Bare Bones Bash

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Aims of this session

- Aim:
  - Familiarise yourself with basic concepts and commands of bash

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  - Familiarise yourself with basic concepts and commands of bash
- Objectives
  - What is a terminal? What is a command prompt?
  - What is the difference between Absolute and Relative paths?
  - How can you move around the filesystem and interact with files and/or directories?
  - What are data streams, pipes, and redirects?
  - Finding documentation for bash tools.
  - What is a variable?
  - Difference between ' and "!
  - Parameter expansion!!

The Five Commandments of Bare Bones Bash

1. Be lazy!

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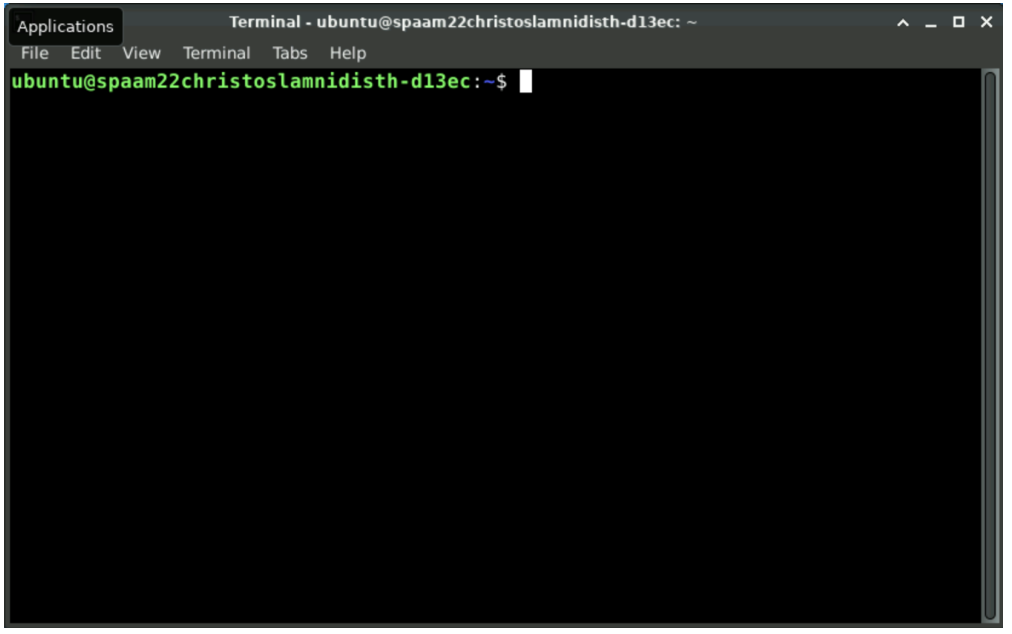
5. Don't be afraid of you freedom!

- Explore! Try out things!

Preparation!


Applications
Terminal - ubuntu@spaam22christoslamnidisth-d13ec: ~
File Edit View Terminal Tabs Help
ubuntu@spaam22christoslamnidisth-d13ec:~$


$BBB

Always mind the $ and >!

Absolute and Relative paths

In addition to your command prompt, you can use `pwd` to see your current directory

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- ~ is a **relative** path, while `pwd` returns an **absolute** path

Let's talk about paths!

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A friendly-looking metalhead.

Happy to help, but I only use **absolute paths.**
From Leipzig Hbf, take Querstraße southward.
Continue straight and take Nürnberger Str. southward until you reach Str. des 18 Oktober.
Finally take Str. des 18 Oktober. moving southeast until you reach EVA!

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Examples of absolute paths:

```
/home/ubuntu
/Hbf/Querstraße/Nürnberger_Str/Str_18_Oktober/Deutscher_Platz/EVA
```

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This street is Str. des 18 Oktober. Walk straight that way till you walk past the tram tracks and you will reach EVA!

A friendly-looking local.

Let's talk about paths!

Not sure how to get back to Leipzig Hbf to apply those directions, you decide to ask someone else for directions.

This street is Str. des 18 Oktober. Walk straight that way till you walk past the tram tracks and you will reach EVA!

A friendly-looking local.

Examples of relative paths:

~

```
./Str_18_Oktober/Deutscher_Platz/EVA
```

The different types of file paths

Absolute

- The location of a file or folder, **from the "root" directory** (/).

Relative

- The location of a file or folder, **from your current directory.**

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- The location of a file or folder, **from the "root" directory** (/).

Relative

- The location of a file or folder, **from your current directory.**

When writing code it is better to use **absolute** paths, so your code works independently of the users's current directory!

Basic bash commands

- **List** directory contents:

```
$ ls
```

```
Desktop    Downloads    'MEGA X'    Pictures    Templates    bin
Documents  M11CC_Out    Music       Public      Videos       thinclient_drives
```

Basic bash commands

- **List** directory contents:

```
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- **Make** a directory:

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- **Move** (or rename) files and directories

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- **Change** directories

```
$ cd BareBonesBash
```

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$ cp Boosted-BBB-meta Boosted-BBB-meta.tsv
```

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- **Copy** a file or directory to a new location

```
$ cp Boosted-BBB-meta Boosted-BBB-meta.tsv
```

- **Remove** (delete) files

```
rm Boosted-BBB-meta
```

Basic bash commands

- Con**cat**enate file contents to screen

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- See only the **first**/**last** 10 lines of a file

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- Look at the contents of a file **interactively** (quit with `q`)

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$ less Boosted-BBB-meta.tsv
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```

- **Count** the number of **l**ines in a file

```
$ wc -l Boosted-BBB-meta.tsv
```

Datastreams,

Piping,

and redirects

Datastreams

Programs can take in and spit out data from different *streams*. By default there are 3 such data streams.

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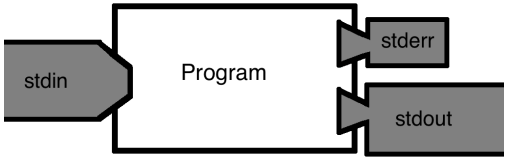

Piping

Piping lets you combine commands together using |

```
$ head -n 10 Boosted-BBB-meta.tsv | wc -l
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10
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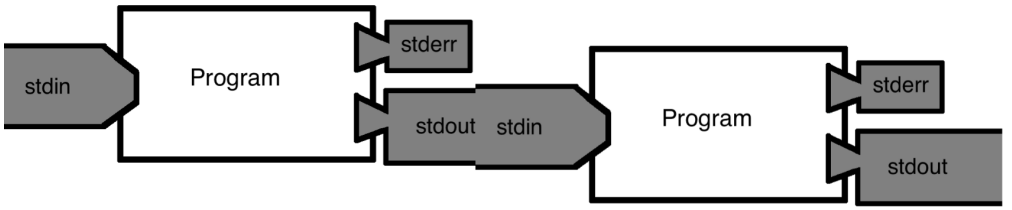

The `stdout` of one script becomes the `stdin` of the other. `stderr` is always printed on your screen.

Redirects

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$ head -n 10 Boosted-BBB-meta.tsv | wc -l >linecount.txt
$ cat linecount.txt
```

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```
$ head -n 10 Boosted-BBB-meta.tsv | wc -l >linecount.txt
$ cat linecount.txt
```

```
10
```

You can then **remove** the file we just made

```
$ rm linecount.txt
```

Finding the help you need

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$ whatis cat
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```
cat(1)                  - concatenate files and print on the standard output
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$ man cat
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> ***Activity***: *What flag should you give* `cat` *to include line numbers in the output?*

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And now for a trip...

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$ GreekFood=delicious   #We overwrite that number with a word (i.e. a 'string').
$ echo "Everyone says that Greek food is $GreekFood."
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$ GreekFood="Greek wine" #We can overwrite 'GreekFood' again,
## but when there is a space in our string, we need quotations.
$ echo "The only thing better than Greek food is $GreekFood!"
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$ GreekFood=7 #And, of course, we can overwrite with a number again too.
$ echo "I have been to Greece $GreekFood times already this year, for the food and
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```
I have been to Greece 7 times already this year, for the food and wine!
```

Quotes matter!

In bash, there is a big difference between a single quote ' and a double quote "!

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I like Greek Food
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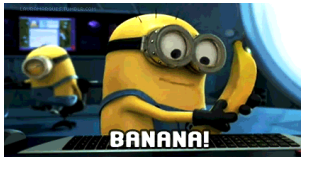

Parameter expansion

The basics

Here's an example variable:

```
$ foo="/home/thiseas/folder/subfolder/BBB.is.bae.txt"
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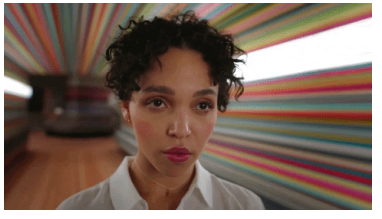
To expand a variable use `${}`.

```
$ echo ${foo}
```

```
/home/thiseas/folder/subfolder/BBB.is.bae.txt
```



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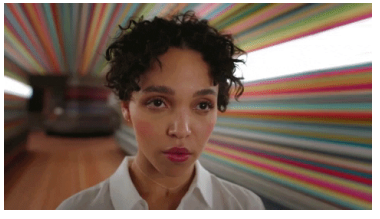

You can also add a **parameter** to expansions:

```
$ echo ${foo#/home/}
$ echo ${foo#*/}
```

```
thiseas/folder/subfolder/BBB.is.bae.txt
home/thiseas/folder/subfolder/BBB.is.bae.txt
```

Some parameters for expansion

```
$ foo="/home/thiseas/folder/subfolder/BBB.is.bae.txt"
$ echo ${foo}    # No parameters in this expansion
$ echo ${foo#*/} # Removes everything before the first '/'
$ echo ${foo%.*} # What will this do?
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These expansion can be generalised:

```
$ echo ${foo##*/} # Removes everything before any '/'
$ echo ${foo%%.*} # Removes everything after any '.'
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```
BBB.is.bae.txt
/home/thiseas/folder/subfolder/BBB
```

More parameters for expansion

You can use two / to substitute parts of the variable:

```
$ foo="/home/thiseas/folder/subfolder/BBB.is.bae.txt"
$ echo ${foo}                    # No parameters
$ echo ${foo/BBB/BareBonesBash}  # Change BBB to BareBonesBash
```

```
/home/thiseas/folder/subfolder/BBB.is.bae.txt
/home/thiseas/folder/subfolder/BareBonesBash.is.bae.txt
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```
$ foo="/home/thiseas/folder/subfolder/BBB.is.bae.txt"
$ echo ${foo}                    # No parameters
$ echo ${foo/BBB/BareBonesBash}  # Change BBB to BareBonesBash
```

```
/home/thiseas/folder/subfolder/BBB.is.bae.txt
/home/thiseas/folder/subfolder/BareBonesBash.is.bae.txt
```

Leaving the second / out replaces the pattern with "an empty string".

```
$ echo ${foo/BBB}  # Remove BBB
```

More parameters for expansion

You can use two / to substitute parts of the variable:

```
$ foo="/home/thiseas/folder/subfolder/BBB.is.bae.txt"
$ echo ${foo}                    # No parameters
$ echo ${foo/BBB/BareBonesBash}  # Change BBB to BareBonesBash
```

```
/home/thiseas/folder/subfolder/BBB.is.bae.txt
/home/thiseas/folder/subfolder/BareBonesBash.is.bae.txt
```

Leaving the second / out replaces the pattern with "an empty string".

```
$ echo ${foo/BBB}  # Remove BBB
```

```
/home/thiseas/folder/subfolder/.is.bae.txt
```

The last parameter, I swear!

Finally, you can check the length of a variable by using a # BEFORE the variable name.

```
$ foo="/home/thiseas/folder/subfolder/BBB.is.bae.txt"
$ echo ${#foo}  # The length of the variable contents
```

The last parameter, I swear!

Finally, you can check the length of a variable by using a # BEFORE the variable name.

```
$ foo="/home/thiseas/folder/subfolder/BBB.is.bae.txt"
$ echo ${#foo}  # The length of the variable contents
```

```
45
```

So the filepath in `foo` is 45 characters long!

The last parameter, I swear!

Finally, you can check the length of a variable by using a # BEFORE the variable name.

```
$ foo="/home/thiseas/folder/subfolder/BBB.is.bae.txt"
$ echo ${#foo}  # The length of the variable contents
```

```
45
```

So the filepath in `foo` is 45 characters long!

This parameter is more useful when dealing with **bash arrays** (i.e. lists of things).

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- The difference between the Terminal and the command prompt.
    - What information the command prompt includes.

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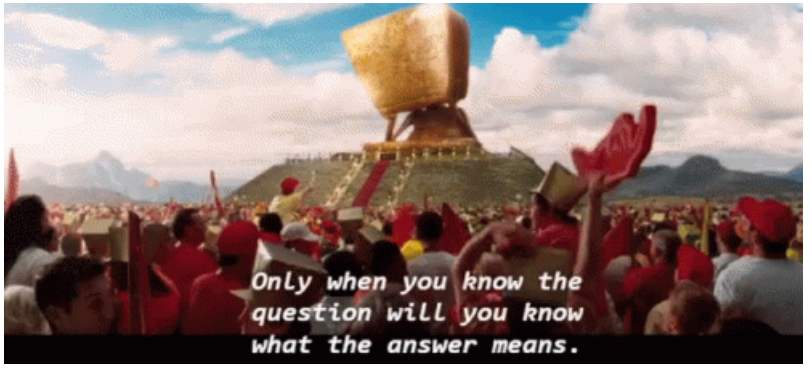
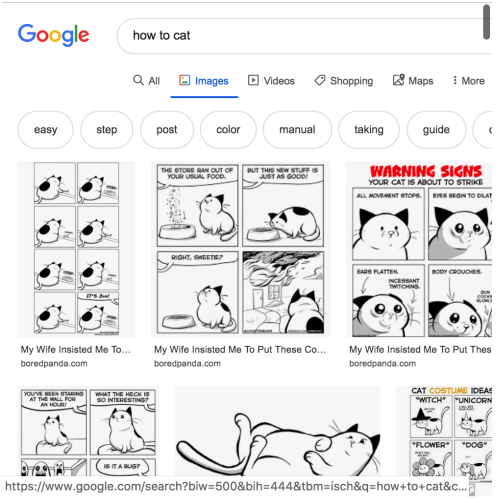
In the next session we will apply some of these concepts together with some new commands to clean up a messy file system.

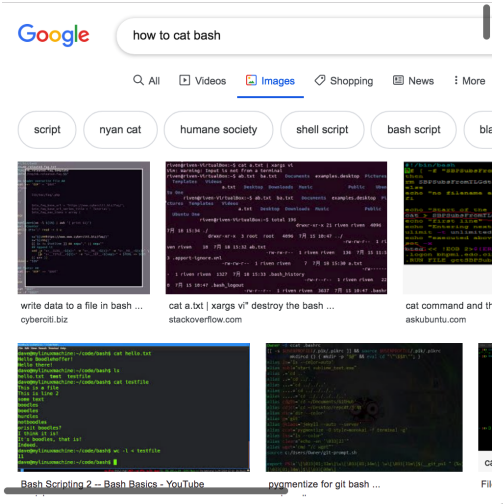
Accessing ~~Google~~ the hive-mind



Knowing the question

- ALWAYS include the name of the language in your query.





Knowing the question

- ALWAYS include the name of the language in your query.
- Broaden your question.

"Hey Google! How to set **X** to **4** in bash?"

"Hey Google! How to set a **variable** to an **integer** in bash?"

Knowing the question

- ALWAYS include the name of the language in your query.
- Broaden your question.
- When you are more familiar, use fancy programmer lingo to make google think you know what you are talking about.

All the cool hackers say:

- "*string*" and not "*text*".
- "*float*" and not "*decimal*".
- Some of these terms can be language specific.