

```
In [3]: import torch  
print(torch.__version__)  
  
0.3.0.post4
```

```
In [2]: import sys  
print(sys.version)  
  
3.6.2 |Anaconda, Inc.| (default, Sep 22 2017, 02:03:08)  
[GCC 7.2.0]
```

```
In [8]: import pandas as pd
btc = pd.read_csv('btc.csv')
btc
```

Out[8]:

	Timestamp	Open	High	Low	Close	Volume (BTC)	Volume (Currency)	Weighted Price
0	2017-11-25 00:00:00	8199.83	8737.00	8114.78	8717.99	11611.67	9.762892e+07	8407.83
1	2017-11-26 00:00:00	8718.00	9366.60	8538.20	9271.06	12021.22	1.085258e+08	9027.86
2	2017-11-27 00:00:00	9278.99	9721.70	9267.00	9708.07	13272.45	1.264581e+08	9527.86
3	2017-11-28 00:00:00	9708.06	9968.00	9582.25	9868.82	11214.93	1.104968e+08	9852.65
4	2017-11-29 00:00:00	9877.63	11395.00	9250.00	9824.68	33432.34	3.469496e+08	10377.66
5	2017-11-30 00:00:00	9833.70	10618.29	9000.00	9947.67	25433.46	2.470939e+08	9715.31
6	2017-12-01 00:00:00	9927.29	10949.89	9370.11	10840.45	16708.03	1.718818e+08	10287.37
7	2017-12-02 00:00:00	10840.45	11200.00	10637.69	10872.00	9267.16	1.012701e+08	10927.84
8	2017-12-03 00:00:00	10875.68	11800.01	10513.16	11250.00	14238.53	1.601763e+08	11249.50
9	2017-12-04 00:00:00	11250.00	11613.07	10850.00	11613.07	13621.48	1.541229e+08	11314.70
10	2017-12-05 00:00:00	11613.07	11850.00	11384.25	11677.00	11875.03	1.383701e+08	11652.18
11	2017-12-06 00:00:00	11676.99	13700.00	11659.80	13623.50	19784.87	2.505608e+08	12664.26
12	2017-12-07 00:00:00	13623.00	16615.62	13085.90	16599.99	25787.68	3.826940e+08	14840.19
13	2017-12-08 00:00:00	16599.99	16666.66	13482.42	15800.00	25473.40	3.893660e+08	15285.20
14	2017-12-09 00:00:00	15799.87	15998.50	12701.05	14607.49	16587.47	2.389091e+08	14402.98
15	2017-12-10 00:00:00	14601.01	15385.00	13011.00	14691.00	18487.98	2.631507e+08	14233.61
16	2017-12-11 00:00:00	14690.99	17270.00	14677.19	16470.00	16583.72	2.702038e+08	16293.32
17	2017-12-12 00:00:00	16470.00	17428.42	15967.29	16650.01	13517.89	2.278423e+08	16854.87
18	2017-12-13 00:00:00	16650.01	17107.03	15497.69	16250.00	17136.71	2.816405e+08	16434.93
19	2017-12-14 00:00:00	16245.02	16830.45	15852.69	16404.99	13409.52	2.192632e+08	16351.30
20	2017-12-15 00:00:00	16404.99	17934.00	16337.19	17471.50	18998.39	3.293370e+08	17335.00

	Timestamp	Open	High	Low	Close	Volume (BTC)	Volume (Currency)	Weighted Price
21	2017-12-16 00:00:00	17477.98	19377.00	17269.99	19187.78	9761.22	1.799060e+08	18430.69
22	2017-12-17 00:00:00	19187.78	19666.00	18465.00	18953.00	9749.25	1.863105e+08	19110.24
23	2017-12-18 00:00:00	18953.00	19220.00	17835.20	18940.57	14678.94	2.735335e+08	18634.42
24	2017-12-19 00:00:00	18940.58	19160.79	16831.26	17700.00	21528.14	3.872062e+08	17986.05
25	2017-12-20 00:00:00	17700.00	17950.00	15343.04	16466.98	31172.23	5.213506e+08	16724.84
26	2017-12-21 00:00:00	16466.98	17281.17	15005.00	15600.01	20377.86	3.267307e+08	16033.61
27	2017-12-22 00:00:00	15600.00	15795.61	11159.93	14009.79	57444.89	7.721430e+08	13441.46
28	2017-12-23 00:00:00	13980.00	15756.22	13496.48	14619.00	21786.41	3.221206e+08	14785.39
29	2017-12-24 00:00:00	14619.00	14619.10	12488.00	14157.87	18519.49	2.504764e+08	13525.02
30	2017-12-25 00:00:00	14107.87	14650.00	13210.00	13911.28	11564.54	1.613474e+08	13951.90
31	2017-12-26 00:00:00	13925.50	16147.87	13746.95	15764.44	15051.16	2.309226e+08	15342.51
32	2017-12-27 00:00:00	15764.45	16480.52	14484.00	15364.93	15643.75	2.418610e+08	15460.55
33	2017-12-28 00:00:00	15390.05	15474.19	13500.00	14470.07	16557.22	2.344286e+08	14158.69
34	2017-12-29 00:00:00	14436.99	15111.00	13998.00	14340.00	13505.70	1.957276e+08	14492.22
35	2017-12-30 00:00:00	14351.00	14463.28	12050.00	12640.00	21749.67	2.859856e+08	13148.96
36	2017-12-31 00:00:00	12640.00	14296.06	12491.21	13880.00	11583.42	1.545526e+08	13342.58
37	2018-01-01 00:00:00	13880.00	13941.75	12801.38	13443.41	7688.03	1.028157e+08	13373.48
38	2018-01-02 00:00:00	13394.20	15257.53	12910.58	14678.94	16299.67	2.291388e+08	14057.88
39	2018-01-03 00:00:00	14670.96	15500.00	14546.28	15155.62	12275.00	1.836394e+08	14960.44
40	2018-01-04 00:00:00	15155.62	15430.27	14192.37	15143.67	15004.02	2.221602e+08	14806.72
41	2018-01-05 00:00:00	15143.67	17200.00	14810.00	16928.00	16248.91	2.596959e+08	15982.35
42	2018-01-06 00:00:00	16927.99	17234.99	16220.00	17149.67	9501.02	1.583896e+08	16670.80
43	2018-01-07 00:00:00	17142.43	17149.97	15707.16	16124.02	8632.81	1.415551e+08	16397.33

	Timestamp	Open	High	Low	Close	Volume (BTC)	Volume (Currency)	Weighted Price
44	2018-01-08 00:00:00	16173.98	16300.00	13900.00	14999.99	16676.35	2.518778e+08	15103.89
45	2018-01-09 00:00:00	14999.99	15367.18	14123.97	14403.51	13913.52	2.045791e+08	14703.62
46	2018-01-10 00:00:00	14403.51	14900.00	13412.00	14890.02	18479.01	2.612107e+08	14135.53
47	2018-01-11 00:00:00	14899.99	14973.07	12800.00	13243.83	19630.08	2.668462e+08	13593.74
48	2018-01-12 00:00:00	13249.99	14152.19	12807.27	13781.41	13433.08	1.833993e+08	13652.81
49	2018-01-13 00:00:00	13829.28	14619.10	13789.42	14197.78	7488.99	1.065957e+08	14233.65
50	2018-01-14 00:00:00	14197.78	14365.81	13072.22	13647.99	7588.64	1.027838e+08	13544.44
51	2018-01-15 00:00:00	13647.99	14394.36	13429.25	13607.04	9444.64	1.310499e+08	13875.59
52	2018-01-16 00:00:00	13581.66	13607.04	10162.00	11386.34	38789.88	4.577258e+08	11800.13
53	2018-01-17 00:00:00	11393.97	11794.07	9222.00	11191.35	41356.19	4.331681e+08	10474.08
54	2018-01-18 00:00:00	11199.00	12146.00	10693.00	11247.57	22195.26	2.560826e+08	11537.72
55	2018-01-19 00:00:00	11290.90	12050.39	11025.18	11552.00	13203.26	1.518344e+08	11499.77
56	2018-01-20 00:00:00	11560.82	13052.12	11515.94	12775.99	10324.06	1.289121e+08	12486.57
57	2018-01-21 00:00:00	12782.99	12791.88	11100.00	11558.87	11596.44	1.371506e+08	11826.96
58	2018-01-22 00:00:00	11558.87	11910.78	10028.41	10808.99	17067.73	1.860289e+08	10899.45
59	2018-01-23 00:00:00	10810.00	10994.56	9927.54	10620.56	11216.60	1.175286e+08	10478.10

```
In [36]: window_size = 10
means = [btc['Close'][i:i+window_size].mean() for i in range(len(btc)-window_size)]
variances = [btc['Close'][i:i+window_size].var() for i in range(len(btc)-window_size)]
print("MEANS:", means)
print("VARIANCES:", variances)
```

```
MEANS: [10191.381, 10487.282000000001, 10922.526000000002, 11611.718, 12204.836, 12683.117, 13157.45, 13720.404999999999, 14298.206, 14798.206, 15277.397999999997, 15856.847999999998, 16413.275999999998, 16648.576999999997, 16962.634, 17271.885000000002, 17449.483, 17362.484000000004, 17098.462000000003, 16935.362, 16710.65, 16354.628, 16012.294, 15653.487, 15206.437, 14870.437, 14487.739000000001, 14315.738000000001, 14259.1, 14265.094000000001, 14364.869, 14488.108000000002, 14604.464000000002, 14782.938, 14948.332999999999, 15014.331999999999, 15190.683, 15291.685000000001, 15271.726999999999, 15181.973999999998, 15086.189999999999, 14936.622, 14604.526000000002, 14028.193, 13534.926000000001, 13159.684, 12874.533000000001, 12663.130000000001, 12494.634000000002, 12197.392, 11839.67]
VARIANCES: [841753.129787778, 748487.4360400002, 1466520.1021377777, 4356390.987328891, 5577071.32664889, 5334857.605512223, 4701413.816955556, 4972004.392761113, 4653185.998982223, 3766290.4434266663, 2670780.860706667, 1392291.3943733338, 1726862.895226666, 2378159.5921566663, 2772251.9248933326, 2110101.2079166663, 1406933.8945566663, 1671986.6912711104, 2787082.434839999, 3360618.8730622213, 4130420.2644222197, 4795982.823262221, 3812610.1504488876, 2755266.1212899988, 1488268.8015122216, 755368.4281788885, 862181.9912988889, 732888.2662622224, 803474.1918666669, 808627.3402266669, 884403.9029211116, 912060.5146400004, 1377467.4490933334, 1997604.7111511102, 2156166.876156666, 2110504.7346844436, 1491021.8810677773, 1298854.5780722213, 1384810.8456011105, 1583598.8814933328, 1680954.164799999, 1885555.211839999, 1518813.4811377767, 1580743.023467778, 1716527.9190044443, 1902918.9591155562, 1927856.0477344447, 1427923.8912444445, 1494398.1842933334, 1527962.0903955558, 1217428.3918222226]
```

```
In [34]: A = torch.FloatTensor([[[[7],[3]],[[11],[3.5]]]])
B = torch.FloatTensor([[[[7,9]],[[4.5,4.5]]]])
torch.matmul(A,B)
```

```
Out[34]:
(0 , , ,) =
  49.0000  63.0000
  21.0000  27.0000

(1 , , ,) =
  49.5000  49.5000
  15.7500  15.7500
[torch.FloatTensor of size 2x2x2]
```