

Project1

How to install the file.

Just Run Server file In Server folder on in Terminal by appropriate command.

Now run Client File in Terminal by appropriate command.

For run from Terminal you try command for ex. `./ python3 tcpserver.py 127.0.0.1 13002`

Implemented total 4 methods that is:-

1. PUT
2. GET
3. Delete
4. HEAD

It's implemented using multithreading for Persistent HTTP that is HTTP 1.1.

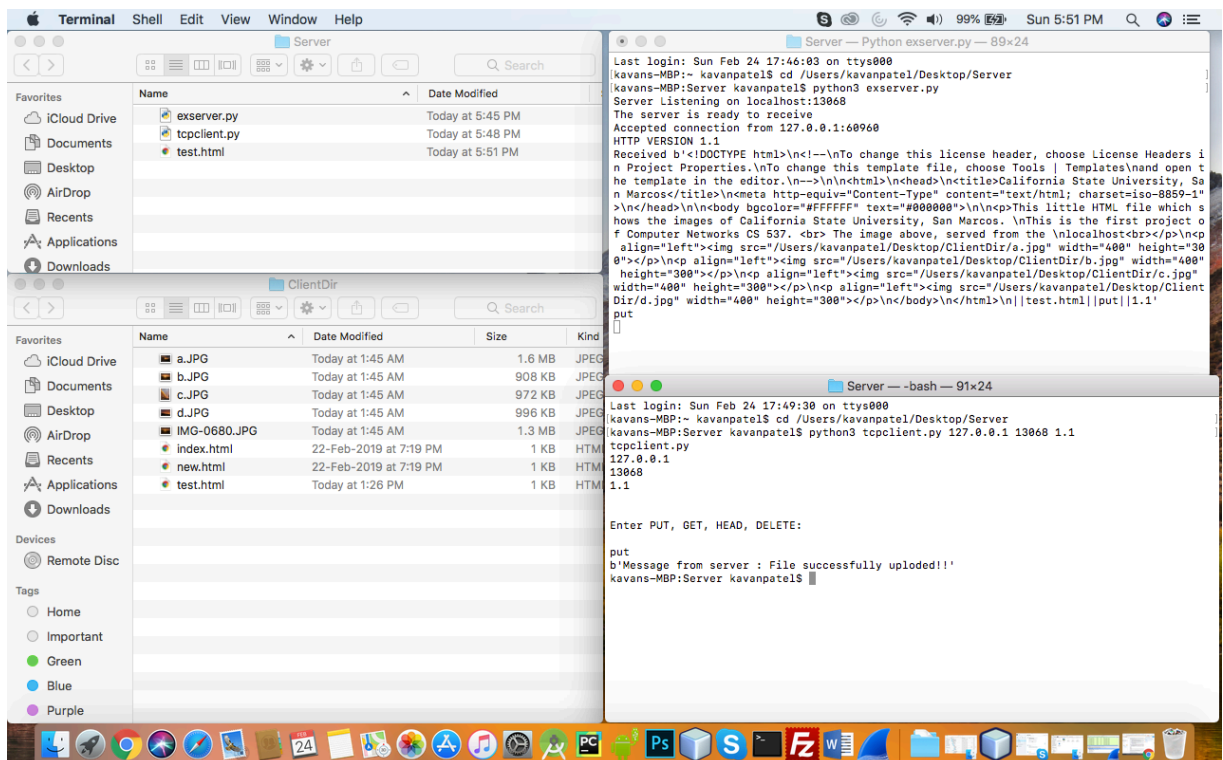
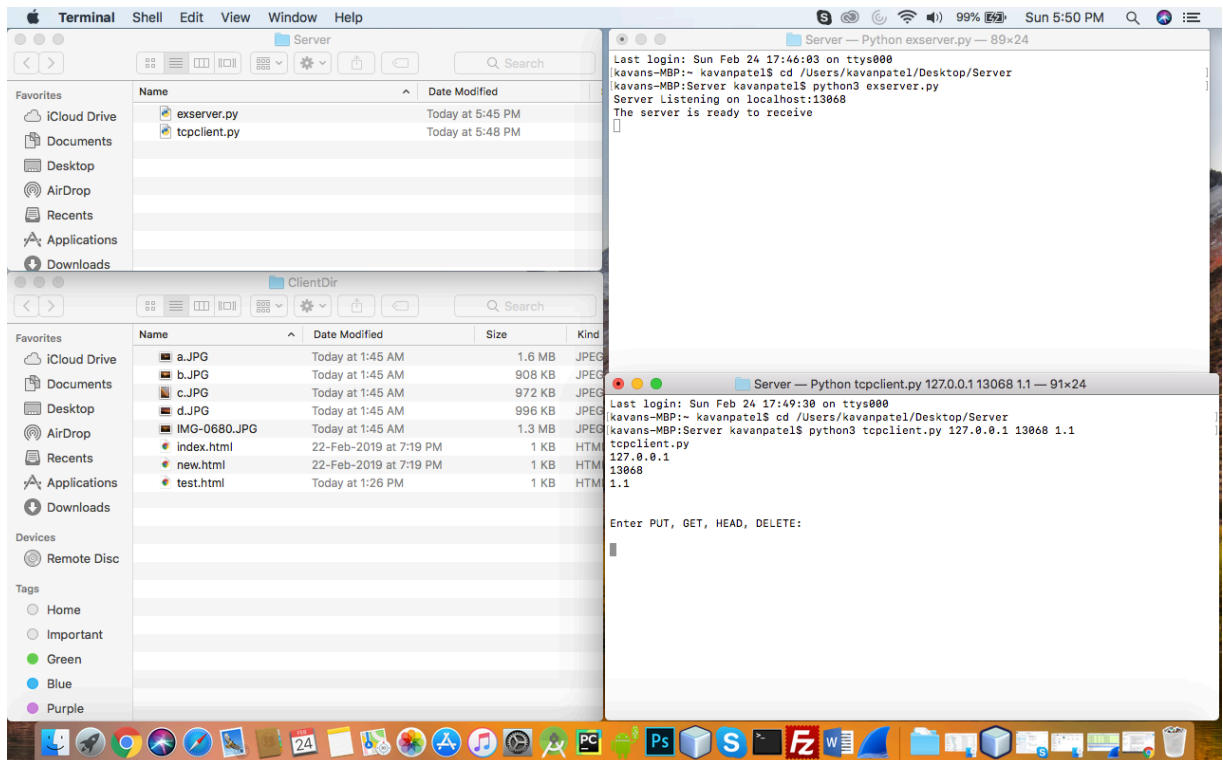
For Non-Persistent HTTP, which is HTTP1.0, we have used Pipelining Method.

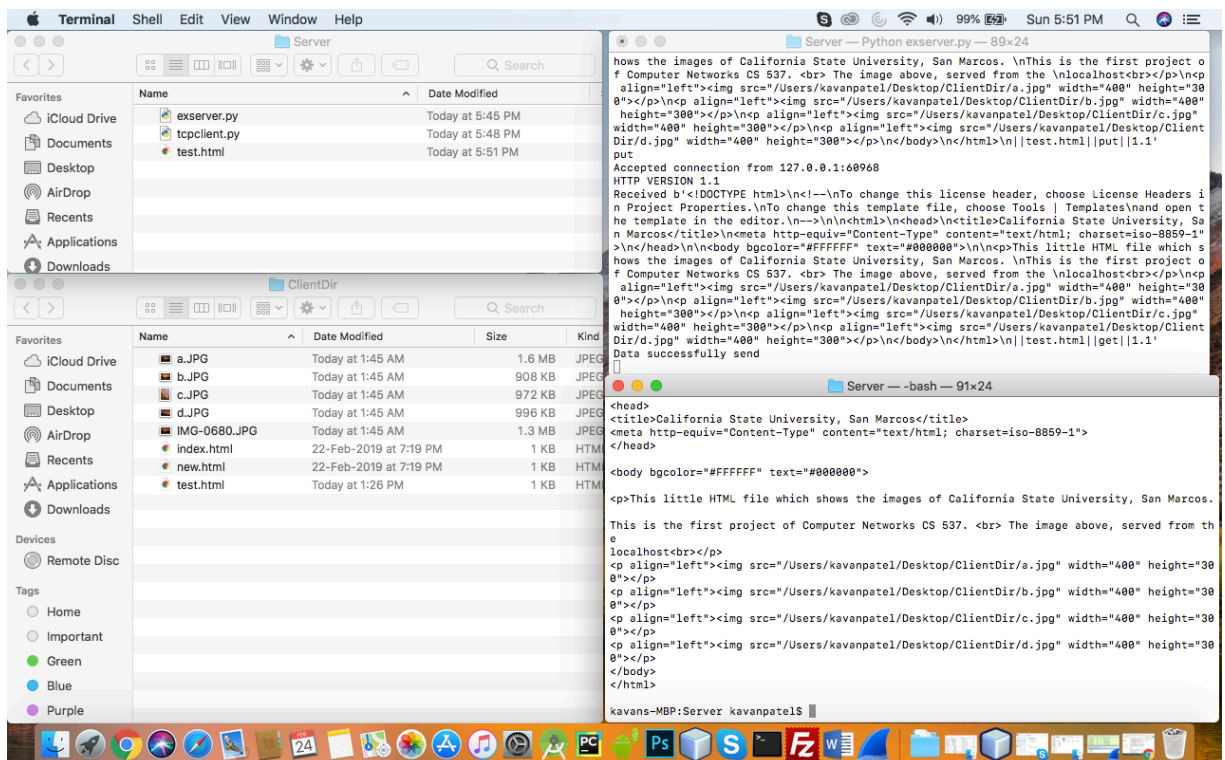
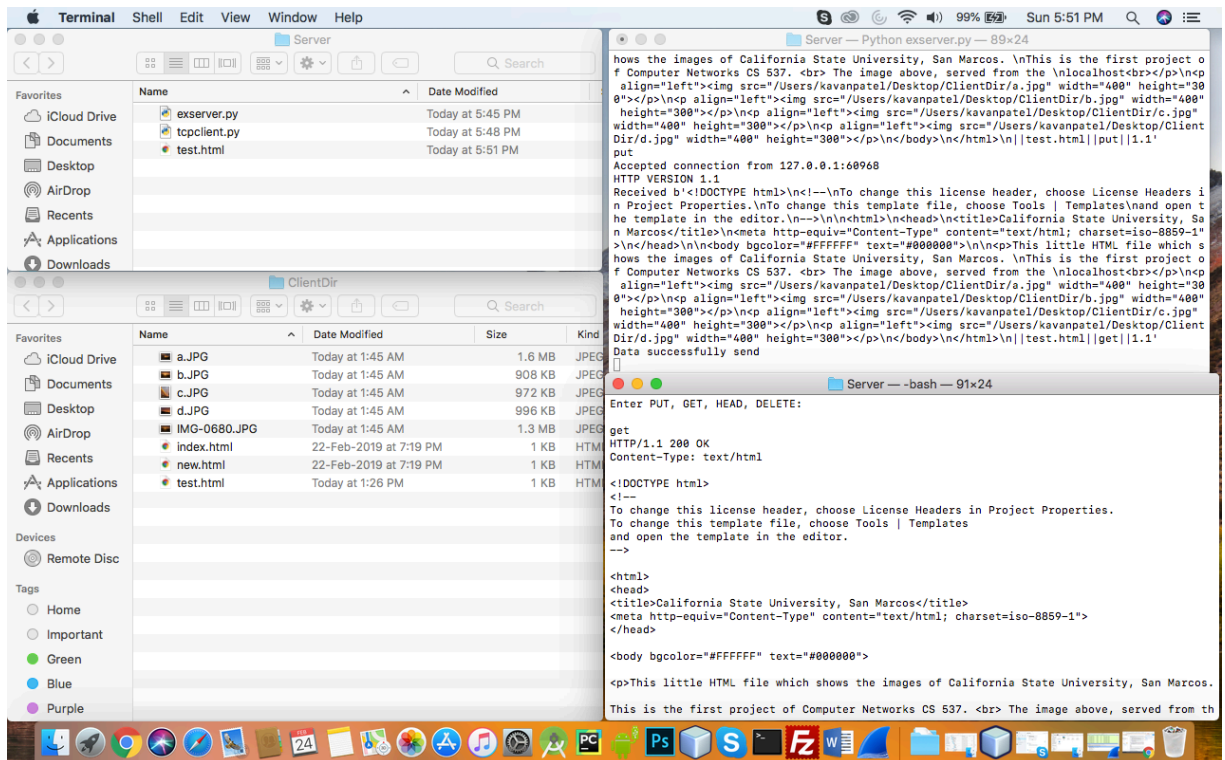
1 step:

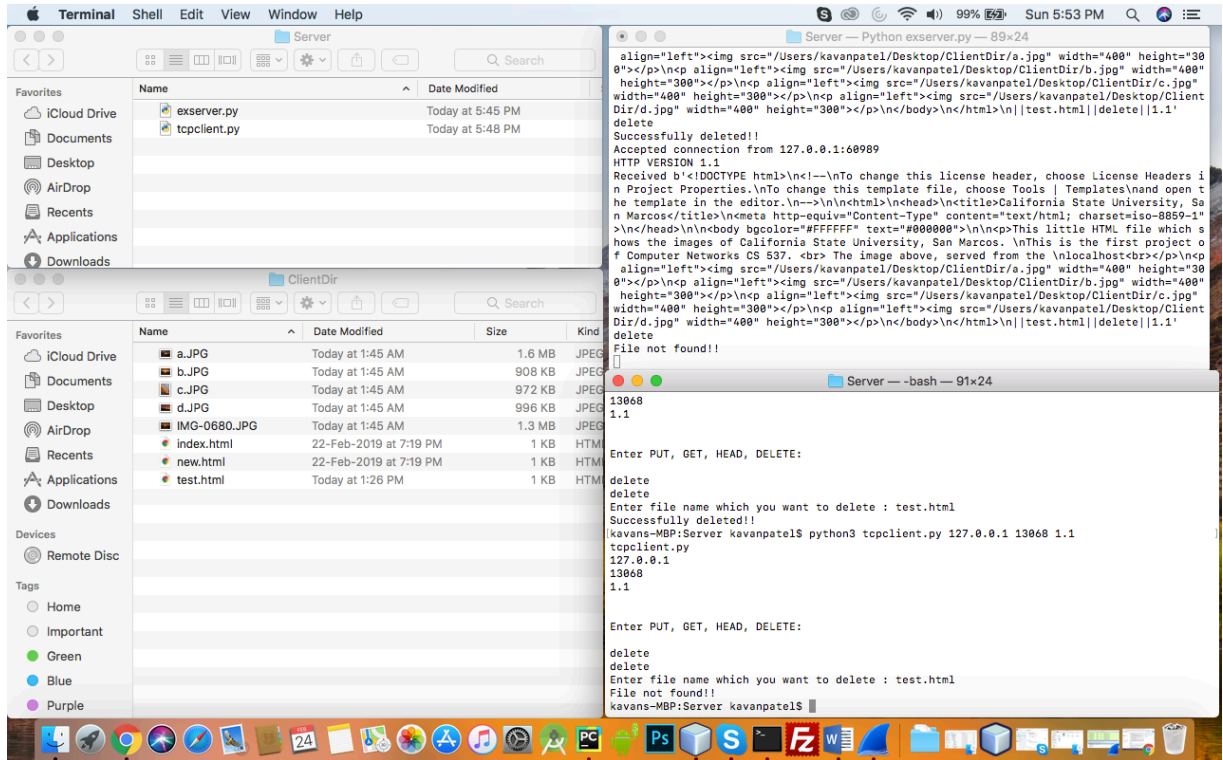
User has option for 4 methods.

As user selects the method, operation happens Using HTTP 1.1 or 1.0 as preferred by user.

Below are the screenshot of working code on MacBoook.







RUN WITH TELNET

V1.0

```
telnet> open localhost 13002
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^I'.
GET /index.html HTTP/1.0
HTTP/1.1 200 OK
Content-Type: text/html

<!DOCTYPE html>
<!--
To change this license header, choose License Headers in Project Properties.
To change this template file, choose Tools | Templates
and open the template in the editor.
-->

<html>
<head>
<title>California State University, San Marcos</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#FFFFFF" text="#000000">

<p>This little HTML file which shows the images of California State University, San Marcos.
This is the first project of Computer Networks CS 537. <br> The image above, served from the
localhost<br></p>
<p align="left"></p>
<p align="left"></p>
<p align="left"></p>
<p align="left"></p>
</body>
</html>
Connection closed by foreign host.
[kavans-MBP:~ kavanpatel$ telnet
telnet> open localhost 13002
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^I'.
HEAD /index.html HTTP/1.0
HTTP/1.1 200 OK
Content-Type: text/html

<!DOCTYPE html>
<!--
To change this license header, choose License Headers in Project Properties.
To change this template file, choose Tools | Templates
and open the template in the editor.
-->

<html>
<head>
<title>California State University, San Marcos</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">

</head>Connection closed by foreign host.
kavans-MBP:~ kavanpatel$ █
```

V1.1

```
telnet> open localhost 13002
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^J'.
GET /index.http HTTP/1.1
HTTP/1.1 200 OK
Content-Type: text/html

<!DOCTYPE html>
<!--
To change this license header, choose License Headers in Project Properties.
To change this template file, choose Tools | Templates
and open the template in the editor.
-->

<html>
<head>
<title>California State University, San Marcos</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#FFFFFF" text="#000000">

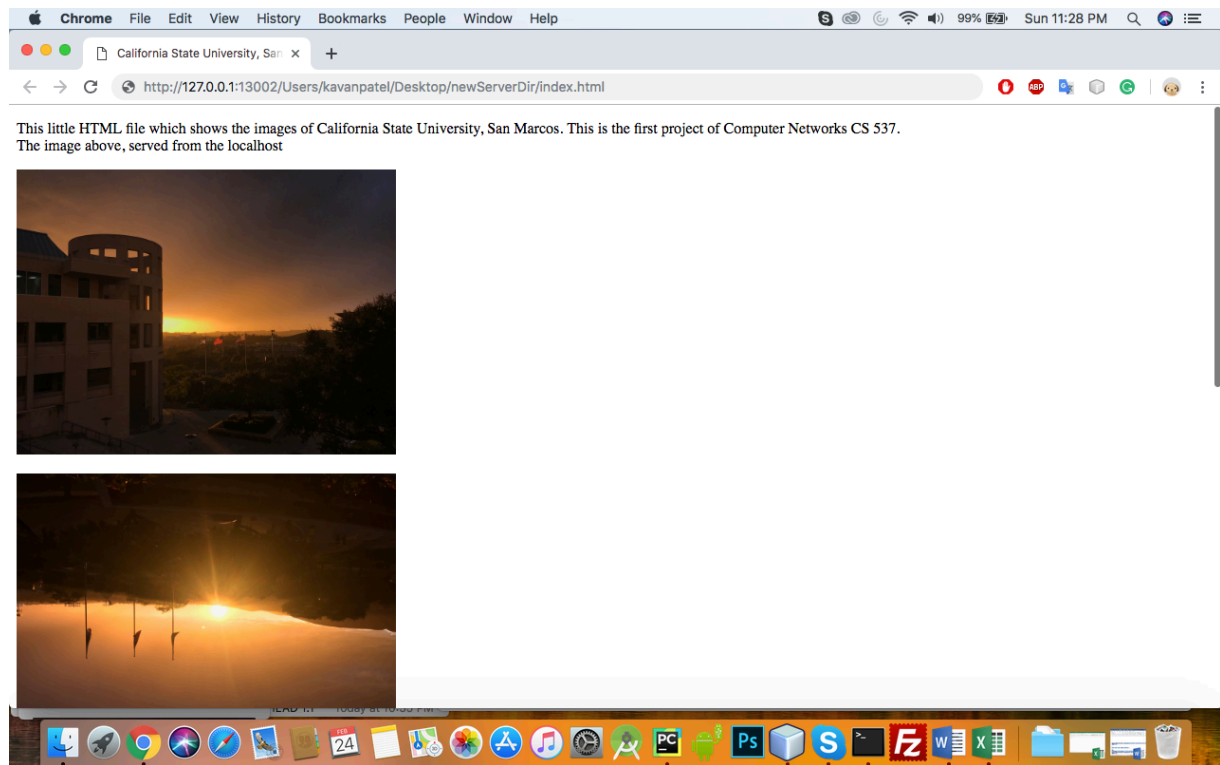
<p>This little HTML file which shows the images of California State University, San Marcos.
This is the first project of Computer Networks CS 537. <br> The image above, served from the
localhost<br></p>
<p align="left"></p>
<p align="left"></p>
<p align="left"></p>
<p align="left"></p>
</body>
</html>
Connection closed by foreign host.
|kavans-MBP:~ kavanpatel$ telnet
telnet> open localhost 13002
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^J'.
HEAD /index.html HTTP/1.1
HTTP/1.1 200 OK
Content-Type: text/html

<!DOCTYPE html>
<!--
To change this license header, choose License Headers in Project Properties.
To change this template file, choose Tools | Templates
and open the template in the editor.
-->

<html>
<head>
<title>California State University, San Marcos</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">

</head>Connection closed by foreign host.
kavans-MBP:~ kavanpatel$ █
```

Run WEB



Server Run:

```
/usr/local/bin/python3.7 /Users/kavanpatel/Desktop/CS537/ServerDir/exserver.py
```

Server Listening on localhost:13002

The server is ready to receive

Accepted connection from 127.0.0.1:65191

HTTP VERSION 1.1

```
Received b'<!DOCTYPE html>\n<!--\n\nTo change this license header, choose License Headers in Project
Properties.\n\nTo change this template file, choose Tools | Templates\n\nand open the template in the
editor.\n\n-->\n\n<html>\n\n<head>\n\n<title>California State University, San Marcos</title>\n\n<meta http-
equiv="Content-Type" content="text/html; charset=iso-8859-1">\n\n</head>\n\n<body
bgcolor="#FFFFFF" text="#000000">\n\n<p>This little HTML file which shows the images of California
State University, San Marcos. \n\nThis is the first project of Computer Networks CS 537. <br> The image
above, served from the \nlocalhost<br></p>\n\n<p align="left"></p>\n\n<p
align="left"><img src="/Users/kavanpatel/Desktop/ClientDir/b.jpg" width="400
```



```
height="300"></p>\n<p align="left"></p>\n<p align="left"></p>\n</body>\n</html>\n| | index.html | | put | | 1.1'
```

put

Accepted connection from 127.0.0.1:65192

HTTP VERSION 1.1

```
Received b'<!DOCTYPE html>\n<!--\n\nTo change this license header, choose License Headers in Project
Properties.\n\nTo change this template file, choose Tools | Templates\n\nand open the template in the
editor.\n\n-->\n\n<html>\n<head>\n<title>California State University, San Marcos</title>\n<meta http-
equiv="Content-Type" content="text/html; charset=iso-8859-1">\n</head>\n\n<body
bgcolor="#FFFFFF" text="#000000">\n\n<p>This little HTML file which shows the images of California
State University, San Marcos. \n\nThis is the first project of Computer Networks CS 537. <br> The image
above, served from the \nlocalhost<br></p>\n<p align="left"></p>\n<p
align="left"></p>\n<p align="left"></p>\n<p align="left"></p>\n</body>\n</html>\n| | index.html | | get | | 1.1'
```

Data successfully send

Accepted connection from 127.0.0.1:65193

HTTP VERSION 1.1

```
Received b'<!DOCTYPE html>\n<!--\n\nTo change this license header, choose License Headers in Project
Properties.\n\nTo change this template file, choose Tools | Templates\n\nand open the template in the
editor.\n\n-->\n\n<html>\n<head>\n<title>California State University, San Marcos</title>\n<meta http-
equiv="Content-Type" content="text/html; charset=iso-8859-1">\n</head>\n\n<body
bgcolor="#FFFFFF" text="#000000">\n\n<p>This little HTML file which shows the images of California
State University, San Marcos. \n\nThis is the first project of Computer Networks CS 537. <br> The image
above, served from the \nlocalhost<br></p>\n<p align="left"></p>\n<p
align="left"></p>\n<p align="left"></p>\n<p align="left"></p>\n</body>\n</html>\n| | index.html | | head | | 1.1'
```

head

Data successfully send

Accepted connection from 127.0.0.1:65194

HTTP VERSION 1.1

```
Received b'<!DOCTYPE html>\n<!--\nTo change this license header, choose License Headers in Project
Properties.\nTo change this template file, choose Tools | Templates\nand open the template in the
editor.\n-->\n\n<html>\n<head>\n<title>California State University, San Marcos</title>\n<meta http-
equiv="Content-Type" content="text/html; charset=iso-8859-1">\n</head>\n\n<body
bgcolor="#FFFFFF" text="#000000">\n\n<p>This little HTML file which shows the images of California
State University, San Marcos. \nThis is the first project of Computer Networks CS 537. <br> The image
above, served from the \nlocalhost<br></p>\n<p align="left"></p>\n<p
align="left"></p>\n<p align="left"></p>\n<p align="left"></p>\n</body>\n</html>\n| | index.html | | delete | | 1.1'
```

delete

Successfully deleted!!

Accepted connection from 127.0.0.1:65195

HTTP VERSION 1.1

```
Received b'<!DOCTYPE html>\n<!--\nTo change this license header, choose License Headers in Project
Properties.\nTo change this template file, choose Tools | Templates\nand open the template in the
editor.\n-->\n\n<html>\n<head>\n<title>California State University, San Marcos</title>\n<meta http-
equiv="Content-Type" content="text/html; charset=iso-8859-1">\n</head>\n\n<body
bgcolor="#FFFFFF" text="#000000">\n\n<p>This little HTML file which shows the images of California
State University, San Marcos. \nThis is the first project of Computer Networks CS 537. <br> The image
above, served from the \nlocalhost<br></p>\n<p align="left"></p>\n<p
align="left"></p>\n<p align="left"></p>\n<p align="left"></p>\n</body>\n</html>\n| | index.html | | delete | | 1.1'
```

delete

File not found!!

Accepted connection from 127.0.0.1:65196

HTTP VERSION 1.0

```
Received b'<!DOCTYPE html>\n<!--\nTo change this license header, choose License Headers in Project
Properties.\nTo change this template file, choose Tools | Templates\nand open the template in the
editor.\n-->\n\n<html>\n<head>\n<title>California State University, San Marcos</title>\n<meta http-
equiv="Content-Type" content="text/html; charset=iso-8859-1">\n</head>\n\n<body
bgcolor="#FFFFFF" text="#000000">\n\n<p>This little HTML file which shows the images of California
State University, San Marcos. \nThis is the first project of Computer Networks CS 537. <br> The image
above, served from the \nlocalhost<br></p>\n<p align="left"></p>\n<p
align="left"></p>\n<p align="left"></p>\n<p align="left"></p>\n</body>\n</html>\n| | index.html | | put | | 1.0'
```

put

Accepted connection from 127.0.0.1:65197

HTTP VERSION 1.0

```
Received b'<!DOCTYPE html>\n<!--\nTo change this license header, choose License Headers in Project
Properties.\nTo change this template file, choose Tools | Templates\nand open the template in the
editor.\n-->\n\n<html>\n<head>\n<title>California State University, San Marcos</title>\n<meta http-
equiv="Content-Type" content="text/html; charset=iso-8859-1">\n</head>\n\n<body
bgcolor="#FFFFFF" text="#000000">\n\n<p>This little HTML file which shows the images of California
State University, San Marcos. \nThis is the first project of Computer Networks CS 537. <br> The image
above, served from the \nlocalhost<br></p>\n<p align="left"></p>\n<p
align="left"></p>\n<p align="left"></p>\n<p align="left"></p>\n</body>\n</html>\n| | index.html | | get | | 1.0'
```

Data successfully send

Accepted connection from 127.0.0.1:65198

HTTP VERSION 1.0

Received b'<!DOCTYPE html>\n<!--\nTo change this license header, choose License Headers in Project Properties.\nTo change this template file, choose Tools | Templates\nand open the template in the editor.\n-->\n\n<html>\n<head>\n<title>California State University, San Marcos</title>\n<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">\n</head>\n\n<body bgcolor="#FFFFFF" text="#000000">\n\n<p>This little HTML file which shows the images of California State University, San Marcos. \nThis is the first project of Computer Networks CS 537.
 The image above, served from the \nlocalhost
</p>\n<p align="left"></p>\n<p align="left"></p>\n<p align="left"></p>\n<p align="left"></p>\n</body>\n</html>\n| | index.html | | head | | 1.0'

head

Data successfully send

Accepted connection from 127.0.0.1:65199

HTTP VERSION 1.0

Received b'<!DOCTYPE html>\n<!--\nTo change this license header, choose License Headers in Project Properties.\nTo change this template file, choose Tools | Templates\nand open the template in the editor.\n-->\n\n<html>\n<head>\n<title>California State University, San Marcos</title>\n<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">\n</head>\n\n<body bgcolor="#FFFFFF" text="#000000">\n\n<p>This little HTML file which shows the images of California State University, San Marcos. \nThis is the first project of Computer Networks CS 537.
 The image above, served from the \nlocalhost
</p>\n<p align="left"></p>\n<p align="left"></p>\n<p align="left"></p>\n<p align="left"></p>\n</body>\n</html>\n| | index.html | | delete | | 1.0'

delete

Successfully deleted!!

Client Run

```
kavans-MBP:ServerDir kavanpatel$ python3 tcpclient.py 127.0.0.1 13002  
1.1
```

Enter PUT, GET, HEAD, DELETE:

put

```
b'Message from server : File successfully uploded!!'
```

```
kavans-MBP:ServerDir kavanpatel$ python3 tcpclient.py 127.0.0.1 13002  
1.1
```

Enter PUT, GET, HEAD, DELETE:

get

```
HTTP/1.1 200 OK
```

```
Content-Type: text/html
```

```
<!DOCTYPE html>
```

```
<!--
```

To change this license header, choose License Headers in Project Properties.

To change this template file, choose Tools | Templates
and open the template in the editor.

```
-->
```

```
<html>

<head>

<title>California State University, San Marcos</title>

<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">

</head>


<body bgcolor="#FFFFFF" text="#000000">


<p>This little HTML file which shows the images of California State University, San Marcos.

This is the first project of Computer Networks CS 537. <br> The image above, served from the

localhost<br></p>

<p align="left"></p>

<p align="left"></p>

<p align="left"></p>

<p align="left"></p>

</body>

</html>
```

```
kavans-MBP:ServerDir kavanpatel$ python3 tcpclient.py 127.0.0.1 13002
1.1
```

Enter PUT, GET, HEAD, DELETE:

head

HTTP/1.1 200 OK

Content-Type: text/html

<!DOCTYPE html>

<!--

To change this license header, choose License Headers in Project Properties.

To change this template file, choose Tools | Templates and open the template in the editor.

-->

<html>

<head>

<title>California State University, San Marcos</title>

<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">

</head>

kavans-MBP:ServerDir kavanpatel\$ python3 tcpclient.py 127.0.0.1 13002
1.1

Enter PUT, GET, HEAD, DELETE:

delete

Enter file name which you want to delete : index.html

Successfully deleted!!

kavans-MBP:ServerDir kavanpatel\$ python3 tcpclient.py 127.0.0.1 13002
1.1

Enter PUT, GET, HEAD, DELETE:

delete

Enter file name which you want to delete : index.html

File not found!!

kavans-MBP:ServerDir kavanpatel\$ python3 tcpclient.py 127.0.0.1 13002
1.0

Enter PUT, GET, HEAD, DELETE:

put

b'Message from server : File successfully uploded!!'

kavans-MBP:ServerDir kavanpatel\$ python3 tcpclient.py 127.0.0.1 13002
1.0

Enter PUT, GET, HEAD, DELETE:

get

HTTP/1.1 200 OK

Content-Type: text/html

```
<!DOCTYPE html>
```

```
<!--
```

To change this license header, choose License Headers in Project Properties.

To change this template file, choose Tools | Templates and open the template in the editor.

```
-->
```

```
<html>
```

```
<head>
```

```
<title>California State University, San Marcos</title>
```

```
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
```

```
</head>
```

```
<body bgcolor="#FFFFFF" text="#000000">
```

```
<p>This little HTML file which shows the images of California State University, San Marcos.
```

```
This is the first project of Computer Networks CS 537. <br> The image above, served from the
```

```
localhost<br></p>
```

```
<p align="left"></p>
```

```
<p align="left"></p>
```

```
<p align="left"></p>
```

```
<p align="left"></p>
```

```
</body>
```

```
</html>
```

```
kavans-MBP:ServerDir kavanpatel$ python3 tcpclient.py 127.0.0.1 13002
1.0
```

Enter PUT, GET, HEAD, DELETE:

head

HTTP/1.1 200 OK

Content-Type: text/html

```
<!DOCTYPE html>
```

```
<!--
```

To change this license header, choose License Headers in Project Properties.

To change this template file, choose Tools | Templates
and open the template in the editor.

```
-->
```

```
<html>
```

```
<head>
```

```
<title>California State University, San Marcos</title>
```

```
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
```

```
</head>
```

```
kavans-MBP:ServerDir kavanpatel$ python3 tcpclient.py 127.0.0.1 13002  
1.0
```

Enter PUT, GET, HEAD, DELETE:

delete

Enter file name which you want to delete : index.html

Successfully deleted!!

```
kavans-MBP:ServerDir kavanpatel$
```

HTTP /1.0

10 Times For Loop			100 Times For Loop		
StartTime	EndTime	Difference	StartTime	EndTime	Difference
9.600691	9.629809	0.029225	9.629823	9.913601	0.283756
23.987395	23.015476	0.028061	23.015497	23.298338	0.282852
31.629045	31.656881	0.027845	31.656891	31.946975	0.290152
26.899531	26.926282	0.026651	26.926292	26.201208	0.275023
29.025419	29.054336	0.028939	29.054347	29.343398	0.289621
33.558552	33.586498	0.027926	33.586524	33.878052	0.291562
33.925984	33.95453	0.028351	33.954543	34.23527	0.280736
28.605461	28.633132	0.027776	28.63342	28.908358	0.275245
Average Time Difference		0.028097	Average Time Difference		0.283618

HTTP /1.1

10 Times For Loop			100 Times For Loop		
StartTime	EndTime	Difference	StartTime	EndTime	Difference
4.336745	4.336735	0.026526	4.336745	4.589663	0.252952
8.839157	8.863977	0.024856	8.863987	9.102088	0.238069
36.152788	36.178772	0.025952	36.178783	36.413712	0.234965
52.564660	52.589014	0.024349	52.589024	52.822968	0.233950
29.577630	29.603726	0.026021	29.603740	29.851239	0.247456
29.656105	29.685525	0.029426	29.685543	29.936716	0.251202
55.655417	55.679575	0.024173	55.679586	55.909686	0.230153
57.079782	57.107096	0.027296	57.107107	57.342505	0.235523
Average Time Difference		0.026075	Average Time Difference		0.240534

Analysis

HTTP 1.1 Persistent

HTTP 1.1 also allows you to have persistent connections which means that you can have more than one request/response on the same HTTP connection.

HTTP 1.0 Persistent

In HTTP 1.0 you had to open a new connection for each request/response pair. And after each response the connection would be closed. This lead to some big efficiency problems because of TCP slow start.

Analysis: HTTP version 1.1 is better then 1.0 when we have many request (i.e 100) done at a same time but when we perform less requests then 1.0 is better because it consumes less time.

Reason: When we do many request on server then in 1.0 it make connection on every request it is good for less request. When we do request on server then 1.1 open connection for every request so it consumes less time.

References:

<https://stackoverflow.com/questions/246859/http-1-0-vs-1-1>

www.Google.com