Shell Scripts

For Beginners

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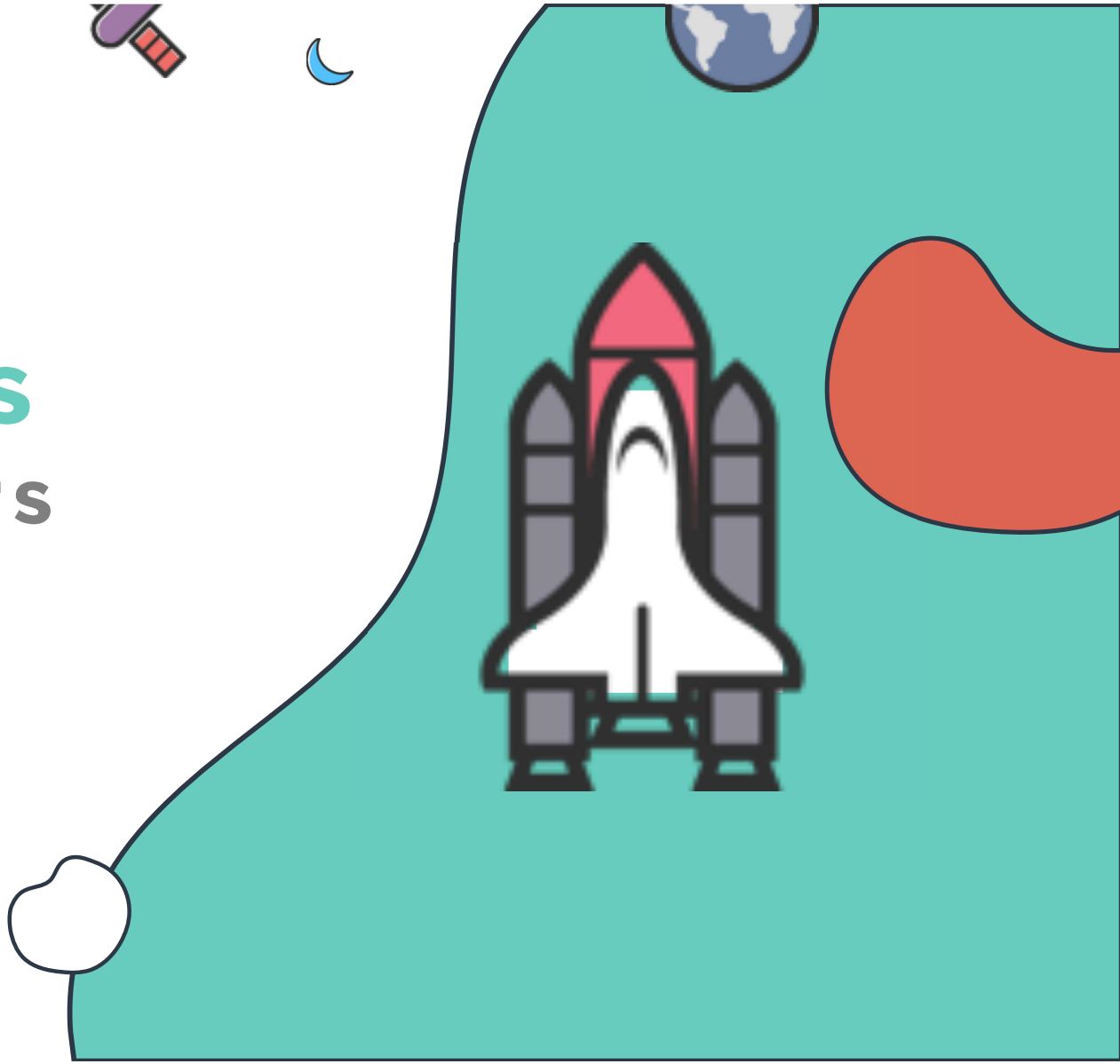

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Vijin
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Why Shell Scripts?

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Why Shell Scripts?

- Automate Daily Backups
- Automate Installation and Patching of software on multiple servers
- Monitor system periodically
- Raise alarms and send notifications
- Troubleshooting and Audits
- Many More

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Who is this for?

- Systems Administrators
- Developers
- IT Engineers
- Absolute Beginners
- **No Programming Experience**

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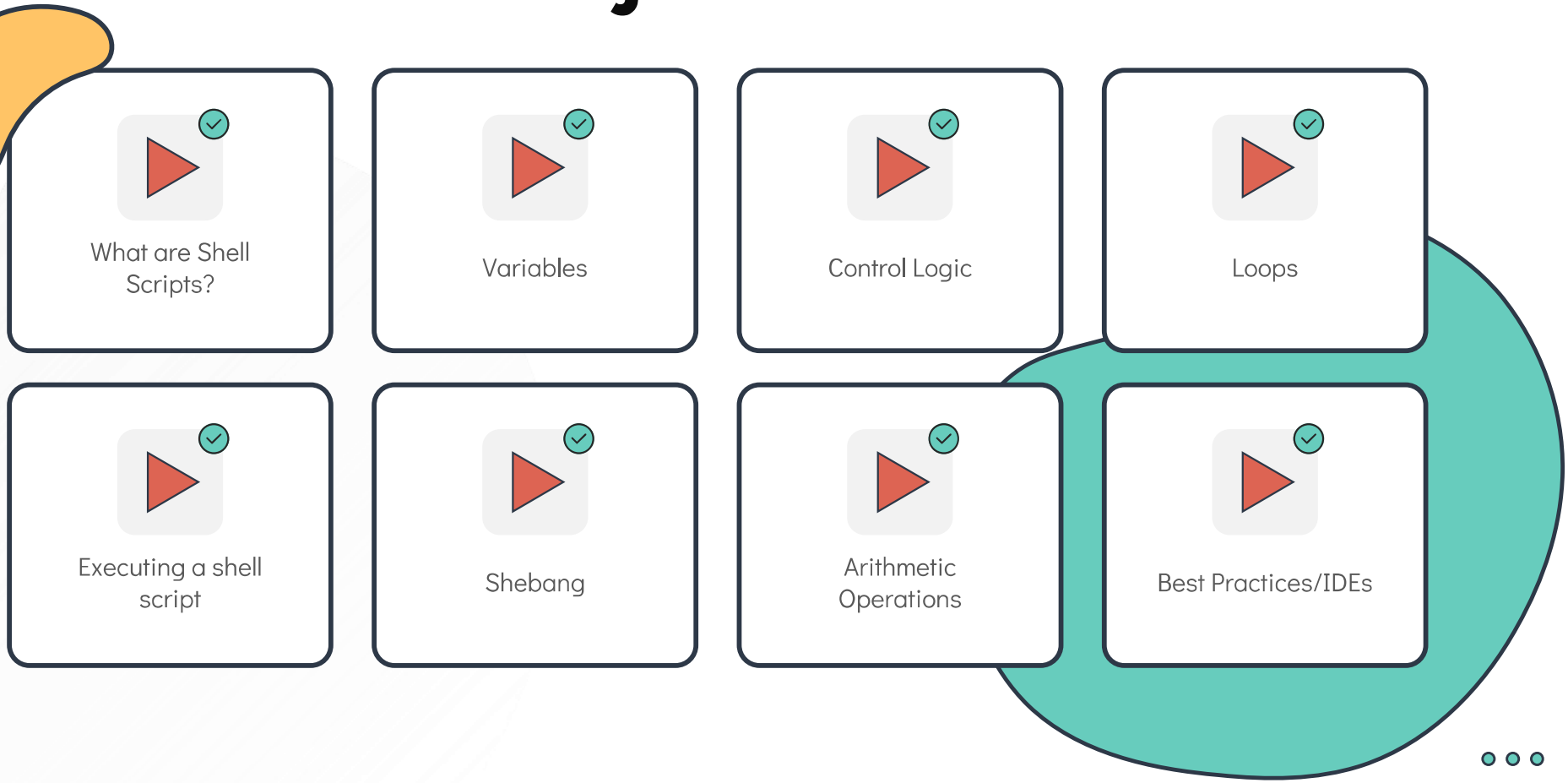
Objectives



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Pre-Requisites

- Linux Basics
- Command line basics
- No programming knowledge required

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Introduction

Shell Scripting

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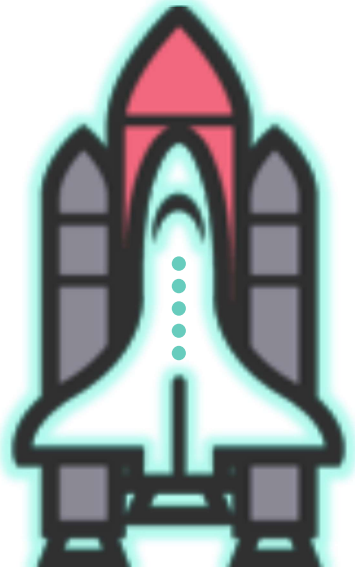
Launch Sequence

1. Start Auxiliary Power
2. Switch to Internal Power
3. Auto Sequence Start
4. Main Engine Start
5. Lift Off



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Launch Sequence

1. Start Auxiliary Power	rocket-start-power	ls	rocket-ls
2. Switch to Internal Power	rocket-internal-power	useradd	rocket-add
3. Auto Sequence Start	rocket-start-sequence	mkdir	rocket-del
4. Main Engine Start	rocket-start-engine	which	rocket-status
5. Lift Off	rocket-lift-off	dir	rocket-debug

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HANDS-ON LABS

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Creating your first Script

Shell Scripting

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Creating your First Script

```
$ mkdir lunar-mission
```

```
$ rocket-add lunar-mission
```

```
$ rocket-start-power lunar-mission
$ rocket-internal-power lunar-mission
$ rocket-start-sequence lunar-mission
$ rocket-start-engine lunar-mission
$ rocket-lift-off lunar-mission
```

```
$ rocket-status lunar-mission
```

```
$ bash create-and-launch-rocket.sh
```

create-and-launch-rocket.sh

```
mkdir lunar-mission

rocket-add lunar-mission

rocket-start-power lunar-mission
rocket-internal-power lunar-mission
rocket-start-sequence lunar-mission
rocket-start-engine lunar-mission
rocket-lift-off lunar-mission

rocket-status lunar-mission
```

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Run script as Command

```
$ bash create-and-launch-rocket.sh
```

```
$ create-and-launch-rocket
create-and-launch-rocket    : command not found
```

```
$ echo $PATH
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
```

```
$ export PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/home/michael
```

or

```
$ export PATH=$PATH:/home/michael
```

```
$ create-and-launch-rocket
```

```
$ which create-and-launch-rocket
/home/michael/create-and-launch-rocket
```

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Executing a Script

```
$ /home/michael/ create-and-launch-rocket
-bash: ./create-and-launch-rocket: Permission denied
```

```
$ ls -l /home/michael/create-and-launch-rocket
-rw-rw-r-- 1 michael michael 19 Mar 16 09:47 create-and-launch-rocket
```

```
$ chmod +x /home/michael/create-and-launch-rocket
```

```
$ ls -l /home/michael/create-and-launch-rocket
-rwx-rwx-r-x 1 michael michael 19 Mar 16 09:47 create-and-launch-rocket
```

```
$ /home/michael/create-and-launch-rocket
```

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Best Practice

"Give your script a name that makes sense"

good:

create-and-launch-rocket

bad:

script1.sh

myscript.sh

test.sh

"Leave out .sh extension for executables"

good:

create-and-launch-rocket

bad:

create-and-launch-rocket.sh

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HANDS-ON LABS

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Variables

Shell Scripting

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VARIABLES

create-and-launch-rocket

```
mkdir lunar-mission

rocket-add lunar-mission

rocket-start-power lunar-mission
rocket-internal-power lunar-mission
rocket-start-sequence lunar-mission
rocket-start-engine lunar-mission
rocket-lift-off lunar-mission

rocket-status lunar-mission
```

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VARIABLES

ALPHANUMERIC OR UNDERSCORES

`mission_name` `mission-name`

CASE SENSITIVE

`MISSION_NAME` ≠ `mission_name`

create-and-launch-rocket

```
mission_name=mars-mission
mkdir  $mission_name

rocket-add  $mission_name

rocket-start-power  $mission_name
rocket-internal-power $mission name
rocket-crew-ready  $mission_name
rocket-start-sequence $mission name
rocket-start-engine $mission name
rocket-lift-off  $mission_name

rocket-status  $mission_name
```

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VARIABLES

```
$ rocket-status lunar-mission
launching    success    failed
```

create-and-launch-rocket

```
mission_name=mars-mission
mkdir  $mission_name

rocket-add  $mission_name

rocket-start-power  $mission_name
rocket-internal-power $mission name
rocket-crew-ready  $mission_name
rocket-start-sequence $mission name
rocket-start-engine $mission name
rocket-lift-off  $mission_name

rocket_status=$(rocket-status $mission_name)
echo "Status of launch: $rocket_status"
```

```
echo "Status of launch: $rocket_status _state"
     "Status of launch: success_state"
```

```
echo "Status of launch: ${rocket_status} _state"
     "Status of launch: success_state"
```

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Best Practice

"Variable names must be in lower-case with underscores to separate words"

good:

mission_name

bad:

Mission_Name

Mission Name

Mission-name

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Command Line Arguments

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Command Line Arguments

```
$ create-and-launch-rocket

$ #modify the create-and-launch-rocket

$ create-and-launch-rocket

$ #modify the create-and-launch-rocket

$ create-and-launch-rocket

$ create-and-launch-rocket saturn-mission
```

$0 $1

```
$ create-and-launch-rocket jupiter-mission

$ create-and-launch-rocket uranus-mission
```

create-and-launch-rocket

```
mission_name= $1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket-status $mission_name

rocket_status=$(rocket-status $mission_name)
echo "Status of launch: $rocket_status"
```

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Command Line Arguments

create-and-launch-rocket

```
mission_name= $1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket-status $mission_name

rocket_status=$(rocket-status $mission_name)
echo "Status of launch: $rocket_status"
```

create-and-launch-rocket

```
mkdir  $1

rocket-add  $1

rocket-start-power $1
rocket-internal-power  $1
rocket-start-sequence  $1
rocket-start-engine $1
rocket-lift-off $1

rocket-status  $1

rocket_status=$(rocket-status  $1
echo "Status of launch: $rocket_status"
```

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Best Practice

“Design your script to be re-usable.”

“Script should not require to be edited before running.”

“Use command line arguments to pass inputs.”

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Input

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```
$ create-and-launch-rocket saturn-mission
```

```
$ create-and-launch-rocket
Enter the mission name:  saturn-mission
```

```
$ create-and-launch-rocket
saturn-mission
```

create-and-launch-rocket

```
read mission_name

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket-status $mission_name

rocket_status=$(rocket-status $mission_name)
echo "Status of launch: $rocket_status"
```

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```
$ create-and-launch-rocket saturn-mission
```

```
$ create-and-launch-rocket
Enter the mission name:  saturn-mission
```

```
$ create-and-launch-rocket
saturn-mission
```

```
$ create-and-launch-rocket
Enter the mission name:  saturn-mission
```

create-and-launch-rocket

```
read -p "Enter mission name:" mission_name

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket-status $mission_name

rocket_status=$(rocket-status $mission_name)
echo "Status of launch: $rocket_status"
```

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create-and-launch-rocket

```
read -p "Enter mission name:" mission_name

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket-status $mission_name

rocket_status=$(rocket-status $mission_name)
echo "Status of launch: $rocket_status"
```

create-and-launch-rocket

```
mission_name= $1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket-status $mission_name

rocket_status=$(rocket-status $mission_name)
echo "Status of launch: $rocket_status"
```

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HANDS-ON LABS

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Arithmetic Operations

Shell Scripting

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expr

```
$ expr 6 + 3
9
```

```
$ expr 6 - 3
3
```

```
$ expr 6 / 3
2
```

```
$ expr 6 \* 3
18
```

```
$ A=6
$ B=3
```

```
$ expr $A + $B
9
```

```
$ expr $A - $B
3
```

```
$ expr $A / $B
2
```

```
$ expr $A \* $B
18
```

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double parentheses

```
$ A=6
$ B=3
```

```
$ expr $A  +  $B
9
```

```
$ expr $A  -  $B
3
```

```
$ expr $A  /  $B
2
```

```
$ expr $A \*  $B
18
```

```
$ echo $(( A + B ))
9
```

```
$ echo $(( A-B ))
3
```

```
$ echo $((A/B))
2
```

```
$ echo $(( A * B ))
18
```

...

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double parentheses

```
$ echo $(( A + B ))
9
```

```
$ echo $(( A-B ))
3
```

```
$ echo $((A/B))
2
```

```
$ echo $(( A * B ))
18
```

```
$ echo $(( ++A ))
7
```

```
$ echo $(( --A ))
6
```

```
$ echo $(( A++ ))
6
```

```
$ echo $(( A-- ))
7
```

...

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bc

```
$ A=10
$ B=3
```

```
$ expr $A  /  $B
3
```

```
$ echo $((A/B))
3
```

```
$ echo $A / $B | bc -l
3.333333
```

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HANDS-ON LABS

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Conditional Logic

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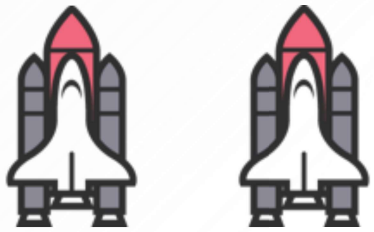
```
$ rocket-status lunar-mission
launching    success    failed
```

```
$ rocket-debug lunar-mission
overheating
```



create-and-launch-rocket

```
mission_name=$1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket_status=$(rocket-status $mission_name

if rocket-status is failed, then run this
rocket-debug $mission_name
```

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Conditional Logic

```
$ rocket-status lunar-mission
launching    success    failed
```

```
$ rocket-debug lunar-mission
overheating
```

create-and-launch-rocket

```
mission_name=$1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket_status=$(rocket-status $mission_name)

    if rocket-status is failed, then run this
if [ $rocket_status = "failed"   ]
then
      rocket-debug $mission_name
fi
```

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Conditional Logic

```
$ rocket-status lunar-mission
launching    success    failed
```

```
$ rocket-debug lunar-mission
overheating
```

create-and-launch-rocket

```
mission_name=$1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket_status=$(rocket-status $mission_name)

if [ $rocket_status = "failed"  ]
then
    rocket-debug $mission_name
fi
```

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Else If

```
$ rocket-status lunar-mission
launching    success    failed
```

```
$ rocket-debug lunar-mission
overheating
```

create-and-launch-rocket

```
mission_name=$1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket_status=$(rocket-status $mission_name)

if [ $rocket_status = "failed"  ]
then
     rocket-debug $mission_name

elif [ $rocket_status = "success" ]
then
     echo "This is successful"
fi
```

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Else

```
$ rocket-status lunar-mission
launching      success      failed
```

```
$ rocket-debug lunar-mission
overheating
```

```
mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket_status=$(rocket-status $mission_name)

if [ $rocket_status = "failed"   ]
then
     rocket-debug $mission_name

elif [ $rocket_status = "success" ]
then
      echo "This is successful"

else

      echo "The state is not failed or succes

fi
```

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Conditional Operators

```
[ STRING1 = STRING2 ]
```

Example	Description
["abc" = "abc"]	If string1 is exactly equal to string2 (true)
["abc" != "abc"]	If string1 is not equal to string 2 (false)
[5 -eq 5]	If number1 is equal to number2 (true)
[5 -ne 5]	If number1 is not equal to number2 (false)
[6 -gt 5]	If number1 is greater than number2 (true)
[5 -lt 6]	If number1 is less than number2 (true)

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Conditional Operators

```
[[ STRING1 = STRING2  ]]
```

Example	Description
`[[ "abcd" = *bc*  ]]`	If abcd contains bc (true)

`[[ "abc" = ab[cd] ]]`
or
`[[ "abd" = ab[cd] ]]`
	If 3rd character of abc is c or d (true)

`[[ "abe" = "ab[cd]" ]]`	If 3rd character of abc is c or d (false)
`[[ "abc" > "bcd" ]]`	If “abc” comes after “bcd” when sorted in alphabetical (lexographical) order (false)
`[[ "abc" < "bcd" ]]`	If “abc” comes before “bcd” when sorted in alphabetical (lexographical) order (true)

Only in BASH

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Conditional Operators

```
[ COND1   ] && [   COND2   ]

[[    COND1 && COND2      ]]

[ COND1   ] || [   COND2   ]

[[    COND1 || COND2      ]]
```

Example	Description
`[[ A -gt 4 && A -lt 10 ]]`	If A is greater than 4 and less than 10
`[[ A -gt 4 || A -lt 10 ]]`	If A is greater than 4 or less than 10

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Conditional Operators

Example	Description
[-e FILE]	if file exists
[-d FILE]	if file exists and is a directory
[-s FILE]	If file exists and has size greater than 0
[-x FILE]	If the file is executable
[-w FILE]	If the file is writeable

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HANDS-ON LABS

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Loops - For

Shell Scripting

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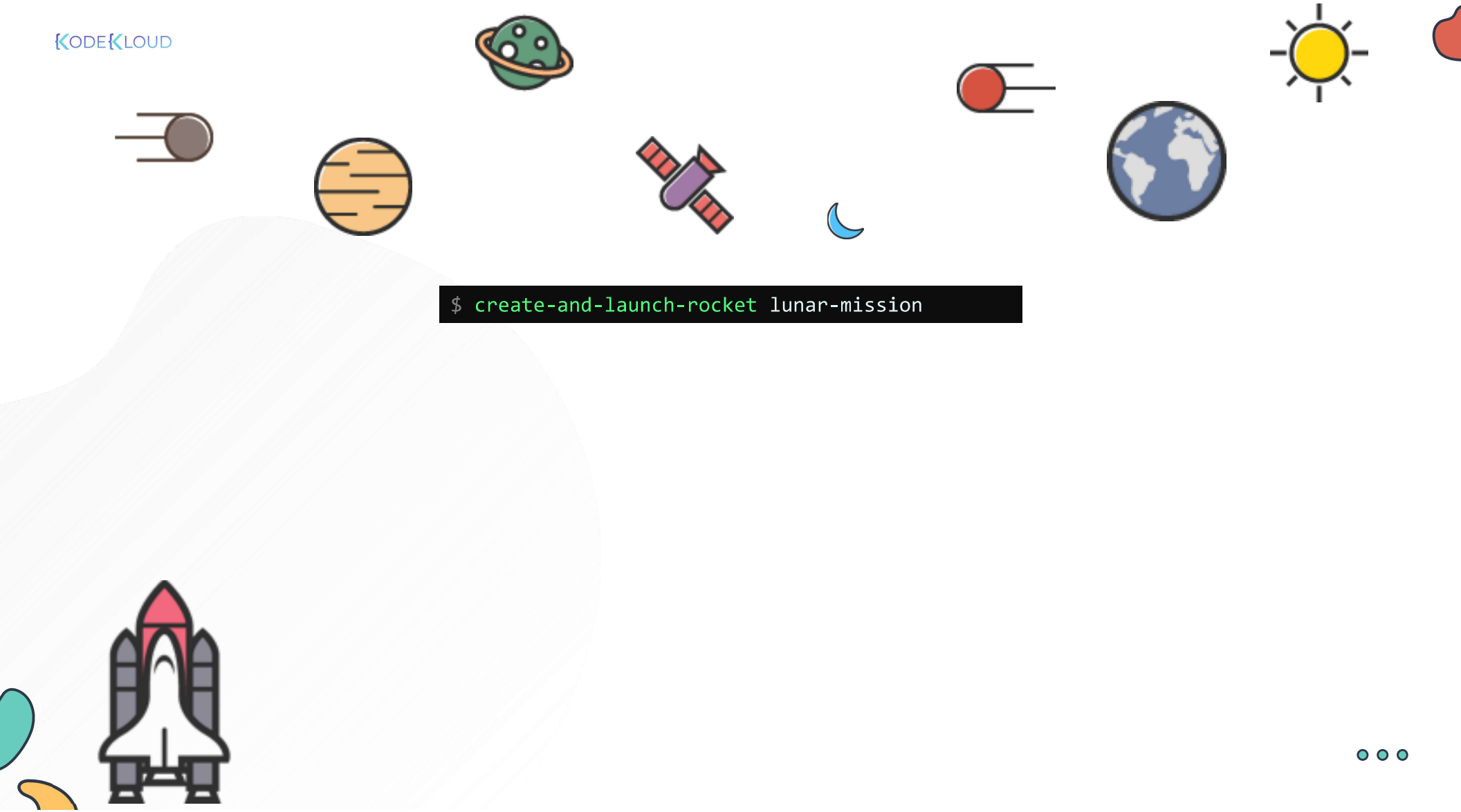

```
$ create-and-launch-rocket lunar-mission
```

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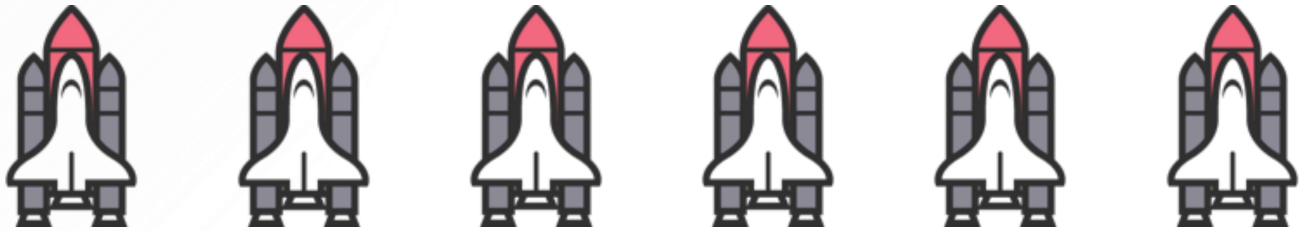
```
$ create-and-launch-rocket lunar-mission
$ create-and-launch-rocket jupiter-mission
$ create-and-launch-rocket saturn-mission
$ create-and-launch-rocket satellite-mission
$ create-and-launch-rocket lunar-mission-2
$ create-and-launch-rocket mars-mission
$ create-and-launch-rocket earth-mission
```



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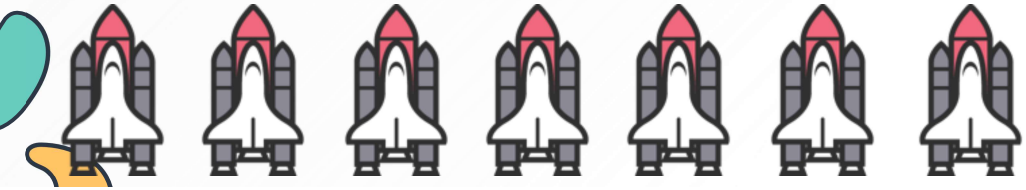
```
$ create-and-launch-rocket lunar-mission
$ create-and-launch-rocket jupiter-mission
$ create-and-launch-rocket saturn-mission
$ create-and-launch-rocket satellite-mission
$ create-and-launch-rocket lunar-mission-2
$ create-and-launch-rocket mars-mission
$ create-and-launch-rocket earth-mission
```

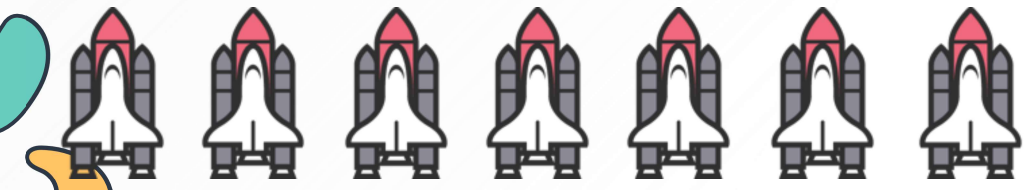


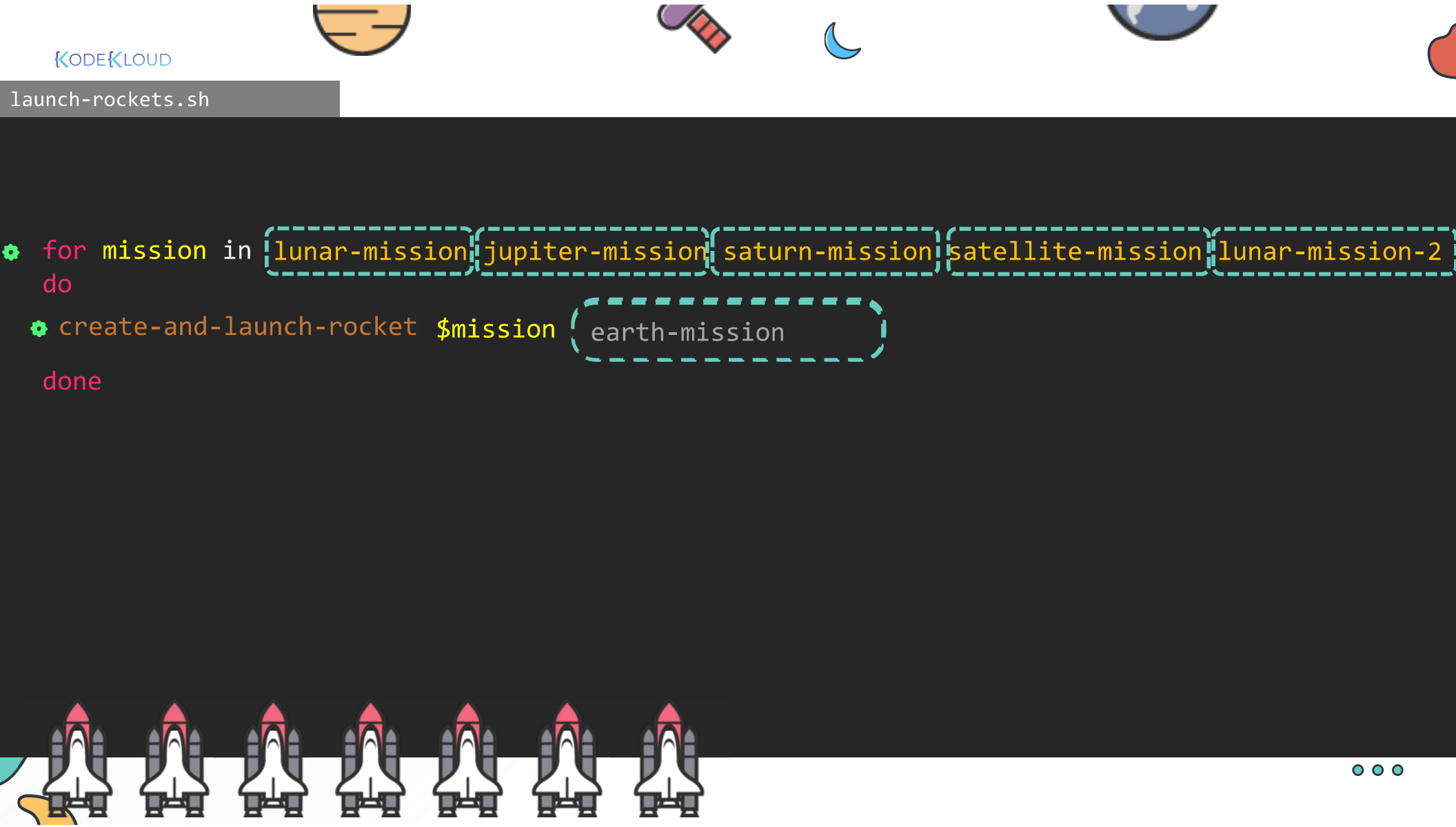
launch-rockets.sh

```
create-and-launch-rocket lunar-mission
create-and-launch-rocket jupiter-mission
create-and-launch-rocket saturn-mission
create-and-launch-rocket satellite-mission
create-and-launch-rocket lunar-mission-2
create-and-launch-rocket mars-mission
create-and-launch-rocket earth-mission
```

launch-rockets.sh

```
# For each mission create and launch rocket
for mission in lunar-mission jupiter-missio
do
  create-and-launch-rocket
done
```

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launch-rockets.sh
for mission in lunar-mission jupiter-mission saturn-mission satellite-mission lunar-mission-2
do
create-and-launch-rocket $mission earth-mission
done

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mission-names.txt

```
lunar-mission
jupiter-mission
saturn-mission
satellite-mission
lunar-mission-2
mars-mission
apollo-mission
spitzer-mission
viking-mission
pheonix-mission
chandrayan-mission
gaganyan-mission
aditya-mission
nisar-mission
mangalyaan-mission
columbia-mission
challenger-mission
atlantis-mission
endeavour-mission
mercury-mission
gemini-mission
```

launch-rockets.sh

```
for mission in $(cat mission-names.txt)
do
  create-and-launch-rocket $mission
done
```

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```
for mission in $(cat mission-names.txt)
do
  create-and-launch-rocket  $mission
done
```

```
for mission in 1 2 3 4 5 6
do
 create-and-launch-rocket mission-$mission
done
```

```
mission-1
mission-2
mission-3
mission-4
mission-5
mission-6
```

```
for mission in  {0..100}
do
 create-and-launch-rocket mission-$mission
done
```

```
mission-1
mission-2
mission-3
mission-4
```

```
mission-100
```

```
for mission in $(cat mission-names.txt)
do
 create-and-launch-rocket  $mission
done
```

```
for (( mission = 0 ; mission <= 100; mission++ ))
do
 create-and-launch-rocket mission-$mission
done
```

```
for mission in 1 2 3 4 5 6
do
 create-and-launch-rocket mission-$mission
done
```

```
for mission in {0..100}
do
 create-and-launch-rocket mission-$mission
done
```

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Use a For Loop when you have to:

- Execute a command or a set of commands many times
- Iterate through files
- Iterate through lines within a file
- Iterate through the output of a command

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Real life use cases:

```
for file in $(ls)
do
  echo Line count of $file is $(cat $file | wc -l)
done
```

```
for server in $(cat servers.txt)
do
  ssh $server "uptime"
done
```

```
for package in $(cat install-packages.txt)
do
  sudo apt-get -y install $package
done
```

KODEKLOUD

HANDS-ON LABS

KODEKLOUD

Loops - While

Shell Scripting

KODEKLOUD

```
$ rocket-status lunar-mission
success
```

create-and-launch-rocket

```
mission_name=$1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name
rocket_status=rocket-status $mission_name


if [ $rocket_status = "failed"   ]
then
      rocket-debug $mission_name
fi
```

KODEKLOUD

```
$ rocket-status lunar-mission
launching
```

create-and-launch-rocket

```
mission_name=$1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket_status=rocket-status $mission_name

if [$rocket_status = "launching"]
then
     sleep 2
     rocket_status=rocket-status $mission_nam
fi

if [ $rocket_status = "failed"   ]
then
      rocket-debug $mission_name
fi
```

KODEKLOUD

```
$ rocket-status lunar-mission
launching
```

create-and-launch-rocket

```
mission_name=$1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket_status=rocket-status $mission_name

if [$rocket_status = "launching"]
then
     sleep 2
     rocket_status=rocket-status $mission_nam

     if [$rocket_status = "launching"]
     then
          sleep 2
     fi
fi
```

KODEKLOUD

```
mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name
rocket_status=rocket-status $mission_name
if [$rocket_status = "launching"]
then
    sleep 2
    rocket_status=rocket-status $mission_name
    if [$rocket_status = "launching"]
    then
        sleep 2
        rocket_status=rocket-status $mission_name
        if [$rocket_status = "launching"]
        then
            sleep 2
        fi
    fi
fi
```

KODEKLOUD

```
rocket-start-engine $mission_name
rocket-lift-off $mission_name
rocket_status=rocket-status $mission_name
while [ $rocket_status = "launching"  ]
do
  sleep 2
  rocket_status=rocket-status $mission_name
done
```

KODEKLOUD

```
rocket_status=failed
```

create-and-launch-rocket

```
mission_name=$1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name
rocket_status=rocket-status $mission_name
while [ $rocket_status = "launching"  ]
do
 sleep 2
 rocket_status=rocket-status $mission_name
done
if [ $rocket_status = "failed"  ]
then
    rocket-debug $mission_name
fi
```

KODEKLOUD

Use a While Loop when you have to:

- Execute a command or a set of commands multiple times but you are not sure how many times.
- Execute a command or a set of commands until a specific condition occurs
- Create infinite loops
- Menu driven programs

KODEKLOUD

Real life use cases:

```
while true
Do
     echo "1. Shutdown"
     echo "2. Restart"
     echo "3. Exit Menu"
     read -p "Enter your choice: " choice

     if [ $choice  -eq 1 ]
     then
        shutdown now
     elif [ $choice  -eq 2 ]
     then
        shutdown -r now
     elif [ $choice  -eq 3 ]
     then
        break
     else
        continue
     fi


done
```

KODEKLOUD

HANDS-ON LABS

KODEKLOUD

Case Statements

Shell Scripting

KODEKLOUD

```
while true
do
    echo "1. Shutdown"
    echo "2. Restart"
    echo "3. Exit Menu"
    read -p "Enter your choice: " choice

    if [ $choice  -eq 1 ]
    then
        shutdown now
    elif [ $choice  -eq 2 ]
    then
        shutdown -r now
    elif [ $choice  -eq 3 ]
    then
        break
    else
        continue
    fi
done
```

KODEKLOUD

```
echo "1. Shutdown"
echo "2. Restart"
echo "3. Exit Menu"
read -p "Enter your choice: " choice

if [ $choice  -eq 1 ]
then
   shutdown now
elif [ $choice  -eq 2 ]
then
   shutdown -r now
elif [ $choice  -eq 3 ]
then
   break
else
   continue
fi
```

KODEKLOUD

Case Statement

```
echo "1. Shutdown"
echo "2. Restart"
echo "3. Exit Menu"
read -p "Enter your choice: " choice

if [ $choice  -eq 1 ]
then
   shutdown now
elif [ $choice  -eq 2 ]
then
   shutdown -r now
elif [ $choice  -eq 3 ]
then
   break
else
   continue
fi
```

```
echo "1. Shutdown"
echo "2. Restart"
echo "3. Exit Menu"
read -p "Enter your choice: " choice

case $choice in

   1) shutdown now ;;

   2) shutdown -r now ;;

   3) break ;;

   *) continue ;;

esac
```

KODEKLOUD

Case Statement

```
echo "1. Shutdown"
echo "2. Restart"
echo "3. Exit Menu"
read -p "Enter your choice: " choice

if [ $choice  -eq 1 ]
then
   shutdown now
elif [ $choice  -eq 2 ]
then
   shutdown -r now
elif [ $choice  -eq 3 ]
then
   break
else
   continue
fi
```

```
echo "1. Shutdown"
echo "2. Restart"
echo "3. Exit Menu"
read -p "Enter your choice: " choice

case $choice in

     1) shutdown now
        ;;
     2) shutdown -r now
        ;;
     3) break
        ;;
     *) continue
        ;;

esac
```

KODEKLOUD

Case Statement

```
echo "1. Shutdown"
echo "2. Restart"
echo "3. Exit Menu"
read -p "Enter your choice: " choice

case $choice in

    1) shutdown now
       ;;
    2) shutdown -r now
       ;;
    3) break
       ;;
    *) continue
       ;;

esac
```

KODEKLOUD

Case Statement

```
while true
do
  echo "1. Shutdown"
  echo "2. Restart"
  echo "3. Exit Menu"
  read -p "Enter your choice: " choice

 case $choice in

      1) shutdown now
         ;;
      2) shutdown -r now
         ;;
      3) break
         ;;
      *) continue
         ;;

 esac

done
```

KODEKLOUD

HANDS-ON LABS

KODEKLOUD

SHEBANG

Shell Scripting

KODEKLOUD

SHEBANG

```
sh$ ls -l /bin/sh
    /bin/sh -> /bin/bash
```

launch-rockets.sh

```
#!/bin/bash
for mission in {0..10}
do
  create-and-launch-rocket $mission
done
```

Bourne Shell (**sh**)
Debian Almquist Shell (**dash**)

```
sh$ launch-rockets.sh
Launching mission {0..10}
```

```
sh$ bash launch-rockets.sh
Launching mission 0
Launching mission 1
Launching mission 2
Launching mission 3
.
.
Launching mission 9
Launching mission 10
```

Bourne again Shell (**bash**)

```
bash$ launch-rockets.sh
Launching mission 0
Launching mission 1
Launching mission 2
Launching mission 3
Launching mission 4
Launching mission 5
Launching mission 6
Launching mission 7
Launching mission 8
Launching mission 9
Launching mission 10
```

KODEKLOUD

Best Practice

“Always start with a Shebang in your scripts”

KODEKLOUD

Exit Codes

Shell Scripting

KODEKLOUD

Exit Codes

```
$ ls
/home /root /tmp
```

```
$ echo $?
0
```

EXIT STATUS = 0 ----------▶ SUCCESS

```
$ rocket-status
success
```

```
$ echo $?
0
```

```
$ lss
Failed: command not found
```

```
$ echo $?
127
```

EXIT STATUS > 0 ----------▶ FAILURE

```
$ rocket-status
failed
```

```
$ echo $?
1
```

KODEKLOUD

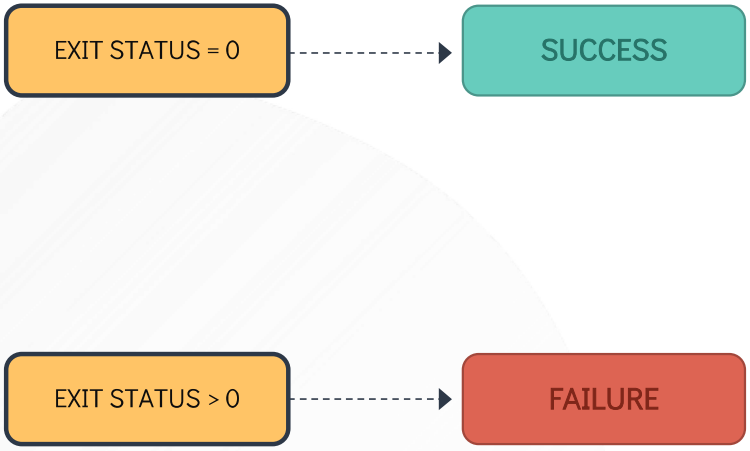

```
$ create-and-launch-rocket
failed
```

```
$ echo $?
0
```

create-and-launch-rocket

```
mission_name=$1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket_status=rocket-status $mission_name

while [ $rocket_status == "launching"  ]
do
  sleep 2
  rocket_status=rocket-status $mission_name
done

if [ $rocket_status = "failed"  ]
then
      rocket-debug $mission_name
fi
```

KODEKLOUD




```
$ create-and-launch-rocket
failed
```

```
$ echo $?
1
```

create-and-launch-rocket

```
mission_name=$1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket_status=rocket-status $mission_name

while [ $rocket_status == "launching"  ]
do
  sleep 2
  rocket_status=rocket-status $mission_name
done

if [ $rocket_status = "failed"  ]
then
     rocket-debug $mission_name
     exit 1
fi
```

KODEKLOUD

Best Practice

"Always return appropriate exit codes in your script"

KODEKLOUD

Functions

Shell Scripting

KODEKLOUD

create-and-launch-rocket

```
mission_name=$1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket_status=$(rocket-status $mission_name)

while [ $rocket_status == "launching"  ]
do
  sleep 2
  rocket_status=$(rocket-status $mission_name)
done
if  [$rocket_status = "failed" ]
then
  rocket-debug $mission_name
  exit 1
fi
```

KODEKLOUD

create-and-launch-rocket

```
mission_name=$1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket_status=$(rocket-status $mission_name)

while [ $rocket_status == "launching"  ]
do
  sleep 2
  rocket_status=$(rocket-status $mission_name)
done
if  [$rocket_status = "failed" ]
then
  rocket-debug $mission_name
  exit 1
fi

mission_name=mars-mission

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket_status=$(rocket-status $mission_name)

while [ $rocket_status == "launching"  ]
do
```

KODEKLOUD

create-and-launch-rocket

```
mission_name=$1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket_status=$(rocket-status $mission_name)

while [ $rocket_status == "launching"  ]
do
  sleep 2
  rocket_status=$(rocket-status $mission_name)
done
if  [$rocket_status = "failed" ]
then
  rocket-debug $mission_name
  exit 1
fi
```

```
mission_name=mars-mission

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket_status=$(rocket-status $mission_name)

while [ $rocket_status == "launching"  ]
do
  sleep 2
  rocket_status=$(rocket-status $mission_name)
done
if  [$rocket_status = "failed" ]
then
  rocket-debug $mission_name
  exit 1
fi
```

```
mission_name=mars-mission

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
```

KODEKLOUD

create-and-launch-rocket

```
mission_name=$1

mkdir $mission_name

rocket-add $mission_name

rocket-start-power $mission_name
rocket-internal-power $mission_name
rocket-start-sequence $mission_name
rocket-start-engine $mission_name
rocket-lift-off $mission_name

rocket_status=$(rocket-status $mission_name)

while [ $rocket_status == "launching"  ]
do
  sleep 2
  rocket_status=$(rocket-status $mission_name)
done
if  [$rocket_status = "failed" ]
then
  rocket-debug $mission_name
  exit 1
fi
```

KODEKLOUD

create-and-launch-rocket

```
function launch-rocket() {
  mission_name=$1

  mkdir $mission_name

  rocket-add $mission_name

  rocket-start-power $mission_name
  rocket-internal-power $mission_name
  rocket-start-sequence $mission_name
  rocket-start-engine $mission_name
  rocket-lift-off $mission_name

  rocket_status=$(rocket-status $mission_name)

  while [ $rocket_status == "launching"  ]
  do
    sleep 2
    rocket_status=$(rocket-status $mission_name)
  done
  if  [$rocket_status = "failed" ]
  then
    rocket-debug $mission_name
    exit 1
  fi
}
```

KODEKLOUD

create-and-launch-rocket

```
function launch-rocket() {
    mission_name=$1

    mkdir $mission_name

    rocket-add $mission_name

    rocket-start-power $mission_name
    rocket-internal-power $mission_name
    rocket-start-sequence $mission_name
    rocket-start-engine $mission_name
    rocket-lift-off $mission_name

    rocket_status=$(rocket-status $mission_name)

    while [ $rocket_status == "launching"  ]
    do
      sleep 2
      rocket_status=$(rocket-status $mission_name)
    done
    if  [$rocket_status = "failed" ]
    then
      rocket-debug $mission_name
      exit 1
    fi
}

  launch-rocket lunar-mission
```

KODEKLOUD

create-and-launch-rocket

Function Definition

```
function launch-rocket() {
  mission_name=$1

  mkdir $mission_name

  rocket-add $mission_name

  rocket-start-power $mission_name
  rocket-internal-power $mission_name
  rocket-start-sequence $mission_name
  rocket-start-engine $mission_name
  rocket-lift-off $mission_name

  rocket_status=$(rocket-status $mission_name)

  while [ $rocket_status == "launching"  ]
  do
    sleep 2
    rocket_status=$(rocket-status $mission_name)
  done
  if  [$rocket_status = "failed" ]
  then
    rocket-debug $mission_name
    exit 1
  fi
}
```

Main

```
launch-rocket lunar-mission

launch-rocket mars-mission

launch-rocket saturn-mission

launch-rocket mercury-mission
```

KODEKLOUD

```
launch-rocket: command not found
```

create-and-launch-rocket

Main

```
launch-rocket lunar-mission
launch-rocket mars-mission
launch-rocket saturn-mission
launch-rocket mercury-mission
```

Function Definition

```
function launch-rocket() {
  mission_name=$1

  mkdir $mission_name

  rocket-add $mission_name

  rocket-start-power $mission_name
  rocket-internal-power $mission_name
  rocket-start-sequence $mission_name
  rocket-start-engine $mission_name
  rocket-lift-off $mission_name

  rocket_status=$(rocket-status $mission_name)

  while [ $rocket_status == "launching"  ]
  do
    sleep 2
    rocket_status=$(rocket-status $mission_name)
  done
  if  [$rocket_status = "failed" ]
  then
    rocket-debug $mission_name
    exit 1
  fi
}
```

KODEKLOUD

create-and-launch-rocket

Function Definition

```
function launch-rocket() {
  mission_name=$1

  mkdir $mission_name

  rocket-add $mission_name

  rocket-start-power $mission_name
  rocket-internal-power $mission_name
  rocket-start-sequence $mission_name
  rocket-start-engine $mission_name
  rocket-lift-off $mission_name

  rocket_status=$(rocket-status $mission_name)

  while [ $rocket_status == "launching"  ]
  do
    sleep 2
    rocket_status=$(rocket-status $mission_name)
  done
  if  [$rocket_status = "failed" ]
  then
    rocket-debug $mission_name
    exit 1
  fi
}
```

Main

```
launch-rocket lunar-mission

launch-rocket mars-mission

launch-rocket saturn-mission

launch-rocket mercury-mission
```

KODEKLOUD

create-and-launch-rocket

```
function launch-rocket() {
  mission_name=$1

  mkdir $mission_name

  rocket-add $mission_name

  rocket-start-power $mission_name
  rocket-internal-power $mission_name
  rocket-start-sequence $mission_name
  rocket-start-engine $mission_name
  rocket-lift-off $mission_name

  rocket_status=$(rocket-status $mission_name)

  while [ $rocket_status == "launching"  ]
  do
    sleep 2
    rocket_status=$(rocket-status $mission_name)
  done
  if  [$rocket_status = "failed" ]
  then
    rocket-debug $mission_name
    return 1
  fi
}

launch-rocket lunar-mission

launch-rocket mars-mission

launch-rocket saturn-mission

launch-rocket mercury-mission
```

KODEKLOUD

create-and-launch-rocket

```
function launch-rocket() {
  mission_name=$1

  mkdir $mission_name

  rocket-add $mission_name

  rocket-start-power $mission_name
  rocket-internal-power $mission_name
  rocket-start-sequence $mission_name
  rocket-start-engine $mission_name
  rocket-lift-off $mission_name

  rocket_status=$(rocket-status $mission_name)

  while [ $rocket_status == "launching"  ]
  do
    sleep 2
    rocket_status=$(rocket-status $mission_name)
  done
  if  [$rocket_status = "failed" ]
  then
    rocket-debug $mission_name
    return 1
  fi
}

launch-rocket lunar-mission
LUNAR_STATUS_CODE=$?
launch-rocket mars-mission
MARS_STATUS_CODE=$?
launch-rocket saturn-mission
SATURN_STATUS_CODE=$?
launch-rocket mercury-mission
```

KODEKLOUD

When to use Functions?

- Break up large script that performs many different tasks:
  - Installing packages
  - Adding users
  - Configuring firewalls
  - Perform Mathematical calculations

KODEKLOUD

```
function add(){
  echo $(( $1 + $2 ))
}

add 3 5
```

KODEKLOUD

```
function add(){
  echo $(( $1 + $2 ))
}

sum=$( add 3 5 )
```

KODEKLOUD

```
function add(){
  echo $(( $1 + $2 ))
}

sum=$( add 3 5 )
```

```
function add(){
  return $(( $1 + $2 ))
}

add 3 5

sum=$?
```

KODEKLOUD

Best Practice

"Always develop scripts in a modular re-usable way using functions"

"Avoid duplicate code"

"Use arguments/parameters to pass in variables"

KODEKLOUD

HANDS-ON LABS

KODEKLOUD

Project

Shell Scripting

KODEKLOUD

https://github.com/kodekloudhub/learning-app-ecommerce

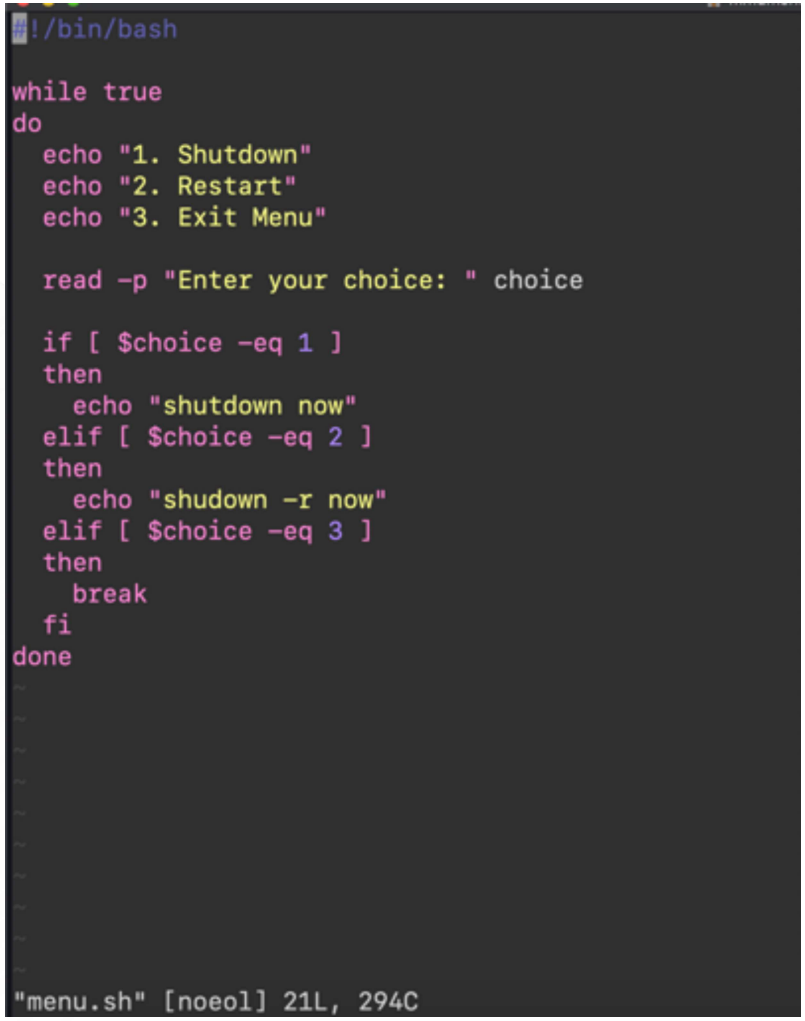
KODEKLOUD

ShellCheck/IDEs

Shell Scripting

KODEKLOUD

VIM Editor



KODEKLOUD

SHELLCHECK

```
$ apt-get install shellcheck
```

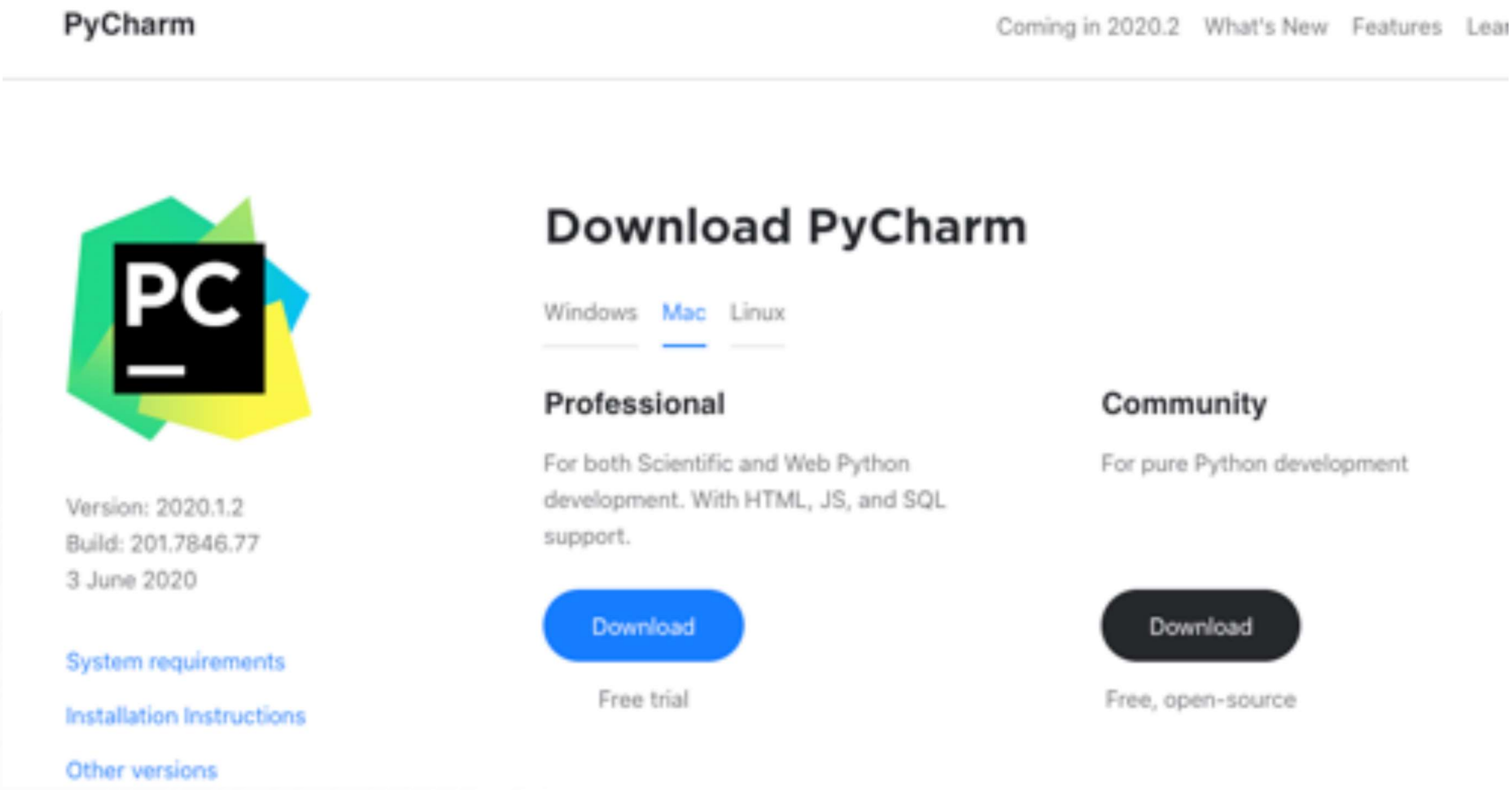
Or

```
$ yum install shellcheck
```

```
$ shellcheck menu.sh


In menu.sh line 9:
  read -p "Enter your choice: " choice
  ^--^ SC2162: read without -r will mangle backslashes.


In menu.sh line 11:
  if [ $choice -eq 1 ]
       ^-----^ SC2086: Double quote to prevent globbing and word splitting.

Did you mean:
  if [ "$choice" -eq 1 ]


In menu.sh line 14:
  elif [ $choice -eq 2 ]
         ^-----^ SC2086: Double quote to prevent globbing and word splittin

Did you mean:
  elif [ "$choice" -eq 2 ]
```

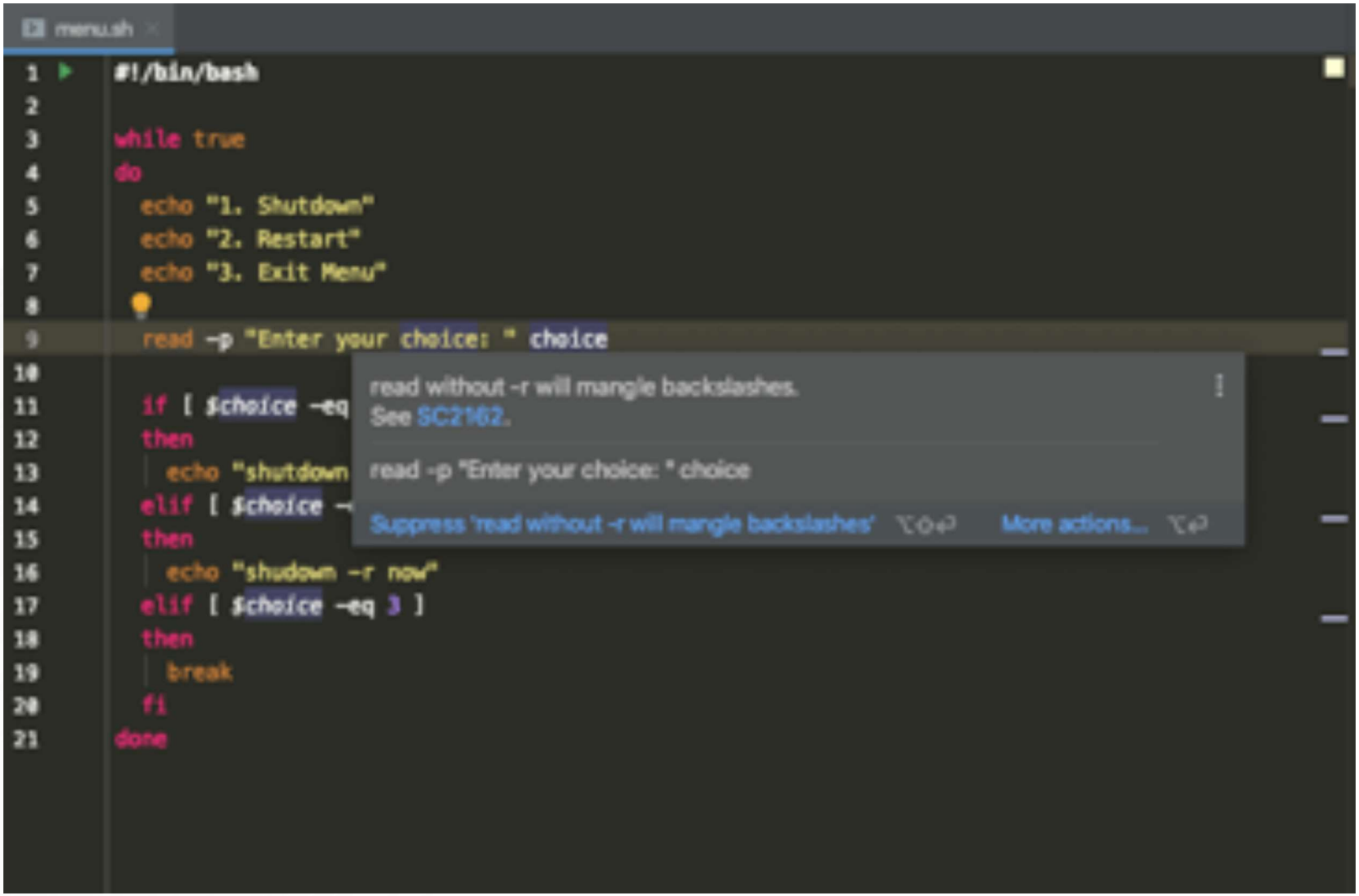
https://github.com/koalaman/shellcheck

KODEKLOUD



https://www.jetbrains.com/pycharm/download

KODEKLOUD


menu.sh
#!/bin/bash
while true
do
echo "1. Shutdown"
echo "2. Restart"
echo "3. Exit Menu"
read -p "Enter your choice: " choice
if [$choice -eq
then
echo "shutdown
elif [$choice -
then
echo "shudown -r now"
elif [$choice -eq 3]
then
break
fi
done
read without -r will mangle backslashes.
See SC2162.
read -p "Enter your choice: " choice
Suppress 'read without -r will mangle backslashes'
More actions...


macOS
Visual Studio Code
Editing and debugging on any OS
(By using Visual Studio Code you agree to its
license and privacy statement)
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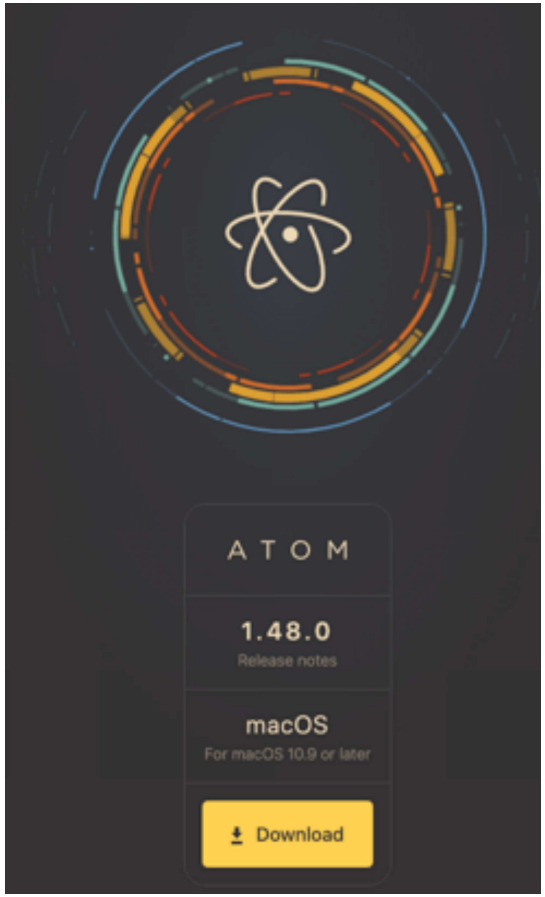
ATOM
1.48.0
Release notes
macOS
For macOS 10.9 or later
Download

KODEKLOUD

styleguide

Shell Style Guide

Revision 2.02

Authored, revised and maintained by many Googlers.

Table of Contents

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Background	Which Shell to Use - When to use Shell
Shell Files and Interpreter Invocation	File Extensions - SUID/SGID
Environment	STDOUT vs STDERR
Comments	File Header - Function Comments - Implementation Comments - TODO Comments
Formatting	Indentation - Line Length and Long Strings - Pipelines - Loops - Case statement - Variable expansion - Quoting
Features and Bugs	ShellCheck - Command Substitution - Test, `[ ]`, and `[[ ]]` - Testing Strings - Wildcard Expansion of Filenames - Eval - Arrays - Pipes to While - Arithmetic
Naming Conventions	Function Names - Variable Names - Constants and Environment Variable Names - Source Filenames - Read-only Variables - Use Local Variables - Function Location - main
Calling Commands	Checking Return Values - Builtin Commands vs. External Commands
Conclusion	

https://google.github.io/styleguide/shellguide.html

Thank You!

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