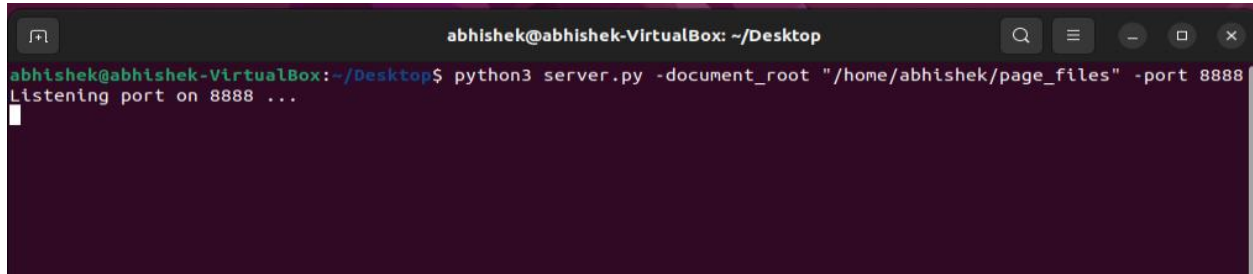


# CS249: Distributed Systems Fall 2022 Programming Assignment 1

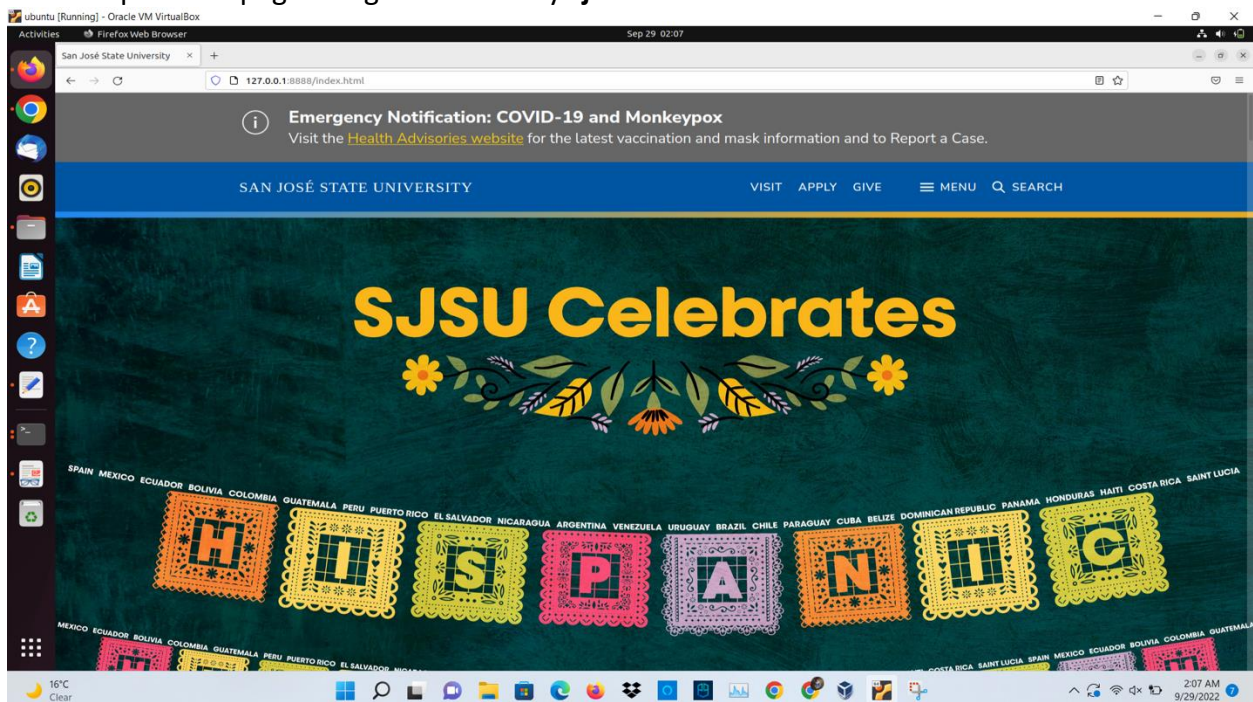
## Name – Abhishek Vaid

- 1.) As seen below I start my server at port 8888 by using command `python3 server.py -document_root "/some-path" -port 8888`. Once the server starts it opens listening port on 8888.

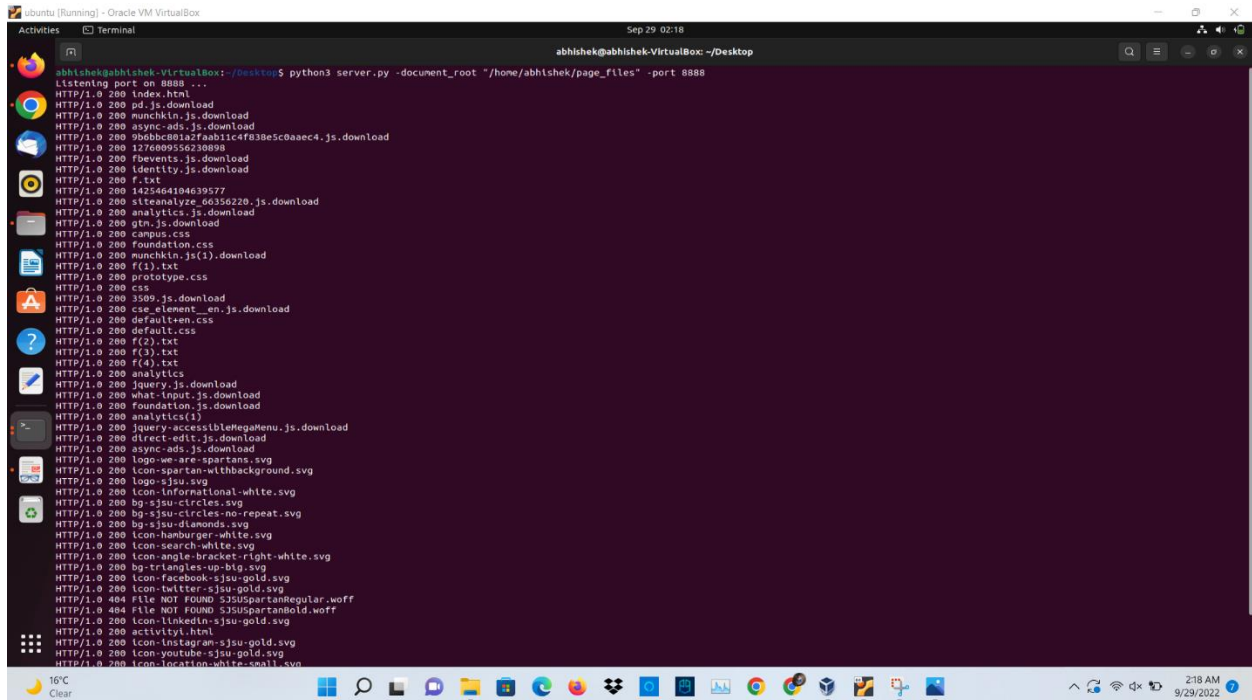


```
abhishek@abhishek-VirtualBox: ~/Desktop
abhishek@abhishek-VirtualBox:~/Desktop$ python3 server.py -document_root "/home/abhishek/page_files" -port 8888
Listening port on 8888 ...
```

- 2.) As seen below I GET the SJSU home local URL on browser as **127.0.0.1/index.html**, this opens the page using data from my **sjsu** home folder.

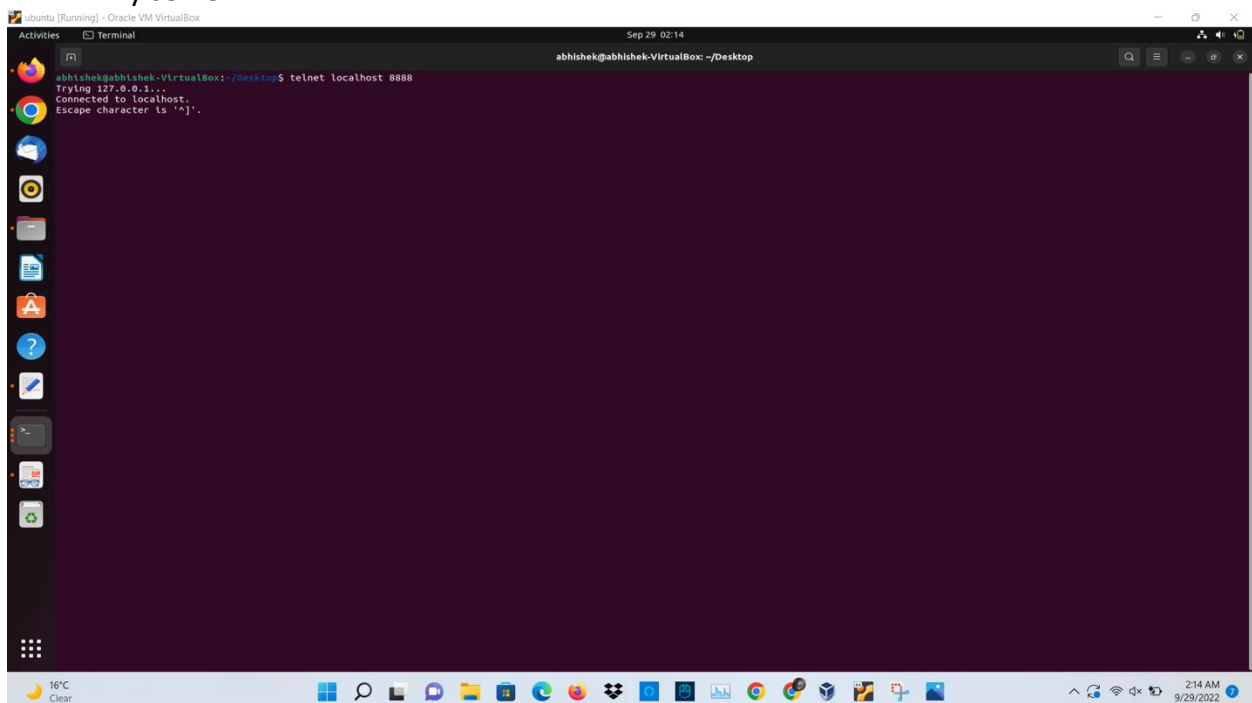


- 3.) When I GET the URL on the browser many HTTP 1.0 connections are made and page files are transferred, as seen below the reference of the connection transmission is like **HTTP/1.0 200 filename** which is transferred in response to GET from browser. Here **200** is code for status ok.



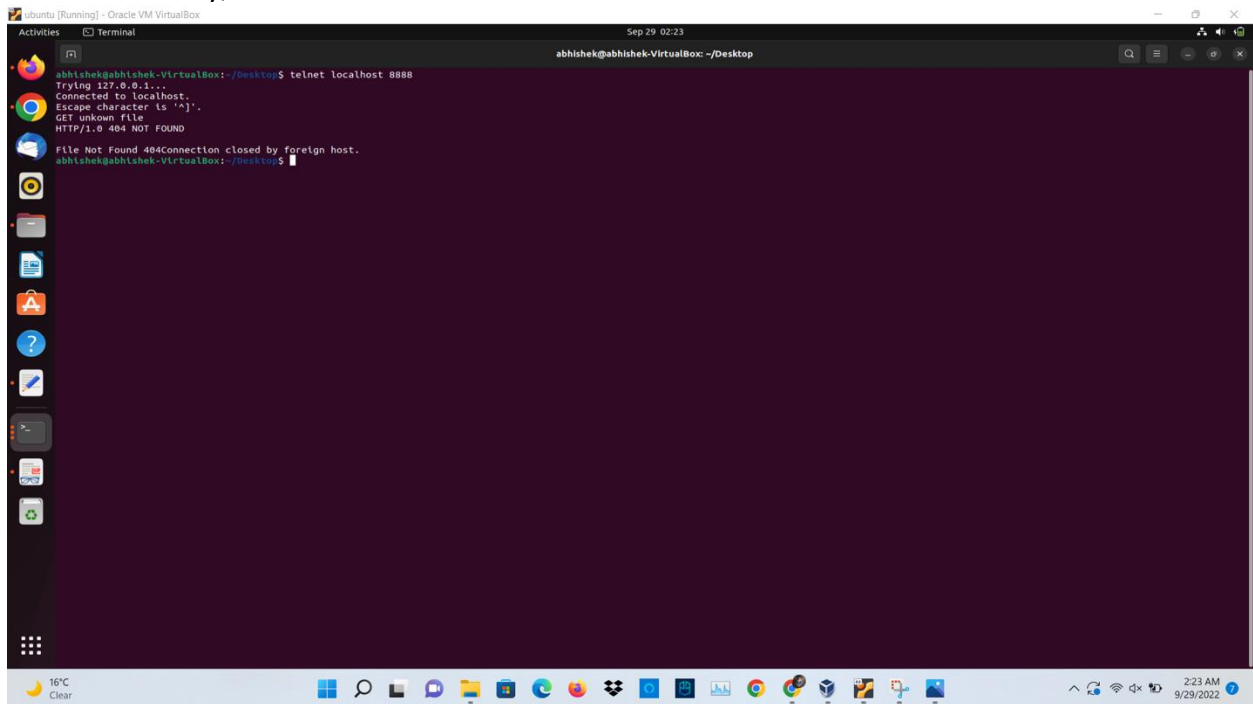
```
abhishek@abhishek-VirtualBox: ~/Desktop$ python3 server.py -document_root "/home/abhishek/page_files" -port 8888
Listening port on 8888 ...
HTTP/1.0 200 index.html
HTTP/1.0 200 pd.js.download
HTTP/1.0 200 munchkin.js.download
HTTP/1.0 200 async-ads.js.download
HTTP/1.0 200 9b6bcb8e1a2faab11c4f839e5c0aaec4.js.download
HTTP/1.0 200 1276009556210098
HTTP/1.0 200 fbevents.js.download
HTTP/1.0 200 ldentity.js.download
HTTP/1.0 200 f.txt
HTTP/1.0 200 1425464184639577
HTTP/1.0 200 siteanalyze_66356228.js.download
HTTP/1.0 200 analytics.js.download
HTTP/1.0 200 gtn.js.download
HTTP/1.0 200 campus.css
HTTP/1.0 200 foundation.css
HTTP/1.0 200 munchkin.js(1).download
HTTP/1.0 200 f(1).txt
HTTP/1.0 200 prototype.css
HTTP/1.0 200 css
HTTP/1.0 200 3509.js.download
HTTP/1.0 200 cse.element_en.js.download
HTTP/1.0 200 default+en.css
HTTP/1.0 200 default.css
HTTP/1.0 200 f(2).txt
HTTP/1.0 200 f(3).txt
HTTP/1.0 200 f(4).txt
HTTP/1.0 200 analytics
HTTP/1.0 200 jquery.js.download
HTTP/1.0 200 what-input.js.download
HTTP/1.0 200 foundation.js.download
HTTP/1.0 200 analytics(1)
HTTP/1.0 200 jquery-accessibleMenu.js.download
HTTP/1.0 200 direct-edit.js.download
HTTP/1.0 200 async-ads.js.download
HTTP/1.0 200 logo-we-are-spartans.svg
HTTP/1.0 200 icon-spartan-withbackground.svg
HTTP/1.0 200 logo-sjsu.svg
HTTP/1.0 200 icon-informational-white.svg
HTTP/1.0 200 bg-sjsu-circles.svg
HTTP/1.0 200 bg-sjsu-circles-no-repeat.svg
HTTP/1.0 200 bg-sjsu-diamonds.svg
HTTP/1.0 200 icon-hamburger-white.svg
HTTP/1.0 200 icon-search-white.svg
HTTP/1.0 200 icon-angle-bracket-right-white.svg
HTTP/1.0 200 bg-triangles-up-bkg.svg
HTTP/1.0 200 icon-facebook-sjsu-gold.svg
HTTP/1.0 200 icon-twitter-sjsu-gold.svg
HTTP/1.0 404 file NOT FOUND sjsuspartanRegular.woff
HTTP/1.0 404 file NOT FOUND sjsuspartanBold.woff
HTTP/1.0 200 icon-linkedin-sjsu-gold.svg
HTTP/1.0 200 activity.html
HTTP/1.0 200 icon-instagram-sjsu-gold.svg
HTTP/1.0 200 icon-youtube-sjsu-gold.svg
HTTP/1.0 200 icon-location-white-small.svg
```

- 4.) As seen below when I use telnet localhost 8888 capability, it establishes connection with my server.



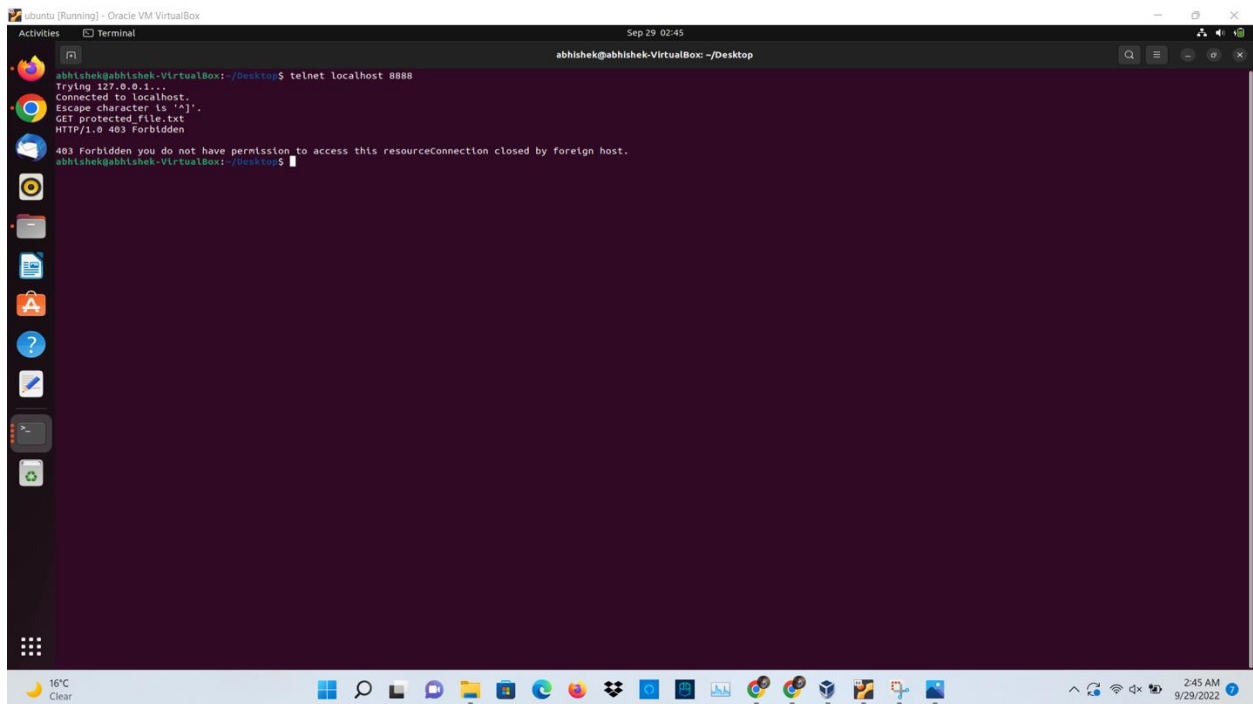
```
abhishek@abhishek-VirtualBox: ~/Desktop$ telnet localhost 8888
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^['.
```

- 5.) As seen below when I GET a unknown file or anything that is not present in the root directory, the server return **404** not found status code.



```
abhishek@abhishek-VirtualBox: ~/Desktop
abhishek@abhishek-VirtualBox:~/Desktop$ telnet localhost 8888
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
GET unknow file
HTTP/1.0 404 NOT FOUND
File Not Found 404Connection closed by foreign host.
abhishek@abhishek-VirtualBox:~/Desktop$
```

- 6.) As seen below, when I try to GET a protected file, the server returns **403** Forbidden status code.



```
abhishek@abhishek-VirtualBox: ~/Desktop
abhishek@abhishek-VirtualBox:~/Desktop$ telnet localhost 8888
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
GET protected_file.txt
HTTP/1.0 403 Forbidden
403 Forbidden you do not have permission to access this resourceConnection closed by foreign host.
abhishek@abhishek-VirtualBox:~/Desktop$
```

7.) As seen below, when I try to make any other method request other than GET like POST, then the server responds with **400** Bad invalid request connection status code.

The screenshot shows a terminal window titled "Terminal" with the prompt "abhishek@abhishek-VirtualBox: ~". The user has entered the command "telnet localhost 8881". The output of the command is as follows:

```

Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
POST new
HTTP/1.0 400 Bad Request
400 Error caused by an invalid requestConnection closed by foreign host.
abhishek@abhishek-VirtualBox: ~

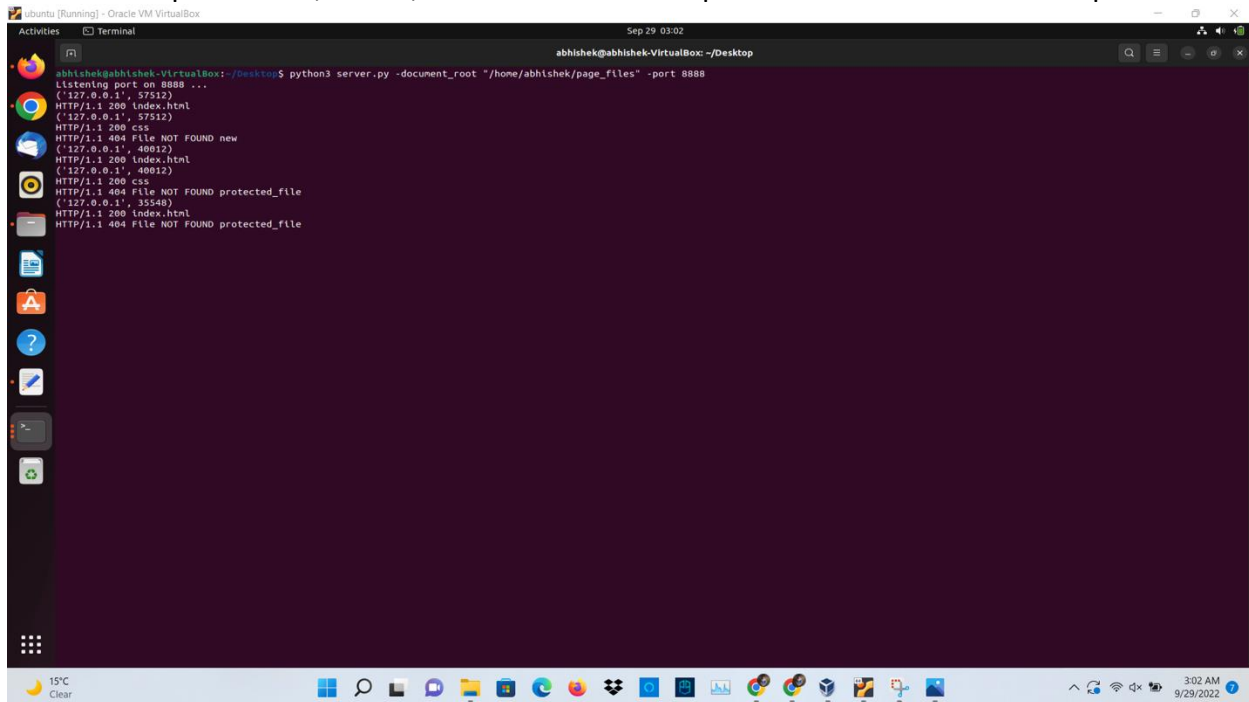
```

The terminal window is part of a desktop environment. The top bar shows "Activities" and "Terminal". The bottom bar shows system status, including "20°C Clear", "9:41 PM", and "9/29/2022". The desktop background is dark, and there are several application icons on the left and bottom panels.

8.) As seen below when I make a GET request on telnet it returns my server response as shown, the server return header of response containing request status code, content-type, content-length, and current date.

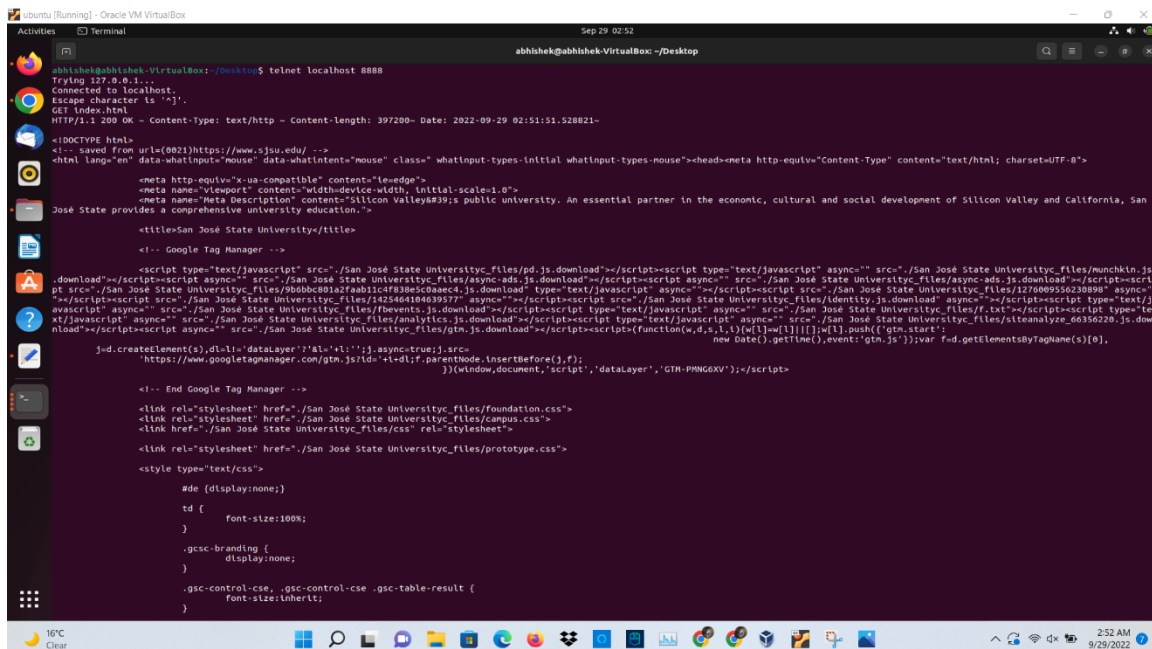
The image shows a Windows 10 desktop with a taskbar at the bottom. A terminal window titled 'abhishek@abhishek-VirtualBox: ~/Desktop' is open, displaying a netcat listener on port 8888. It receives a connection from 127.0.0.1, which sends a GET request for 'index.html'. The terminal shows the content of the file, which is an HTML page for 'San José State University'. The page includes a Google Tag Manager script and a JavaScript alert box that says 'GTM-PMNG6XV'. The browser window in the background shows the Google Chrome interface with the alert box visible. The system tray at the bottom right shows the date and time as 9/29/2022, 2:47 AM.

- 9.) When we use **HTTP 1.1** as shown below some requests are handled on the same connection rather than in HTTP 1.0 where each request requires one connection. As seen port 57512, 40012, 35548 are used multiple times for simultaneous requests.



```
abhishek@abhishek-VirtualBox:~/Desktop$ python3 server.py -document_root "/home/abhishek/page_files" -port 8888
Listening port on 8888 ...
('127.0.0.1', 57512)
HTTP/1.1 200 index.html
('127.0.0.1', 57512)
HTTP/1.1 200 css
HTTP/1.1 404 File NOT FOUND new
('127.0.0.1', 40012)
HTTP/1.1 200 index.html
('127.0.0.1', 40012)
HTTP/1.1 200 css
HTTP/1.1 404 File NOT FOUND protected_file
('127.0.0.1', 35548)
HTTP/1.1 200 index.html
HTTP/1.1 404 File NOT FOUND protected_file
```

- 10.) As shown below in 2 screenshots on 2 simultaneous GET requests on HTTP1.1, the server keeps working and keeps connection open on port 57512.



```
abhishek@abhishek-VirtualBox:~/Desktop$ telnet localhost 8888
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^['.
GET index.html
HTTP/1.1 200 OK - Content-Type: text/html - Content-Length: 397200 - Date: 2022-09-29 02:51:51.528821-

<!DOCTYPE html>
<!-- saved from url=(0021)https://www.sjsu.edu/ -->
<html lang="en" data-whatinput="mouse" data-whatintent="mouse" class="" whatinput-types-initial whatinput-types-mouse"><head><meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
<meta http-equiv="x-ua-compatible" content="ie=edge">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<meta name="Meta Description" content="Silicon Valley&#39;s public university. An essential partner in the economic, cultural and social development of Silicon Valley and California, San
José State provides a comprehensive university education.">
<title>San José State University</title>
<!-- Google Tag Manager -->
<script type="text/javascript" src="/San José State University_files/pd.js.download"></script><script type="text/javascript" async="" src="/San José State University_files/munchkin.js
.download"></script><script async="" src="/San José State University_files/async-ads.js.download"></script><script async="" src="/San José State University_files/async-ads.js.download"></script><scri
pt src="/San José State University_files/9b8b8c81a2faab1c4f838e5c0a6c4.js.download" type="text/javascript" async=""></script><script src="/San José State University_files/1276089556230898" async=""
"></script><script src="/San José State University_files/1425464104039577" async=""></script><script src="/San José State University_files/identity.js.download" async=""></script><script type="text/j
avascript" async="" src="/San José State University_files/pbevents.js.download"></script><script type="text/javascript" async="" src="/San José State University_files/f.txt"></script><script type="te
xt/javascript" async="" src="/San José State University_files/gtm.js.download"></script><script type="text/javascript" async="" src="/San José State University_files/siteanalyze_66356220.js.dow
nload"></script><script async="" src="/San José State University_files/gtm.js.download"></script><script>(function(w,d,s,l,i){w[l]=w[l]||[];w[l].push(({"gtm.start":
new Date().getTime(),event:'gtm.js'}));var f=d.getElementsByTagName(s)[0];
j=d.createElement(s),dl=l+"dataLayer"?&l="":'':j.async=true;j.src=
'https://www.googletagmanager.com/gtm.js?id='+i+dl;f.parentNode.insertBefore(j,f);
})(window,document,'script','dataLayer','GTM-PNMG6XV');</script>
<!-- End Google Tag Manager -->
<link rel="stylesheet" href="/San José State University_files/foundation.css">
<link rel="stylesheet" href="/San José State University_files/campus.css">
<link href="/San José State University_files/css" rel="stylesheet">
<link rel="stylesheet" href="/San José State University_files/prototype.css">
<style type="text/css">
#de {display:none;}
td {
font-size:100%;
}
.gsc-branding {
display:none;
}
.gsc-control-cse .gsc-control-cse .gsc-table-result {
font-size:inherit;
}
</style>
```



The screenshot shows a Kali Linux virtual machine with the following details:

- Window Title:** Kali Linux [VirtualBox]
- Terminal Title:** Sep 19 02:52
- Terminal Content:**

```

abhishek@abhishek-VirtualBox: ~/Desktop

</script>
<a href="https://www.cnn.com/2022/09/19/7skins-sjsu&account=sjsu&site=www&action=de&path=/index.php" target="_top" rel="nofollow" id="de">Last Upda

</main></div></div>
<script type="text/javascript" id="fb">function(b,e,f,g,a,c,d){b.fbq||(a.b.fbq=function(){a.callMethod;a.callMethod.apply(a,arguments);a.queue.push(arguments)};b._fbq||(b._fbq=a),a.push(a,a.loaded=!0,a ve
bq["init","1270095562308990"])(c,e,document(f),c.async=!0,c._scq=d,e.getIframeByTagName(f)[0],d.parentNode.insertBefore(c,d)))(window,document,"script","https://connect.facebook.net/en_US/fbevents.js");f
noscript</noscript>
<div class="gssb" cellpadding="0" role="presentation" class="gssb" style="width: 2px; display: none; top: 3px; position: absolute; left: -1px;">tbody<tr<td class="gssb" f">td<td class="gssb" style="width: 100%;"/></td></tr></tbody></table><div class="nalliber-caa" style="z-index: 2147483647 !important; text-transform: none !n
important; position: fixed;"></div></body></div sn-wrapper"></div></html>

GET /css
HTTP/1.1 200 OK - Content-Type: text/html - Content-Length: 268619 - Date: 2022-09-19 02:52:34.142470-

/* cyrillic-ext */
@font-face {
  font-family: 'Nunito Sans';
  font-style: normal;
  font-weight: 400;
  src: url(https://fonts.gstatic.com/s/nunitosans/v12/peqbQMInSLVBIvIo4XIM8CceZI9tScg.woff2) format('woff2');
  unicode-range: U+0400-04FF, U+1C80-1C88, U+20B4, U+2DE8-2DFF, U+A640-A6FF, U+E2E2-E2F7;
}

/* cyrillic */
@font-face {
  font-family: 'Nunito Sans';
  font-style: normal;
  font-weight: 400;
  src: url(https://fonts.gstatic.com/s/nunitosans/v12/peqbQMInSLVBIvIo4XIM8CceZI9tScg.woff2) format('woff2');
  unicode-range: U+0301, U+0400-04FF, U+0490-0491, U+04B0-04B1, U+2116;
}

/* vietnamese */
@font-face {
  font-family: 'Nunito Sans';
  font-style: normal;
  font-weight: 400;
  src: url(https://fonts.gstatic.com/s/nunitosans/v12/peqbQMInSLVBIvIo4XIM8CceZI9tScg.woff2) format('woff2');
  unicode-range: U+0102-0103, U+0110-0111, U+0128-0129, U+0168-0169, U+01A0-01A1, U+01AF-01B0, U+1E60-1E6F, U+20A0;
}

/* latin-ext */
@font-face {
  font-family: 'Nunito Sans';
  font-style: normal;
  font-weight: 400;
  src: url(https://fonts.gstatic.com/s/nunitosans/v12/peqbQMInSLVBIvIo4XIM8CceZI9tScg.woff2) format('woff2');
  unicode-range: U+0100-024F, U+0259, U+1E00-1EFF, U+2020, U+20A0-20AB, U+20AD-20CF, U+2113, U+2C60-2C7F, U+A720-A7FF;
}

/* latin */
@font-face {
  font-family: 'Nunito Sans';
  font-style: normal;
  font-weight: 400;
  src: url(https://fonts.gstatic.com/s/nunitosans/v12/peqbQMInSLVBIvIo4XIM8CceZI9tScg.woff2) format('woff2');
}

```

The image shows a terminal window titled "Ubuntu [Running] - Oracle VM VirtualBox" with a subtitle "Sep 29 03:10". The terminal is running a Python web server on port 8888. The output shows a series of HTTP requests and responses, including file downloads and status codes. The requests are from "127.0.0.1" and the responses are from "127.0.0.1". The responses include file names like "index.html", "pd.js", "munchkin.js", "async-ads.js", "9b6bbc01a2faab11c4f83be5c0aaec4.js", "1276809556230898", "14254640463957", "identity.js", "f.txt", "fsevents.js", "analytics.js", "foundation.css", "gdn.js", "siteanalyze\_60356220.js", "campus.css", "css", "prototype.css", "f(1).txt", "3509.js", "munchkin.js(1)", "default/en.css", "default.css", "cse\_element\_en.js", "f(2).txt", "f(3).txt", "analytics(1)", "f(4).txt", "analytics", "what-input.js", "jquery.js", "direct-edit.js", "jquery-accessibilityhelpers.js", "foundation.js", "icon-spartan-whitebackground.svg", "logo-sjsu.svg", "logo-we-are-spartans.svg", "async-ads.js", "icon-informational-white.svg", "icon-hamburger-white.svg", "icon-search-white.svg", "icon-angle-bracket-right-white.svg", "bg-sjsu-circles.svg", "bg-sjsu-diamonds.svg", "bg-triangles-up-big.svg", "bg-sjsu-circles-no-repeat.svg", "icon-location-white-small.svg", "File NOT FOUND SJSUspartanRegular.woff", "icon-facebook-sjsu-gold.svg", "File NOT FOUND SJSUspartanBold.woff", "icon-twitter-sjsu-gold.svg", "icon-linkedin-sjsu-gold.svg", "icon-instagram-sjsu-gold.svg", "activity.html", and "icon-vault-the-sjsu-gold.svg". The terminal window has a dark background and a light-colored text. The window title bar shows the application name and the current time. The window is open on a desktop environment with various icons visible on the left and bottom panels.