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Project 1 Write-up

Python version: Python 3.8.5

Libraries used: socket

How to compile on Linux:

make run

or

python3 project1.py

For reference, I programmed on a Windows OS using Anaconda's Spyder IDE, so it would automatically compile with just a click of a button instead of a terminal command. This project should still compile with the aforementioned commands as I've tested both out on my Linux VM.

How to run:

Compile, run with python project1.py, and type into web browser:

localhost:8080/index.html in order to reach the homepage. There should be an image, and a URL link to another webpage. To test out the 301 code, please type int localhost:8080/test.html and you will be redirected to index.html from it with the 301 error code sent through the TCP connection.

Limitations:

After a long pause of inactivity, sometimes the program will print to console "IndexError: list index out of range." When this happens I'll use a keyboard interruption or will shut down the IDE and restart.

WireShark Pictures:

```
474 61.589784    127.0.0.1        127.0.0.1        HTTP    704 GET / HTTP/1.1
475 61.589813    127.0.0.1        127.0.0.1        TCP      44 8080 → 51864 [ACK] Seq=1 Ack=661 Win=2619648 Len=0
478 61.590722    127.0.0.1        127.0.0.1        TCP      61 8080 → 51864 [PSH, ACK] Seq=1 Ack=661 Win=2619648 Len=17 [TCP segment of a reassembled PDU]
479 61.590744    127.0.0.1        127.0.0.1        TCP      44 51864 → 8080 [ACK] Seq=661 Ack=18 Win=2619648 Len=0
480 61.590769    127.0.0.1        127.0.0.1        TCP     391 8080 → 51864 [PSH, ACK] Seq=18 Ack=661 Win=2619648 Len=347 [TCP segment of a reassembled PDU]
481 61.590783    127.0.0.1        127.0.0.1        TCP      44 51864 → 8080 [ACK] Seq=661 Ack=365 Win=2619392 Len=0
482 61.590811    127.0.0.1        127.0.0.1        HTTP     44 HTTP/1.1 200 OK
483 61.590825    127.0.0.1        127.0.0.1        TCP      44 51864 → 8080 [ACK] Seq=661 Ack=366 Win=2619392 Len=0
484 61.592697    127.0.0.1        127.0.0.1        TCP      44 51864 → 8080 [FIN, ACK] Seq=661 Ack=366 Win=2619392 Len=0
485 61.592739    127.0.0.1        127.0.0.1        TCP      44 8080 → 51864 [ACK] Seq=366 Ack=662 Win=2619648 Len=0
486 61.621494    127.0.0.1        127.0.0.1        HTTP    628 GET /cutie.jpg HTTP/1.1
```

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Shows the 200 OK message for receiving the index.html file (from the basic "/"), alongside receiving the cutie.jpg file hosted on the webpage from the directory.

```
3183 180.230077   127.0.0.1        127.0.0.1        HTTP    780 GET /ipsum.html HTTP/1.1
3184 180.230099   127.0.0.1        127.0.0.1        TCP     44 8080 → 50942 [ACK] Seq=613717092 Ack=737 Win=2619648 Len=0
3187 180.230637   127.0.0.1        127.0.0.1        TCP     61 8080 → 50942 [PSH, ACK] Seq=613717092 Ack=737 Win=2619648 Len=17 [TCP segment of a reassembled PDU]
3188 180.230649   127.0.0.1        127.0.0.1        TCP     44 50942 → 8080 [ACK] Seq=737 Ack=613717109 Win=2619648 Len=0
3189 180.230660   127.0.0.1        127.0.0.1        TCP     559 8080 → 50942 [PSH, ACK] Seq=613717109 Ack=737 Win=2619648 Len=515 [TCP segment of a reassembled PDU]
3190 180.230667   127.0.0.1        127.0.0.1        TCP     44 50942 → 8080 [ACK] Seq=737 Ack=613717624 Win=2619136 Len=0
3191 180.230682   127.0.0.1        127.0.0.1        HTTP    44 HTTP/1.1 200 OK
3192 180.230690   127.0.0.1        127.0.0.1        TCP     44 50942 → 8080 [ACK] Seq=737 Ack=613717625 Win=2619136 Len=0
3193 180.231625   127.0.0.1        127.0.0.1        TCP     44 50942 → 8080 [FIN, ACK] Seq=737 Ack=613717625 Win=2619136 Len=0
3194 180.231655   127.0.0.1        127.0.0.1        TCP     44 8080 → 50942 [ACK] Seq=613717625 Ack=738 Win=2619648 Len=0
```

Shows the 200 OK for the ipsum.html

```
3675 239.581370   127.0.0.1        127.0.0.1        HTTP    713 GET /blah.html HTTP/1.1
3676 239.581438   127.0.0.1        127.0.0.1        TCP     44 8080 → 51605 [ACK] Seq=1 Ack=670 Win=2619648 Len=0
3679 239.582844   127.0.0.1        127.0.0.1        TCP     84 8080 → 51605 [PSH, ACK] Seq=1 Ack=670 Win=2619648 Len=40 [TCP segment of a reassembled PDU]
3680 239.582901   127.0.0.1        127.0.0.1        TCP     44 51605 → 8080 [ACK] Seq=670 Ack=41 Win=2619648 Len=0
3681 239.582971   127.0.0.1        127.0.0.1        HTTP    44 HTTP/1.0 404 NOT FOUND
3682 239.583005   127.0.0.1        127.0.0.1        TCP     44 51605 → 8080 [ACK] Seq=670 Ack=42 Win=2619648 Len=0
3683 239.586232   127.0.0.1        127.0.0.1        TCP     44 51605 → 8080 [FIN, ACK] Seq=670 Ack=42 Win=2619648 Len=0
3684 239.586350   127.0.0.1        127.0.0.1        TCP     44 8080 → 51605 [ACK] Seq=42 Ack=671 Win=2619648 Len=0
3695 239.843822   127.0.0.1        127.0.0.1        TCP     56 51384 → 8080 [SYN] Seq=0 Win=65535 Len=0 MSS=65495 WS=256 SACK_PERM=1
3696 239.843924   127.0.0.1        127.0.0.1        TCP     56 8080 → 51384 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=65495 WS=256 SACK_PERM=1
3697 239.843965   127.0.0.1        127.0.0.1        TCP     44 51384 → 8080 [ACK] Seq=1 Ack=1 Win=2619648 Len=0
```

Shows the 404 NOT FOUND from trying to make the webserver host blah.html which is not a real webpage in the directory.

```
6463 391.173928   127.0.0.1        127.0.0.1        HTTP    739 GET /test.html HTTP/1.1
6464 391.173941   127.0.0.1        127.0.0.1        TCP     44 8080 → 60455 [ACK] Seq=1 Ack=696 Win=2619648 Len=0
6467 391.174064   127.0.0.1        127.0.0.1        TCP     78 8080 → 60455 [PSH, ACK] Seq=1 Ack=696 Win=2619648 Len=34 [TCP se
6468 391.174072   127.0.0.1        127.0.0.1        TCP     44 60455 → 8080 [ACK] Seq=696 Ack=35 Win=2619648 Len=0
6469 391.174436   127.0.0.1        127.0.0.1        TCP     391 8080 → 60455 [PSH, ACK] Seq=35 Ack=696 Win=2619648 Len=347 [TCP
6470 391.174445   127.0.0.1        127.0.0.1        TCP     44 60455 → 8080 [ACK] Seq=696 Ack=382 Win=2619392 Len=0
6471 391.174458   127.0.0.1        127.0.0.1        HTTP    44 HTTP/1.0 301 Moved Permanently
```

Shows /test.html being moved permanently with the 301 command before being redirected to index.html

These pictures are also posted in the submitted .zip file.