EXAMPLE: How to generate and update dYdX Trading Rewards reports

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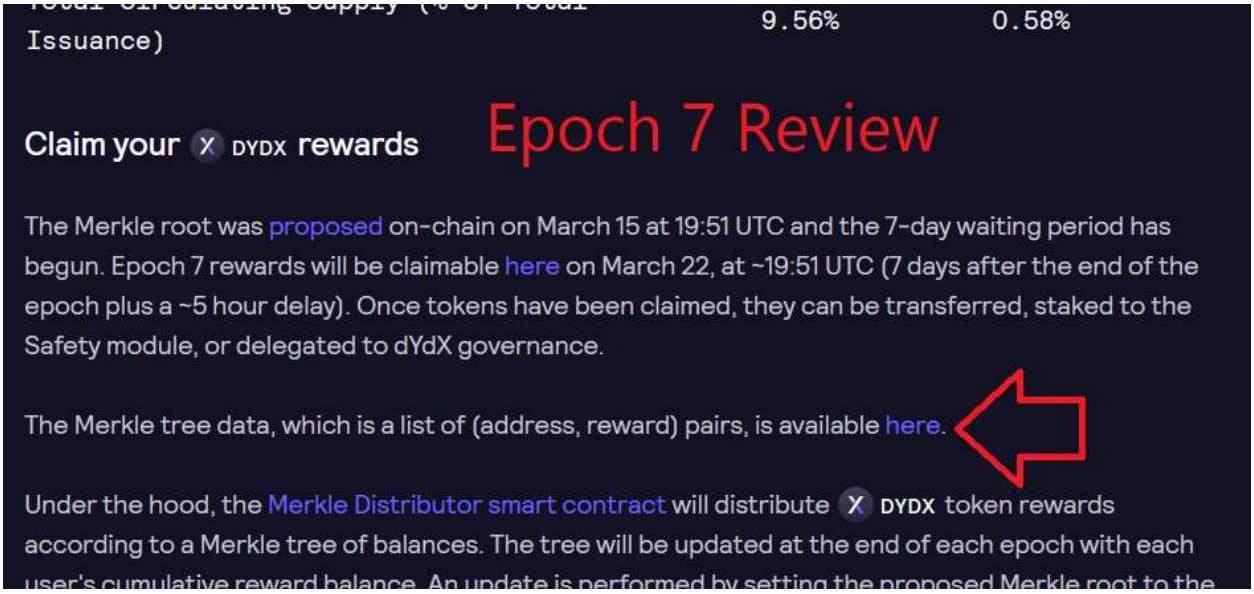
Tested on: Ubuntu Server 20.04.4 LTS, Windows 10 (See Appendix A), MacOS 12.3.1 (Monterey) (See Appendix B)

We will generate dYdX Trading Rewards reports with the update_rewards.sh shell script. In addition, you will need Merkle tree files from epoch 0 up to the last epoch. Links to these are provided in the dYdX Foundation reviews. For example, for epoch 7, the review is at https://dydx.foundation/blog/en/epoch-7 and the link to the Merkle tree file is at https://gateway.ipfs.io/ipfs/bafybeiauyvb7mxv3xjuu2wlxojzkyr27nsekkpr52un5hywi26s3ohfs2m

Each Merkle tree file must be named epoch<#>.json where <#> is the epoch number.



The program and epoch files (up to epoch 8) are available at https://github.com/chiwalfrm/dydxexamples

PART 1: The First Time

1. If this is the first time running it, your directory should have just the script and the epoch files.

```
vmware@ubuntu20041a: ~/update_rewards
vmware@ubuntu20041a:~/update_rewards$ ls -al
total 23036
drwxrwxr-x  2 vmware vmware    4096 Apr 16 20:08 .
drwx------ 27 vmware vmware    4096 Apr 16 20:08 ..
-rw-rw-r--  1 vmware vmware 2323419 Dec 31  1969 epoch0.json
-rw-rw-r--  1 vmware vmware 2560115 Dec 31  1969 epoch1.json
-rw-rw-r--  1 vmware vmware 2908914 Dec 31  1969 epoch2.json
-rw-rw-r--  1 vmware vmware 3005265 Dec 31  1969 epoch3.json
-rw-rw-r--  1 vmware vmware 3087872 Dec 31  1969 epoch4.json
-rw-rw-r--  1 vmware vmware 3137100 Dec 31  1969 epoch5.json
-rw-rw-r--  1 vmware vmware 3215228 Dec 31  1969 epoch6.json
-rw-rw-r--  1 vmware vmware 3320103 Dec 31  1969 epoch7.json
-rwxr-xr-x  1 vmware vmware    5534 Apr 16 19:48 update_rewards.sh
vmware@ubuntu20041a:~/update_rewards$
```

2. Note: On Linux, you will be prompted for your password in order to execute a few sudo commands to set up a ramdisk. If you are not comfortable providing your password, remove the sudo commands and run them yourself (before running the script). The commands are:

```
if [ "`uname`" = "Darwin" ]
then
        diskutil erasevolume HFS+ "epochdisk" `hdiutil attach -nomount ram://2097152`
        TMPFOLDER=/Volumes/epochdisk
else
        sudo mkdir -p /mnt/epochdisk
        sudo mount -t tmpfs -o rw,size=1G tmpfs /mnt/epochdisk
        sudo chmod 777 /mnt/epochdisk
        TMPFOLDER=/mnt/epochdisk
fi
mkdir -p $TMPFOLDER/update_rewards$$/output
```

comment these lines out if you want to run them yourself

```
cleanup ()
{
        if [ "`uname`" = "Darwin" ]
        then
                hdiutil detach $TMPFOLDER
        else
                sudo umount $TMPFOLDER
        fi
}

pid=$$
trap 'echo; echo "Ctrl-C detected. Cleaning up..."; kill -TERM `ps h --ppid $pid -o pid`; cleanup; exit' INT HUP

prepare_epoch_file ()
```

If commented out, run this command at the end when finished ($TMPFOLDER = /mnt/epochdisk)

1. Start the program. Invoke the program with the <INTENSITY> parameter which has 3 choices: 'low', 'medium', or 'high' (if omitted, it defaults to 'medium'). This parameter determines how many CPU cores to use, as shown below along with a sample of estimated runtimes. Our own testing indicates there isn't much value to using 'high' (200% CPU cores) as opposed to 'medium' intensity.

CPU	Intensity	CPU usage	Runtime (8 epochs)
12th Gen Intel(R) Core(TM) i9-12900K (4 cores)	low	50% cores	0:24:09
12th Gen Intel(R) Core(TM) i9-12900K (4 cores)	medium	100% cores	0:12:45
12th Gen Intel(R) Core(TM) i9-12900K (4 cores)	high	200% cores	0:11:51
Intel(R) Core(TM) i7-9750H CPU @ 2.60GHz	low	50% cores	1:57:21
Intel(R) Core(TM) i7-9750H CPU @ 2.60GHz	medium	100% cores	1:17:57
Intel(R) Core(TM) i7-9750H CPU @ 2.60GHz	high	200% cores	1:10:47
Intel(R) Xeon(R) CPU E5-2670 0 @ 2.60GHz	low	50% cores	0:55:02
Intel(R) Xeon(R) CPU E5-2670 0 @ 2.60GHz	medium	100% cores	0:30:53
Intel(R) Xeon(R) CPU E5-2670 0 @ 2.60GHz	high	200% cores	0:30:19

```
$ ./update_rewards.sh medium
```

3. This will take some time. You can monitor the progress in another terminal with the command:

```
$ while true; do clear; tail /mnt/epochdisk/update_rewards*/xaa.stdout; sleep 1; done
```

This screenshot shows progress at 48%)

4. The reports are stored in output/ directory. In the same directory you will also find fulllist.html and whalelist.html, with the former containing links to addresses in alphanumeric order, and the latter sorted by total rewards in descending order.

```
vmware@ubuntu20041a: ~/update_rewards
vmware@ubuntu20041a:~/update_rewards$ ./update_rewards.sh
STAGE  1 Setting up ramdisk...
[sudo] password for vmware:
STAGE  2 Determining starting and last epoch...
STAGE  3 Copying existing output/ directory data (if any)...
STAGE  4 Preparing epoch files...
STAGE  5 Generating address lists...
STAGE  6 Generating/updating trading reports...
STAGE  7 Generating parallel workloads...
STAGE  8 Executing parallel jobs...
STAGE  9 Waiting for completion of jobs...
STAGE 10 Finalizing...
[sudo] password for vmware:
vmware@ubuntu20041a:~/update_rewards$
```

PART 2: Subsequent Updates

2. After the first time, updates for later epochs will run faster. Add the new epoch file(s) and run the program again.

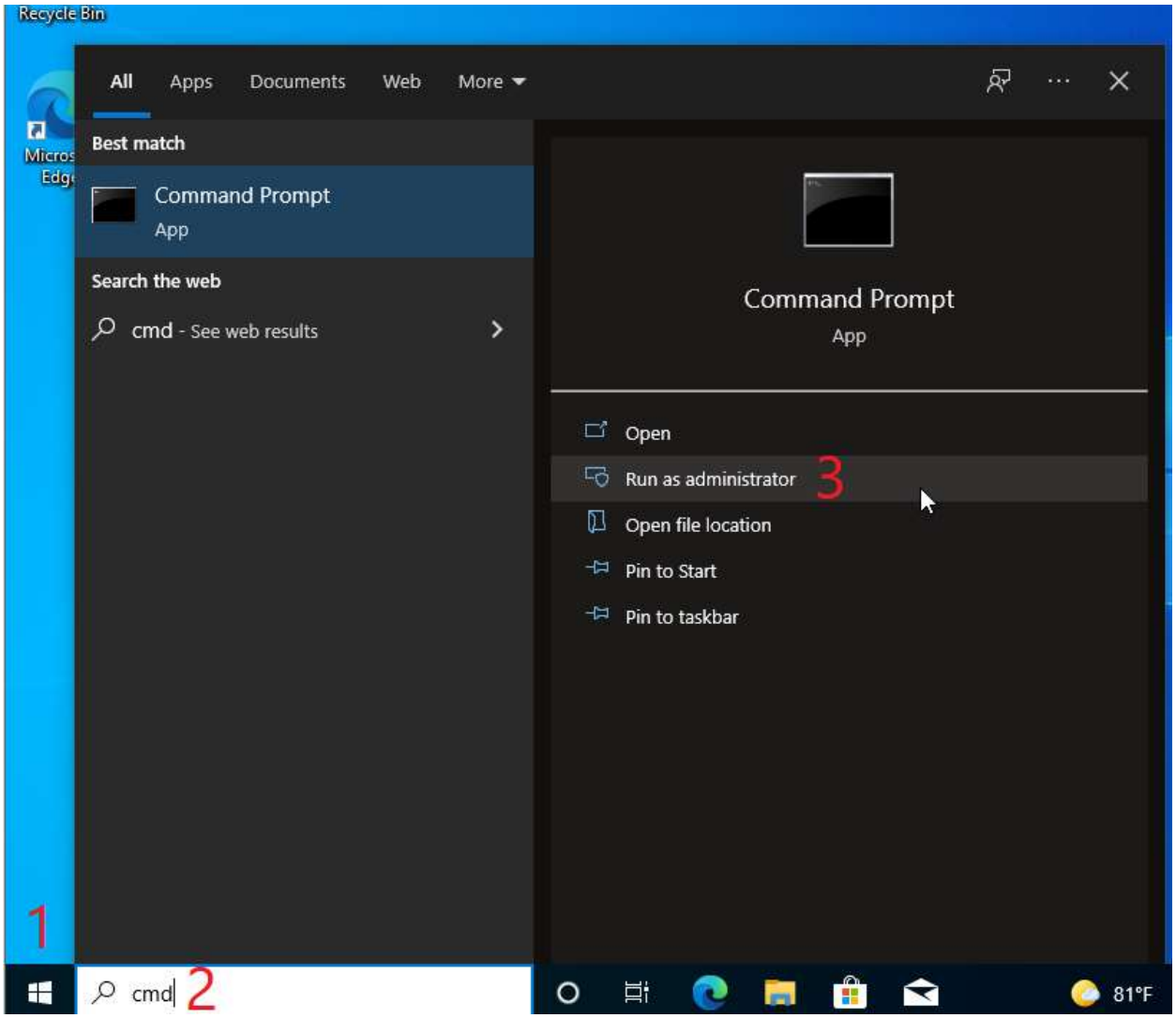
```
vmware@ubuntu20041a: ~/update_rewards
vmware@ubuntu20041a:~/update_rewards$ ls -al
total 54940
drwxrwxr-x  3 vmware vmware    4096 Apr 16 21:17 .
drwx------ 27 vmware vmware    4096 Apr 16 20:52 ..
-rw-rw-r--  1 vmware vmware 2323419 Dec 31  1969 epoch0.json
-rw-rw-r--  1 vmware vmware 2128676 Apr 16 20:51 epoch0.txt
-rw-rw-r--  1 vmware vmware 2560115 Dec 31  1969 epoch1.json
-rw-rw-r--  1 vmware vmware 2344936 Apr 16 20:51 epoch1.txt
-rw-rw-r--  1 vmware vmware 2908914 Dec 31  1969 epoch2.json
-rw-rw-r--  1 vmware vmware 2663711 Apr 16 20:51 epoch2.txt
-rw-rw-r--  1 vmware vmware 3005265 Dec 31  1969 epoch3.json
-rw-rw-r--  1 vmware vmware 2751860 Apr 16 20:51 epoch3.txt
-rw-rw-r--  1 vmware vmware 3087872 Dec 31  1969 epoch4.json
-rw-rw-r--  1 vmware vmware 2827387 Apr 16 20:51 epoch4.txt
-rw-rw-r--  1 vmware vmware 3137100 Dec 31  1969 epoch5.json
-rw-rw-r--  1 vmware vmware 2872427 Apr 16 20:51 epoch5.txt
-rw-rw-r--  1 vmware vmware 3215228 Dec 31  1969 epoch6.json
-rw-rw-r--  1 vmware vmware 2943853 Apr 16 20:51 epoch6.txt
-rw-rw-r--  1 vmware vmware 3320103 Dec 31  1969 epoch7.json
-rw-rw-r--  1 vmware vmware 3039680 Apr 16 20:51 epoch7.txt
-rw-rw-r--  1 vmware vmware 3483266 Dec 31  1969 epoch8.json
-rw-rw-r--  1 vmware vmware 2009691 Apr 16 20:51 epochaccounts_sorted_alpha.txt
-rw-rw-r--  1 vmware vmware 2009691 Apr 16 20:51 epochaccounts_sorted_rewards.txt
drwxrwxr-x  2 vmware vmware 3567616 Apr 16 21:14 output
-rwxr-xr-x  1 vmware vmware    5567 Apr 16 20:42 update_rewards.sh
vmware@ubuntu20041a:~/update_rewards$
```


```
$ ./update_rewards.sh medium
```

APPENDIX A: Windows 10

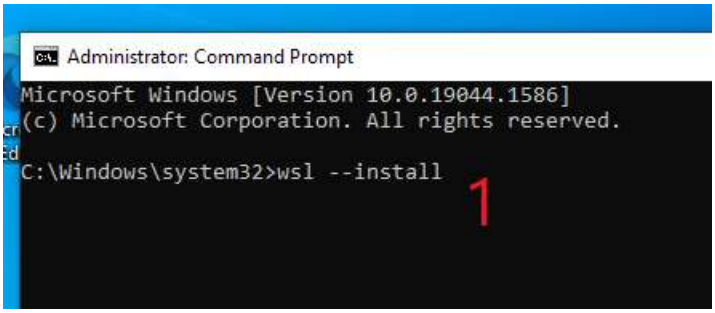
(Win10) PART 1: Install Windows Subsystem for Linux (WSL)

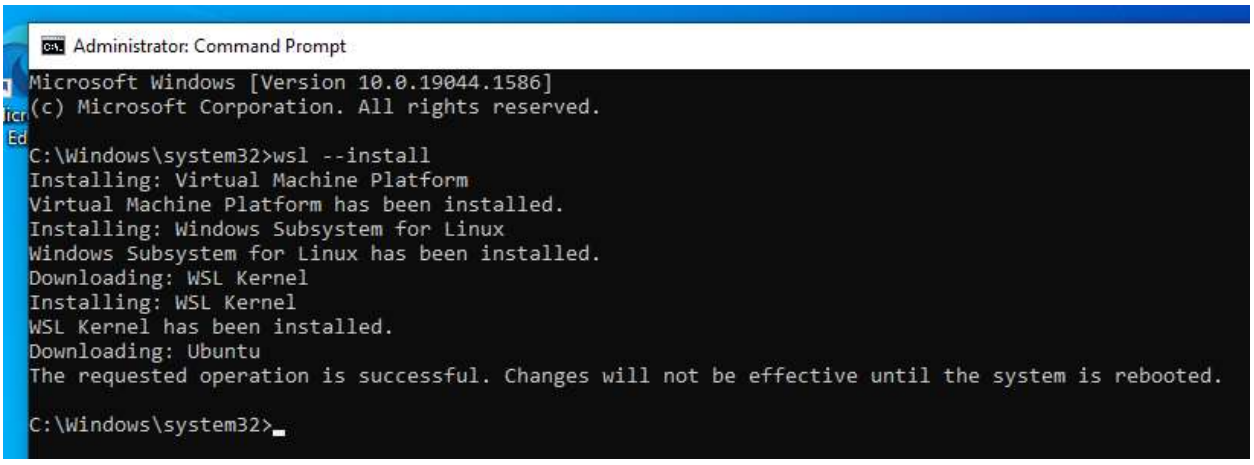
1) Start Command Prompt as Administrator:
    a. Click the Windows button.
    b. Type ‘cmd’.
    c. Click on ‘Run as administrator’.



d. Click Yes.

2) Type wsl --install and wait.

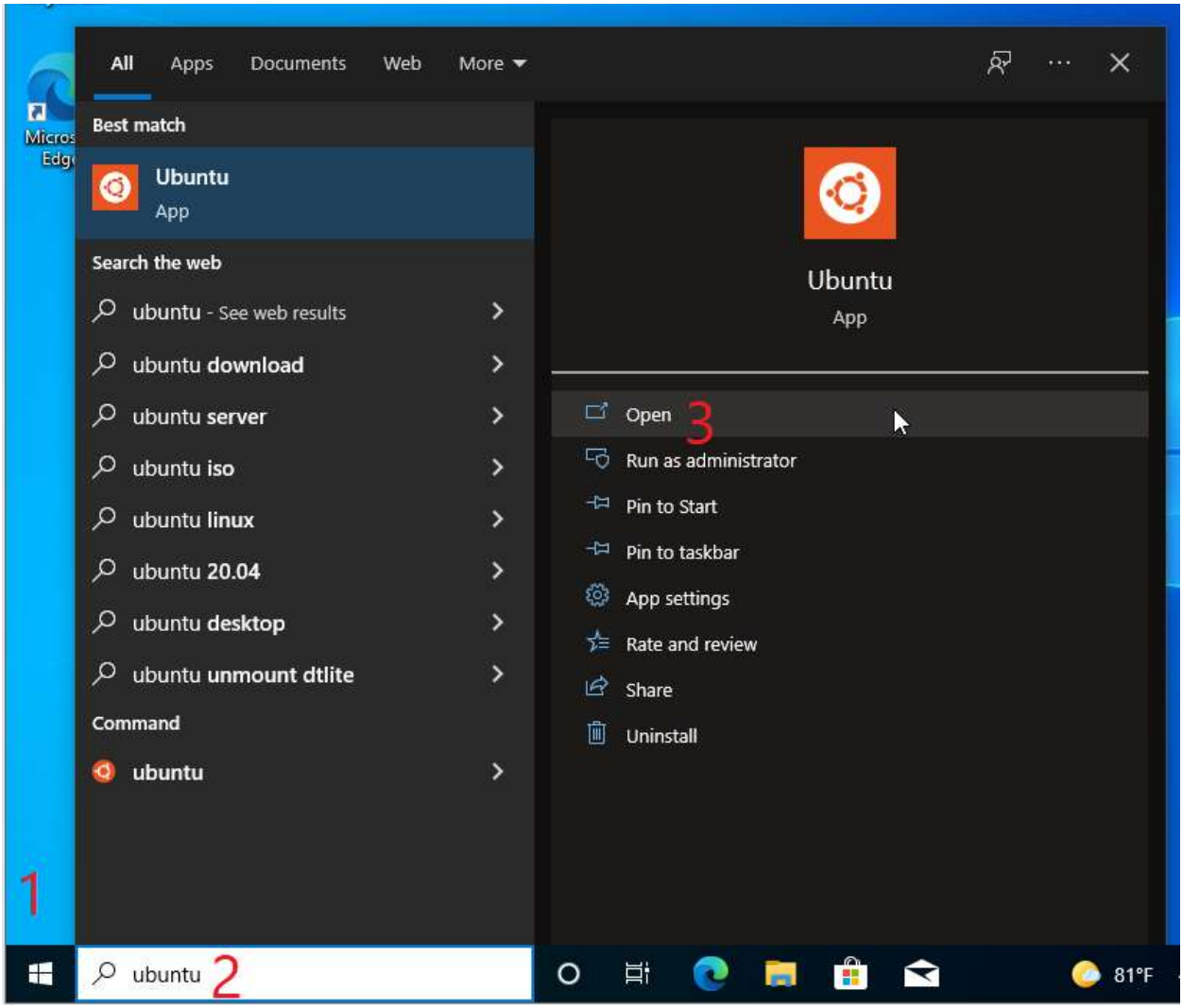




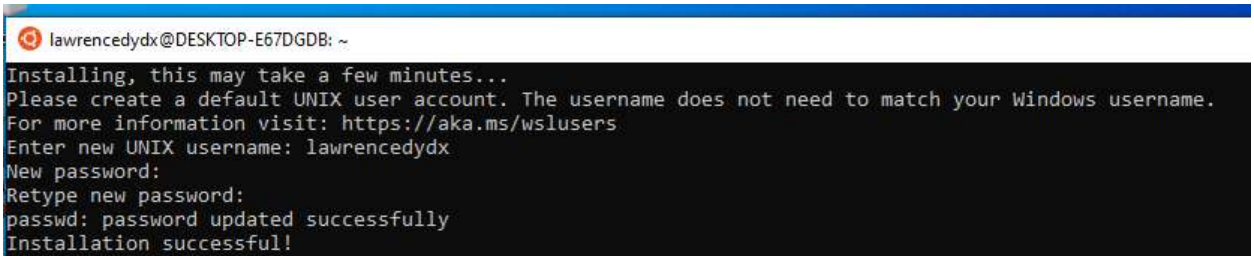
3) Reboot.

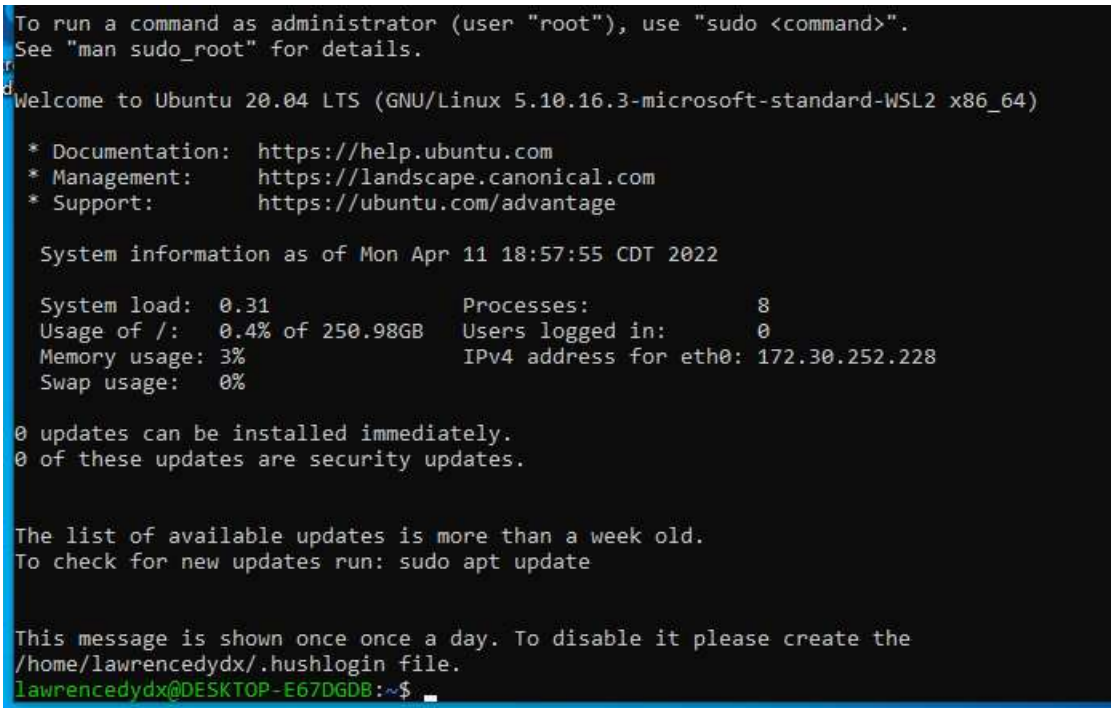
(Win10) PART 2: Launch WSL

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



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





(Win10) PART 3: Update WSL

1) Update WSL with the following commands:

```
$ sudo apt-get update

$ sudo apt-get upgrade
```

(Win10) PART 4: Download dYdX trading rewards files

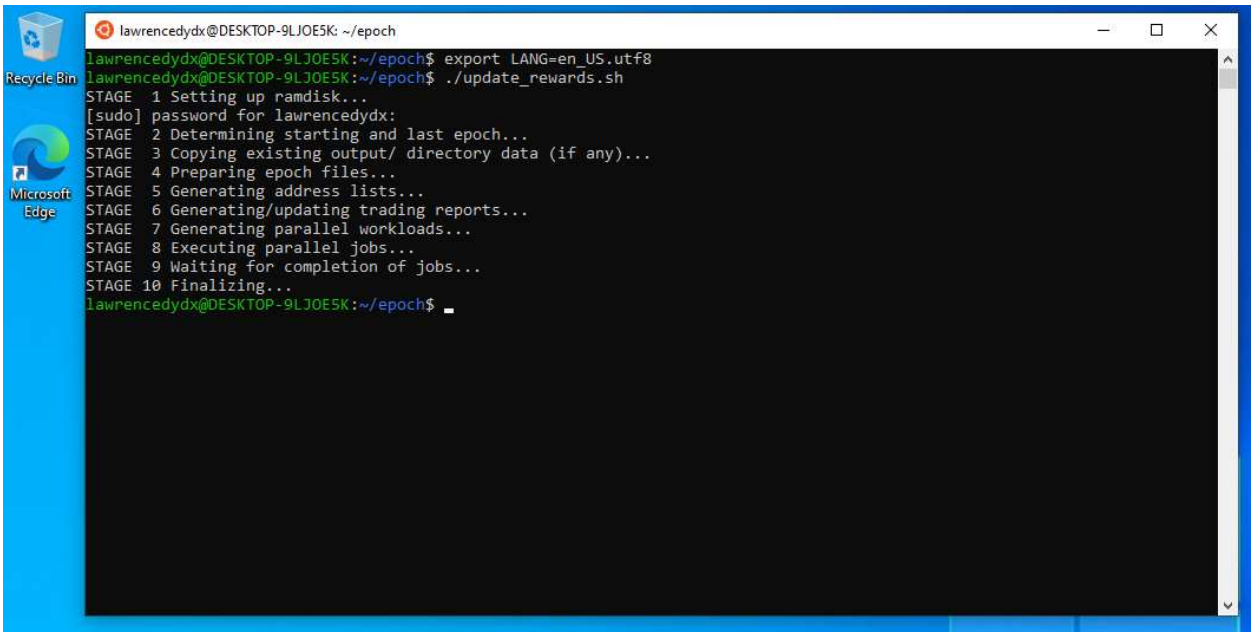
1) You can download the shell script and all epoch files with the following commands:

```
$ wget https://github.com/chiwalfrm/dydxexamples/raw/main/tradingrewards/epoch0.json
$ wget https://github.com/chiwalfrm/dydxexamples/raw/main/tradingrewards/epoch1.json
$ wget https://github.com/chiwalfrm/dydxexamples/raw/main/tradingrewards/epoch2.json
$ wget https://github.com/chiwalfrm/dydxexamples/raw/main/tradingrewards/epoch3.json
$ wget https://github.com/chiwalfrm/dydxexamples/raw/main/tradingrewards/epoch4.json
$ wget https://github.com/chiwalfrm/dydxexamples/raw/main/tradingrewards/epoch5.json
$ wget https://github.com/chiwalfrm/dydxexamples/raw/main/tradingrewards/epoch6.json
$ wget https://github.com/chiwalfrm/dydxexamples/raw/main/tradingrewards/epoch7.json
$ wget https://github.com/chiwalfrm/dydxexamples/raw/main/tradingrewards/epoch8.json
$ wget https://github.com/chiwalfrm/dydxexamples/raw/main/tradingrewards/update_rewards.sh
```

2) If you want commas in numbers for readability (e.g. display one million as 1,000,000), set the LANG variable:

```
$ export LANG=en_US.utf8
```

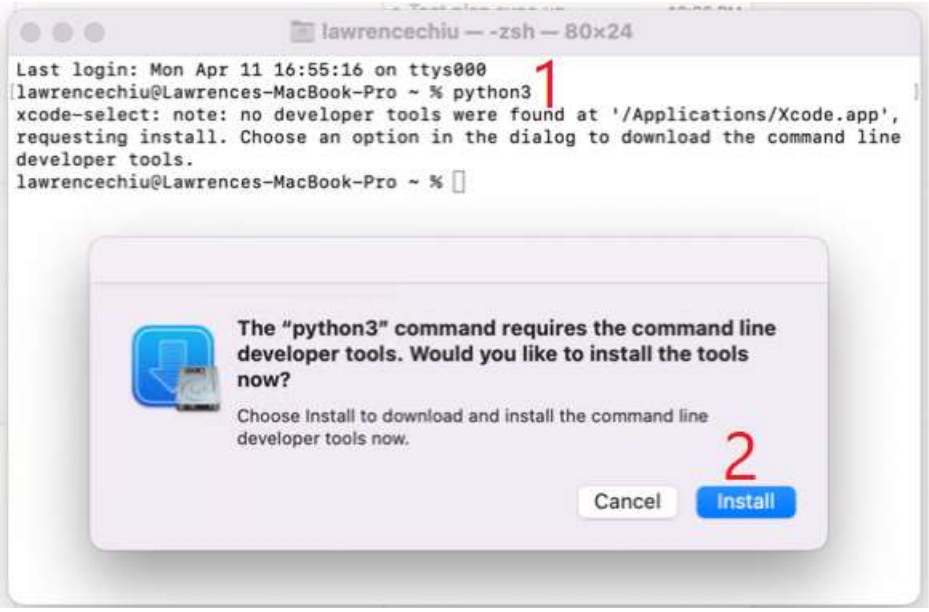
3) The rest of the guide follows the Linux version. Here is a picture of it running on Windows.



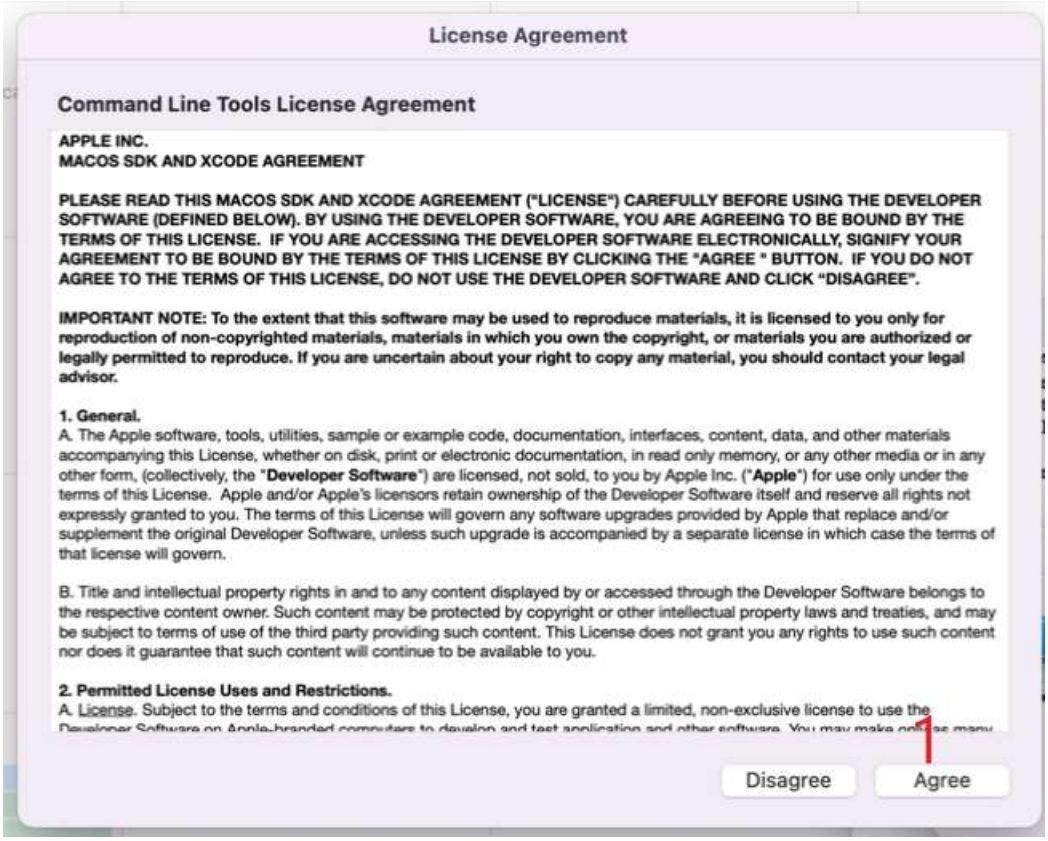
APPENDIX B: MacOS

(MacOS) PART 1: Install Python3

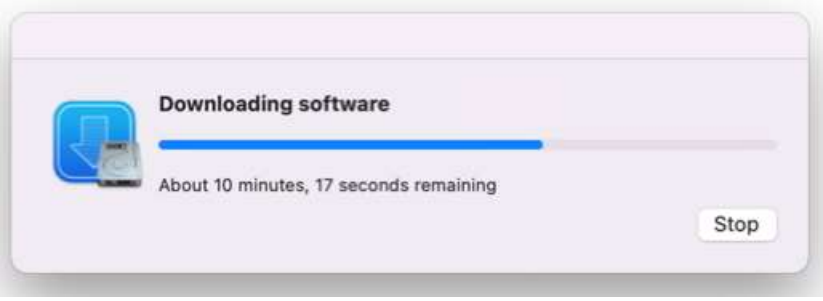
1) Launch Terminal and type ‘python3’. Then click Install.



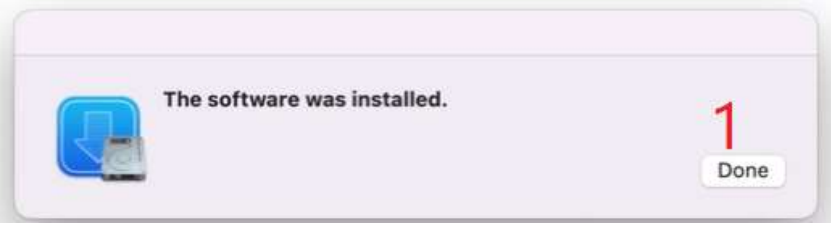
2) Click Agree.



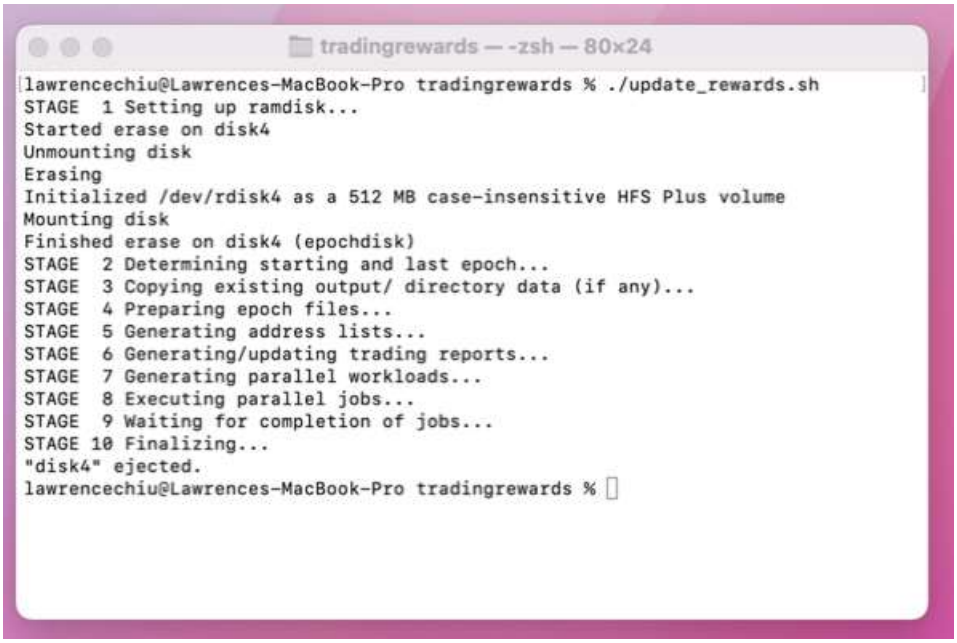
3) Wait.



4) Click Done.



5) The rest of the guide follows the Linux version.
6) Here is a picture of it running on MacOS.



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