# Linux

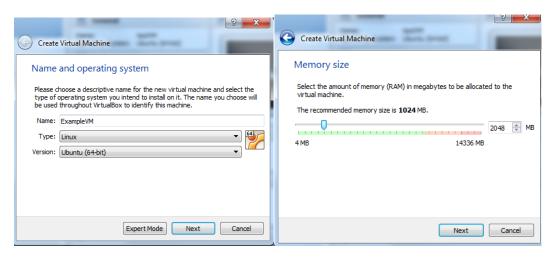
### Task1: Your first Virtual Machine

Download virtualbox at https://www.virtualbox.org/wiki/Downloads.



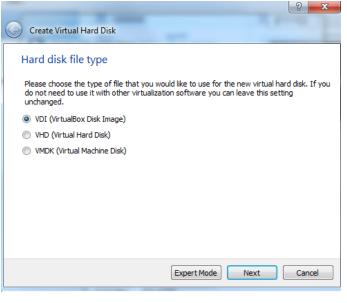
Create a new VM, Choose the OS that you have on version. If not present, choose others 64/32 bits.

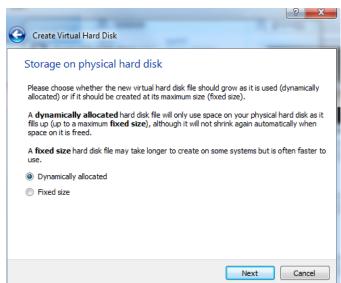
Max recommended is half of available RAM.

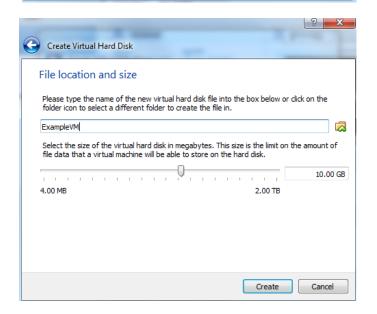




Create a virtual hard disk



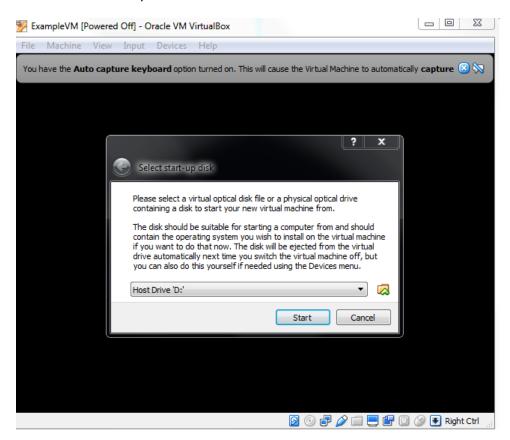




#### Start the VM



Select the ISO file of your ubuntu machine and install it.



### **Task 2: Terminal Exploration**

```
_ O X
root@ip-172-31-10-21: /home/QACPawan
ubuntu@ip-172-31-10-21:~$ ls
ubuntu@ip-172-31-10-21:~$ whoami
ubuntu
ubuntu@ip-172-31-10-21:~$ pwd
/home/ubuntu
ubuntu@ip-172-31-10-21:~$ cd ..
ubuntu@ip-172-31-10-21:/home$ ls
ubuntu@ip-172-31-10-21:/home$ mkdir QACPawan
mkdir: cannot create directory 'QACPawan': Permission denied
ubuntu@ip-172-31-10-21:/home$ sudo mkdir QACPawan
ubuntu@ip-172-31-10-21:/home$ 1s
ubuntu@ip-172-31-10-21:/home$ cd QACPawan/
ubuntu@ip-172-31-10-21:/home/QACPawan$ ls
ubuntu@ip-172-31-10-21:/home/QACPawan$ touch rand.txt
touch: cannot touch 'rand.txt': Permission denied
ubuntu@ip-172-31-10-21:/home/QACPawan$ sudo touch rand.txt
ubuntu@ip-172-31-10-21:/home/QACPawan$ echo "hello devops" >> rand.txt
-bash: rand.txt: Permission denied
ubuntu@ip-172-31-10-21:/home/QACPawan$ sudo echo "hello devops" >> rand.txt
-bash: rand.txt: Permission denied
ubuntu@ip-172-31-10-21:/home/QACPawan$ ls
rand.txt
ubuntu@ip-172-31-10-21:/home/QACPawan$ cat rand.txt
ubuntu@ip-172-31-10-21:/home/QACPawan$ echo "what" >>rand.txt
-bash: rand.txt: Permission denied
ubuntu@ip-172-31-10-21:/home/QACPawan$ user root
No command 'user' found, did you mean:
Command 'kuser' from package 'kuser' (universe)
Command 'fuser' from package 'psmisc' (main)
Command 'users' from package 'coreutils' (main)
Command 'userv' from package 'userv' (universe)
user: command not found
ubuntu@ip-172-31-10-21:/home/QACPawan$ echo "hello"
hello
ubuntu@ip-172-31-10-21:/home/QACPawan$ echo "hello" >> rand.txt
-bash: rand.txt: Permission denied
ubuntu@ip-172-31-10-21:/home/QACPawan$ sudo bash
root@ip-172-31-10-21:/home/QACPawan# echo "hello">>rand.txt
root@ip-172-31-10-21:/home/QACPawan# cat rand.txt
hello
root@ip-172-31-10-21:/home/QACPawan# ls
```

# Task 3: Creating a script file

```
GNU nano 2.5.3 File: adduser.sh

#!/bin/bash
read -p "Username: " username
useradd -g sudo -m $username
passwd $username
passwd $username
echo "Username "+$username+ "created in sudo group."
```

```
GNU nano 2.5.3 File: task1challenge.sh

#/bin/bash
date
w
uptime
```

### Task 4: Configuring the Linux environment

#### apt-get update

#### apt-get install maven

(Maven installed itself and java as well)

```
Processing triggers for libc-bin (2.23-0ubuntu7) ...
Processing triggers for systemd (229-4ubuntu16) ...
Processing triggers for ureadahead (0.100.0-19) ...
Processing triggers for ca-certificates (20160104ubuntu1) ...
Updating certificates in /etc/ssl/certs...
O added, O removed; done.
Running hooks in /etc/ca-certificates/update.d...
done.
done.
root@ip-172-31-10-21:/home/QACPawan/MyProject# java -version
openjdk version "1.8.0 131"
OpenJDK Runtime Environment (build 1.8.0 131-8u131-b11-0ubuntu1.16.04.2-b11)
OpenJDK 64-Bit Server VM (build 25.131-b11, mixed mode)
root@ip-172-31-10-21:/home/QACPawan/MyProject# mvn -v
Warning: JAVA HOME environment variable is not set.
Apache Maven 3.3.9
Maven home: /usr/share/maven
Java version: 1.8.0_131, vendor: Oracle Corporation Java home: /usr/lib/jvm/java-8-openjdk-amd64/jre
Default locale: en_US, platform encoding: UTF-8
OS name: "linux", version: "4.4.0-1013-aws", arch: "amd64", family: "unix"
root@ip-172-31-10-21:/home/QACPawan/MyProject#
```

### Task 5: Using Iptables

Start iptables:

sudo ufw enable

Stop iptables:

sudo ufw disable

Show status:

sudo ufw status

```
root@ip-172-31-10-21:/home/QACPawan/MyProject# ufw status
Status: active
root@ip-172-31-10-21:/home/QACPawan/MyProject# ufw disable
Firewall stopped and disabled on system startup
root@ip-172-31-10-21:/home/QACPawan/MyProject# ufw status
Status: inactive
root@ip-172-31-10-21:/home/QACPawan/MyProject# ufw enable
Command may disrupt existing ssh connections. Proceed with operation (y|n)? y
Firewall is active and enabled on system startup
root@ip-172-31-10-21:/home/QACPawan/MyProject# []
```

Allowing ftp at port 21 rule:

```
root@ip-172-31-10-21:/home/QACPawan/MyProject# iptables -A INPUT -p tcp --dport ftp -j ACCEPT root@ip-172-31-10-21:/home/QACPawan/MyProject# iptables -L -v -n Chain INPUT (policy DROP 0 packets, 0 bytes)
pkts bytes target prot opt in out source destination

421 34971 ufw-before-logging-input all -- * * 0.00.0/0 0.00.0/0

422 34971 ufw-before-input all -- * * 0.00.0/0 0.00.0/0

40 2944 ufw-after-input all -- * * 0.00.0/0 0.00.0/0

40 2944 ufw-after-logging-input all -- * * 0.00.0/0 0.00.0/0

40 2944 ufw-reject-input all -- * * 0.00.0/0 0.00.0/0

40 2944 ufw-reject-input all -- * * 0.00.0/0 0.00.0/0

40 2944 ufw-track-input all -- * * 0.00.0/0 0.00.0/0

40 2944 ufw-track-input all -- * * 0.00.0/0 0.00.0/0

40 2944 ufw-track-input all -- * * 0.00.0/0 0.00.0/0

40 2944 ufw-track-input all -- * * 0.00.0/0 0.00.0/0

40 2944 ufw-track-input all -- * * 0.00.0/0 0.00.0/0

40 2944 ufw-track-input all -- * * 0.00.0/0 0.00.0/0
```

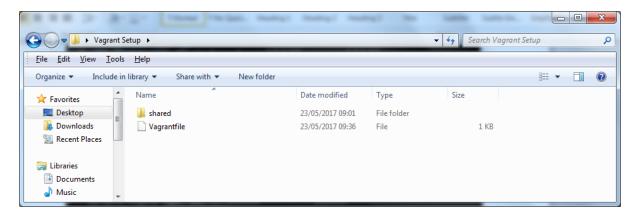
View rule by input chain and by line number, delete by input chain+linenumber

```
Chain ufw-user-output (1 references)
                  prot opt source
                                                     destination
num target
root@ip-172-31-10-21:/home/QACPawan/MyProject# iptables -L INPUT --line-number
Chain INPUT (policy DROP)
num target
                                                     destination
     ufw-before-logging-input all -- anywhere ufw-before-input all -- anywhere ufw-after-input all -- anywhere
                                                                        anywhere
                                                              anywhere
                                                             anywhere
     ufw-after-logging-input all -- anywhere
                                                                      anywhere
     ufw-reject-input all -- anywhere
ufw-track-input all -- anywhere
ACCEPT tcp -- anywhere anyw
                                                             anywhere
                                                            anywhere
                                                                               tcp dpt:ftp
                                                     anywhere
root@ip-172-31-10-21:/home/QACPawan/MyProject# iptables -D INPUT 7
root@ip-172-31-10-21:/home/QACPawan/MyProject# iptables -L INPUT --line-number
Chain INPUT (policy DROP)
                prot opt source
                                                     destination
num target
     ufw-before-logging-input all -- anywhere
                                                                        anywhere
     ufw-before-input all -- anywhere ufw-after-input all -- anywhere
                                                              anywhere
     ufw-after-input all -- anywhere ufw-after-logging-input all -- anywhere anywhere
                                                           anywhere
                                                                      anywhere
                                                              anywhere
6 ufw-track-input all -- anywhere
root@ip-172-31-10-21:/home/QACPawan/MyProject#
                                                             anywhere
```

# **Task 6: Vagrant scripting**

Create directory "Vagrant Setup" - in here open Git bash and use the command, vagrant init, to initialise a new vagrant repository. This should add a Vagrantfile to the directory

Create a shared folder to use with VM.



### For single VM installation

Edited vagrantfile to setup the VM with required specification.

Bash script used to install JAVA, Maven and Git on VM.

```
_ _ _ X
C:\Users\Administrator\Desktop\Vagrant Setup\bootstrap.sh - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help
             Vagrantfile
                                                 bootstrap.sh
          echo "Copying files from shared folder" cd /tmp/shared
                        java.tar.gz /opt/
maven.tar.gz /opt/
           cd /opt/
                    "Installing java and maven"
          sudo apt-get update
sudo tar zxvf java.tar.gz
sudo tar zxvf maven.tar.gz
sudo update-alternatives --install /usr/bin/java java /opt/jdk1.8.0_45/bin/java 100
sudo update-alternatives --install /usr/bin/javac javac /opt/jdk1.8.0_45/bin/javac 100
sudo update-alternatives --install /usr/bin/mvn mvn /opt/apache-maven-3.3.9/bin/mvn 100
          echo "Installing git'
          sudo apt-get install -y git
echo "Confirming installation"
            java -version
          mvn -v
          git --version
                                                                                                                                               Tab Size: 4 Shell Script (Bash)
```

Use "vagrant up" on the folder with vagrantfile to create VM and run bash script.

```
## MINGW64:/c/Users/Administrator/Desktop/Vagrant Setup

## default: Preparing to unpack .../git-man_1%3a1.9.1-1ubuntu0.5_all.deb ...

## default: Unpacking git-man (1:1.9.1-1ubuntu0.5) ...

## default: Selecting previously unselected package git.

## default: Preparing to unpack .../git_1%3a1.9.1-1ubuntu0.5_amd64.deb ...

## default: Unpacking git (1:1.9.1-1ubuntu0.5) ...

## default: Processing triggers for man-db (2.6.7.1-1) ...

## default: Setting up piberror-perl (0.17-1.1) ...

## default: Setting up git-man (1:1.9.1-1ubuntu0.5) ...

## default: Setting up git (1:1.9.1-1ubuntu0.5) ...

## default: Jova (This is in the setting up git (1:1.9.1-1ubuntu0.5) ...

## default: Java version "1.8.0_45"

## default: Java (This is Environment (build 1.8.0_45-b14)

## default: Java HotSpot(TM) 64-Bit Server VM (build 25.45-b02, mixed mode)

## default: Java HotSpot(TM) 64-Bit Server VM (build 25.45-b02, mixed mode)

## default: Java home: /opt/apache-maven-3.3.9

## default: Java home: /opt/apache-maven-3.3.9

## default: Java home: /opt/apache-maven-3.3.9

## default: Java home: /opt/jdk1.8.0_45/jre

## default: Dava home: /opt/gbk1.8.0_45/jre

## default: Dava home: /opt/gbk1
```

### For multiple VM installation

For CentOS installation, edit C:\Users\Administrator\.vagrant.d\boxes\centos-VAGRANTSLASH-7\1704.01\virtualbox\Vagrantfile

```
config.vm.synced_folder ".", "/vagrant", type: "rsync"
config.vm.synced_folder ".", "/vagrant", type: "virtualbox"
```

Rsync isn't installed.

Run **vagrant plugin install vagrant-vbguest** on git bash as the shared folder encounters problem with centOS due to mismatch of GuestAdditions between centOS and virtualbox.

```
centos: in which case you may ignore this message.

=>> centos: Setting hostname...
=>> centos: Setting hostname...
=>> centos: Configuring and enabling network interfaces...
=>> centos: Mounting shared folders...
centos: /vagrant => C:/Users/Administrator/Desktop/Vagrant Setup
Failed to mount folders in Linux guest. This is usually because
the "vboxsf" file system is not available. Please verify that
the guest additions are properly installed in the guest and
can work properly. The command attempted was:

mount -t vboxsf -o uid=`id -u vagrant`,gid=`getent group vagrant | cut -d: -f3`
vagrant /vagrant
mount -t vboxsf -o uid=`id -u vagrant`,gid=`id -g vagrant` vagrant /vagrant
The error output from the last command was:
mount: unknown filesystem type 'vboxsf'

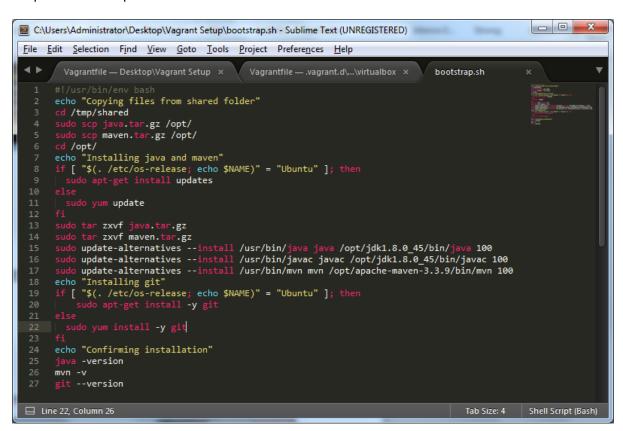
Administrator@STUDENTO2 MINGW64 ~/Desktop/Vagrant Setup
$ vagrant plugin install vagrant-vbguest
Installing the 'vagrant-vbguest' plugin. This can take a few minutes...
Installed the plugin 'vagrant-vbguest (0.14.2)'!

Administrator@STUDENTO2 MINGW64 ~/Desktop/Vagrant Setup
$
```

#### Vagrantfile for multiple VM

```
agrant.configure(2) do |config|
| config.vm.define "ubuntu" do |ubuntu|
              ubuntu.vm.hostname="Pawan.qac.local"
              ubuntu.vm.box = "chad-thompson-VAGRANTSLASH-ubuntu-trusty64-gui"
             ubuntu.vm.network:public_network, ip:"192.168.1.17
ubuntu.vm.synced_folder "shared", "/tmp/shared"
             vb.gui = true
                 vb.name = "Ubuntu Machine"
vb.cpus =2
                 vb.memory = "4096"
         config.vm.define "centos" do |centos
             centos.vm.hostname="Pawan1.qac.local"
             centos.vm.box = "centos-VAGRANTSLASH-7"
             centos.vm.network:public_network
centos.vm.synced_folder "shared", "/tmp/shared"
             centos.vm.provider "virtualbox" do |vb|
# Display the VirtualBox GUI when booting the machine
vb.gui = true
                 vb.name = "CentOS"
vb.cpus =2
                 vb.memory = "4096"
         config.vm.provision :shell, path: "bootstrap.sh"
☐ Line 38, Column 4; Saved C:\Users\Administrator\Desktop\Vagrant Setup\Vagrantfile (UTF-8)
                                                                                                        Tab Size: 4
```

#### Script file for multiple VM



Use "vagrant up" on the folder with vagrantfile to create VM and run bash script.

Ubuntu installed with JAVA, MAVEN, and GIT.

```
MINGW64:/c/Users/Administrator/Desktop/Vagrant Setup

=> ubuntu: Unpacking git-man (1:1.9.1-1) ...
=> ubuntu: Selecting previously unselected package git.
=> ubuntu: Preparing to unpack .../git_1%3a1.9.1-1_amd64.deb ...
=> ubuntu: Unpacking git (1:1.9.1-1) ...
=> ubuntu: Processing triggers for man-db (2.6.7.1-1) ...
=> ubuntu: Setting up liberror-perl (0.17-1.1) ...
=> ubuntu: Setting up git (1:1.9.1-1) ...
=> ubuntu: Setting up git (1:1.9.1-1) ...
=> ubuntu: Confirming installation
=> ubuntu: Java version "1.8.0_45"
=> ubuntu: Java HotSpot(TM) 64-Bit Server VM (build 25.45-b02, mixed mode)
=> ubuntu: Apache Maven 3.3.9 (bb52d8502b132ec0a5a3f4c09453c07478323dc5; 2015-1
1-10T10:41:47-06:00)
=> ubuntu: Maven home: /opt/apache-maven-3.3.9
=> ubuntu: Maven home: /opt/jdk1.8.0_45/jre
=> ubuntu: Java version: 1.8.0_45, vendor: Oracle Corporation
=> ubuntu: Java version: 1.8.0_45, vendor: Oracle Corporation
=> ubuntu: Java home: /opt/jdk1.8.0_45/jre
=> ubuntu: Default locale: en_US, platform encoding: UTF-8
=> ubuntu: OS name: "linux", version: "3.13.0-24-generic", arch: "amd64", famil
y: "unix"
=> ubuntu: git version 1.9.1
=> centos: Importing base box 'centos-VAGRANTSLASH-7'...
Progress: 90%
```

CentOS installed with JAVA, MAVEN, and GIT.

```
MINGW64:/c/Users/Administrator/Desktop/Vagrant Setup

=> centos: libgnome-keyring.x86_64 0:3.8.0-3.el7 perl-Error.noarch 1:0.17020  
-2.el7

=> centos: perl-Git.noarch 0:1.8.3.1-6.el7_2.1 perl-TermReadKey.x86_64 0:2
.30-20.el7

=> centos: Complete!

=> centos: Confirming installation

=> centos: java version "1.8.0_45"

=> centos: Java(TM) SE Runtime Environment (build 1.8.0_45-b14)

=> centos: Java HotSpot(TM) 64-Bit Server VM (build 25.45-b02, mixed mode)

=> centos: Apache Maven 3.3.9 (bb52d8502b132ec0a5a3f4c09453c07478323dc5; 2015-1
1-10T16:41:47+00:00)

=> centos: Maven home: /opt/apache-maven-3.3.9

=> centos: Java version: 1.8.0_45, vendor: Oracle Corporation

=> centos: Java home: /opt/jdk1.8.0_45/jre

=> centos: Default locale: en_US, platform encoding: UTF-8

=> centos: OS name: "linux", version: "3.10.0-514.16.1.el7.x86_64", arch: "amd6
4", family: "unix"

=> centos: git version 1.8.3.1

Administrator@STUDENTO2 MINGW64 ~/Desktop/Vagrant Setup

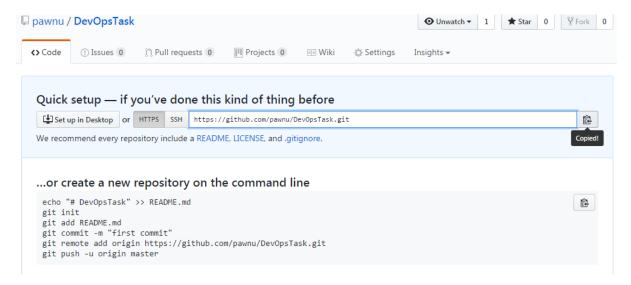
$
```

# **Task 7: Repository Management**

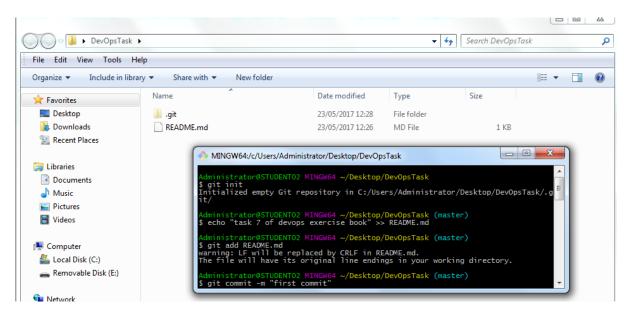
Confirmed Git is installed in VM

```
vagrant@Pawan: ~
vagrant@Pawan: ~
git --version
git version 1.9.1
vagrant@Pawan: ~$
```

On Windows host machine, create a repository on github.



On host windows machine, create a directory for git and use "git init" command on that folder. Create a file, add and commit it.



Add the commit to your repository on github with HTTPS link and push the changes.

```
MINGW64:/c/Users/Administrator/Desktop/DevOpsTask

Administrator@STUDENTO2 MINGW64 ~/Desktop/DevOpsTask (master)

$ git commit -m "first commit"
[master (root-commit) c4c5727] first commit

1 file changed, 1 insertion(+)
create mode 100644 README.md

Administrator@STUDENTO2 MINGW64 ~/Desktop/DevOpsTask (master)

$ git remote add origin https://github.com/pawnu/DevOpsTask.git

Administrator@STUDENTO2 MINGW64 ~/Desktop/DevOpsTask (master)

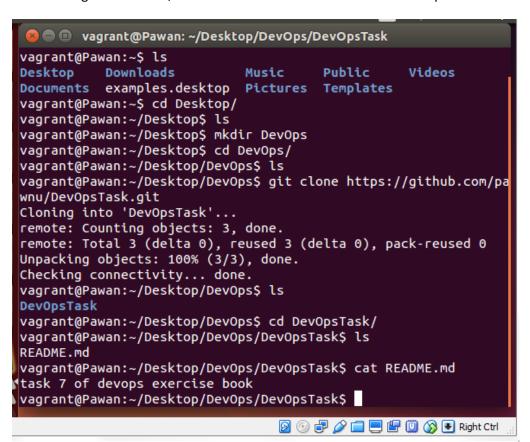
$ git push -u origin master
Username for 'https://github.com': pawan.uppadey@gmail.com
Counting objects: 3, done.
Writing objects: 3, done.
Writing objects: 100% (3/3), 243 bytes | 0 bytes/s, done.
Total 3 (delta 0), reused 0 (delta 0)
To https://github.com/pawnu/DevOpsTask.git

* [new branch] master -> master
Branch master set up to track remote branch master from origin.

Administrator@STUDENTO2 MINGW64 ~/Desktop/DevOpsTask (master)

$ |
```

On Ubuntu guest machine, clone and confirm the file created earlier is present.



Create a new file on Windows host machine and push change to repository.

```
Administrator@STUDENTO2 MINGW64 ~/Desktop/DevOpsTask (master)

§ git add example.txt
The file will be replaced by CRLF in example.txt.
The file will have its original line endings in your working directory.

Administrator@STUDENTO2 MINGW64 ~/Desktop/DevOpsTask (master)

§ git commit "added example file"
error: pathspec 'added example file' did not match any file(s) known to git.

Administrator@STUDENTO2 MINGW64 ~/Desktop/DevOpsTask (master)

§ ls
example.txt README.md

Administrator@STUDENTO2 MINGW64 ~/Desktop/DevOpsTask (master)

§ git commit -m "added example file"
[master dle073a] added example file
1 file changed, 1 insertion(+)
create mode 100644 example.txt

Administrator@STUDENTO2 MINGW64 ~/Desktop/DevOpsTask (master)

§ git remote -v
origin https://github.com/pawnu/DevOpsTask.git (fetch)
origin https://github.com/pawnu/DevOpsTask.git (push)

Administrator@STUDENTO2 MINGW64 ~/Desktop/DevOpsTask (master)

§ git push origin master
Username for 'https://github.com': pawan.uppadey@gmail.com
Counting objects: 100% (2/2), done.
Wirting objects: 100% (3/3), 290 bytes | 0 bytes/s, done.
Total 3 (delta 0), reused 0 (delta 0)
To https://github.com/pawnu/DevOpsTask.git
c4c5727.dle073a master -> master

Administrator@STUDENTO2 MINGW64 ~/Desktop/DevOpsTask (master)

§ done.

Administrator@STUDENTO2 MINGW64 ~/Desktop/DevOpsTask (master)
```

Confirm the file present on Ubuntu guest machine.

```
vagrant@Pawan: ~/Desktop/DevOps/DevOpsTask
vagrant@Pawan:~/Desktop/DevOps/DevOpsTask$ ls
README.md
vagrant@Pawan:~/Desktop/DevOps/DevOpsTask$ cat README.md
task 7 of devops exercise book
vagrant@Pawan:~/Desktop/DevOps/DevOpsTask$ git pull origin mast
remote: Counting objects: 3, done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 0), reused 3 (delta 0), pack-reused 0
Unpacking objects: 100% (3/3), done.
From https://github.com/pawnu/DevOpsTask
 * branch
                                -> FETCH_HEAD
                     master
                     master
   c4c5727..d1e073a
                                -> origin/master
Updating c4c5727..d1e073a
Fast-forward
 example.txt | 1 +
 1 file changed, 1 insertion(+)
 create mode 100644 example.txt
vagrant@Pawan:~/Desktop/DevOps/DevOpsTask$ ls
example.txt README.md
vagrant@Pawan:~/Desktop/DevOps/DevOpsTask$ cat example.txt
new file
```

Make change to a file on Ubuntu and push to repository

```
vagrant@Pawan:~/Desktop/DevOps/DevOpsTask$ git add example.txt
 vagrant@Pawan:~/Desktop/DevOps/DevOpsTask$ git commit -m "made
 change to example text file"
 [master 179bba0] made change to example text file
 Committer: Vagrant <vagrant@Pawan.qac.local>
 Your name and email address were configured automatically based
 on your username and hostname. Please check that they are accur
 ate.
 You can suppress this message by setting them explicitly:
     git config --global user.name "Your Name"
     git config --global user.email you@example.com
 After doing this, you may fix the identity used for this commit
 with:
     git commit --amend --reset-author
1 file changed, 1 insertion(+)
Counting objects: 5, done.
Delta compression using up to 2 threads.
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 339 bytes | 0 bytes/s, done.
Total 3 (delta 0), reused 0 (delta 0)
```

Confirm changes on Windows host machine side

To https://github.com/pawnu/DevOpsTask.git d1e073a..179bba0 master -> master vagrant@Pawan:~/Desktop/DevOps/De<u>vOpsTask</u>\$

```
X
    MINGW64:/c/Users/Administrator/Desktop/DevOpsTask
Administrator@STUDENT02 MINGW64 ~/Desktop/DevOpsTask (master)
$ git pull origin master
remote: Counting objects: 3, done.
remote: Compressing objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 3 (delta 0), pack-reused 0
Unpacking objects: 100% (3/3), done.
From https://github.com/pawnu/DevOpsTask

* branch master -> FETCH_HEAD
                                             -> FETCH_HEAD
d1e073a..179bba0 master
Updating d1e073a..179bba0
                                              -> origin/master
Fast-forward
  example.txt | 1 -
 1 file changed, 1 insertion(+)
Administrator@STUDENTO2 MINGW64 ~/Desktop/DevOpsTask (master)
$ 1s
example.txt README.md
 Administrator@STUDENT02 MINGW64 ~/Desktop/DevOpsTask (master)
$ cat example.txt
new file
This file has been modified on Ubuntu VM
 Administrator@STUDENT02 MINGW64 ~/Desktop/DevOpsTask (master)
```