TO RUN THE SERVER

python3 server.py

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1) IMPORTED MODULES (PYTHON3)

1] socket : For establishing a TCP connection between server and clients

2] os : For using various functionalities of os.path

3] threading : For load balancing using multiple threads to handle requests

4] mimetypes : To get the appropriate mimetype of the file in response header

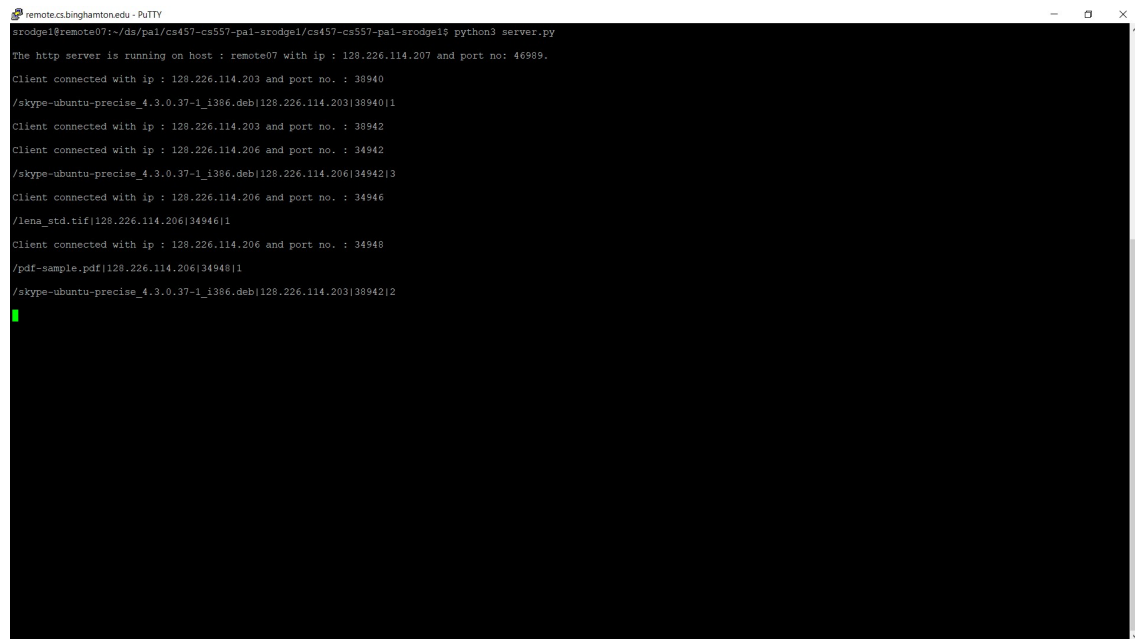5] datetime : For the Date attribute in response header

2) IMPLEMENTATION DETAILS

- When the sever.py file is run a server socket bound to ('',0) is created.
  '' : represents this server will accept requests from any ip address.
  0 : is port no. So that os will dynamically allot a free port.
  After created socket server will enter into infinite loop that is always ON.
  At most it can have 5 connection requests as backlog.

- If the www directory does not exist the server will shutdown and will not cater to any further or earlier requests.

- After accepting a connection request a new thread is created per each connection. This thread has target set to function **http_response** which is responsible for creating the proper response, whether the file/resource is found in www directory or not. Status code "200 OK" if found else "404 Not Found".

- The client socket object and address of the client connected are passed as arguments to the thread.

- Each thread reads the corresponding file in binary mode, that will be the response body. As per the requirements response header is encoded in utf-8 format and appended with \n\n to separate it from response body.

- Sendall() is used for sending the response body, but with wget it was not sending all the data in one pass so I put it inside a loop.

- A **global dictionary num_access** is used to keep track of number of times the files were requested since the start of server. The values in this dictionary are read and updated with a **num_access_lock.** That is it will display in the sequence of number of times a particular file was requested. It wouldn't matter which client received the file first.

MULTITHREADING INPUT/OUTPUT SAMPLES:

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Mul-server

Mul-client1


```
srodge1@remote03:~/test_ds$ wget http://remote07:46989/skype-ubuntu-precise_4.3.0.37-1_i386.deb --limit-rate=100k
--2018-09-20 17:52:33--  http://remote07:46989/skype-ubuntu-precise_4.3.0.37-1_i386.deb
Resolving remote07 (remote07)... 128.226.114.207
Connecting to remote07 (remote07)|128.226.114.207|:46989... connected.
HTTP request sent, awaiting response... 200 OK
Length: 20112698 (19M) [application/x-debian-package]
Saving to: 'skype-ubuntu-precise_4.3.0.37-1_i386.deb'

skype-ubuntu-precise_4.3.0.37-1_i386.deb          60%[==================================================>                ] 11.53M  100KB/s    eta 79s
```

Mul-client2


```
srodge1@remote06:~/test_ds$ wget http://remote07:46989/skype-ubuntu-precise_4.3.0.37-1_i386.deb
--2018-09-20 17:52:39--  http://remote07:46989/skype-ubuntu-precise_4.3.0.37-1_i386.deb
Resolving remote07 (remote07)... 128.226.114.207
Connecting to remote07 (remote07)|128.226.114.207|:46989... connected.
HTTP request sent, awaiting response... 200 OK
Length: 20112698 (19M) [application/x-debian-package]
Saving to: 'skype-ubuntu-precise_4.3.0.37-1_i386.deb.1'

skype-ubuntu-precise_4.3.0.37-1_i386.deb.1        100%[=================================================================>] 19.18M  --.-KB/s    in 0.03s

2018-09-20 17:52:39 (603 MB/s) - 'skype-ubuntu-precise_4.3.0.37-1_i386.deb.1' saved [20112698/20112698]

srodge1@remote06:~/test_ds$ wget http://remote07:50571/lena_std.tif
--2018-09-20 17:53:27--  http://remote07:50571/lena_std.tif
Resolving remote07 (remote07)... 128.226.114.207
Connecting to remote07 (remote07)|128.226.114.207|:50571... failed: Connection refused.
srodge1@remote06:~/test_ds$ wget http://remote07:46989/lena_std.tif
--2018-09-20 17:53:41--  http://remote07:46989/lena_std.tif
Resolving remote07 (remote07)... 128.226.114.207
Connecting to remote07 (remote07)|128.226.114.207|:46989... connected.
HTTP request sent, awaiting response... 200 OK
Length: 786572 (768K) [image/tiff]
Saving to: 'lena_std.tif'

lena_std.tif                                      100%[=================================================================>] 768.14K  --.-KB/s    in 0.002s

2018-09-20 17:53:41 (329 MB/s) - 'lena_std.tif' saved [786572/786572]

srodge1@remote06:~/test_ds$ wget http://remote07:46989/pdf-sample.pdf --limit-rate=10k
--2018-09-20 17:54:07--  http://remote07:46989/pdf-sample.pdf
Resolving remote07 (remote07)... 128.226.114.207
Connecting to remote07 (remote07)|128.226.114.207|:46989... connected.
HTTP request sent, awaiting response... 200 OK
Length: 7945 (7.8K) [application/pdf]
Saving to: 'pdf-sample.pdf'

pdf-sample.pdf                                    100%[=================================================================>] 7.76K  10.0KB/s    in 0.8s

2018-09-20 17:54:08 (10.0 KB/s) - 'pdf-sample.pdf' saved [7945/7945]

srodge1@remote06:~/test_ds$
```

DIFF COMMAND SAMPLES:

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Diff-server

Diff-client

Note:

1] All the images are available in the screenshots folder in the same directory

2] The same file is also available in pdf format Readme.pdf