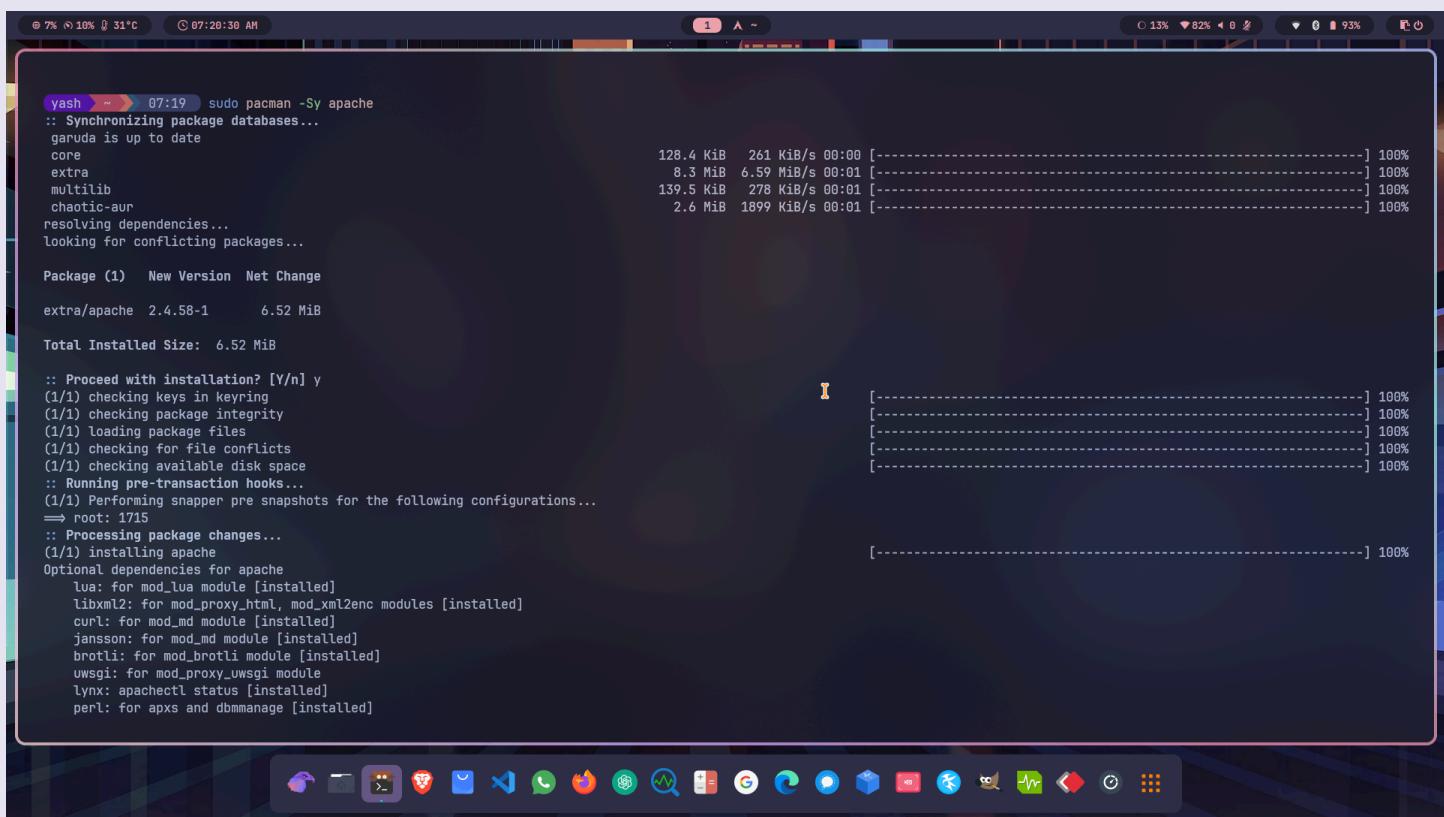


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## Exercises :

### 1) Configuration of apache web server

- Install apache or httpd from the current distro's repos or get local installation file



A screenshot of a Linux terminal window titled 'yash ~' at 07:19. The window shows the command 'sudo pacman -Sy apache' being run. The output indicates that the package database is synchronized, and the package 'extra/apache' version 2.4.58-1 is being installed. The total installed size is 6.52 MiB. The process involves several steps: checking keys in keyring, package integrity, loading package files, checking for file conflicts, checking available disk space, running pre-transaction hooks, performing snapper pre snapshots, and finally processing package changes. A progress bar shows the download and extraction of files. The terminal window has a dark theme with a blue header bar.

```
yash ~ 07:19 sudo pacman -Sy apache
:: Synchronizing package databases...
garuda is up to date
core
extra
multilib
chaotic-aur
resolving dependencies...
looking for conflicting packages...

Package (1) New Version Net Change
extra/apache 2.4.58-1      6.52 MiB

Total Installed Size: 6.52 MiB

:: Proceed with installation? [Y/n] y
(1/1) checking keys in keyring
(1/1) checking package integrity
(1/1) loading package files
(1/1) checking for file conflicts
(1/1) checking available disk space
:: Running pre-transaction hooks...
(1/1) Performing snapper pre snapshots for the following configurations...
==> root: 1715
:: Processing package changes...
(1/1) installing apache
Optional dependencies for apache
  lua: for mod_lua module [installed]
  libxml2: for mod_proxy_html, mod_xml2enc modules [installed]
  curl: for mod_md module [installed]
  jansson: for mod_md module [installed]
  brotli: for mod_brotli module [installed]
  uwsgi: for mod_proxy_uwsgi module
  lynx: apachectl status [installed]
  perl: for apxs and dbmmanage [installed]
```

Command : **sudo pacman -Sy apache**

Explanation : **pacman** is the package manager for arch or arch based linux distributions which requires root privileges hence, **sudo** is used. The options **-S** stands for sync (basically search) and **-Sy** is for search after syncing the repositories and then **apache** is the package in official repo to be downloaded

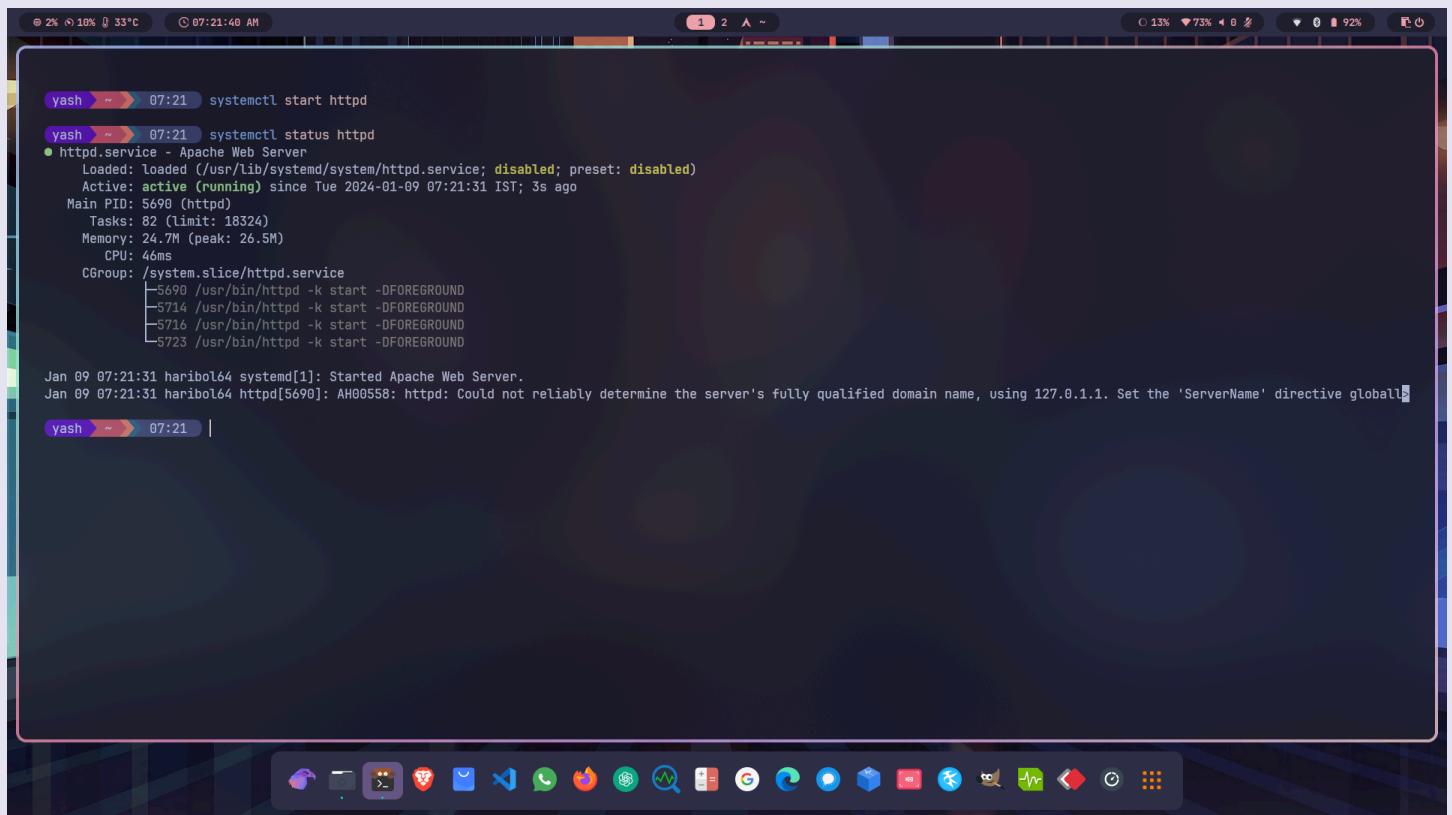
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b. Start the service of httpd daemon.



The screenshot shows a terminal window with a dark background and light-colored text. At the top, there are system status icons for battery level (2%), signal strength (10%), and temperature (33°C). The time is listed as 07:21:48 AM. The terminal title bar says "yash ~". The main area of the terminal shows the following command history:

```
yash ~ > 07:21 systemctl start httpd
yash ~ > 07:21 systemctl status httpd
● httpd.service - Apache Web Server
  Loaded: loaded (/usr/lib/systemd/system/httpd.service; disabled; preset: disabled)
  Active: active (running) since Tue 2024-01-09 07:21:31 IST; 3s ago
    Main PID: 5690 (httpd)
      Tasks: 82 (limit: 18324)
     Memory: 24.7M (peak: 26.5M)
        CPU: 46ms
       CGrou...
```

Below the command history, there are two log entries from the Apache server:

```
Jan 09 07:21:31 haribol64 systemd[1]: Started Apache Web Server.
Jan 09 07:21:31 haribol64 httpd[5690]: AH00058: httpd: Could not reliably determine the server's fully qualified domain name, using 127.0.1.1. Set the 'ServerName' directive globally.
```

At the bottom of the terminal window, there is a command prompt "yash ~ > 07:21 |".

Command : **systemctl start httpd** (or **httpd.service**)

Explanation : The linux distributions using systemd for bootloader and other service management uses command **systemctl** and the **start** stands for starting the service named **httpd**

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**2) Create one directory with your name and another with your friend's name in apache server's root directory and configure your apache server in such a way that whenever you try to access the contents of the directory with your name, it gets redirected and display contents from the directory with your friend's name.**

a. Root directory html

The screenshot shows a Linux desktop environment with a dark theme. On the left is a terminal window titled 'index.html - KWrite' containing the following command and its output:

```
yash ~ 07:23 cd /srv/http/
yash .../http 07:23 kwrite index.html
qt.qpa.wayland: Wayland does not support QWidget::requestActivate()
kf.sonnet.core: No language dictionaries for the language: "en_US"
```

To the right of the terminal is a KWrite text editor window with the file 'index.html' open. The content of the file is:

```
Hare Krishna!
The root dir of apache
```

The desktop bar at the bottom contains various application icons, including a browser, file manager, and system tools. The status bar at the bottom right shows the time as 3:23, mode as INSERT, soft tabs as 4, encoding as UTF-8, and file type as HTML.

Command : cd /srv/http (cd for change directory and then path)

Command : kwrite index.html (kwrite is a text editor based on kate and then file name if exists or create if does't)

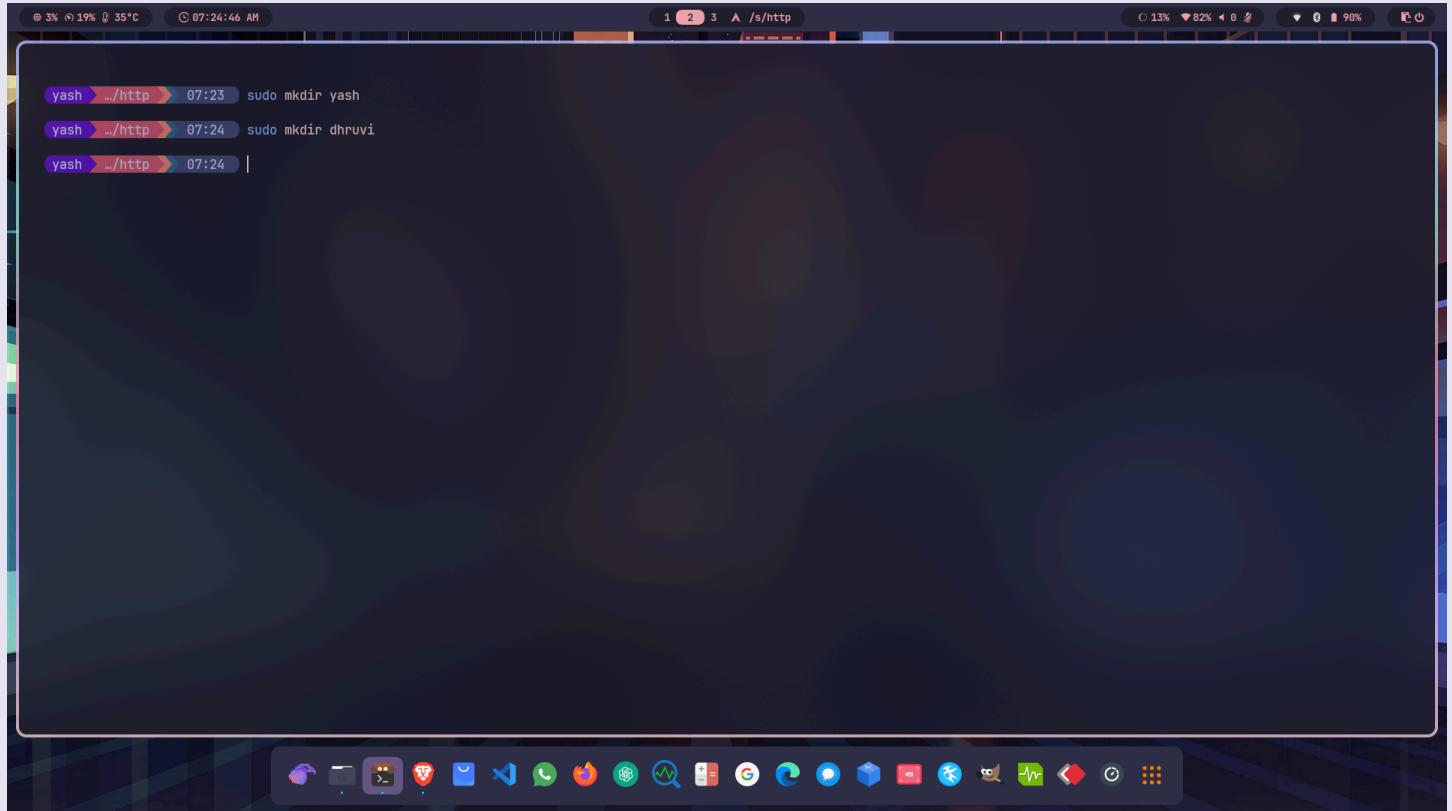
b. Creating directories of me and my friend

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A screenshot of a Linux desktop environment. At the top, there is a system tray with icons for battery (3%, 19%, 35°C), signal strength, and time (07:24:46 AM). Below the tray is a terminal window titled '1 2 3 A /s/http'. The terminal shows the following command history:

```
yash ~/http 07:23 sudo mkdir yash
yash ~/http 07:24 sudo mkdir dhruvi
yash ~/http 07:24 |
```

The desktop background is dark, and the bottom of the screen features a dock with various application icons.

Command : `sudo mkdir <dirname>`

Explanation : ***mkdir*** stands for make directory, and ***sudo*** used for root privileges because we are dealing outside of home directory of current user and then directory name

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c. Create HTML file in mine and friend's directory

The screenshot shows a Linux desktop environment with a dark theme. At the top, there is a system tray with icons for battery level (1%), signal strength (19%), temperature (36°C), and system status. The clock shows 07:26:28 AM. In the center, a terminal window titled "index.html - KWrite" is open, displaying a command-line session:

```
yash .../http 07:23 sudo mkdir yash
yash .../http 07:24 sudo mkdir dhruv
yash .../http 07:24 cd yash/
yash .../yash 07:25 kwrite index.html
qt.qpa.wayland: Wayland does not support QWindow::requestActivate()
kf.sonnet.core: No language dictionaries for the language: "en_US"
```

To the right of the terminal is a file manager window titled "This is yash's directory". The file manager has a toolbar with "New", "Open", "Save", "Save As", "Undo", and "Redo" buttons. The main pane shows two items: "1" and "2".

At the bottom of the screen is a dock with various application icons, including a terminal, file manager, browser, and other system utilities.

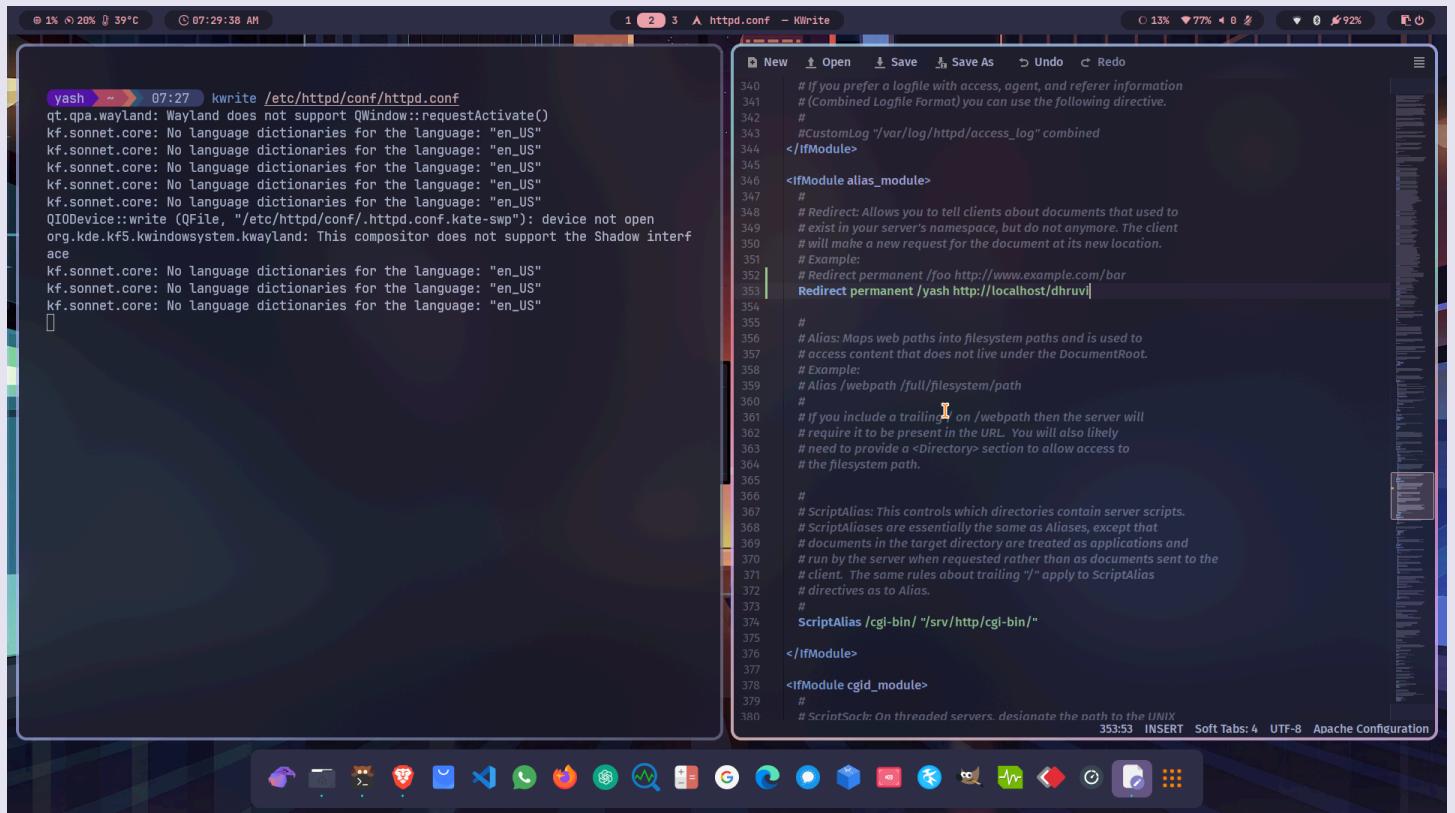
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d. Specify redirection in **httpd.conf** configuration file located in **/etc/httpd/conf/**



```
yash ~ 07:27 kwrite /etc/httpd/conf/httpd.conf
qt.qpa.wayland: Wayland does not support QWindow::requestActivate()
Kf.sonnet.core: No language dictionaries for the language: "en_US"
QIODevice::write (QFile, "/etc/httpd/conf/.httpd.conf.kate-swp"): device not open
org.kde.kf5.kwindowsystem.kwayland: This compositon does not support the Shadow interface
kf.sonnet.core: No language dictionaries for the language: "en_US"
kf.sonnet.core: No language dictionaries for the language: "en_US"
kf.sonnet.core: No language dictionaries for the language: "en_US"
[...]
340 # If you prefer a logfile with access, agent, and referer information
341 # (Combined Logfile Format) you can use the following directive.
342 #
343 #CustomLog "/var/log/httpd/access_log" combined
344 </IfModule>
345
346 <ifModule alias_module>
347 #
348 # Redirect: Allows you to tell clients about documents that used to
349 # exist in your server's namespace, but do not anymore. The client
350 # will make a new request for the document at its new location.
351 # Example:
352 # Redirect permanent /foo http://www.example.com/bar
353 Redirect permanent /yash http://localhost/dhruv|
354 #
355 #
356 # Alias: Maps web paths into filesystem paths and is used to
357 # access content that does not live under the DocumentRoot.
358 # Example:
359 # Alias /webpath /full/filesystem/path
360 #
361 # if you include a trailing / on /webpath then the server will
362 # require it to be present in the URL. You will also likely
363 # need to provide a <Directory> section to allow access to
364 # the filesystem path.
365 #
366 #
367 # ScriptAlias: This controls which directories contain server scripts.
368 # ScriptAliases are essentially the same as Aliases, except that
369 # documents in the target directory are treated as applications and
370 # run by the server when requested rather than as documents sent to the
371 # client. The same rules about trailing "/" apply to ScriptAlias
372 # directives as to Alias.
373 #
374 ScriptAlias /cgi-bin/ "/srv/http/cgi-bin/"
375
376 </IfModule>
377
378 <ifModule cgi_module>
379 #
380 # ScriptSock: On threaded servers, designate the path to the UNIX
```

353:53 INSERT Soft Tabs: 4 UTF-8 Apache Configuration

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e. Then restart the httpd service via **systemctl** command with **restart** keyword

The screenshot shows a Linux desktop environment with a dark theme. There are two terminal windows and one code editor window.

**Terminal 1:** Shows the command `kwrite /etc/httpd/conf/httpd.conf` being run at 07:27. The output indicates various configuration errors related to Wayland and KDE components.

```
yash ~ 07:27 kwrite /etc/httpd/conf/httpd.conf
qt.qpa.wayland: Wayland does not support QWindow::requestActivate()
Kf.sonnet.core: No language dictionaries for the language: "en_US"
QIODevice::write ( QFile, "/etc/httpd/conf/.httpd.conf.kate-swp" ): device not open
org.kde.kf5.kwindowsystem.kwayland: This compositor does not support the Shadow interface
Kf.sonnet.core: No language dictionaries for the language: "en_US"
Kf.sonnet.core: No language dictionaries for the language: "en_US"
Kf.sonnet.core: No language dictionaries for the language: "en_US"
```

**Terminal 2:** Shows the command `systemctl restart httpd` being run at 07:30.

```
yash ~ 07:30 systemctl restart httpd
yash ~ 07:30
```

**Code Editor:** An Apache configuration file (`httpd.conf`) is being edited in KWrite. The cursor is positioned on the line `Redirect permanent /yash http://localhost/dhruv/`. The code editor shows syntax highlighting for XML-like tags and comments.

```
340 # If you prefer a logfile with access, agent, and referer information
341 # (Combined Logfile Format) you can use the following directive.
342 #
343 #CustomLog "/var/log/httpd/access_log" combined
344 </IfModule>
345
346 <ifModule alias_module>
347 #
348 # Redirect: Allows you to tell clients about documents that used to
349 # exist in your server's namespace, but do not anymore. The client
350 # will make a new request for the document at its new location.
351 # Example:
352 # Redirect permanent /foo http://www.example.com/bar
353 Redirect permanent /yash http://localhost/dhruv/
354
355 #
356 # Alias: Maps web paths into filesystem paths and is used to
357 # access content that does not live under the DocumentRoot.
358 # Example:
359 # Alias /webpath /full/filesystem/path
360 #
361 # if you include a trailing / on /webpath then the server will
362 # require it to be present in the URL. You will also likely
363 # need to provide a <Directory> section to allow access to
364 # the filesystem path.
365 #
366
367 # ScriptAlias: This controls which directories contain server scripts.
368 # ScriptAliases are essentially the same as Aliases, except that
369 # documents in the target directory are treated as applications and
370 # run by the server when requested rather than as documents sent to the
371 # client. The same rules about trailing "/" apply to ScriptAlias
372 # directives as to Alias.
373 #
374 ScriptAlias /cgi-bin/ "/srv/http/cgi-bin/"
375
376 </IfModule>
377
378 <ifModule cgid_module>
379 #
380 # ScriptSock: On threaded servers, designate the path to the UNIX
```

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Now, whenever <http://localhost/yash> is visited then it redirects to the <http://localhost/dhruvi>

The screenshot shows a Linux desktop environment with several windows open:

- A terminal window titled "localhost/dhruvi - Brave" containing command-line output from kwrite /etc/httpd/conf/httpd.conf. The output includes error messages about Wayland support and language dictionaries.
- A web browser window showing the URL "http://localhost/dhruvi/" with the page content "This is dhruvi's directory".
- A code editor window titled "localhost/dhruvi - Apache Configuration" displaying the Apache configuration file httpd.conf. The configuration includes sections for <IfModule alias\_module>, <IfModule cgid\_module>, and <IfModule log\_config\_module>. It contains directives like #include conf.d/\*.conf, Alias, ScriptAlias, and ScriptAliasMatch.

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**3) Create one directory with your enrolment number in apache server's root directory and another with your friend's enrolment number outside the root path. Configure your apache server in such a way that you should be able to access the contents of a directory while trying to access content from another directory.**

- Follow similar steps to create directories and HTML files and **cp** (copy command) can also be used to save time and effort.

The screenshot shows a Linux desktop environment with several windows open. On the left, there are two terminal windows. The top terminal window shows a user named 'yash' navigating to the directory '/srv/http/' and creating a directory '21162101012' with the command 'sudo mkdir 21162101012'. The bottom terminal window shows the user running 'kwrite /etc/httpd/conf/httpd.conf' and viewing error messages related to Wayland support. On the right, a code editor window displays Apache configuration code, specifically the httpd.conf file. The code includes sections for custom logs, aliases, and script aliases. The status bar at the bottom of the code editor indicates the file is 353:53, has INSERT mode active, shows 4 soft tabs, and is in UTF-8 encoding. The desktop interface includes a dock with various application icons at the bottom.

```
340 # If you prefer a logfile with access, agent, and referer information
341 # (Combined Logfile Format) you can use the following directive.
342 #
343 #CustomLog "/var/log/httpd/access_log" combined
344 </IfModule>
345 #
346 <IfModule alias_module>
347 #
348 # Redirect: Allows you to tell clients about documents that used to
349 # exist in your server's namespace, but do not anymore. The client
350 # will make a new request for the document at its new location.
351 # Example:
352 # Redirect permanent /foo http://www.example.com/bar
353 Redirect permanent /yash http://localhost/dhruv/
354 #
355 # Alias: Maps web paths into filesystem paths and is used to
356 # access content that does not live under the DocumentRoot.
357 # Example:
358 # Alias /webpath /full/filesystem/path
359 #
360 # If you include a trailing / on /webpath then the server will
361 # require it to be present in the URL. You will also likely
362 # need to provide a <Directory> section to allow access to
363 # the filesystem path.
364 #
365 #
366 # ScriptAlias: This controls which directories contain server scripts.
367 # ScriptAliases are essentially the same as Aliases, except that
368 # documents in the target directory are treated as applications and
369 # run by the server when requested rather than as documents sent to the
370 # client. The same rules about trailing "/" apply to ScriptAlias
371 # directives as to Alias.
372 #
373 # ScriptAlias /cgi-bin/ "/srv/http/cgi-bin/"
374 </IfModule>
375 #
376 <IfModule cgid_module>
377 #
378 # ScriptSock: On threaded servers, designate the path to the UNIX
379 # socket for the cgid process. This is the socket that will receive
380 # requests from the threads. The path must be absolute.
```

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A screenshot of a Linux desktop environment. At the top, there is a system tray with icons for battery level (1%), signal strength (22%), temperature (44°C), date (08:43:36 AM), and a power button. Below the tray is a terminal window titled '1 /s/http'. The terminal shows the following command history:

```
yash ~ 08:42 cd /srv/http/  
yash .../http 08:42 sudo mkdir 21162101005  
[sudo] password for yash:  
yash .../http 08:43 sudo cp dhruvi/index.html 21162101005/  
yash .../http 08:43
```

The desktop background is dark. A docked application bar at the bottom contains icons for various applications, including a file manager, terminal, browser, and system tools. The overall interface is clean and modern.

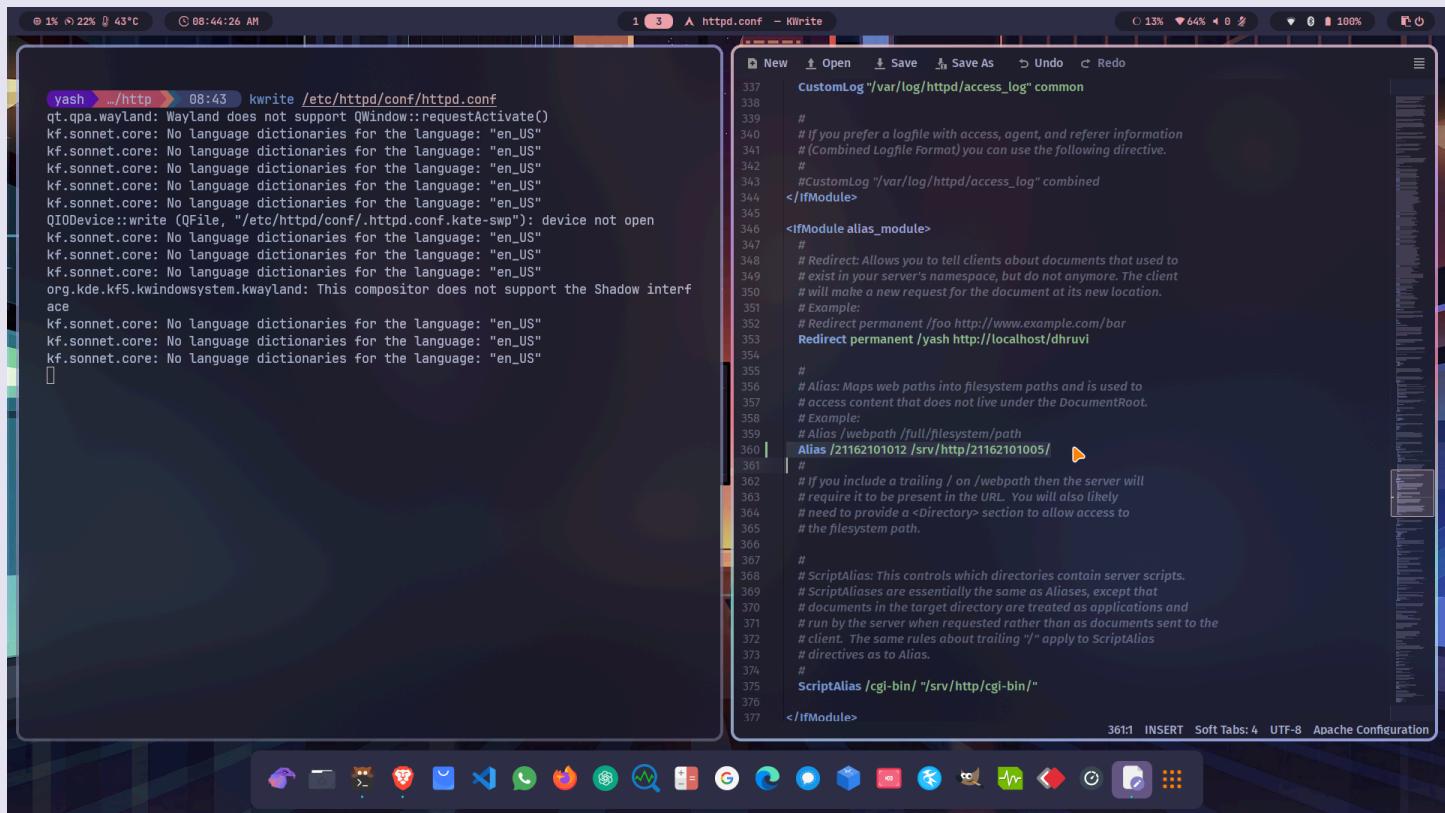
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- b. Now, create ALIAS in configuration file for getting contents of friend's directory in my localhost URL



```
yash > .../http > 08:43 kwrite /etc/httpd/conf/httpd.conf
qt.qpa.wayland: Wayland does not support QWindow::requestActivate()
Kf.sonnet.core: No language dictionaries for the language: "en_US"
QIODevice::write (QFile, "/etc/httpd/conf/.httpd.conf.kate-swp"): device not open
Kf.sonnet.core: No language dictionaries for the language: "en_US"
Kf.sonnet.core: No language dictionaries for the language: "en_US"
Kf.sonnet.core: No language dictionaries for the language: "en_US"
org.kde.kf5.kwindowsystem.kwayland: This compositor does not support the Shadow interface
Kf.sonnet.core: No language dictionaries for the language: "en_US"
Kf.sonnet.core: No language dictionaries for the language: "en_US"
Kf.sonnet.core: No language dictionaries for the language: "en_US"

CustomLog "/var/log/httpd/access_log" common
#
# If you prefer a logfile with access, agent, and referer information
# (Combined Logfile Format) you can use the following directive.
#
#CustomLog "/var/log/httpd/access_log" combined
</IfModule>

<ifModule alias_module>
#
# Redirect: Allows you to tell clients about documents that used to
# exist in your server's namespace, but do not anymore. The client
# will make a new request for the document at its new location.
#
# Example:
# Redirect permanent /foo http://www.example.com/bar
Redirect permanent /yash http://localhost/dhruvi

#
# Alias: Maps web paths into filesystem paths and is used to
# access content that does not live under the DocumentRoot.
#
# Example:
# Alias /webpath /full/filesystem/path
Alias /21162101012 /srv/http/21162101005/
#
# if you include a trailing / on /webpath then the server will
# require it to be present in the URL. You will also likely
# need to provide a <Directory> section to allow access to
# the filesystem path.

#
# ScriptAlias: This controls which directories contain server scripts.
# ScriptAliases are essentially the same as Aliases, except that
# documents in the target directory are treated as applications and
# run by the server when requested rather than as documents sent to the
# client. The same rules about trailing "/" apply to ScriptAlias
# directives as to Alias.
#
# ScriptAlias /cgi-bin/ "/srv/http/cgi-bin/"

</ifModule>
```

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c. Restart the service again.

The screenshot shows a Linux desktop environment with a dark theme. In the top panel, there are system icons for battery (22%), signal (43%), and temperature (43°C). The date and time are shown as 08:44:42 AM. The bottom panel shows a dock with various application icons.

The terminal window on the left displays the command:

```
yash ~ 08:44 systemctl restart httpd
```

The code editor window on the right is displaying Apache configuration files. The current file is named "Apache Configuration" and contains the following code:

```
CustomLog "/var/log/httpd/access_log" common
#
# if you prefer a logfile with access, agent, and referer information
# (Combined Logfile Format) you can use the following directive.
#
#CustomLog '/var/log/httpd/access_log' combined
</IfModule>
345
346 <ifModule alias_module>
347 #
348 # Redirect: Allows you to tell clients about documents that used to
349 # exist in your server's namespace, but do not anymore. The client
350 # will make a new request for the document at its new location.
351 # Example:
352 # Redirect permanent /foo http://www.example.com/bar
353 Redirect permanent /yash http://localhost/dhruti
354
355 #
356 # Alias: Maps web paths into filesystem paths and is used to
357 # access content that does not live under the DocumentRoot.
358 # Example:
359 # Alias /webpath /full/filesystem/path
360 Alias /21162101012 /srv/http/21162101005/
361 #
362 # If you include a trailing / on /webpath then the server will
363 # require it to be present in the URL. You will also likely
364 # need to provide a <Directory> section to allow access to
365 # the filesystem path.
366
367 #
368 # ScriptAlias: This controls which directories contain server scripts.
369 # ScriptAliases are essentially the same as Aliases, except that
370 # documents in the target directory are treated as applications and
371 # run by the server when requested rather than as documents sent to the
372 # client. The same rules about trailing "/" apply to ScriptAlias
373 # directives as to Alias.
374 #
375 ScriptAlias /cgi-bin/ "/srv/http/cgi-bin/"
376
377 </IfModule>
```

The status bar at the bottom of the code editor shows: 361:1 INSERT Soft Tabs: 4 UTF-8 Apache Configuration.

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Now, URL is mine but the contents of HTML are those of friend's directory.

