Handout: Basic Shell Commands and Tools

1. General Syntax

Each shell command follows this basic syntax:

```
command [options] [arguments]
```

2. Navigation Commands

2.1. `ls`

Lists files and directories.

```
ls
ls -l        # long format
ls -a        # show hidden files
```

2.2. `cd`

Changes the current directory.

```
cd /path/to/directory
cd /         # go to the system root directory
cd ..        # go up one level
cd ~         # go to home directory
```

2.3. `pwd`

Prints the current working directory.

```
pwd
```

Use `pwd` to verify where you are before running file operations like `rm` or `mv`.

3. Working with Files

3.1. `cat`

Displays the content of a file.

```
cat filename.txt
```

3.2. `touch`

Creates a new empty file.

```
touch notes.txt
```

The command `touch` gets its name from its original purpose: updating the *timestamp* of a file (i.e. "touching" it). If the file doesn't exist, it creates a new empty one.

3.3. `mv`

Moves or renames files and directories.

```
mv old.txt new.txt          # rename
mv file.txt /path/          # move
```

3.4. `cp`

Copies files or directories.

```
cp file.txt backup.txt
cp -r folder1 folder2       # copy a directory and all its contents (this is known as
↪  copying recursively)
```

Use `cp -a` to preserve file attributes like permissions and timestamps when copying.

3.5. `rm`

Removes files or directories.

```
rm file.txt
rm -r folder/              # delete directory and all its contents (this is known as
↪  removing recursively)
```

⚠️ Use `rm` with caution — especially with `-r`. There's no undo.

4. System Monitoring Tools

4.1. `top`

Displays real-time system processes and resource usage.

```
top
```

4.2. `htop`

An interactive, user-friendly alternative to `top`. It displays real-time system processes, allows you to sort columns, search, and even kill processes directly.

```
htop
```

⚠️ Unlike `top`, which is preinstalled on most systems, `htop` may need to be installed manually.

5. Package Management

5.1. `apt`

Package manager for Debian-based systems like Ubuntu.

```
apt update       # Refresh the list of available packages and their versions
apt install htop # Install 'htop', an interactive system monitor
```

It is **required** to run `apt update` before you can install new software to ensure you have the latest package information.

6. Text Editor

6.1. `nano`

Simple terminal-based text editor.

```
nano filename.txt          # open or create the file using a basic terminal text editor
```

To exit `nano`, press `Ctrl + X`, then `Y` to save changes or `N` to discard them.

7. Networking Tools

7.1. `ping`

Checks network connectivity.

```
ping google.com          # check network connectivity by sending test packets to Google's
↪  server
```

7.2. `curl`

Transfers data from or to a server. Useful for APIs and testing connectivity.

```
curl https://example.com                 # Make an HTTP GET request and print the response
↪  to the terminal
curl https://example.com -o example.html  # Make an HTTP GET request and save the reponse
↪  to a file named 'example.html'
```