

## Section 1:

→ This is the bash script.

```
#!/bin/bash

# Check if .bashrc exists
if [ -f "$HOME/.bashrc" ]; then
    # Append new environment variables to .bashrc
    echo "export HELLO=$(hostname)" >> "$HOME/.bashrc"
    echo "export LOCAL=$(whoami)" >> "$HOME/.bashrc"

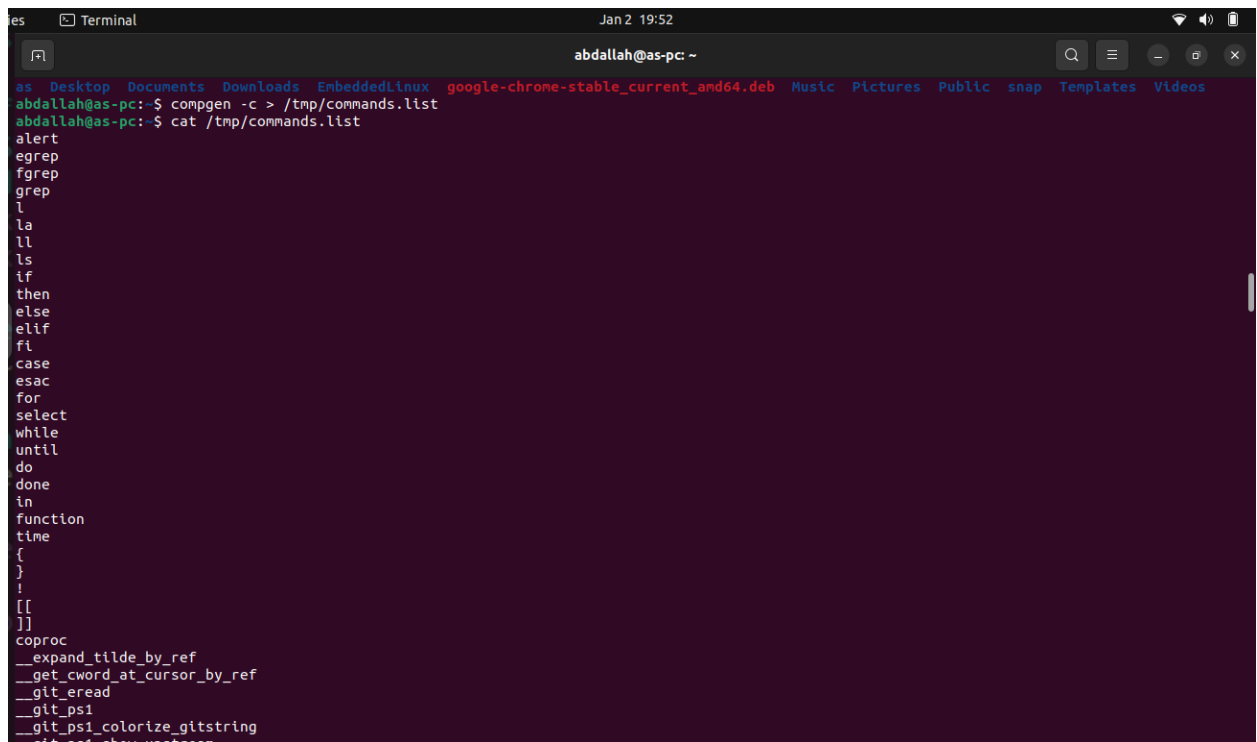
    # Source .bashrc to apply the changes immediatly
    source ~/.bashrc

    # Open another terminal
    gnome-terminal

    echo "New environment variables have been added. A new terminal has been opened."
else
    echo ".bashrc file does not exist in the user's home directory."
fi
```

## Section 2:

1. Listing user commands & directing the out to /tmp/commands.list

A terminal window titled 'Terminal' with a timestamp of 'Jan 2 19:52'. The user 'abdallah@as-pc' is at the prompt. The command 'compgen -c > /tmp/commands.list' has been executed. The output shows a list of shell built-in commands: alert, egrep, fgrep, grep, l, la, ll, ls, if, then, else, elif, fi, case, esac, for, select, while, until, do, done, in, function, time, {, }, !, [[, ]], coproc, \_\_expand\_tilde\_by\_ref, \_\_get\_cword\_at\_cursor\_by\_ref, \_\_git\_eread, \_\_git\_ps1, \_\_git\_ps1\_colorize\_gitstring, and \_\_git\_ps1\_show\_unfrozen.

```
es Desktop Documents Downloads EmbeddedLinux google-chrome-stable_current_amd64.deb Music Pictures Public snap Templates Videos
abdallah@as-pc:~$ compgen -c > /tmp/commands.list
abdallah@as-pc:~$ cat /tmp/commands.list
alert
egrep
fgrep
grep
l
la
ll
ls
if
then
else
elif
fi
case
esac
for
select
while
until
do
done
in
function
time
{
}
!
[[
]]
coproc
__expand_tilde_by_ref
__get_cword_at_cursor_by_ref
__git_eread
__git_ps1
__git_ps1_colorize_gitstring
__git_ps1_show_unfrozen
```

2. Editing “. profile” to display the date at login

```
ies Terminal Jan 2 17:43
abdallah@as-pc: ~

# ~/.profile: executed by the command interpreter for login shells.
# This file is not read by bash(1), if ~/.bash_profile or ~/.bash_login
# exists.
# see /usr/share/doc/bash/examples/startup-files for examples.
# the files are located in the bash-doc package.

# the default umask is set in /etc/profile; for setting the umask
# for ssh logins, install and configure the libpam-umask package.
#umask 022

# if running bash
if [ -n "$BASH_VERSION" ]; then
    # include .bashrc if it exists
    if [ -f "$HOME/.bashrc" ]; then
        . "$HOME/.bashrc"
    fi
fi

# set PATH so it includes user's private bin if it exists
if [ -d "$HOME/bin" ] ; then
    PATH="$HOME/bin:$PATH"
fi

# set PATH so it includes user's private bin if it exists
if [ -d "$HOME/.local/bin" ] ; then
    PATH="$HOME/.local/bin:$PATH"
fi

# Display date at login
echo "Login date: $(date)"

# Change the prompt permanently
export PS1='\u@\h:\w$ '

~
~
~
"profile" 34L, 917B 34,0-1 All
```

### 3. Displaying num of words in “. profile” file and date at login

```
ies Terminal Jan 2 18:57
abdallah@as-pc: ~

abdallah@as-pc:~$ ls
as Desktop Documents Downloads EmbeddedLinux google-chrome-stable_current_amd64.deb Music Pictures Public snap Templates Videos
abdallah@as-pc:~$ ls -a
.          .bash_logout Desktop      .gitconfig      Music           .profile        .sudo_as_admin_successful
..         .bashrc     Documents   google-chrome-stable_current_amd64.deb .pam_environment Public          Templates
as         .cache      Downloads   .lessht         Pictures        snap            Videos
.bash_history .config     EmbeddedLinux .local          .pki           .ssh           .viminfo
abdallah@as-pc:~$ wc -w .profile
147 .profile
abdallah@as-pc:~$ wc .profile
 34 147 917 .profile
abdallah@as-pc:~$ source .profile
Login date: Thu Jan  2 06:56:27 PM EET 2025
```

### 4. What happens in executing a,b&c

```
es Terminal Jan 2 19:00
abdallah@as-pc: ~
abdallah@as-pc:~/as$ ls
as1.txt as2.txt
abdallah@as-pc:~/as$ cat as1.txt
HELLO From AS1 File :)
abdallah@as-pc:~/as$ cat as2.txt
HELLO From AS2 File :)
abdallah@as-pc:~/as$ cat as2.txt | cat as1.txt
HELLO From AS1 File :)
abdallah@as-pc:~/as$ cat as1.txt | cat as2.txt
HELLO From AS2 File :)
abdallah@as-pc:~/as$ ls | rm
rm: missing operand
Try 'rm --help' for more information.
abdallah@as-pc:~/as$ ls /etc/passwd | wc -l
1
abdallah@as-pc:~/as$
```

## 5. Searching for all files with name “. profile”

```
es Terminal Jan 2 19:06
abdallah@as-pc: ~
abdallah@as-pc:~$ sudo find / -name ".profile"
find: '/run/user/1000/doc': Permission denied
find: '/run/user/1000/gvfs': Permission denied
/root/.profile
/home/abdallah/.profile
/etc/skel/.profile
/snap/core22/858/etc/skel/.profile
/snap/core22/858/root/.profile
/snap/core22/1722/etc/skel/.profile
/snap/core22/1722/root/.profile
/snap/core20/1974/etc/skel/.profile
/snap/core20/1974/root/.profile
/snap/core20/2434/etc/skel/.profile
/snap/core20/2434/root/.profile
abdallah@as-pc:~$
```

## 6. List of the inode numbers

```
es Terminal Jan 2 19:15
abdallah@as-pc: ~
abdallah@as-pc:~$ ls -i /
12 bin 1 dev 13 lib 16 libx32 1310721 mnt 5505025 root 1048577 snap 5767169 tmp
1572865 boot 3407873 etc 14 lib32 11 lost+found 3932161 opt 1 run 6029313 srv 3801089 usr
2621441 cdrom 5242881 home 15 lib64 3538945 media 1 proc 17/sbin 1 sys 2097153 var
abdallah@as-pc:~$ ls -i /etc
3407880 acpi 3408030 gai.conf 3408057 magic 3407976 rsyslog.d
3408010 adduser.conf 3407918 gdb 3408058 magic.mine 3408082 rygel.conf
3407881 alsa 3407919 gdn3 3410968 mailcap 3407977 sane.d
3407882 alternatives 3407920 geoclue 3408060 mailcap.order 3407978 security
3408011 anacrontab 3407921 ghostscript 3408061 manpath.config 3407979 selinux
3408012 app.conf 3407922 glvnd 3408062 mime.types 3408083 sensors3.conf
3407883 apm 3407923 gnome 3408063 mke2fs.conf 3407980 sensors.d
3407884 apparmor 3407924 groff 3407875 ModemManager 3408084 services
3407885 apparmor.d 3410858 group 3407948 modprobe.d 3407981 sgml
3407886 appport 3408032 group- 3408064 modules 3408085 shadow
3408013 appstream.conf 3407925 grub.d 3407949 modules-load.d 3408074 shadow-
3407887 apt 3408056 gshadow 3408065 mtab 3408086 shells
3407888 avahi 3410855 gshadow- 3408066 nanorc 3407982 skel
3408014 bash.bashrc 3407926 gss 3408067 netconfig 3407983 snmp
3408015 bash_completion 3407927 gtk-2.0 3407950 netplan 3407984 speech-dispatcher
3407889 bash_completion.d 3407928 gtk-3.0 3407951 network 3407985 ssh
3408016 bindresvport.blacklist 3408033 hdpam.conf 3407952 networkd-dispatcher 3407986 ssl
3407890 binfmt.d 3408034 host.conf 3407876 NetworkManager 3410865 subgid
3407891 bluetooth 3408035 hostid 3408068 networks 3408088 subgid-
3408017 brlapi.key 3408036 hostname 3407953 newt 3410864 subid
3407892 brltty 3408037 hosts 3408069 nftables.conf 3410859 subuid
3408018 brltty.conf 3408038 hosts.allow 3407903 nsswitch.conf 3408089 sudo.conf
3407893 ca-certificates 3408039 hosts.deny 3407954 openvpn 3408091 sudoers
3408008 ca-certificates.conf 3407929 hp 3407955 opt 3407988 sudoers.d
3408019 ca-certificates.conf.dpkg-old 3407930 lfplugd 3408557 os-release 3408090 sudo_logsrvd.conf
3407894 chatscripts 3407931 lnit 3407877 PackageKit 3408092 sysctl.conf
3407896 console-setup 3407932 lnit.d 3408072 pam.conf 3407989 sysctl.d
3407897 cracklib 3407933 lnitramfs-tools 3407956 pam.d 3407990 systemd
3407898 cron.d 3408040 inputrc 3410451 papersize 3407991 terminfo
3407899 cron.daily 3407934 lnsserv.conf.d 3408087 passwd 3407992 thermald
3407900 cron.hourly 3407935 lpp-usb 3410854 passwd- 3408093 timezone
3407901 cron.monthly 3407936 lproute2 3407957 pcnclia 3407994 tmpfiles.d
3408021 crontab 3408390 issue 3407958 perl 3407995 ubuntu-advantage
3407902 cron.weekly 3408434 issue.net 3407959 pki 3408094 ucf.conf
3407904 cups 3407937 kernel 3407960 pm 3407996 udev
3407905 cupshelpers 3409198 kernel-img.conf 3408075 pnm2ppa.conf 3407997 udisks2
3407906 dbus-1 3408044 kerneloops.conf 3407961 polkit-1 3407998 ufw
3407907 dconf 3407940 ldap 3407962 ppp 3407999 update-manager
3408022 debconf.conf 3409175 ld.so.cache 3408584 printcap 3408000 update-motd.d
3408023 debian_version 3408046 ld.so.conf 3408076 profile 3408001 update-notifier
3407908 default 3407939 ld.so.conf.d 3407963 profile.d 3407878 UPower
3408024 deluser.conf 3408047 legal 3408077 protocols 3408095 usb_modeswitch.conf
3407909 depmod.d 3408048 libao.conf 3407964 pulse 3408002 usb_modeswitch.d
3407910 dhcp 3408049 libaudit.conf 3407965 python3 3408380 vdpau_wrapper.cfg
3407911 dictionaries-common 3407941 libblockdev 3407966 python3.10 3408003 vim
3407912 dpkg 3407942 libnl-3 3407967 rc0.d 3408096 vtrgb
3408025 e2scrub.conf 3407943 libpaper.d 3407968 rc1.d 3408004 vulkan
3407913 enacs 3407944 libreoffice 3407969 rc2.d 3408097 wgetrc
3408026 environment 3408050 locale.alias 3407970 rc3.d 3408005 wpa_supplicant
3407914 environment.d 3407975 locale.gen 3407971 rc4.d 3407879 X11
3408027 ethertypes 3409638 localtime 3407972 rc5.d 3408098 xattr.conf
3407915 Firefox 3407945 logcheck 3407973 rc6.d 3408006 xdg
3407916 fonts 3408053 login.defs 3407974 rcS.d 3408007 xml
3408028 fprintd.conf 3408054 logrotate.conf 3408078 resolv.conf 3408099 zsh_command_not_found
3407874 fstab 3407946 logrotate.d 3408042 rmt
3408029 fuse.conf 3408526 lsb-release 3408080 rpc
3407917 fwupd 3408056 machine-id 3408081 rsyslog.conf
abdallah@as-pc:~$ ls -i /etc/hosts
3408037 /etc/hosts
abdallah@as-pc:~$
```

## 7. Symbolic link

```
es Terminal Jan 2 19:28
abdallah@as-pc: /boot

abdallah@as-pc:/boot$ cd ~
abdallah@as-pc:~$ man ln
abdallah@as-pc:~$ ln -s /etc/passwd /boot/symbolic_passwd
ln: failed to create symbolic link '/boot/symbolic_passwd': Permission denied
abdallah@as-pc:~$ sudo ln -s /etc/passwd /boot/symbolic_passwd
abdallah@as-pc:~$ cd /boot
abdallah@as-pc:/boot$ ls
config-6.2.0-26-generic  initrd.img          mentest86+.bin      System.map-6.2.0-26-generic  vmlinuz-6.8.0-49-generic
config-6.8.0-49-generic  initrd.img-6.2.0-26-generic  mentest86+.elf      System.map-6.8.0-49-generic  vmlinuz.old
efi                     initrd.img-6.8.0-49-generic  mentest86+_multiboot.bin  vmlinuz
grub                    initrd.img.old        symbolic_passwd      vmlinuz-6.2.0-26-generic
abdallah@as-pc:/boot$
```

8. Hard link : it can't be done in Ubuntu as etc & boot are different file systems with different inodes.

```
es Terminal Jan 2 19:30
abdallah@as-pc: /boot

abdallah@as-pc:~$ ln /etc/passwd /boot/symbolic_passwd
ln: failed to create hard link '/boot/symbolic_passwd': File exists
abdallah@as-pc:~$ sudo ln /etc/passwd /boot/symbolic_passwd
ln: failed to create hard link '/boot/symbolic_passwd': File exists
abdallah@as-pc:~$ cd /boot
abdallah@as-pc:/boot$ sudo rm symbolic_passwd
abdallah@as-pc:/boot$ cd ~
abdallah@as-pc:~$ ln /etc/passwd /boot/symbolic_passwd
ln: failed to create hard link '/boot/symbolic_passwd' => '/etc/passwd': Operation not permitted
abdallah@as-pc:~$ sudo ln /etc/passwd /boot/symbolic_passwd
abdallah@as-pc:~$ cd /boot
abdallah@as-pc:/boot$ ls
config-6.2.0-26-generic  initrd.img          mentest86+.bin      System.map-6.2.0-26-generic  vmlinuz-6.8.0-49-generic
config-6.8.0-49-generic  initrd.img-6.2.0-26-generic  mentest86+.elf      System.map-6.8.0-49-generic  vmlinuz.old
efi                     initrd.img-6.8.0-49-generic  mentest86+_multiboot.bin  vmlinuz
grub                    initrd.img.old        symbolic_passwd      vmlinuz-6.2.0-26-generic
abdallah@as-pc:/boot$
```