| Cedar Rapids Area Homeschools Cyber Defense Club | |
|---|---|
| **Date** | 2025-11-08 |
| **Presenter** | Chris Leonard |
| **Document** | Student Class Notes |

# Using bash (the Bourne-Again Shell)

---

# 📚 Bash Lesson Plan

## 0. Setup

- Connect to a Linux computer on ISERink **OR** open a local Linux terminal.
- Create a safe “sandbox” directory to experiment in:

```
mkdir ~/bash_playground && cd ~/bash_playground
```

- Install and test a utility called `tldr`.

```
sudo apt update
sudo apt install tldr
tldr --update
tldr ls
```

> **Note:** unless instructed otherwise, run every command in this worksheet inside your `~/bash_playground` directory.

---

## 1. Orientation

- **Explain:** Bash is a command-line shell—like talking directly to the computer.
- **Commands:** `pwd`, `ls`, `whoami`
- **Mini-challenges:**
  - Where are you in the file system right now?
  - What is your username?

---

## 2. Filesystem Basics

- **Commands:** `pwd`, `ls`, `cd`, `mkdir`, `touch`, `rm`, `rmdir`
- **Mini-challenges:**
  - Create a folder called `school` and inside it make `class/notes`.
  - Make a file called `hello.txt` and delete it.
  - uild `school/class/notes` fastest?

---

## 3. Viewing Files

- **Commands:** `cat`, `less`, `head`, `tail`
- **Mini-challenges:**
  - Show first 5 lines of `/etc/passwd`.
  - Show last line of `/etc/passwd`.
  - Try to read `/etc/shadow` → discuss permissions.

**BONUS!**

- You'll probably want to edit files when you are using a `bash` shell.
- New users tend to prefer using `nano`.
- Create a new file in your `bash_sandbox` directory by using `touch`:

```
touch ~/bash_sandbox/test_file.txt
```

- Open the file in `nano`:

```
nano ~/bash_sandbox/test_file.txti
```

- Put into the file the names of two nursery rhymes you liked when you were little.
- Now you want to save the file. Look at the bottom of the screen. Nano tells you to type `^O` (`Ctrl-O`) to "write out" the file, which means saving the file. Do this to save your file.
- The other most important action in the `nano` menu is `[^X] Exit`. Type `Ctrl-X` to leave `Nano`.
- After you exit `nano`, use commands we discussed earlier to see what's in the file and then delete the file.

---

## 4. Permissions & Ownership

- **Commands:** `ls -l`, `chmod`
  - Discussion: file modes, or, "what the heck does `-rwxrwxrwx` mean?"
  - `tldr` is your new best friend
- **Mini-challenges:**
  - Who owns `/etc/passwd`?
  - Make a file only you can read (`chmod 600 myfile`).
  - In English, what permissions are given to it by default?
  - Remove all permissions (`chmod 000 myfile`) and try to edit it. What happens?
    - Can you fix this so you can edit the file?

---

## 5. Searching & Filtering

- **Commands:** `grep`, `wc`, `sort`, `uniq`
- **Mini-challenges:**
  - Count users in `/etc/passwd`.

- Find all users with `/bin/bash`.
- Sort users alphabetically.

---

## 6. Intro to Variables & Scripting (if time permits)

- **Commands:** variables, `if`, `while`
- **Demo only:**

```
name="Chris"
echo "Hello, $name"
```

```
if [ -f /etc/passwd ]; then
  echo "File exists!"
fi
```

```
count=1
while [ $count -le 5 ]; do
  echo "Welcome $count times"
  count=$((count+1))
done
```