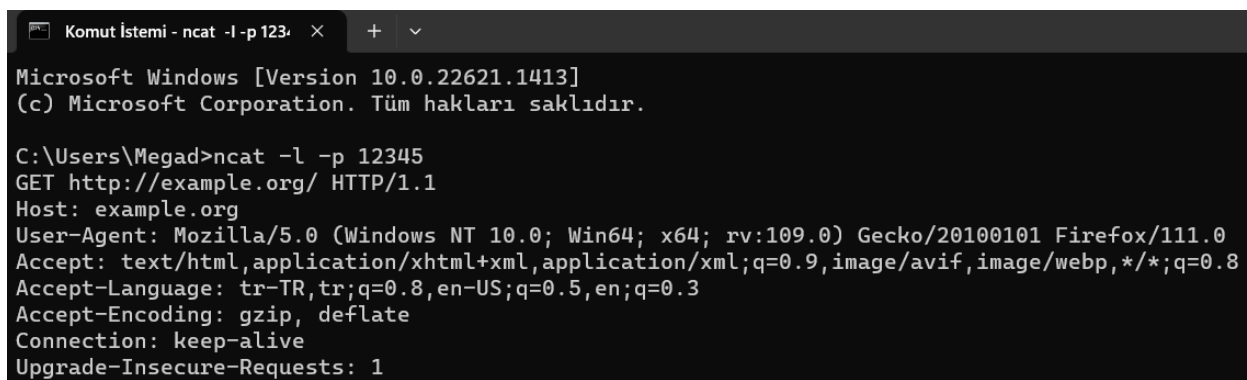


## CS 421 - Computer Networks

### Programming Assignment 1

### ProxyDownloader

1) On the first part of programming assignment, I downloaded “Nmap” program and I observed what happened on “example.org”. But before that, I made Mozilla Firefox localhost and its port number is 12345. Since I downloaded different program, my inputs works with ncat not nc. When I worked that line for “example.org”:

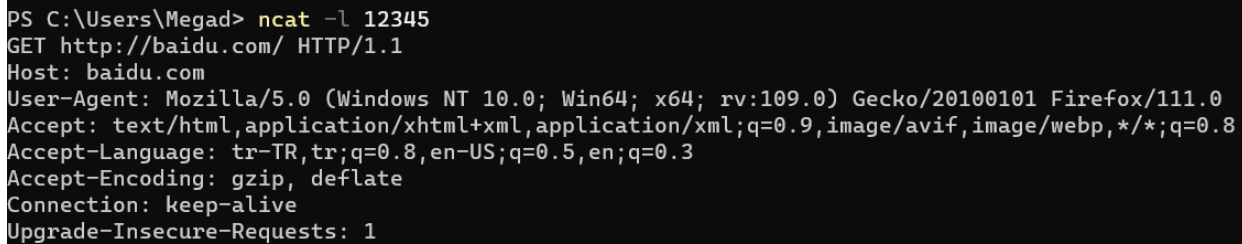


```
Komut İstemi - ncat -l -p 12345 X + v
Microsoft Windows [Version 10.0.22621.1413]
(c) Microsoft Corporation. Tüm hakları saklıdır.

C:\Users\Megad>ncat -l -p 12345
GET http://example.org/ HTTP/1.1
Host: example.org
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/111.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8
Accept-Language: tr-TR,tr;q=0.8,en-US;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1
```

Since there is no file or anything different on example.org, we get only our accepts, user agents and connections. Also, I need to check three different sites. All I get these from a site you gave on assignment.

My first site is baidu.com:



```
PS C:\Users\Megad> ncat -l 12345
GET http://baidu.com/ HTTP/1.1
Host: baidu.com
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/111.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8
Accept-Language: tr-TR,tr;q=0.8,en-US;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1
```

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My second site is cnnic.cn:

```
PS C:\Users\Megad> ncat -l 12345
GET http://cnnic.cn/ HTTP/1.1
Host: cnnic.cn
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/111.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8
Accept-Language: tr-TR,tr;q=0.8,en-US;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1
```

Finally, my last site is myshopify.org:

```
PS C:\Users\Megad> ncat -l 12345
GET http://myshopify.org/ HTTP/1.1
Host: myshopify.org
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/111.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8
Accept-Language: tr-TR,tr;q=0.8,en-US;q=0.5,en;q=0.3
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1
```

For all sites, since there is no downloadable information, I get all of these same messages.

2) On second part, we need to code a similar program which is “Nmap”. We need to enter “python ProxyDownloader.py (port numbers)” on command line and we need to look connection and client ports. Also, if there is downloadable content, we need to download it and inform users.

Firstly, I coded that assignment on Python. Firstly, I added a port argument for entering our information and I labeled it as parser. After I arranged my writable port number, I started to define my codes.

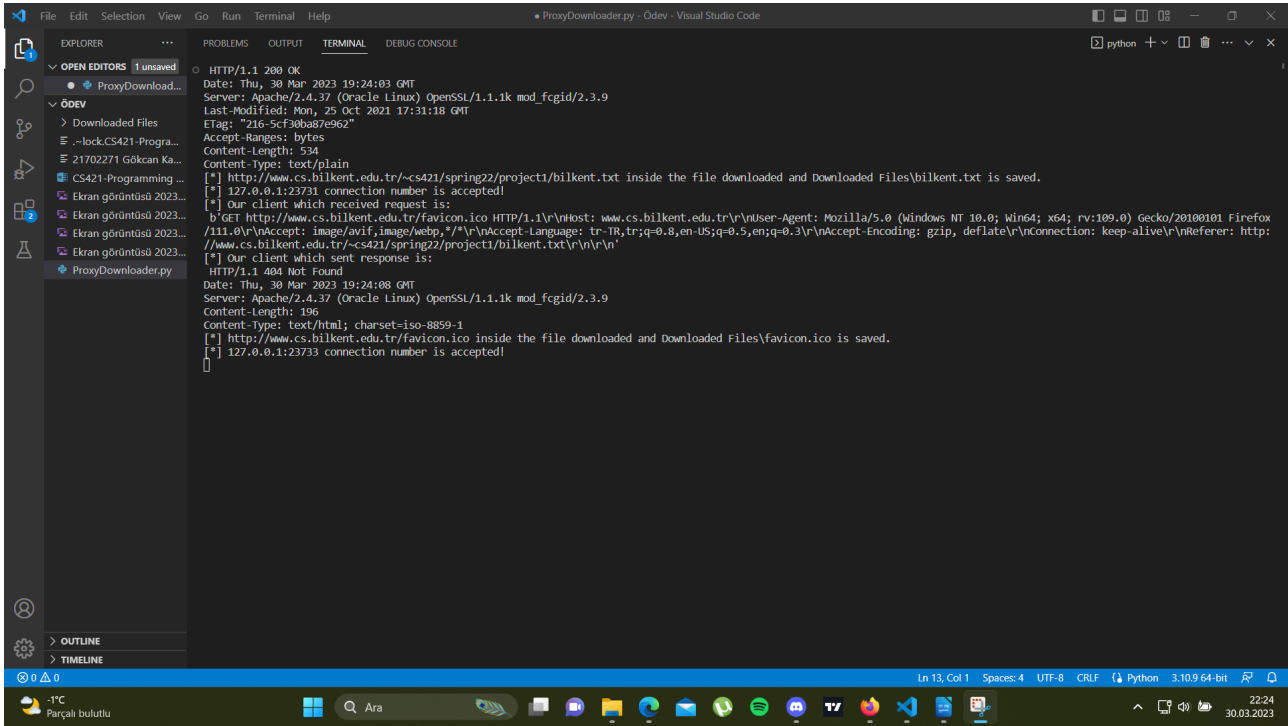
Firstly, I defined a proxy downloader. On that part, firstly, I create a new socket and specify its host and ports. Then, I listen it and if there is accepting reaction, I retrieve data from the client and our request is extracting in the URL. Then, I specify that retrieving and before close that connection, I also inform users.

Secondly, I defined a code which name is urlExtract. It only makes extracting URL from an HTTP GET. This sample is for getting information on URL's.

Thirdly, I define retrieving file. It makes retrieving a files content from the given URL. Also, there will be a tuple for file content and HTTP response is returned. For that reason, I created a new socket object and host. Same as, we get our HTTP GET message and it is received other side. After that, our file extracted at the file content and HTTP close. After that operation, our socket is closed. Finally, I code a saving file content. Firstly, we create a download path. After that, we create a file name based on URL. Finally, we write our file content and our all code is finished.

To test my code, I used four different links which you will give and they consist cs.bilkent...

[www.cs.bilkent.edu.tr/~cs421/spring22/project1/bilkent.txt](http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/bilkent.txt):



```

File Edit Selection View Go Run Terminal Help
ProxyDownloader.py - Ödev - Visual Studio Code

EXPLORER PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE
OPEN EDITORS 1 unsaved
ProxyDownload...
ÖDEV
Downloaded Files
lock.CS421-Progra...
21702271 Gökcan Ka...
CS421-Programming ...
Ekran görüntüsü 2023...
Ekran görüntüsü 2023...
Ekran görüntüsü 2023...
Ekran görüntüsü 2023...
ProxyDownloader.py

OUTLINE
TIMELINE

0 0 0 Ln 13, Col 1 Spaces: 4 UTF-8 CRLF Python 3.10.9 64-bit 22:24 30.03.2023

-1°C Parçalı bulutlu

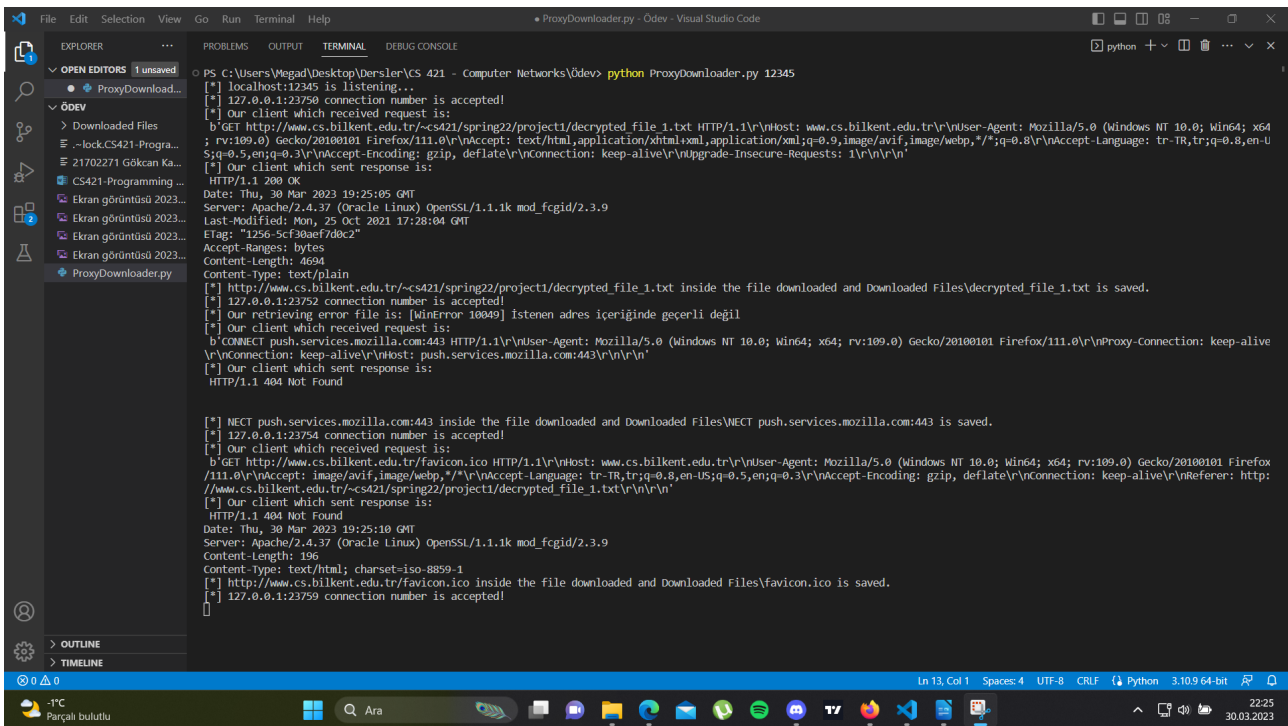
```

```

o HTTP/1.1 200 OK
Date: Thu, 30 Mar 2023 19:24:03 GMT
Server: Apache/2.4.37 (Oracle Linux) OpenSSL/1.1.1k mod_fcgid/2.3.9
Last-Modified: Mon, 25 Oct 2021 17:31:18 GMT
ETag: "216-5cf30ba8/e962"
Accept-Ranges: bytes
Content-Length: 534
Content-Type: text/plain
[*] http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/bilkent.txt inside the file downloaded and Downloaded Files\bilkent.txt is saved.
[*] 127.0.0.1:23731 connection number is accepted!
[*] Our client which received request is:
b'GET http://www.cs.bilkent.edu.tr/favicon.ico HTTP/1.1\r\nHost: www.cs.bilkent.edu.tr\r\nUser-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/111.0\r\nAccept: image/avif,image/webp,*/*\r\nAccept-Language: tr-TR,tr;q=0.8,en-US;q=0.5,en;q=0.3\r\nAccept-Encoding: gzip, deflate\r\nConnection: keep-alive\r\nReferer: http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/bilkent.txt\r\n\r\n'
[*] Our client which sent response is:
HTTP/1.1 404 Not Found
Date: Thu, 30 Mar 2023 19:24:08 GMT
Server: Apache/2.4.37 (Oracle Linux) OpenSSL/1.1.1k mod_fcgid/2.3.9
Content-Length: 196
Content-Type: text/html; charset=iso-8859-1
[*] http://www.cs.bilkent.edu.tr/favicon.ico inside the file downloaded and Downloaded Files/favicon.ico is saved.
[*] 127.0.0.1:23733 connection number is accepted!

```

[www.cs.bilkent.edu.tr/~cs421/spring22/project1/decrypted\\_file\\_1.txt](http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/decrypted_file_1.txt):



```

File Edit Selection View Go Run Terminal Help
ProxyDownloader.py - Ödev - Visual Studio Code

EXPLORER PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE
OPEN EDITORS 1 unsaved
ProxyDownload...
ÖDEV
Downloaded Files
lock.CS421-Progra...
21702271 Gökcan Ka...
CS421-Programming ...
Ekran görüntüsü 2023...
Ekran görüntüsü 2023...
Ekran görüntüsü 2023...
Ekran görüntüsü 2023...
ProxyDownloader.py

OUTLINE
TIMELINE

0 0 0 Ln 13, Col 1 Spaces: 4 UTF-8 CRLF Python 3.10.9 64-bit 22:25 30.03.2023

-1°C Parçalı bulutlu

```

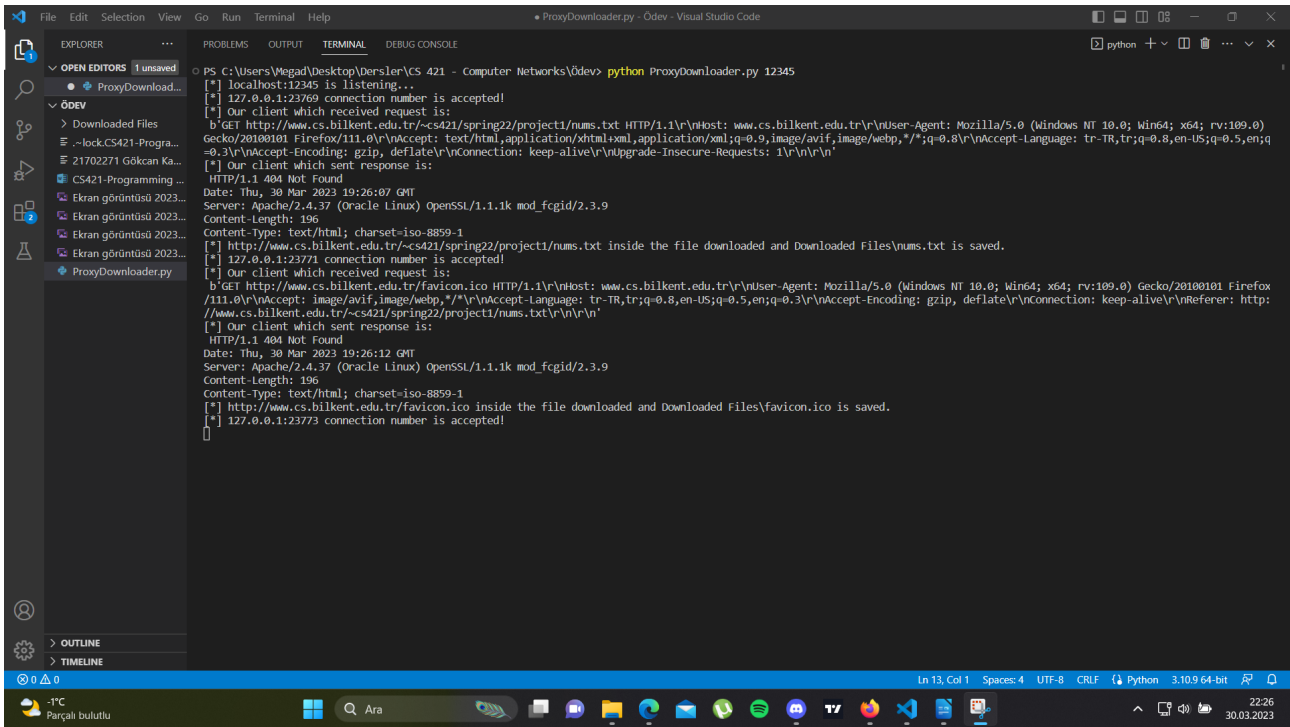
```

o PS C:\Users\Wegad\Desktop\Dersler\CS 421 - Computer Networks\Ödev> python ProxyDownloader.py 12345
[*] localhost:12345 is listening...
[*] 127.0.0.1:23750 connection number is accepted!
[*] Our client which received request is:
b'GET http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/decrypted_file_1.txt HTTP/1.1\r\nHost: www.cs.bilkent.edu.tr\r\nUser-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/111.0\r\nAccept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8\r\nAccept-Language: tr-TR,tr;q=0.8,en-US;q=0.5,en;q=0.3\r\nAccept-Encoding: gzip, deflate\r\nConnection: keep-alive\r\nUpgrade-Insecure-Requests: 1\r\n\r\n'
[*] Our client which sent response is:
HTTP/1.1 200 OK
Date: Thu, 30 Mar 2023 19:25:05 GMT
Server: Apache/2.4.37 (Oracle Linux) OpenSSL/1.1.1k mod_fcgid/2.3.9
Last-Modified: Mon, 25 Oct 2021 17:28:04 GMT
ETag: "1256-5cf30ba8/700c2"
Accept-Ranges: bytes
Content-Length: 4694
Content-Type: text/plain
[*] http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/decrypted_file_1.txt inside the file downloaded and Downloaded Files\decrypted_file_1.txt is saved.
[*] 127.0.0.1:23752 connection number is accepted!
[*] Our retrieving error file is: [MinError 10049] İstenen adres içeriğinde geçerli değil
[*] Our client which received request is:
b'CONNECT push.services.mozilla.com:443 HTTP/1.1\r\nUser-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/111.0\r\nProxy-Connection: keep-alive\r\nConnection: keep-alive\r\nHost: push.services.mozilla.com:443\r\n\r\n'
[*] Our client which sent response is:
HTTP/1.1 404 Not Found

[*] NECT push.services.mozilla.com:443 inside the file downloaded and Downloaded Files\NECT push.services.mozilla.com:443 is saved.
[*] 127.0.0.1:23754 connection number is accepted!
[*] Our client which received request is:
b'GET http://www.cs.bilkent.edu.tr/favicon.ico HTTP/1.1\r\nHost: www.cs.bilkent.edu.tr\r\nUser-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/111.0\r\nAccept: image/avif,image/webp,*/*\r\nAccept-Language: tr-TR,tr;q=0.8,en-US;q=0.5,en;q=0.3\r\nAccept-Encoding: gzip, deflate\r\nConnection: keep-alive\r\nReferer: http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/decrypted_file_1.txt\r\n\r\n'
[*] Our client which sent response is:
HTTP/1.1 404 Not Found
Date: Thu, 30 Mar 2023 19:25:10 GMT
Server: Apache/2.4.37 (Oracle Linux) OpenSSL/1.1.1k mod_fcgid/2.3.9
Content-Length: 196
Content-Type: text/html; charset=iso-8859-1
[*] http://www.cs.bilkent.edu.tr/favicon.ico inside the file downloaded and Downloaded Files/favicon.ico is saved.
[*] 127.0.0.1:23759 connection number is accepted!

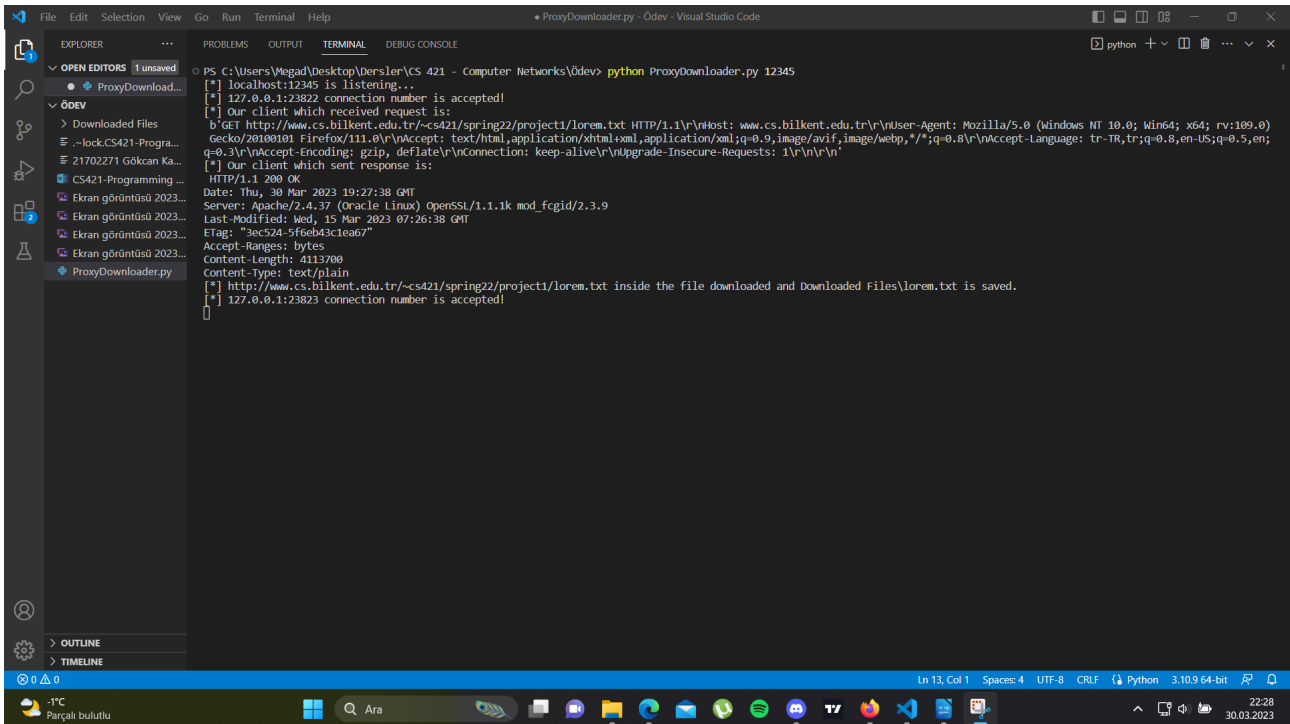
```

[www.cs.bilkent.edu.tr/~cs421/spring22/project1/nums.txt](http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/nums.txt) (Handle 404 error):



```
PS C:\Users\Megad\Desktop\dersler\CS 421 - Computer Networks\ödev> python ProxyDownloader.py 12345
[*] localhost:12345 is listening...
[*] 127.0.0.1:23769 connection number is accepted!
[*] Our client which received request is:
b'GET http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/nums.txt HTTP/1.1\r\nHost: www.cs.bilkent.edu.tr\r\nUser-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/111.0\r\nAccept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8\r\nAccept-Language: tr-TR,tr;q=0.8,en-US;q=0.5,en;q=0.3\r\nAccept-Encoding: gzip, deflate\r\nConnection: keep-alive\r\nUpgrade-Insecure-Requests: 1\r\n\r\n'
[*] Our client which sent response is:
HTTP/1.1 404 Not Found
Date: Thu, 30 Mar 2023 19:26:07 GMT
Server: Apache/2.4.37 (Oracle Linux) OpenSSL/1.1.1k mod_fcgid/2.3.9
Content-Length: 196
Content-Type: text/html; charset=iso-8859-1
[*] http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/nums.txt inside the file downloaded and Downloaded Files\nums.txt is saved.
[*] 127.0.0.1:23771 connection number is accepted!
[*] Our client which received request is:
b'GET http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/nums.txt HTTP/1.1\r\nHost: www.cs.bilkent.edu.tr\r\nUser-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/111.0\r\nAccept: image/avif,image/webp,*/*\r\nAccept-Language: tr-TR,tr;q=0.8,en-US;q=0.5,en;q=0.3\r\nAccept-Encoding: gzip, deflate\r\nConnection: keep-alive\r\nReferer: http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/nums.txt\r\n\r\n'
[*] Our client which sent response is:
HTTP/1.1 404 Not Found
Date: Thu, 30 Mar 2023 19:26:12 GMT
Server: Apache/2.4.37 (Oracle Linux) OpenSSL/1.1.1k mod_fcgid/2.3.9
Content-Length: 196
Content-Type: text/html; charset=iso-8859-1
[*] http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/nums.txt inside the file downloaded and Downloaded Files\favicon.ico is saved.
[*] 127.0.0.1:23773 connection number is accepted!
```

[www.cs.bilkent.edu.tr/~cs421/spring22/project1/lorem.txt](http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/lorem.txt) (Large file, around 4 MB):



```
PS C:\Users\Megad\Desktop\dersler\CS 421 - Computer Networks\ödev> python ProxyDownloader.py 12345
[*] localhost:12345 is listening...
[*] 127.0.0.1:23822 connection number is accepted!
[*] Our client which received request is:
b'GET http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/lorem.txt HTTP/1.1\r\nHost: www.cs.bilkent.edu.tr\r\nUser-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/111.0\r\nAccept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8\r\nAccept-Language: tr-TR,tr;q=0.8,en-US;q=0.5,en;q=0.3\r\nAccept-Encoding: gzip, deflate\r\nConnection: keep-alive\r\nUpgrade-Insecure-Requests: 1\r\n\r\n'
[*] Our client which sent response is:
HTTP/1.1 200 OK
Date: Thu, 30 Mar 2023 19:27:38 GMT
Server: Apache/2.4.37 (Oracle Linux) OpenSSL/1.1.1k mod_fcgid/2.3.9
Last-Modified: Wed, 15 Mar 2023 07:26:38 GMT
ETag: "3ec524-5f6eb43c1ea67"
Accept-Ranges: bytes
Content-Length: 4113700
Content-Type: text/plain
[*] http://www.cs.bilkent.edu.tr/~cs421/spring22/project1/lorem.txt inside the file downloaded and Downloaded Files\lorem.txt is saved.
[*] 127.0.0.1:23823 connection number is accepted!
```

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Finally, our downloaded contents are:

