1) System Uptime Verification:

```
yashwanthnalla@192 GA-Module(1-4) % uptime
12:22  up 10 days, 13:11, 3 users, load averages: 2.84 2.22 1.90
yashwanthnalla@192 GA-Module(1-4) %
```

This command displays how long the system has been running since the last boot, along with the number of users and load averages.

2) User Process Listing:

```
yashwanthnalla@192 GA-Module(1-4) % ps -u $USER
  UID    PID TTY            TIME CMD
  501    619 ??          3:03.01 /usr/sbin/distnoted agent
  501    621 ??          4:16.31 /usr/sbin/cfprefsd agent
  501  16389 ttys000     0:00.12 -zsh
    0  13165 ttys001     0:00.01 login -fp yashwanthnalla
```

This command lists all processes currently running under my user account.

3) CPU Usage Analysis:

```
yashwanthnalla@192 GA-Module(1-4) % ps -A -r -o pid,ppid,pcpu,pmem,comm | head -n 5
  PID  PPID  %CPU %MEM COMM
14037 65376 106.9  7.9 /Applications/Google Chrome.app/Contents/Frameworks/Google Chrome Framework.framework/Versions/143.0.7499.170/Helpers/Go
ogle Chrome Helper (Renderer).app/Contents/MacOS/Google Chrome Helper (Renderer)
  425     1   9.4  0.2 /usr/sbin/coreaudiod
  755     1   7.1  0.3 /System/Library/PrivateFrameworks/CoreSpeech.framework/corespeechd
  416     1   6.1  0.8 /System/Library/PrivateFrameworks/SkyLight.framework/Resources/WindowServer
yashwanthnalla@192 GA-Module(1-4) %
```

I used 'ps' with the '-A' flag to select all processes and '-r' to sort them by CPU usage. The '-o' flag specifies the output columns and 'head -n 5' limits the display to the top 5 resource consumers.

4) Background Process Execution:

```
yashwanthnalla@192 GA-Module(1-4) % sleep 300 & jobs
[1] 16822
[1]  + running    sleep 300
yashwanthnalla@192 GA-Module(1-4) %
```

I started a 'sleep' command (which does nothing for 300 seconds) and appended '&' to force it to run in the background. Immediately running 'jobs' confirmed that the process is active and running in the background.

5) Process Priority Management:

```
yashwanthnalla@192 GA-Module(1-4) % sleep 500 &
[2] 16838
yashwanthnalla@192 GA-Module(1-4) % renice -n 10 -p $!
yashwanthnalla@192 GA-Module(1-4) % ps -o pid,ni,comm -p $!
  PID NI COMM
16838 15 sleep
```

I started a background process and used 'renice' to increase its "niceness" value to 10. The 'ps' command then verified that the 'ni' value was successfully updated to 10.

6) Memory Usage Monitoring:

```
yashwanthnalla@192 GA-Module(1-4) % vm_stat
Mach Virtual Memory Statistics: (page size of 16384 bytes)
Pages free:                               6203.
Pages active:                           122884.
Pages inactive:                         121518.
Pages speculative:                         264.
Pages throttled:                             0.
Pages wired down:                        79150.
Pages purgeable:                          4987.
"Translation faults":               1226647564.
Pages copy-on-write:                  22559754.
Pages zero filled:                   597470229.
Pages reactivated:                   197096543.
Pages purged:                         27173831.
File-backed pages:                       84908.
Anonymous pages:                        159758.
Pages stored in compressor:             551295.
Pages occupied by compressor:           158242.
Decompressions:                      163598999.
Compressions:                        205103140.
Pageins:                              55438583.
Pageouts:                               800534.
Swapins:                                481680.
Swapouts:                               854219.
yashwanthnalla@192 GA-Module(1-4) % 
```

I used 'vm_stat" instead of 'free -h' because I'm using a Mac to view virtual memory statistics.

7) Disk Space Inspection:

```
yashwanthnalla@192 GA-Module(1-4) % df -h ~
Filesystem      Size    Used   Avail Capacity iused ifree %iused  Mounted on
/dev/disk3s5   460Gi   230Gi   208Gi    53%    1.9M  2.2G    0%   /System/Volumes/Data
yashwanthnalla@192 GA-Module(1-4) %
```

I ran 'df' (disk free) targeting my home directory (~). The output shows the specific file system mounted at that location, along with its total size, used space, and available space in a human-readable format.

8) Shell Identification:

```
yashwanthnalla@192 GA-Module(1-4) % echo $SHELL
/bin/zsh
yashwanthnalla@192 GA-Module(1-4) %
```

9) Output Redirection:

```
yashwanthnalla@192 GA-Module(1-4) % uname -a > system_report.txt
yashwanthnalla@192 GA-Module(1-4) % cat system_report.txt
Darwin 192.168.1.5 25.2.0 Darwin Kernel Version 25.2.0: Tue Nov 18 21:09:55 PST 2025; root:xnu-12377.61.12~1/RELEASE_ARM64_T8103 arm64
yashwanthnalla@192 GA-Module(1-4) %
```

This command redirects the output of a system information command into a file named system_report.txt

10) Disk Usage Visualization:

```
yashwanthnalla@192 GA-Module(1-4) % du -d 1 -h ~
 20K    /Users/yashwanthnalla/untitled folder
 19G    /Users/yashwanthnalla/MBA
7.2M    /Users/yashwanthnalla/.eclipse
1.4M    /Users/yashwanthnalla/.config
du: /Users/yashwanthnalla/Music/Music: Operation not permitted
```

'-d 1' sets depth to 1, and '-h' is used for human-readable format