EXAMPLE: How to build a dYdX Orderbook

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Tested on: Ubuntu Server 20.04.4 LTS, Windows 10 (See Appendix A), MacOS 12.3.1 (Monterey) (See Appendix B)

We will build the dYdX orderbook with 3 programs:

1) dydxob.py (the orderbook builder).

2) dydxtrades (the last-trade monitor), and

3) dydxob2.py (the orderbook displayer)

All programs are available at https://github.com/chiwalfrm/dydxexamples

PART 1: dydxob.py

1. First, create a 1GB ramdisk and mount it as /mnt/ramdisk/ as this program will write a LOT of files to it continuously. Set the permissions mask to 777.

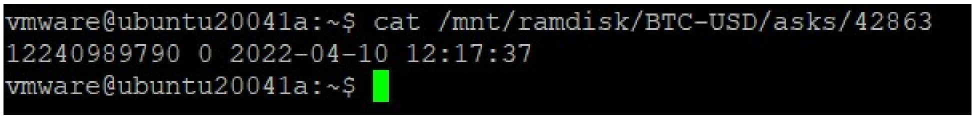
```
$ sudo mkdir -p /mnt/ramdisk

$ sudo mount -t tmpfs -o rw,size=1G tmpfs /mnt/ramdisk

$ sudo chmod 777 /mnt/ramdisk
```

2. Next, start the dydxob.py program. Invoke the program with the <MARKET> parameter (if omitted, it defaults to 'BTC-USD'). You can get a list of markets from https://api.dydx.exchange/v3/markets Markets with status = 'POST_ONLY' are not open for trading, and this program will not do anything. The -u option tells python not to buffer.

```
-u Force the stdout and stderr streams to be unbuffered.  This option
has no effect on the stdin stream.
```

```
$ nohup python3 -u dydxob.py BTC-USD > /mnt/ramdisk/dydxobBTC-USD.stdout 2>&1 &
```

3. This creates and continuously updates 'price' files in the directories <MARKET>/asks/ and <MARKET>/bids/. These price files each contain four elements: the 'offset' of the price, the 'size' at that price, and the 'date' (yyyy-mm-dd) and 'time' (hh:mm:ss) of the last update. The program logs to and automatically rotates the logfiles /mnt/ramdisk/dydxob<MARKET>.log so that each <MARKET> uses less than 5 MB.



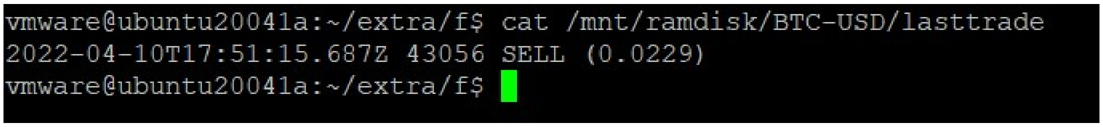
```
vmware@ubuntu20041a:~$ cat /mnt/ramdisk/BTC-USD/asks/42863
12240989790 0 2022-04-10 12:17:37
vmware@ubuntu20041a:~$
```

PART 2: dydxtrades.py

1. Start the dydxtrades.py program. Invoke the program with the <MARKET> parameter (if omitted, it defaults to 'BTC-USD').

```
$ nohup python3 -u dydxtrades.py BTC-USD > /mnt/ramdisk/dydxtradesBTC-USD.stdout 2>&1 &
```

2. This creates and continuously updates the file <MARKET>/lasttrade with the 'date/timestamp', 'price' and 'side' (BUY or SELL) of the last trade. The program logs to and automatically rotates the logfiles /mnt/ramdisk/dydxtrades<MARKET>.log so that each <MARKET> uses less than 5 MB.



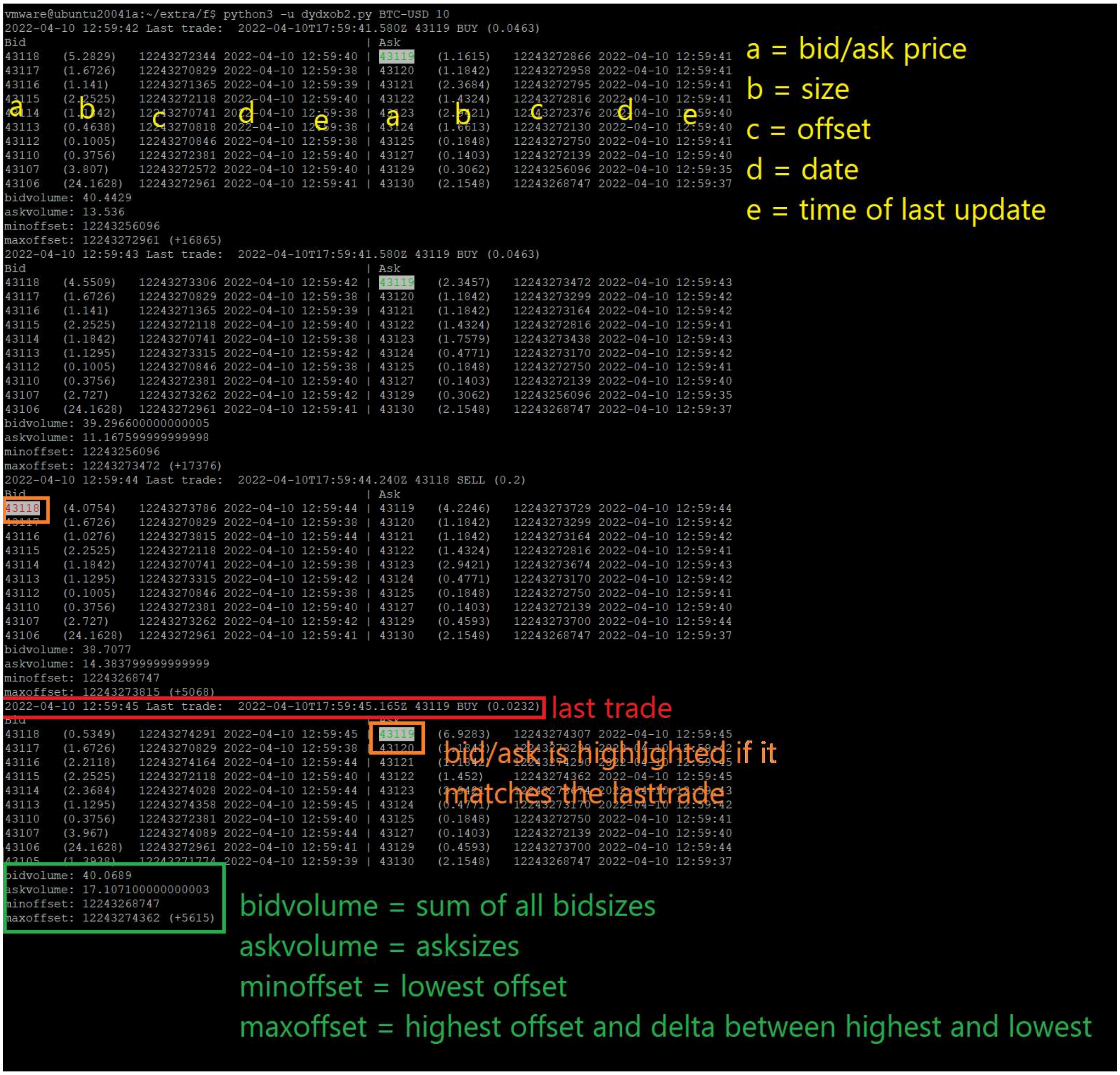
```
vmware@ubuntu20041a:~/extra/f$ cat /mnt/ramdisk/BTC-USD/lasttrade
2022-04-10T17:51:15.687Z 43056 SELL (0.0229)
vmware@ubuntu20041a:~/extra/f$
```

PART 3: dydxob2.py

1. Finally, start the dydxob2.py program. Invoke the program with the <MARKET> and <DEPTH> parameters. <MARKET> must be first parameter, and <DEPTH> must be second. If <DEPTH> is omitted, it defaults to '10'. If <MARKET> and <DEPTH> are both omitted, it defaults to 'BTC-USD' and '10'. This requires a 103-column terminal to look good.

```
$ python3 -u dydxob2.py BTC-USD 10
```

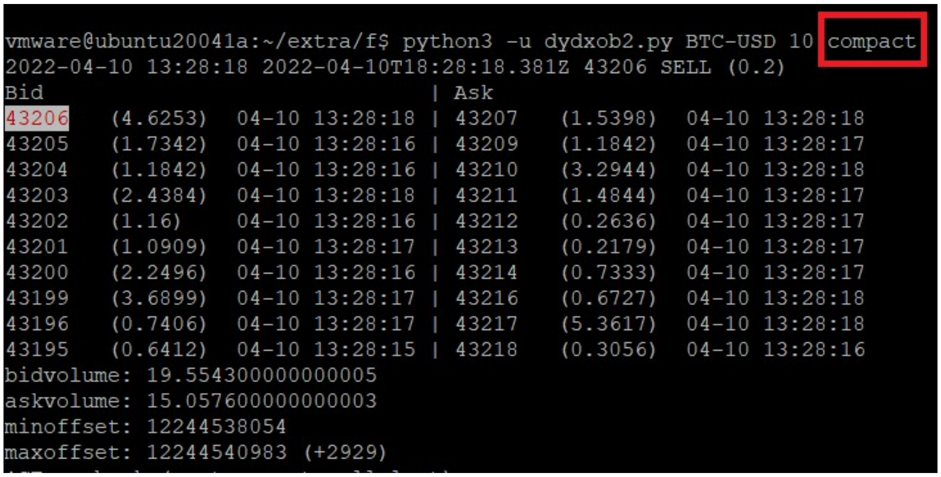
2. This will display and continuously update the order book on your screen.



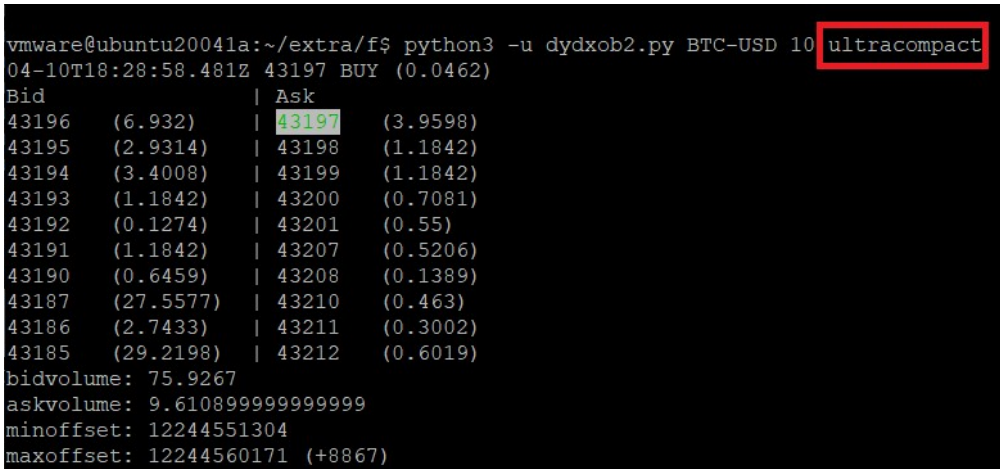
```
vmware@ubuntu20041a:~/extra/f$ python3 -u dydxob2.py BTC-USD 10
2022-04-10 12:59:42 Last trade:  2022-04-10T17:59:41.580Z 43119 BUY (0.0463)
Bid                                                 | Ask
43118   (5.2829)   12243272344 2022-04-10 12:59:40 | 43119   (1.1615)   12243272866 2022-04-10 12:59:41
43117   (1.6726)   12243270829 2022-04-10 12:59:38 | 43120   (1.1842)   12243272958 2022-04-10 12:59:41
43116   (1.141)    12243271365 2022-04-10 12:59:39 | 43121   (2.3684)   12243272795 2022-04-10 12:59:41
43115   (2.2525)   12243272118 2022-04-10 12:59:40 | 43122   (1.4324)   12243272816 2022-04-10 12:59:41
43114   (1.1842)   12243270741 2022-04-10 12:59:38 | 43123   (2.9421)   12243272376 2022-04-10 12:59:40
43113   (0.4638)   12243270818 2022-04-10 12:59:38 | 43124   (1.6613)   12243272130 2022-04-10 12:59:40
43112   (0.1005)   12243270846 2022-04-10 12:59:38 | 43125   (0.1848)   12243272750 2022-04-10 12:59:41
43110   (0.3756)   12243272381 2022-04-10 12:59:40 | 43127   (0.1403)   12243272139 2022-04-10 12:59:40
43107   (3.807)    12243272572 2022-04-10 12:59:40 | 43129   (0.3062)   12243256096 2022-04-10 12:59:35
43106   (24.1628)  12243272961 2022-04-10 12:59:41 | 43130   (2.1548)   12243268747 2022-04-10 12:59:37
bidvolume: 40.4429
askvolume: 13.536
minoffset: 12243256096
maxoffset: 12243272961 (+16865)
2022-04-10 12:59:43 Last trade:  2022-04-10T17:59:41.580Z 43119 BUY (0.0463)
Bid                                                 | Ask
43118   (4.5509)   12243273306 2022-04-10 12:59:42 | 43119   (2.3457)   12243273472 2022-04-10 12:59:43
43117   (1.6726)   12243270829 2022-04-10 12:59:38 | 43120   (1.1842)   12243273299 2022-04-10 12:59:42
43116   (1.141)    12243271365 2022-04-10 12:59:39 | 43121   (1.1842)   12243273164 2022-04-10 12:59:42
43115   (2.2525)   12243272118 2022-04-10 12:59:40 | 43122   (1.4324)   12243272816 2022-04-10 12:59:41
43114   (1.1842)   12243270741 2022-04-10 12:59:38 | 43123   (1.7579)   12243273438 2022-04-10 12:59:43
43113   (1.1295)   12243273315 2022-04-10 12:59:42 | 43124   (0.4771)   12243273170 2022-04-10 12:59:42
43112   (0.1005)   12243270846 2022-04-10 12:59:38 | 43125   (0.1848)   12243272750 2022-04-10 12:59:41
43110   (0.3756)   12243272381 2022-04-10 12:59:40 | 43127   (0.1403)   12243272139 2022-04-10 12:59:40
43107   (2.727)    12243273262 2022-04-10 12:59:42 | 43129   (0.3062)   12243256096 2022-04-10 12:59:35
43106   (24.1628)  12243272961 2022-04-10 12:59:41 | 43130   (2.1548)   12243268747 2022-04-10 12:59:37
bidvolume: 39.296600000000005
askvolume: 11.167599999999998
minoffset: 12243256096
maxoffset: 12243273472 (+17376)
2022-04-10 12:59:44 Last trade:  2022-04-10T17:59:44.240Z 43118 SELL (0.2)
Bid                                                 | Ask
43118   (4.0754)   12243273786 2022-04-10 12:59:44 | 43119   (4.2246)   12243273729 2022-04-10 12:59:44
43117   (1.6726)   12243270829 2022-04-10 12:59:38 | 43120   (1.1842)   12243273299 2022-04-10 12:59:42
43116   (1.0276)   12243273815 2022-04-10 12:59:44 | 43121   (1.1842)   12243273164 2022-04-10 12:59:42
43115   (2.2525)   12243272118 2022-04-10 12:59:40 | 43122   (1.4324)   12243272816 2022-04-10 12:59:41
43114   (1.1842)   12243270741 2022-04-10 12:59:38 | 43123   (2.9421)   12243273674 2022-04-10 12:59:43
43113   (1.1295)   12243273315 2022-04-10 12:59:42 | 43124   (0.4771)   12243273170 2022-04-10 12:59:42
43112   (0.1005)   12243270846 2022-04-10 12:59:38 | 43125   (0.1848)   12243272750 2022-04-10 12:59:41
43110   (0.3756)   12243272381 2022-04-10 12:59:40 | 43127   (0.1403)   12243272139 2022-04-10 12:59:40
43107   (2.727)    12243273262 2022-04-10 12:59:42 | 43129   (0.4593)   12243273700 2022-04-10 12:59:44
43106   (24.1628)  12243272961 2022-04-10 12:59:41 | 43130   (2.1548)   12243268747 2022-04-10 12:59:37
bidvolume: 38.7077
askvolume: 14.383799999999999
minoffset: 12243268747
maxoffset: 12243273815 (+5068)
2022-04-10 12:59:45 Last trade:  2022-04-10T17:59:45.165Z 43119 BUY (0.0232)
Bid                                                 | Ask
43118   (0.5349)   12243274291 2022-04-10 12:59:45 | 43119   (6.9283)   12243274307 2022-04-10 12:59:45
43117   (1.6726)   12243270829 2022-04-10 12:59:38 | 43120   (1.1842)   12243273299 2022-04-10 12:59:42
43116   (2.2118)   12243274164 2022-04-10 12:59:44 | 43121   (1.1842)   12243274290 2022-04-10 12:59:45
43115   (2.2525)   12243272118 2022-04-10 12:59:40 | 43122   (1.452)    12243274362 2022-04-10 12:59:45
43114   (2.3684)   12243274028 2022-04-10 12:59:44 | 43123   (2.9421)   12243273674 2022-04-10 12:59:43
43113   (1.1295)   12243274358 2022-04-10 12:59:45 | 43124   (0.4771)   12243273170 2022-04-10 12:59:42
43110   (0.3756)   12243272381 2022-04-10 12:59:40 | 43125   (0.1848)   12243272750 2022-04-10 12:59:41
43107   (3.967)    12243274089 2022-04-10 12:59:44 | 43127   (0.1403)   12243272139 2022-04-10 12:59:40
43106   (24.1628)  12243272961 2022-04-10 12:59:41 | 43129   (0.4593)   12243273700 2022-04-10 12:59:44
43105   (1.3938)   12243271774 2022-04-10 12:59:39 | 43130   (2.1548)   12243268747 2022-04-10 12:59:37
bidvolume: 40.0689
askvolume: 17.107100000000003
minoffset: 12243268747
maxoffset: 12243274362 (+5615)
```

a
b
c
d
e
a
b
c
d
e
a = bid/ask price
b = size
c = offset
d = date
e = time of last update
last trade
bid/ask is highlighted if it matches the lasttrade
bidvolume = sum of all bidsizes
askvolume = asksizes
minoffset = lowest offset
maxoffset = highest offset and delta between highest and lowest

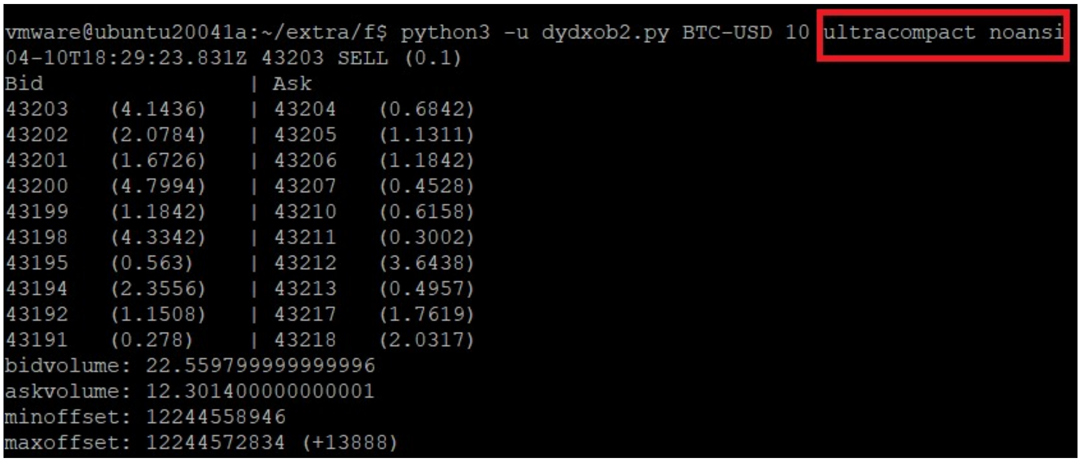
3. (Optional) There are a few optional parameters to customize the display to your preference.
    a. compact – Removes ‘offset’ values from the display (67-column terminal required)
    b. ultracompact – Removes ‘offset’ and year part of the ‘date’ values (39-column terminal required)
    c. noansi – Removes colored values (this must be the last parameter)



```
vmware@ubuntu20041a:~/extra/f$ python3 -u dydxob2.py BTC-USD 10 compact
2022-04-10 13:28:18 2022-04-10T18:28:18.381Z 43206 SELL (0.2)
Bid                               | Ask
43206   (4.6253)  04-10 13:28:18 | 43207   (1.5398)  04-10 13:28:18
43205   (1.7342)  04-10 13:28:16 | 43209   (1.1842)  04-10 13:28:17
43204   (1.1842)  04-10 13:28:16 | 43210   (3.2944)  04-10 13:28:18
43203   (2.4384)  04-10 13:28:18 | 43211   (1.4844)  04-10 13:28:17
43202   (1.16)    04-10 13:28:16 | 43212   (0.2636)  04-10 13:28:17
43201   (1.0909)  04-10 13:28:17 | 43213   (0.2179)  04-10 13:28:17
43200   (2.2496)  04-10 13:28:16 | 43214   (0.7333)  04-10 13:28:17
43199   (3.6899)  04-10 13:28:17 | 43216   (0.6727)  04-10 13:28:18
43196   (0.7406)  04-10 13:28:17 | 43217   (5.3617)  04-10 13:28:18
43195   (0.6412)  04-10 13:28:15 | 43218   (0.3056)  04-10 13:28:16
bidvolume: 19.554300000000005
askvolume: 15.057600000000003
minoffset: 12244538054
maxoffset: 12244540983 (+2929)
```



```
vmware@ubuntu20041a:~/extra/f$ python3 -u dydxob2.py BTC-USD 10 ultracompact
04-10T18:28:58.481Z 43197 BUY (0.0462)
Bid                | Ask
43196   (6.932)    | 43197   (3.9598)
43195   (2.9314)   | 43198   (1.1842)
43194   (3.4008)   | 43199   (1.1842)
43193   (1.1842)   | 43200   (0.7081)
43192   (0.1274)   | 43201   (0.55)
43191   (1.1842)   | 43207   (0.5206)
43190   (0.6459)   | 43208   (0.1389)
43187   (27.5577)  | 43210   (0.463)
43186   (2.7433)   | 43211   (0.3002)
43185   (29.2198)  | 43212   (0.6019)
bidvolume: 75.9267
askvolume: 9.610899999999999
minoffset: 12244551304
maxoffset: 12244560171 (+8867)
```



```
vmware@ubuntu20041a:~/extra/f$ python3 -u dydxob2.py BTC-USD 10 ultracompact noansi
04-10T18:29:23.831Z 43203 SELL (0.1)
Bid                | Ask
43203   (4.1436)   | 43204   (0.6842)
43202   (2.0784)   | 43205   (1.1311)
43201   (1.6726)   | 43206   (1.1842)
43200   (4.7994)   | 43207   (0.4528)
43199   (1.1842)   | 43210   (0.6158)
43198   (4.3342)   | 43211   (0.3002)
43195   (0.563)    | 43212   (3.6438)
43194   (2.3556)   | 43213   (0.4957)
43192   (1.1508)   | 43217   (1.7619)
43191   (0.278)    | 43218   (2.0317)
bidvolume: 22.559799999999996
askvolume: 12.301400000000001
minoffset: 12244558946
maxoffset: 12244572834 (+13888)
```

PART 4: (Optional) Launching multiple orderbooks

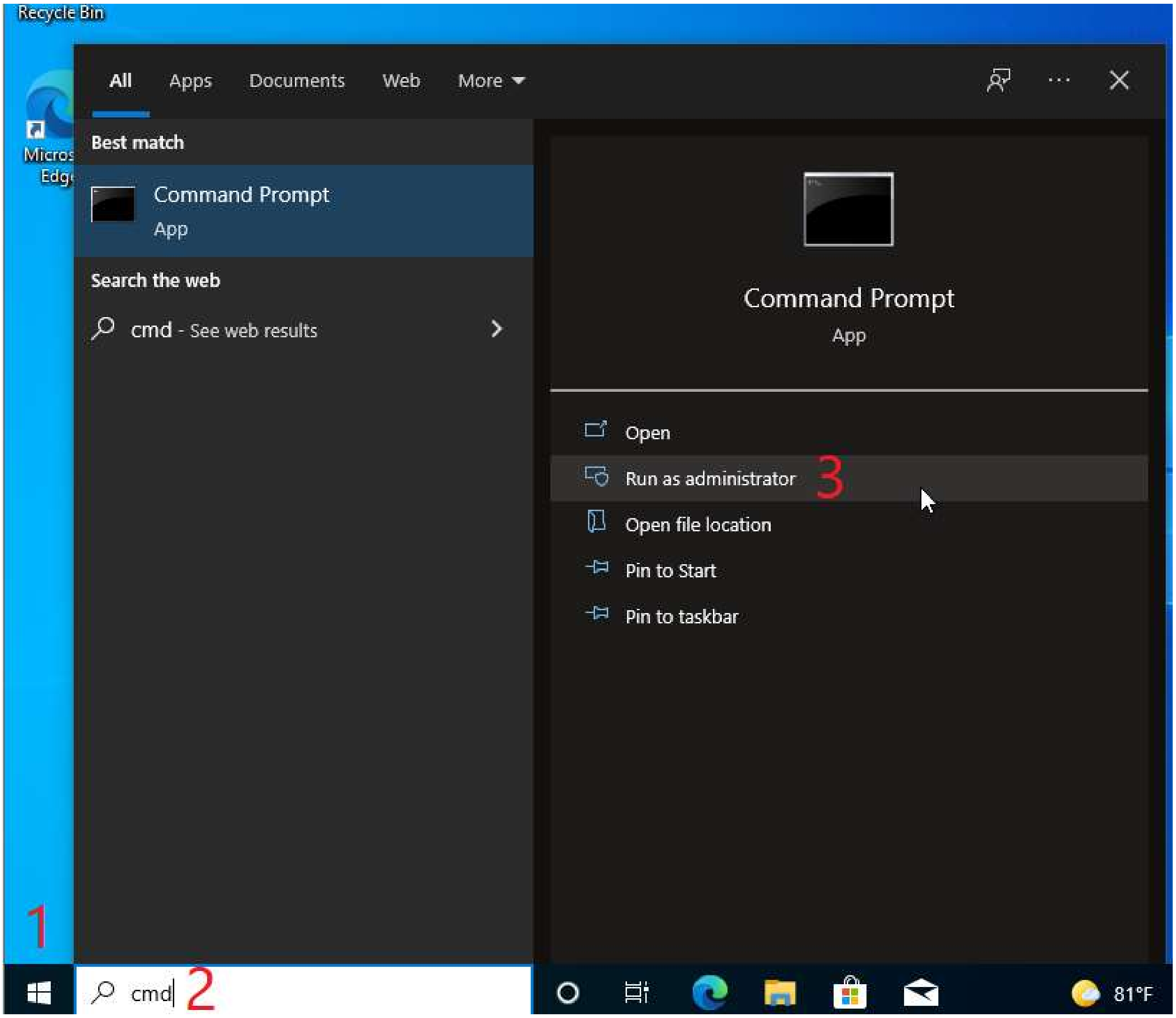
1. You can launch this program for multiple dYdX markets with this simple command.

```
for s1 in 1INCH-USD AAVE-USD  ADA-USD ALGO-USD ATOM-USD AVAX-USD BCH-USD BTC-USD COMP-USD \
        CRV-USD DOGE-USD DOT-USD ENJ-USD EOS-USD ETC-USD ETH-USD FIL-USD LINK-USD LTC-USD \
        MATIC-USD MKR-USD SNX-USD SOL-USD SUSHI-USD UMA-USD UNI-USD XLM-USD XMR-USD YFI-USD \
        ZEC-USD ZRX-USD
do
        nohup python3 -u dydxob.py $s1 > /mnt/ramdisk/dydxob$s1.stdout 2>&1 &
        nohup python3 -u dydxtrades.py $s1 > /mnt/ramdisk/dydxob$s1.stdout 2>&1 &
        sleep 1
done
```

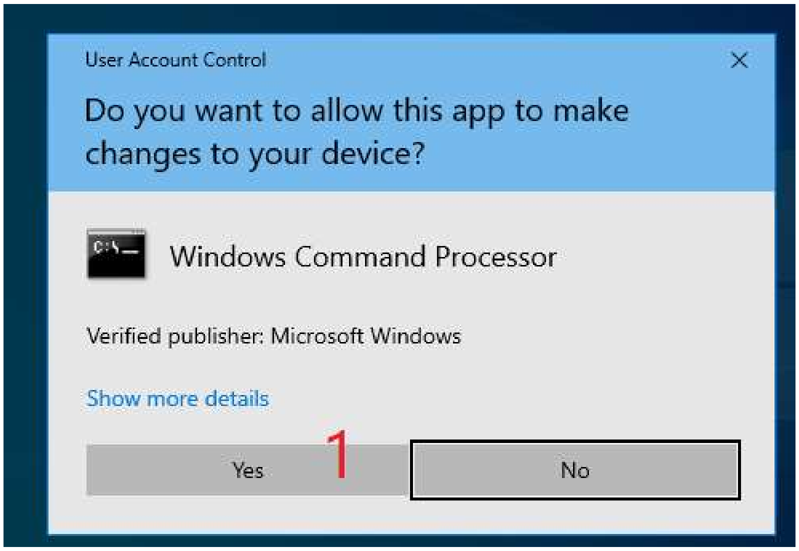
APPENDIX A: Windows 10

(Win10) PART 1: Install Windows Subsystem for Linux (WSL)

1) Start Command Prompt as Administrator:
    a. Click the Windows button.
    b. Type ‘cmd’.
    c. Click on ‘Run as administrator’.



d. Click Yes.



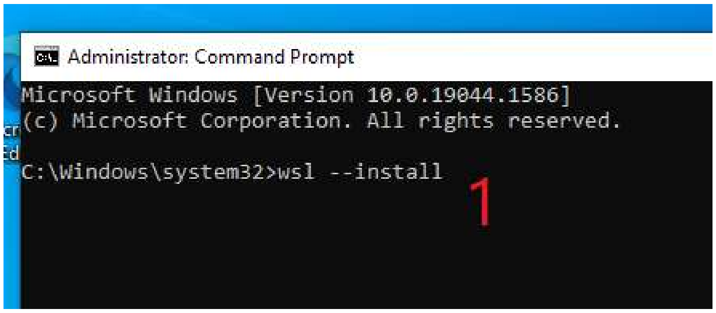
User Account Control

Do you want to allow this app to make changes to your device?

Windows Command Processor

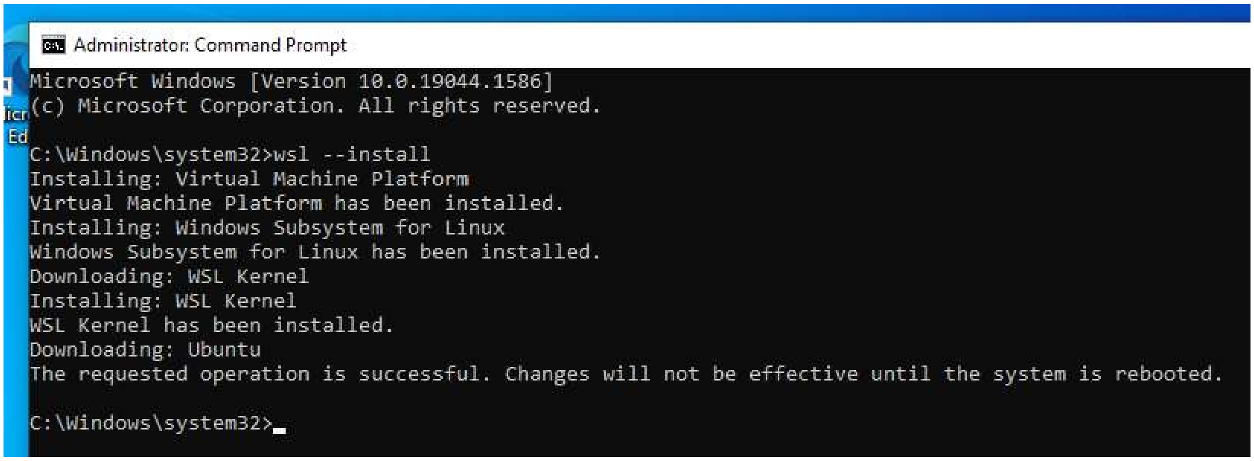
Verified publisher: Microsoft Windows

2) Type wsl --install and wait.



Administrator: Command Prompt

```
Microsoft Windows [Version 10.0.19044.1586]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\system32>wsl --install
```



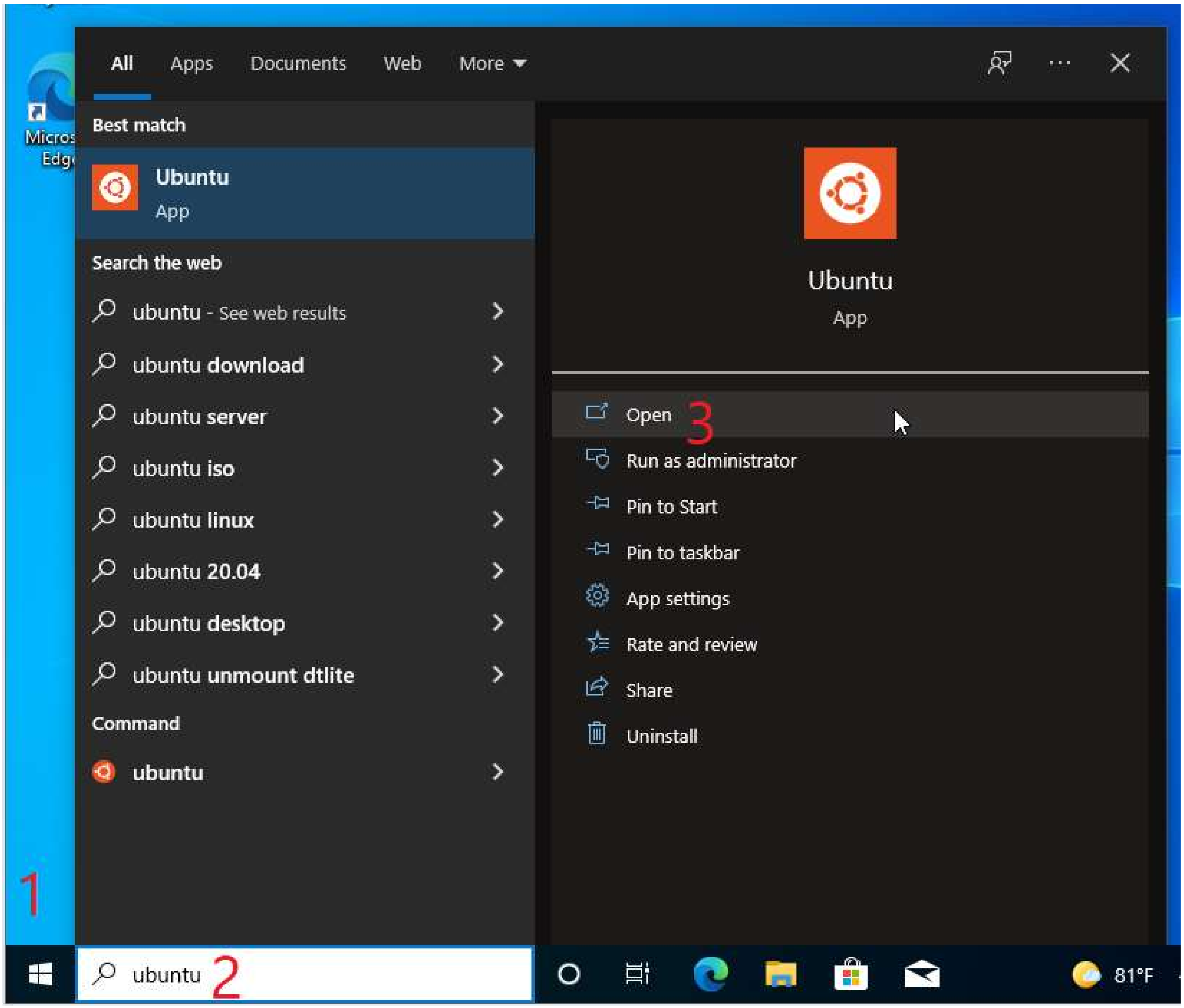
Administrator: Command Prompt

```
Microsoft Windows [Version 10.0.19044.1586]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\system32>wsl --install
Installing: Virtual Machine Platform
Virtual Machine Platform has been installed.
Installing: Windows Subsystem for Linux
Windows Subsystem for Linux has been installed.
Downloading: WSL Kernel
Installing: WSL Kernel
WSL Kernel has been installed.
Downloading: Ubuntu
The requested operation is successful. Changes will not be effective until the system is rebooted.

C:\Windows\system32>_
```

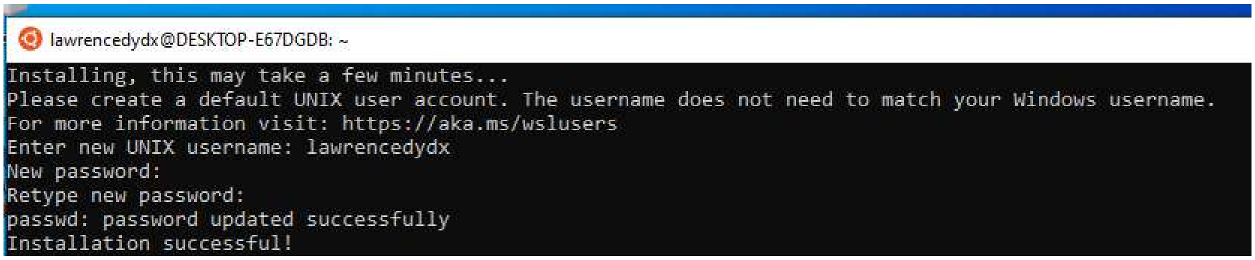
3) Reboot.

(Win10) PART 2: Launch WSL

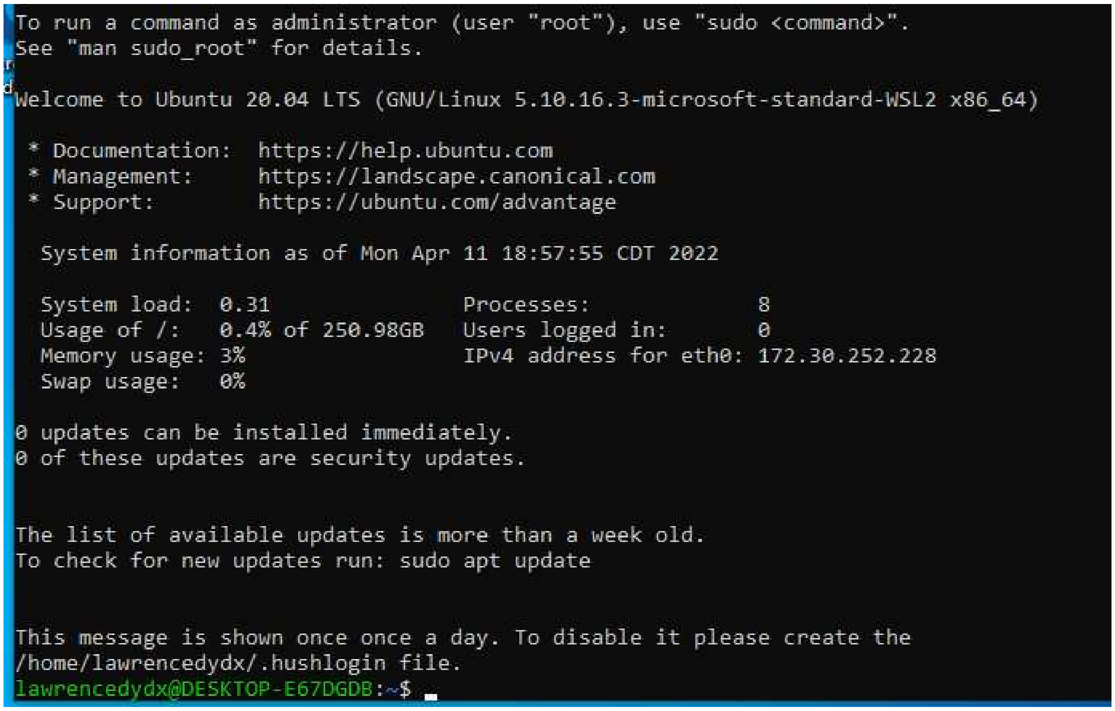
1) Start Ubuntu:
    a. Click the Windows button.
    b. Type ‘ubuntu’.
    c. Click on ‘Open’.



2) (First time) Enter username and password (twice).


lawrencedydx@DESKTOP-E67DGDB: ~

```
Installing, this may take a few minutes...
Please create a default UNIX user account. The username does not need to match your Windows username.
For more information visit: https://aka.ms/wslusers
Enter new UNIX username: lawrencedydx
New password:
Retype new password:
passwd: password updated successfully
Installation successful!
```



```
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

Welcome to Ubuntu 20.04 LTS (GNU/Linux 5.10.16.3-microsoft-standard-WSL2 x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

  System information as of Mon Apr 11 18:57:55 CDT 2022

  System load:  0.31               Processes:             8
  Usage of /:   0.4% of 250.98GB   Users logged in:       0
  Memory usage: 3%                 IPv4 address for eth0: 172.30.252.228
  Swap usage:   0%

0 updates can be installed immediately.
0 of these updates are security updates.


The list of available updates is more than a week old.
To check for new updates run: sudo apt update


This message is shown once once a day. To disable it please create the
/home/lawrencedydx/.hushlogin file.
lawrencedydx@DESKTOP-E67DGDB:~$
```

(Win10) PART 3: Update WSL

1) Update WSL with the following commands:

```
$ sudo apt-get update

$ sudo apt-get upgrade
```

2) Install required components:

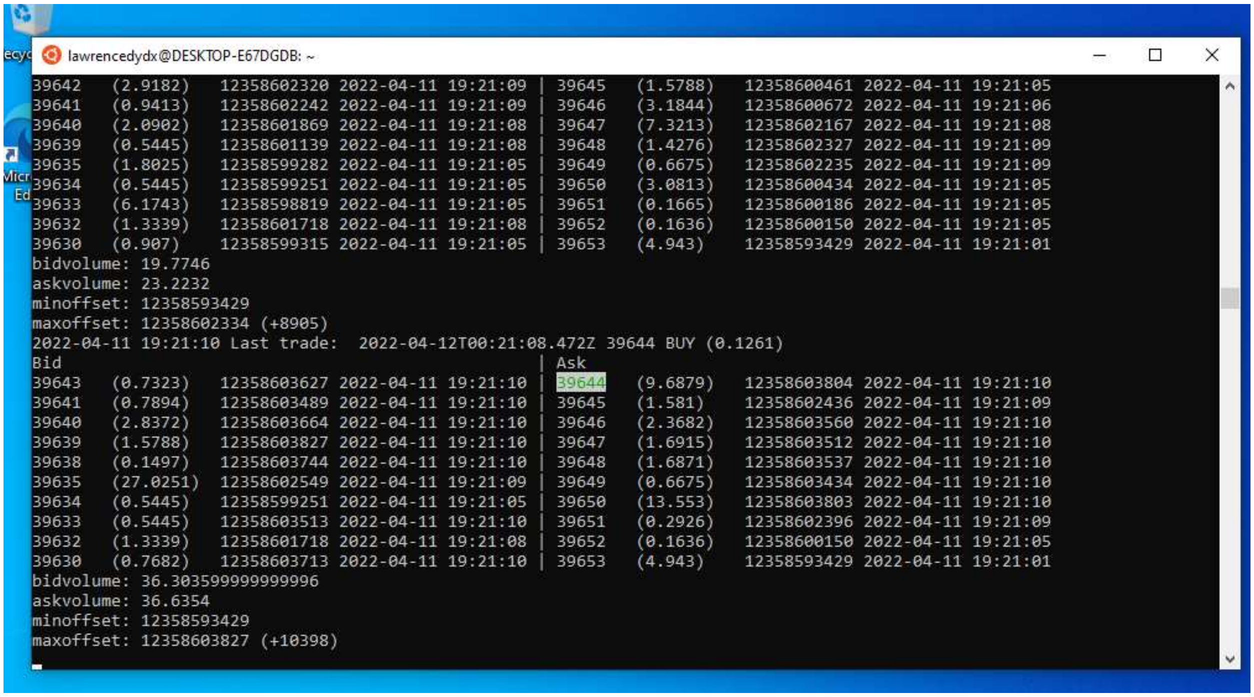
```
$ sudo apt-get install python3-pip

$ pip3 install websocket-client
```

(Win10) PART 4: Download dYdX order book files

1) You can download the 3 dYdX order book files with the following commands:

```
$ wget https://raw.githubusercontent.com/chiwalfrm/dydxexamples/main/dydxob.py

$ wget https://raw.githubusercontent.com/chiwalfrm/dydxexamples/main/dydxtrades.py

$ wget https://raw.githubusercontent.com/chiwalfrm/dydxexamples/main/dydxob2.py
```

2) The rest of the guide follows the Linux version. Here is a picture of it running on Windows.

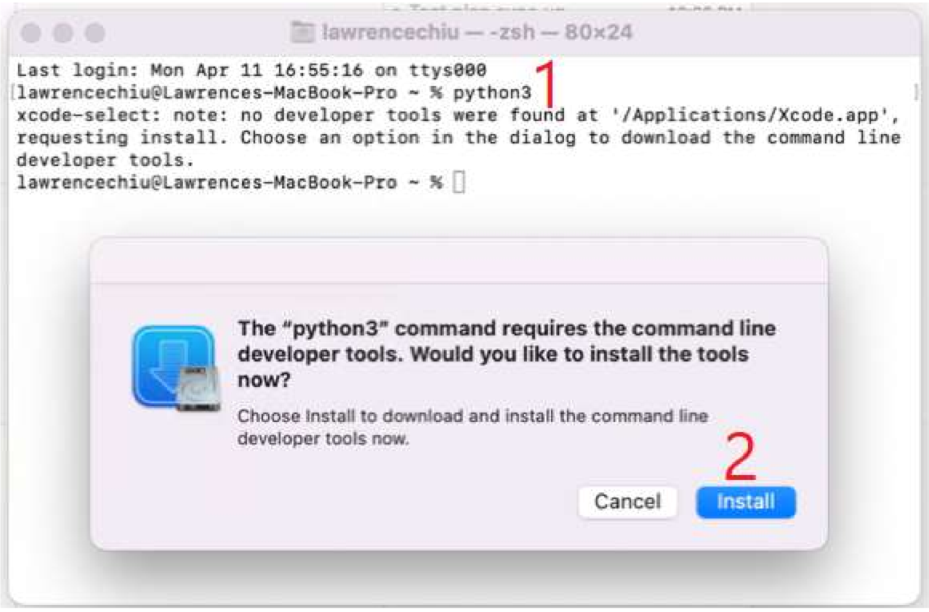


```
39642   (2.9182)   12358602320 2022-04-11 19:21:09 | 39645   (1.5788)   12358600461 2022-04-11 19:21:05
39641   (0.9413)   12358602242 2022-04-11 19:21:09 | 39646   (3.1844)   12358600672 2022-04-11 19:21:06
39640   (2.0902)   12358601869 2022-04-11 19:21:08 | 39647   (7.3213)   12358602167 2022-04-11 19:21:08
39639   (0.5445)   12358601139 2022-04-11 19:21:08 | 39648   (1.4276)   12358602327 2022-04-11 19:21:09
39635   (1.8025)   12358599282 2022-04-11 19:21:05 | 39649   (0.6675)   12358602235 2022-04-11 19:21:09
39634   (0.5445)   12358599251 2022-04-11 19:21:05 | 39650   (3.0813)   12358600434 2022-04-11 19:21:05
39633   (6.1743)   12358598819 2022-04-11 19:21:05 | 39651   (0.1665)   12358600186 2022-04-11 19:21:05
39632   (1.3339)   12358601718 2022-04-11 19:21:08 | 39652   (0.1636)   12358600150 2022-04-11 19:21:05
39630   (0.907)    12358599315 2022-04-11 19:21:05 | 39653   (4.943)    12358593429 2022-04-11 19:21:01
bidvolume: 19.7746
askvolume: 23.2232
minoffset: 12358593429
maxoffset: 12358602334 (+8905)
2022-04-11 19:21:10 Last trade:  2022-04-12T00:21:08.472Z 39644 BUY (0.1261)
Bid                                                | Ask
39643   (0.7323)   12358603627 2022-04-11 19:21:10 | 39644   (9.6879)   12358603804 2022-04-11 19:21:10
39641   (0.7894)   12358603489 2022-04-11 19:21:10 | 39645   (1.581)    12358602436 2022-04-11 19:21:09
39640   (2.8372)   12358603664 2022-04-11 19:21:10 | 39646   (2.3682)   12358603560 2022-04-11 19:21:10
39639   (1.5788)   12358603827 2022-04-11 19:21:10 | 39647   (1.6915)   12358603512 2022-04-11 19:21:10
39638   (0.1497)   12358603744 2022-04-11 19:21:10 | 39648   (1.6871)   12358603537 2022-04-11 19:21:10
39635   (27.0251)  12358602549 2022-04-11 19:21:09 | 39649   (0.6675)   12358603434 2022-04-11 19:21:10
39634   (0.5445)   12358599251 2022-04-11 19:21:05 | 39650   (13.553)   12358603803 2022-04-11 19:21:10
39633   (0.5445)   12358603513 2022-04-11 19:21:10 | 39651   (0.2926)   12358602396 2022-04-11 19:21:09
39632   (1.3339)   12358601718 2022-04-11 19:21:08 | 39652   (0.1636)   12358600150 2022-04-11 19:21:05
39630   (0.7682)   12358603713 2022-04-11 19:21:10 | 39653   (4.943)    12358593429 2022-04-11 19:21:01
bidvolume: 36.303599999999996
askvolume: 36.6354
minoffset: 12358593429
maxoffset: 12358603827 (+10398)
```

APPENDIX B: MacOS

(MacOS) PART 1: Install Python3

1) Launch Terminal and type ‘python3’. Then click Install.



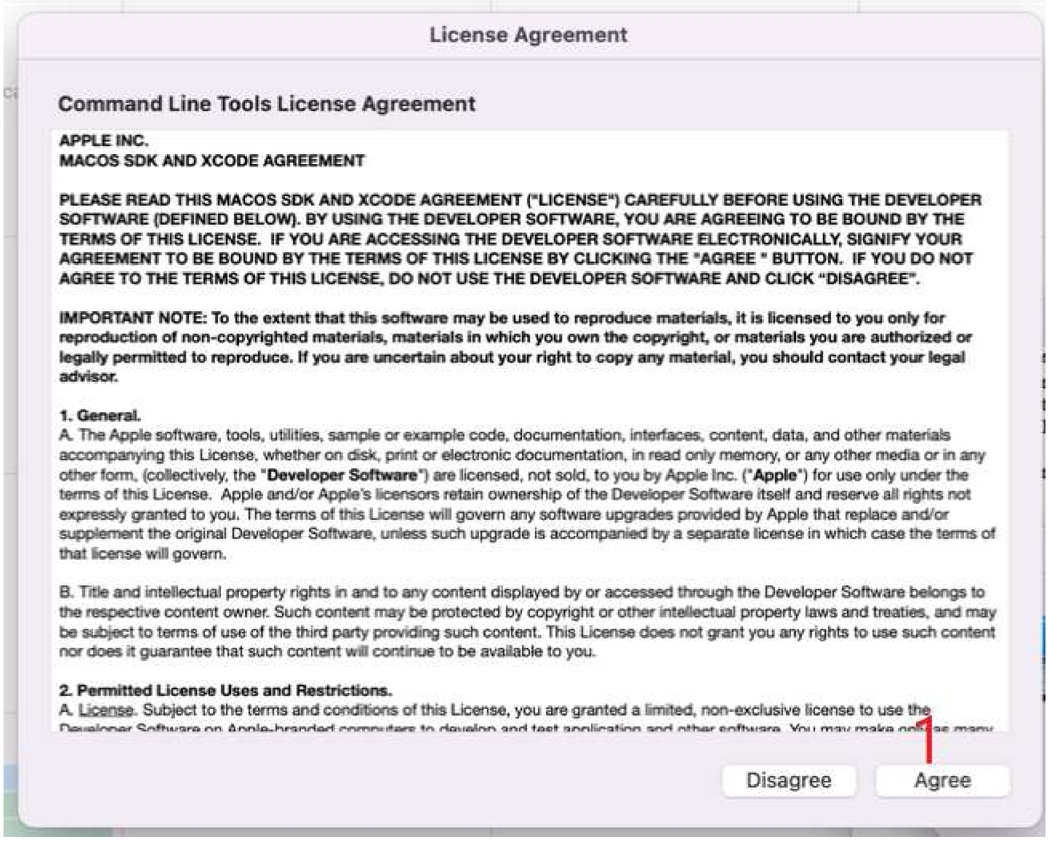
lawrencechiu — -zsh — 80×24

```
Last login: Mon Apr 11 16:55:16 on ttys000
lawrencechiu@Lawrences-MacBook-Pro ~ % python3
xcode-select: note: no developer tools were found at '/Applications/Xcode.app',
requesting install. Choose an option in the dialog to download the command line
developer tools.
lawrencechiu@Lawrences-MacBook-Pro ~ % 
```

The “python3” command requires the command line developer tools. Would you like to install the tools now?

Choose Install to download and install the command line developer tools now.

2) Click Agree.



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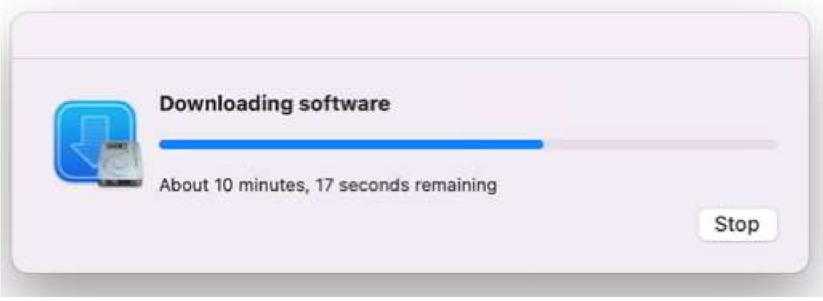
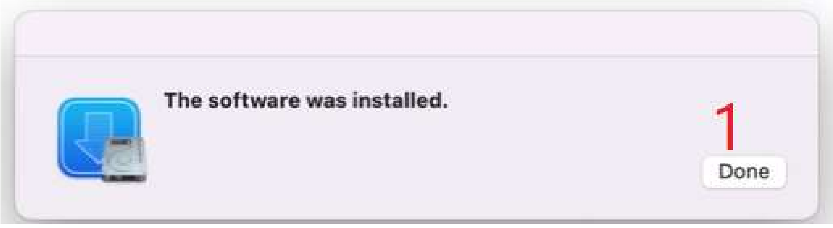
3) Wait.



4) Click Done.



(MacOS) PART 2: Install components

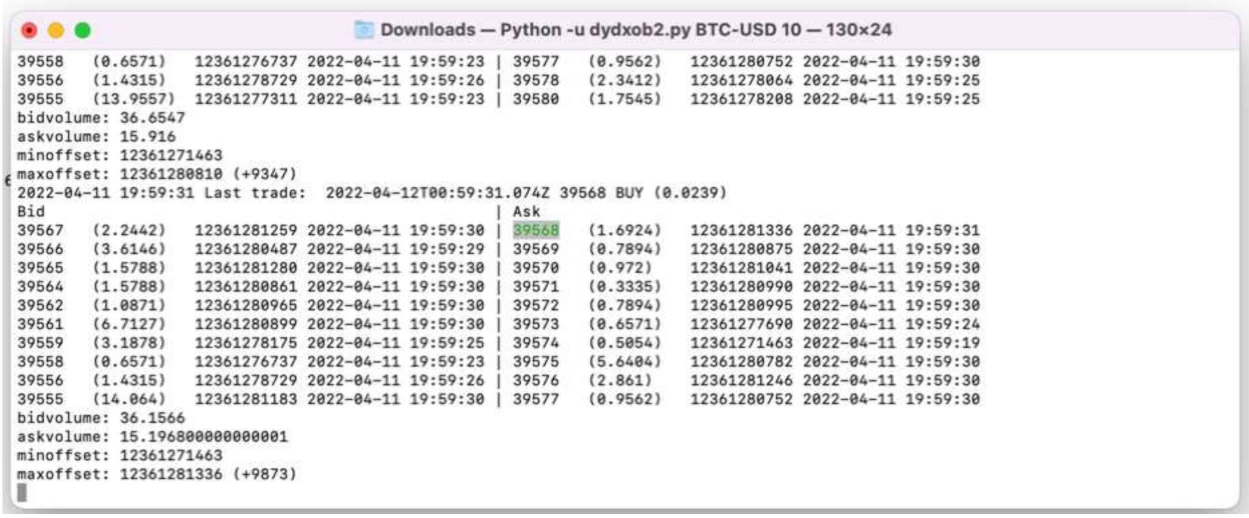
1) Install required components:

```
$ pip3 install websocket-client
```

2) The rest of the guide follows the Linux version except the command to create the ramdisk is different:

```
$ diskutil erasevolume HFS+ "RAMDisk" `hdiutil attach -nomount ram://2097152`
```

3) Here is a picture of it running on MacOS.



Downloads — Python -u dydxob2.py BTC-USD 10 — 130×24

```
39558    (0.6571)    12361276737 2022-04-11 19:59:23 | 39577    (0.9562)    12361280752 2022-04-11 19:59:30
39556    (1.4315)    12361278729 2022-04-11 19:59:26 | 39578    (2.3412)    12361278064 2022-04-11 19:59:25
39555    (13.9557)   12361277311 2022-04-11 19:59:23 | 39580    (1.7545)    12361278208 2022-04-11 19:59:25
bidvolume: 36.6547
askvolume: 15.916
minoffset: 12361271463
maxoffset: 12361280810 (+9347)
2022-04-11 19:59:31 Last trade:  2022-04-12T00:59:31.074Z 39568 BUY (0.0239)
Bid                                                  | Ask
39567    (2.2442)    12361281259 2022-04-11 19:59:30 | 39568    (1.6924)    12361281336 2022-04-11 19:59:31
39566    (3.6146)    12361280487 2022-04-11 19:59:29 | 39569    (0.7894)    12361280875 2022-04-11 19:59:30
39565    (1.5788)    12361281280 2022-04-11 19:59:30 | 39570    (0.972)     12361281041 2022-04-11 19:59:30
39564    (1.5788)    12361280861 2022-04-11 19:59:30 | 39571    (0.3335)    12361280990 2022-04-11 19:59:30
39562    (1.0871)    12361280965 2022-04-11 19:59:30 | 39572    (0.7894)    12361280995 2022-04-11 19:59:30
39561    (6.7127)    12361280899 2022-04-11 19:59:30 | 39573    (0.6571)    12361277690 2022-04-11 19:59:24
39559    (3.1878)    12361278175 2022-04-11 19:59:25 | 39574    (0.5054)    12361271463 2022-04-11 19:59:19
39558    (0.6571)    12361276737 2022-04-11 19:59:23 | 39575    (5.6404)    12361280782 2022-04-11 19:59:30
39556    (1.4315)    12361278729 2022-04-11 19:59:26 | 39576    (2.861)     12361281246 2022-04-11 19:59:30
39555    (14.064)    12361281183 2022-04-11 19:59:30 | 39577    (0.9562)    12361280752 2022-04-11 19:59:30
bidvolume: 36.1566
askvolume: 15.196800000000001
minoffset: 12361271463
maxoffset: 12361281336 (+9873)
```

<END>