



# Module 3 Cheat Sheet - Introduction to Shell Scripting

## Bash shebang

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1. 1
1. #!/bin/bash

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## Get the path to a command

---

1. 1
1. which bash

Copied!

## Pipes, filters, and chaining

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Chain filter commands together using the pipe operator:

1. 1
1. ls | sort -r

Copied!

Pipe the output of manual page for ls to head to display the first 20 lines:

1. 1
1. man ls | head -20

Copied!

Use a pipeline to extract a column of names from a csv and drop duplicate names:

1. 1
1. cut -d "," -f1 names.csv | sort | uniq

Copied!

## Working with shell and environment variables:

---

List all shell variables:

1. 1
1. set

Copied!

Define a shell variable called `my_planet` and assign value `Earth` to it:

1. 1
1. `my_planet=Earth`

Copied!

Display value of a shell variable:

1. 1
1. `echo $my_planet`

Copied!

Reading user input into a shell variable at the command line:

1. 1
1. `read first_name`

Copied!

**Tip:** Whatever text string you enter after running this command gets stored as the value of the variable `first_name`.

List all environment variables:

1. 1
1. `env`

Copied!

Environment vars: define/extend variable scope to child processes:

1. 1
2. 2
1. `export my_planet`
2. `export my_galaxy='Milky Way'`

Copied!

# Metacharacters

---

## Comments #:

```
1. 1
```

```
1. # The shell will not respond to this message
```

Copied!

## Command separator ;:

```
1. 1
```

```
1. echo 'here are some files and folders'; ls
```

Copied!

## File name expansion wildcard \*:

```
1. 1
```

```
1. ls *.json
```

Copied!

## Single character wildcard ?:

```
1. 1
```

```
1. ls file_2021-06-???.json
```

Copied!

# Quoting

---

## Single quotes '' - interpret literally:

```
1. 1
```

```
1. echo 'My home directory can be accessed by entering: echo $HOME'
```

Copied!

## Double quotes "" - interpret literally, but evaluate metacharacters:

```
1. 1
```

```
1. echo "My home directory is $HOME"
```

Copied!

## Backslash \ - escape metacharacter interpretation:

```
1. 1
```

```
1. echo "This dollar sign should render: \$"
```

Copied!

## I/O Redirection

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### Redirect output to file and overwrite any existing content:

```
1. 1
```

```
1. echo 'Write this text to file x' > x
```

Copied!

### Append output to file:

```
1. 1
```

```
1. echo 'Add this line to file x' >> x
```

Copied!

### Redirect standard error to file:

```
1. 1
```

```
1. bad_command_1 2> error.log
```

Copied!

### Append standard error to file:

```
1. 1
```

```
1. bad_command_2 2>> error.log
```

Copied!

### Redirect file contents to standard input:

```
1. 1
```

```
1. $ tr "[a-z]" "[A-Z]" < a_text_file.txt
```

Copied!

### The input redirection above is equivalent to:

```
1. 1
```

```
1. $cat a_text_file.txt | tr "[a-z]" "[A-Z]"
```

Copied!

## Command Substitution

---

Capture output of a command and echo its value:

- 1.
  - 2.
1. THE\_PRESENT=\$(date)
  2. echo "There is no time like \$THE\_PRESENT"

Copied!

Capture output of a command and echo its value:

- 1.
1. echo "There is no time like \$(date)"

Copied!

## Command line arguments

---

- 1.
1. ./My\_Bash\_Script.sh arg1 arg2 arg3

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## Batch vs. concurrent modes

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Run commands sequentially:

- 1.
1. start=\$(date); ./MyBigScript.sh ; end=\$(date)

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Run commands in parallel:

- 1.
1. ./ETL\_chunk\_one\_on\_these\_nodes.sh & ./ETL\_chunk\_two\_on\_those\_nodes.sh

Copied!

## Scheduling jobs with cron

---

Open crontab editor:

- 1.

```
1. crontab -e
```

Copied!

### Job scheduling syntax:

```
1. 1
```

```
1. m h dom mon dow    command
```

Copied!

(minute, hour, day of month, month, day of week)

**Tip:** You can use the \* wildcard to mean "any".

### Append the date/time to a file every Sunday at 6:15 pm:

```
1. 1
```

```
1. 15 18 * * 0 date >> sundays.txt
```

Copied!

### Run a shell script on the first minute of the first day of each month:

```
1. 1
```

```
1. 1 0 1 * * ./My_Shell_Script.sh
```

Copied!

### Back up your home directory every Monday at 3:00 am:

```
1. 1
```

```
1. 0 3 * * 1 tar -cvf my_backup_path\my_archive.tar.gz $HOME\
```

Copied!

### Deploy your cron job:

Close the crontab editor and save the file.

### List all cron jobs:

```
1. 1
```

```
1. crontab -l
```

Copied!

## Conditionals

### if-then-else syntax:

```
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
```

```
1. if [[ $# == 2 ]]
2. then
3.   echo "number of arguments is equal to 2"
4. else
5.   echo "number of arguments is not equal to 2"
6. fi
```

Copied!

#### 'and' operator &&:

```
1. 1

1. if [ condition1 ] && [ condition2 ]
```

Copied!

#### 'or' operator ||:

```
1. 1

1. if [ condition1 ] || [ condition2 ]
```

Copied!

## Logical operators

Operator	Definition
==	is equal to
!=	is not equal to
<	is less than
>	is greater than
<=	is less than or equal to
>=	is greater than or equal to

## Arithmetic calculations

#### Integer arithmetic notation:

```
1. 1

1. $(( ))
```

Copied!

#### Basic arithmetic operators:

## Symbol Operation

+	addition
-	subtraction
*	multiplication
/	division

**Display the result of adding 3 and 2:**

```
1. 1
1. echo $((3+2))
```

Copied!

**Negate a number:**

```
1. 1
1. echo $((-1*-2))
```

Copied!

## Arrays

**Declare an array that contains items 1, 2, "three", "four", and 5:**

```
1. 1
1. my_array=(1 2 "three" "four" 5)
```

Copied!

**Add an item to your array:**

```
1. 1
2. 2

1. my_array+="six"
2. my_array+=7
```

Copied!

**Declare an array and load it with lines of text from a file:**

```
1. 1
1. my_array=$(echo $(cat column.txt))
```

Copied!

## for loops

**Use a for loop to iterate over values from 1 to 5:**



```
1. 1
2. 2
3. 3

1. for i in {0..5}; do
2.     echo "this is iteration number $i"
3. done
```

Copied!

Use a **for** loop to print all items in an array:

```
1. 1
2. 2
3. 3

1. for item in ${my_array[@]}; do
2.     echo $item
3. done
```

Copied!

Use array indexing within a **for** loop, assuming the array has seven elements:

```
1. 1
2. 2
3. 3

1. for i in {0..6}; do
2.     echo ${my_array[$i]}
3. done
```

Copied!

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## Change Log

Date (YYYY-MM-DD)	Version	Changed By	Change Description
2023-06-07	2.0	Jeff Grossman	Added advanced scripting examples
2023-05-17	1.3	Nick Yi	Added content
2023-05-09	1.2	Nick Yi	Add code blocks, update title
2023-04-26	1.1	Nick Yi	ID Review
2023-02-14	1.0	Jeff Grossman	Update to reflect module content

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