

General instructions

1. The approach of solving the Problem solely depends on the Candidate
2. Make sure to have Draw.io diagrams for the workflows and application architecture
3. Every configuration, code written should be pushed on git (Private Repo)
4. You are not permitted to share the doc with anyone, even with your colleagues

Scenario There is a customer who came to you with a problem to have a custom linux command for his operations. Your task is to understand the problem and create a linux command via bash script as per the instructions.

Command name - internsctl

Command version - v0.1.0

Section A

1. I want a manual page of command so that I can see the full documentation of the command.

For example if you execute the command

`man ls`

as output we get the doc and usage guidelines. Similarly if I execute `man internsctl` I want to see the manual of my command.

2. Each linux command has an option `--help` which helps the end user to understand the use cases via examples. Similarly if I execute `internsctl --help` it should provide me the necessary help

3. I want to see version of my command by executing

`internsctl --version`

Section B

I want to execute the following command for -

Part1 | Level Easy

I want to get cpu information of my server through the following command: `$ internsctl cpu getinfo`

Expected Output -

I want similar output as we get from `lscpu` command

I want to get memory information of my server through the following command:

`$ internsctl memory getinfo`

Expected Output

I want similar output as we get from `free` command

Part2 | Level Intermediate

I want to create a new user on my server through the following command:

`$ internsctl user create <username>`

Note - above command should create user who can login to linux system and access his home directory

I want to list all the regular users present on my server through the following command:

`$ internsctl user list`

If want to list all the users with sudo permissions on my server through the following command:

`$ internsctl user list --sudo-only`

Part3 | Advanced Level

By executing below command I want to get some information about a **file**

`$ internsctl file getinfo <file-name>`

Expected Output [make sure to have the output in following format only]

`xenonstack@xsd-034:~$ internsctl file getinfo hello.txt`

File:

`hellot.txt`

Access:

`-rw-r--r--`

Size(B):

5448

Owner:

xenonstackModify: 2020-10-07 20:34:44.616123431 +0530

In case I want only specific information then I must have a provision to use **options**

\$ internsctl file getinfo [options] <file-name>

--size, -s to print size

--permissions, -p print file permissions

--owner, -o print file owner

--last-modified, -m

Expected Output with options

If I want to obtain the size of the specified file only, I should be able to use the following command:

xenonstack@xsd-034:~\$ internsctl file getinfo --size hello.txt

5448

If I want to obtain the permissions of the specified file only, I should be able to use the following

command:

xenonstack@xsd-034:~\$ internsctl file getinfo --permissions hello.txt

-rw-r--r--

If I want to obtain the owner of the specified file only, I should be able to use the following command:

xenonstack@xsd-034:~\$ internsctl file getinfo --owner hello.txt

xenonstack

If I want to obtain the last modified time of the specified file only, I should be able to use the following command:

xenonstack@xsd-034:~\$ internsctl file getinfo --last-modified hello.txt

2020-10-07 20:34:44.616123431 +0530

Solution:-

Step1:-

Source code

```
#!/bin/bash
```

```
# Section A - Command Handling
```

```
case $1 in
```

```
  --help)
```

```
    # Display usage guidelines and available commands with examples
```

```
    echo "Usage: internsctl [command] [options]"
```

```
    echo "Commands:"
```

```
    echo "  cpu getinfo          Get CPU information"
```

```
    echo "  memory getinfo       Get memory information"
```

```
    echo "  user create <username> Create a new user"
```

```
    echo "  user list            List all regular users"
```

```
    echo "  user list --sudo-only List users with sudo permissions"
```

```
    echo "  file getinfo <file-name> Get file information"
```

```
    echo "Options:"
```

```
    echo "  --size, -s          Print file size"
```

```
    echo "  --permissions, -p   Print file permissions"
```

```
    echo "  --owner, -o         Print file owner"
```

```
    echo "  --last-modified, -m Print last modified time"
```

```
    ;;
```

```
  --version)
```

```
    # Display the command's version
```

```

    echo "internsctl v0.1.0"
    ;;
cpu)
    if [ "$2" == "getinfo" ]; then
        # Retrieve CPU information using lscpu command
        lscpu
    else
        echo "Invalid command. Use 'internsctl --help' for usage."
    fi
    ;;
memory)
    if [ "$2" == "getinfo" ]; then
        # Retrieve memory information using free command
        free
    else
        echo "Invalid command. Use 'internsctl --help' for usage."
    fi
    ;;
user)
    case $2 in
        create)
            if [ -z "$3" ]; then
                # Error message if username is missing
                echo "Error: Missing username. Usage: internsctl user create <username>"
            else
                # Create a new user using adduser command
                sudo adduser "$3"
            fi
            ;;
        list)
            if [ "$3" == "--sudo-only" ]; then
                # List users with sudo permissions using grep on /etc/group
                grep -Po '^sudo.+:\K.*$' /etc/group | tr ',' '\n'
            else
                # List all regular users using getent passwd
                getent passwd | grep -vE '(/sbin/nologin/bin/false)$' | cut -d: -f1
            fi
            ;;
        *)
            echo "Invalid command. Use 'internsctl --help' for usage."
            ;;
    esac
    ;;
file)
    if [ "$2" == "getinfo" ]; then
        file_name="$3"
        if [ -z "$file_name" ]; then
            # Error message if file name is missing
            echo "Error: Missing file name. Usage: internsctl file getinfo <file-name>"
        else
            case $4 in
                --size | -s)
                    # Retrieve file size using stat command
                    stat --printf="%s\n" "$file_name"
                    ;;
            esac
        fi
    fi

```

```

--permissions | -p)
    # Retrieve file permissions using stat command
    stat --printf="%A\n" "$file_name"
    ;;
--owner | -o)
    # Retrieve file owner using stat command
    stat --printf="%U\n" "$file_name"
    ;;
--last-modified | -m)
    # Retrieve last modified time using stat command
    stat --printf="%y\n" "$file_name"
    ;;
*)
    # Error for invalid option
    echo "Invalid option. Use 'internsctl --help' for usage."
    ;;
esac
fi
else
    echo "Invalid command. Use 'internsctl --help' for usage."
fi
;;
*)
    # Display error for invalid command
    echo "Invalid command. Use 'internsctl --help' for usage."
    ;;
esac

```

Explanation:-

- Shebang (#!/bin/bash):

Indicates that the script should be executed using the Bash shell.

- case Statement:

Handles different scenarios based on the provided command (\$1) using the case statement.

- Handling Arguments:

Checks for provided arguments (\$1, \$2, \$3, \$4) to determine the flow of execution and perform relevant actions based on the command structure.

- Command Execution:

Executes specific commands (lscpu, free, adduser, getent, grep, stat) based on user input and requirements.

- Options Processing:

Processes options (--size, --permissions, --owner, --last-modified) for file-related commands to retrieve specific file information using the stat command.

- Error Handling:

Provides error messages for incorrect or incomplete commands or options to guide the user on correct usage.

internsctl Command Documentation

Version

Current version: v0.1.0

```
stranger@192: ~/Desktop
(stranger@192)-[~/Desktop]
$ ./internsctl --help
internsctl - Custom Linux Command
Version: v0.1.0

Usage: internsctl [OPTIONS] COMMAND [ARGUMENTS]
  Run the following command to make the script executable:
  $ chmod +x internsctl

Options:
  --help      Display this help message
  --version   Display version information

Commands:
  cpu getinfo      Get CPU information
  memory getinfo   Get memory information
  user create <username> Create a new user
  user list [--sudo-only] List all users or sudo users only
  file getinfo [OPTIONS] <file-name> Get information about a file

File Information Options:
  --size, -s      Print file size
  --permissions, -p Print file permissions
  --owner, -o     Print file owner
  --last-modified, -m Print last modified time

This will display the help message and usage guidelines.
To run other commands, use the appropriate syntax. For example:
$ ./internsctl cpu getinfo

(stranger@192)-[~/Desktop]
$ ./internsctl --version
internsctl version v0.1.0

(stranger@192)-[~/Desktop]
$ man ls
```

1. Help

The `--help` option provides usage guidelines and available commands with examples

```
stranger@192: ~/Desktop
(stranger@192)-[~/Desktop]
$ ./internsctl --help
internsctl - Custom Linux Command
Version: v0.1.0

Usage: internsctl [OPTIONS] COMMAND [ARGUMENTS]
  Run the following command to make the script executable:
  $ chmod +x internsctl

Options:
  --help      Display this help message
  --version   Display version information

Commands:
  cpu getinfo      Get CPU information
  memory getinfo   Get memory information
  user create <username> Create a new user
  user list [--sudo-only] List all users or sudo users only
  file getinfo [OPTIONS] <file-name> Get information about a file

File Information Options:
  --size, -s      Print file size
  --permissions, -p Print file permissions
  --owner, -o     Print file owner
  --last-modified, -m Print last modified time

This will display the help message and usage guidelines.
To run other commands, use the appropriate syntax. For example:
$ ./internsctl cpu getinfo

(stranger@192)-[~/Desktop]
$
```

CPU Information

The `cpu getinfo` command retrieves CPU-related information similar to the `lscpu` command.

```
stranger@192: ~/Desktop
(stranger@192)-[~/Desktop]
$ ./internsctl cpu getinfo
Architecture:      x86_64
CPU op-mode(s):    32-bit, 64-bit
Address sizes:      39 bits physical, 48 bits virtual
Byte Order:         Little Endian
CPU(s):             4
On-line CPU(s) list: 0-3
Vendor ID:          GenuineIntel
Model name:         Intel(R) Core(TM) i3-7100U CPU @ 2.40GHz
CPU family:         6
Model:              142
Thread(s) per core: 2
Core(s) per socket: 2
Socket(s):          1
Stepping:           9
CPU(s) scaling MHz: 87%
CPU max MHz:        2400.0000
CPU min MHz:        400.0000
BogoMIPS:           4800.00
Flags:              fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse s
se2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtop
ology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl est tm2 ssse3 sdbg fma cx16 xtpr
pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3
dnowprefetch cpuid_fault epb invpcid_single pti ssbd ibrs ibpb stibp fsgsbase tsc_adjust bmi1 avx2 smep
bmi2 erms invpcid mpx rdseed adx smap clflushopt intel_pt xsaveopt xsavec xgetbv1 xsaves dtherm arat p
ln pts hwp hwp_notify hwp_act_window hwp_epp md_clear flush_l1d arch_capabilities

Caches (sum of all):
L1d:                64 KiB (2 instances)
L1i:                64 KiB (2 instances)
L2:                 512 KiB (2 instances)
L3:                 3 MiB (1 instance)

(stranger@192)-[~/Desktop]
```

Memory Information

The **memory getinfo** command retrieves memory-related information similar to the free command.

```
stranger@192: ~/Desktop
(stranger@192)-[~/Desktop]
$ ./internsctl memory getinfo
Flags:              fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse s
se2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtop
ology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl est tm2 ssse3 sdbg fma cx16 xtpr
pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3
dnowprefetch cpuid_fault epb invpcid_single pti ssbd ibrs ibpb stibp fsgsbase tsc_adjust bmi1 avx2 smep
bmi2 erms invpcid mpx rdseed adx smap clflushopt intel_pt xsaveopt xsavec xgetbv1 xsaves dtherm arat p
ln pts hwp hwp_notify hwp_act_window hwp_epp md_clear flush_l1d arch_capabilities

Caches (sum of all):
L1d:                64 KiB (2 instances)
L1i:                64 KiB (2 instances)
L2:                 512 KiB (2 instances)
L3:                 3 MiB (1 instance)
NUMA:
NUMA node(s):       1
NUMA node0 CPU(s): 0-3
Vulnerabilities:
Gather data sampling: Mitigation; Microcode
Itlb multihit:       KVM: Mitigation: VMX unsupported
L1tf:                Mitigation; PTE Inversion
Mds:                 Mitigation; Clear CPU buffers; SMT vulnerable
Meltdown:            Mitigation; PTI
Mmio stale data:     Mitigation; Clear CPU buffers; SMT vulnerable
Retbleed:            Mitigation; IBRS
Spec rstack overflow: Not affected
Spec store bypass:   Mitigation; Speculative Store Bypass disabled via prctl
Spectre v1:          Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Spectre v2:          Mitigation; IBRS, IBPB conditional, STIBP conditional, RSB filling, PBSRB-eIBRS Not affected
Srbds:               Mitigation; Microcode
Tsx async abort:     Not affected

(stranger@192)-[~/Desktop]
$
```

User Management

Create User

The **user create <username>** command creates a new user who can log in to the Linux system and access their home directory.

```
root@kalix230: ~  
File Edit View Search Terminal Help  
root@kalix230:~# adduser --home /mikedan mikedan  
Adding user `mikedan' ...  
Adding new group `mikedan' (1002) ...  
Adding new user `mikedan' (1001) with group `mikedan' ...  
Creating home directory `/mikedan' ...  
Copying files from `/etc/skel' ...  
Enter new UNIX password:  
Retype new UNIX password:  
passwd: password updated successfully  
Changing the user information for mikedan  
Enter the new value, or press ENTER for the default  
  Full Name []: Mike Danseglio  
    Room Number []:  
    Work Phone []:  
    Home Phone []:  
      Other []:  
Is the information correct? [Y/n] y  
root@kalix230:~#
```

List Users

The user list command lists all regular users on the system.

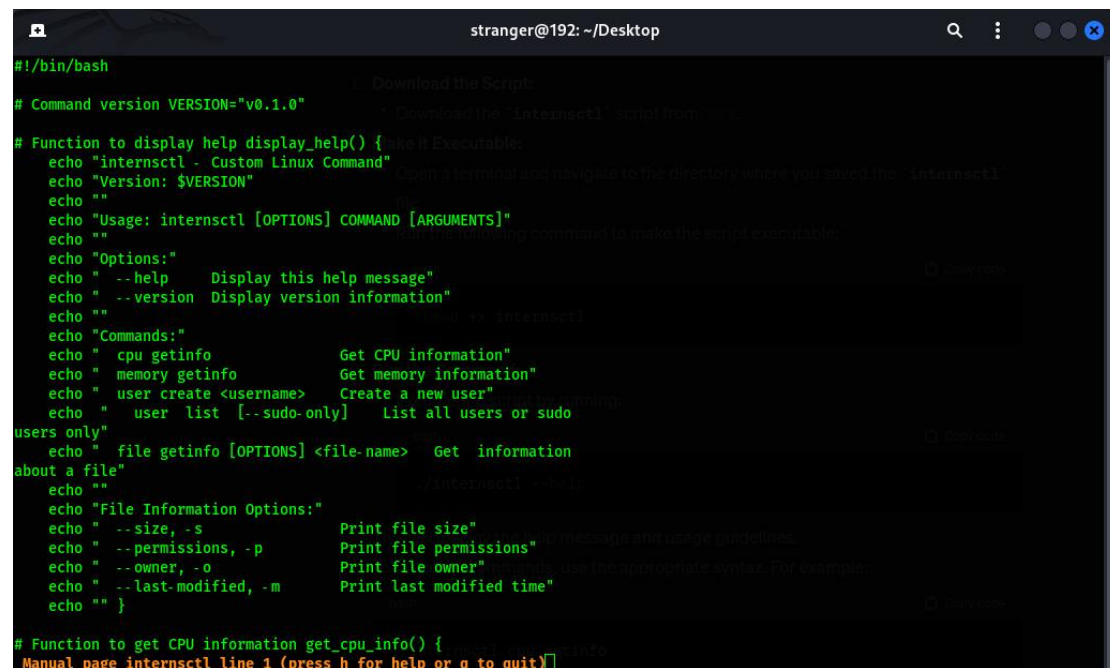
```
stranger@192: ~/Desktop  
stranger@192:~/Desktop  
$ sudo ./internsctl user list  
root  
daemon  
bin  
sys  
sync  
games  
man  
lp  
mail  
news  
uucp  
proxy  
www-data  
backup  
list  
irc  
_apt  
nobody  
systemd-network  
mysql  
tss  
systemd-coredump  
strongswan  
systemd-timesync  
redsocks  
rwhod  
_gophish  
iodine  
messagebus
```

File Information

Get File Information

The file getinfo <file-name> command retrieves detailed information about a specific file

internsctl file getinfo <file-name>



```
stranger@192: ~/Desktop
#!/bin/bash

# Command version VERSION="v0.1.0"

# Function to display help display_help() {
    echo "internsctl - Custom Linux Command"
    echo "Version: $VERSION"
    echo ""
    echo "Usage: internsctl [OPTIONS] COMMAND [ARGUMENTS]"
    echo ""
    echo "Options:"
    echo "  --help      Display this help message"
    echo "  --version   Display version information"
    echo ""
    echo "Commands:"
    echo "  cpu getinfo      Get CPU information"
    echo "  memory getinfo   Get memory information"
    echo "  user create <username> Create a new user"
    echo "  user list [--sudo-only] List all users or sudo users only"
    echo "  file getinfo [OPTIONS] <file-name> Get information about a file"
    echo ""
    echo "File Information Options:"
    echo "  --size, -s      Print file size"
    echo "  --permissions, -p Print file permissions"
    echo "  --owner, -o     Print file owner"
    echo "  --last-modified, -m Print last modified time"
    echo ""
}

# Function to get CPU information get_cpu_info() {
    # ...
}

Manual page internsctl line 1 (press h for help or q to quit)
```

Options for File Information

Options allow fetching specific information about a file:

- size, -s: Retrieve file size.
- permissions, -p: Retrieve file permissions.
- owner, -o: Retrieve file owner.
- last-modified, -m: Retrieve last modified time.