230419P00013000	REGULAR	USD	2023-04-19	13.0	0.01	0.0000000
## 6	VIX230419P00013500	REGULAR	USD	2023-04-19	13.5	0.01	0.0000000
## 7	VIX230419P00014000	REGULAR	USD	2023-04-19	14.0	0.01	0.0000000
## 8	VIX230419P00014500	REGULAR	USD	2023-04-19	14.5	0.01	0.0000000
## 9	VIX230419P00015000	REGULAR	USD	2023-04-19	15.0	0.01	0.0000000
## 10	VIX230419P00016000	REGULAR	USD	2023-04-19	16.0	0.01	0.0000000
## 11	VIX230419P00017000	REGULAR	USD	2023-04-19	17.0	0.07	0.0200000
## 12	VIX230419P00018000	REGULAR	USD	2023-04-19	18.0	0.40	0.1100000
## 13	VIX230419P00019000	REGULAR	USD	2023-04-19	19.0	1.07	0.2500001
## 14	VIX230419P00020000	REGULAR	USD	2023-04-19	20.0	1.90	0.3199999
## 15	VIX230419P00021000	REGULAR	USD	2023-04-19	21.0	2.83	0.3799999
## 16	VIX230419P00022000	REGULAR	USD	2023-04-19	22.0	3.75	0.4500000
## 17	VIX230419P00023000	REGULAR	USD	2023-04-19	23.0	4.66	0.4099998
## 18	VIX230419P00024000	REGULAR	USD	2023-04-19	24.0	5.40	0.2300000
## 19	VIX230419P00025000	REGULAR	USD	2023-04-19	25.0	6.65	0.7000003
## 20	VIX230419P00026000	REGULAR	USD	2023-04-19	26.0	7.80	0.4500003
## 21	VIX230419P00027000	REGULAR	USD	2023-04-19	27.0	8.65	0.3499994
## 22	VIX230419P00028000	REGULAR	USD	2023-04-19	28.0	9.59	0.6000004
## 23	VIX230419P00029000	REGULAR	USD	2023-04-19	29.0	10.67	1.1900005
## 24	VIX230419P00030000	REGULAR	USD	2023-04-19	30.0	11.62	0.4700003
## 25	VIX230419P00031000	REGULAR	USD	2023-04-19	31.0	11.10	0.0000000
## 26	VIX230419P00032000	REGULAR	USD	2023-04-19	32.0	13.35	1.0799999
## 27	VIX230419P00032500	REGULAR	USD	2023-04-19	32.5	12.10	0.0000000
## 28	VIX230419P00033000	REGULAR	USD	2023-04-19	33.0	14.58	2.2299995
## 29	VIX230419P00034000	REGULAR	USD	2023-04-19	34.0	14.24	0.0000000
## 30	VIX230419P00035000	REGULAR	USD	2023-04-19	35.0	16.28	0.7800007
## 31	VIX230419P00036000	REGULAR	USD	2023-04-19	36.0	17.12	0.0000000
## 32	VIX230419P00037000	REGULAR	USD	2023-04-19	37.0	16.55	0.0000000

## 33	VIX230419P00037500	REGULAR	USD	2023-04-19	37.5	15.45	0.0000000	
## 34	VIX230419P00038000	REGULAR	USD	2023-04-19	38.0	17.96	0.0000000	
## 35	VIX230419P00039000	REGULAR	USD	2023-04-19	39.0	18.32	0.0000000	
## 36	VIX230419P00040000	REGULAR	USD	2023-04-19	40.0	20.02	0.0000000	
## 37	VIX230419P00042500	REGULAR	USD	2023-04-19	42.5	22.37	0.0000000	
## 38	VIX230419P00045000	REGULAR	USD	2023-04-19	45.0	22.70	0.0000000	
## 39	VIX230419P00047500	REGULAR	USD	2023-04-19	47.5	27.50	0.0000000	
## 40	VIX230419P00050000	REGULAR	USD	2023-04-19	50.0	30.65	0.0000000	
## 41	VIX230419P00055000	REGULAR	USD	2023-04-19	55.0	33.15	0.0000000	
## 42	VIX230419P00060000	REGULAR	USD	2023-04-19	60.0	38.75	0.0000000	
## 43	VIX230419P00065000	REGULAR	USD	2023-04-19	65.0	44.20	0.0000000	
## 44	VIX230419P00070000	REGULAR	USD	2023-04-19	70.0	48.75	0.0000000	
## 45	VIX230419P00075000	REGULAR	USD	2023-04-19	75.0	54.20	0.0000000	
## 46	VIX230419P00080000	REGULAR	USD	2023-04-19	80.0	59.30	0.0000000	
## 47	VIX230419P00085000	REGULAR	USD	2023-04-19	85.0	64.15	0.0000000	
## 48	VIX230419P00090000	REGULAR	USD	2023-04-19	90.0	64.95	0.0000000	
## 49	VIX230419P00095000	REGULAR	USD	2023-04-19	95.0	72.95	0.0000000	
## 50	VIX230419P00100000	REGULAR	USD	2023-04-19	100.0	80.48	0.0000000	
## 51	VIX230419P00110000	REGULAR	USD	2023-04-19	110.0	83.27	0.0000000	
## 52	VIX230419P00120000	REGULAR	USD	2023-04-19	120.0	98.05	0.0000000	
## 53	VIX230419P00130000	REGULAR	USD	2023-04-19	130.0	103.00	0.0000000	
## 54	VIX230419P00140000	REGULAR	USD	2023-04-19	140.0	112.65	0.0000000	
## 55	VIX230419P00150000	REGULAR	USD	2023-04-19	150.0	122.70	0.0000000	
## 56	VIX230419P00180000	REGULAR	USD	2023-04-19	180.0	159.90	0.0000000	
##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM
## 1	0.000000	0.00	0.00	3	14	2023-04-10 15:23:06	0.5000050	FALSE
## 2	0.000000	0.00	0.02	NA	4	2023-02-21 10:15:01	1.8125009	FALSE
## 3	0.000000	0.00	0.00	1	2	2023-04-13 09:35:12	0.5000050	FALSE
## 4	0.000000	0.00	0.02	4	10	2023-02-21 10:15:01	1.5000025	FALSE
## 5	0.000000	0.00	0.00	4	29	2023-03-27 10:30:40	0.5000050	FALSE
## 6	0.000000	0.00	0.00	1	22	2023-04-06 08:52:43	0.5000050	FALSE
## 7	0.000000	0.00	0.00	1	193	2023-04-10 09:42:09	0.5000050	FALSE
## 8	0.000000	0.00	0.00	2	62	2023-04-13 11:55:30	0.5000050	FALSE
## 9	0.000000	0.00	0.02	5	26195	2023-04-12 13:34:10	0.6250038	FALSE
## 10	0.000000	0.00	0.05	83	25272	2023-04-14 15:27:59	0.5156298	FALSE
## 11	39.999996	0.03	0.10	12944	126785	2023-04-14 16:14:59	0.1855550	FALSE
## 12	37.931040	0.37	0.49	54270	161814	2023-04-14 16:14:59	0.0000100	TRUE
## 13	30.487812	1.05	1.19	35823	143573	2023-04-14 16:14:59	0.0000100	TRUE
## 14	20.253159	1.91	2.06	14228	129837	2023-04-14 16:07:27	0.0000100	TRUE
## 15	15.510199	2.79	3.00	4175	177211	2023-04-14 16:01:12	0.0000100	TRUE
## 16	13.636366	3.75	4.00	125	72923	2023-04-14 15:43:34	0.0000100	TRUE
## 17	9.647055	4.75	5.00	2052	93901	2023-04-14 15:33:17	0.0000100	TRUE
## 18	4.448743	5.70	6.00	6	47481	2023-04-14 15:16:54	0.0000100	TRUE
## 19	11.764711	6.70	6.95	126	61116	2023-04-14 15:12:58	0.0000100	TRUE
## 20	6.122453	7.70	7.95	69	48204	2023-04-14 16:13:07	0.0000100	TRUE
## 21	4.216861	8.70	8.95	1535	19441	2023-04-14 15:12:27	0.0000100	TRUE
## 22	6.674087	9.65	9.95	37	17702	2023-04-14 15:07:13	0.0000100	TRUE
## 23	12.552749	10.65	10.95	33	9538	2023-04-14 14:58:26	0.0000100	TRUE
## 24	4.215249	11.65	11.95	76	7631	2023-04-14 15:12:27	0.0000100	TRUE
## 25	0.000000	12.65	12.95	1	975	2023-04-12 11:05:04	0.0000100	TRUE
## 26	8.801955	13.65	13.95	31	1451	2023-04-14 11:27:55	0.0000100	TRUE
## 27	0.000000	14.15	14.45	5	385	2023-04-05 14:41:34	0.0000100	TRUE
## 28	18.056675	14.65	14.95	2	119	2023-04-14 15:06:07	0.0000100	TRUE
## 29	0.000000	15.65	15.95	20	292	2023-04-10 13:54:06	0.0000100	TRUE

```
## 30 5.032263 16.65 16.95 40 949 2023-04-13 09:55:25 0.0000100 TRUE
## 31 0.000000 17.65 17.95 1 52 2023-04-13 15:38:10 0.0000100 TRUE
## 32 0.000000 18.65 18.95 9 137 2023-04-04 16:01:32 0.0000100 TRUE
## 33 0.000000 16.40 16.55 4 229 2023-01-17 09:35:54 0.0000100 TRUE
## 34 0.000000 19.65 19.95 4 417 2023-04-12 15:51:29 0.0000100 TRUE
## 35 0.000000 20.65 20.95 4 547 2023-04-03 09:30:24 0.0000100 TRUE
## 36 0.000000 21.65 21.95 2 146 2023-04-12 16:00:39 0.0000100 TRUE
## 37 0.000000 24.15 24.45 5 128 2023-04-10 09:42:47 0.0000100 TRUE
## 38 0.000000 26.65 26.90 3 36 2023-03-23 09:43:53 0.0000100 TRUE
## 39 0.000000 29.15 29.40 55 55 2023-04-10 15:45:08 0.0000100 TRUE
## 40 0.000000 31.65 31.90 6 228 2023-04-12 09:31:10 0.0000100 TRUE
## 41 0.000000 36.65 36.90 6 26 2023-03-28 15:43:35 0.0000100 TRUE
## 42 0.000000 41.65 41.90 3 43 2023-03-29 03:57:32 0.0000100 TRUE
## 43 0.000000 46.65 46.90 5 30 2023-03-31 11:56:53 0.0000100 TRUE
## 44 0.000000 51.65 51.90 10 105 2023-03-29 14:09:11 0.0000100 TRUE
## 45 0.000000 56.65 56.90 10 130 2023-03-31 10:19:01 0.0000100 TRUE
## 46 0.000000 61.65 61.90 5 6 2023-04-03 13:02:24 0.0000100 TRUE
## 47 0.000000 66.65 66.90 3 3 2023-03-31 09:47:55 0.0000100 TRUE
## 48 0.000000 71.65 71.90 NA 3 2023-03-20 23:45:40 0.0000100 TRUE
## 49 0.000000 76.65 76.90 3 5 2023-03-28 15:43:44 0.0000100 TRUE
## 50 0.000000 81.65 81.90 3 29 2023-04-11 15:16:49 0.0000100 TRUE
## 51 0.000000 87.85 88.15 1 1 2022-12-29 10:43:55 0.0000100 TRUE
## 52 0.000000 95.70 96.05 NA 1 2023-02-14 15:37:36 0.0000100 TRUE
## 53 0.000000 107.65 107.90 1 1 2022-12-29 10:57:54 0.0000100 TRUE
## 54 0.000000 117.50 117.80 1 2 2022-12-30 08:19:20 0.0000100 TRUE
## 55 0.000000 127.40 127.70 1 101 2022-12-29 11:09:20 0.0000100 TRUE
## 56 0.000000 161.60 161.85 10 182 2023-04-10 11:08:36 0.0000100 TRUE
```

#2. Download the current price (last quote price) for ~VIX

```
VIX_Last<- getQuote("~VIX")$Last
VIX_Last
```

```
## [1] 17.07
```

#3. For calls and puts of VIX.options at each expiration calculate the average of Bid and Ask. Create a

```
VIX.options.all<- getOptionChain("~VIX", NULL)
for (i in 1:length(VIX.options.all)) {
  VIX.options.all[[i]]$calls$Price<-0.5*(VIX.options.all[[i]]$calls$Bid + VIX.options.all[[i]]$calls$Ask)
  VIX.options.all[[i]]$puts$Price<-0.5*(VIX.options.all[[i]]$puts$Bid + VIX.options.all[[i]]$puts$Ask)
}
print(head(VIX.options.all))
```

```
## $Apr.19.2023
```

```
## $Apr.19.2023$calls
```

```
##      ContractID ConractSize Currency Expiration Strike Last      Chg
## 1 VIX230419C00010000    REGULAR      USD 2023-04-19  10.0  8.35 -0.46999930
## 2 VIX230419C00010500    REGULAR      USD 2023-04-19  10.5 10.39  0.00000000
## 3 VIX230419C00011000    REGULAR      USD 2023-04-19  11.0  7.45 -0.65000060
## 4 VIX230419C00011500    REGULAR      USD 2023-04-19  11.5  9.39  0.00000000
## 5 VIX230419C00012000    REGULAR      USD 2023-04-19  12.0  7.05  0.00000000
## 6 VIX230419C00012500    REGULAR      USD 2023-04-19  12.5  9.05  0.00000000
## 7 VIX230419C00013000    REGULAR      USD 2023-04-19  13.0  5.51 -1.43999960
## 8 VIX230419C00013500    REGULAR      USD 2023-04-19  13.5  5.95  0.00000000
```

## 9	VIX230419C00014000	REGULAR	USD	2023-04-19	14.0	4.90	-0.54999970		
## 10	VIX230419C00014500	REGULAR	USD	2023-04-19	14.5	4.85	0.00000000		
## 11	VIX230419C00015000	REGULAR	USD	2023-04-19	15.0	3.40	-0.44999980		
## 12	VIX230419C00016000	REGULAR	USD	2023-04-19	16.0	2.30	-0.58000016		
## 13	VIX230419C00017000	REGULAR	USD	2023-04-19	17.0	1.35	-0.50000000		
## 14	VIX230419C00018000	REGULAR	USD	2023-04-19	18.0	0.67	-0.38999993		
## 15	VIX230419C00019000	REGULAR	USD	2023-04-19	19.0	0.35	-0.25000003		
## 16	VIX230419C00020000	REGULAR	USD	2023-04-19	20.0	0.21	-0.15000002		
## 17	VIX230419C00021000	REGULAR	USD	2023-04-19	21.0	0.15	-0.08999999		
## 18	VIX230419C00022000	REGULAR	USD	2023-04-19	22.0	0.10	-0.07000000		
## 19	VIX230419C00023000	REGULAR	USD	2023-04-19	23.0	0.09	-0.02000000		
## 20	VIX230419C00024000	REGULAR	USD	2023-04-19	24.0	0.05	-0.04000000		
## 21	VIX230419C00025000	REGULAR	USD	2023-04-19	25.0	0.06	-0.03000000		
## 22	VIX230419C00026000	REGULAR	USD	2023-04-19	26.0	0.05	-0.02000000		
## 23	VIX230419C00027000	REGULAR	USD	2023-04-19	27.0	0.03	0.00000000		
## 24	VIX230419C00028000	REGULAR	USD	2023-04-19	28.0	0.04	0.00000000		
## 25	VIX230419C00029000	REGULAR	USD	2023-04-19	29.0	0.03	0.00000000		
## 26	VIX230419C00030000	REGULAR	USD	2023-04-19	30.0	0.03	0.00000000		
## 27	VIX230419C00031000	REGULAR	USD	2023-04-19	31.0	0.02	0.01000000		
## 28	VIX230419C00032000	REGULAR	USD	2023-04-19	32.0	0.01	-0.01000000		
## 29	VIX230419C00032500	REGULAR	USD	2023-04-19	32.5	0.01	-0.01000000		
## 30	VIX230419C00033000	REGULAR	USD	2023-04-19	33.0	0.01	-0.01000000		
## 31	VIX230419C00034000	REGULAR	USD	2023-04-19	34.0	0.02	0.01000000		
## 32	VIX230419C00035000	REGULAR	USD	2023-04-19	35.0	0.02	0.00000000		
## 33	VIX230419C00036000	REGULAR	USD	2023-04-19	36.0	0.02	0.01000000		
## 34	VIX230419C00037000	REGULAR	USD	2023-04-19	37.0	0.02	0.00000000		
## 35	VIX230419C00037500	REGULAR	USD	2023-04-19	37.5	0.02	0.00000000		
## 36	VIX230419C00038000	REGULAR	USD	2023-04-19	38.0	0.01	0.00000000		
## 37	VIX230419C00039000	REGULAR	USD	2023-04-19	39.0	0.02	0.00000000		
## 38	VIX230419C00040000	REGULAR	USD	2023-04-19	40.0	0.01	0.00000000		
## 39	VIX230419C00042500	REGULAR	USD	2023-04-19	42.5	0.01	0.00000000		
## 40	VIX230419C00045000	REGULAR	USD	2023-04-19	45.0	0.01	0.00000000		
## 41	VIX230419C00047500	REGULAR	USD	2023-04-19	47.5	0.01	-0.01000000		
## 42	VIX230419C00050000	REGULAR	USD	2023-04-19	50.0	0.02	0.01000000		
## 43	VIX230419C00055000	REGULAR	USD	2023-04-19	55.0	0.01	0.00000000		
## 44	VIX230419C00060000	REGULAR	USD	2023-04-19	60.0	0.01	0.00000000		
## 45	VIX230419C00065000	REGULAR	USD	2023-04-19	65.0	0.01	0.00000000		
## 46	VIX230419C00070000	REGULAR	USD	2023-04-19	70.0	0.01	0.00000000		
## 47	VIX230419C00075000	REGULAR	USD	2023-04-19	75.0	0.01	0.00000000		
## 48	VIX230419C00080000	REGULAR	USD	2023-04-19	80.0	0.01	0.00000000		
## 49	VIX230419C00085000	REGULAR	USD	2023-04-19	85.0	0.01	0.00000000		
## 50	VIX230419C00090000	REGULAR	USD	2023-04-19	90.0	0.01	0.00000000		
## 51	VIX230419C00095000	REGULAR	USD	2023-04-19	95.0	0.02	0.00000000		
## 52	VIX230419C00100000	REGULAR	USD	2023-04-19	100.0	0.01	0.00000000		
## 53	VIX230419C00110000	REGULAR	USD	2023-04-19	110.0	0.04	0.00000000		
## 54	VIX230419C00120000	REGULAR	USD	2023-04-19	120.0	0.02	0.00000000		
## 55	VIX230419C00130000	REGULAR	USD	2023-04-19	130.0	0.02	0.00000000		
## 56	VIX230419C00140000	REGULAR	USD	2023-04-19	140.0	0.04	0.00000000		
## 57	VIX230419C00150000	REGULAR	USD	2023-04-19	150.0	0.02	0.00000000		
## 58	VIX230419C00160000	REGULAR	USD	2023-04-19	160.0	0.01	0.00000000		
## 59	VIX230419C00170000	REGULAR	USD	2023-04-19	170.0	0.01	0.00000000		
## 60	VIX230419C00180000	REGULAR	USD	2023-04-19	180.0	0.01	0.00000000		
##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM	Price
## 1	-5.328791	8.05	8.35	27	3029	2023-04-14 14:16:43	6.687502	TRUE	8.200

## 2	0.000000	7.55	7.85	20	21	2023-04-04	15:48:06	6.253908	TRUE	7.700
## 3	-8.024697	7.05	7.35	4	464	2023-04-14	14:02:29	5.843753	TRUE	7.200
## 4	0.000000	6.55	6.85	10	210	2023-04-04	15:48:08	5.449222	TRUE	6.700
## 5	0.000000	6.05	6.35	1	595	2023-04-13	13:11:41	5.070316	TRUE	6.200
## 6	0.000000	5.55	5.85	150	185	2023-03-30	13:43:31	4.703129	TRUE	5.700
## 7	-20.719420	5.05	5.35	3	273	2023-04-14	09:45:41	4.347661	TRUE	5.200
## 8	0.000000	4.55	4.85	1	28	2023-04-11	11:49:59	4.000005	TRUE	4.700
## 9	-10.091739	4.05	4.35	7	769	2023-04-14	12:58:26	3.660157	TRUE	4.200
## 10	0.000000	3.55	3.85	6	12	2023-04-12	09:39:06	3.328127	TRUE	3.700
## 11	-11.688307	3.10	3.35	127	2348	2023-04-14	14:11:24	3.039065	TRUE	3.225
## 12	-20.138893	2.10	2.33	134	1581	2023-04-14	15:58:45	2.359379	TRUE	2.215
## 13	-27.027025	1.18	1.37	485	1208	2023-04-14	16:14:59	1.746095	TRUE	1.275
## 14	-36.792450	0.58	0.71	12686	15439	2023-04-14	16:14:07	1.429690	FALSE	0.645
## 15	-41.666668	0.27	0.38	5194	23590	2023-04-14	16:14:18	1.343753	FALSE	0.325
## 16	-41.666670	0.14	0.24	8074	78224	2023-04-14	16:11:09	1.394534	FALSE	0.190
## 17	-37.499996	0.08	0.16	16430	148988	2023-04-14	16:00:54	1.468753	FALSE	0.120
## 18	-41.176470	0.05	0.12	31154	81842	2023-04-14	16:00:46	1.570315	FALSE	0.085
## 19	-18.181814	0.03	0.09	17642	104516	2023-04-14	15:49:14	1.656252	FALSE	0.060
## 20	-44.444447	0.02	0.08	49165	139485	2023-04-14	16:00:58	1.781251	FALSE	0.050
## 21	-33.333336	0.01	0.06	26395	220718	2023-04-14	16:06:27	1.843751	FALSE	0.035
## 22	-28.571426	0.00	0.06	4253	91049	2023-04-14	16:09:13	1.937500	FALSE	0.030
## 23	0.000000	0.00	0.05	67	70093	2023-04-14	16:01:54	2.031255	FALSE	0.025
## 24	0.000000	0.01	0.05	9972	55123	2023-04-14	15:39:49	2.218754	FALSE	0.030
## 25	0.000000	0.00	0.04	27	59881	2023-04-14	16:04:10	2.218754	FALSE	0.020
## 26	0.000000	0.01	0.04	13590	271880	2023-04-14	16:04:15	2.406254	FALSE	0.025
## 27	100.000000	0.00	0.03	2	41301	2023-04-14	15:19:00	2.375004	FALSE	0.015
## 28	-50.000000	0.00	0.03	2513	35771	2023-04-14	15:38:40	2.468754	FALSE	0.015
## 29	-50.000000	0.00	0.03	2952	39367	2023-04-14	15:31:32	2.531254	FALSE	0.015
## 30	-50.000000	0.00	0.03	273	31016	2023-04-14	09:56:24	2.562504	FALSE	0.015
## 31	100.000000	0.00	0.03	800	30123	2023-04-14	15:37:10	2.687503	FALSE	0.015
## 32	0.000000	0.00	0.03	130	166294	2023-04-14	16:14:51	2.750003	FALSE	0.015
## 33	100.000000	0.00	0.03	1400	30245	2023-04-14	15:19:27	2.875003	FALSE	0.015
## 34	0.000000	0.00	0.02	4000	42075	2023-04-13	15:23:40	2.812503	FALSE	0.010
## 35	0.000000	0.00	0.02	1002	11313	2023-04-14	15:45:50	2.875003	FALSE	0.010
## 36	0.000000	0.00	0.02	4	12323	2023-04-12	13:41:08	2.875003	FALSE	0.010
## 37	0.000000	0.00	0.02	50	38578	2023-04-13	11:01:22	3.000002	FALSE	0.010
## 38	0.000000	0.00	0.02	92	125507	2023-04-14	15:42:27	3.062502	FALSE	0.010
## 39	0.000000	0.00	0.03	30	17005	2023-04-14	15:18:07	3.375002	FALSE	0.015
## 40	0.000000	0.00	0.03	3	61013	2023-04-14	15:18:12	3.562501	FALSE	0.015
## 41	-50.000000	0.00	0.03	80	25090	2023-04-14	15:18:48	3.750001	FALSE	0.015
## 42	100.000000	0.00	0.03	80	85041	2023-04-14	11:45:03	3.875000	FALSE	0.015
## 43	0.000000	0.00	0.03	100	36257	2023-04-14	10:41:54	4.187505	FALSE	0.015
## 44	0.000000	0.00	0.02	200	100799	2023-04-14	13:41:51	4.250005	FALSE	0.010
## 45	0.000000	0.00	0.02	150	69489	2023-04-14	13:42:39	4.500004	FALSE	0.010
## 46	0.000000	0.00	0.02	100	91297	2023-04-14	13:42:57	4.687504	FALSE	0.010
## 47	0.000000	0.00	0.02	100	76048	2023-04-14	13:43:22	4.875004	FALSE	0.010
## 48	0.000000	0.00	0.02	200	33334	2023-04-14	13:43:46	5.062504	FALSE	0.010
## 49	0.000000	0.00	0.02	2	26166	2023-04-05	15:58:07	5.250003	FALSE	0.010
## 50	0.000000	0.00	0.02	3	12932	2023-04-10	15:31:31	5.375003	FALSE	0.010
## 51	0.000000	0.00	0.02	56	4028	2023-03-28	15:25:32	5.500003	FALSE	0.010
## 52	0.000000	0.00	0.02	1	76474	2023-04-10	09:39:21	5.687503	FALSE	0.010
## 53	0.000000	0.00	0.02	2	2026	2023-03-21	09:39:29	5.937503	FALSE	0.010
## 54	0.000000	0.00	0.02	10	3527	2023-03-31	15:47:57	6.125002	FALSE	0.010
## 55	0.000000	0.00	0.02	4	3453	2023-03-22	12:15:04	6.375002	FALSE	0.010

## 56	0.000000	0.00	0.02	6	7179	2023-03-20	10:01:08	6.625002	FALSE	0.010
## 57	0.000000	0.00	0.02	15	1702	2023-03-22	10:20:07	6.750002	FALSE	0.010
## 58	0.000000	0.00	0.02	240	4457	2023-03-21	16:13:00	6.875001	FALSE	0.010
## 59	0.000000	0.00	0.02	4	844	2023-03-23	13:58:15	7.125001	FALSE	0.010
## 60	0.000000	0.00	0.02	50	15392	2023-03-30	14:10:59	7.250001	FALSE	0.010

##

\$Apr.19.2023\$puts

##	ContractID	ContractSize	Currency	Expiration	Strike	Last	Chg
## 1	VIX230419P00010000	REGULAR	USD	2023-04-19	10.0	0.01	0.0000000
## 2	VIX230419P00011000	REGULAR	USD	2023-04-19	11.0	0.01	0.0000000
## 3	VIX230419P00011500	REGULAR	USD	2023-04-19	11.5	0.01	0.0000000
## 4	VIX230419P00012000	REGULAR	USD	2023-04-19	12.0	0.01	0.0000000
## 5	VIX230419P00013000	REGULAR	USD	2023-04-19	13.0	0.01	0.0000000
## 6	VIX230419P00013500	REGULAR	USD	2023-04-19	13.5	0.01	0.0000000
## 7	VIX230419P00014000	REGULAR	USD	2023-04-19	14.0	0.01	0.0000000
## 8	VIX230419P00014500	REGULAR	USD	2023-04-19	14.5	0.01	0.0000000
## 9	VIX230419P00015000	REGULAR	USD	2023-04-19	15.0	0.01	0.0000000
## 10	VIX230419P00016000	REGULAR	USD	2023-04-19	16.0	0.01	0.0000000
## 11	VIX230419P00017000	REGULAR	USD	2023-04-19	17.0	0.07	0.0200000
## 12	VIX230419P00018000	REGULAR	USD	2023-04-19	18.0	0.40	0.1100000
## 13	VIX230419P00019000	REGULAR	USD	2023-04-19	19.0	1.07	0.2500001
## 14	VIX230419P00020000	REGULAR	USD	2023-04-19	20.0	1.90	0.3199999
## 15	VIX230419P00021000	REGULAR	USD	2023-04-19	21.0	2.83	0.3799999
## 16	VIX230419P00022000	REGULAR	USD	2023-04-19	22.0	3.75	0.4500000
## 17	VIX230419P00023000	REGULAR	USD	2023-04-19	23.0	4.66	0.4099998
## 18	VIX230419P00024000	REGULAR	USD	2023-04-19	24.0	5.40	0.2300000
## 19	VIX230419P00025000	REGULAR	USD	2023-04-19	25.0	6.65	0.7000003
## 20	VIX230419P00026000	REGULAR	USD	2023-04-19	26.0	7.80	0.4500003
## 21	VIX230419P00027000	REGULAR	USD	2023-04-19	27.0	8.65	0.3499994
## 22	VIX230419P00028000	REGULAR	USD	2023-04-19	28.0	9.59	0.6000004
## 23	VIX230419P00029000	REGULAR	USD	2023-04-19	29.0	10.67	1.1900005
## 24	VIX230419P00030000	REGULAR	USD	2023-04-19	30.0	11.62	0.4700003
## 25	VIX230419P00031000	REGULAR	USD	2023-04-19	31.0	11.10	0.0000000
## 26	VIX230419P00032000	REGULAR	USD	2023-04-19	32.0	13.35	1.0799999
## 27	VIX230419P00032500	REGULAR	USD	2023-04-19	32.5	12.10	0.0000000
## 28	VIX230419P00033000	REGULAR	USD	2023-04-19	33.0	14.58	2.2299995
## 29	VIX230419P00034000	REGULAR	USD	2023-04-19	34.0	14.24	0.0000000
## 30	VIX230419P00035000	REGULAR	USD	2023-04-19	35.0	16.28	0.7800007
## 31	VIX230419P00036000	REGULAR	USD	2023-04-19	36.0	17.12	0.0000000
## 32	VIX230419P00037000	REGULAR	USD	2023-04-19	37.0	16.55	0.0000000
## 33	VIX230419P00037500	REGULAR	USD	2023-04-19	37.5	15.45	0.0000000
## 34	VIX230419P00038000	REGULAR	USD	2023-04-19	38.0	17.96	0.0000000
## 35	VIX230419P00039000	REGULAR	USD	2023-04-19	39.0	18.32	0.0000000
## 36	VIX230419P00040000	REGULAR	USD	2023-04-19	40.0	20.02	0.0000000
## 37	VIX230419P00042500	REGULAR	USD	2023-04-19	42.5	22.37	0.0000000
## 38	VIX230419P00045000	REGULAR	USD	2023-04-19	45.0	22.70	0.0000000
## 39	VIX230419P00047500	REGULAR	USD	2023-04-19	47.5	27.50	0.0000000
## 40	VIX230419P00050000	REGULAR	USD	2023-04-19	50.0	30.65	0.0000000
## 41	VIX230419P00055000	REGULAR	USD	2023-04-19	55.0	33.15	0.0000000
## 42	VIX230419P00060000	REGULAR	USD	2023-04-19	60.0	38.75	0.0000000
## 43	VIX230419P00065000	REGULAR	USD	2023-04-19	65.0	44.20	0.0000000
## 44	VIX230419P00070000	REGULAR	USD	2023-04-19	70.0	48.75	0.0000000
## 45	VIX230419P00075000	REGULAR	USD	2023-04-19	75.0	54.20	0.0000000
## 46	VIX230419P00080000	REGULAR	USD	2023-04-19	80.0	59.30	0.0000000

## 47	VIX230419P00085000	REGULAR	USD	2023-04-19	85.0	64.15	0.0000000	
## 48	VIX230419P00090000	REGULAR	USD	2023-04-19	90.0	64.95	0.0000000	
## 49	VIX230419P00095000	REGULAR	USD	2023-04-19	95.0	72.95	0.0000000	
## 50	VIX230419P00100000	REGULAR	USD	2023-04-19	100.0	80.48	0.0000000	
## 51	VIX230419P00110000	REGULAR	USD	2023-04-19	110.0	83.27	0.0000000	
## 52	VIX230419P00120000	REGULAR	USD	2023-04-19	120.0	98.05	0.0000000	
## 53	VIX230419P00130000	REGULAR	USD	2023-04-19	130.0	103.00	0.0000000	
## 54	VIX230419P00140000	REGULAR	USD	2023-04-19	140.0	112.65	0.0000000	
## 55	VIX230419P00150000	REGULAR	USD	2023-04-19	150.0	122.70	0.0000000	
## 56	VIX230419P00180000	REGULAR	USD	2023-04-19	180.0	159.90	0.0000000	
##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM
## 1	0.000000	0.00	0.00	3	14	2023-04-10 15:23:06	0.5000050	FALSE
## 2	0.000000	0.00	0.02	NA	4	2023-02-21 10:15:01	1.8125009	FALSE
## 3	0.000000	0.00	0.00	1	2	2023-04-13 09:35:12	0.5000050	FALSE
## 4	0.000000	0.00	0.02	4	10	2023-02-21 10:15:01	1.5000025	FALSE
## 5	0.000000	0.00	0.00	4	29	2023-03-27 10:30:40	0.5000050	FALSE
## 6	0.000000	0.00	0.00	1	22	2023-04-06 08:52:43	0.5000050	FALSE
## 7	0.000000	0.00	0.00	1	193	2023-04-10 09:42:09	0.5000050	FALSE
## 8	0.000000	0.00	0.00	2	62	2023-04-13 11:55:30	0.5000050	FALSE
## 9	0.000000	0.00	0.02	5	26195	2023-04-12 13:34:10	0.6250038	FALSE
## 10	0.000000	0.00	0.05	83	25272	2023-04-14 15:27:59	0.5156298	FALSE
## 11	39.999996	0.03	0.10	12944	126785	2023-04-14 16:14:59	0.1855550	FALSE
## 12	37.931040	0.37	0.49	54270	161814	2023-04-14 16:14:59	0.0000100	TRUE
## 13	30.487812	1.05	1.19	35823	143573	2023-04-14 16:14:59	0.0000100	TRUE
## 14	20.253159	1.91	2.06	14228	129837	2023-04-14 16:07:27	0.0000100	TRUE
## 15	15.510199	2.79	3.00	4175	177211	2023-04-14 16:01:12	0.0000100	TRUE
## 16	13.636366	3.75	4.00	125	72923	2023-04-14 15:43:34	0.0000100	TRUE
## 17	9.647055	4.75	5.00	2052	93901	2023-04-14 15:33:17	0.0000100	TRUE
## 18	4.448743	5.70	6.00	6	47481	2023-04-14 15:16:54	0.0000100	TRUE
## 19	11.764711	6.70	6.95	126	61116	2023-04-14 15:12:58	0.0000100	TRUE
## 20	6.122453	7.70	7.95	69	48204	2023-04-14 16:13:07	0.0000100	TRUE
## 21	4.216861	8.70	8.95	1535	19441	2023-04-14 15:12:27	0.0000100	TRUE
## 22	6.674087	9.65	9.95	37	17702	2023-04-14 15:07:13	0.0000100	TRUE
## 23	12.552749	10.65	10.95	33	9538	2023-04-14 14:58:26	0.0000100	TRUE
## 24	4.215249	11.65	11.95	76	7631	2023-04-14 15:12:27	0.0000100	TRUE
## 25	0.000000	12.65	12.95	1	975	2023-04-12 11:05:04	0.0000100	TRUE
## 26	8.801955	13.65	13.95	31	1451	2023-04-14 11:27:55	0.0000100	TRUE
## 27	0.000000	14.15	14.45	5	385	2023-04-05 14:41:34	0.0000100	TRUE
## 28	18.056675	14.65	14.95	2	119	2023-04-14 15:06:07	0.0000100	TRUE
## 29	0.000000	15.65	15.95	20	292	2023-04-10 13:54:06	0.0000100	TRUE
## 30	5.032263	16.65	16.95	40	949	2023-04-13 09:55:25	0.0000100	TRUE
## 31	0.000000	17.65	17.95	1	52	2023-04-13 15:38:10	0.0000100	TRUE
## 32	0.000000	18.65	18.95	9	137	2023-04-04 16:01:32	0.0000100	TRUE
## 33	0.000000	16.40	16.55	4	229	2023-01-17 09:35:54	0.0000100	TRUE
## 34	0.000000	19.65	19.95	4	417	2023-04-12 15:51:29	0.0000100	TRUE
## 35	0.000000	20.65	20.95	4	547	2023-04-03 09:30:24	0.0000100	TRUE
## 36	0.000000	21.65	21.95	2	146	2023-04-12 16:00:39	0.0000100	TRUE
## 37	0.000000	24.15	24.45	5	128	2023-04-10 09:42:47	0.0000100	TRUE
## 38	0.000000	26.65	26.90	3	36	2023-03-23 09:43:53	0.0000100	TRUE
## 39	0.000000	29.15	29.40	55	55	2023-04-10 15:45:08	0.0000100	TRUE
## 40	0.000000	31.65	31.90	6	228	2023-04-12 09:31:10	0.0000100	TRUE
## 41	0.000000	36.65	36.90	6	26	2023-03-28 15:43:35	0.0000100	TRUE
## 42	0.000000	41.65	41.90	3	43	2023-03-29 03:57:32	0.0000100	TRUE
## 43	0.000000	46.65	46.90	5	30	2023-03-31 11:56:53	0.0000100	TRUE

## 44	0.000000	51.65	51.90	10	105	2023-03-29	14:09:11	0.0000100	TRUE
## 45	0.000000	56.65	56.90	10	130	2023-03-31	10:19:01	0.0000100	TRUE
## 46	0.000000	61.65	61.90	5	6	2023-04-03	13:02:24	0.0000100	TRUE
## 47	0.000000	66.65	66.90	3	3	2023-03-31	09:47:55	0.0000100	TRUE
## 48	0.000000	71.65	71.90	NA	3	2023-03-20	23:45:40	0.0000100	TRUE
## 49	0.000000	76.65	76.90	3	5	2023-03-28	15:43:44	0.0000100	TRUE
## 50	0.000000	81.65	81.90	3	29	2023-04-11	15:16:49	0.0000100	TRUE
## 51	0.000000	87.85	88.15	1	1	2022-12-29	10:43:55	0.0000100	TRUE
## 52	0.000000	95.70	96.05	NA	1	2023-02-14	15:37:36	0.0000100	TRUE
## 53	0.000000	107.65	107.90	1	1	2022-12-29	10:57:54	0.0000100	TRUE
## 54	0.000000	117.50	117.80	1	2	2022-12-30	08:19:20	0.0000100	TRUE
## 55	0.000000	127.40	127.70	1	101	2022-12-29	11:09:20	0.0000100	TRUE
## 56	0.000000	161.60	161.85	10	182	2023-04-10	11:08:36	0.0000100	TRUE
##	Price								
## 1	0.000								
## 2	0.010								
## 3	0.000								
## 4	0.010								
## 5	0.000								
## 6	0.000								
## 7	0.000								
## 8	0.000								
## 9	0.010								
## 10	0.025								
## 11	0.065								
## 12	0.430								
## 13	1.120								
## 14	1.985								
## 15	2.895								
## 16	3.875								
## 17	4.875								
## 18	5.850								
## 19	6.825								
## 20	7.825								
## 21	8.825								
## 22	9.800								
## 23	10.800								
## 24	11.800								
## 25	12.800								
## 26	13.800								
## 27	14.300								
## 28	14.800								
## 29	15.800								
## 30	16.800								
## 31	17.800								
## 32	18.800								
## 33	16.475								
## 34	19.800								
## 35	20.800								
## 36	21.800								
## 37	24.300								
## 38	26.775								
## 39	29.275								
## 40	31.775								

41 36.775
 ## 42 41.775
 ## 43 46.775
 ## 44 51.775
 ## 45 56.775
 ## 46 61.775
 ## 47 66.775
 ## 48 71.775
 ## 49 76.775
 ## 50 81.775
 ## 51 88.000
 ## 52 95.875
 ## 53 107.775
 ## 54 117.650
 ## 55 127.550
 ## 56 161.725

 ##

\$Apr.26.2023

\$Apr.26.2023\$calls

##	ContractID	ContractSize	Currency	Expiration	Strike	Last	Chg
## 1	VIXW230426C00011500	REGULAR	USD	2023-04-26	11.5	9.03	0.00000000
## 2	VIXW230426C00013500	REGULAR	USD	2023-04-26	13.5	10.00	0.00000000
## 3	VIXW230426C00017000	REGULAR	USD	2023-04-26	17.0	2.29	-0.27999997
## 4	VIXW230426C00018000	REGULAR	USD	2023-04-26	18.0	1.53	-0.22000003
## 5	VIXW230426C00019000	REGULAR	USD	2023-04-26	19.0	0.98	-0.22000003
## 6	VIXW230426C00020000	REGULAR	USD	2023-04-26	20.0	0.75	-0.14999998
## 7	VIXW230426C00021000	REGULAR	USD	2023-04-26	21.0	0.51	-0.19000000
## 8	VIXW230426C00022000	REGULAR	USD	2023-04-26	22.0	0.45	-0.11000001
## 9	VIXW230426C00023000	REGULAR	USD	2023-04-26	23.0	0.34	-0.15000000
## 10	VIXW230426C00024000	REGULAR	USD	2023-04-26	24.0	0.27	-0.13000000
## 11	VIXW230426C00025000	REGULAR	USD	2023-04-26	25.0	0.24	-0.08000000
## 12	VIXW230426C00026000	REGULAR	USD	2023-04-26	26.0	0.24	-0.02000000
## 13	VIXW230426C00027000	REGULAR	USD	2023-04-26	27.0	0.18	-0.02000000
## 14	VIXW230426C00028000	REGULAR	USD	2023-04-26	28.0	0.13	-0.02000001
## 15	VIXW230426C00029000	REGULAR	USD	2023-04-26	29.0	0.11	-0.02000000
## 16	VIXW230426C00030000	REGULAR	USD	2023-04-26	30.0	0.13	0.02000000
## 17	VIXW230426C00031000	REGULAR	USD	2023-04-26	31.0	0.10	0.00000000
## 18	VIXW230426C00032000	REGULAR	USD	2023-04-26	32.0	0.06	-0.04000000
## 19	VIXW230426C00033000	REGULAR	USD	2023-04-26	33.0	0.05	0.00000000
## 20	VIXW230426C00034000	REGULAR	USD	2023-04-26	34.0	0.03	-0.02000000
## 21	VIXW230426C00035000	REGULAR	USD	2023-04-26	35.0	0.06	0.00000000
## 22	VIXW230426C00036000	REGULAR	USD	2023-04-26	36.0	0.07	0.00000000
## 23	VIXW230426C00037000	REGULAR	USD	2023-04-26	37.0	0.05	0.00000000
## 24	VIXW230426C00038000	REGULAR	USD	2023-04-26	38.0	0.29	0.00000000
## 25	VIXW230426C00039000	REGULAR	USD	2023-04-26	39.0	0.23	0.00000000
## 26	VIXW230426C00040000	REGULAR	USD	2023-04-26	40.0	0.05	0.01000000
## 27	VIXW230426C00042500	REGULAR	USD	2023-04-26	42.5	0.03	0.00000000
## 28	VIXW230426C00045000	REGULAR	USD	2023-04-26	45.0	0.03	0.00000000
## 29	VIXW230426C00050000	REGULAR	USD	2023-04-26	50.0	0.04	0.00000000
## 30	VIXW230426C00060000	REGULAR	USD	2023-04-26	60.0	0.02	0.00000000
## 31	VIXW230426C00065000	REGULAR	USD	2023-04-26	65.0	0.09	0.00000000
## 32	VIXW230426C00070000	REGULAR	USD	2023-04-26	70.0	0.05	0.00000000
## 33	VIXW230426C00075000	REGULAR	USD	2023-04-26	75.0	0.05	0.00000000

##	34	VIXW230426C00080000	REGULAR	USD	2023-04-26	80.0	0.01	0.00000000		
##	35	VIXW230426C00085000	REGULAR	USD	2023-04-26	85.0	0.04	0.00000000		
##	36	VIXW230426C00090000	REGULAR	USD	2023-04-26	90.0	0.02	0.00000000		
##	37	VIXW230426C00095000	REGULAR	USD	2023-04-26	95.0	0.19	0.00000000		
##		ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM	Price
##	1	0.000000	6.42	8.59	2	5	2023-04-10 13:17:44	4.335942	TRUE	7.505
##	2	0.000000	4.41	6.61	150	150	2023-03-24 09:30:17	3.302736	TRUE	5.510
##	3	-10.894940	0.79	3.47	353	42	2023-04-14 15:59:29	1.783204	TRUE	2.130
##	4	-12.571430	0.08	1.90	521	443	2023-04-14 16:06:49	1.160160	FALSE	0.990
##	5	-18.333336	0.00	2.25	721	2623	2023-04-14 16:00:41	1.558596	FALSE	1.125
##	6	-16.666664	0.00	1.91	1271	3049	2023-04-14 16:08:37	1.647463	FALSE	0.955
##	7	-27.142859	0.00	1.68	369	2863	2023-04-14 15:52:41	1.748048	FALSE	0.840
##	8	-19.642860	0.00	1.52	207	4020	2023-04-14 15:57:00	1.855469	FALSE	0.760
##	9	-30.612246	0.00	1.39	63	570	2023-04-14 16:00:41	1.953125	FALSE	0.695
##	10	-32.500000	0.00	0.30	230	862	2023-04-14 15:58:01	1.343753	FALSE	0.150
##	11	-25.000000	0.00	1.16	362	974	2023-04-14 15:38:24	2.115239	FALSE	0.580
##	12	-7.692306	0.00	1.07	16	318	2023-04-14 14:27:21	2.189458	FALSE	0.535
##	13	-9.999998	0.00	0.98	56	1288	2023-04-14 15:48:49	2.250004	FALSE	0.490
##	14	-13.333340	0.00	0.91	6	1410	2023-04-14 15:22:42	2.314457	FALSE	0.455
##	15	-15.384613	0.00	0.85	10	106	2023-04-14 15:08:30	2.375004	FALSE	0.425
##	16	18.181814	0.08	0.79	498	1412	2023-04-14 15:33:59	2.492191	FALSE	0.435
##	17	0.000000	0.00	0.75	2	92	2023-04-13 09:57:23	2.492191	FALSE	0.375
##	18	-40.000004	0.00	0.71	1	313	2023-04-14 12:45:49	2.546879	FALSE	0.355
##	19	0.000000	0.00	0.67	1	36	2023-04-13 14:32:35	2.597660	FALSE	0.335
##	20	-40.000004	0.00	0.64	1	28	2023-04-14 14:57:05	2.648441	FALSE	0.320
##	21	0.000000	0.00	0.62	27	244	2023-04-13 11:02:00	2.707034	FALSE	0.310
##	22	0.000000	0.00	0.60	20	36	2023-04-13 11:11:11	2.761722	FALSE	0.300
##	23	0.000000	0.00	0.58	3	20	2023-04-12 15:33:01	2.812503	FALSE	0.290
##	24	0.000000	0.00	0.56	10	60	2023-03-30 15:15:54	2.859378	FALSE	0.280
##	25	0.000000	0.00	0.55	1	2	2023-03-31 15:21:23	2.917971	FALSE	0.275
##	26	25.000006	0.00	0.53	28	221	2023-04-14 15:56:03	2.957034	FALSE	0.265
##	27	0.000000	0.00	0.51	5	2002	2023-04-14 10:28:51	3.085940	FALSE	0.255
##	28	0.000000	0.00	0.48	5	111	2023-04-14 10:31:01	3.187502	FALSE	0.240
##	29	0.000000	0.00	0.44	10	78	2023-04-12 09:37:51	3.382814	FALSE	0.220
##	30	0.000000	0.00	0.38	1	187	2023-04-13 15:55:13	3.707032	FALSE	0.190
##	31	0.000000	0.00	0.37	10	12	2023-03-30 03:11:17	3.867188	FALSE	0.185
##	32	0.000000	0.00	0.35	5	7	2023-04-03 11:04:17	3.992188	FALSE	0.175
##	33	0.000000	0.00	0.34	5	5	2023-03-31 13:30:42	4.117192	FALSE	0.170
##	34	0.000000	0.00	0.32	1	1	2023-04-10 13:28:48	4.210942	FALSE	0.160
##	35	0.000000	0.00	0.31	18	28	2023-03-31 13:43:58	4.312505	FALSE	0.155
##	36	0.000000	0.00	0.30	4	33	2023-04-03 15:10:55	4.414067	FALSE	0.150
##	37	0.000000	0.00	0.30	NA	3	2023-03-23 14:47:22	4.515629	FALSE	0.150
##										
##		\$Apr.26.2023\$puts								
##		ContractID	ContractSize	Currency	Expiration	Strike	Last		Chg	
##	1	VIXW230426P00013500	REGULAR	USD	2023-04-26	13.5	0.02	0.00000000		
##	2	VIXW230426P00014000	REGULAR	USD	2023-04-26	14.0	0.11	0.00000000		
##	3	VIXW230426P00015000	REGULAR	USD	2023-04-26	15.0	0.02	0.00000000		
##	4	VIXW230426P00016000	REGULAR	USD	2023-04-26	16.0	0.04	0.02000000		
##	5	VIXW230426P00017000	REGULAR	USD	2023-04-26	17.0	0.11	0.02000000		
##	6	VIXW230426P00018000	REGULAR	USD	2023-04-26	18.0	0.35	0.00000000		
##	7	VIXW230426P00019000	REGULAR	USD	2023-04-26	19.0	0.88	0.13999999		
##	8	VIXW230426P00020000	REGULAR	USD	2023-04-26	20.0	1.49	0.13000000		
##	9	VIXW230426P00021000	REGULAR	USD	2023-04-26	21.0	2.29	0.07999992		

```

## 10 VIXW230426P00022000    REGULAR    USD 2023-04-26    22.0    3.17 0.07000017
## 11 VIXW230426P00023000    REGULAR    USD 2023-04-26    23.0    4.08 0.08999991
## 12 VIXW230426P00024000    REGULAR    USD 2023-04-26    24.0    4.90 0.09000015
## 13 VIXW230426P00025000    REGULAR    USD 2023-04-26    25.0    5.85 0.08999968
## 14 VIXW230426P00026000    REGULAR    USD 2023-04-26    26.0    6.73 0.82999990
## 15 VIXW230426P00027000    REGULAR    USD 2023-04-26    27.0    5.15 0.00000000
## 16 VIXW230426P00028000    REGULAR    USD 2023-04-26    28.0    8.01 0.00000000
## 17 VIXW230426P00029000    REGULAR    USD 2023-04-26    29.0    9.11 0.00000000
## 18 VIXW230426P00030000    REGULAR    USD 2023-04-26    30.0    10.96 1.15999980
## 19 VIXW230426P00032000    REGULAR    USD 2023-04-26    32.0    11.14 0.00000000
## 20 VIXW230426P00034000    REGULAR    USD 2023-04-26    34.0    11.59 0.00000000
## 21 VIXW230426P00035000    REGULAR    USD 2023-04-26    35.0    14.01 0.00000000
##      ChgPct    Bid    Ask Vol    OI      LastTradeTime      IV    ITM    Price
## 1      0.000000    0.00    0.02  57    57 2023-03-24 10:16:52 0.6406286 FALSE 0.010
## 2      0.000000    0.00    0.02  NA    23 2023-03-22 14:35:00 0.5468795 FALSE 0.010
## 3      0.000000    0.00    0.03  10    50 2023-03-30 15:15:16 0.4648491 FALSE 0.015
## 4     100.000000    0.00    0.05   8    14 2023-04-14 13:10:02 0.3125069 FALSE 0.025
## 5     22.222216    0.03    0.12 238   514 2023-04-14 15:59:43 0.1289150 FALSE 0.075
## 6      0.000000    0.30    1.54 309   686 2023-04-14 15:58:46 0.8300798  TRUE 0.920
## 7     18.918917    0.00   10.00 236  1420 2023-04-14 15:55:14 3.2148457  TRUE 5.000
## 8      9.558823    0.30    2.00 132   493 2023-04-14 14:14:51 0.0000100  TRUE 1.150
## 9      3.619906    0.00   10.00  94  1247 2023-04-14 15:31:24 1.9667970  TRUE 5.000
## 10     2.258070    0.00   10.00  17    38 2023-04-14 14:27:18 0.9101571  TRUE 5.000
## 11     2.255637    2.95    5.70  18    56 2023-04-14 09:47:48 0.0000100  TRUE 4.325
## 12     1.871105    3.88    6.60   6   442 2023-04-13 13:52:18 0.0000100  TRUE 5.240
## 13     1.562494    4.84    7.53  15    32 2023-04-14 13:17:19 0.0000100  TRUE 6.185
## 14    14.067795    5.81    8.47   1   421 2023-04-14 11:26:36 0.0000100  TRUE 7.140
## 15     0.000000    6.80    9.41   5     5 2023-03-28 03:22:39 0.0000100  TRUE 8.105
## 16     0.000000    7.78   10.37   1    11 2023-04-12 14:00:26 0.0000100  TRUE 9.075
## 17     0.000000    8.78   11.33   4    12 2023-04-11 12:30:23 0.0000100  TRUE 10.055
## 18    11.836733    9.77   12.30   1    18 2023-04-14 15:51:58 0.0000100  TRUE 11.035
## 19     0.000000   11.76   14.25   2     2 2023-03-31 14:30:22 0.0000100  TRUE 13.005
## 20     0.000000   13.76   16.22  NA    10 2023-03-23 09:45:51 0.0000100  TRUE 14.990
## 21     0.000000   14.76   17.20  10    30 2023-04-06 10:54:33 0.0000100  TRUE 15.980
##
##
## $May.03.2023
## $May.03.2023$calls
##      ContractID ContractSize Currency Expiration Strike Last      Chg
## 1 VIXW230503C00014000    REGULAR    USD 2023-05-03    14.0 5.92 0.000000000
## 2 VIXW230503C00015000    REGULAR    USD 2023-05-03    15.0 5.27 0.000000000
## 3 VIXW230503C00016000    REGULAR    USD 2023-05-03    16.0 4.07 -2.049999700
## 4 VIXW230503C00018000    REGULAR    USD 2023-05-03    18.0 2.09 -0.190000060
## 5 VIXW230503C00019000    REGULAR    USD 2023-05-03    19.0 1.50 -0.210000040
## 6 VIXW230503C00020000    REGULAR    USD 2023-05-03    20.0 1.18 -0.120000005
## 7 VIXW230503C00021000    REGULAR    USD 2023-05-03    21.0 1.01 -0.090000030
## 8 VIXW230503C00022000    REGULAR    USD 2023-05-03    22.0 0.78 -0.170000020
## 9 VIXW230503C00023000    REGULAR    USD 2023-05-03    23.0 0.63 -0.130000000
## 10 VIXW230503C00024000    REGULAR    USD 2023-05-03    24.0 0.57 -0.019999980
## 11 VIXW230503C00025000    REGULAR    USD 2023-05-03    25.0 0.40 -0.119999975
## 12 VIXW230503C00026000    REGULAR    USD 2023-05-03    26.0 0.40 -0.099999994
## 13 VIXW230503C00027000    REGULAR    USD 2023-05-03    27.0 0.35 -0.080000010
## 14 VIXW230503C00028000    REGULAR    USD 2023-05-03    28.0 0.33 0.010000020
## 15 VIXW230503C00029000    REGULAR    USD 2023-05-03    29.0 0.23 -0.059999987

```

## 16	VIXW230503C00030000	REGULAR	USD	2023-05-03	30.0	0.21	-0.030000001
## 17	VIXW230503C00031000	REGULAR	USD	2023-05-03	31.0	0.26	0.0399999990
## 18	VIXW230503C00032000	REGULAR	USD	2023-05-03	32.0	0.26	0.000000000
## 19	VIXW230503C00035000	REGULAR	USD	2023-05-03	35.0	0.12	0.0099999998
## 20	VIXW230503C00037000	REGULAR	USD	2023-05-03	37.0	0.13	0.000000000
## 21	VIXW230503C00038000	REGULAR	USD	2023-05-03	38.0	0.14	0.000000000
## 22	VIXW230503C00040000	REGULAR	USD	2023-05-03	40.0	0.05	-0.050000000
## 23	VIXW230503C00042500	REGULAR	USD	2023-05-03	42.5	0.05	0.000000000
## 24	VIXW230503C00045000	REGULAR	USD	2023-05-03	45.0	0.09	0.000000000
## 25	VIXW230503C00050000	REGULAR	USD	2023-05-03	50.0	0.08	0.000000000
## 26	VIXW230503C00055000	REGULAR	USD	2023-05-03	55.0	0.03	-0.150000000
## 27	VIXW230503C00060000	REGULAR	USD	2023-05-03	60.0	0.03	0.000000000
## 28	VIXW230503C00065000	REGULAR	USD	2023-05-03	65.0	0.02	0.000000000
## 29	VIXW230503C00070000	REGULAR	USD	2023-05-03	70.0	0.05	0.000000000
## 30	VIXW230503C00085000	REGULAR	USD	2023-05-03	85.0	0.04	0.000000000

##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM	Price
## 1	0.000000	4.33	6.48	20	95	2023-04-13 14:20:12	2.713870	TRUE	5.405
## 2	0.000000	3.30	5.53	25	32	2023-04-13 09:51:22	2.335942	TRUE	4.415
## 3	-33.496727	2.25	4.64	1	1	2023-04-14 13:39:22	1.981445	TRUE	3.445
## 4	-8.333336	0.67	3.19	253	444	2023-04-14 16:00:25	1.531252	FALSE	1.930
## 5	-12.280705	0.20	2.67	262	655	2023-04-14 15:58:44	1.428714	FALSE	1.435
## 6	-9.230770	0.00	3.70	5446	788	2023-04-14 15:59:51	1.904297	FALSE	1.850
## 7	-8.181821	0.00	1.24	1264	1126	2023-04-14 15:57:00	1.193363	FALSE	0.620
## 8	-17.894740	0.00	1.82	458	766	2023-04-14 15:58:52	1.568362	FALSE	0.910
## 9	-17.105263	0.50	0.75	102	80	2023-04-14 15:44:21	1.466800	FALSE	0.625
## 10	-3.389827	0.45	0.59	766	68	2023-04-14 15:26:58	1.488284	FALSE	0.520
## 11	-23.076920	0.34	0.55	225	233	2023-04-14 15:59:28	1.519534	FALSE	0.445
## 12	-19.999998	0.28	0.48	2	257	2023-04-14 09:30:02	1.544924	FALSE	0.380
## 13	-18.604654	0.23	0.42	1	123	2023-04-14 14:32:59	1.568362	FALSE	0.325
## 14	3.125006	0.20	0.33	57	81	2023-04-14 13:23:34	1.570315	FALSE	0.265
## 15	-20.689651	0.16	0.29	4	71	2023-04-14 14:15:59	1.585940	FALSE	0.225
## 16	-12.500002	0.14	0.30	109	391	2023-04-14 16:02:00	1.652345	FALSE	0.220
## 17	18.181814	0.11	0.22	4	258	2023-04-14 09:44:39	1.621096	FALSE	0.165
## 18	0.000000	0.09	0.20	12	42	2023-04-11 11:16:48	1.640627	FALSE	0.145
## 19	9.090907	0.05	0.14	2	211	2023-04-14 09:32:48	1.687502	FALSE	0.095
## 20	0.000000	0.03	0.12	5	46	2023-04-13 11:09:17	1.718751	FALSE	0.075
## 21	0.000000	0.00	0.70	3	23	2023-04-12 15:49:01	2.347660	FALSE	0.350
## 22	-50.000000	0.00	0.66	20	509	2023-04-14 10:46:59	2.421879	FALSE	0.330
## 23	0.000000	0.00	0.62	4	8	2023-04-13 14:23:05	2.507816	FALSE	0.310
## 24	0.000000	0.00	0.59	200	622	2023-04-12 14:21:22	2.593754	FALSE	0.295
## 25	0.000000	0.00	0.54	13	48	2023-04-12 14:43:12	2.746097	FALSE	0.270
## 26	-83.333330	0.00	0.50	200	2	2023-04-14 16:00:42	2.878909	FALSE	0.250
## 27	0.000000	0.00	10.00	5	57	2023-04-13 11:06:37	7.041017	FALSE	5.000
## 28	0.000000	0.00	0.45	16	271	2023-04-14 13:52:10	3.117190	FALSE	0.225
## 29	0.000000	0.00	0.43	20	20	2023-04-06 11:30:18	3.222658	FALSE	0.215
## 30	0.000000	0.00	0.38	NA	3	2023-04-04 11:21:46	3.476564	FALSE	0.190

##

\$May.03.2023\$puts

##	ContractID	ContractSize	Currency	Expiration	Strike	Last	Chg
## 1	VIXW230503P00012000	REGULAR	USD	2023-05-03	12.0	0.01	0.000000000
## 2	VIXW230503P00013000	REGULAR	USD	2023-05-03	13.0	0.01	0.000000000
## 3	VIXW230503P00013500	REGULAR	USD	2023-05-03	13.5	0.01	0.000000000
## 4	VIXW230503P00014000	REGULAR	USD	2023-05-03	14.0	0.04	0.000000000
## 5	VIXW230503P00015000	REGULAR	USD	2023-05-03	15.0	0.02	0.000000000

## 6	VIXW230503P00016000	REGULAR	USD	2023-05-03	16.0	0.05	0.03000000
## 7	VIXW230503P00017000	REGULAR	USD	2023-05-03	17.0	0.14	0.05000000
## 8	VIXW230503P00018000	REGULAR	USD	2023-05-03	18.0	0.40	0.05000001
## 9	VIXW230503P00019000	REGULAR	USD	2023-05-03	19.0	0.74	-0.00999999
## 10	VIXW230503P00020000	REGULAR	USD	2023-05-03	20.0	1.54	0.18999994
## 11	VIXW230503P00021000	REGULAR	USD	2023-05-03	21.0	2.30	0.20000005
## 12	VIXW230503P00022000	REGULAR	USD	2023-05-03	22.0	2.89	0.00000000
## 13	VIXW230503P00025000	REGULAR	USD	2023-05-03	25.0	5.01	0.00000000
## 14	VIXW230503P00026000	REGULAR	USD	2023-05-03	26.0	5.86	0.00000000
## 15	VIXW230503P00030000	REGULAR	USD	2023-05-03	30.0	10.46	0.69999980
## 16	VIXW230503P00032000	REGULAR	USD	2023-05-03	32.0	10.42	0.00000000
## 17	VIXW230503P00035000	REGULAR	USD	2023-05-03	35.0	14.35	0.00000000

##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM	Price
## 1	0.000000	0.00	0.02	4	4	2023-03-31 15:45:35	0.7187528	FALSE	0.010
## 2	0.000000	0.00	0.02	5	5	2023-03-31 15:46:48	0.5625044	FALSE	0.010
## 3	0.000000	0.00	0.02	90	90	2023-03-31 13:54:05	0.5000050	FALSE	0.010
## 4	0.000000	0.00	0.28	NA	1	2023-03-30 11:24:09	0.7382839	FALSE	0.140
## 5	0.000000	0.00	0.04	2	23	2023-04-14 09:57:18	0.3867249	FALSE	0.020
## 6	150.000020	0.00	0.10	13	33	2023-04-14 10:03:11	0.3027413	FALSE	0.050
## 7	55.555553	0.07	0.16	46	69	2023-04-14 11:44:58	0.1279384	FALSE	0.115
## 8	14.285718	0.37	0.54	115	258	2023-04-14 15:58:42	0.0000100	TRUE	0.455
## 9	-1.333332	0.79	1.10	14	173	2023-04-14 11:51:04	0.0000100	TRUE	0.945
## 10	14.074069	0.00	10.00	127	68	2023-04-14 14:39:57	2.0507861	TRUE	5.000
## 11	9.523812	0.00	10.00	10	201	2023-04-14 15:58:42	1.5371117	TRUE	5.000
## 12	0.000000	0.00	10.00	22	8	2023-04-13 14:02:39	0.7109404	TRUE	5.000
## 13	0.000000	4.71	7.29	4	7	2023-04-12 10:59:53	0.0000100	TRUE	6.000
## 14	0.000000	5.64	8.21	5	15	2023-04-10 11:22:56	0.0000100	TRUE	6.925
## 15	7.172129	9.50	12.00	2	12	2023-04-14 15:51:58	0.0000100	TRUE	10.750
## 16	0.000000	11.47	13.93	NA	1	2023-03-30 10:41:49	0.0000100	TRUE	12.700
## 17	0.000000	14.44	16.85	1	1	2023-04-06 12:53:12	0.0000100	TRUE	15.645

##

##

\$May.10.2023

\$May.10.2023\$calls

##	ContractID	ContractSize	Currency	Expiration	Strike	Last	Chg
## 1	VIXW230510C00011000	REGULAR	USD	2023-05-10	11	9.75	0.00000000
## 2	VIXW230510C00014000	REGULAR	USD	2023-05-10	14	6.75	0.00000000
## 3	VIXW230510C00015000	REGULAR	USD	2023-05-10	15	4.38	0.30000020
## 4	VIXW230510C00017000	REGULAR	USD	2023-05-10	17	2.46	-0.25000000
## 5	VIXW230510C00018000	REGULAR	USD	2023-05-10	18	1.89	-0.22999990
## 6	VIXW230510C00019000	REGULAR	USD	2023-05-10	19	1.53	-0.14999998
## 7	VIXW230510C00020000	REGULAR	USD	2023-05-10	20	1.26	-0.15999997
## 8	VIXW230510C00022000	REGULAR	USD	2023-05-10	22	0.91	-0.09999996
## 9	VIXW230510C00023000	REGULAR	USD	2023-05-10	23	0.77	-0.06999999
## 10	VIXW230510C00025000	REGULAR	USD	2023-05-10	25	0.64	-0.02000004
## 11	VIXW230510C00027000	REGULAR	USD	2023-05-10	27	0.49	0.03000000
## 12	VIXW230510C00030000	REGULAR	USD	2023-05-10	30	0.37	-0.09000000
## 13	VIXW230510C00035000	REGULAR	USD	2023-05-10	35	0.22	0.01000000
## 14	VIXW230510C00037000	REGULAR	USD	2023-05-10	37	0.15	-0.22999999
## 15	VIXW230510C00060000	REGULAR	USD	2023-05-10	60	0.02	0.00000000
## 16	VIXW230510C00095000	REGULAR	USD	2023-05-10	95	0.06	0.00000000

##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM	Price
## 1	0.000000	6.68	9.23	10	10	2023-04-06 10:12:47	3.021487	TRUE	7.955
## 2	0.000000	3.62	6.33	338	338	2023-04-06 07:34:27	2.007817	TRUE	4.975


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## 3      7.352946 2.52 5.43 315 4669 2023-04-14 15:20:48 1.701173 TRUE 3.975
## 4     -9.225092 0.76 3.96 343 443 2023-04-14 16:10:00 1.313480 TRUE 2.360
## 5    -10.849052 0.20 3.39 424 112 2023-04-14 15:59:28 1.222660 FALSE 1.795
## 6     -8.928570 0.00 2.96 470 252 2023-04-14 16:01:09 1.238285 FALSE 1.480
## 7    -11.267604 0.00 2.64 295 502 2023-04-14 15:59:53 1.310550 FALSE 1.320
## 8     -9.900987 0.00 2.23 214 406 2023-04-14 16:10:00 1.460940 FALSE 1.115
## 9     -8.333333 0.00 2.08 41 50 2023-04-14 14:47:43 1.531252 FALSE 1.040
## 10    -3.030309 0.00 0.80 197 344 2023-04-14 16:00:42 1.248051 FALSE 0.400
## 11     6.521739 0.00 1.66 4 37 2023-04-14 14:55:00 1.769532 FALSE 0.830
## 12   -19.565218 0.00 1.42 20 352 2023-04-14 15:55:57 1.902344 FALSE 0.710
## 13     4.761908 0.00 1.14 2 105 2023-04-14 12:58:46 2.082036 FALSE 0.570
## 14   -60.526310 0.00 1.05 5 5 2023-04-14 13:27:29 2.142583 FALSE 0.525
## 15     0.000000 0.00 0.67 12 12 2023-04-13 13:39:25 2.714847 FALSE 0.335
## 16     0.000000 0.00 0.53 8 8 2023-04-06 13:40:47 3.265627 FALSE 0.265
##
## $May.10.2023$puts
##      ContractID ContractSize Currency Expiration Strike Last Chg
## 1 VIXW230510P00015000 REGULAR USD 2023-05-10 15 0.04 0.000000000
## 2 VIXW230510P00016000 REGULAR USD 2023-05-10 16 0.12 0.009999998
## 3 VIXW230510P00017000 REGULAR USD 2023-05-10 17 0.35 0.049999982
## 4 VIXW230510P00018000 REGULAR USD 2023-05-10 18 0.75 0.040000020
## 5 VIXW230510P00019000 REGULAR USD 2023-05-10 19 1.40 0.159999970
## 6 VIXW230510P00022000 REGULAR USD 2023-05-10 22 3.75 0.250000000
## 7 VIXW230510P00026000 REGULAR USD 2023-05-10 26 7.08 0.000000000
## 8 VIXW230510P00028000 REGULAR USD 2023-05-10 28 9.23 0.379999160
## 9 VIXW230510P00029000 REGULAR USD 2023-05-10 29 8.23 0.000000000
## 10 VIXW230510P00030000 REGULAR USD 2023-05-10 30 10.76 0.000000000
##      ChgPct Bid Ask Vol OI LastTradeTime IV ITM Price
## 1 0.000000 0.00 0.72 14 212 2023-04-14 15:54:36 0.6582065 FALSE 0.360
## 2 9.090907 0.00 1.11 1262 364 2023-04-14 15:48:45 0.5800823 FALSE 0.555
## 3 16.666660 0.00 1.63 1083 462 2023-04-14 15:59:17 0.9384772 FALSE 0.815
## 4 5.633806 0.40 2.22 218 643 2023-04-14 15:59:33 0.9394537 TRUE 1.310
## 5 12.903222 0.50 2.92 432 2021 2023-04-14 15:48:45 0.9550786 TRUE 1.710
## 6 7.142858 2.23 5.43 15 69 2023-04-14 14:49:15 1.0429735 TRUE 3.830
## 7 0.000000 5.84 9.12 10 32 2023-04-13 11:40:45 1.0976608 TRUE 7.480
## 8 4.293776 7.75 10.97 100 61 2023-04-14 15:56:11 0.9296882 TRUE 9.360
## 9 0.000000 8.71 11.91 56 56 2023-04-06 09:37:07 0.0000100 TRUE 10.310
## 10 0.000000 9.69 12.86 1 53 2023-04-13 10:28:01 0.0000100 TRUE 11.275
##
##
## $May.17.2023
## $May.17.2023$calls
##      ContractID ContractSize Currency Expiration Strike Last Chg
## 1 VIX230517C00010000 REGULAR USD 2023-05-17 10.0 10.24 -0.079999920
## 2 VIX230517C00010500 REGULAR USD 2023-05-17 10.5 11.68 0.000000000
## 3 VIX230517C00011000 REGULAR USD 2023-05-17 11.0 9.16 -0.140000340
## 4 VIX230517C00011500 REGULAR USD 2023-05-17 11.5 10.68 0.000000000
## 5 VIX230517C00012000 REGULAR USD 2023-05-17 12.0 8.62 0.000000000
## 6 VIX230517C00013000 REGULAR USD 2023-05-17 13.0 7.25 -0.300000200
## 7 VIX230517C00013500 REGULAR USD 2023-05-17 13.5 8.60 0.000000000
## 8 VIX230517C00014000 REGULAR USD 2023-05-17 14.0 6.35 -0.599999900
## 9 VIX230517C00014500 REGULAR USD 2023-05-17 14.5 5.95 0.000000000
## 10 VIX230517C00015000 REGULAR USD 2023-05-17 15.0 5.25 -0.099999905
## 11 VIX230517C00016000 REGULAR USD 2023-05-17 16.0 4.20 -0.180000300

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## 12	VIX230517C00017000	REGULAR	USD	2023-05-17	17.0	3.40	-0.199999810	
## 13	VIX230517C00018000	REGULAR	USD	2023-05-17	18.0	2.72	-0.240000010	
## 14	VIX230517C00019000	REGULAR	USD	2023-05-17	19.0	2.25	-0.140000100	
## 15	VIX230517C00020000	REGULAR	USD	2023-05-17	20.0	1.81	-0.180000070	
## 16	VIX230517C00021000	REGULAR	USD	2023-05-17	21.0	1.56	-0.170000080	
## 17	VIX230517C00022000	REGULAR	USD	2023-05-17	22.0	1.37	-0.120000005	
## 18	VIX230517C00023000	REGULAR	USD	2023-05-17	23.0	1.18	-0.120000005	
## 19	VIX230517C00024000	REGULAR	USD	2023-05-17	24.0	1.04	-0.090000030	
## 20	VIX230517C00025000	REGULAR	USD	2023-05-17	25.0	0.92	-0.099999964	
## 21	VIX230517C00026000	REGULAR	USD	2023-05-17	26.0	0.83	-0.069999990	
## 22	VIX230517C00027000	REGULAR	USD	2023-05-17	27.0	0.74	-0.060000002	
## 23	VIX230517C00028000	REGULAR	USD	2023-05-17	28.0	0.66	-0.039999960	
## 24	VIX230517C00029000	REGULAR	USD	2023-05-17	29.0	0.59	-0.040000020	
## 25	VIX230517C00030000	REGULAR	USD	2023-05-17	30.0	0.54	-0.039999960	
## 26	VIX230517C00031000	REGULAR	USD	2023-05-17	31.0	0.51	-0.009999990	
## 27	VIX230517C00032000	REGULAR	USD	2023-05-17	32.0	0.45	-0.030000001	
## 28	VIX230517C00032500	REGULAR	USD	2023-05-17	32.5	0.42	-0.030000001	
## 29	VIX230517C00033000	REGULAR	USD	2023-05-17	33.0	0.39	-0.040000020	
## 30	VIX230517C00034000	REGULAR	USD	2023-05-17	34.0	0.43	0.030000001	
## 31	VIX230517C00035000	REGULAR	USD	2023-05-17	35.0	0.35	-0.030000001	
## 32	VIX230517C00036000	REGULAR	USD	2023-05-17	36.0	0.33	0.000000000	
## 33	VIX230517C00037000	REGULAR	USD	2023-05-17	37.0	0.33	0.010000020	
## 34	VIX230517C00037500	REGULAR	USD	2023-05-17	37.5	0.28	0.000000000	
## 35	VIX230517C00038000	REGULAR	USD	2023-05-17	38.0	0.28	0.000000000	
## 36	VIX230517C00039000	REGULAR	USD	2023-05-17	39.0	0.27	0.020000010	
## 37	VIX230517C00040000	REGULAR	USD	2023-05-17	40.0	0.24	0.000000000	
## 38	VIX230517C00042500	REGULAR	USD	2023-05-17	42.5	0.18	-0.029999986	
## 39	VIX230517C00045000	REGULAR	USD	2023-05-17	45.0	0.18	0.010000005	
## 40	VIX230517C00047500	REGULAR	USD	2023-05-17	47.5	0.13	-0.030000001	
## 41	VIX230517C00050000	REGULAR	USD	2023-05-17	50.0	0.12	-0.009999998	
## 42	VIX230517C00055000	REGULAR	USD	2023-05-17	55.0	0.11	0.019999996	
## 43	VIX230517C00060000	REGULAR	USD	2023-05-17	60.0	0.07	0.000000000	
## 44	VIX230517C00065000	REGULAR	USD	2023-05-17	65.0	0.06	0.009999998	
## 45	VIX230517C00070000	REGULAR	USD	2023-05-17	70.0	0.05	0.000000000	
## 46	VIX230517C00075000	REGULAR	USD	2023-05-17	75.0	0.05	0.010000002	
## 47	VIX230517C00080000	REGULAR	USD	2023-05-17	80.0	0.03	-0.010000000	
## 48	VIX230517C00085000	REGULAR	USD	2023-05-17	85.0	0.04	0.000000000	
## 49	VIX230517C00090000	REGULAR	USD	2023-05-17	90.0	0.02	0.000000000	
## 50	VIX230517C00095000	REGULAR	USD	2023-05-17	95.0	0.02	0.000000000	
## 51	VIX230517C00100000	REGULAR	USD	2023-05-17	100.0	0.02	0.000000000	
## 52	VIX230517C00110000	REGULAR	USD	2023-05-17	110.0	0.02	0.000000000	
## 53	VIX230517C00120000	REGULAR	USD	2023-05-17	120.0	0.02	0.000000000	
## 54	VIX230517C00130000	REGULAR	USD	2023-05-17	130.0	0.01	0.000000000	
## 55	VIX230517C00140000	REGULAR	USD	2023-05-17	140.0	0.01	0.000000000	
## 56	VIX230517C00150000	REGULAR	USD	2023-05-17	150.0	0.01	0.000000000	
## 57	VIX230517C00160000	REGULAR	USD	2023-05-17	160.0	0.02	0.000000000	
## 58	VIX230517C00170000	REGULAR	USD	2023-05-17	170.0	0.02	0.000000000	
## 59	VIX230517C00180000	REGULAR	USD	2023-05-17	180.0	0.02	0.000000000	
##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM
## 1	-0.7751931	9.85	10.15	54	707	2023-04-14 14:22:14	3.916016	TRUE
## 2	0.0000000	9.35	9.65	20	20	2023-04-04 15:48:06	3.691407	TRUE
## 3	-1.5053800	8.85	9.15	75	1200	2023-04-14 14:57:49	3.478517	TRUE
## 4	0.0000000	8.40	8.65	10	10	2023-04-04 15:48:08	3.294924	TRUE
## 5	0.0000000	7.90	8.15	13	638	2023-04-13 09:46:39	3.103518	TRUE

## 6	-3.9735124	6.90	7.15	16	803	2023-04-14	15:50:37	2.744144	TRUE
## 7	0.0000000	6.40	6.65	NA	3	2023-03-30	10:01:25	2.574222	TRUE
## 8	-8.6330920	5.90	6.15	3	525	2023-04-14	10:08:09	2.410160	TRUE
## 9	0.0000000	5.40	5.65	1	621	2023-04-13	15:07:59	2.251957	TRUE
## 10	-1.8691572	4.90	5.20	790	3324	2023-04-14	15:55:59	2.111333	TRUE
## 11	-4.1095960	4.00	4.25	205	2467	2023-04-14	15:59:58	1.848634	TRUE
## 12	-5.5555506	3.15	3.40	199	2137	2023-04-14	16:14:13	1.625978	TRUE
## 13	-8.1081085	2.53	2.69	10861	12478	2023-04-14	16:14:34	1.486331	FALSE
## 14	-5.8577447	2.06	2.20	905	10313	2023-04-14	16:09:39	1.417972	FALSE
## 15	-9.0452290	1.80	1.85	9627	27611	2023-04-14	16:14:33	1.415042	FALSE
## 16	-9.8265930	1.46	1.58	1293	91352	2023-04-14	16:06:48	1.391605	FALSE
## 17	-8.0536920	1.30	1.37	28547	95736	2023-04-14	16:14:59	1.412112	FALSE
## 18	-9.2307700	1.12	1.19	10053	44949	2023-04-14	15:59:42	1.418948	FALSE
## 19	-7.9646053	0.98	1.05	1938	182925	2023-04-14	16:11:01	1.433597	FALSE
## 20	-9.8039180	0.86	0.92	30699	126151	2023-04-14	16:11:01	1.445315	FALSE
## 21	-7.7777770	0.76	0.82	852	66736	2023-04-14	16:05:16	1.462893	FALSE
## 22	-7.5000005	0.67	0.74	1250	48661	2023-04-14	16:10:14	1.479495	FALSE
## 23	-5.7142806	0.61	0.66	467	42949	2023-04-14	16:01:54	1.498049	FALSE
## 24	-6.3492100	0.54	0.60	308	16121	2023-04-14	15:55:24	1.513674	FALSE
## 25	-6.8965450	0.50	0.54	31560	207556	2023-04-14	16:14:59	1.533205	FALSE
## 26	-1.9230751	0.45	0.49	631	12358	2023-04-14	15:27:30	1.548830	FALSE
## 27	-6.2500010	0.41	0.45	5099	139905	2023-04-14	15:58:36	1.566408	FALSE
## 28	-6.6666670	0.39	0.43	229	28028	2023-04-14	16:11:01	1.572268	FALSE
## 29	-9.3023310	0.37	0.41	26	10357	2023-04-14	16:08:47	1.578127	FALSE
## 30	7.5000005	0.34	0.38	2057	16510	2023-04-14	10:45:55	1.595705	FALSE
## 31	-7.8947372	0.30	0.35	9668	58551	2023-04-14	16:01:43	1.605471	FALSE
## 32	0.0000000	0.28	0.32	6701	20237	2023-04-14	11:47:26	1.619143	FALSE
## 33	3.1250064	0.26	0.30	2767	8969	2023-04-14	11:42:02	1.636721	FALSE
## 34	0.0000000	0.25	0.29	10	12423	2023-04-13	15:12:03	1.644533	FALSE
## 35	0.0000000	0.24	0.28	15	5744	2023-04-14	09:57:06	1.652345	FALSE
## 36	8.0000040	0.22	0.26	4	8646	2023-04-14	14:56:22	1.664064	FALSE
## 37	0.0000000	0.20	0.24	9501	91675	2023-04-14	16:03:56	1.671877	FALSE
## 38	-14.2857070	0.16	0.20	3888	38521	2023-04-14	16:06:24	1.695314	FALSE
## 39	5.8823560	0.14	0.17	6408	50589	2023-04-14	15:53:17	1.726564	FALSE
## 40	-18.7500020	0.11	0.15	27	31977	2023-04-14	16:06:18	1.750001	FALSE
## 41	-7.6923065	0.10	0.13	15535	253665	2023-04-14	15:59:50	1.781251	FALSE
## 42	22.2222160	0.07	0.11	155	107093	2023-04-14	15:58:35	1.835938	FALSE
## 43	0.0000000	0.05	0.09	4156	45785	2023-04-14	15:38:43	1.875001	FALSE
## 44	19.9999960	0.04	0.07	1408	79968	2023-04-14	15:00:22	1.906250	FALSE
## 45	0.0000000	0.03	0.06	15	42751	2023-04-14	09:57:32	1.945313	FALSE
## 46	25.0000060	0.02	0.05	773	43042	2023-04-14	14:23:31	1.968750	FALSE
## 47	-25.0000000	0.01	0.04	10675	33646	2023-04-14	15:59:03	1.968750	FALSE
## 48	0.0000000	0.00	0.04	3	75788	2023-04-12	11:46:02	1.968750	FALSE
## 49	0.0000000	0.00	0.04	401	102891	2023-04-14	13:20:09	2.031255	FALSE
## 50	0.0000000	0.00	0.05	4	3090	2023-04-11	11:55:28	2.140630	FALSE
## 51	0.0000000	0.00	0.05	1	19904	2023-04-11	14:39:25	2.187505	FALSE
## 52	0.0000000	0.00	0.05	10	1233	2023-04-06	14:05:01	2.281254	FALSE
## 53	0.0000000	0.00	0.04	100	788	2023-04-04	11:05:43	2.312504	FALSE
## 54	0.0000000	0.00	0.04	720	2363	2023-04-04	11:07:23	2.406254	FALSE
## 55	0.0000000	0.00	0.03	370	2801	2023-04-04	11:06:17	2.406254	FALSE
## 56	0.0000000	0.00	0.03	10	10131	2023-04-12	09:48:58	2.468754	FALSE
## 57	0.0000000	0.00	0.03	250	3059	2023-03-31	14:09:29	2.531254	FALSE
## 58	0.0000000	0.00	0.03	120	3061	2023-03-29	15:20:00	2.593754	FALSE
## 59	0.0000000	0.00	0.03	100	5507	2023-03-29	10:47:18	2.656253	FALSE

##	Price
## 1	10.000
## 2	9.500
## 3	9.000
## 4	8.525
## 5	8.025
## 6	7.025
## 7	6.525
## 8	6.025
## 9	5.525
## 10	5.050
## 11	4.125
## 12	3.275
## 13	2.610
## 14	2.130
## 15	1.825
## 16	1.520
## 17	1.335
## 18	1.155
## 19	1.015
## 20	0.890
## 21	0.790
## 22	0.705
## 23	0.635
## 24	0.570
## 25	0.520
## 26	0.470
## 27	0.430
## 28	0.410
## 29	0.390
## 30	0.360
## 31	0.325
## 32	0.300
## 33	0.280
## 34	0.270
## 35	0.260
## 36	0.240
## 37	0.220
## 38	0.180
## 39	0.155
## 40	0.130
## 41	0.115
## 42	0.090
## 43	0.070
## 44	0.055
## 45	0.045
## 46	0.035
## 47	0.025
## 48	0.020
## 49	0.020
## 50	0.025
## 51	0.025
## 52	0.025
## 53	0.020

54 0.020
 ## 55 0.015
 ## 56 0.015
 ## 57 0.015
 ## 58 0.015
 ## 59 0.015

##

\$May.17.2023\$puts

##	ContractID	ContractSize	Currency	Expiration	Strike	Last
## 1	VIX230517P00010000	REGULAR	USD	2023-05-17	10.0	0.01
## 2	VIX230517P00011000	REGULAR	USD	2023-05-17	11.0	0.01
## 3	VIX230517P00012000	REGULAR	USD	2023-05-17	12.0	0.01
## 4	VIX230517P00013000	REGULAR	USD	2023-05-17	13.0	0.01
## 5	VIX230517P00014000	REGULAR	USD	2023-05-17	14.0	0.01
## 6	VIX230517P00014500	REGULAR	USD	2023-05-17	14.5	0.01
## 7	VIX230517P00015000	REGULAR	USD	2023-05-17	15.0	0.04
## 8	VIX230517P00016000	REGULAR	USD	2023-05-17	16.0	0.08
## 9	VIX230517P00017000	REGULAR	USD	2023-05-17	17.0	0.23
## 10	VIX230517P00018000	REGULAR	USD	2023-05-17	18.0	0.54
## 11	VIX230517P00019000	REGULAR	USD	2023-05-17	19.0	1.06
## 12	VIX230517P00020000	REGULAR	USD	2023-05-17	20.0	1.68
## 13	VIX230517P00021000	REGULAR	USD	2023-05-17	21.0	2.44
## 14	VIX230517P00022000	REGULAR	USD	2023-05-17	22.0	3.23
## 15	VIX230517P00023000	REGULAR	USD	2023-05-17	23.0	4.06
## 16	VIX230517P00024000	REGULAR	USD	2023-05-17	24.0	4.90
## 17	VIX230517P00025000	REGULAR	USD	2023-05-17	25.0	5.65
## 18	VIX230517P00026000	REGULAR	USD	2023-05-17	26.0	6.65
## 19	VIX230517P00027000	REGULAR	USD	2023-05-17	27.0	7.60
## 20	VIX230517P00028000	REGULAR	USD	2023-05-17	28.0	8.20
## 21	VIX230517P00029000	REGULAR	USD	2023-05-17	29.0	9.35
## 22	VIX230517P00030000	REGULAR	USD	2023-05-17	30.0	10.30
## 23	VIX230517P00031000	REGULAR	USD	2023-05-17	31.0	11.22
## 24	VIX230517P00032000	REGULAR	USD	2023-05-17	32.0	11.97
## 25	VIX230517P00032500	REGULAR	USD	2023-05-17	32.5	12.65
## 26	VIX230517P00033000	REGULAR	USD	2023-05-17	33.0	11.05
## 27	VIX230517P00034000	REGULAR	USD	2023-05-17	34.0	14.08
## 28	VIX230517P00035000	REGULAR	USD	2023-05-17	35.0	14.80
## 29	VIX230517P00036000	REGULAR	USD	2023-05-17	36.0	14.65
## 30	VIX230517P00037000	REGULAR	USD	2023-05-17	37.0	16.90
## 31	VIX230517P00037500	REGULAR	USD	2023-05-17	37.5	16.10
## 32	VIX230517P00040000	REGULAR	USD	2023-05-17	40.0	19.80
## 33	VIX230517P00042500	REGULAR	USD	2023-05-17	42.5	22.25
## 34	VIX230517P00045000	REGULAR	USD	2023-05-17	45.0	23.22
## 35	VIX230517P00047500	REGULAR	USD	2023-05-17	47.5	25.77
## 36	VIX230517P00050000	REGULAR	USD	2023-05-17	50.0	29.60
## 37	VIX230517P00055000	REGULAR	USD	2023-05-17	55.0	32.80
## 38	VIX230517P00060000	REGULAR	USD	2023-05-17	60.0	38.96
## 39	VIX230517P00065000	REGULAR	USD	2023-05-17	65.0	42.67
## 40	VIX230517P00070000	REGULAR	USD	2023-05-17	70.0	46.11
## 41	VIX230517P00075000	REGULAR	USD	2023-05-17	75.0	54.30
## 42	VIX230517P00080000	REGULAR	USD	2023-05-17	80.0	59.30
## 43	VIX230517P00090000	REGULAR	USD	2023-05-17	90.0	61.25
## 44	VIX230517P00100000	REGULAR	USD	2023-05-17	100.0	74.00
## 45	VIX230517P00110000	REGULAR	USD	2023-05-17	110.0	86.62

## 46	VIX230517P00130000	REGULAR	USD	2023-05-17	130.0	106.00		
## 47	VIX230517P00140000	REGULAR	USD	2023-05-17	140.0	116.21		
## 48	VIX230517P00150000	REGULAR	USD	2023-05-17	150.0	123.30		
## 49	VIX230517P00180000	REGULAR	USD	2023-05-17	180.0	157.55		
##	Chg	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	
## 1	0.000000000	0.000000	0.00	0.02	1	32	2023-03-29 10:52:29	
## 2	0.000000000	0.000000	0.00	0.02	3	7	2023-04-12 10:55:11	
## 3	0.000000000	0.000000	0.00	0.02	43	43	2023-04-13 09:45:31	
## 4	0.000000000	0.000000	0.00	0.02	5	8	2023-03-10 14:15:30	
## 5	0.000000000	0.000000	0.00	0.03	212	2777	2023-04-14 11:23:10	
## 6	-0.010000000	-50.000000	0.00	0.04	11	1421	2023-04-14 16:14:11	
## 7	0.020000000	100.000000	0.01	0.05	1637	12914	2023-04-14 14:59:27	
## 8	0.009999998	14.285712	0.06	0.10	436	31695	2023-04-14 16:04:48	
## 9	0.030000001	15.000001	0.23	0.26	2967	71617	2023-04-14 16:14:11	
## 10	0.050000012	10.204084	0.55	0.60	21773	60128	2023-04-14 16:09:35	
## 11	0.079999920	8.163258	1.06	1.13	10532	61157	2023-04-14 16:14:15	
## 12	0.099999905	6.329108	1.70	1.77	13978	63630	2023-04-14 16:14:15	
## 13	0.160000090	7.017548	2.42	2.50	1146	75363	2023-04-14 16:13:36	
## 14	0.200000050	6.600662	3.20	3.30	133	64265	2023-04-14 16:00:11	
## 15	0.260000000	6.842105	4.00	4.15	73	49828	2023-04-14 15:59:57	
## 16	0.200000290	4.255325	4.85	5.00	116	48555	2023-04-14 15:59:50	
## 17	0.099999905	1.801800	5.75	5.90	24	42157	2023-04-14 15:53:17	
## 18	0.210000040	3.260870	6.60	6.80	104	31453	2023-04-14 15:58:30	
## 19	0.250000000	3.401361	7.55	7.70	95	23397	2023-04-14 16:00:00	
## 20	-0.100000380	-1.204824	8.45	8.65	93	9900	2023-04-14 13:43:13	
## 21	0.370000840	4.120277	9.40	9.60	68	1795	2023-04-14 15:11:47	
## 22	0.180000300	1.778659	10.30	10.55	56	1891	2023-04-14 15:46:01	
## 23	0.170000080	1.538462	11.30	11.50	72	1635	2023-04-14 15:06:38	
## 24	0.430000300	3.726172	12.25	12.45	2	269	2023-04-14 13:24:59	
## 25	0.449999800	3.688523	12.70	12.90	5	95	2023-04-14 14:39:35	
## 26	0.000000000	0.000000	13.20	13.40	30	51	2023-03-28 09:37:46	
## 27	1.479999500	11.746028	14.15	14.35	1	89	2023-04-14 15:06:07	
## 28	0.000000000	0.000000	15.10	15.35	1	209	2023-04-13 10:35:52	
## 29	0.000000000	0.000000	16.05	16.30	1	98	2023-04-03 13:13:37	
## 30	0.000000000	0.000000	17.05	17.30	3	77	2023-04-13 11:29:21	
## 31	0.000000000	0.000000	17.50	17.75	1	245	2023-04-03 12:50:34	
## 32	0.000000000	0.000000	19.95	20.20	1	39	2023-04-13 11:34:17	
## 33	0.000000000	0.000000	22.40	22.65	3	20	2023-04-13 11:43:36	
## 34	0.000000000	0.000000	24.85	25.15	10	12	2023-03-29 15:47:25	
## 35	0.000000000	0.000000	22.65	23.00	NA	2	2023-02-16 15:39:46	
## 36	0.000000000	0.000000	29.80	30.05	39	282	2023-04-13 11:24:10	
## 37	0.000000000	0.000000	34.75	35.00	2	29	2023-03-30 15:02:43	
## 38	0.000000000	0.000000	39.70	40.00	2	47	2023-04-11 10:26:21	
## 39	0.000000000	0.000000	44.70	44.95	2	39	2023-03-30 15:02:43	
## 40	0.000000000	0.000000	49.65	49.90	2	5	2023-03-21 10:36:05	
## 41	5.799999000	11.958761	54.60	54.90	5	1	2023-04-14 12:21:36	
## 42	0.000000000	0.000000	59.60	59.85	10	13	2023-04-13 14:30:47	
## 43	0.000000000	0.000000	63.30	63.55	20	20	2022-11-14 13:32:40	
## 44	0.000000000	0.000000	79.50	79.75	1	112	2023-03-24 10:48:50	
## 45	0.000000000	0.000000	83.75	84.25	3	2	2023-02-13 11:59:04	
## 46	0.000000000	0.000000	0.00	0.00	34	39	2023-02-21 05:26:08	
## 47	0.000000000	0.000000	113.35	113.90	3	3	2023-02-13 11:59:04	
## 48	0.000000000	0.000000	128.70	128.85	1	119	2023-03-13 09:37:17	
## 49	0.000000000	0.000000	159.15	159.40	8	19	2023-04-06 12:09:29	

##		IV	ITM	Price
## 1	0.7812522	FALSE		0.010
## 2	0.6562534	FALSE		0.010
## 3	0.5312547	FALSE		0.010
## 4	0.4687553	FALSE		0.010
## 5	0.3867249	FALSE		0.015
## 6	0.3496159	FALSE		0.020
## 7	0.3046945	FALSE		0.030
## 8	0.2275468	FALSE		0.080
## 9	0.1455164	FALSE		0.245
## 10	0.0000100	TRUE		0.575
## 11	0.0000100	TRUE		1.095
## 12	0.0000100	TRUE		1.735
## 13	0.0000100	TRUE		2.460
## 14	0.0000100	TRUE		3.250
## 15	0.0000100	TRUE		4.075
## 16	0.0000100	TRUE		4.925
## 17	0.0000100	TRUE		5.825
## 18	0.0000100	TRUE		6.700
## 19	0.0000100	TRUE		7.625
## 20	0.0000100	TRUE		8.550
## 21	0.0000100	TRUE		9.500
## 22	0.0000100	TRUE		10.425
## 23	0.0000100	TRUE		11.400
## 24	0.0000100	TRUE		12.350
## 25	0.0000100	TRUE		12.800
## 26	0.0000100	TRUE		13.300
## 27	0.0000100	TRUE		14.250
## 28	0.0000100	TRUE		15.225
## 29	0.0000100	TRUE		16.175
## 30	0.0000100	TRUE		17.175
## 31	0.0000100	TRUE		17.625
## 32	0.0000100	TRUE		20.075
## 33	0.0000100	TRUE		22.525
## 34	0.0000100	TRUE		25.000
## 35	0.0000100	TRUE		22.825
## 36	0.0000100	TRUE		29.925
## 37	0.0000100	TRUE		34.875
## 38	0.0000100	TRUE		39.850
## 39	0.0000100	TRUE		44.825
## 40	0.0000100	TRUE		49.775
## 41	0.0000100	TRUE		54.750
## 42	0.0000100	TRUE		59.725
## 43	0.0000100	TRUE		63.425
## 44	0.0000100	TRUE		79.625
## 45	0.0000100	TRUE		84.000
## 46	0.0000100	TRUE		0.000
## 47	0.0000100	TRUE		113.625
## 48	0.0000100	TRUE		128.775
## 49	0.0000100	TRUE		159.275
##				
##				
##	\$Jun.21.2023			
##	\$Jun.21.2023	\$calls		

##	ContractID	ContractSize	Currency	Expiration	Strike	Last	Chg
## 1	VIX230621C00010000	REGULAR	USD	2023-06-21	10.0	11.67	-0.01000023
## 2	VIX230621C00011000	REGULAR	USD	2023-06-21	11.0	10.62	0.01999950
## 3	VIX230621C00012000	REGULAR	USD	2023-06-21	12.0	9.82	-0.57999990
## 4	VIX230621C00013000	REGULAR	USD	2023-06-21	13.0	9.00	0.00000000
## 5	VIX230621C00014000	REGULAR	USD	2023-06-21	14.0	9.00	0.00000000
## 6	VIX230621C00015000	REGULAR	USD	2023-06-21	15.0	6.80	0.10000038
## 7	VIX230621C00016000	REGULAR	USD	2023-06-21	16.0	5.80	-0.04999971
## 8	VIX230621C00017000	REGULAR	USD	2023-06-21	17.0	5.00	-0.01999998
## 9	VIX230621C00018000	REGULAR	USD	2023-06-21	18.0	4.25	-0.07000017
## 10	VIX230621C00019000	REGULAR	USD	2023-06-21	19.0	3.70	-0.04999995
## 11	VIX230621C00020000	REGULAR	USD	2023-06-21	20.0	3.30	-0.04999995
## 12	VIX230621C00021000	REGULAR	USD	2023-06-21	21.0	2.88	-0.01999998
## 13	VIX230621C00022000	REGULAR	USD	2023-06-21	22.0	2.60	-0.04000020
## 14	VIX230621C00023000	REGULAR	USD	2023-06-21	23.0	2.32	-0.04999995
## 15	VIX230621C00024000	REGULAR	USD	2023-06-21	24.0	2.08	-0.05000019
## 16	VIX230621C00025000	REGULAR	USD	2023-06-21	25.0	1.90	-0.05000007
## 17	VIX230621C00026000	REGULAR	USD	2023-06-21	26.0	1.74	0.03999996
## 18	VIX230621C00027000	REGULAR	USD	2023-06-21	27.0	1.60	-0.02999997
## 19	VIX230621C00028000	REGULAR	USD	2023-06-21	28.0	1.47	-0.02999997
## 20	VIX230621C00029000	REGULAR	USD	2023-06-21	29.0	1.35	-0.01999998
## 21	VIX230621C00030000	REGULAR	USD	2023-06-21	30.0	1.25	-0.01999998
## 22	VIX230621C00031000	REGULAR	USD	2023-06-21	31.0	1.15	-0.00999999
## 23	VIX230621C00032000	REGULAR	USD	2023-06-21	32.0	1.10	0.06000006
## 24	VIX230621C00032500	REGULAR	USD	2023-06-21	32.5	1.05	0.00000000
## 25	VIX230621C00033000	REGULAR	USD	2023-06-21	33.0	1.00	-0.01999998
## 26	VIX230621C00034000	REGULAR	USD	2023-06-21	34.0	0.95	0.02999997
## 27	VIX230621C00035000	REGULAR	USD	2023-06-21	35.0	0.89	0.00000000
## 28	VIX230621C00036000	REGULAR	USD	2023-06-21	36.0	0.84	-0.08000004
## 29	VIX230621C00037000	REGULAR	USD	2023-06-21	37.0	0.80	0.04000002
## 30	VIX230621C00037500	REGULAR	USD	2023-06-21	37.5	0.83	0.07999998
## 31	VIX230621C00038000	REGULAR	USD	2023-06-21	38.0	0.72	0.01000005
## 32	VIX230621C00039000	REGULAR	USD	2023-06-21	39.0	0.67	0.00999999
## 33	VIX230621C00040000	REGULAR	USD	2023-06-21	40.0	0.65	0.01999998
## 34	VIX230621C00042500	REGULAR	USD	2023-06-21	42.5	0.56	0.03000003
## 35	VIX230621C00045000	REGULAR	USD	2023-06-21	45.0	0.50	0.00999999
## 36	VIX230621C00047500	REGULAR	USD	2023-06-21	47.5	0.44	0.02000001
## 37	VIX230621C00050000	REGULAR	USD	2023-06-21	50.0	0.38	0.00000000
## 38	VIX230621C00055000	REGULAR	USD	2023-06-21	55.0	0.32	0.03000000
## 39	VIX230621C00060000	REGULAR	USD	2023-06-21	60.0	0.22	-0.03000000
## 40	VIX230621C00065000	REGULAR	USD	2023-06-21	65.0	0.21	0.00000000
## 41	VIX230621C00070000	REGULAR	USD	2023-06-21	70.0	0.16	-0.01000000
## 42	VIX230621C00075000	REGULAR	USD	2023-06-21	75.0	0.14	0.00000000
## 43	VIX230621C00080000	REGULAR	USD	2023-06-21	80.0	0.10	-0.04000000
## 44	VIX230621C00085000	REGULAR	USD	2023-06-21	85.0	0.12	0.00000000
## 45	VIX230621C00090000	REGULAR	USD	2023-06-21	90.0	0.10	0.02000000
## 46	VIX230621C00095000	REGULAR	USD	2023-06-21	95.0	0.10	0.00000000
## 47	VIX230621C00100000	REGULAR	USD	2023-06-21	100.0	0.06	0.00000000
## 48	VIX230621C00110000	REGULAR	USD	2023-06-21	110.0	0.04	-0.01000000
## 49	VIX230621C00120000	REGULAR	USD	2023-06-21	120.0	0.04	0.00000000
## 50	VIX230621C00130000	REGULAR	USD	2023-06-21	130.0	0.05	0.00000000
## 51	VIX230621C00140000	REGULAR	USD	2023-06-21	140.0	0.03	0.00000000
## 52	VIX230621C00150000	REGULAR	USD	2023-06-21	150.0	0.03	0.00000000
## 53	VIX230621C00160000	REGULAR	USD	2023-06-21	160.0	0.02	-0.01000000

## 54	VIX230621C00170000		REGULAR		USD	2023-06-21	170.0	0.02	0.00000000
## 55	VIX230621C00180000		REGULAR		USD	2023-06-21	180.0	0.04	0.00000000
##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime		IV	ITM
## 1	-0.08561839	11.35	11.65	42	993	2023-04-14 16:06:40		3.623048	TRUE
## 2	0.18867455	10.40	10.65	109	1089	2023-04-14 14:57:49		3.240236	TRUE
## 3	-5.57692240	9.40	9.65	25	411	2023-04-10 13:06:44		2.894534	TRUE
## 4	0.00000000	8.40	8.65	2	813	2023-04-12 12:01:16		2.585941	TRUE
## 5	0.00000000	7.45	7.70	2	53	2023-04-04 15:50:06		2.327153	TRUE
## 6	1.49254310	6.50	6.75	976	2694	2023-04-14 15:53:27		2.087407	TRUE
## 7	-0.85469600	5.55	5.80	85	542	2023-04-14 16:13:12		1.861329	TRUE
## 8	-0.39840603	4.75	5.00	143	620	2023-04-14 16:13:27		1.699220	TRUE
## 9	-1.62037420	4.20	4.30	510	1563	2023-04-14 16:11:48		1.599611	FALSE
## 10	-1.33333210	3.55	3.75	509	8498	2023-04-14 16:12:45		1.502932	FALSE
## 11	-1.49253600	3.10	3.30	1188	29282	2023-04-14 16:09:01		1.451175	FALSE
## 12	-0.68965447	2.75	2.89	241	8305	2023-04-14 16:14:26		1.414065	FALSE
## 13	-1.51515900	2.45	2.58	326	82354	2023-04-14 15:57:36		1.394046	FALSE
## 14	-2.10970260	2.20	2.33	543	145006	2023-04-14 15:59:16		1.384769	FALSE
## 15	-2.34742670	1.99	2.11	1092	62411	2023-04-14 15:59:55		1.379886	FALSE
## 16	-2.56410620	1.81	1.92	1163	84428	2023-04-14 16:11:50		1.378909	FALSE
## 17	2.35293900	1.65	1.75	65	25556	2023-04-14 16:14:15		1.378909	FALSE
## 18	-1.84048900	1.53	1.61	165	81169	2023-04-14 15:57:36		1.386722	FALSE
## 19	-1.99999810	1.38	1.48	390	57525	2023-04-14 15:58:29		1.384769	FALSE
## 20	-1.45985260	1.30	1.37	129	12587	2023-04-14 16:02:49		1.396487	FALSE
## 21	-1.57480170	1.20	1.27	3988	488245	2023-04-14 16:11:01		1.401370	FALSE
## 22	-0.86206810	1.11	1.17	6	1815	2023-04-14 15:47:35		1.405276	FALSE
## 23	5.76923660	1.03	1.09	573	96068	2023-04-14 15:17:24		1.411136	FALSE
## 24	0.00000000	0.97	1.06	7	4449	2023-04-14 15:53:28		1.410159	FALSE
## 25	-1.96078250	0.96	1.02	115	3169	2023-04-14 16:04:00		1.418460	FALSE
## 26	3.26086660	0.87	0.95	15	94074	2023-04-14 15:56:40		1.417972	FALSE
## 27	0.00000000	0.84	0.89	976	74027	2023-04-14 15:23:27		1.431643	FALSE
## 28	-8.69565700	0.78	0.84	6	2127	2023-04-14 10:11:18		1.437503	FALSE
## 29	5.26316070	0.73	0.79	286	27070	2023-04-14 11:41:15		1.443362	FALSE
## 30	10.66666500	0.71	0.76	1	13650	2023-04-14 12:54:59		1.445315	FALSE
## 31	1.40845780	0.67	0.73	53	3391	2023-04-14 16:06:48		1.441409	FALSE
## 32	1.51515000	0.65	0.69	1003	1738	2023-04-14 15:58:24		1.455081	FALSE
## 33	3.17460010	0.61	0.66	6747	438741	2023-04-14 15:59:38		1.462893	FALSE
## 34	5.66038300	0.53	0.57	160	10997	2023-04-14 14:56:50		1.476565	FALSE
## 35	2.04081440	0.46	0.50	409	34171	2023-04-14 15:58:50		1.490237	FALSE
## 36	4.76190760	0.40	0.45	40	2548	2023-04-14 13:48:46		1.505862	FALSE
## 37	0.00000000	0.36	0.40	529	106388	2023-04-14 16:06:18		1.521487	FALSE
## 38	10.34482900	0.28	0.32	1108	31372	2023-04-14 12:00:46		1.542971	FALSE
## 39	-12.00000000	0.22	0.26	4952	104312	2023-04-14 16:14:50		1.562502	FALSE
## 40	0.00000000	0.18	0.21	8628	25961	2023-04-13 15:48:11		1.578127	FALSE
## 41	-5.88235600	0.14	0.18	1	53127	2023-04-14 16:06:48		1.593752	FALSE
## 42	0.00000000	0.12	0.16	4540	34986	2023-04-14 15:56:32		1.621096	FALSE
## 43	-28.57142600	0.10	0.14	101	25187	2023-04-14 14:19:18		1.636721	FALSE
## 44	0.00000000	0.08	0.12	16	53198	2023-04-12 15:00:24		1.644533	FALSE
## 45	25.00000600	0.07	0.10	1101	16815	2023-04-14 13:21:24		1.656252	FALSE
## 46	0.00000000	0.05	0.09	6000	15845	2023-04-05 15:55:31		1.656252	FALSE
## 47	0.00000000	0.04	0.08	1060	7855	2023-04-13 15:11:45		1.664064	FALSE
## 48	-20.00000400	0.03	0.07	4600	12626	2023-04-14 10:45:54		1.703126	FALSE
## 49	0.00000000	0.02	0.06	1	3448	2023-04-14 16:14:20		1.718751	FALSE
## 50	0.00000000	0.01	0.05	45	4025	2023-04-06 10:08:54		1.726564	FALSE
## 51	0.00000000	0.01	0.04	1	985	2023-04-14 16:01:44		1.750001	FALSE

```

## 52  0.00000000  0.00  0.05    1  3870 2023-04-10 09:41:36 1.796876 FALSE
## 53 -33.33333600  0.00  0.05    1  1041 2023-04-14 15:59:40 1.828126 FALSE
## 54  0.00000000  0.00  0.05    5  3976 2023-04-14 14:48:31 1.875001 FALSE
## 55  0.00000000  0.00  0.05   11 17766 2023-03-31 15:48:38 1.906250 FALSE
##      Price
## 1  11.500
## 2  10.525
## 3   9.525
## 4   8.525
## 5   7.575
## 6   6.625
## 7   5.675
## 8   4.875
## 9   4.250
## 10  3.650
## 11  3.200
## 12  2.820
## 13  2.515
## 14  2.265
## 15  2.050
## 16  1.865
## 17  1.700
## 18  1.570
## 19  1.430
## 20  1.335
## 21  1.235
## 22  1.140
## 23  1.060
## 24  1.015
## 25  0.990
## 26  0.910
## 27  0.865
## 28  0.810
## 29  0.760
## 30  0.735
## 31  0.700
## 32  0.670
## 33  0.635
## 34  0.550
## 35  0.480
## 36  0.425
## 37  0.380
## 38  0.300
## 39  0.240
## 40  0.195
## 41  0.160
## 42  0.140
## 43  0.120
## 44  0.100
## 45  0.085
## 46  0.070
## 47  0.060
## 48  0.050
## 49  0.040

```

50 0.030
 ## 51 0.025
 ## 52 0.025
 ## 53 0.025
 ## 54 0.025
 ## 55 0.025

##

\$Jun.21.2023\$puts

##	ContractID	ContractSize	Currency	Expiration	Strike	Last	Chg
## 1	VIX230621P00010000	REGULAR	USD	2023-06-21	10.0	0.01	0.00000000
## 2	VIX230621P00011000	REGULAR	USD	2023-06-21	11.0	0.01	0.00000000
## 3	VIX230621P00012000	REGULAR	USD	2023-06-21	12.0	0.01	0.00000000
## 4	VIX230621P00013000	REGULAR	USD	2023-06-21	13.0	0.01	0.00000000
## 5	VIX230621P00014000	REGULAR	USD	2023-06-21	14.0	0.02	-0.01000000
## 6	VIX230621P00015000	REGULAR	USD	2023-06-21	15.0	0.06	0.02000000
## 7	VIX230621P00016000	REGULAR	USD	2023-06-21	16.0	0.12	0.02999999
## 8	VIX230621P00017000	REGULAR	USD	2023-06-21	17.0	0.29	0.03000000
## 9	VIX230621P00018000	REGULAR	USD	2023-06-21	18.0	0.59	0.03999996
## 10	VIX230621P00019000	REGULAR	USD	2023-06-21	19.0	1.00	0.02999997
## 11	VIX230621P00020000	REGULAR	USD	2023-06-21	20.0	1.52	0.00999999
## 12	VIX230621P00021000	REGULAR	USD	2023-06-21	21.0	2.13	0.01000023
## 13	VIX230621P00022000	REGULAR	USD	2023-06-21	22.0	2.84	0.03999996
## 14	VIX230621P00023000	REGULAR	USD	2023-06-21	23.0	3.57	0.01999998
## 15	VIX230621P00024000	REGULAR	USD	2023-06-21	24.0	4.35	0.00000000
## 16	VIX230621P00025000	REGULAR	USD	2023-06-21	25.0	5.15	0.00000000
## 17	VIX230621P00026000	REGULAR	USD	2023-06-21	26.0	5.85	-0.15000010
## 18	VIX230621P00027000	REGULAR	USD	2023-06-21	27.0	6.85	0.04999971
## 19	VIX230621P00028000	REGULAR	USD	2023-06-21	28.0	7.70	0.04999971
## 20	VIX230621P00029000	REGULAR	USD	2023-06-21	29.0	8.57	0.11999989
## 21	VIX230621P00030000	REGULAR	USD	2023-06-21	30.0	9.44	0.33999920
## 22	VIX230621P00031000	REGULAR	USD	2023-06-21	31.0	9.63	0.00000000
## 23	VIX230621P00032000	REGULAR	USD	2023-06-21	32.0	11.09	0.14000034
## 24	VIX230621P00032500	REGULAR	USD	2023-06-21	32.5	11.46	0.00000000
## 25	VIX230621P00033000	REGULAR	USD	2023-06-21	33.0	12.17	0.02000046
## 26	VIX230621P00034000	REGULAR	USD	2023-06-21	34.0	12.25	0.00000000
## 27	VIX230621P00035000	REGULAR	USD	2023-06-21	35.0	14.00	0.00000000
## 28	VIX230621P00036000	REGULAR	USD	2023-06-21	36.0	14.90	0.00000000
## 29	VIX230621P00037000	REGULAR	USD	2023-06-21	37.0	15.60	1.00000000
## 30	VIX230621P00037500	REGULAR	USD	2023-06-21	37.5	15.30	0.00000000
## 31	VIX230621P00038000	REGULAR	USD	2023-06-21	38.0	14.75	0.00000000
## 32	VIX230621P00039000	REGULAR	USD	2023-06-21	39.0	15.15	0.00000000
## 33	VIX230621P00040000	REGULAR	USD	2023-06-21	40.0	18.55	0.00000000
## 34	VIX230621P00042500	REGULAR	USD	2023-06-21	42.5	19.25	0.00000000
## 35	VIX230621P00045000	REGULAR	USD	2023-06-21	45.0	22.45	0.00000000
## 36	VIX230621P00047500	REGULAR	USD	2023-06-21	47.5	24.70	0.00000000
## 37	VIX230621P00050000	REGULAR	USD	2023-06-21	50.0	28.24	-0.07999992
## 38	VIX230621P00055000	REGULAR	USD	2023-06-21	55.0	31.82	0.00000000
## 39	VIX230621P00060000	REGULAR	USD	2023-06-21	60.0	38.02	-0.09000015
## 40	VIX230621P00065000	REGULAR	USD	2023-06-21	65.0	41.60	0.00000000
## 41	VIX230621P00070000	REGULAR	USD	2023-06-21	70.0	44.65	0.00000000
## 42	VIX230621P00080000	REGULAR	USD	2023-06-21	80.0	57.80	0.00000000
## 43	VIX230621P00100000	REGULAR	USD	2023-06-21	100.0	76.25	0.00000000
## 44	VIX230621P00110000	REGULAR	USD	2023-06-21	110.0	85.00	0.00000000
## 45	VIX230621P00130000	REGULAR	USD	2023-06-21	130.0	105.12	0.00000000

## 46	VIX230621P00150000		REGULAR		USD 2023-06-21	150.0	124.88	0.00000000	
##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM	
## 1	0.0000000	0.00	0.02	2	5	2023-03-31 11:20:31	0.5312547	FALSE	
## 2	0.0000000	0.00	0.02	4	5	2023-03-15 12:24:09	0.4921926	FALSE	
## 3	0.0000000	0.00	0.02	5	10	2023-03-21 09:52:01	0.4062559	FALSE	
## 4	0.0000000	0.00	0.03	4	165	2023-04-14 13:49:20	0.3476628	FALSE	
## 5	-33.3333360	0.00	0.05	14	672	2023-04-14 14:17:17	0.2968820	FALSE	
## 6	50.0000000	0.03	0.07	29256	105444	2023-04-14 16:00:07	0.2304764	FALSE	
## 7	33.3333240	0.11	0.15	89	20089	2023-04-14 16:10:46	0.1836019	FALSE	
## 8	11.5384630	0.28	0.31	240	33439	2023-04-14 16:00:07	0.1181729	FALSE	
## 9	7.2727203	0.57	0.63	12961	51502	2023-04-14 16:10:46	0.0000100	TRUE	
## 10	3.0927806	0.99	1.06	7388	84123	2023-04-14 16:11:07	0.0000100	TRUE	
## 11	0.6622511	1.53	1.60	219	53122	2023-04-14 15:34:49	0.0000100	TRUE	
## 12	0.4717089	2.15	2.23	5016	24674	2023-04-14 15:17:07	0.0000100	TRUE	
## 13	1.4285702	2.84	2.95	169	92716	2023-04-14 15:51:08	0.0000100	TRUE	
## 14	0.5633798	3.55	3.70	249	57548	2023-04-14 15:32:31	0.0000100	TRUE	
## 15	0.0000000	4.30	4.45	7	61923	2023-04-14 15:53:16	0.0000100	TRUE	
## 16	0.0000000	5.15	5.30	69	19142	2023-04-14 15:56:35	0.0000100	TRUE	
## 17	-2.5000014	5.95	6.10	61	14132	2023-04-14 13:26:03	0.0000100	TRUE	
## 18	0.7352899	6.80	6.95	36	9858	2023-04-14 15:20:29	0.0000100	TRUE	
## 19	0.6535910	7.65	7.85	216	6880	2023-04-14 15:42:20	0.0000100	TRUE	
## 20	1.4201170	8.55	8.70	2000	929	2023-04-14 16:11:07	0.0000100	TRUE	
## 21	3.7362550	9.45	9.60	6	598	2023-04-14 15:56:35	0.0000100	TRUE	
## 22	0.0000000	10.35	10.50	20	329	2023-04-06 14:43:13	0.0000100	TRUE	
## 23	1.2785420	11.25	11.45	2	217	2023-04-14 13:24:59	0.0000100	TRUE	
## 24	0.0000000	11.70	11.85	154	403	2023-04-12 13:06:53	0.0000100	TRUE	
## 25	0.1646128	12.15	12.35	12	78	2023-04-14 15:31:58	0.0000100	TRUE	
## 26	0.0000000	13.10	13.25	10	55	2023-04-04 09:36:42	0.0000100	TRUE	
## 27	0.0000000	14.00	14.25	30	115	2023-04-13 13:51:23	0.0000100	TRUE	
## 28	0.0000000	14.95	15.15	2	102	2023-04-13 13:36:59	0.0000100	TRUE	
## 29	6.8493150	15.90	16.10	40	701	2023-04-04 11:15:38	0.0000100	TRUE	
## 30	0.0000000	16.35	16.60	3	8	2023-03-31 10:02:01	0.0000100	TRUE	
## 31	0.0000000	16.25	16.35	1	565	2023-01-10 11:45:50	0.0000100	TRUE	
## 32	0.0000000	16.80	17.05	NA	1	2023-03-10 13:45:23	0.0000100	TRUE	
## 33	0.0000000	18.75	18.95	2	91	2023-04-13 09:46:02	0.0000100	TRUE	
## 34	0.0000000	0.00	0.00	5	20	2023-01-12 09:40:52	0.0000100	TRUE	
## 35	0.0000000	23.55	23.75	1	17	2023-03-31 10:26:36	0.0000100	TRUE	
## 36	0.0000000	25.95	26.20	205	215	2023-03-22 14:08:44	0.0000100	TRUE	
## 37	-0.2824856	28.35	28.65	5	85	2023-04-14 10:39:37	0.0000100	TRUE	
## 38	0.0000000	33.25	33.50	2	44	2023-04-04 11:29:33	0.0000100	TRUE	
## 39	-0.2361589	38.15	38.40	5	17	2023-04-14 10:39:37	0.0000100	TRUE	
## 40	0.0000000	43.05	43.30	2	54	2023-04-04 11:29:33	0.0000100	TRUE	
## 41	0.0000000	47.95	48.25	6	54	2023-03-24 10:34:58	0.0000100	TRUE	
## 42	0.0000000	56.55	56.75	1	0	2023-03-06 10:35:55	0.0000100	TRUE	
## 43	0.0000000	77.60	77.85	8	329	2023-03-30 10:34:02	0.0000100	TRUE	
## 44	0.0000000	87.50	87.75	1	4	2023-03-21 12:23:21	0.0000100	TRUE	
## 45	0.0000000	104.20	104.55	1	0	2023-02-22 12:14:42	0.0000100	TRUE	
## 46	0.0000000	116.20	0.00	100	324	2023-02-10 09:30:09	0.0000100	TRUE	
##	Price								
## 1	0.010								
## 2	0.010								
## 3	0.010								
## 4	0.015								
## 5	0.025								

```
## 6    0.050
## 7    0.130
## 8    0.295
## 9    0.600
## 10   1.025
## 11   1.565
## 12   2.190
## 13   2.895
## 14   3.625
## 15   4.375
## 16   5.225
## 17   6.025
## 18   6.875
## 19   7.750
## 20   8.625
## 21   9.525
## 22  10.425
## 23  11.350
## 24  11.775
## 25  12.250
## 26  13.175
## 27  14.125
## 28  15.050
## 29  16.000
## 30  16.475
## 31  16.300
## 32  16.925
## 33  18.850
## 34   0.000
## 35  23.650
## 36  26.075
## 37  28.500
## 38  33.375
## 39  38.275
## 40  43.175
## 41  48.100
## 42  56.650
## 43  77.725
## 44  87.625
## 45 104.375
## 46  58.100
```

#4. For calls and puts of VIX.options at each expiration, add a column of InTheMoney, which takes value

```
for (i in 1:length(VIX.options.all)) {
  VIX.options.all[[i]]$calls$InTheMoney<-VIX.options.all[[i]]$calls$Strike < VIX_Last
  VIX.options.all[[i]]$puts$InTheMoney<-VIX.options.all[[i]]$puts$Strike > VIX_Last
}

print(head(VIX.options.all))
```

```
## $Apr.19.2023
## $Apr.19.2023$calls
##      ContractID ContractSize Currency Expiration Strike  Last      Chg
```

## 1	VIX230419C00010000	REGULAR	USD	2023-04-19	10.0	8.35	-0.46999930
## 2	VIX230419C00010500	REGULAR	USD	2023-04-19	10.5	10.39	0.00000000
## 3	VIX230419C00011000	REGULAR	USD	2023-04-19	11.0	7.45	-0.65000060
## 4	VIX230419C00011500	REGULAR	USD	2023-04-19	11.5	9.39	0.00000000
## 5	VIX230419C00012000	REGULAR	USD	2023-04-19	12.0	7.05	0.00000000
## 6	VIX230419C00012500	REGULAR	USD	2023-04-19	12.5	9.05	0.00000000
## 7	VIX230419C00013000	REGULAR	USD	2023-04-19	13.0	5.51	-1.43999960
## 8	VIX230419C00013500	REGULAR	USD	2023-04-19	13.5	5.95	0.00000000
## 9	VIX230419C00014000	REGULAR	USD	2023-04-19	14.0	4.90	-0.54999970
## 10	VIX230419C00014500	REGULAR	USD	2023-04-19	14.5	4.85	0.00000000
## 11	VIX230419C00015000	REGULAR	USD	2023-04-19	15.0	3.40	-0.44999980
## 12	VIX230419C00016000	REGULAR	USD	2023-04-19	16.0	2.30	-0.58000016
## 13	VIX230419C00017000	REGULAR	USD	2023-04-19	17.0	1.35	-0.50000000
## 14	VIX230419C00018000	REGULAR	USD	2023-04-19	18.0	0.67	-0.38999993
## 15	VIX230419C00019000	REGULAR	USD	2023-04-19	19.0	0.35	-0.25000003
## 16	VIX230419C00020000	REGULAR	USD	2023-04-19	20.0	0.21	-0.15000002
## 17	VIX230419C00021000	REGULAR	USD	2023-04-19	21.0	0.15	-0.08999999
## 18	VIX230419C00022000	REGULAR	USD	2023-04-19	22.0	0.10	-0.07000000
## 19	VIX230419C00023000	REGULAR	USD	2023-04-19	23.0	0.09	-0.02000000
## 20	VIX230419C00024000	REGULAR	USD	2023-04-19	24.0	0.05	-0.04000000
## 21	VIX230419C00025000	REGULAR	USD	2023-04-19	25.0	0.06	-0.03000000
## 22	VIX230419C00026000	REGULAR	USD	2023-04-19	26.0	0.05	-0.02000000
## 23	VIX230419C00027000	REGULAR	USD	2023-04-19	27.0	0.03	0.00000000
## 24	VIX230419C00028000	REGULAR	USD	2023-04-19	28.0	0.04	0.00000000
## 25	VIX230419C00029000	REGULAR	USD	2023-04-19	29.0	0.03	0.00000000
## 26	VIX230419C00030000	REGULAR	USD	2023-04-19	30.0	0.03	0.00000000
## 27	VIX230419C00031000	REGULAR	USD	2023-04-19	31.0	0.02	0.01000000
## 28	VIX230419C00032000	REGULAR	USD	2023-04-19	32.0	0.01	-0.01000000
## 29	VIX230419C00032500	REGULAR	USD	2023-04-19	32.5	0.01	-0.01000000
## 30	VIX230419C00033000	REGULAR	USD	2023-04-19	33.0	0.01	-0.01000000
## 31	VIX230419C00034000	REGULAR	USD	2023-04-19	34.0	0.02	0.01000000
## 32	VIX230419C00035000	REGULAR	USD	2023-04-19	35.0	0.02	0.00000000
## 33	VIX230419C00036000	REGULAR	USD	2023-04-19	36.0	0.02	0.01000000
## 34	VIX230419C00037000	REGULAR	USD	2023-04-19	37.0	0.02	0.00000000
## 35	VIX230419C00037500	REGULAR	USD	2023-04-19	37.5	0.02	0.00000000
## 36	VIX230419C00038000	REGULAR	USD	2023-04-19	38.0	0.01	0.00000000
## 37	VIX230419C00039000	REGULAR	USD	2023-04-19	39.0	0.02	0.00000000
## 38	VIX230419C00040000	REGULAR	USD	2023-04-19	40.0	0.01	0.00000000
## 39	VIX230419C00042500	REGULAR	USD	2023-04-19	42.5	0.01	0.00000000
## 40	VIX230419C00045000	REGULAR	USD	2023-04-19	45.0	0.01	0.00000000
## 41	VIX230419C00047500	REGULAR	USD	2023-04-19	47.5	0.01	-0.01000000
## 42	VIX230419C00050000	REGULAR	USD	2023-04-19	50.0	0.02	0.01000000
## 43	VIX230419C00055000	REGULAR	USD	2023-04-19	55.0	0.01	0.00000000
## 44	VIX230419C00060000	REGULAR	USD	2023-04-19	60.0	0.01	0.00000000
## 45	VIX230419C00065000	REGULAR	USD	2023-04-19	65.0	0.01	0.00000000
## 46	VIX230419C00070000	REGULAR	USD	2023-04-19	70.0	0.01	0.00000000
## 47	VIX230419C00075000	REGULAR	USD	2023-04-19	75.0	0.01	0.00000000
## 48	VIX230419C00080000	REGULAR	USD	2023-04-19	80.0	0.01	0.00000000
## 49	VIX230419C00085000	REGULAR	USD	2023-04-19	85.0	0.01	0.00000000
## 50	VIX230419C00090000	REGULAR	USD	2023-04-19	90.0	0.01	0.00000000
## 51	VIX230419C00095000	REGULAR	USD	2023-04-19	95.0	0.02	0.00000000
## 52	VIX230419C00100000	REGULAR	USD	2023-04-19	100.0	0.01	0.00000000
## 53	VIX230419C00110000	REGULAR	USD	2023-04-19	110.0	0.04	0.00000000
## 54	VIX230419C00120000	REGULAR	USD	2023-04-19	120.0	0.02	0.00000000

## 55	VIX230419C00130000	REGULAR	USD	2023-04-19	130.0	0.02	0.00000000		
## 56	VIX230419C00140000	REGULAR	USD	2023-04-19	140.0	0.04	0.00000000		
## 57	VIX230419C00150000	REGULAR	USD	2023-04-19	150.0	0.02	0.00000000		
## 58	VIX230419C00160000	REGULAR	USD	2023-04-19	160.0	0.01	0.00000000		
## 59	VIX230419C00170000	REGULAR	USD	2023-04-19	170.0	0.01	0.00000000		
## 60	VIX230419C00180000	REGULAR	USD	2023-04-19	180.0	0.01	0.00000000		
##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM	Price
## 1	-5.328791	8.05	8.35	27	3029	2023-04-14 14:16:43	6.687502	TRUE	8.200
## 2	0.000000	7.55	7.85	20	21	2023-04-04 15:48:06	6.253908	TRUE	7.700
## 3	-8.024697	7.05	7.35	4	464	2023-04-14 14:02:29	5.843753	TRUE	7.200
## 4	0.000000	6.55	6.85	10	210	2023-04-04 15:48:08	5.449222	TRUE	6.700
## 5	0.000000	6.05	6.35	1	595	2023-04-13 13:11:41	5.070316	TRUE	6.200
## 6	0.000000	5.55	5.85	150	185	2023-03-30 13:43:31	4.703129	TRUE	5.700
## 7	-20.719420	5.05	5.35	3	273	2023-04-14 09:45:41	4.347661	TRUE	5.200
## 8	0.000000	4.55	4.85	1	28	2023-04-11 11:49:59	4.000005	TRUE	4.700
## 9	-10.091739	4.05	4.35	7	769	2023-04-14 12:58:26	3.660157	TRUE	4.200
## 10	0.000000	3.55	3.85	6	12	2023-04-12 09:39:06	3.328127	TRUE	3.700
## 11	-11.688307	3.10	3.35	127	2348	2023-04-14 14:11:24	3.039065	TRUE	3.225
## 12	-20.138893	2.10	2.33	134	1581	2023-04-14 15:58:45	2.359379	TRUE	2.215
## 13	-27.027025	1.18	1.37	485	1208	2023-04-14 16:14:59	1.746095	TRUE	1.275
## 14	-36.792450	0.58	0.71	12686	15439	2023-04-14 16:14:07	1.429690	FALSE	0.645
## 15	-41.666668	0.27	0.38	5194	23590	2023-04-14 16:14:18	1.343753	FALSE	0.325
## 16	-41.666670	0.14	0.24	8074	78224	2023-04-14 16:11:09	1.394534	FALSE	0.190
## 17	-37.499996	0.08	0.16	16430	148988	2023-04-14 16:00:54	1.468753	FALSE	0.120
## 18	-41.176470	0.05	0.12	31154	81842	2023-04-14 16:00:46	1.570315	FALSE	0.085
## 19	-18.181814	0.03	0.09	17642	104516	2023-04-14 15:49:14	1.656252	FALSE	0.060
## 20	-44.444447	0.02	0.08	49165	139485	2023-04-14 16:00:58	1.781251	FALSE	0.050
## 21	-33.333336	0.01	0.06	26395	220718	2023-04-14 16:06:27	1.843751	FALSE	0.035
## 22	-28.571426	0.00	0.06	4253	91049	2023-04-14 16:09:13	1.937500	FALSE	0.030
## 23	0.000000	0.00	0.05	67	70093	2023-04-14 16:01:54	2.031255	FALSE	0.025
## 24	0.000000	0.01	0.05	9972	55123	2023-04-14 15:39:49	2.218754	FALSE	0.030
## 25	0.000000	0.00	0.04	27	59881	2023-04-14 16:04:10	2.218754	FALSE	0.020
## 26	0.000000	0.01	0.04	13590	271880	2023-04-14 16:04:15	2.406254	FALSE	0.025
## 27	100.000000	0.00	0.03	2	41301	2023-04-14 15:19:00	2.375004	FALSE	0.015
## 28	-50.000000	0.00	0.03	2513	35771	2023-04-14 15:38:40	2.468754	FALSE	0.015
## 29	-50.000000	0.00	0.03	2952	39367	2023-04-14 15:31:32	2.531254	FALSE	0.015
## 30	-50.000000	0.00	0.03	273	31016	2023-04-14 09:56:24	2.562504	FALSE	0.015
## 31	100.000000	0.00	0.03	800	30123	2023-04-14 15:37:10	2.687503	FALSE	0.015
## 32	0.000000	0.00	0.03	130	166294	2023-04-14 16:14:51	2.750003	FALSE	0.015
## 33	100.000000	0.00	0.03	1400	30245	2023-04-14 15:19:27	2.875003	FALSE	0.015
## 34	0.000000	0.00	0.02	4000	42075	2023-04-13 15:23:40	2.812503	FALSE	0.010
## 35	0.000000	0.00	0.02	1002	11313	2023-04-14 15:45:50	2.875003	FALSE	0.010
## 36	0.000000	0.00	0.02	4	12323	2023-04-12 13:41:08	2.875003	FALSE	0.010
## 37	0.000000	0.00	0.02	50	38578	2023-04-13 11:01:22	3.000002	FALSE	0.010
## 38	0.000000	0.00	0.02	92	125507	2023-04-14 15:42:27	3.062502	FALSE	0.010
## 39	0.000000	0.00	0.03	30	17005	2023-04-14 15:18:07	3.375002	FALSE	0.015
## 40	0.000000	0.00	0.03	3	61013	2023-04-14 15:18:12	3.562501	FALSE	0.015
## 41	-50.000000	0.00	0.03	80	25090	2023-04-14 15:18:48	3.750001	FALSE	0.015
## 42	100.000000	0.00	0.03	80	85041	2023-04-14 11:45:03	3.875000	FALSE	0.015
## 43	0.000000	0.00	0.03	100	36257	2023-04-14 10:41:54	4.187505	FALSE	0.015
## 44	0.000000	0.00	0.02	200	100799	2023-04-14 13:41:51	4.250005	FALSE	0.010
## 45	0.000000	0.00	0.02	150	69489	2023-04-14 13:42:39	4.500004	FALSE	0.010
## 46	0.000000	0.00	0.02	100	91297	2023-04-14 13:42:57	4.687504	FALSE	0.010
## 47	0.000000	0.00	0.02	100	76048	2023-04-14 13:43:22	4.875004	FALSE	0.010

## 48	0.000000	0.00	0.02	200	33334	2023-04-14	13:43:46	5.062504	FALSE	0.010
## 49	0.000000	0.00	0.02	2	26166	2023-04-05	15:58:07	5.250003	FALSE	0.010
## 50	0.000000	0.00	0.02	3	12932	2023-04-10	15:31:31	5.375003	FALSE	0.010
## 51	0.000000	0.00	0.02	56	4028	2023-03-28	15:25:32	5.500003	FALSE	0.010
## 52	0.000000	0.00	0.02	1	76474	2023-04-10	09:39:21	5.687503	FALSE	0.010
## 53	0.000000	0.00	0.02	2	2026	2023-03-21	09:39:29	5.937503	FALSE	0.010
## 54	0.000000	0.00	0.02	10	3527	2023-03-31	15:47:57	6.125002	FALSE	0.010
## 55	0.000000	0.00	0.02	4	3453	2023-03-22	12:15:04	6.375002	FALSE	0.010
## 56	0.000000	0.00	0.02	6	7179	2023-03-20	10:01:08	6.625002	FALSE	0.010
## 57	0.000000	0.00	0.02	15	1702	2023-03-22	10:20:07	6.750002	FALSE	0.010
## 58	0.000000	0.00	0.02	240	4457	2023-03-21	16:13:00	6.875001	FALSE	0.010
## 59	0.000000	0.00	0.02	4	844	2023-03-23	13:58:15	7.125001	FALSE	0.010
## 60	0.000000	0.00	0.02	50	15392	2023-03-30	14:10:59	7.250001	FALSE	0.010
##	InTheMoney									
## 1	TRUE									
## 2	TRUE									
## 3	TRUE									
## 4	TRUE									
## 5	TRUE									
## 6	TRUE									
## 7	TRUE									
## 8	TRUE									
## 9	TRUE									
## 10	TRUE									
## 11	TRUE									
## 12	TRUE									
## 13	TRUE									
## 14	FALSE									
## 15	FALSE									
## 16	FALSE									
## 17	FALSE									
## 18	FALSE									
## 19	FALSE									
## 20	FALSE									
## 21	FALSE									
## 22	FALSE									
## 23	FALSE									
## 24	FALSE									
## 25	FALSE									
## 26	FALSE									
## 27	FALSE									
## 28	FALSE									
## 29	FALSE									
## 30	FALSE									
## 31	FALSE									
## 32	FALSE									
## 33	FALSE									
## 34	FALSE									
## 35	FALSE									
## 36	FALSE									
## 37	FALSE									
## 38	FALSE									
## 39	FALSE									
## 40	FALSE									


```

## 41      FALSE
## 42      FALSE
## 43      FALSE
## 44      FALSE
## 45      FALSE
## 46      FALSE
## 47      FALSE
## 48      FALSE
## 49      FALSE
## 50      FALSE
## 51      FALSE
## 52      FALSE
## 53      FALSE
## 54      FALSE
## 55      FALSE
## 56      FALSE
## 57      FALSE
## 58      FALSE
## 59      FALSE
## 60      FALSE

```

```
##
```

```
## $Apr.19.2023$puts
```

##	ContractID	ContractSize	Currency	Expiration	Strike	Last	Chg
## 1	VIX230419P00010000	REGULAR	USD	2023-04-19	10.0	0.01	0.0000000
## 2	VIX230419P00011000	REGULAR	USD	2023-04-19	11.0	0.01	0.0000000
## 3	VIX230419P00011500	REGULAR	USD	2023-04-19	11.5	0.01	0.0000000
## 4	VIX230419P00012000	REGULAR	USD	2023-04-19	12.0	0.01	0.0000000
## 5	VIX230419P00013000	REGULAR	USD	2023-04-19	13.0	0.01	0.0000000
## 6	VIX230419P00013500	REGULAR	USD	2023-04-19	13.5	0.01	0.0000000
## 7	VIX230419P00014000	REGULAR	USD	2023-04-19	14.0	0.01	0.0000000
## 8	VIX230419P00014500	REGULAR	USD	2023-04-19	14.5	0.01	0.0000000
## 9	VIX230419P00015000	REGULAR	USD	2023-04-19	15.0	0.01	0.0000000
## 10	VIX230419P00016000	REGULAR	USD	2023-04-19	16.0	0.01	0.0000000
## 11	VIX230419P00017000	REGULAR	USD	2023-04-19	17.0	0.07	0.0200000
## 12	VIX230419P00018000	REGULAR	USD	2023-04-19	18.0	0.40	0.1100000
## 13	VIX230419P00019000	REGULAR	USD	2023-04-19	19.0	1.07	0.2500001
## 14	VIX230419P00020000	REGULAR	USD	2023-04-19	20.0	1.90	0.3199999
## 15	VIX230419P00021000	REGULAR	USD	2023-04-19	21.0	2.83	0.3799999
## 16	VIX230419P00022000	REGULAR	USD	2023-04-19	22.0	3.75	0.4500000
## 17	VIX230419P00023000	REGULAR	USD	2023-04-19	23.0	4.66	0.4099998
## 18	VIX230419P00024000	REGULAR	USD	2023-04-19	24.0	5.40	0.2300000
## 19	VIX230419P00025000	REGULAR	USD	2023-04-19	25.0	6.65	0.7000003
## 20	VIX230419P00026000	REGULAR	USD	2023-04-19	26.0	7.80	0.4500003
## 21	VIX230419P00027000	REGULAR	USD	2023-04-19	27.0	8.65	0.3499994
## 22	VIX230419P00028000	REGULAR	USD	2023-04-19	28.0	9.59	0.6000004
## 23	VIX230419P00029000	REGULAR	USD	2023-04-19	29.0	10.67	1.1900005
## 24	VIX230419P00030000	REGULAR	USD	2023-04-19	30.0	11.62	0.4700003
## 25	VIX230419P00031000	REGULAR	USD	2023-04-19	31.0	11.10	0.0000000
## 26	VIX230419P00032000	REGULAR	USD	2023-04-19	32.0	13.35	1.0799999
## 27	VIX230419P00032500	REGULAR	USD	2023-04-19	32.5	12.10	0.0000000
## 28	VIX230419P00033000	REGULAR	USD	2023-04-19	33.0	14.58	2.2299995
## 29	VIX230419P00034000	REGULAR	USD	2023-04-19	34.0	14.24	0.0000000
## 30	VIX230419P00035000	REGULAR	USD	2023-04-19	35.0	16.28	0.7800007
## 31	VIX230419P00036000	REGULAR	USD	2023-04-19	36.0	17.12	0.0000000

## 32	VIX230419P00037000	REGULAR	USD	2023-04-19	37.0	16.55	0.0000000	
## 33	VIX230419P00037500	REGULAR	USD	2023-04-19	37.5	15.45	0.0000000	
## 34	VIX230419P00038000	REGULAR	USD	2023-04-19	38.0	17.96	0.0000000	
## 35	VIX230419P00039000	REGULAR	USD	2023-04-19	39.0	18.32	0.0000000	
## 36	VIX230419P00040000	REGULAR	USD	2023-04-19	40.0	20.02	0.0000000	
## 37	VIX230419P00042500	REGULAR	USD	2023-04-19	42.5	22.37	0.0000000	
## 38	VIX230419P00045000	REGULAR	USD	2023-04-19	45.0	22.70	0.0000000	
## 39	VIX230419P00047500	REGULAR	USD	2023-04-19	47.5	27.50	0.0000000	
## 40	VIX230419P00050000	REGULAR	USD	2023-04-19	50.0	30.65	0.0000000	
## 41	VIX230419P00055000	REGULAR	USD	2023-04-19	55.0	33.15	0.0000000	
## 42	VIX230419P00060000	REGULAR	USD	2023-04-19	60.0	38.75	0.0000000	
## 43	VIX230419P00065000	REGULAR	USD	2023-04-19	65.0	44.20	0.0000000	
## 44	VIX230419P00070000	REGULAR	USD	2023-04-19	70.0	48.75	0.0000000	
## 45	VIX230419P00075000	REGULAR	USD	2023-04-19	75.0	54.20	0.0000000	
## 46	VIX230419P00080000	REGULAR	USD	2023-04-19	80.0	59.30	0.0000000	
## 47	VIX230419P00085000	REGULAR	USD	2023-04-19	85.0	64.15	0.0000000	
## 48	VIX230419P00090000	REGULAR	USD	2023-04-19	90.0	64.95	0.0000000	
## 49	VIX230419P00095000	REGULAR	USD	2023-04-19	95.0	72.95	0.0000000	
## 50	VIX230419P00100000	REGULAR	USD	2023-04-19	100.0	80.48	0.0000000	
## 51	VIX230419P00110000	REGULAR	USD	2023-04-19	110.0	83.27	0.0000000	
## 52	VIX230419P00120000	REGULAR	USD	2023-04-19	120.0	98.05	0.0000000	
## 53	VIX230419P00130000	REGULAR	USD	2023-04-19	130.0	103.00	0.0000000	
## 54	VIX230419P00140000	REGULAR	USD	2023-04-19	140.0	112.65	0.0000000	
## 55	VIX230419P00150000	REGULAR	USD	2023-04-19	150.0	122.70	0.0000000	
## 56	VIX230419P00180000	REGULAR	USD	2023-04-19	180.0	159.90	0.0000000	
##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM
## 1	0.000000	0.00	0.00	3	14	2023-04-10 15:23:06	0.5000050	FALSE
## 2	0.000000	0.00	0.02	NA	4	2023-02-21 10:15:01	1.8125009	FALSE
## 3	0.000000	0.00	0.00	1	2	2023-04-13 09:35:12	0.5000050	FALSE
## 4	0.000000	0.00	0.02	4	10	2023-02-21 10:15:01	1.5000025	FALSE
## 5	0.000000	0.00	0.00	4	29	2023-03-27 10:30:40	0.5000050	FALSE
## 6	0.000000	0.00	0.00	1	22	2023-04-06 08:52:43	0.5000050	FALSE
## 7	0.000000	0.00	0.00	1	193	2023-04-10 09:42:09	0.5000050	FALSE
## 8	0.000000	0.00	0.00	2	62	2023-04-13 11:55:30	0.5000050	FALSE
## 9	0.000000	0.00	0.02	5	26195	2023-04-12 13:34:10	0.6250038	FALSE
## 10	0.000000	0.00	0.05	83	25272	2023-04-14 15:27:59	0.5156298	FALSE
## 11	39.999996	0.03	0.10	12944	126785	2023-04-14 16:14:59	0.1855550	FALSE
## 12	37.931040	0.37	0.49	54270	161814	2023-04-14 16:14:59	0.0000100	TRUE
## 13	30.487812	1.05	1.19	35823	143573	2023-04-14 16:14:59	0.0000100	TRUE
## 14	20.253159	1.91	2.06	14228	129837	2023-04-14 16:07:27	0.0000100	TRUE
## 15	15.510199	2.79	3.00	4175	177211	2023-04-14 16:01:12	0.0000100	TRUE
## 16	13.636366	3.75	4.00	125	72923	2023-04-14 15:43:34	0.0000100	TRUE
## 17	9.647055	4.75	5.00	2052	93901	2023-04-14 15:33:17	0.0000100	TRUE
## 18	4.448743	5.70	6.00	6	47481	2023-04-14 15:16:54	0.0000100	TRUE
## 19	11.764711	6.70	6.95	126	61116	2023-04-14 15:12:58	0.0000100	TRUE
## 20	6.122453	7.70	7.95	69	48204	2023-04-14 16:13:07	0.0000100	TRUE
## 21	4.216861	8.70	8.95	1535	19441	2023-04-14 15:12:27	0.0000100	TRUE
## 22	6.674087	9.65	9.95	37	17702	2023-04-14 15:07:13	0.0000100	TRUE
## 23	12.552749	10.65	10.95	33	9538	2023-04-14 14:58:26	0.0000100	TRUE
## 24	4.215249	11.65	11.95	76	7631	2023-04-14 15:12:27	0.0000100	TRUE
## 25	0.000000	12.65	12.95	1	975	2023-04-12 11:05:04	0.0000100	TRUE
## 26	8.801955	13.65	13.95	31	1451	2023-04-14 11:27:55	0.0000100	TRUE
## 27	0.000000	14.15	14.45	5	385	2023-04-05 14:41:34	0.0000100	TRUE
## 28	18.056675	14.65	14.95	2	119	2023-04-14 15:06:07	0.0000100	TRUE

## 29	0.000000	15.65	15.95	20	292	2023-04-10	13:54:06	0.0000100	TRUE
## 30	5.032263	16.65	16.95	40	949	2023-04-13	09:55:25	0.0000100	TRUE
## 31	0.000000	17.65	17.95	1	52	2023-04-13	15:38:10	0.0000100	TRUE
## 32	0.000000	18.65	18.95	9	137	2023-04-04	16:01:32	0.0000100	TRUE
## 33	0.000000	16.40	16.55	4	229	2023-01-17	09:35:54	0.0000100	TRUE
## 34	0.000000	19.65	19.95	4	417	2023-04-12	15:51:29	0.0000100	TRUE
## 35	0.000000	20.65	20.95	4	547	2023-04-03	09:30:24	0.0000100	TRUE
## 36	0.000000	21.65	21.95	2	146	2023-04-12	16:00:39	0.0000100	TRUE
## 37	0.000000	24.15	24.45	5	128	2023-04-10	09:42:47	0.0000100	TRUE
## 38	0.000000	26.65	26.90	3	36	2023-03-23	09:43:53	0.0000100	TRUE
## 39	0.000000	29.15	29.40	55	55	2023-04-10	15:45:08	0.0000100	TRUE
## 40	0.000000	31.65	31.90	6	228	2023-04-12	09:31:10	0.0000100	TRUE
## 41	0.000000	36.65	36.90	6	26	2023-03-28	15:43:35	0.0000100	TRUE
## 42	0.000000	41.65	41.90	3	43	2023-03-29	03:57:32	0.0000100	TRUE
## 43	0.000000	46.65	46.90	5	30	2023-03-31	11:56:53	0.0000100	TRUE
## 44	0.000000	51.65	51.90	10	105	2023-03-29	14:09:11	0.0000100	TRUE
## 45	0.000000	56.65	56.90	10	130	2023-03-31	10:19:01	0.0000100	TRUE
## 46	0.000000	61.65	61.90	5	6	2023-04-03	13:02:24	0.0000100	TRUE
## 47	0.000000	66.65	66.90	3	3	2023-03-31	09:47:55	0.0000100	TRUE
## 48	0.000000	71.65	71.90	NA	3	2023-03-20	23:45:40	0.0000100	TRUE
## 49	0.000000	76.65	76.90	3	5	2023-03-28	15:43:44	0.0000100	TRUE
## 50	0.000000	81.65	81.90	3	29	2023-04-11	15:16:49	0.0000100	TRUE
## 51	0.000000	87.85	88.15	1	1	2022-12-29	10:43:55	0.0000100	TRUE
## 52	0.000000	95.70	96.05	NA	1	2023-02-14	15:37:36	0.0000100	TRUE
## 53	0.000000	107.65	107.90	1	1	2022-12-29	10:57:54	0.0000100	TRUE
## 54	0.000000	117.50	117.80	1	2	2022-12-30	08:19:20	0.0000100	TRUE
## 55	0.000000	127.40	127.70	1	101	2022-12-29	11:09:20	0.0000100	TRUE
## 56	0.000000	161.60	161.85	10	182	2023-04-10	11:08:36	0.0000100	TRUE
##	Price	InTheMoney							
## 1	0.000	FALSE							
## 2	0.010	FALSE							
## 3	0.000	FALSE							
## 4	0.010	FALSE							
## 5	0.000	FALSE							
## 6	0.000	FALSE							
## 7	0.000	FALSE							
## 8	0.000	FALSE							
## 9	0.010	FALSE							
## 10	0.025	FALSE							
## 11	0.065	FALSE							
## 12	0.430	TRUE							
## 13	1.120	TRUE							
## 14	1.985	TRUE							
## 15	2.895	TRUE							
## 16	3.875	TRUE							
## 17	4.875	TRUE							
## 18	5.850	TRUE							
## 19	6.825	TRUE							
## 20	7.825	TRUE							
## 21	8.825	TRUE							
## 22	9.800	TRUE							
## 23	10.800	TRUE							
## 24	11.800	TRUE							
## 25	12.800	TRUE							

```

## 26 13.800      TRUE
## 27 14.300      TRUE
## 28 14.800      TRUE
## 29 15.800      TRUE
## 30 16.800      TRUE
## 31 17.800      TRUE
## 32 18.800      TRUE
## 33 16.475      TRUE
## 34 19.800      TRUE
## 35 20.800      TRUE
## 36 21.800      TRUE
## 37 24.300      TRUE
## 38 26.775      TRUE
## 39 29.275      TRUE
## 40 31.775      TRUE
## 41 36.775      TRUE
## 42 41.775      TRUE
## 43 46.775      TRUE
## 44 51.775      TRUE
## 45 56.775      TRUE
## 46 61.775      TRUE
## 47 66.775      TRUE
## 48 71.775      TRUE
## 49 76.775      TRUE
## 50 81.775      TRUE
## 51 88.000      TRUE
## 52 95.875      TRUE
## 53 107.775     TRUE
## 54 117.650     TRUE
## 55 127.550     TRUE
## 56 161.725     TRUE

```

```
##
```

```
##
```

```
## $Apr.26.2023
```

```
## $Apr.26.2023$calls
```

##	ContractID	ContractSize	Currency	Expiration	Strike	Last	Chg
## 1	VIXW230426C00011500	REGULAR	USD	2023-04-26	11.5	9.03	0.00000000
## 2	VIXW230426C00013500	REGULAR	USD	2023-04-26	13.5	10.00	0.00000000
## 3	VIXW230426C00017000	REGULAR	USD	2023-04-26	17.0	2.29	-0.27999997
## 4	VIXW230426C00018000	REGULAR	USD	2023-04-26	18.0	1.53	-0.22000003
## 5	VIXW230426C00019000	REGULAR	USD	2023-04-26	19.0	0.98	-0.22000003
## 6	VIXW230426C00020000	REGULAR	USD	2023-04-26	20.0	0.75	-0.14999998
## 7	VIXW230426C00021000	REGULAR	USD	2023-04-26	21.0	0.51	-0.19000000
## 8	VIXW230426C00022000	REGULAR	USD	2023-04-26	22.0	0.45	-0.11000001
## 9	VIXW230426C00023000	REGULAR	USD	2023-04-26	23.0	0.34	-0.15000000
## 10	VIXW230426C00024000	REGULAR	USD	2023-04-26	24.0	0.27	-0.13000000
## 11	VIXW230426C00025000	REGULAR	USD	2023-04-26	25.0	0.24	-0.08000000
## 12	VIXW230426C00026000	REGULAR	USD	2023-04-26	26.0	0.24	-0.02000000
## 13	VIXW230426C00027000	REGULAR	USD	2023-04-26	27.0	0.18	-0.02000000
## 14	VIXW230426C00028000	REGULAR	USD	2023-04-26	28.0	0.13	-0.02000001
## 15	VIXW230426C00029000	REGULAR	USD	2023-04-26	29.0	0.11	-0.02000000
## 16	VIXW230426C00030000	REGULAR	USD	2023-04-26	30.0	0.13	0.02000000
## 17	VIXW230426C00031000	REGULAR	USD	2023-04-26	31.0	0.10	0.00000000
## 18	VIXW230426C00032000	REGULAR	USD	2023-04-26	32.0	0.06	-0.04000000

## 19	VIXW230426C00033000	REGULAR	USD	2023-04-26	33.0	0.05	0.00000000		
## 20	VIXW230426C00034000	REGULAR	USD	2023-04-26	34.0	0.03	-0.02000000		
## 21	VIXW230426C00035000	REGULAR	USD	2023-04-26	35.0	0.06	0.00000000		
## 22	VIXW230426C00036000	REGULAR	USD	2023-04-26	36.0	0.07	0.00000000		
## 23	VIXW230426C00037000	REGULAR	USD	2023-04-26	37.0	0.05	0.00000000		
## 24	VIXW230426C00038000	REGULAR	USD	2023-04-26	38.0	0.29	0.00000000		
## 25	VIXW230426C00039000	REGULAR	USD	2023-04-26	39.0	0.23	0.00000000		
## 26	VIXW230426C00040000	REGULAR	USD	2023-04-26	40.0	0.05	0.01000000		
## 27	VIXW230426C00042500	REGULAR	USD	2023-04-26	42.5	0.03	0.00000000		
## 28	VIXW230426C00045000	REGULAR	USD	2023-04-26	45.0	0.03	0.00000000		
## 29	VIXW230426C00050000	REGULAR	USD	2023-04-26	50.0	0.04	0.00000000		
## 30	VIXW230426C00060000	REGULAR	USD	2023-04-26	60.0	0.02	0.00000000		
## 31	VIXW230426C00065000	REGULAR	USD	2023-04-26	65.0	0.09	0.00000000		
## 32	VIXW230426C00070000	REGULAR	USD	2023-04-26	70.0	0.05	0.00000000		
## 33	VIXW230426C00075000	REGULAR	USD	2023-04-26	75.0	0.05	0.00000000		
## 34	VIXW230426C00080000	REGULAR	USD	2023-04-26	80.0	0.01	0.00000000		
## 35	VIXW230426C00085000	REGULAR	USD	2023-04-26	85.0	0.04	0.00000000		
## 36	VIXW230426C00090000	REGULAR	USD	2023-04-26	90.0	0.02	0.00000000		
## 37	VIXW230426C00095000	REGULAR	USD	2023-04-26	95.0	0.19	0.00000000		
##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM	Price
## 1	0.000000	6.42	8.59	2	5	2023-04-10 13:17:44	4.335942	TRUE	7.505
## 2	0.000000	4.41	6.61	150	150	2023-03-24 09:30:17	3.302736	TRUE	5.510
## 3	-10.894940	0.79	3.47	353	42	2023-04-14 15:59:29	1.783204	TRUE	2.130
## 4	-12.571430	0.08	1.90	521	443	2023-04-14 16:06:49	1.160160	FALSE	0.990
## 5	-18.333336	0.00	2.25	721	2623	2023-04-14 16:00:41	1.558596	FALSE	1.125
## 6	-16.666664	0.00	1.91	1271	3049	2023-04-14 16:08:37	1.647463	FALSE	0.955
## 7	-27.142859	0.00	1.68	369	2863	2023-04-14 15:52:41	1.748048	FALSE	0.840
## 8	-19.642860	0.00	1.52	207	4020	2023-04-14 15:57:00	1.855469	FALSE	0.760
## 9	-30.612246	0.00	1.39	63	570	2023-04-14 16:00:41	1.953125	FALSE	0.695
## 10	-32.500000	0.00	0.30	230	862	2023-04-14 15:58:01	1.343753	FALSE	0.150
## 11	-25.000000	0.00	1.16	362	974	2023-04-14 15:38:24	2.115239	FALSE	0.580
## 12	-7.692306	0.00	1.07	16	318	2023-04-14 14:27:21	2.189458	FALSE	0.535
## 13	-9.999998	0.00	0.98	56	1288	2023-04-14 15:48:49	2.250004	FALSE	0.490
## 14	-13.333340	0.00	0.91	6	1410	2023-04-14 15:22:42	2.314457	FALSE	0.455
## 15	-15.384613	0.00	0.85	10	106	2023-04-14 15:08:30	2.375004	FALSE	0.425
## 16	18.181814	0.08	0.79	498	1412	2023-04-14 15:33:59	2.492191	FALSE	0.435
## 17	0.000000	0.00	0.75	2	92	2023-04-13 09:57:23	2.492191	FALSE	0.375
## 18	-40.000004	0.00	0.71	1	313	2023-04-14 12:45:49	2.546879	FALSE	0.355
## 19	0.000000	0.00	0.67	1	36	2023-04-13 14:32:35	2.597660	FALSE	0.335
## 20	-40.000004	0.00	0.64	1	28	2023-04-14 14:57:05	2.648441	FALSE	0.320
## 21	0.000000	0.00	0.62	27	244	2023-04-13 11:02:00	2.707034	FALSE	0.310
## 22	0.000000	0.00	0.60	20	36	2023-04-13 11:11:11	2.761722	FALSE	0.300
## 23	0.000000	0.00	0.58	3	20	2023-04-12 15:33:01	2.812503	FALSE	0.290
## 24	0.000000	0.00	0.56	10	60	2023-03-30 15:15:54	2.859378	FALSE	0.280
## 25	0.000000	0.00	0.55	1	2	2023-03-31 15:21:23	2.917971	FALSE	0.275
## 26	25.000006	0.00	0.53	28	221	2023-04-14 15:56:03	2.957034	FALSE	0.265
## 27	0.000000	0.00	0.51	5	2002	2023-04-14 10:28:51	3.085940	FALSE	0.255
## 28	0.000000	0.00	0.48	5	111	2023-04-14 10:31:01	3.187502	FALSE	0.240
## 29	0.000000	0.00	0.44	10	78	2023-04-12 09:37:51	3.382814	FALSE	0.220
## 30	0.000000	0.00	0.38	1	187	2023-04-13 15:55:13	3.707032	FALSE	0.190
## 31	0.000000	0.00	0.37	10	12	2023-03-30 03:11:17	3.867188	FALSE	0.185
## 32	0.000000	0.00	0.35	5	7	2023-04-03 11:04:17	3.992188	FALSE	0.175
## 33	0.000000	0.00	0.34	5	5	2023-03-31 13:30:42	4.117192	FALSE	0.170
## 34	0.000000	0.00	0.32	1	1	2023-04-10 13:28:48	4.210942	FALSE	0.160

## 35	0.000000	0.00	0.31	18	28	2023-03-31	13:43:58	4.312505	FALSE	0.155
## 36	0.000000	0.00	0.30	4	33	2023-04-03	15:10:55	4.414067	FALSE	0.150
## 37	0.000000	0.00	0.30	NA	3	2023-03-23	14:47:22	4.515629	FALSE	0.150

InTheMoney

## 1	TRUE
## 2	TRUE
## 3	TRUE
## 4	FALSE
## 5	FALSE
## 6	FALSE
## 7	FALSE
## 8	FALSE
## 9	FALSE
## 10	FALSE
## 11	FALSE
## 12	FALSE
## 13	FALSE
## 14	FALSE
## 15	FALSE
## 16	FALSE
## 17	FALSE
## 18	FALSE
## 19	FALSE
## 20	FALSE
## 21	FALSE
## 22	FALSE
## 23	FALSE
## 24	FALSE
## 25	FALSE
## 26	FALSE
## 27	FALSE
## 28	FALSE
## 29	FALSE
## 30	FALSE
## 31	FALSE
## 32	FALSE
## 33	FALSE
## 34	FALSE
## 35	FALSE
## 36	FALSE
## 37	FALSE

##

\$Apr.26.2023\$puts

##	ContractID	ContractSize	Currency	Expiration	Strike	Last	Chg
## 1	VIXW230426P00013500	REGULAR	USD	2023-04-26	13.5	0.02	0.00000000
## 2	VIXW230426P00014000	REGULAR	USD	2023-04-26	14.0	0.11	0.00000000
## 3	VIXW230426P00015000	REGULAR	USD	2023-04-26	15.0	0.02	0.00000000
## 4	VIXW230426P00016000	REGULAR	USD	2023-04-26	16.0	0.04	0.02000000
## 5	VIXW230426P00017000	REGULAR	USD	2023-04-26	17.0	0.11	0.02000000
## 6	VIXW230426P00018000	REGULAR	USD	2023-04-26	18.0	0.35	0.00000000
## 7	VIXW230426P00019000	REGULAR	USD	2023-04-26	19.0	0.88	0.13999999
## 8	VIXW230426P00020000	REGULAR	USD	2023-04-26	20.0	1.49	0.13000000
## 9	VIXW230426P00021000	REGULAR	USD	2023-04-26	21.0	2.29	0.07999992
## 10	VIXW230426P00022000	REGULAR	USD	2023-04-26	22.0	3.17	0.07000017

## 11	VIXW230426P00023000	REGULAR	USD	2023-04-26	23.0	4.08	0.08999991			
## 12	VIXW230426P00024000	REGULAR	USD	2023-04-26	24.0	4.90	0.09000015			
## 13	VIXW230426P00025000	REGULAR	USD	2023-04-26	25.0	5.85	0.08999968			
## 14	VIXW230426P00026000	REGULAR	USD	2023-04-26	26.0	6.73	0.82999990			
## 15	VIXW230426P00027000	REGULAR	USD	2023-04-26	27.0	5.15	0.00000000			
## 16	VIXW230426P00028000	REGULAR	USD	2023-04-26	28.0	8.01	0.00000000			
## 17	VIXW230426P00029000	REGULAR	USD	2023-04-26	29.0	9.11	0.00000000			
## 18	VIXW230426P00030000	REGULAR	USD	2023-04-26	30.0	10.96	1.15999980			
## 19	VIXW230426P00032000	REGULAR	USD	2023-04-26	32.0	11.14	0.00000000			
## 20	VIXW230426P00034000	REGULAR	USD	2023-04-26	34.0	11.59	0.00000000			
## 21	VIXW230426P00035000	REGULAR	USD	2023-04-26	35.0	14.01	0.00000000			
##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM	Price	
## 1	0.000000	0.00	0.02	57	57	2023-03-24 10:16:52	0.6406286	FALSE	0.010	
## 2	0.000000	0.00	0.02	NA	23	2023-03-22 14:35:00	0.5468795	FALSE	0.010	
## 3	0.000000	0.00	0.03	10	50	2023-03-30 15:15:16	0.4648491	FALSE	0.015	
## 4	100.000000	0.00	0.05	8	14	2023-04-14 13:10:02	0.3125069	FALSE	0.025	
## 5	22.222216	0.03	0.12	238	514	2023-04-14 15:59:43	0.1289150	FALSE	0.075	
## 6	0.000000	0.30	1.54	309	686	2023-04-14 15:58:46	0.8300798	TRUE	0.920	
## 7	18.918917	0.00	10.00	236	1420	2023-04-14 15:55:14	3.2148457	TRUE	5.000	
## 8	9.558823	0.30	2.00	132	493	2023-04-14 14:14:51	0.0000100	TRUE	1.150	
## 9	3.619906	0.00	10.00	94	1247	2023-04-14 15:31:24	1.9667970	TRUE	5.000	
## 10	2.258070	0.00	10.00	17	38	2023-04-14 14:27:18	0.9101571	TRUE	5.000	
## 11	2.255637	2.95	5.70	18	56	2023-04-14 09:47:48	0.0000100	TRUE	4.325	
## 12	1.871105	3.88	6.60	6	442	2023-04-13 13:52:18	0.0000100	TRUE	5.240	
## 13	1.562494	4.84	7.53	15	32	2023-04-14 13:17:19	0.0000100	TRUE	6.185	
## 14	14.067795	5.81	8.47	1	421	2023-04-14 11:26:36	0.0000100	TRUE	7.140	
## 15	0.000000	6.80	9.41	5	5	2023-03-28 03:22:39	0.0000100	TRUE	8.105	
## 16	0.000000	7.78	10.37	1	11	2023-04-12 14:00:26	0.0000100	TRUE	9.075	
## 17	0.000000	8.78	11.33	4	12	2023-04-11 12:30:23	0.0000100	TRUE	10.055	
## 18	11.836733	9.77	12.30	1	18	2023-04-14 15:51:58	0.0000100	TRUE	11.035	
## 19	0.000000	11.76	14.25	2	2	2023-03-31 14:30:22	0.0000100	TRUE	13.005	
## 20	0.000000	13.76	16.22	NA	10	2023-03-23 09:45:51	0.0000100	TRUE	14.990	
## 21	0.000000	14.76	17.20	10	30	2023-04-06 10:54:33	0.0000100	TRUE	15.980	
##	InTheMoney									
## 1	FALSE									
## 2	FALSE									
## 3	FALSE									
## 4	FALSE									
## 5	FALSE									
## 6	TRUE									
## 7	TRUE									
## 8	TRUE									
## 9	TRUE									
## 10	TRUE									
## 11	TRUE									
## 12	TRUE									
## 13	TRUE									
## 14	TRUE									
## 15	TRUE									
## 16	TRUE									
## 17	TRUE									
## 18	TRUE									
## 19	TRUE									
## 20	TRUE									

```

## 21      TRUE
##
##
## $May.03.2023
## $May.03.2023$calls
##      ContractID ContractSize Currency Expiration Strike Last      Chg
## 1  VIXW230503C00014000    REGULAR      USD 2023-05-03   14.0 5.92  0.000000000
## 2  VIXW230503C00015000    REGULAR      USD 2023-05-03   15.0 5.27  0.000000000
## 3  VIXW230503C00016000    REGULAR      USD 2023-05-03   16.0 4.07 -2.049999700
## 4  VIXW230503C00018000    REGULAR      USD 2023-05-03   18.0 2.09 -0.190000060
## 5  VIXW230503C00019000    REGULAR      USD 2023-05-03   19.0 1.50 -0.210000040
## 6  VIXW230503C00020000    REGULAR      USD 2023-05-03   20.0 1.18 -0.120000005
## 7  VIXW230503C00021000    REGULAR      USD 2023-05-03   21.0 1.01 -0.090000030
## 8  VIXW230503C00022000    REGULAR      USD 2023-05-03   22.0 0.78 -0.170000020
## 9  VIXW230503C00023000    REGULAR      USD 2023-05-03   23.0 0.63 -0.130000000
## 10 VIXW230503C00024000    REGULAR      USD 2023-05-03   24.0 0.57 -0.019999980
## 11 VIXW230503C00025000    REGULAR      USD 2023-05-03   25.0 0.40 -0.119999975
## 12 VIXW230503C00026000    REGULAR      USD 2023-05-03   26.0 0.40 -0.099999994
## 13 VIXW230503C00027000    REGULAR      USD 2023-05-03   27.0 0.35 -0.080000010
## 14 VIXW230503C00028000    REGULAR      USD 2023-05-03   28.0 0.33  0.010000020
## 15 VIXW230503C00029000    REGULAR      USD 2023-05-03   29.0 0.23 -0.059999987
## 16 VIXW230503C00030000    REGULAR      USD 2023-05-03   30.0 0.21 -0.030000001
## 17 VIXW230503C00031000    REGULAR      USD 2023-05-03   31.0 0.26  0.039999990
## 18 VIXW230503C00032000    REGULAR      USD 2023-05-03   32.0 0.26  0.000000000
## 19 VIXW230503C00035000    REGULAR      USD 2023-05-03   35.0 0.12  0.009999998
## 20 VIXW230503C00037000    REGULAR      USD 2023-05-03   37.0 0.13  0.000000000
## 21 VIXW230503C00038000    REGULAR      USD 2023-05-03   38.0 0.14  0.000000000
## 22 VIXW230503C00040000    REGULAR      USD 2023-05-03   40.0 0.05 -0.050000000
## 23 VIXW230503C00042500    REGULAR      USD 2023-05-03   42.5 0.05  0.000000000
## 24 VIXW230503C00045000    REGULAR      USD 2023-05-03   45.0 0.09  0.000000000
## 25 VIXW230503C00050000    REGULAR      USD 2023-05-03   50.0 0.08  0.000000000
## 26 VIXW230503C00055000    REGULAR      USD 2023-05-03   55.0 0.03 -0.150000000
## 27 VIXW230503C00060000    REGULAR      USD 2023-05-03   60.0 0.03  0.000000000
## 28 VIXW230503C00065000    REGULAR      USD 2023-05-03   65.0 0.02  0.000000000
## 29 VIXW230503C00070000    REGULAR      USD 2023-05-03   70.0 0.05  0.000000000
## 30 VIXW230503C00085000    REGULAR      USD 2023-05-03   85.0 0.04  0.000000000
##      ChgPct  Bid   Ask  Vol   OI      LastTradeTime      IV  ITM Price
## 1    0.000000 4.33  6.48   20   95 2023-04-13 14:20:12 2.713870  TRUE 5.405
## 2    0.000000 3.30  5.53   25  32 2023-04-13 09:51:22 2.335942  TRUE 4.415
## 3   -33.496727 2.25  4.64    1    1 2023-04-14 13:39:22 1.981445  TRUE 3.445
## 4    -8.333336 0.67  3.19  253 444 2023-04-14 16:00:25 1.531252 FALSE 1.930
## 5   -12.280705 0.20  2.67  262 655 2023-04-14 15:58:44 1.428714 FALSE 1.435
## 6    -9.230770 0.00  3.70 5446 788 2023-04-14 15:59:51 1.904297 FALSE 1.850
## 7    -8.181821 0.00  1.24 1264 1126 2023-04-14 15:57:00 1.193363 FALSE 0.620
## 8   -17.894740 0.00  1.82  458 766 2023-04-14 15:58:52 1.568362 FALSE 0.910
## 9   -17.105263 0.50  0.75  102  80 2023-04-14 15:44:21 1.466800 FALSE 0.625
## 10   -3.389827 0.45  0.59  766  68 2023-04-14 15:26:58 1.488284 FALSE 0.520
## 11  -23.076920 0.34  0.55  225 233 2023-04-14 15:59:28 1.519534 FALSE 0.445
## 12  -19.999998 0.28  0.48    2 257 2023-04-14 09:30:02 1.544924 FALSE 0.380
## 13  -18.604654 0.23  0.42    1 123 2023-04-14 14:32:59 1.568362 FALSE 0.325
## 14    3.125006 0.20  0.33   57  81 2023-04-14 13:23:34 1.570315 FALSE 0.265
## 15  -20.689651 0.16  0.29    4  71 2023-04-14 14:15:59 1.585940 FALSE 0.225
## 16  -12.500002 0.14  0.30  109 391 2023-04-14 16:02:00 1.652345 FALSE 0.220
## 17  18.181814 0.11  0.22    4 258 2023-04-14 09:44:39 1.621096 FALSE 0.165

```


## 18	0.000000	0.09	0.20	12	42	2023-04-11	11:16:48	1.640627	FALSE	0.145
## 19	9.090907	0.05	0.14	2	211	2023-04-14	09:32:48	1.687502	FALSE	0.095
## 20	0.000000	0.03	0.12	5	46	2023-04-13	11:09:17	1.718751	FALSE	0.075
## 21	0.000000	0.00	0.70	3	23	2023-04-12	15:49:01	2.347660	FALSE	0.350
## 22	-50.000000	0.00	0.66	20	509	2023-04-14	10:46:59	2.421879	FALSE	0.330
## 23	0.000000	0.00	0.62	4	8	2023-04-13	14:23:05	2.507816	FALSE	0.310
## 24	0.000000	0.00	0.59	200	622	2023-04-12	14:21:22	2.593754	FALSE	0.295
## 25	0.000000	0.00	0.54	13	48	2023-04-12	14:43:12	2.746097	FALSE	0.270
## 26	-83.333330	0.00	0.50	200	2	2023-04-14	16:00:42	2.878909	FALSE	0.250
## 27	0.000000	0.00	10.00	5	57	2023-04-13	11:06:37	7.041017	FALSE	5.000
## 28	0.000000	0.00	0.45	16	271	2023-04-14	13:52:10	3.117190	FALSE	0.225
## 29	0.000000	0.00	0.43	20	20	2023-04-06	11:30:18	3.222658	FALSE	0.215
## 30	0.000000	0.00	0.38	NA	3	2023-04-04	11:21:46	3.476564	FALSE	0.190

InTheMoney

## 1	TRUE
## 2	TRUE
## 3	TRUE
## 4	FALSE
## 5	FALSE
## 6	FALSE
## 7	FALSE
## 8	FALSE
## 9	FALSE
## 10	FALSE
## 11	FALSE
## 12	FALSE
## 13	FALSE
## 14	FALSE
## 15	FALSE
## 16	FALSE
## 17	FALSE
## 18	FALSE
## 19	FALSE
## 20	FALSE
## 21	FALSE
## 22	FALSE
## 23	FALSE
## 24	FALSE
## 25	FALSE
## 26	FALSE
## 27	FALSE
## 28	FALSE
## 29	FALSE
## 30	FALSE

##

\$May.03.2023\$puts

##	ContractID	ContractSize	Currency	Expiration	Strike	Last	Chg
## 1	VIXW230503P00012000	REGULAR	USD	2023-05-03	12.0	0.01	0.00000000
## 2	VIXW230503P00013000	REGULAR	USD	2023-05-03	13.0	0.01	0.00000000
## 3	VIXW230503P00013500	REGULAR	USD	2023-05-03	13.5	0.01	0.00000000
## 4	VIXW230503P00014000	REGULAR	USD	2023-05-03	14.0	0.04	0.00000000
## 5	VIXW230503P00015000	REGULAR	USD	2023-05-03	15.0	0.02	0.00000000
## 6	VIXW230503P00016000	REGULAR	USD	2023-05-03	16.0	0.05	0.03000000
## 7	VIXW230503P00017000	REGULAR	USD	2023-05-03	17.0	0.14	0.05000000

## 8	VIXW230503P00018000	REGULAR	USD	2023-05-03	18.0	0.40	0.05000001		
## 9	VIXW230503P00019000	REGULAR	USD	2023-05-03	19.0	0.74	-0.00999999		
## 10	VIXW230503P00020000	REGULAR	USD	2023-05-03	20.0	1.54	0.18999994		
## 11	VIXW230503P00021000	REGULAR	USD	2023-05-03	21.0	2.30	0.20000005		
## 12	VIXW230503P00022000	REGULAR	USD	2023-05-03	22.0	2.89	0.00000000		
## 13	VIXW230503P00025000	REGULAR	USD	2023-05-03	25.0	5.01	0.00000000		
## 14	VIXW230503P00026000	REGULAR	USD	2023-05-03	26.0	5.86	0.00000000		
## 15	VIXW230503P00030000	REGULAR	USD	2023-05-03	30.0	10.46	0.69999980		
## 16	VIXW230503P00032000	REGULAR	USD	2023-05-03	32.0	10.42	0.00000000		
## 17	VIXW230503P00035000	REGULAR	USD	2023-05-03	35.0	14.35	0.00000000		
##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM	Price
## 1	0.000000	0.00	0.02	4	4	2023-03-31 15:45:35	0.7187528	FALSE	0.010
## 2	0.000000	0.00	0.02	5	5	2023-03-31 15:46:48	0.5625044	FALSE	0.010
## 3	0.000000	0.00	0.02	90	90	2023-03-31 13:54:05	0.5000050	FALSE	0.010
## 4	0.000000	0.00	0.28	NA	1	2023-03-30 11:24:09	0.7382839	FALSE	0.140
## 5	0.000000	0.00	0.04	2	23	2023-04-14 09:57:18	0.3867249	FALSE	0.020
## 6	150.000020	0.00	0.10	13	33	2023-04-14 10:03:11	0.3027413	FALSE	0.050
## 7	55.555553	0.07	0.16	46	69	2023-04-14 11:44:58	0.1279384	FALSE	0.115
## 8	14.285718	0.37	0.54	115	258	2023-04-14 15:58:42	0.0000100	TRUE	0.455
## 9	-1.333332	0.79	1.10	14	173	2023-04-14 11:51:04	0.0000100	TRUE	0.945
## 10	14.074069	0.00	10.00	127	68	2023-04-14 14:39:57	2.0507861	TRUE	5.000
## 11	9.523812	0.00	10.00	10	201	2023-04-14 15:58:42	1.5371117	TRUE	5.000
## 12	0.000000	0.00	10.00	22	8	2023-04-13 14:02:39	0.7109404	TRUE	5.000
## 13	0.000000	4.71	7.29	4	7	2023-04-12 10:59:53	0.0000100	TRUE	6.000
## 14	0.000000	5.64	8.21	5	15	2023-04-10 11:22:56	0.0000100	TRUE	6.925
## 15	7.172129	9.50	12.00	2	12	2023-04-14 15:51:58	0.0000100	TRUE	10.750
## 16	0.000000	11.47	13.93	NA	1	2023-03-30 10:41:49	0.0000100	TRUE	12.700
## 17	0.000000	14.44	16.85	1	1	2023-04-06 12:53:12	0.0000100	TRUE	15.645
##	InTheMoney								
## 1	FALSE								
## 2	FALSE								
## 3	FALSE								
## 4	FALSE								
## 5	FALSE								
## 6	FALSE								
## 7	FALSE								
## 8	TRUE								
## 9	TRUE								
## 10	TRUE								
## 11	TRUE								
## 12	TRUE								
## 13	TRUE								
## 14	TRUE								
## 15	TRUE								
## 16	TRUE								
## 17	TRUE								
##									
##									
##	\$May.10.2023								
##	\$May.10.2023\$calls								
##	ContractID	ContractSize	Currency	Expiration	Strike	Last		Chg	
## 1	VIXW230510C00011000	REGULAR	USD	2023-05-10	11	9.75	0.00000000		
## 2	VIXW230510C00014000	REGULAR	USD	2023-05-10	14	6.75	0.00000000		
## 3	VIXW230510C00015000	REGULAR	USD	2023-05-10	15	4.38	0.30000020		

## 4	VIXW230510C00017000	REGULAR	USD	2023-05-10	17	2.46	-0.25000000		
## 5	VIXW230510C00018000	REGULAR	USD	2023-05-10	18	1.89	-0.22999990		
## 6	VIXW230510C00019000	REGULAR	USD	2023-05-10	19	1.53	-0.14999998		
## 7	VIXW230510C00020000	REGULAR	USD	2023-05-10	20	1.26	-0.15999997		
## 8	VIXW230510C00022000	REGULAR	USD	2023-05-10	22	0.91	-0.09999996		
## 9	VIXW230510C00023000	REGULAR	USD	2023-05-10	23	0.77	-0.06999999		
## 10	VIXW230510C00025000	REGULAR	USD	2023-05-10	25	0.64	-0.02000004		
## 11	VIXW230510C00027000	REGULAR	USD	2023-05-10	27	0.49	0.03000000		
## 12	VIXW230510C00030000	REGULAR	USD	2023-05-10	30	0.37	-0.09000000		
## 13	VIXW230510C00035000	REGULAR	USD	2023-05-10	35	0.22	0.01000000		
## 14	VIXW230510C00037000	REGULAR	USD	2023-05-10	37	0.15	-0.22999999		
## 15	VIXW230510C00060000	REGULAR	USD	2023-05-10	60	0.02	0.00000000		
## 16	VIXW230510C00095000	REGULAR	USD	2023-05-10	95	0.06	0.00000000		
##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM	Price
## 1	0.000000	6.68	9.23	10	10	2023-04-06 10:12:47	3.021487	TRUE	7.955
## 2	0.000000	3.62	6.33	338	338	2023-04-06 07:34:27	2.007817	TRUE	4.975
## 3	7.352946	2.52	5.43	315	4669	2023-04-14 15:20:48	1.701173	TRUE	3.975
## 4	-9.225092	0.76	3.96	343	443	2023-04-14 16:10:00	1.313480	TRUE	2.360
## 5	-10.849052	0.20	3.39	424	112	2023-04-14 15:59:28	1.222660	FALSE	1.795
## 6	-8.928570	0.00	2.96	470	252	2023-04-14 16:01:09	1.238285	FALSE	1.480
## 7	-11.267604	0.00	2.64	295	502	2023-04-14 15:59:53	1.310550	FALSE	1.320
## 8	-9.900987	0.00	2.23	214	406	2023-04-14 16:10:00	1.460940	FALSE	1.115
## 9	-8.333333	0.00	2.08	41	50	2023-04-14 14:47:43	1.531252	FALSE	1.040
## 10	-3.030309	0.00	0.80	197	344	2023-04-14 16:00:42	1.248051	FALSE	0.400
## 11	6.521739	0.00	1.66	4	37	2023-04-14 14:55:00	1.769532	FALSE	0.830
## 12	-19.565218	0.00	1.42	20	352	2023-04-14 15:55:57	1.902344	FALSE	0.710
## 13	4.761908	0.00	1.14	2	105	2023-04-14 12:58:46	2.082036	FALSE	0.570
## 14	-60.526310	0.00	1.05	5	5	2023-04-14 13:27:29	2.142583	FALSE	0.525
## 15	0.000000	0.00	0.67	12	12	2023-04-13 13:39:25	2.714847	FALSE	0.335
## 16	0.000000	0.00	0.53	8	8	2023-04-06 13:40:47	3.265627	FALSE	0.265
##	InTheMoney								
## 1	TRUE								
## 2	TRUE								
## 3	TRUE								
## 4	TRUE								
## 5	FALSE								
## 6	FALSE								
## 7	FALSE								
## 8	FALSE								
## 9	FALSE								
## 10	FALSE								
## 11	FALSE								
## 12	FALSE								
## 13	FALSE								
## 14	FALSE								
## 15	FALSE								
## 16	FALSE								
##									
##	\$May.10.2023\$puts								
##	ContractID	ContractSize	Currency	Expiration	Strike	Last		Chg	
## 1	VIXW230510P00015000	REGULAR	USD	2023-05-10	15	0.04	0.00000000		
## 2	VIXW230510P00016000	REGULAR	USD	2023-05-10	16	0.12	0.009999998		
## 3	VIXW230510P00017000	REGULAR	USD	2023-05-10	17	0.35	0.049999982		
## 4	VIXW230510P00018000	REGULAR	USD	2023-05-10	18	0.75	0.040000020		

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## 5 VIXW230510P00019000 REGULAR USD 2023-05-10 19 1.40 0.159999970
## 6 VIXW230510P00022000 REGULAR USD 2023-05-10 22 3.75 0.250000000
## 7 VIXW230510P00026000 REGULAR USD 2023-05-10 26 7.08 0.000000000
## 8 VIXW230510P00028000 REGULAR USD 2023-05-10 28 9.23 0.379999160
## 9 VIXW230510P00029000 REGULAR USD 2023-05-10 29 8.23 0.000000000
## 10 VIXW230510P00030000 REGULAR USD 2023-05-10 30 10.76 0.000000000
## ChgPct Bid Ask Vol OI LastTradeTime IV ITM Price
## 1 0.000000 0.00 0.72 14 212 2023-04-14 15:54:36 0.6582065 FALSE 0.360
## 2 9.090907 0.00 1.11 1262 364 2023-04-14 15:48:45 0.5800823 FALSE 0.555
## 3 16.666660 0.00 1.63 1083 462 2023-04-14 15:59:17 0.9384772 FALSE 0.815
## 4 5.633806 0.40 2.22 218 643 2023-04-14 15:59:33 0.9394537 TRUE 1.310
## 5 12.903222 0.50 2.92 432 2021 2023-04-14 15:48:45 0.9550786 TRUE 1.710
## 6 7.142858 2.23 5.43 15 69 2023-04-14 14:49:15 1.0429735 TRUE 3.830
## 7 0.000000 5.84 9.12 10 32 2023-04-13 11:40:45 1.0976608 TRUE 7.480
## 8 4.293776 7.75 10.97 100 61 2023-04-14 15:56:11 0.9296882 TRUE 9.360
## 9 0.000000 8.71 11.91 56 56 2023-04-06 09:37:07 0.0000100 TRUE 10.310
## 10 0.000000 9.69 12.86 1 53 2023-04-13 10:28:01 0.0000100 TRUE 11.275
## InTheMoney
## 1 FALSE
## 2 FALSE
## 3 FALSE
## 4 TRUE
## 5 TRUE
## 6 TRUE
## 7 TRUE
## 8 TRUE
## 9 TRUE
## 10 TRUE
##
##
## $May.17.2023
## $May.17.2023$calls
## ContractID ConractSize Currency Expiration Strike Last Chg
## 1 VIX230517C00010000 REGULAR USD 2023-05-17 10.0 10.24 -0.079999920
## 2 VIX230517C00010500 REGULAR USD 2023-05-17 10.5 11.68 0.000000000
## 3 VIX230517C00011000 REGULAR USD 2023-05-17 11.0 9.16 -0.140000340
## 4 VIX230517C00011500 REGULAR USD 2023-05-17 11.5 10.68 0.000000000
## 5 VIX230517C00012000 REGULAR USD 2023-05-17 12.0 8.62 0.000000000
## 6 VIX230517C00013000 REGULAR USD 2023-05-17 13.0 7.25 -0.300000200
## 7 VIX230517C00013500 REGULAR USD 2023-05-17 13.5 8.60 0.000000000
## 8 VIX230517C00014000 REGULAR USD 2023-05-17 14.0 6.35 -0.599999900
## 9 VIX230517C00014500 REGULAR USD 2023-05-17 14.5 5.95 0.000000000
## 10 VIX230517C00015000 REGULAR USD 2023-05-17 15.0 5.25 -0.099999905
## 11 VIX230517C00016000 REGULAR USD 2023-05-17 16.0 4.20 -0.180000300
## 12 VIX230517C00017000 REGULAR USD 2023-05-17 17.0 3.40 -0.199999810
## 13 VIX230517C00018000 REGULAR USD 2023-05-17 18.0 2.72 -0.240000010
## 14 VIX230517C00019000 REGULAR USD 2023-05-17 19.0 2.25 -0.140000100
## 15 VIX230517C00020000 REGULAR USD 2023-05-17 20.0 1.81 -0.180000070
## 16 VIX230517C00021000 REGULAR USD 2023-05-17 21.0 1.56 -0.170000080
## 17 VIX230517C00022000 REGULAR USD 2023-05-17 22.0 1.37 -0.120000005
## 18 VIX230517C00023000 REGULAR USD 2023-05-17 23.0 1.18 -0.120000005
## 19 VIX230517C00024000 REGULAR USD 2023-05-17 24.0 1.04 -0.090000030
## 20 VIX230517C00025000 REGULAR USD 2023-05-17 25.0 0.92 -0.099999964
## 21 VIX230517C00026000 REGULAR USD 2023-05-17 26.0 0.83 -0.069999990

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##	22	VIX230517C00027000	REGULAR	USD	2023-05-17	27.0	0.74	-0.060000002	
##	23	VIX230517C00028000	REGULAR	USD	2023-05-17	28.0	0.66	-0.039999960	
##	24	VIX230517C00029000	REGULAR	USD	2023-05-17	29.0	0.59	-0.040000020	
##	25	VIX230517C00030000	REGULAR	USD	2023-05-17	30.0	0.54	-0.039999960	
##	26	VIX230517C00031000	REGULAR	USD	2023-05-17	31.0	0.51	-0.009999990	
##	27	VIX230517C00032000	REGULAR	USD	2023-05-17	32.0	0.45	-0.030000001	
##	28	VIX230517C00032500	REGULAR	USD	2023-05-17	32.5	0.42	-0.030000001	
##	29	VIX230517C00033000	REGULAR	USD	2023-05-17	33.0	0.39	-0.040000020	
##	30	VIX230517C00034000	REGULAR	USD	2023-05-17	34.0	0.43	0.030000001	
##	31	VIX230517C00035000	REGULAR	USD	2023-05-17	35.0	0.35	-0.030000001	
##	32	VIX230517C00036000	REGULAR	USD	2023-05-17	36.0	0.33	0.000000000	
##	33	VIX230517C00037000	REGULAR	USD	2023-05-17	37.0	0.33	0.010000020	
##	34	VIX230517C00037500	REGULAR	USD	2023-05-17	37.5	0.28	0.000000000	
##	35	VIX230517C00038000	REGULAR	USD	2023-05-17	38.0	0.28	0.000000000	
##	36	VIX230517C00039000	REGULAR	USD	2023-05-17	39.0	0.27	0.020000010	
##	37	VIX230517C00040000	REGULAR	USD	2023-05-17	40.0	0.24	0.000000000	
##	38	VIX230517C00042500	REGULAR	USD	2023-05-17	42.5	0.18	-0.029999986	
##	39	VIX230517C00045000	REGULAR	USD	2023-05-17	45.0	0.18	0.010000005	
##	40	VIX230517C00047500	REGULAR	USD	2023-05-17	47.5	0.13	-0.030000001	
##	41	VIX230517C00050000	REGULAR	USD	2023-05-17	50.0	0.12	-0.009999998	
##	42	VIX230517C00055000	REGULAR	USD	2023-05-17	55.0	0.11	0.019999996	
##	43	VIX230517C00060000	REGULAR	USD	2023-05-17	60.0	0.07	0.000000000	
##	44	VIX230517C00065000	REGULAR	USD	2023-05-17	65.0	0.06	0.009999998	
##	45	VIX230517C00070000	REGULAR	USD	2023-05-17	70.0	0.05	0.000000000	
##	46	VIX230517C00075000	REGULAR	USD	2023-05-17	75.0	0.05	0.010000002	
##	47	VIX230517C00080000	REGULAR	USD	2023-05-17	80.0	0.03	-0.010000000	
##	48	VIX230517C00085000	REGULAR	USD	2023-05-17	85.0	0.04	0.000000000	
##	49	VIX230517C00090000	REGULAR	USD	2023-05-17	90.0	0.02	0.000000000	
##	50	VIX230517C00095000	REGULAR	USD	2023-05-17	95.0	0.02	0.000000000	
##	51	VIX230517C00100000	REGULAR	USD	2023-05-17	100.0	0.02	0.000000000	
##	52	VIX230517C00110000	REGULAR	USD	2023-05-17	110.0	0.02	0.000000000	
##	53	VIX230517C00120000	REGULAR	USD	2023-05-17	120.0	0.02	0.000000000	
##	54	VIX230517C00130000	REGULAR	USD	2023-05-17	130.0	0.01	0.000000000	
##	55	VIX230517C00140000	REGULAR	USD	2023-05-17	140.0	0.01	0.000000000	
##	56	VIX230517C00150000	REGULAR	USD	2023-05-17	150.0	0.01	0.000000000	
##	57	VIX230517C00160000	REGULAR	USD	2023-05-17	160.0	0.02	0.000000000	
##	58	VIX230517C00170000	REGULAR	USD	2023-05-17	170.0	0.02	0.000000000	
##	59	VIX230517C00180000	REGULAR	USD	2023-05-17	180.0	0.02	0.000000000	
##		ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM
##	1	-0.7751931	9.85	10.15	54	707	2023-04-14 14:22:14	3.916016	TRUE
##	2	0.0000000	9.35	9.65	20	20	2023-04-04 15:48:06	3.691407	TRUE
##	3	-1.5053800	8.85	9.15	75	1200	2023-04-14 14:57:49	3.478517	TRUE
##	4	0.0000000	8.40	8.65	10	10	2023-04-04 15:48:08	3.294924	TRUE
##	5	0.0000000	7.90	8.15	13	638	2023-04-13 09:46:39	3.103518	TRUE
##	6	-3.9735124	6.90	7.15	16	803	2023-04-14 15:50:37	2.744144	TRUE
##	7	0.0000000	6.40	6.65	NA	3	2023-03-30 10:01:25	2.574222	TRUE
##	8	-8.6330920	5.90	6.15	3	525	2023-04-14 10:08:09	2.410160	TRUE
##	9	0.0000000	5.40	5.65	1	621	2023-04-13 15:07:59	2.251957	TRUE
##	10	-1.8691572	4.90	5.20	790	3324	2023-04-14 15:55:59	2.111333	TRUE
##	11	-4.1095960	4.00	4.25	205	2467	2023-04-14 15:59:58	1.848634	TRUE
##	12	-5.5555506	3.15	3.40	199	2137	2023-04-14 16:14:13	1.625978	TRUE
##	13	-8.1081085	2.53	2.69	10861	12478	2023-04-14 16:14:34	1.486331	FALSE
##	14	-5.8577447	2.06	2.20	905	10313	2023-04-14 16:09:39	1.417972	FALSE
##	15	-9.0452290	1.80	1.85	9627	27611	2023-04-14 16:14:33	1.415042	FALSE

## 16	-9.8265930	1.46	1.58	1293	91352	2023-04-14	16:06:48	1.391605	FALSE
## 17	-8.0536920	1.30	1.37	28547	95736	2023-04-14	16:14:59	1.412112	FALSE
## 18	-9.2307700	1.12	1.19	10053	44949	2023-04-14	15:59:42	1.418948	FALSE
## 19	-7.9646053	0.98	1.05	1938	182925	2023-04-14	16:11:01	1.433597	FALSE
## 20	-9.8039180	0.86	0.92	30699	126151	2023-04-14	16:11:01	1.445315	FALSE
## 21	-7.7777770	0.76	0.82	852	66736	2023-04-14	16:05:16	1.462893	FALSE
## 22	-7.5000005	0.67	0.74	1250	48661	2023-04-14	16:10:14	1.479495	FALSE
## 23	-5.7142806	0.61	0.66	467	42949	2023-04-14	16:01:54	1.498049	FALSE
## 24	-6.3492100	0.54	0.60	308	16121	2023-04-14	15:55:24	1.513674	FALSE
## 25	-6.8965450	0.50	0.54	31560	207556	2023-04-14	16:14:59	1.533205	FALSE
## 26	-1.9230751	0.45	0.49	631	12358	2023-04-14	15:27:30	1.548830	FALSE
## 27	-6.2500010	0.41	0.45	5099	139905	2023-04-14	15:58:36	1.566408	FALSE
## 28	-6.6666670	0.39	0.43	229	28028	2023-04-14	16:11:01	1.572268	FALSE
## 29	-9.3023310	0.37	0.41	26	10357	2023-04-14	16:08:47	1.578127	FALSE
## 30	7.5000005	0.34	0.38	2057	16510	2023-04-14	10:45:55	1.595705	FALSE
## 31	-7.8947372	0.30	0.35	9668	58551	2023-04-14	16:01:43	1.605471	FALSE
## 32	0.0000000	0.28	0.32	6701	20237	2023-04-14	11:47:26	1.619143	FALSE
## 33	3.1250064	0.26	0.30	2767	8969	2023-04-14	11:42:02	1.636721	FALSE
## 34	0.0000000	0.25	0.29	10	12423	2023-04-13	15:12:03	1.644533	FALSE
## 35	0.0000000	0.24	0.28	15	5744	2023-04-14	09:57:06	1.652345	FALSE
## 36	8.0000040	0.22	0.26	4	8646	2023-04-14	14:56:22	1.664064	FALSE
## 37	0.0000000	0.20	0.24	9501	91675	2023-04-14	16:03:56	1.671877	FALSE
## 38	-14.2857070	0.16	0.20	3888	38521	2023-04-14	16:06:24	1.695314	FALSE
## 39	5.8823560	0.14	0.17	6408	50589	2023-04-14	15:53:17	1.726564	FALSE
## 40	-18.7500020	0.11	0.15	27	31977	2023-04-14	16:06:18	1.750001	FALSE
## 41	-7.6923065	0.10	0.13	15535	253665	2023-04-14	15:59:50	1.781251	FALSE
## 42	22.2222160	0.07	0.11	155	107093	2023-04-14	15:58:35	1.835938	FALSE
## 43	0.0000000	0.05	0.09	4156	45785	2023-04-14	15:38:43	1.875001	FALSE
## 44	19.9999960	0.04	0.07	1408	79968	2023-04-14	15:00:22	1.906250	FALSE
## 45	0.0000000	0.03	0.06	15	42751	2023-04-14	09:57:32	1.945313	FALSE
## 46	25.0000060	0.02	0.05	773	43042	2023-04-14	14:23:31	1.968750	FALSE
## 47	-25.0000000	0.01	0.04	10675	33646	2023-04-14	15:59:03	1.968750	FALSE
## 48	0.0000000	0.00	0.04	3	75788	2023-04-12	11:46:02	1.968750	FALSE
## 49	0.0000000	0.00	0.04	401	102891	2023-04-14	13:20:09	2.031255	FALSE
## 50	0.0000000	0.00	0.05	4	3090	2023-04-11	11:55:28	2.140630	FALSE
## 51	0.0000000	0.00	0.05	1	19904	2023-04-11	14:39:25	2.187505	FALSE
## 52	0.0000000	0.00	0.05	10	1233	2023-04-06	14:05:01	2.281254	FALSE
## 53	0.0000000	0.00	0.04	100	788	2023-04-04	11:05:43	2.312504	FALSE
## 54	0.0000000	0.00	0.04	720	2363	2023-04-04	11:07:23	2.406254	FALSE
## 55	0.0000000	0.00	0.03	370	2801	2023-04-04	11:06:17	2.406254	FALSE
## 56	0.0000000	0.00	0.03	10	10131	2023-04-12	09:48:58	2.468754	FALSE
## 57	0.0000000	0.00	0.03	250	3059	2023-03-31	14:09:29	2.531254	FALSE
## 58	0.0000000	0.00	0.03	120	3061	2023-03-29	15:20:00	2.593754	FALSE
## 59	0.0000000	0.00	0.03	100	5507	2023-03-29	10:47:18	2.656253	FALSE
##	Price	InTheMoney							
## 1	10.000	TRUE							
## 2	9.500	TRUE							
## 3	9.000	TRUE							
## 4	8.525	TRUE							
## 5	8.025	TRUE							
## 6	7.025	TRUE							
## 7	6.525	TRUE							
## 8	6.025	TRUE							
## 9	5.525	TRUE							

##	10	5.050	TRUE
##	11	4.125	TRUE
##	12	3.275	TRUE
##	13	2.610	FALSE
##	14	2.130	FALSE
##	15	1.825	FALSE
##	16	1.520	FALSE
##	17	1.335	FALSE
##	18	1.155	FALSE
##	19	1.015	FALSE
##	20	0.890	FALSE
##	21	0.790	FALSE
##	22	0.705	FALSE
##	23	0.635	FALSE
##	24	0.570	FALSE
##	25	0.520	FALSE
##	26	0.470	FALSE
##	27	0.430	FALSE
##	28	0.410	FALSE
##	29	0.390	FALSE
##	30	0.360	FALSE
##	31	0.325	FALSE
##	32	0.300	FALSE
##	33	0.280	FALSE
##	34	0.270	FALSE
##	35	0.260	FALSE
##	36	0.240	FALSE
##	37	0.220	FALSE
##	38	0.180	FALSE
##	39	0.155	FALSE
##	40	0.130	FALSE
##	41	0.115	FALSE
##	42	0.090	FALSE
##	43	0.070	FALSE
##	44	0.055	FALSE
##	45	0.045	FALSE
##	46	0.035	FALSE
##	47	0.025	FALSE
##	48	0.020	FALSE
##	49	0.020	FALSE
##	50	0.025	FALSE
##	51	0.025	FALSE
##	52	0.025	FALSE
##	53	0.020	FALSE
##	54	0.020	FALSE
##	55	0.015	FALSE
##	56	0.015	FALSE
##	57	0.015	FALSE
##	58	0.015	FALSE
##	59	0.015	FALSE

##

\$May.17.2023\$puts

##	ContractID	ContractSize	Currency	Expiration	Strike	Last
## 1	VIX230517P00010000	REGULAR	USD	2023-05-17	10.0	0.01

## 2	VIX230517P00011000	REGULAR	USD	2023-05-17	11.0	0.01		
## 3	VIX230517P00012000	REGULAR	USD	2023-05-17	12.0	0.01		
## 4	VIX230517P00013000	REGULAR	USD	2023-05-17	13.0	0.01		
## 5	VIX230517P00014000	REGULAR	USD	2023-05-17	14.0	0.01		
## 6	VIX230517P00014500	REGULAR	USD	2023-05-17	14.5	0.01		
## 7	VIX230517P00015000	REGULAR	USD	2023-05-17	15.0	0.04		
## 8	VIX230517P00016000	REGULAR	USD	2023-05-17	16.0	0.08		
## 9	VIX230517P00017000	REGULAR	USD	2023-05-17	17.0	0.23		
## 10	VIX230517P00018000	REGULAR	USD	2023-05-17	18.0	0.54		
## 11	VIX230517P00019000	REGULAR	USD	2023-05-17	19.0	1.06		
## 12	VIX230517P00020000	REGULAR	USD	2023-05-17	20.0	1.68		
## 13	VIX230517P00021000	REGULAR	USD	2023-05-17	21.0	2.44		
## 14	VIX230517P00022000	REGULAR	USD	2023-05-17	22.0	3.23		
## 15	VIX230517P00023000	REGULAR	USD	2023-05-17	23.0	4.06		
## 16	VIX230517P00024000	REGULAR	USD	2023-05-17	24.0	4.90		
## 17	VIX230517P00025000	REGULAR	USD	2023-05-17	25.0	5.65		
## 18	VIX230517P00026000	REGULAR	USD	2023-05-17	26.0	6.65		
## 19	VIX230517P00027000	REGULAR	USD	2023-05-17	27.0	7.60		
## 20	VIX230517P00028000	REGULAR	USD	2023-05-17	28.0	8.20		
## 21	VIX230517P00029000	REGULAR	USD	2023-05-17	29.0	9.35		
## 22	VIX230517P00030000	REGULAR	USD	2023-05-17	30.0	10.30		
## 23	VIX230517P00031000	REGULAR	USD	2023-05-17	31.0	11.22		
## 24	VIX230517P00032000	REGULAR	USD	2023-05-17	32.0	11.97		
## 25	VIX230517P00032500	REGULAR	USD	2023-05-17	32.5	12.65		
## 26	VIX230517P00033000	REGULAR	USD	2023-05-17	33.0	11.05		
## 27	VIX230517P00034000	REGULAR	USD	2023-05-17	34.0	14.08		
## 28	VIX230517P00035000	REGULAR	USD	2023-05-17	35.0	14.80		
## 29	VIX230517P00036000	REGULAR	USD	2023-05-17	36.0	14.65		
## 30	VIX230517P00037000	REGULAR	USD	2023-05-17	37.0	16.90		
## 31	VIX230517P00037500	REGULAR	USD	2023-05-17	37.5	16.10		
## 32	VIX230517P00040000	REGULAR	USD	2023-05-17	40.0	19.80		
## 33	VIX230517P00042500	REGULAR	USD	2023-05-17	42.5	22.25		
## 34	VIX230517P00045000	REGULAR	USD	2023-05-17	45.0	23.22		
## 35	VIX230517P00047500	REGULAR	USD	2023-05-17	47.5	25.77		
## 36	VIX230517P00050000	REGULAR	USD	2023-05-17	50.0	29.60		
## 37	VIX230517P00055000	REGULAR	USD	2023-05-17	55.0	32.80		
## 38	VIX230517P00060000	REGULAR	USD	2023-05-17	60.0	38.96		
## 39	VIX230517P00065000	REGULAR	USD	2023-05-17	65.0	42.67		
## 40	VIX230517P00070000	REGULAR	USD	2023-05-17	70.0	46.11		
## 41	VIX230517P00075000	REGULAR	USD	2023-05-17	75.0	54.30		
## 42	VIX230517P00080000	REGULAR	USD	2023-05-17	80.0	59.30		
## 43	VIX230517P00090000	REGULAR	USD	2023-05-17	90.0	61.25		
## 44	VIX230517P00100000	REGULAR	USD	2023-05-17	100.0	74.00		
## 45	VIX230517P00110000	REGULAR	USD	2023-05-17	110.0	86.62		
## 46	VIX230517P00130000	REGULAR	USD	2023-05-17	130.0	106.00		
## 47	VIX230517P00140000	REGULAR	USD	2023-05-17	140.0	116.21		
## 48	VIX230517P00150000	REGULAR	USD	2023-05-17	150.0	123.30		
## 49	VIX230517P00180000	REGULAR	USD	2023-05-17	180.0	157.55		
##	Chg	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	
## 1	0.000000000	0.000000	0.00	0.02	1	32	2023-03-29	10:52:29
## 2	0.000000000	0.000000	0.00	0.02	3	7	2023-04-12	10:55:11
## 3	0.000000000	0.000000	0.00	0.02	43	43	2023-04-13	09:45:31
## 4	0.000000000	0.000000	0.00	0.02	5	8	2023-03-10	14:15:30
## 5	0.000000000	0.000000	0.00	0.03	212	2777	2023-04-14	11:23:10

## 6	-0.010000000	-50.000000	0.00	0.04	11	1421	2023-04-14	16:14:11
## 7	0.020000000	100.000000	0.01	0.05	1637	12914	2023-04-14	14:59:27
## 8	0.009999998	14.285712	0.06	0.10	436	31695	2023-04-14	16:04:48
## 9	0.030000001	15.000001	0.23	0.26	2967	71617	2023-04-14	16:14:11
## 10	0.050000012	10.204084	0.55	0.60	21773	60128	2023-04-14	16:09:35
## 11	0.079999920	8.163258	1.06	1.13	10532	61157	2023-04-14	16:14:15
## 12	0.099999905	6.329108	1.70	1.77	13978	63630	2023-04-14	16:14:15
## 13	0.160000090	7.017548	2.42	2.50	1146	75363	2023-04-14	16:13:36
## 14	0.200000050	6.600662	3.20	3.30	133	64265	2023-04-14	16:00:11
## 15	0.260000000	6.842105	4.00	4.15	73	49828	2023-04-14	15:59:57
## 16	0.200000290	4.255325	4.85	5.00	116	48555	2023-04-14	15:59:50
## 17	0.099999905	1.801800	5.75	5.90	24	42157	2023-04-14	15:53:17
## 18	0.210000040	3.260870	6.60	6.80	104	31453	2023-04-14	15:58:30
## 19	0.250000000	3.401361	7.55	7.70	95	23397	2023-04-14	16:00:00
## 20	-0.100000380	-1.204824	8.45	8.65	93	9900	2023-04-14	13:43:13
## 21	0.370000840	4.120277	9.40	9.60	68	1795	2023-04-14	15:11:47
## 22	0.180000300	1.778659	10.30	10.55	56	1891	2023-04-14	15:46:01
## 23	0.170000080	1.538462	11.30	11.50	72	1635	2023-04-14	15:06:38
## 24	0.430000300	3.726172	12.25	12.45	2	269	2023-04-14	13:24:59
## 25	0.449999800	3.688523	12.70	12.90	5	95	2023-04-14	14:39:35
## 26	0.000000000	0.000000	13.20	13.40	30	51	2023-03-28	09:37:46
## 27	1.479999500	11.746028	14.15	14.35	1	89	2023-04-14	15:06:07
## 28	0.000000000	0.000000	15.10	15.35	1	209	2023-04-13	10:35:52
## 29	0.000000000	0.000000	16.05	16.30	1	98	2023-04-03	13:13:37
## 30	0.000000000	0.000000	17.05	17.30	3	77	2023-04-13	11:29:21
## 31	0.000000000	0.000000	17.50	17.75	1	245	2023-04-03	12:50:34
## 32	0.000000000	0.000000	19.95	20.20	1	39	2023-04-13	11:34:17
## 33	0.000000000	0.000000	22.40	22.65	3	20	2023-04-13	11:43:36
## 34	0.000000000	0.000000	24.85	25.15	10	12	2023-03-29	15:47:25
## 35	0.000000000	0.000000	22.65	23.00	NA	2	2023-02-16	15:39:46
## 36	0.000000000	0.000000	29.80	30.05	39	282	2023-04-13	11:24:10
## 37	0.000000000	0.000000	34.75	35.00	2	29	2023-03-30	15:02:43
## 38	0.000000000	0.000000	39.70	40.00	2	47	2023-04-11	10:26:21
## 39	0.000000000	0.000000	44.70	44.95	2	39	2023-03-30	15:02:43
## 40	0.000000000	0.000000	49.65	49.90	2	5	2023-03-21	10:36:05
## 41	5.799999000	11.958761	54.60	54.90	5	1	2023-04-14	12:21:36
## 42	0.000000000	0.000000	59.60	59.85	10	13	2023-04-13	14:30:47
## 43	0.000000000	0.000000	63.30	63.55	20	20	2022-11-14	13:32:40
## 44	0.000000000	0.000000	79.50	79.75	1	112	2023-03-24	10:48:50
## 45	0.000000000	0.000000	83.75	84.25	3	2	2023-02-13	11:59:04
## 46	0.000000000	0.000000	0.00	0.00	34	39	2023-02-21	05:26:08
## 47	0.000000000	0.000000	113.35	113.90	3	3	2023-02-13	11:59:04
## 48	0.000000000	0.000000	128.70	128.85	1	119	2023-03-13	09:37:17
## 49	0.000000000	0.000000	159.15	159.40	8	19	2023-04-06	12:09:29
##	IV	ITM	Price	InTheMoney				
## 1	0.7812522	FALSE	0.010	FALSE				
## 2	0.6562534	FALSE	0.010	FALSE				
## 3	0.5312547	FALSE	0.010	FALSE				
## 4	0.4687553	FALSE	0.010	FALSE				
## 5	0.3867249	FALSE	0.015	FALSE				
## 6	0.3496159	FALSE	0.020	FALSE				
## 7	0.3046945	FALSE	0.030	FALSE				
## 8	0.2275468	FALSE	0.080	FALSE				
## 9	0.1455164	FALSE	0.245	FALSE				

##	10	0.0000100	TRUE	0.575	TRUE
##	11	0.0000100	TRUE	1.095	TRUE
##	12	0.0000100	TRUE	1.735	TRUE
##	13	0.0000100	TRUE	2.460	TRUE
##	14	0.0000100	TRUE	3.250	TRUE
##	15	0.0000100	TRUE	4.075	TRUE
##	16	0.0000100	TRUE	4.925	TRUE
##	17	0.0000100	TRUE	5.825	TRUE
##	18	0.0000100	TRUE	6.700	TRUE
##	19	0.0000100	TRUE	7.625	TRUE
##	20	0.0000100	TRUE	8.550	TRUE
##	21	0.0000100	TRUE	9.500	TRUE
##	22	0.0000100	TRUE	10.425	TRUE
##	23	0.0000100	TRUE	11.400	TRUE
##	24	0.0000100	TRUE	12.350	TRUE
##	25	0.0000100	TRUE	12.800	TRUE
##	26	0.0000100	TRUE	13.300	TRUE
##	27	0.0000100	TRUE	14.250	TRUE
##	28	0.0000100	TRUE	15.225	TRUE
##	29	0.0000100	TRUE	16.175	TRUE
##	30	0.0000100	TRUE	17.175	TRUE
##	31	0.0000100	TRUE	17.625	TRUE
##	32	0.0000100	TRUE	20.075	TRUE
##	33	0.0000100	TRUE	22.525	TRUE
##	34	0.0000100	TRUE	25.000	TRUE
##	35	0.0000100	TRUE	22.825	TRUE
##	36	0.0000100	TRUE	29.925	TRUE
##	37	0.0000100	TRUE	34.875	TRUE
##	38	0.0000100	TRUE	39.850	TRUE
##	39	0.0000100	TRUE	44.825	TRUE
##	40	0.0000100	TRUE	49.775	TRUE
##	41	0.0000100	TRUE	54.750	TRUE
##	42	0.0000100	TRUE	59.725	TRUE
##	43	0.0000100	TRUE	63.425	TRUE
##	44	0.0000100	TRUE	79.625	TRUE
##	45	0.0000100	TRUE	84.000	TRUE
##	46	0.0000100	TRUE	0.000	TRUE
##	47	0.0000100	TRUE	113.625	TRUE
##	48	0.0000100	TRUE	128.775	TRUE
##	49	0.0000100	TRUE	159.275	TRUE

##

##

\$Jun.21.2023

\$Jun.21.2023\$calls

##		ContractID	ContractSize	Currency	Expiration	Strike	Last	Chg
##	1	VIX230621C00010000	REGULAR	USD	2023-06-21	10.0	11.67	-0.01000023
##	2	VIX230621C00011000	REGULAR	USD	2023-06-21	11.0	10.62	0.01999950
##	3	VIX230621C00012000	REGULAR	USD	2023-06-21	12.0	9.82	-0.57999990
##	4	VIX230621C00013000	REGULAR	USD	2023-06-21	13.0	9.00	0.00000000
##	5	VIX230621C00014000	REGULAR	USD	2023-06-21	14.0	9.00	0.00000000
##	6	VIX230621C00015000	REGULAR	USD	2023-06-21	15.0	6.80	0.10000038
##	7	VIX230621C00016000	REGULAR	USD	2023-06-21	16.0	5.80	-0.04999971
##	8	VIX230621C00017000	REGULAR	USD	2023-06-21	17.0	5.00	-0.01999998
##	9	VIX230621C00018000	REGULAR	USD	2023-06-21	18.0	4.25	-0.07000017

## 10	VIX230621C00019000	REGULAR	USD	2023-06-21	19.0	3.70	-0.04999995	
## 11	VIX230621C00020000	REGULAR	USD	2023-06-21	20.0	3.30	-0.04999995	
## 12	VIX230621C00021000	REGULAR	USD	2023-06-21	21.0	2.88	-0.01999998	
## 13	VIX230621C00022000	REGULAR	USD	2023-06-21	22.0	2.60	-0.04000020	
## 14	VIX230621C00023000	REGULAR	USD	2023-06-21	23.0	2.32	-0.04999995	
## 15	VIX230621C00024000	REGULAR	USD	2023-06-21	24.0	2.08	-0.05000019	
## 16	VIX230621C00025000	REGULAR	USD	2023-06-21	25.0	1.90	-0.05000007	
## 17	VIX230621C00026000	REGULAR	USD	2023-06-21	26.0	1.74	0.03999996	
## 18	VIX230621C00027000	REGULAR	USD	2023-06-21	27.0	1.60	-0.02999997	
## 19	VIX230621C00028000	REGULAR	USD	2023-06-21	28.0	1.47	-0.02999997	
## 20	VIX230621C00029000	REGULAR	USD	2023-06-21	29.0	1.35	-0.01999998	
## 21	VIX230621C00030000	REGULAR	USD	2023-06-21	30.0	1.25	-0.01999998	
## 22	VIX230621C00031000	REGULAR	USD	2023-06-21	31.0	1.15	-0.00999999	
## 23	VIX230621C00032000	REGULAR	USD	2023-06-21	32.0	1.10	0.06000006	
## 24	VIX230621C00032500	REGULAR	USD	2023-06-21	32.5	1.05	0.00000000	
## 25	VIX230621C00033000	REGULAR	USD	2023-06-21	33.0	1.00	-0.01999998	
## 26	VIX230621C00034000	REGULAR	USD	2023-06-21	34.0	0.95	0.02999997	
## 27	VIX230621C00035000	REGULAR	USD	2023-06-21	35.0	0.89	0.00000000	
## 28	VIX230621C00036000	REGULAR	USD	2023-06-21	36.0	0.84	-0.08000004	
## 29	VIX230621C00037000	REGULAR	USD	2023-06-21	37.0	0.80	0.04000002	
## 30	VIX230621C00037500	REGULAR	USD	2023-06-21	37.5	0.83	0.07999998	
## 31	VIX230621C00038000	REGULAR	USD	2023-06-21	38.0	0.72	0.01000005	
## 32	VIX230621C00039000	REGULAR	USD	2023-06-21	39.0	0.67	0.00999999	
## 33	VIX230621C00040000	REGULAR	USD	2023-06-21	40.0	0.65	0.01999998	
## 34	VIX230621C00042500	REGULAR	USD	2023-06-21	42.5	0.56	0.03000003	
## 35	VIX230621C00045000	REGULAR	USD	2023-06-21	45.0	0.50	0.00999999	
## 36	VIX230621C00047500	REGULAR	USD	2023-06-21	47.5	0.44	0.02000001	
## 37	VIX230621C00050000	REGULAR	USD	2023-06-21	50.0	0.38	0.00000000	
## 38	VIX230621C00055000	REGULAR	USD	2023-06-21	55.0	0.32	0.03000000	
## 39	VIX230621C00060000	REGULAR	USD	2023-06-21	60.0	0.22	-0.03000000	
## 40	VIX230621C00065000	REGULAR	USD	2023-06-21	65.0	0.21	0.00000000	
## 41	VIX230621C00070000	REGULAR	USD	2023-06-21	70.0	0.16	-0.01000000	
## 42	VIX230621C00075000	REGULAR	USD	2023-06-21	75.0	0.14	0.00000000	
## 43	VIX230621C00080000	REGULAR	USD	2023-06-21	80.0	0.10	-0.04000000	
## 44	VIX230621C00085000	REGULAR	USD	2023-06-21	85.0	0.12	0.00000000	
## 45	VIX230621C00090000	REGULAR	USD	2023-06-21	90.0	0.10	0.02000000	
## 46	VIX230621C00095000	REGULAR	USD	2023-06-21	95.0	0.10	0.00000000	
## 47	VIX230621C00100000	REGULAR	USD	2023-06-21	100.0	0.06	0.00000000	
## 48	VIX230621C00110000	REGULAR	USD	2023-06-21	110.0	0.04	-0.01000000	
## 49	VIX230621C00120000	REGULAR	USD	2023-06-21	120.0	0.04	0.00000000	
## 50	VIX230621C00130000	REGULAR	USD	2023-06-21	130.0	0.05	0.00000000	
## 51	VIX230621C00140000	REGULAR	USD	2023-06-21	140.0	0.03	0.00000000	
## 52	VIX230621C00150000	REGULAR	USD	2023-06-21	150.0	0.03	0.00000000	
## 53	VIX230621C00160000	REGULAR	USD	2023-06-21	160.0	0.02	-0.01000000	
## 54	VIX230621C00170000	REGULAR	USD	2023-06-21	170.0	0.02	0.00000000	
## 55	VIX230621C00180000	REGULAR	USD	2023-06-21	180.0	0.04	0.00000000	
##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM
## 1	-0.08561839	11.35	11.65	42	993	2023-04-14 16:06:40	3.623048	TRUE
## 2	0.18867455	10.40	10.65	109	1089	2023-04-14 14:57:49	3.240236	TRUE
## 3	-5.57692240	9.40	9.65	25	411	2023-04-10 13:06:44	2.894534	TRUE
## 4	0.00000000	8.40	8.65	2	813	2023-04-12 12:01:16	2.585941	TRUE
## 5	0.00000000	7.45	7.70	2	53	2023-04-04 15:50:06	2.327153	TRUE
## 6	1.49254310	6.50	6.75	976	2694	2023-04-14 15:53:27	2.087407	TRUE
## 7	-0.85469600	5.55	5.80	85	542	2023-04-14 16:13:12	1.861329	TRUE

## 8	-0.39840603	4.75	5.00	143	620	2023-04-14	16:13:27	1.699220	TRUE
## 9	-1.62037420	4.20	4.30	510	1563	2023-04-14	16:11:48	1.599611	FALSE
## 10	-1.33333210	3.55	3.75	509	8498	2023-04-14	16:12:45	1.502932	FALSE
## 11	-1.49253600	3.10	3.30	1188	29282	2023-04-14	16:09:01	1.451175	FALSE
## 12	-0.68965447	2.75	2.89	241	8305	2023-04-14	16:14:26	1.414065	FALSE
## 13	-1.51515900	2.45	2.58	326	82354	2023-04-14	15:57:36	1.394046	FALSE
## 14	-2.10970260	2.20	2.33	543	145006	2023-04-14	15:59:16	1.384769	FALSE
## 15	-2.34742670	1.99	2.11	1092	62411	2023-04-14	15:59:55	1.379886	FALSE
## 16	-2.56410620	1.81	1.92	1163	84428	2023-04-14	16:11:50	1.378909	FALSE
## 17	2.35293900	1.65	1.75	65	25556	2023-04-14	16:14:15	1.378909	FALSE
## 18	-1.84048900	1.53	1.61	165	81169	2023-04-14	15:57:36	1.386722	FALSE
## 19	-1.99999810	1.38	1.48	390	57525	2023-04-14	15:58:29	1.384769	FALSE
## 20	-1.45985260	1.30	1.37	129	12587	2023-04-14	16:02:49	1.396487	FALSE
## 21	-1.57480170	1.20	1.27	3988	488245	2023-04-14	16:11:01	1.401370	FALSE
## 22	-0.86206810	1.11	1.17	6	1815	2023-04-14	15:47:35	1.405276	FALSE
## 23	5.76923660	1.03	1.09	573	96068	2023-04-14	15:17:24	1.411136	FALSE
## 24	0.00000000	0.97	1.06	7	4449	2023-04-14	15:53:28	1.410159	FALSE
## 25	-1.96078250	0.96	1.02	115	3169	2023-04-14	16:04:00	1.418460	FALSE
## 26	3.26086660	0.87	0.95	15	94074	2023-04-14	15:56:40	1.417972	FALSE
## 27	0.00000000	0.84	0.89	976	74027	2023-04-14	15:23:27	1.431643	FALSE
## 28	-8.69565700	0.78	0.84	6	2127	2023-04-14	10:11:18	1.437503	FALSE
## 29	5.26316070	0.73	0.79	286	27070	2023-04-14	11:41:15	1.443362	FALSE
## 30	10.66666500	0.71	0.76	1	13650	2023-04-14	12:54:59	1.445315	FALSE
## 31	1.40845780	0.67	0.73	53	3391	2023-04-14	16:06:48	1.441409	FALSE
## 32	1.51515000	0.65	0.69	1003	1738	2023-04-14	15:58:24	1.455081	FALSE
## 33	3.17460010	0.61	0.66	6747	438741	2023-04-14	15:59:38	1.462893	FALSE
## 34	5.66038300	0.53	0.57	160	10997	2023-04-14	14:56:50	1.476565	FALSE
## 35	2.04081440	0.46	0.50	409	34171	2023-04-14	15:58:50	1.490237	FALSE
## 36	4.76190760	0.40	0.45	40	2548	2023-04-14	13:48:46	1.505862	FALSE
## 37	0.00000000	0.36	0.40	529	106388	2023-04-14	16:06:18	1.521487	FALSE
## 38	10.34482900	0.28	0.32	1108	31372	2023-04-14	12:00:46	1.542971	FALSE
## 39	-12.00000000	0.22	0.26	4952	104312	2023-04-14	16:14:50	1.562502	FALSE
## 40	0.00000000	0.18	0.21	8628	25961	2023-04-13	15:48:11	1.578127	FALSE
## 41	-5.88235600	0.14	0.18	1	53127	2023-04-14	16:06:48	1.593752	FALSE
## 42	0.00000000	0.12	0.16	4540	34986	2023-04-14	15:56:32	1.621096	FALSE
## 43	-28.57142600	0.10	0.14	101	25187	2023-04-14	14:19:18	1.636721	FALSE
## 44	0.00000000	0.08	0.12	16	53198	2023-04-12	15:00:24	1.644533	FALSE
## 45	25.00000600	0.07	0.10	1101	16815	2023-04-14	13:21:24	1.656252	FALSE
## 46	0.00000000	0.05	0.09	6000	15845	2023-04-05	15:55:31	1.656252	FALSE
## 47	0.00000000	0.04	0.08	1060	7855	2023-04-13	15:11:45	1.664064	FALSE
## 48	-20.00000400	0.03	0.07	4600	12626	2023-04-14	10:45:54	1.703126	FALSE
## 49	0.00000000	0.02	0.06	1	3448	2023-04-14	16:14:20	1.718751	FALSE
## 50	0.00000000	0.01	0.05	45	4025	2023-04-06	10:08:54	1.726564	FALSE
## 51	0.00000000	0.01	0.04	1	985	2023-04-14	16:01:44	1.750001	FALSE
## 52	0.00000000	0.00	0.05	1	3870	2023-04-10	09:41:36	1.796876	FALSE
## 53	-33.33333600	0.00	0.05	1	1041	2023-04-14	15:59:40	1.828126	FALSE
## 54	0.00000000	0.00	0.05	5	3976	2023-04-14	14:48:31	1.875001	FALSE
## 55	0.00000000	0.00	0.05	11	17766	2023-03-31	15:48:38	1.906250	FALSE
##	Price InTheMoney								
## 1	11.500							TRUE	
## 2	10.525							TRUE	
## 3	9.525							TRUE	
## 4	8.525							TRUE	
## 5	7.575							TRUE	

## 6	6.625	TRUE
## 7	5.675	TRUE
## 8	4.875	TRUE
## 9	4.250	FALSE
## 10	3.650	FALSE
## 11	3.200	FALSE
## 12	2.820	FALSE
## 13	2.515	FALSE
## 14	2.265	FALSE
## 15	2.050	FALSE
## 16	1.865	FALSE
## 17	1.700	FALSE
## 18	1.570	FALSE
## 19	1.430	FALSE
## 20	1.335	FALSE
## 21	1.235	FALSE
## 22	1.140	FALSE
## 23	1.060	FALSE
## 24	1.015	FALSE
## 25	0.990	FALSE
## 26	0.910	FALSE
## 27	0.865	FALSE
## 28	0.810	FALSE
## 29	0.760	FALSE
## 30	0.735	FALSE
## 31	0.700	FALSE
## 32	0.670	FALSE
## 33	0.635	FALSE
## 34	0.550	FALSE
## 35	0.480	FALSE
## 36	0.425	FALSE
## 37	0.380	FALSE
## 38	0.300	FALSE
## 39	0.240	FALSE
## 40	0.195	FALSE
## 41	0.160	FALSE
## 42	0.140	FALSE
## 43	0.120	FALSE
## 44	0.100	FALSE
## 45	0.085	FALSE
## 46	0.070	FALSE
## 47	0.060	FALSE
## 48	0.050	FALSE
## 49	0.040	FALSE
## 50	0.030	FALSE
## 51	0.025	FALSE
## 52	0.025	FALSE
## 53	0.025	FALSE
## 54	0.025	FALSE
## 55	0.025	FALSE

##

\$Jun.21.2023\$puts

##	ContractID	ContractSize	Currency	Expiration	Strike	Last	Chg
## 1	VIX230621P00010000	REGULAR	USD	2023-06-21	10.0	0.01	0.00000000

## 2	VIX230621P00011000	REGULAR	USD	2023-06-21	11.0	0.01	0.00000000	
## 3	VIX230621P00012000	REGULAR	USD	2023-06-21	12.0	0.01	0.00000000	
## 4	VIX230621P00013000	REGULAR	USD	2023-06-21	13.0	0.01	0.00000000	
## 5	VIX230621P00014000	REGULAR	USD	2023-06-21	14.0	0.02	-0.01000000	
## 6	VIX230621P00015000	REGULAR	USD	2023-06-21	15.0	0.06	0.02000000	
## 7	VIX230621P00016000	REGULAR	USD	2023-06-21	16.0	0.12	0.02999999	
## 8	VIX230621P00017000	REGULAR	USD	2023-06-21	17.0	0.29	0.03000000	
## 9	VIX230621P00018000	REGULAR	USD	2023-06-21	18.0	0.59	0.03999996	
## 10	VIX230621P00019000	REGULAR	USD	2023-06-21	19.0	1.00	0.02999997	
## 11	VIX230621P00020000	REGULAR	USD	2023-06-21	20.0	1.52	0.00999999	
## 12	VIX230621P00021000	REGULAR	USD	2023-06-21	21.0	2.13	0.01000023	
## 13	VIX230621P00022000	REGULAR	USD	2023-06-21	22.0	2.84	0.03999996	
## 14	VIX230621P00023000	REGULAR	USD	2023-06-21	23.0	3.57	0.01999998	
## 15	VIX230621P00024000	REGULAR	USD	2023-06-21	24.0	4.35	0.00000000	
## 16	VIX230621P00025000	REGULAR	USD	2023-06-21	25.0	5.15	0.00000000	
## 17	VIX230621P00026000	REGULAR	USD	2023-06-21	26.0	5.85	-0.15000010	
## 18	VIX230621P00027000	REGULAR	USD	2023-06-21	27.0	6.85	0.04999971	
## 19	VIX230621P00028000	REGULAR	USD	2023-06-21	28.0	7.70	0.04999971	
## 20	VIX230621P00029000	REGULAR	USD	2023-06-21	29.0	8.57	0.11999989	
## 21	VIX230621P00030000	REGULAR	USD	2023-06-21	30.0	9.44	0.33999920	
## 22	VIX230621P00031000	REGULAR	USD	2023-06-21	31.0	9.63	0.00000000	
## 23	VIX230621P00032000	REGULAR	USD	2023-06-21	32.0	11.09	0.14000034	
## 24	VIX230621P00032500	REGULAR	USD	2023-06-21	32.5	11.46	0.00000000	
## 25	VIX230621P00033000	REGULAR	USD	2023-06-21	33.0	12.17	0.02000046	
## 26	VIX230621P00034000	REGULAR	USD	2023-06-21	34.0	12.25	0.00000000	
## 27	VIX230621P00035000	REGULAR	USD	2023-06-21	35.0	14.00	0.00000000	
## 28	VIX230621P00036000	REGULAR	USD	2023-06-21	36.0	14.90	0.00000000	
## 29	VIX230621P00037000	REGULAR	USD	2023-06-21	37.0	15.60	1.00000000	
## 30	VIX230621P00037500	REGULAR	USD	2023-06-21	37.5	15.30	0.00000000	
## 31	VIX230621P00038000	REGULAR	USD	2023-06-21	38.0	14.75	0.00000000	
## 32	VIX230621P00039000	REGULAR	USD	2023-06-21	39.0	15.15	0.00000000	
## 33	VIX230621P00040000	REGULAR	USD	2023-06-21	40.0	18.55	0.00000000	
## 34	VIX230621P00042500	REGULAR	USD	2023-06-21	42.5	19.25	0.00000000	
## 35	VIX230621P00045000	REGULAR	USD	2023-06-21	45.0	22.45	0.00000000	
## 36	VIX230621P00047500	REGULAR	USD	2023-06-21	47.5	24.70	0.00000000	
## 37	VIX230621P00050000	REGULAR	USD	2023-06-21	50.0	28.24	-0.07999992	
## 38	VIX230621P00055000	REGULAR	USD	2023-06-21	55.0	31.82	0.00000000	
## 39	VIX230621P00060000	REGULAR	USD	2023-06-21	60.0	38.02	-0.09000015	
## 40	VIX230621P00065000	REGULAR	USD	2023-06-21	65.0	41.60	0.00000000	
## 41	VIX230621P00070000	REGULAR	USD	2023-06-21	70.0	44.65	0.00000000	
## 42	VIX230621P00080000	REGULAR	USD	2023-06-21	80.0	57.80	0.00000000	
## 43	VIX230621P00100000	REGULAR	USD	2023-06-21	100.0	76.25	0.00000000	
## 44	VIX230621P00110000	REGULAR	USD	2023-06-21	110.0	85.00	0.00000000	
## 45	VIX230621P00130000	REGULAR	USD	2023-06-21	130.0	105.12	0.00000000	
## 46	VIX230621P00150000	REGULAR	USD	2023-06-21	150.0	124.88	0.00000000	
##	ChgPct	Bid	Ask	Vol	OI	LastTradeTime	IV	ITM
## 1	0.0000000	0.00	0.02	2	5	2023-03-31 11:20:31	0.5312547	FALSE
## 2	0.0000000	0.00	0.02	4	5	2023-03-15 12:24:09	0.4921926	FALSE
## 3	0.0000000	0.00	0.02	5	10	2023-03-21 09:52:01	0.4062559	FALSE
## 4	0.0000000	0.00	0.03	4	165	2023-04-14 13:49:20	0.3476628	FALSE
## 5	-33.3333360	0.00	0.05	14	672	2023-04-14 14:17:17	0.2968820	FALSE
## 6	50.0000000	0.03	0.07	29256	105444	2023-04-14 16:00:07	0.2304764	FALSE
## 7	33.3333240	0.11	0.15	89	20089	2023-04-14 16:10:46	0.1836019	FALSE
## 8	11.5384630	0.28	0.31	240	33439	2023-04-14 16:00:07	0.1181729	FALSE

## 9	7.2727203	0.57	0.63	12961	51502	2023-04-14	16:10:46	0.0000100	TRUE
## 10	3.0927806	0.99	1.06	7388	84123	2023-04-14	16:11:07	0.0000100	TRUE
## 11	0.6622511	1.53	1.60	219	53122	2023-04-14	15:34:49	0.0000100	TRUE
## 12	0.4717089	2.15	2.23	5016	24674	2023-04-14	15:17:07	0.0000100	TRUE
## 13	1.4285702	2.84	2.95	169	92716	2023-04-14	15:51:08	0.0000100	TRUE
## 14	0.5633798	3.55	3.70	249	57548	2023-04-14	15:32:31	0.0000100	TRUE
## 15	0.0000000	4.30	4.45	7	61923	2023-04-14	15:53:16	0.0000100	TRUE
## 16	0.0000000	5.15	5.30	69	19142	2023-04-14	15:56:35	0.0000100	TRUE
## 17	-2.5000014	5.95	6.10	61	14132	2023-04-14	13:26:03	0.0000100	TRUE
## 18	0.7352899	6.80	6.95	36	9858	2023-04-14	15:20:29	0.0000100	TRUE
## 19	0.6535910	7.65	7.85	216	6880	2023-04-14	15:42:20	0.0000100	TRUE
## 20	1.4201170	8.55	8.70	2000	929	2023-04-14	16:11:07	0.0000100	TRUE
## 21	3.7362550	9.45	9.60	6	598	2023-04-14	15:56:35	0.0000100	TRUE
## 22	0.0000000	10.35	10.50	20	329	2023-04-06	14:43:13	0.0000100	TRUE
## 23	1.2785420	11.25	11.45	2	217	2023-04-14	13:24:59	0.0000100	TRUE
## 24	0.0000000	11.70	11.85	154	403	2023-04-12	13:06:53	0.0000100	TRUE
## 25	0.1646128	12.15	12.35	12	78	2023-04-14	15:31:58	0.0000100	TRUE
## 26	0.0000000	13.10	13.25	10	55	2023-04-04	09:36:42	0.0000100	TRUE
## 27	0.0000000	14.00	14.25	30	115	2023-04-13	13:51:23	0.0000100	TRUE
## 28	0.0000000	14.95	15.15	2	102	2023-04-13	13:36:59	0.0000100	TRUE
## 29	6.8493150	15.90	16.10	40	701	2023-04-04	11:15:38	0.0000100	TRUE
## 30	0.0000000	16.35	16.60	3	8	2023-03-31	10:02:01	0.0000100	TRUE
## 31	0.0000000	16.25	16.35	1	565	2023-01-10	11:45:50	0.0000100	TRUE
## 32	0.0000000	16.80	17.05	NA	1	2023-03-10	13:45:23	0.0000100	TRUE
## 33	0.0000000	18.75	18.95	2	91	2023-04-13	09:46:02	0.0000100	TRUE
## 34	0.0000000	0.00	0.00	5	20	2023-01-12	09:40:52	0.0000100	TRUE
## 35	0.0000000	23.55	23.75	1	17	2023-03-31	10:26:36	0.0000100	TRUE
## 36	0.0000000	25.95	26.20	205	215	2023-03-22	14:08:44	0.0000100	TRUE
## 37	-0.2824856	28.35	28.65	5	85	2023-04-14	10:39:37	0.0000100	TRUE
## 38	0.0000000	33.25	33.50	2	44	2023-04-04	11:29:33	0.0000100	TRUE
## 39	-0.2361589	38.15	38.40	5	17	2023-04-14	10:39:37	0.0000100	TRUE
## 40	0.0000000	43.05	43.30	2	54	2023-04-04	11:29:33	0.0000100	TRUE
## 41	0.0000000	47.95	48.25	6	54	2023-03-24	10:34:58	0.0000100	TRUE
## 42	0.0000000	56.55	56.75	1	0	2023-03-06	10:35:55	0.0000100	TRUE
## 43	0.0000000	77.60	77.85	8	329	2023-03-30	10:34:02	0.0000100	TRUE
## 44	0.0000000	87.50	87.75	1	4	2023-03-21	12:23:21	0.0000100	TRUE
## 45	0.0000000	104.20	104.55	1	0	2023-02-22	12:14:42	0.0000100	TRUE
## 46	0.0000000	116.20	0.00	100	324	2023-02-10	09:30:09	0.0000100	TRUE
##	Price	InTheMoney							
## 1	0.010	FALSE							
## 2	0.010	FALSE							
## 3	0.010	FALSE							
## 4	0.015	FALSE							
## 5	0.025	FALSE							
## 6	0.050	FALSE							
## 7	0.130	FALSE							
## 8	0.295	FALSE							
## 9	0.600	TRUE							
## 10	1.025	TRUE							
## 11	1.565	TRUE							
## 12	2.190	TRUE							
## 13	2.895	TRUE							
## 14	3.625	TRUE							
## 15	4.375	TRUE							

```
## 16 5.225 TRUE
## 17 6.025 TRUE
## 18 6.875 TRUE
## 19 7.750 TRUE
## 20 8.625 TRUE
## 21 9.525 TRUE
## 22 10.425 TRUE
## 23 11.350 TRUE
## 24 11.775 TRUE
## 25 12.250 TRUE
## 26 13.175 TRUE
## 27 14.125 TRUE
## 28 15.050 TRUE
## 29 16.000 TRUE
## 30 16.475 TRUE
## 31 16.300 TRUE
## 32 16.925 TRUE
## 33 18.850 TRUE
## 34 0.000 TRUE
## 35 23.650 TRUE
## 36 26.075 TRUE
## 37 28.500 TRUE
## 38 33.375 TRUE
## 39 38.275 TRUE
## 40 43.175 TRUE
## 41 48.100 TRUE
## 42 56.650 TRUE
## 43 77.725 TRUE
## 44 87.625 TRUE
## 45 104.375 TRUE
## 46 58.100 TRUE
```

#5. For calls and puts of VIX at each expiration, delete all the fields except Strike, Bid, Ask, Price,

```
VIX.options <- VIX.options.all
for (i in 1:length(VIX.options)){
  VIX.options[[i]]$calls <- VIX.options[[i]]$calls[c('Strike', 'Bid', 'Ask', 'Price', 'InTheMoney' )]
  VIX.options[[i]]$puts <- VIX.options[[i]]$puts[c('Strike', 'Bid', 'Ask', 'Price', 'InTheMoney' )] }

Exp <- names(VIX.options)
Exp2<-c()
for(i in 1:length(Exp)){
  Exp1<-format(as.Date(Exp[i], "%B.%d.%Y"), "%Y-%m-%d")
  Exp2[i]<-Exp1 }
today <- format(Sys.Date())
for(i in 1:length(Exp)){
  write.csv(VIX.options[[i]]$calls, file=paste("VIXdata",today,"Exp",Exp2[i],"calls.csv",sep=""))
  write.csv(VIX.options[[i]]$puts, file=paste("VIXdata",today,"Exp",Exp2[i],"puts.csv",sep="")) } }
```