

## CS359 : Assignment-3

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1)

```
from socket import *

def startServer():
    #create Socket
    serverPort = 12000
    serverSocket = socket(AF_INET, SOCK_STREAM)
    serverSocket.bind('', serverPort)
    serverSocket.listen(1)
    print("The server is ready to receive")
    while 1:
        connectionSocket, addr = serverSocket.accept()
        print("connection received from client", addr)

        # Get the client request
        request = connectionSocket.recv(1024).decode()
        print(request)

        # Parse HTTP headers
        headers = request.split('\n')
        filename = headers[0].split()[1]

        #default file
        if filename == '/':
            filename = '/index.html'

        #Get the content of the file
        try:
            fin = open('.') + filename)
            content = fin.read()
            fin.close()
            response = 'HTTP/1.0 200 OK\n\n' + content

        except FileNotFoundError:
            response = 'HTTP/1.0 404 NOT FOUND\n\nFile Not Found'

        connectionSocket.sendall(response.encode())

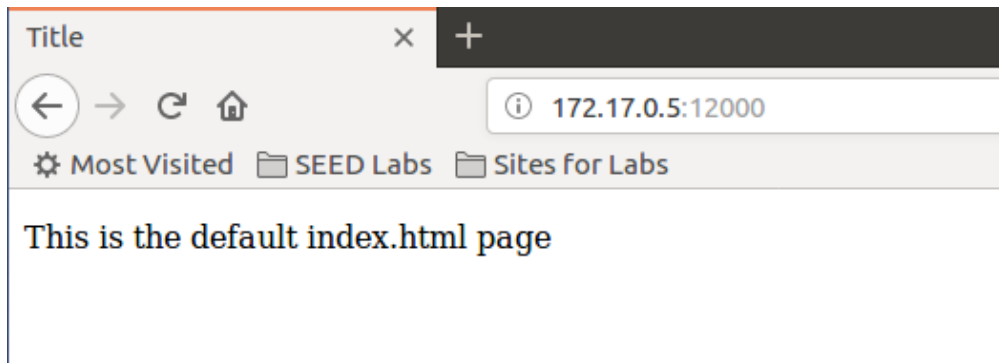
        connectionSocket.close()

if __name__ == '__main__':
    startServer()
```

- Server is listening on port 12000
- Default file is index.html in the same directory as the server
- If file not found, then error message displayed else the file is sent as response from the server.
- Two html files exist: index.html and HelloWorld.html

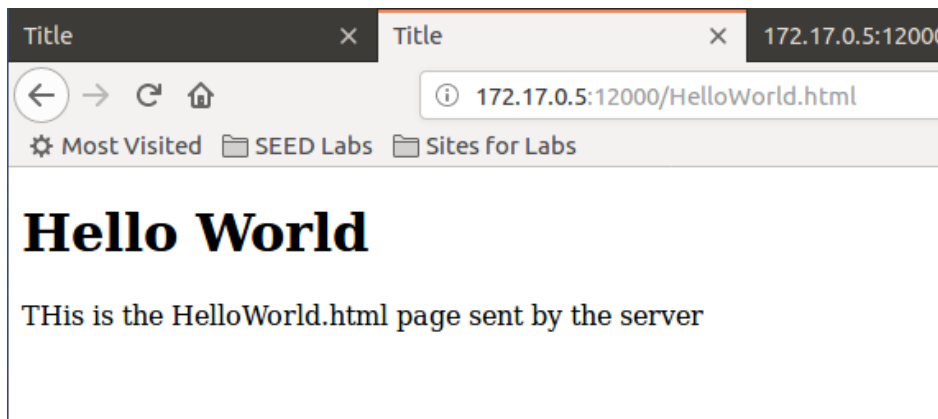
```
[02/21/22]seed@VM:~/.../Networks$ python3.5 server1.py
The server is ready to receive on PORT 12000
```

Requesting Default page:



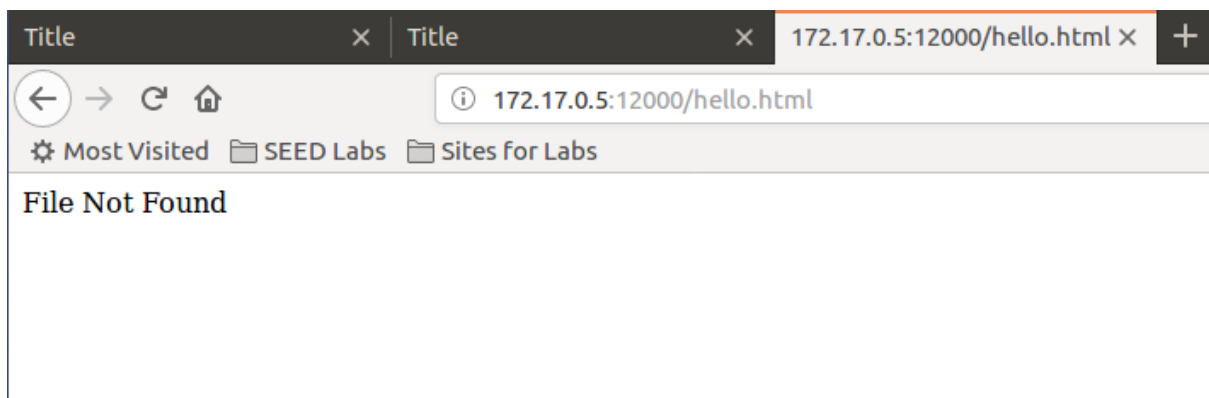
```
connection received from client ('172.17.0.5', 44126)
GET / HTTP/1.1
Host: 172.17.0.5:12000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux i686; rv:60.0) Gecko/20100101 Firefox/60.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1
```

Requesting HelloWorld.html:



```
connection received from client ('172.17.0.5', 44128)
GET /HelloWorld.html HTTP/1.1
Host: 172.17.0.5:12000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux i686; rv:60.0) Gecko/20100101 Firefox/60.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1
```

Requesting a page that does not exist:



```
connection received from client ('172.17.0.5', 44122)
GET /hello.html HTTP/1.1
Host: 172.17.0.5:12000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux i686; rv:60.0) Gecko/20100101 Firefox/60.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1
```

2)

Python code for Multithreaded HTTP server to handle multiple requests:

```
import socket
import time
import threading
import json

#import configurations
configuration = json.load(open('configuration.json'))

#Handle request of clients
def handle_request(request):
    print("Request under process : ")
    time.sleep(10)

    headers = request.split('\n')
    filename = headers[0].split()[1]

    if filename == '/':
        filename = configuration["defaultFile"]

    try:
        fin = open('.'+filename)
        content = fin.read()
        fin.close()

        response = 'HTTP/1.0 200 OK\n\n' + content
    except FileNotFoundError:
        response = 'HTTP/1.0 404 NOT FOUND\n\nFile Not Found'

    return response
```

```

# get the client request from the connection socket and pass the request to handle_client
def handle_client(conn, addr):
    if addr[0] not in configuration["blockedIP"] :
        request = conn.recv(1024).decode()
        print(request)

        # Return an HTTP response
        response = handle_request(request)
        conn.sendall(response.encode())
        conn.close()

    # when IP blocked, close the connection
    else:
        print("Connection Refused as the IP is blocked! ", addr[0])
        response = 'HTTP/1.0 403 UNAUTHORISED\n\nYou are blocked!'
        conn.sendall(response.encode())
        conn.close()

```

```

# Define socket host and port
SERVER_HOST = '0.0.0.0'
SERVER_PORT = 5058

# Create server socket
serverSocket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
serverSocket.setsockopt(socket.SOL_SOCKET, socket.SO_REUSEADDR, 1)
serverSocket.bind((SERVER_HOST, SERVER_PORT))
serverSocket.listen()
print("The server is ready to receive on port", SERVER_PORT)

while True:
    # Wait for client connections
    connectionSocket, addr = serverSocket.accept()
    print("connection received from client: ", addr)
    # check for active connections
    if (threading.activeCount()-1 < configuration["maxThreads"]):
        thread = threading.Thread(target=handle_client, args=(connectionSocket, addr))
        thread.start()
        print("Client requests active: ", (threading.activeCount()-1))
    else:
        print("Connection Refused as maximum connection limit reached ")
        response = 'HTTP/1.0 503 Overloaded Server \n\n Maximum Connection limit reached!'
        connectionSocket.sendall(response.encode())
        connectionSocket.close()

```

Configuration file:



```

1  {
2      "maxThreads": 2,
3      "blockedIP": ["172.17.0.5"],
4      "defaultFile": "/index.html"
5  }
6

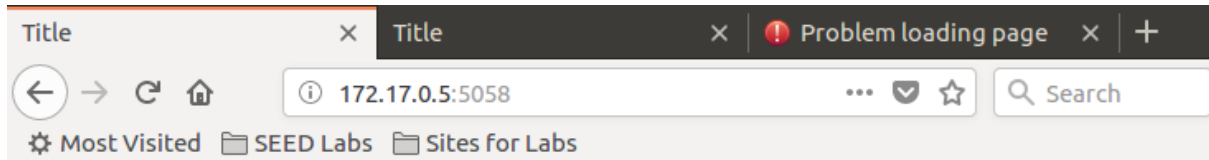
```

- Maximum two client connections allowed simultaneously.
- The IP 172.17.0.5 is blocked (IP of the server machine taken)
- Default file is index.html located in the same directory as the server.
- Server listening on PORT 5058

Trying to open three simultaneous connection to the server using client with different IP (172.17.0.4) than the server (172.17.0.5):

```
[02/21/22]seed@VM:~/.../Networks$ python3.5 server2.py
The server is ready to receive on port 5058
```

Default page

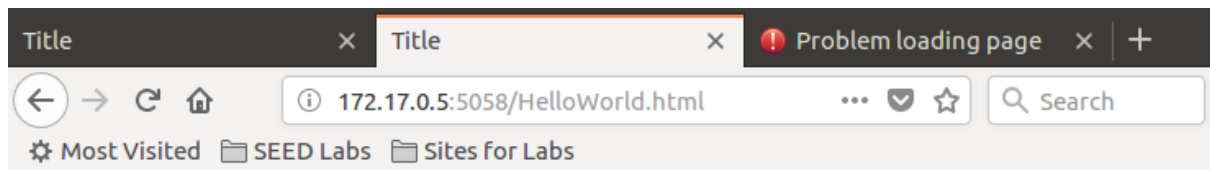


This is the default index.html page

```
Request under process :
connection received from client: ('172.17.0.4', 54696)
Client requests active: 1
GET / HTTP/1.1
Host: 172.17.0.5:5058
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux i686; rv:60.0) Gecko/20100101 Firefox/60.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1
```

Second request:

Request for HelloWorld.html



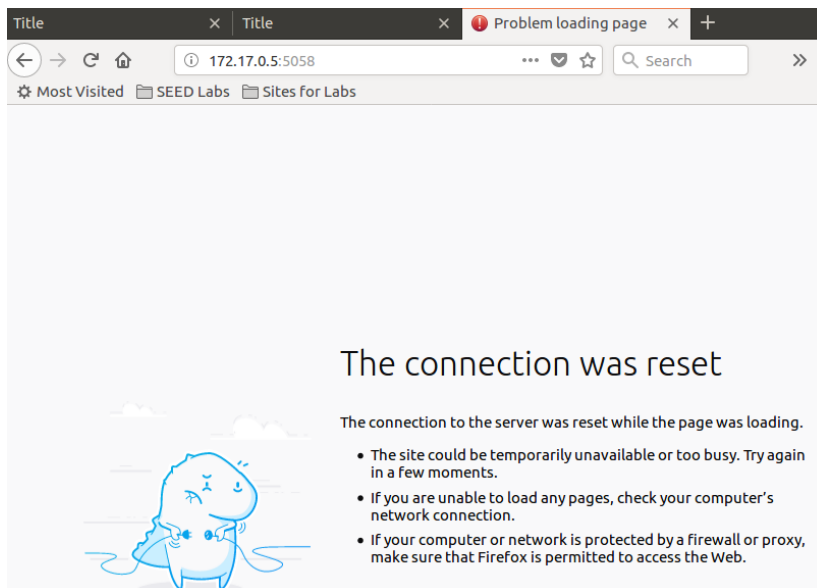
# Hello World

This is the HelloWorld.html page sent by the server

```
Request under process :  
connection received from client: ('172.17.0.4', 54698)  
GET /HelloWorld.html HTTP/1.1  
Host: 172.17.0.5:5058  
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux i686; rv:60.0) Gecko/20100101 Firefox/60.0  
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8  
Accept-Language: en-US,en;q=0.5  
Accept-Encoding: gzip, deflate  
Connection: keep-alive  
Upgrade-Insecure-Requests: 1
```

Third request:

Request for default page again:

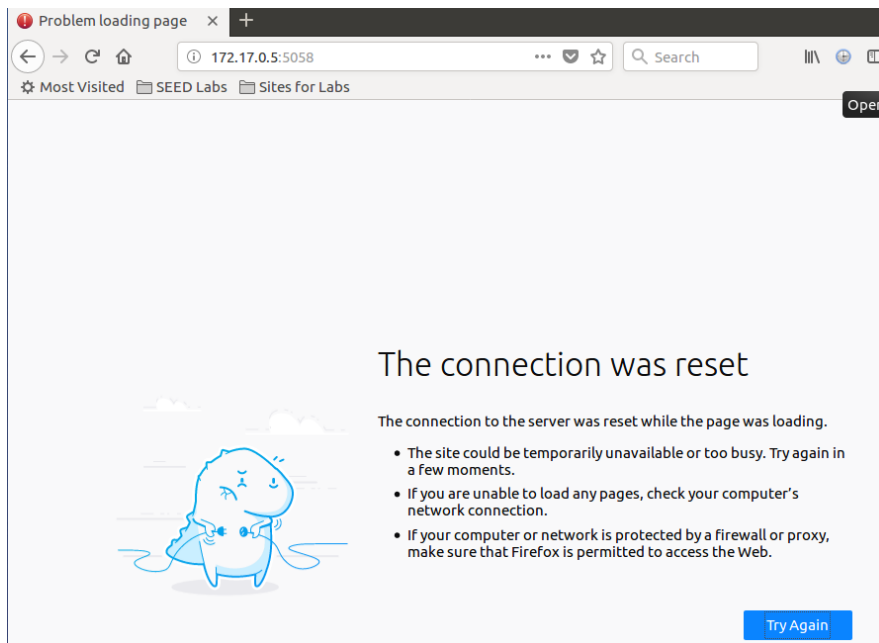


```
Request under process :  
Client requests active: 2  
connection received from client: ('172.17.0.4', 54700)  
Connection Refused as maximum connection limit reached
```

Here we see that connection is refused since maximum clients in the configuration file was set to 2.

---

Now trying to use blocked IP (running on server machine) to send the request:



```
connection received from client: ('172.17.0.5', 40610)
Connection Refused as the IP is blocked! 172.17.0.5
Client requests active: 1
```