

EXPERIMENT - 1

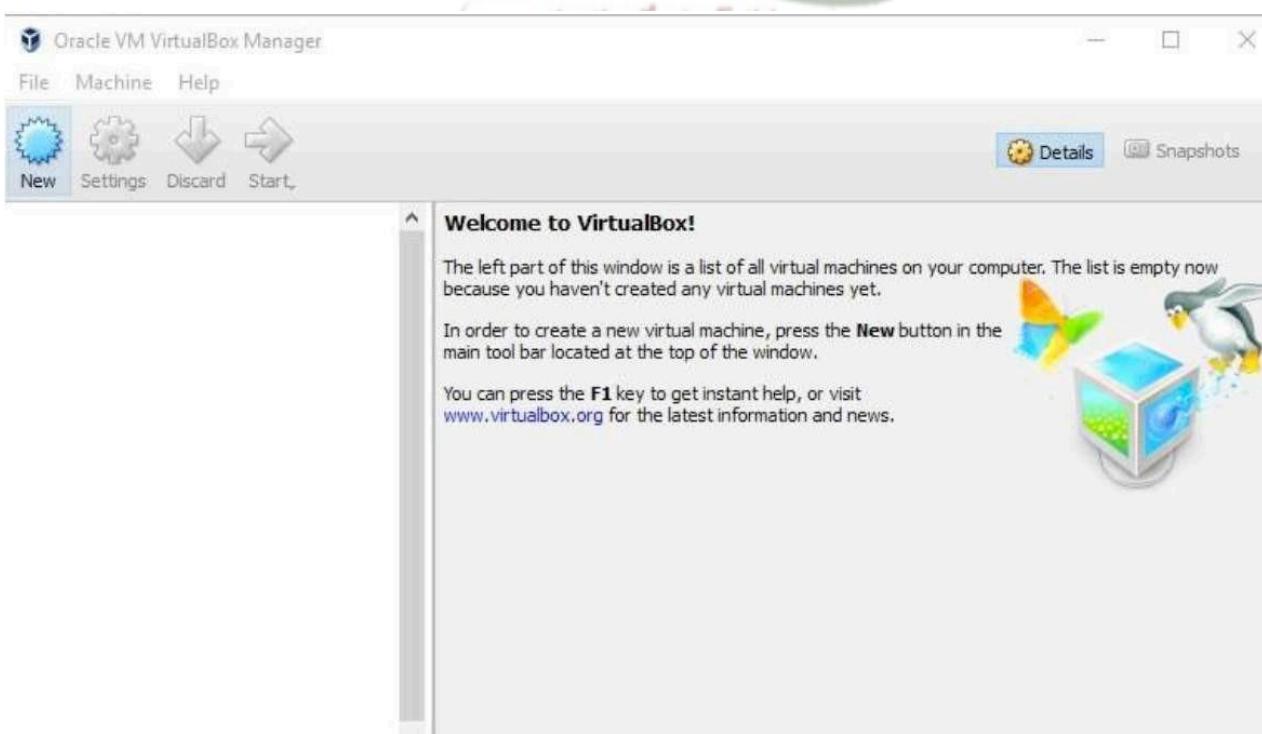
AIM:

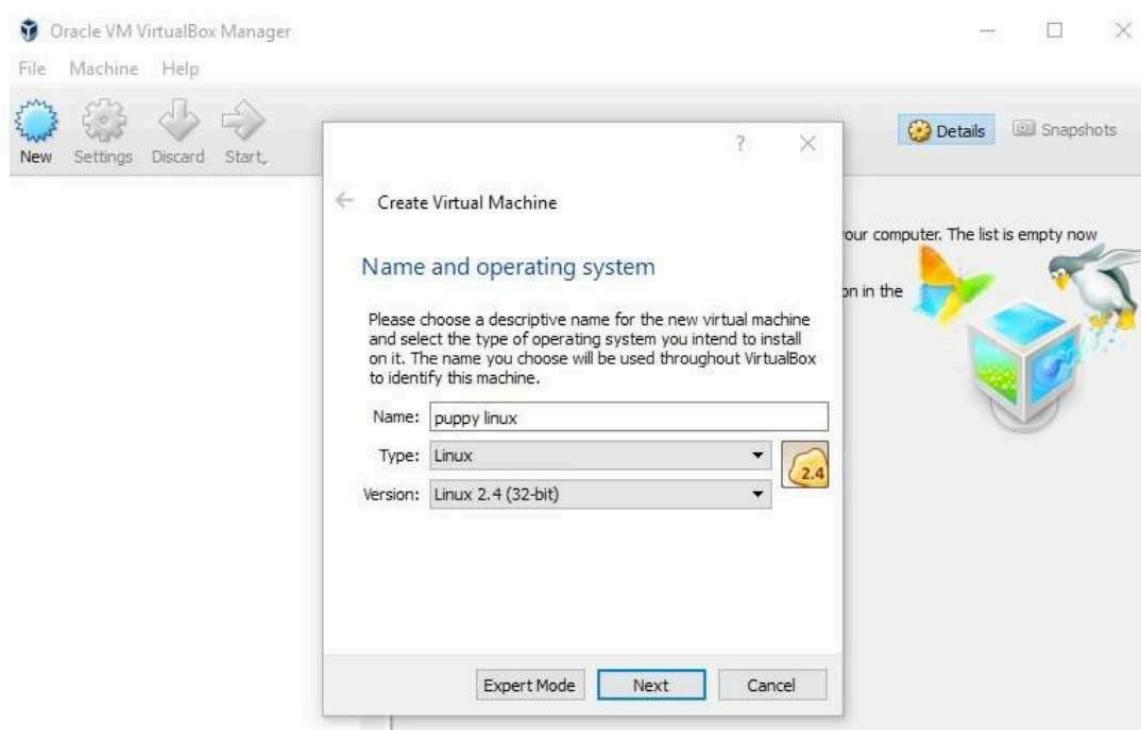
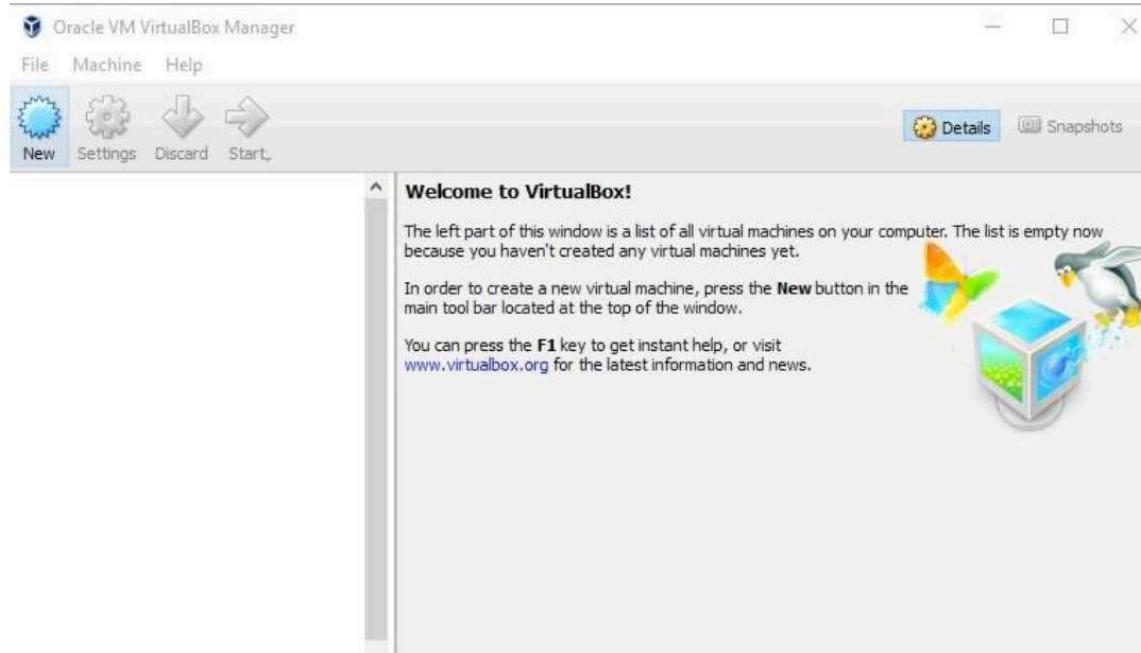
To create a virtual machine using Virtual box.

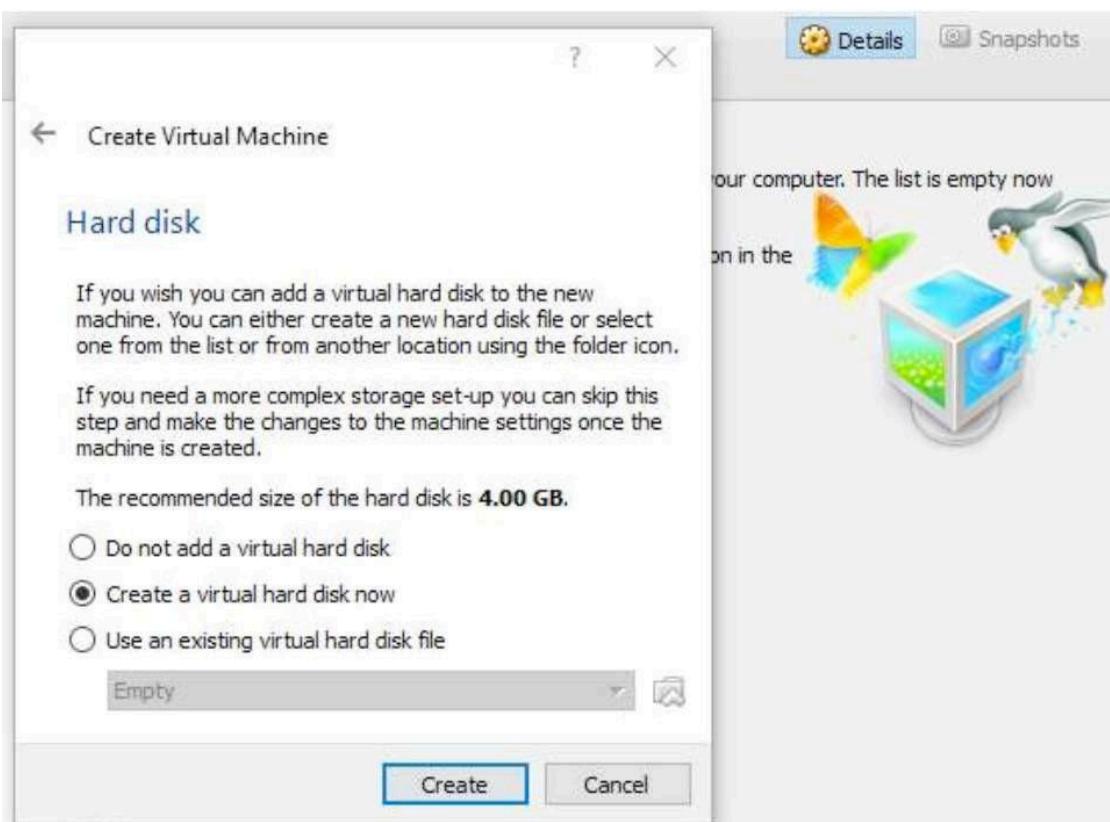
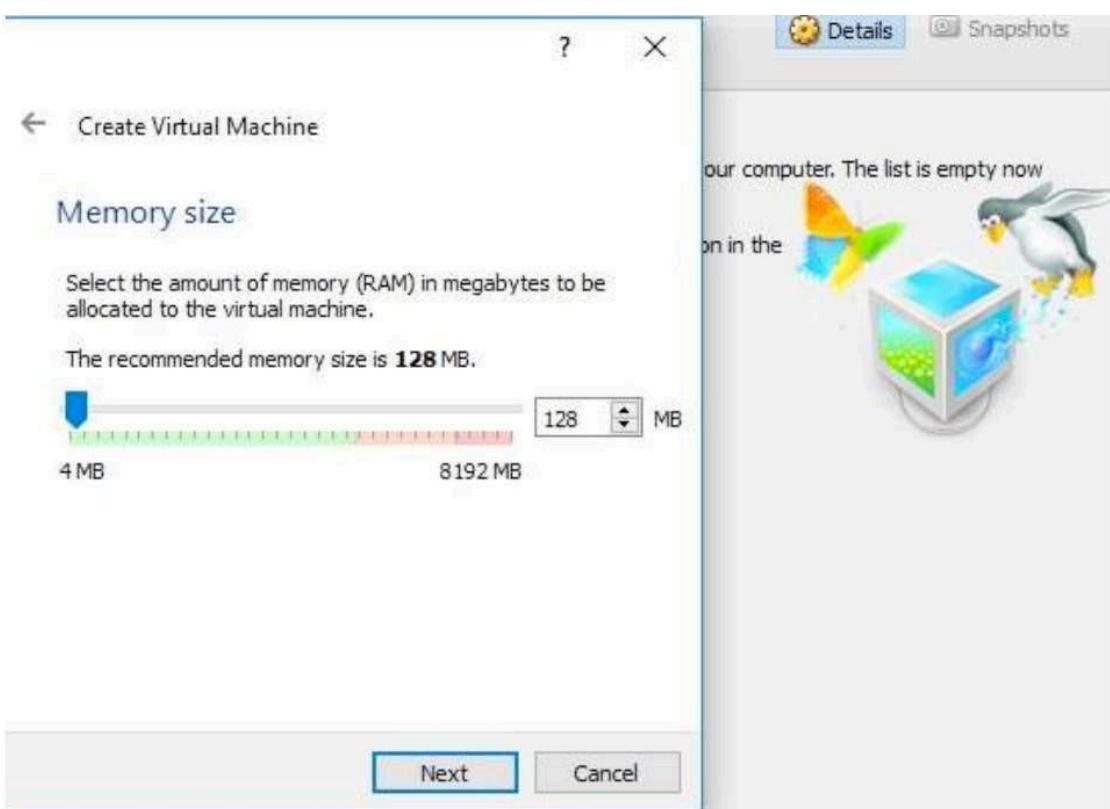
DESCRIPTION:

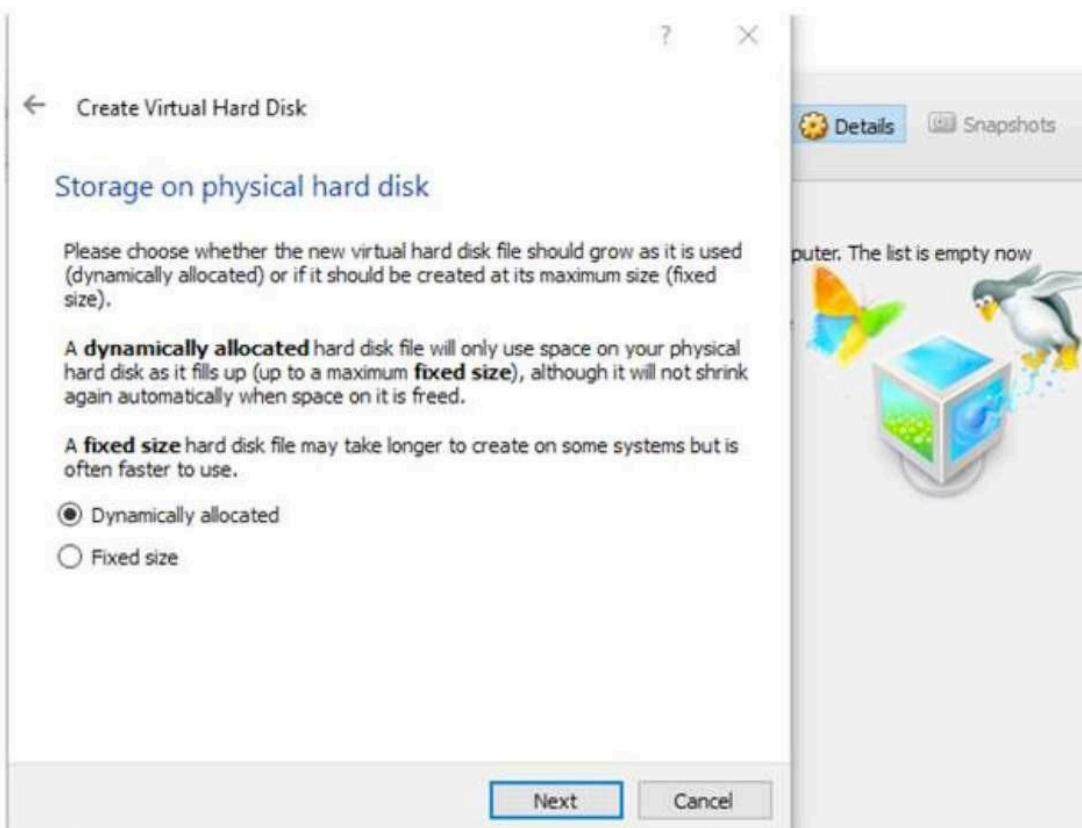
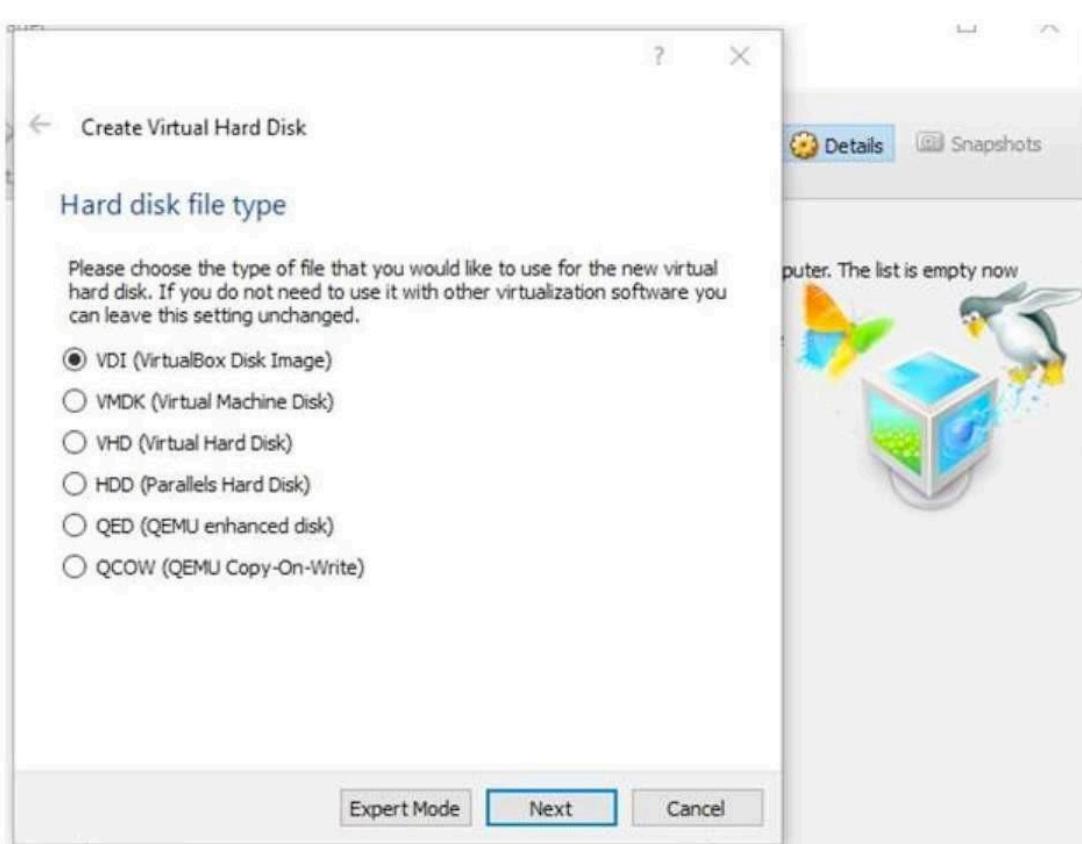
1. Open Virtualbox. Select New option.
2. In the Name box, type as puppy linux, Type as Linux, Version as Linux 2.4 (32 bit) and click Next button.
3. Select Memory Size as 128 MB and click Next button.
4. The next option is Hard Disk creation. Select the option button 'Create a virtual hard disk now' and then click Create button.
5. Next option is 'Hard disk file type' selection. Select 'VDI (VirtualBox Disk Image)' and click Next button.
6. Next option is 'Storage on Physical Hard Disk'. Select 'Dynamically allocated' option and click Next button.
7. In the 'File location and Size' option, allocate 10 GB and click Create button.
8. Now a virtual machine is created and displayed in the left pane of the virtual box named puppy linux.

OUTPUT









← Create Virtual Hard Disk

File location and size

Please type the name of the new virtual hard disk file into the box below or click on the folder icon to select a different folder to create the file in.

puppy linux

Select the size of the virtual hard disk in megabytes. This size is the limit on the amount of file data that a virtual machine will be able to store on the hard disk.

4.00 MB 10.00 GB 2.00 TB



Create

Cancel

Oracle VM VirtualBox Manager

File Machine Help

New Settings Discard Start

puppy linux 2.4 Powered Off

General
Name: puppy linux
Operating System: Linux 2.4 (32-bit)

System
Base Memory: 128 MB
Boot Order: Floppy, Optical, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging

Display
Video Memory: 6 MB
Remote Desktop Server: Disabled
Video Capture: Disabled

Storage
Controller: IDE
IDE Primary Master: puppy linux.vdi (Normal, 10.00 GB)
IDE Secondary Master: [Optical Drive] Empty

Audio

Details Snapshots

Preview


EXPERIMENT - 2

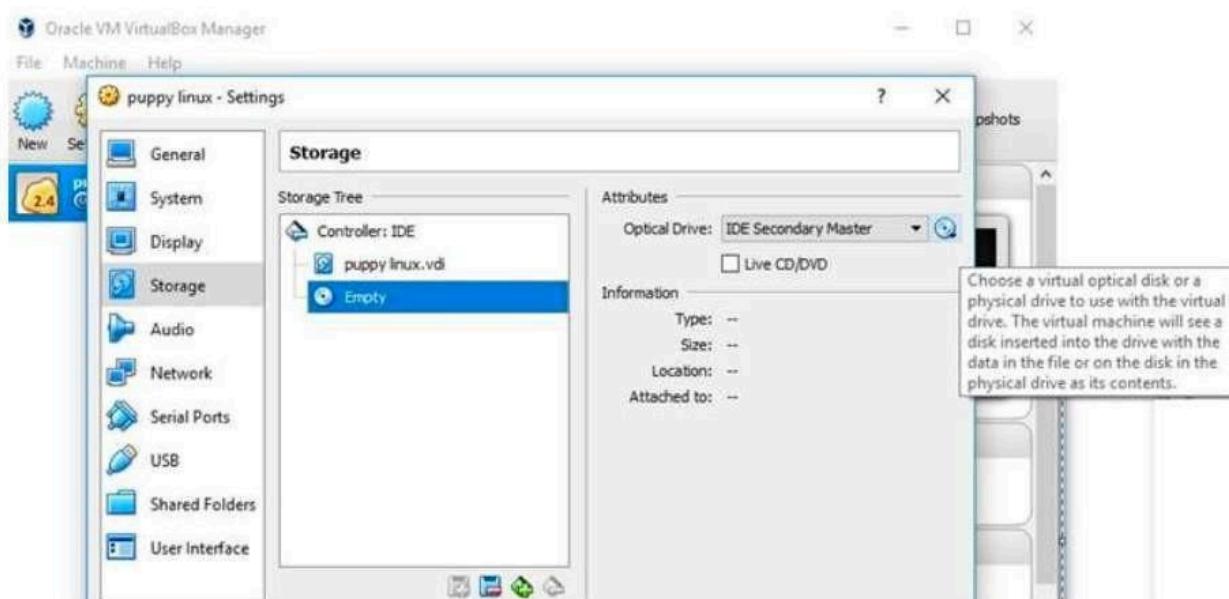
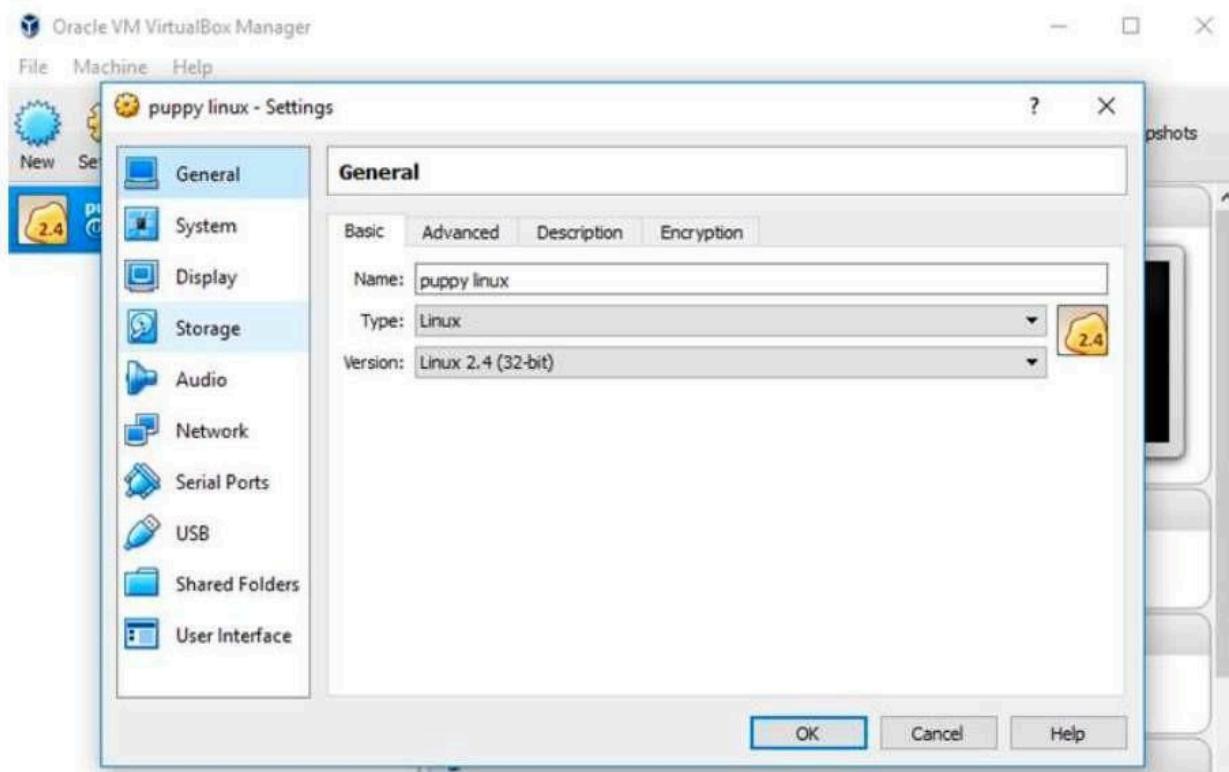
AIM:

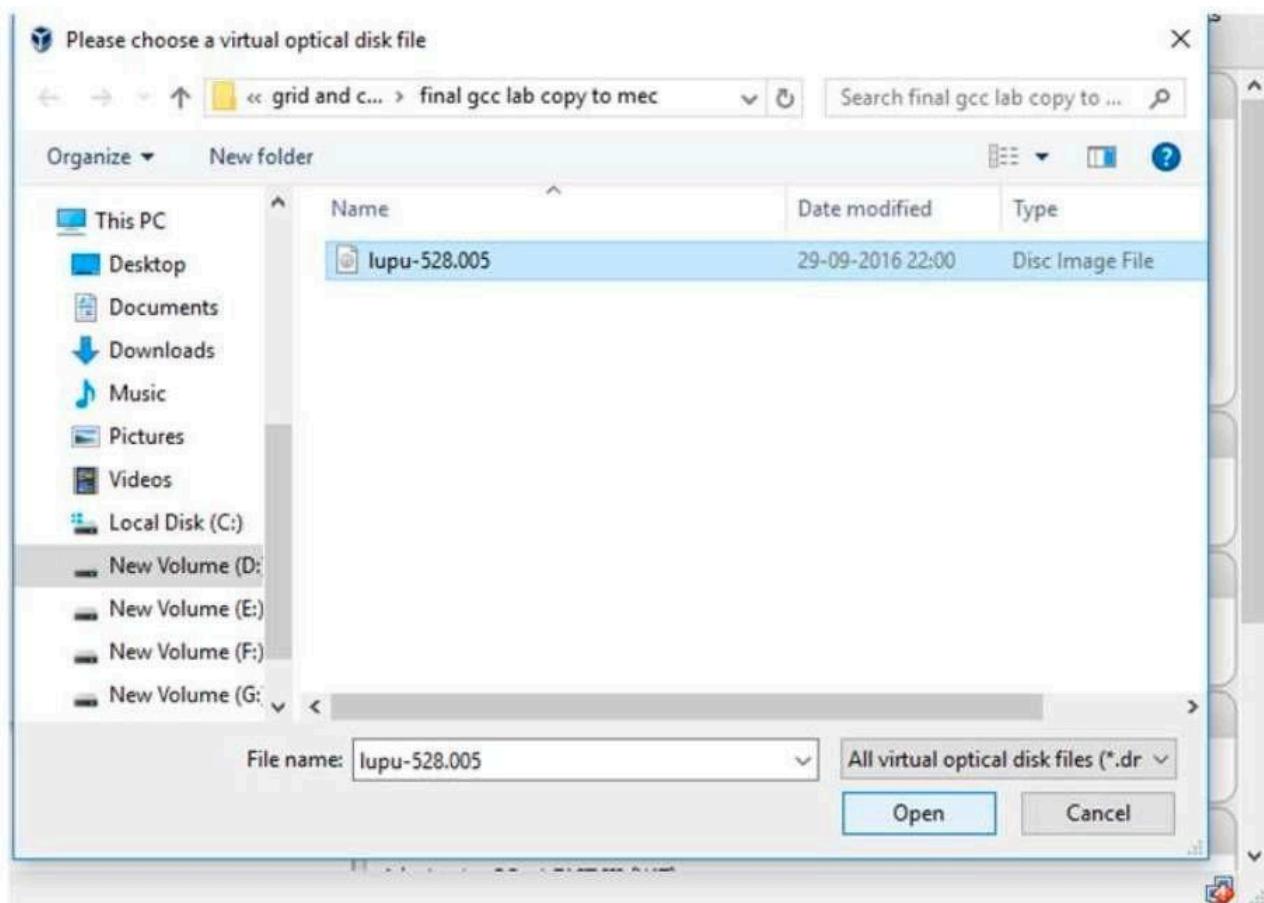
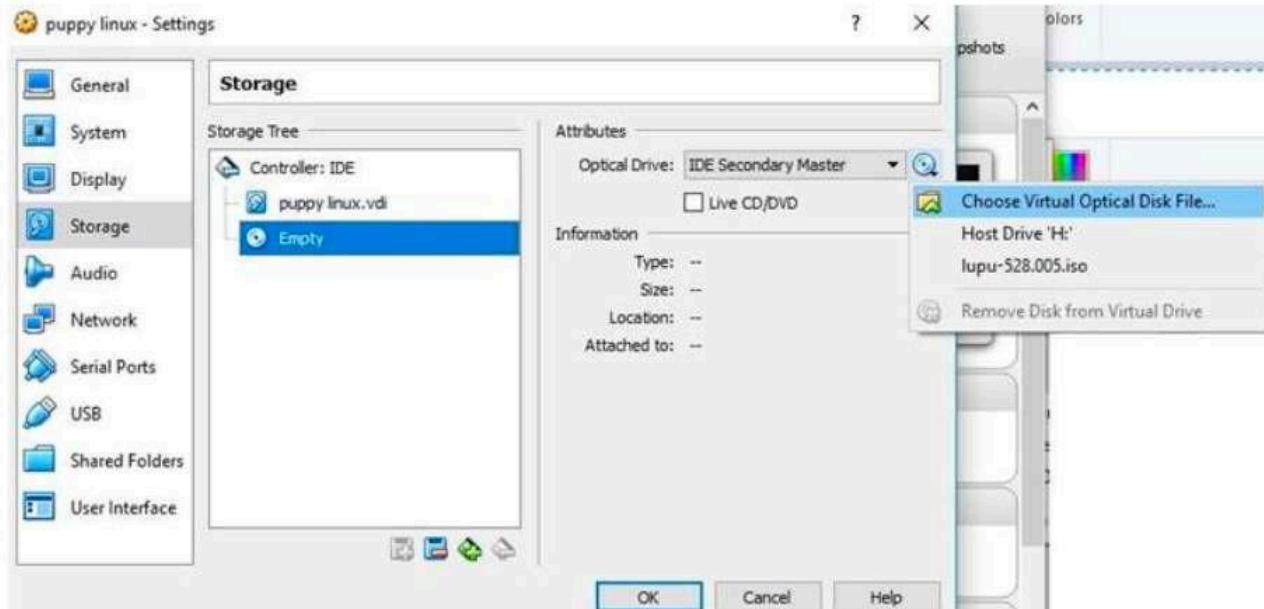
To create a virtual machine and attach a virtual block to the virtual machine using VirtualBox.

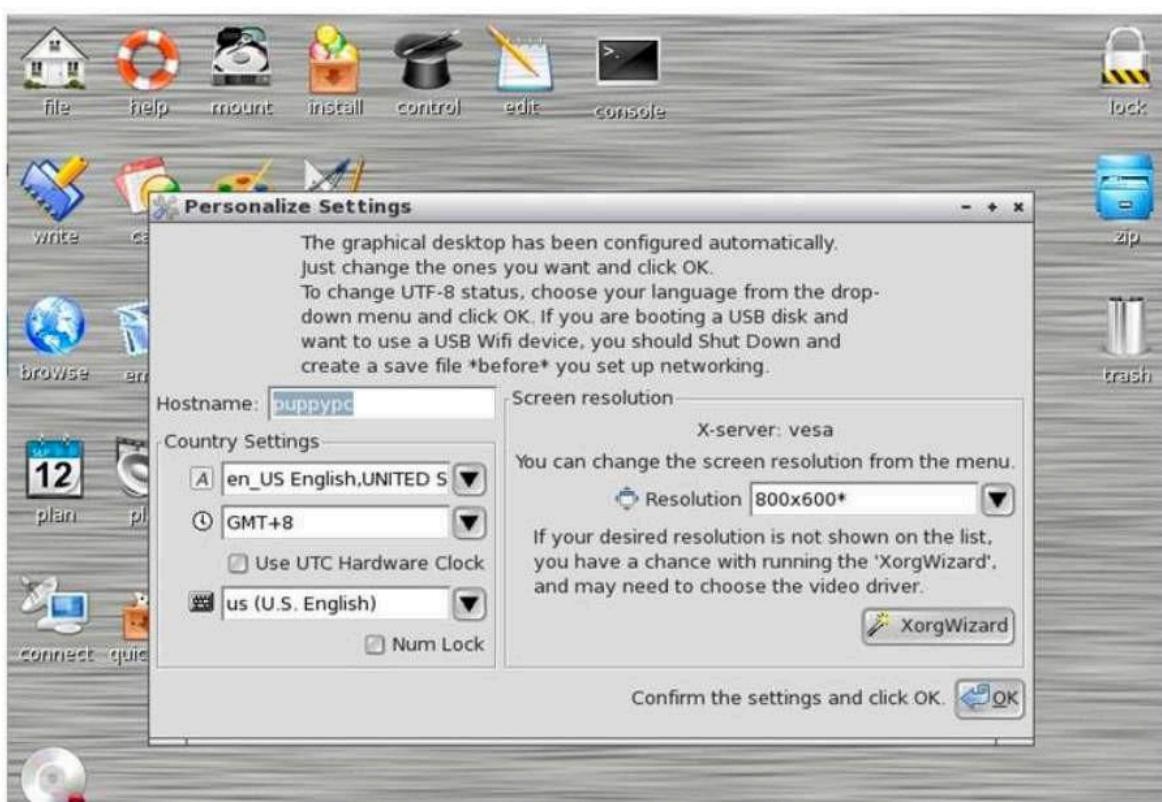
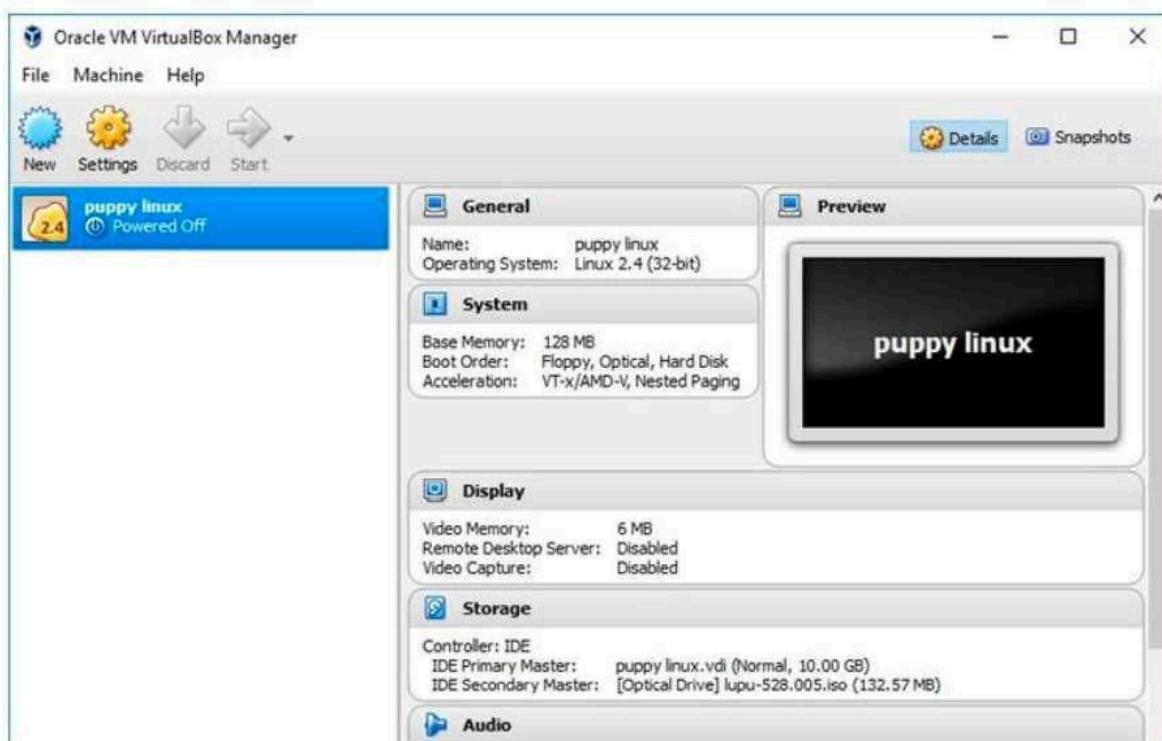
DESCRIPTION:

1. Open Virtualbox. Select New option.
2. In the Name box, type as puppy linux, Type as Linux, Version as Linux 2.4 (32 bit) and click Next button.
3. Select Memory Size as 128 MB and click Next button.
4. The next option is Hard Disk creation. Select the option button 'Create a virtual hard disk now' and then click Create button.
5. Next option is 'Hard disk file type' selection. Select 'VDI (VirtualBox Disk Image)' and click Next button.
6. Next option is 'Storage on Physical Hard Disk'. Select 'Dynamically allocated' option and click Next button.
7. In the 'File location and Size' option, allocate 10 GB and click Create button.
8. Now a virtual machine is created and displayed in the left pane of the virtual box named puppy linux.
9. Select 'Settings' icon and select 'Storage' option. From the displayed window, select the CD icon within the 'Storage Tree' and select the CD icon near the Optical Drive IDE Secondary Master option.
10. Select 'Choose Virtual Optical Disk File' option and select the iso file for puppy linux named 'lupu-528.005.iso' within the host machine.
11. Now within the Storage Tree of the Storage settings, the CD icon is displayed with the name of the iso file. Now click OK button. Select the Start button in the VirtualBox.
12. Now virtual machine will run with the operating system loaded.

OUTPUT







EXPERIMENT - 3

AIM:

To install a C compiler in Virtual machine and execute sample program using Virtual box.

DESCRIPTION:

1. Open VirtualBox.
2. Select File -> Import Appliance -> Select file named 'ubuntu15 with gcc.ova' -> Open -> Next -> Import.
3. Select 'ubuntu15' virtual machine and select start button.
4. Enter into terminal mode and type as 'sudo nano first.c'.
5. Type the content of the file given below for first.c.
6. Press ctrl+o and ctrl+x key combinations for saving the file and exit from the editor mode respectively.
7. For compiling, type the command as: gcc first.c –o first
8. For execution of the file, type as: ./first
9. Now result of the C program will be displayed.

CODE

```
#include<stdio.h>
Int main(void)
{
printf("My first C program");
return 0;
}
```

OUTPUT

```
al
superuser@superuser-VirtualBox: ~
superuser@superuser-VirtualBox:~$ sudo nano first.c
```

```
al
superuser@superuser-VirtualBox: ~
GNU nano 2.4.2           File: first.c

#include<stdio.h>
int main(void)
{
printf("My first C Program\n");
return 0;
}

File Name to Write: first.c
^G Get Help      M-D DOS Format    M-A Append      M-B Backup File
^C Cancel       M-M Mac Format    M-P Prepend     ^T To Files
```

```
tu15 [Running] - Oracle VM VirtualBox
File   View   Input   Devices   Help
al
superuser@superuser-VirtualBox: ~
superuser@superuser-VirtualBox:~$ gcc first.c -o first
superuser@superuser-VirtualBox:~$ ./first
My first C Program
superuser@superuser-VirtualBox:~$
```

EXPERIMENT - 4

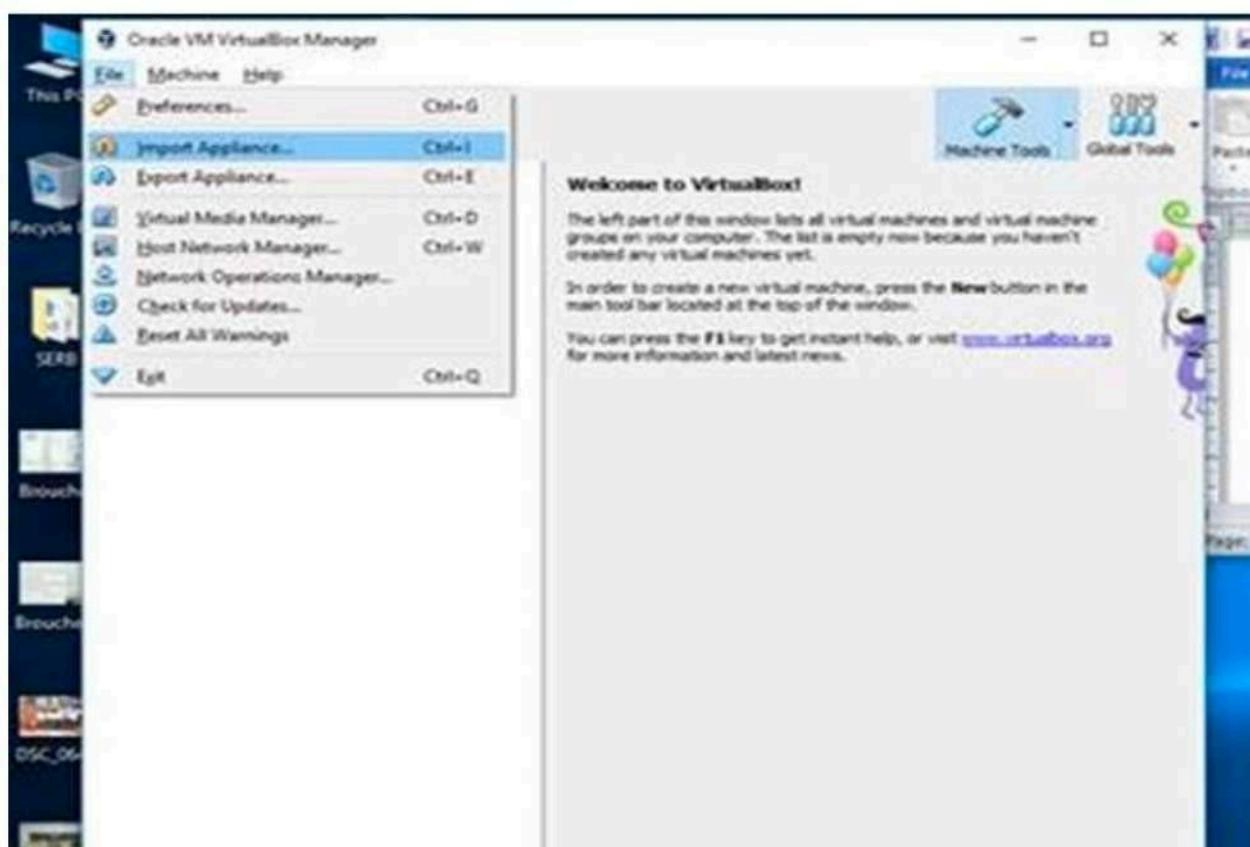
AIM:

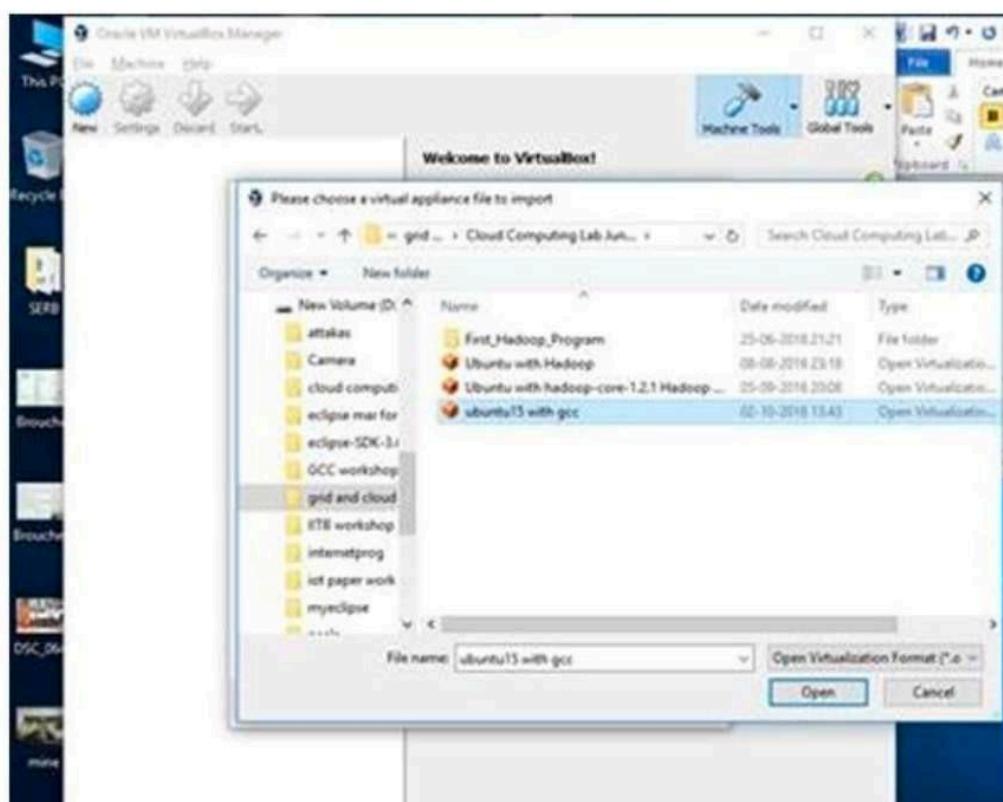
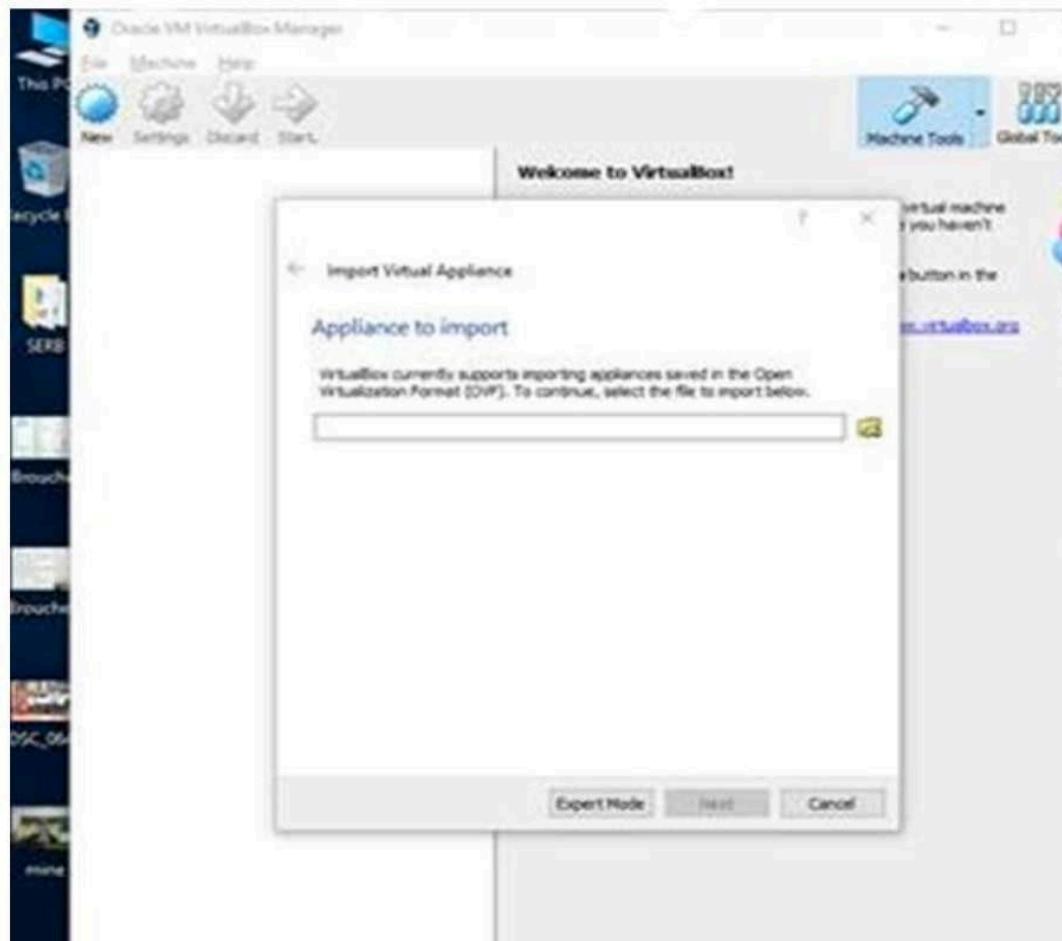
To perform virtual machine migration from one node to another using Virtual Box.

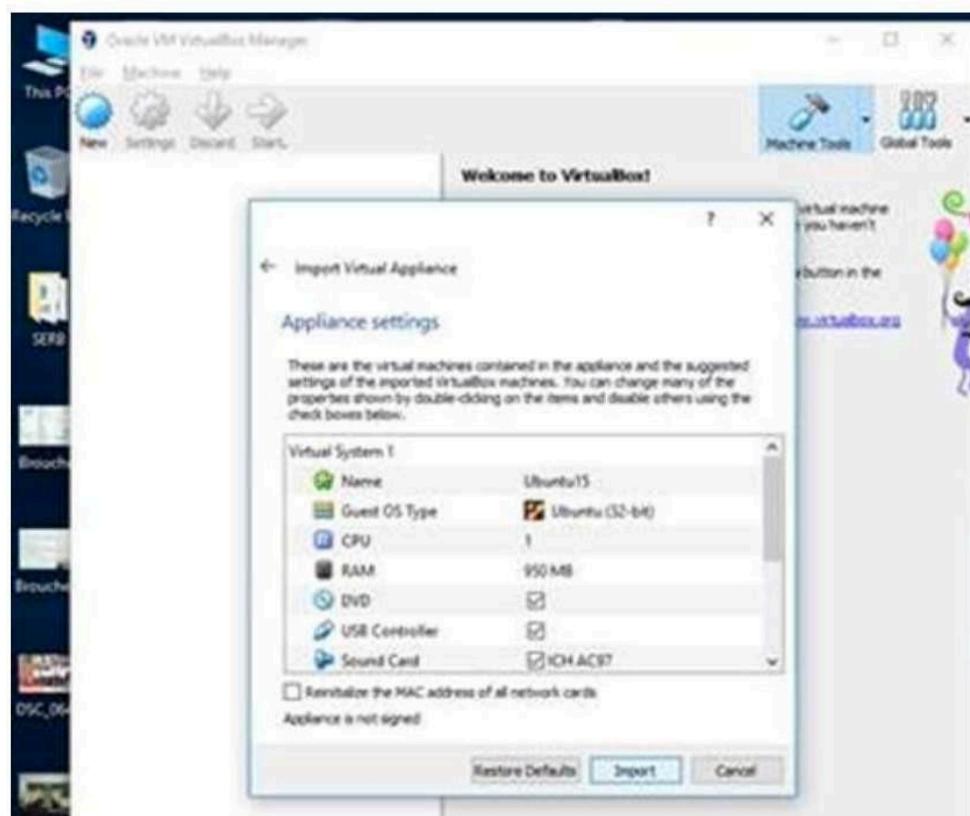
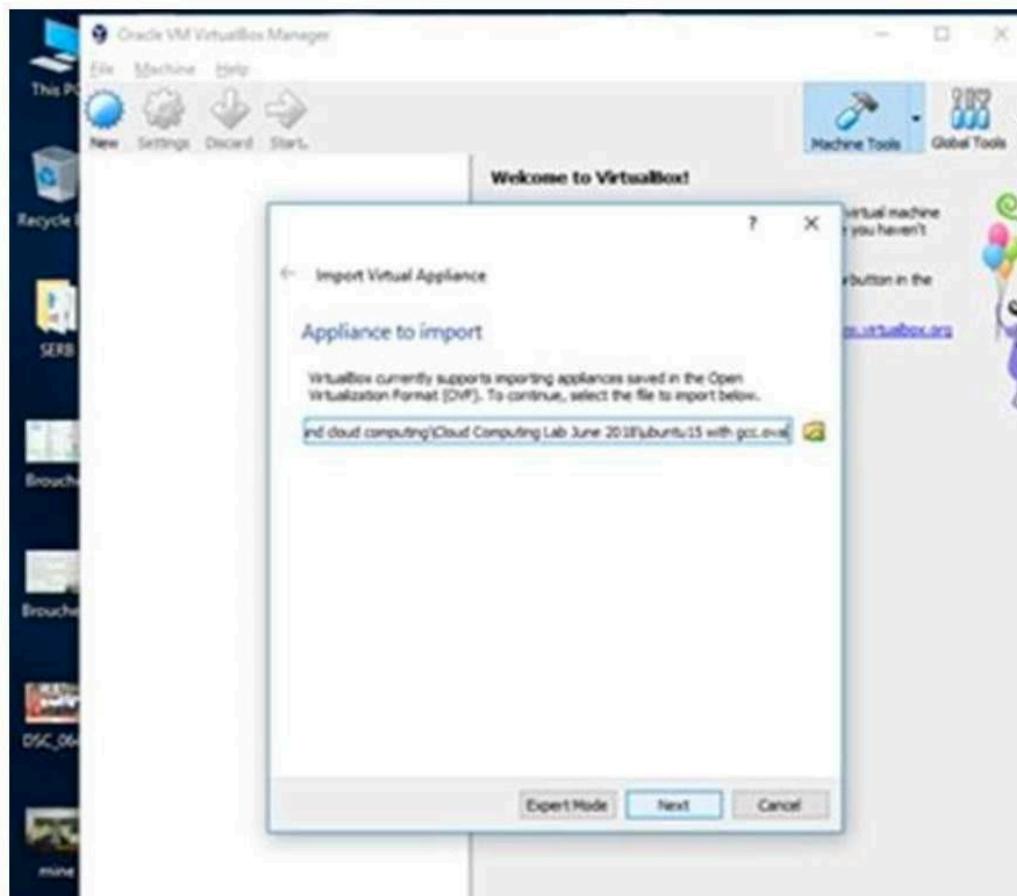
DESCRIPTION:

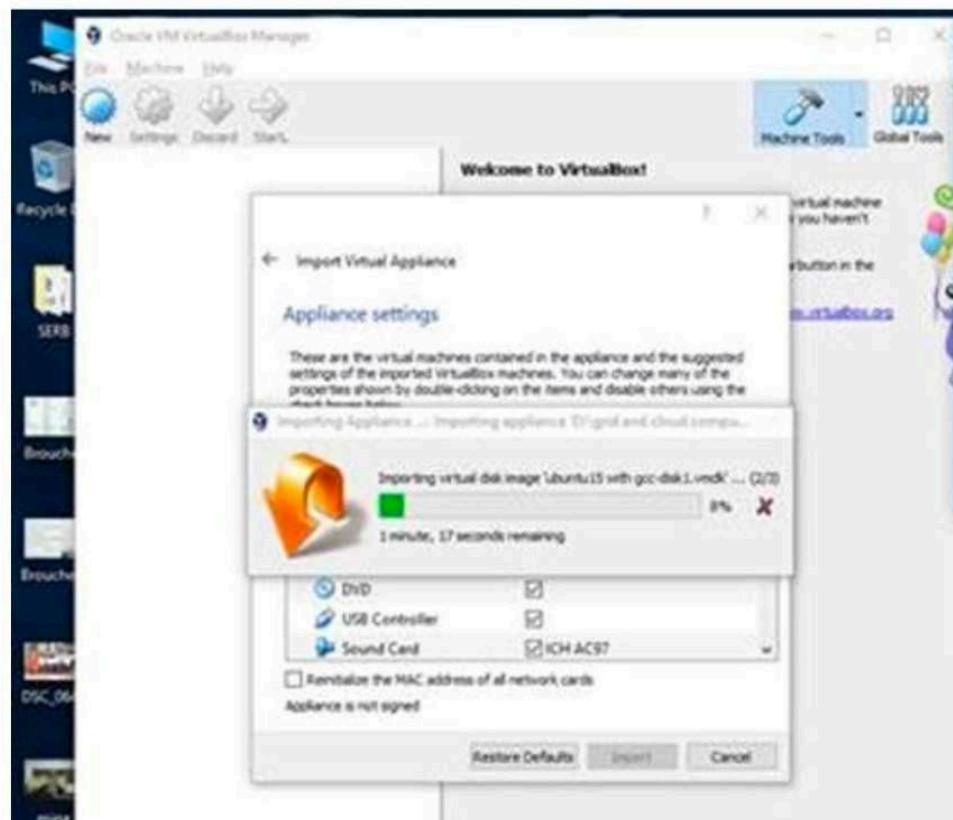
1. Open Virtualbox. Open Ubuntu.ova file using importing option.
2. Create a sample c file named test.c and compile, run it.
3. Click File -> Export Appliance.
4. Click Next button. Select the folder where we want to save .ova file.
5. Save the Ubuntu.ova file in USB pendrive.
6. Go to another system where we want to run the ova file.
7. Open Virtual Box in another system and select the option File -> Import Appliance.
8. Select the .ova file and load it into the current system.
9. Check the same test.c file in the same directory where we stored it first.
10. Run test.c file. This verifies that virtual machine is migrated to another system.

OUTPUT







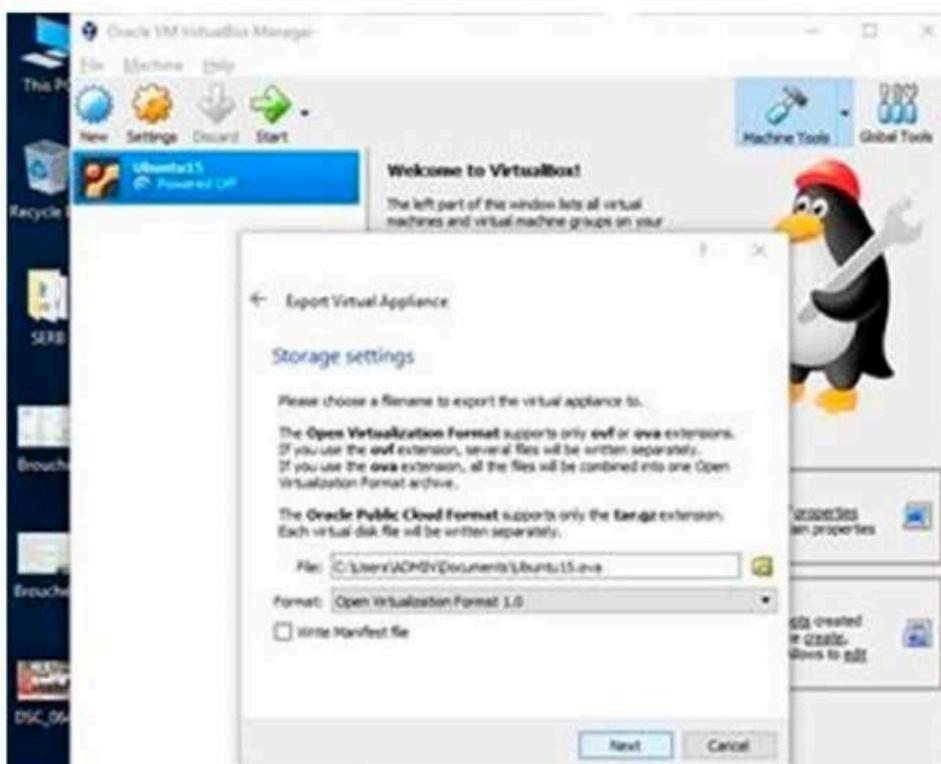
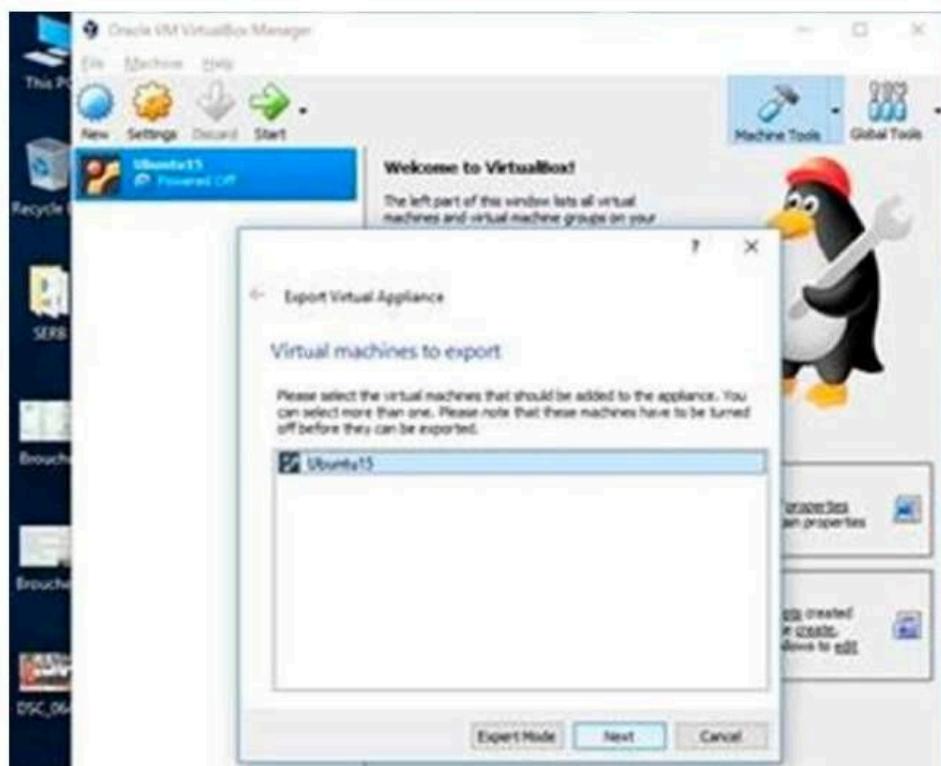


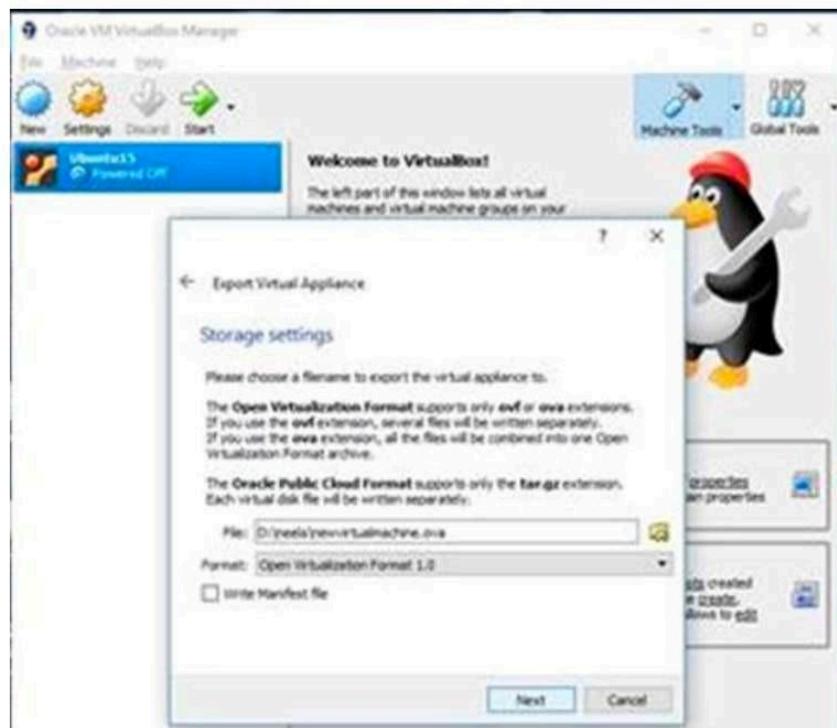
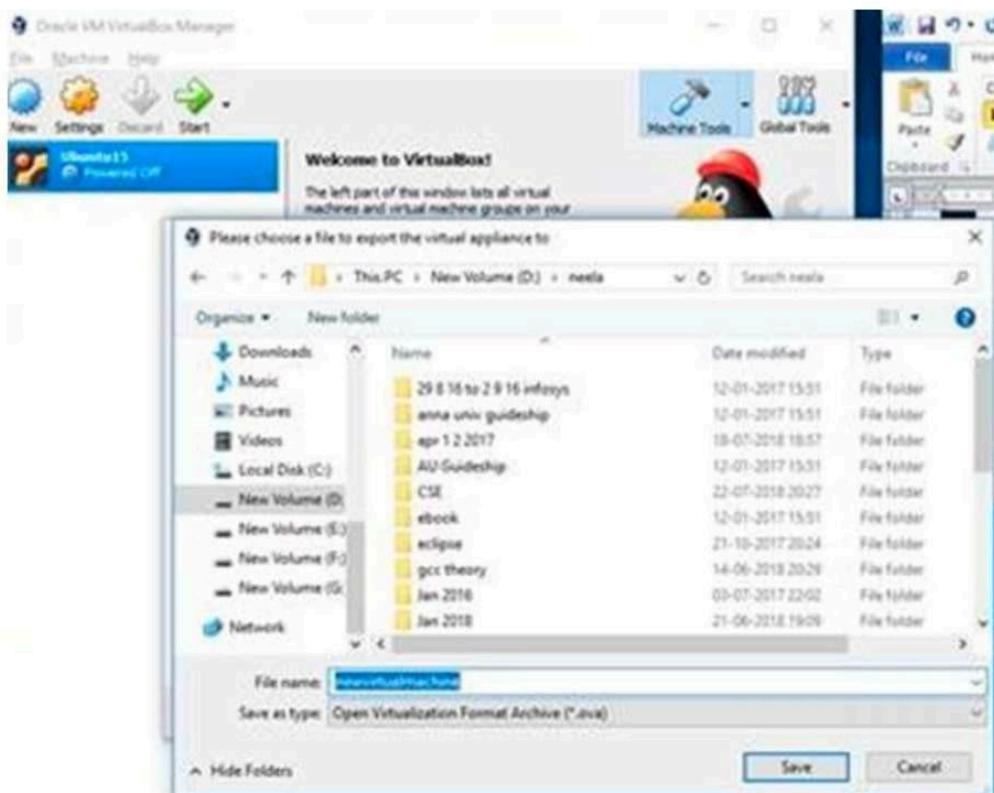


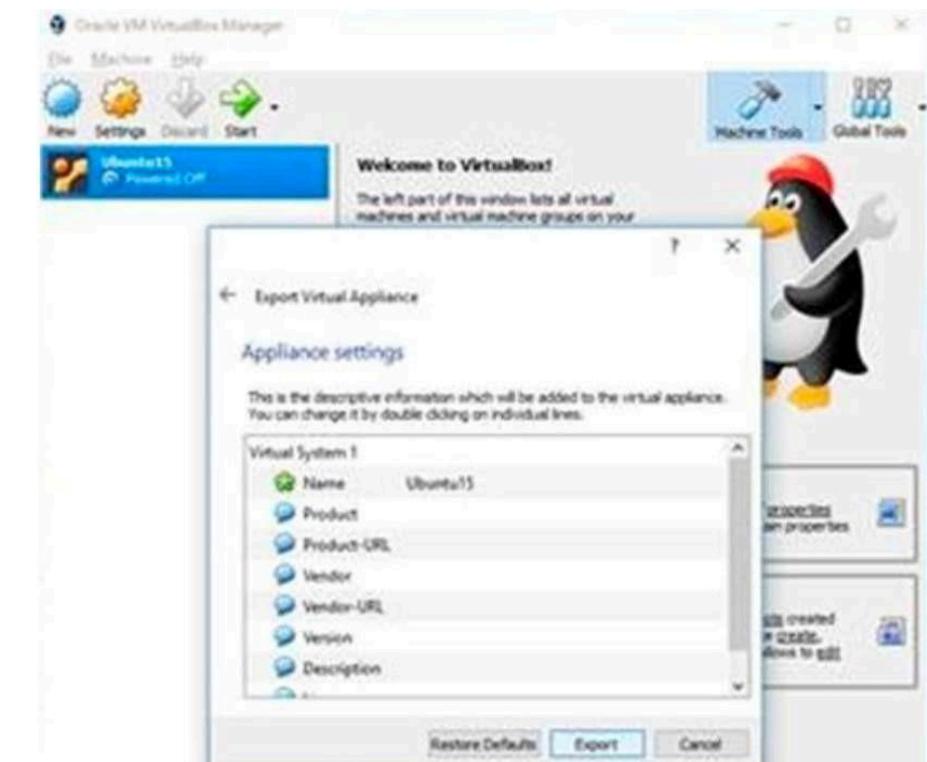
```
Ubuntu15 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Terminal
superuser@superuser-VirtualBox: ~
superuser@superuser-VirtualBox:~$ ls
Desktop Downloads first Music Public Videos
Documents examples.desktop first.c Pictures Templates
superuser@superuser-VirtualBox:~$
```

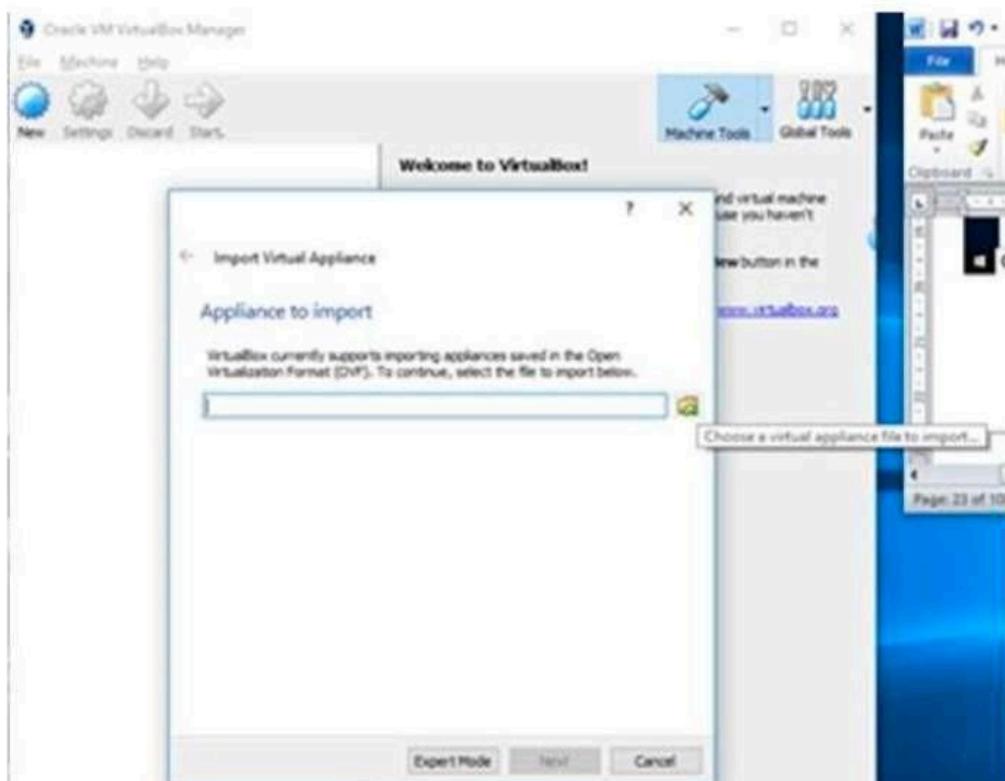
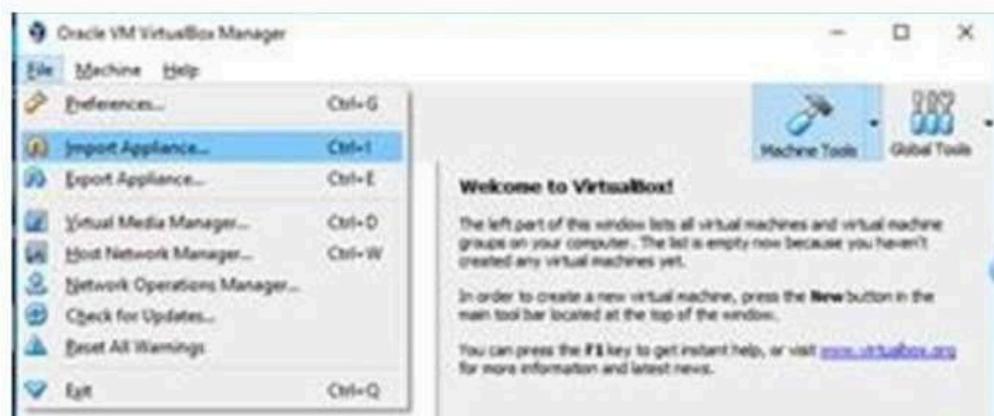
```
Ubuntu15 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Terminal
superuser@superuser-VirtualBox: ~
superuser@superuser-VirtualBox:~$ ls
Desktop Downloads first Music Public Videos
Documents examples.desktop first.c Pictures Templates
superuser@superuser-VirtualBox:~$ gcc first.c -o first1
superuser@superuser-VirtualBox:~$ ./first1
My first C Program
superuser@superuser-VirtualBox:~$ pwd
/home/superuser
superuser@superuser-VirtualBox:~$
```

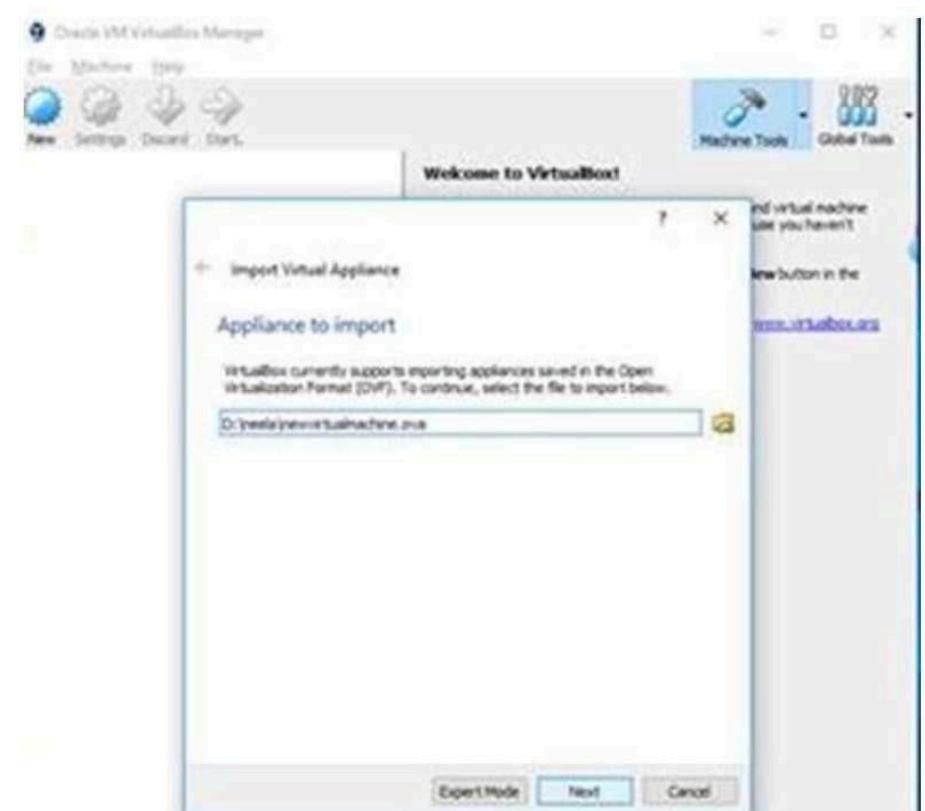
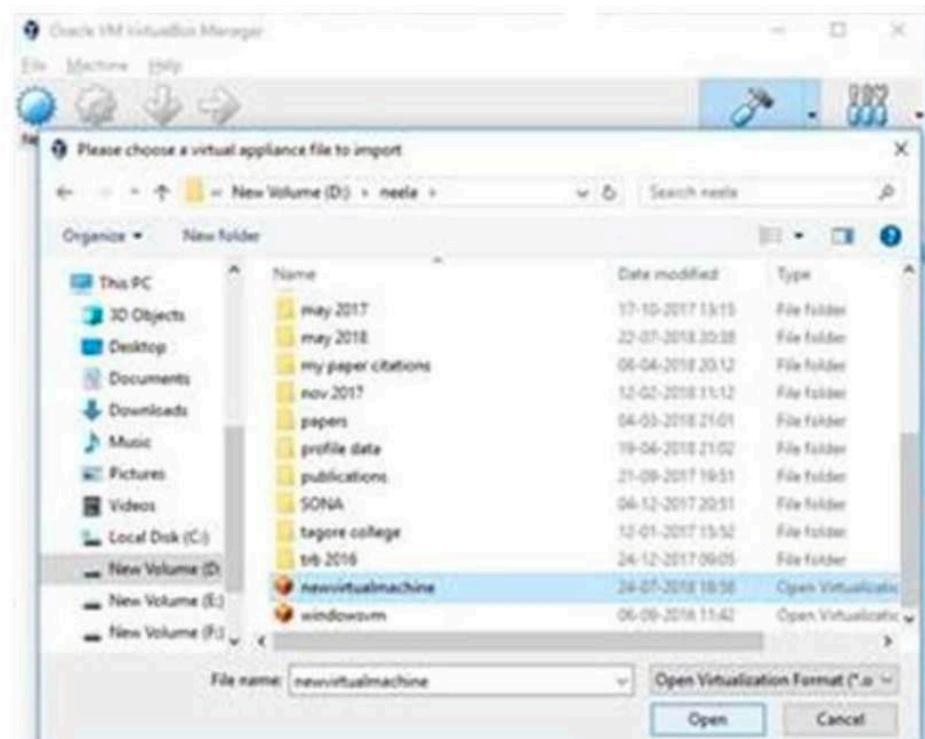
















```
superuser@superuser-VirtualBox:~$ ls
Desktop  Downloads      first  first.c Pictures  Templates
Documents examples.desktop  firsti  Music    Public   Videos
superuser@superuser-VirtualBox:~$ gcc first.c -o firsti2
superuser@superuser-VirtualBox:~$ ./firsti2
My first C Program
superuser@superuser-VirtualBox:~$ pwd
/home/superuser
superuser@superuser-VirtualBox:~$ exit
```

EXPERIMENT - 5

AIM:

To demonstrate the Working of Docker

DESCRIPTION:

Docker is an open platform for developing, shipping, and running applications. Docker enables you to separate your applications from your infrastructure so you can deliver software quickly. With Docker, you can manage your infrastructure in the same ways you manage your applications. Docker provides the ability to package and run an application in a loosely isolated environment called a container. The isolation and security lets you run many containers simultaneously on a given host. Containers are lightweight and contain everything needed to run the application, so you don't need to rely on what's installed on the host.

Installing Docker on Desktop

Choose the respective installation package based on your operating system

Docker Desktop for Mac

[Download \(Apple Silicon\)](#) | [Download \(Intel\)](#) | [Install instructions](#)

Docker Desktop for Windows

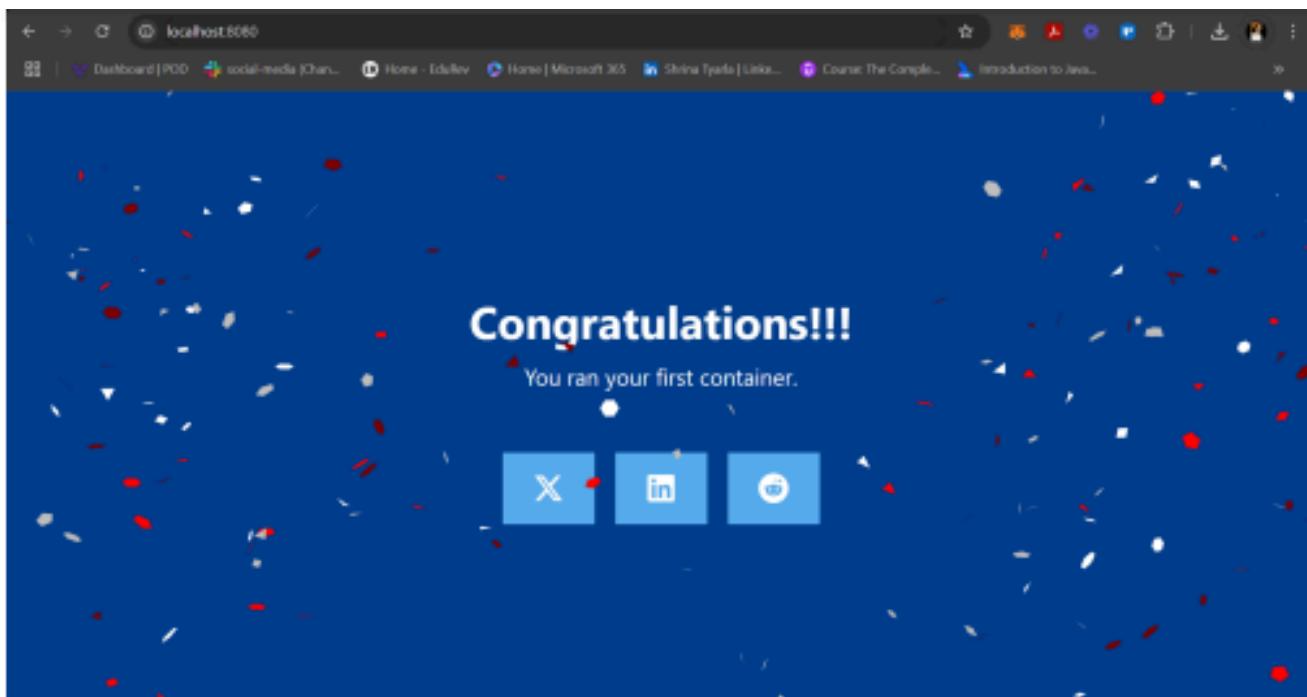
[Download](#) | [Install instructions](#)

Docker Desktop for Linux

[Install instructions](#)

Creating a Container

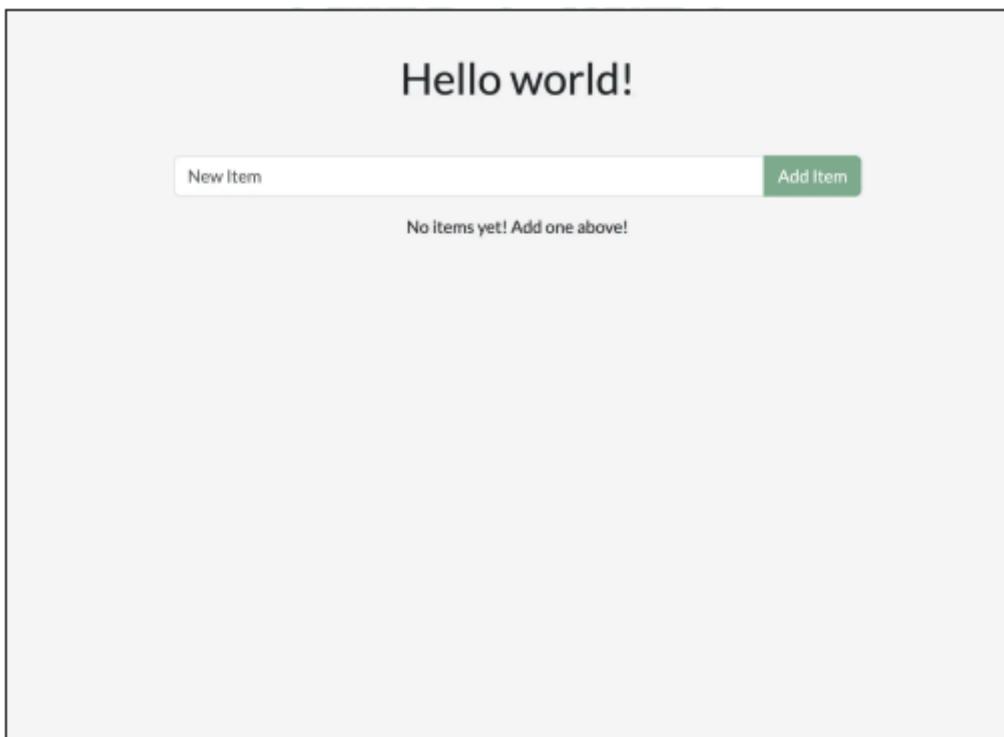
1. Open your CLI terminal and start a container by running the docker run command
`docker run -d -p 8080:80 docker/welcome-to-docker`
2. For this container, the frontend is accessible on port 8080. To open the website, visit <http://localhost:8080> in your browser.



The screenshot displays the Docker Desktop application window. On the left is a sidebar with navigation links: Containers, Images, Volumes, Builds, Docker Scouting, and Extensions. The main area is titled "Containers" and shows a single container named "stoic_jepsen". The container's status is "Running (56 seconds ago)". Below the container list are tabs for Logs, Inspect, Bind mounts, Exec, Files, and Stats. The "Logs" tab is selected, displaying a log history. The log entries show several requests from "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/130.0.0.0 Safari/537.36" to the Docker welcome page. At the bottom of the logs, there is a "Terminal" section which shows a Windows PowerShell prompt. The terminal output includes the PowerShell logo, copyright information, and a command line showing the Docker run command used to start the container. The bottom status bar indicates "Engine running", "RAM 3.73 GB CPU 1.12%", "Disk -- 69 available -- 69", and "RTA 2... Terminal".

Application Development on Docker

1. To get started, either clone or download the project as a ZIP file to your local machine.
git clone <https://github.com/docker/getting-started-todo-app>
2. After the project is cloned, navigate into the new directory created by the clone: cd getting-started-todo-app
3. Once you have the project, start the development environment using Docker Compose. To start the project using the CLI, run the following command docker compose up
4. Open your browser to http://localhost to see the application up and running. It may take a few minutes for the app to run. The app is a simple to-do application.



```
87acde0982543e8f4c9a4d57fba53546b9903da3fe898526ce3de6e68e0c6afb
[+] Building 87.2s (22/22) FINISHED                                            docker :desktop-linux
=> [backend internal] load build definition from Dockerfile               0.1s
=> => transferring dockerfile: 3.39kB                                     0.0s
=> [client internal] load build definition from Dockerfile               0.1s
=> => transferring dockerfile: 3.39kB                                     0.0s
=> [client internal] load metadata for docker.io/library/node:20          3.6s
=> [client internal] load .dockerignore                                    0.1s
=> => transferring context: 52B                                         0.0s
=> [backend internal] load .dockerignore                                    0.1s
=> => transferring context: 52B                                         0.0s
=> [backend internal] load build context                                 0.1s
=> => transferring context: 176.35kB                                     0.0s
```

```
[+] Running 7/7
✓ Network getting-started-todo-app_default      Created          0.3s
✓ Volume "getting-started-todo-app_todo-mysql-data" Created          0.0s
✓ Container getting-started-todo-app-backend-1 Started         14.9s
✓ Container getting-started-todo-app-phpmyadmin-1 Started         14.9s
✓ Container getting-started-todo-app-client-1   Started         14.9s
✓ Container getting-started-todo-app-proxy-1    Started         14.9s
✓ Container getting-started-todo-app-mysql-1    Started         14.9s
watch enabled
```

Building and Pushing an Image

1. To get started, either clone or download the project as a ZIP file to your local machine.
git clone <https://github.com/docker/getting-started-todo-app>
2. And after the project is cloned, navigate into the new directory created by the clone.
cd getting-started-todo-app
3. Build the project by running the following command, swapping out
DOCKER_USERNAME with your username docker build -t /getting-started-todo-app
4. To verify the image exists locally, you can use the docker image ls command
docker image ls
5. To push the image, use the docker push command. Be sure to replace
DOCKER_USERNAME with your username docker push /getting-started-todo-app

```
S C:\Users\styar\getting-started-todo-app> docker build -t styarla/getting-started-todo-app .
+] Building 6.9s (16/22)                                            docker:desktop-linux
=> [base 1/2] FROM docker.io/library/node:20@sha256:a5e0ed56f2c20b9689e0f7dd498cac7e08d2a3a283e92  0.0s
=> => resolve docker.io/library/node:20@sha256:a5e0ed56f2c20b9689e0f7dd498cac7e08d2a3a283e92d9304  0.0s
=> CACHED [base 2/2] WORKDIR /usr/local/app                           0.0s
=> CACHED [client-base 1/5] COPY client/package.json client/yarn.lock ./ 0.0s
=> CACHED [client-base 2/5] RUN --mount-type=cache,id=yarn,target=/usr/local/share/.cache/yarn   0.0s
=> CACHED [client-base 3/5] COPY client/.eslintrc.cjs client/index.html client/vite.config.js ./ 0.0s
=> CACHED [client-base 4/5] COPY client/public ./public                  0.0s
=> CACHED [client-base 5/5] COPY client/src ./src                      0.0s
=> CACHED [backend-dev 1/4] COPY backend/package.json backend/yarn.lock ./ 0.0s
=> CACHED [backend-dev 2/4] RUN --mount-type=cache,id=yarn,target=/usr/local/share/.cache/yarn   0.0s
=> CACHED [backend-dev 3/4] COPY backend/spec ./spec                   0.0s
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
styarla/getting-started-todo-app	latest	9e6128541f57	48 seconds ago	1.61GB
getting-started-todo-app-client	latest	3f5ba9b10a14	15 minutes ago	1.74GB
getting-started-todo-app-backend	latest	1a81826640a6	15 minutes ago	1.7GB
traefik	v2.11	c817243b033d	5 weeks ago	218MB
phpmyadmin	latest	0e1c550eda82	6 weeks ago	803MB
mysql	8.0	ccb8f749bb5e	3 months ago	785MB
docker/welcome-to-docker	latest	eedaff45e3c7	12 months ago	29.5MB

```
PS C:\Users\styar\getting-started-todo-app> docker push styarla/getting-started-todo-app
Using default tag: latest
The push refers to repository [docker.io/styarla/getting-started-todo-app]
d536ff06ba60: Pushed
8f86048bbb77: Pushed
816b32f55a8e: Pushed
ee2a0351a498: Pushed
d6105da3ed04: Pushed
57cff12bcf23: Pushed
da802df85c96: Pushed
f91a6361eed1: Pushed
7aadc5092c3b: Pushed
7d98d813d54f: Pushed
ad1c7cfcc347f: Pushed
78bc7fc07512: Pushed
78d016a4ad21: Pushed
latest: digest: sha256:9e6128541f57d7617912749ae5bfd348006214c7df1cc47b6848c0a85e4d497d size: 856
```

EXPERIMENT - 6

AIM:

To install Hadoop in the virtual machine using VirtualBox

DESCRIPTION:

The following steps are followed to install Hadoop in virtual machine.

1. Open VirtualBox. Create Ubuntu VM using ‘ubuntu-15.10-desktop-i386.iso’ file.

Go

to terminal mode.

2. Install java using the following commands:

a. sudo add-apt-repository ppa:webupd8team/java

b. sudo apt-get update

c. sudo apt-get install oracle-java8-installer

d. To check the installation of java, use the command: java –version

e. To automatically set up Java environment variables, use the command: sudo apt-get install oracle-java8-set-default

Install gcc using the following commands:

a. sudo add-apt-repository ppa:ubuntu-toolchain-r/test

b. sudo apt-get update

c. sudo apt-get install gcc-6

gcc-6-base Install Perl using the following

commands:

a. sudo apt-get install perl

Install other essentials using following commands:

a. sudo apt-get install sed make libssl-dev pkg-config

Create separate user group for Hadoop using the command:

a. sudo addgroup hadoop

Create separate user for Hadoop using the command:

a. sudo adduser --ingroup hadoop

hduser Install ssh using the following

commands:

a. sudo apt-get install ssh

b. to check the installation of ssh in our system, use the commands:

i. which ssh

ii. which sshd

Enter into hadoop user mode and configure ssh using the commands:

a. su hduser

b. ssh-keygen -t rsa -P ""

c. cat /home/hduser/.ssh/id_rsa.pub >> /home/hduser/.ssh/authorized_keys

10. Download Hadoop bundle after entering into the super user mode using the commands:

Laboratory Record Of :
Cloud Computing

Roll No : 160121749024
Experiment No :
Sheet No:PAGE *

MERGEFORMAT

a. su neela

b. wget
<http://mirrors.sonic.net/apache/hadoop/common/hadoop-2.6.0/hadoop-2.6.0.tar.gz>

11. Extract the Hadoop bundle using the commands:

a. tar xvzf hadoop-2.6.0.tar.gz

12. Check the Hadoop files using the following commands:

a. cd hadoop-2.6.0/

b. cd /usr/local

c. ls

d. sudo mkdir hadoop

e. ls

f. cd /

g. cd home/neela/hadoop-2.6.0/

h. ls

13. Moving Hadoop extraction to /usr/local/hadoop folder, use the following commands:

a. Move to super user's hadoop-2.6.0 folder.

b. sudo mv * /usr/local/hadoop

c. move to super user's home folder.

d. ssh localhost

e. Move to hduser using the command: su hduser

f. Move to hduser's account and move to /home/neela folder, where neela is the super user's folder

g. ssh localhost

14. Add root administrator privilege to hadoop user using the following commands:

a. From the super user's login, move to /home/hduser folder.

b. Give the command: sudo adduser hduser sudo

15. Configure ~/.bashrc file:

a. Move to hduser login using su hduser

b. Use the command: sudo nano ~/.bashrc (at the end, use ctrl + O key for save, ctrl+x key for exit)

c. At the end of the file, add the following contents:

```
# -- HADOOP ENVIRONMENT VARIABLES START -- #
export JAVA_HOME=/usr/lib/jvm/java-8-oracle
export HADOOP_HOME=/usr/local/hadoop
export PATH=$PATH:$HADOOP_HOME/bin
export PATH=$PATH:$HADOOP_HOME/sbin
export HADOOP_MAPRED_HOME=$HADOOP_HOME
export HADOOP_COMMON_HOME=$HADOOP_HOME
export HADOOP_HDFS_HOME=$HADOOP_HOME
export YARN_HOME=$HADOOP_HOME
export HADOOP_COMMON_LIB_NATIVE_DIR=$HADOOP_HOME/lib/native
export HADOOP_OPTS="-Djava.library.path=$HADOOP_INSTALL/lib"
```

-- HADOOP ENVIRONMENT VARIABLES END --

16. Configure hadoop-env.sh file:

a. b. c. d. Move to hduser login using: su hduser

Move to folder /usr/local/hadoop/etc/hadoop folder

Check the files using the command: ls

Check the java folder path using:

i. which javac

ii. iii. Let the output be /usr/bin/javac

Then find the entire path for java using: readlink -f

/usr/bin/javac

iv. v. If the output is /usr/lib/jvm/javac-8-oracle/bin/javac

Consider the path for JAVA_HOME upto /bin from the output.

i.e. here /usr/lib/jvm/javac-8-oracle

e. sudo nano hadoop-env.sh

f. Modify the line for JAVA_HOME as: export

JAVA_HOME=/usr/lib/jvm/java-8-oracle

17. Configure core-site.xml file using the following commands:

a. Login into hduser.

b. Move to the folder /usr/local/hadoop/etc/hadoop

c. sudo nano core-site.xml

d. At the end of the file, add the following contents:

<configuration>

<property>

<name>fs.default.name</name>

<value>hdfs://localhost:9000</value> </property>

</configuration>

18. Configure hdfs-site.xml file using the following commands:

a. Login to hduser

b. Move to the folder /usr/local/hadoop/etc/hadoop

c. sudo nano hdfs-site.xml

d. At the end of the file, add the following contents:

<!—Put site-specific property overrides in this file. -->

<configur

ation>

cat<prop

erty>

<name>dfs.replication</name>

<value>1</value> </property>

<property>

<name>dfs.namenode.name.dir</name>

<value>file:/usr/local/hadoop_store/hdfs/namenode</value>

</property>

```
<property>
<name>dfs.datanode.data.dir</name>
<value>file:/usr/local/hadoop_store/hdfs/datanode</value>
</property>
</configuration>
```

19. Configure yarn-site.xml file using the following commands:

- Login to hduser
- Move to folder /usr/local/hadoop/etc/hadoop
- sudo nano yarn-site.xml

d. Add the contents at the end of the file the following contents:

```
<configuration>
<property>
<name>yarn.nodemanager.aux-services</name>
<value>mapreduce_shuffle</value> </property>
<property>
<name>yarn.nodemanager.aux-
services.mapreduce.shuffle.class</name>
<value>org.apache.hadoop.mapred.ShuffleHandler</value>
</property>
</configuration>
```

20. Configure mapred-site.xml file:

- Login to hduser
- Move to the folder /usr/local/hadoop/etc/hadoop
- sudo cp /usr/local/hadoop/etc/hadoop/mapred-site.xml.template /usr/local/hadoop/etc/hadoop/mapred-site.xml

d. sudo nano mapred-site.xml

e. Add the following contents at the end of the file:

```
<configuration>
<property>
<name>mapred.framework.name</name>
<value>yarn</value> </property>
</configuration>
```

21. Check Hadoop installation using the commands:

- Login to hduser
- Move to the folder /usr/local/hadoop/bin folder
- hadoop version

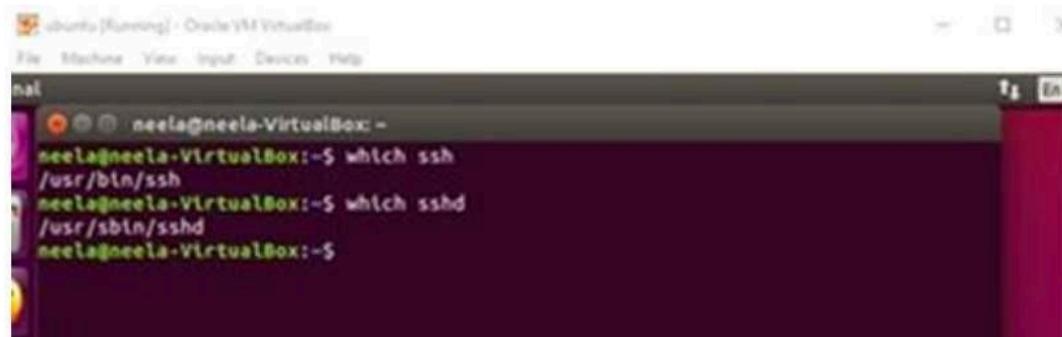
OUTPUT

```
Ubuntu [Running] - Oracle VM VirtualBox  
File Machine View Input Devices Help  
neela@neela-VirtualBox:~$ sudo apt-get update  
Hit http://ppa.launchpad.net wily InRelease  
Hit http://security.ubuntu.com wily-security InRelease  
Hit http://in.archive.ubuntu.com wily InRelease  
Hit http://ppa.launchpad.net wily InRelease  
Hit http://in.archive.ubuntu.com wily-updates InRelease  
Hit http://security.ubuntu.com wily-security/main Sources  
Hit http://in.archive.ubuntu.com wily-backports InRelease  
Hit http://ppa.launchpad.net wily/main i386 Packages  
Hit http://security.ubuntu.com wily-security/restricted Sources  
Hit http://in.archive.ubuntu.com wily/main Sources  
Hit http://ppa.launchpad.net wily/main Translation-en  
Hit http://security.ubuntu.com wily-security/universe Sources  
Hit http://in.archive.ubuntu.com wily/restricted Sources  
Hit http://ppa.launchpad.net wily/main i386 Packages  
Hit http://security.ubuntu.com wily-security/multiverse Sources  
Hit http://in.archive.ubuntu.com wily/universe Sources  
Hit http://ppa.launchpad.net wily/main Translation-en  
Hit http://security.ubuntu.com wily-security/main i386 Packages  
Hit http://in.archive.ubuntu.com wily/multiverse Sources  
Hit http://security.ubuntu.com wily-security/restricted i386 Packages  
Hit http://in.archive.ubuntu.com wily/main i386 Packages  
Hit http://security.ubuntu.com wily-security/universe i386 Packages
```

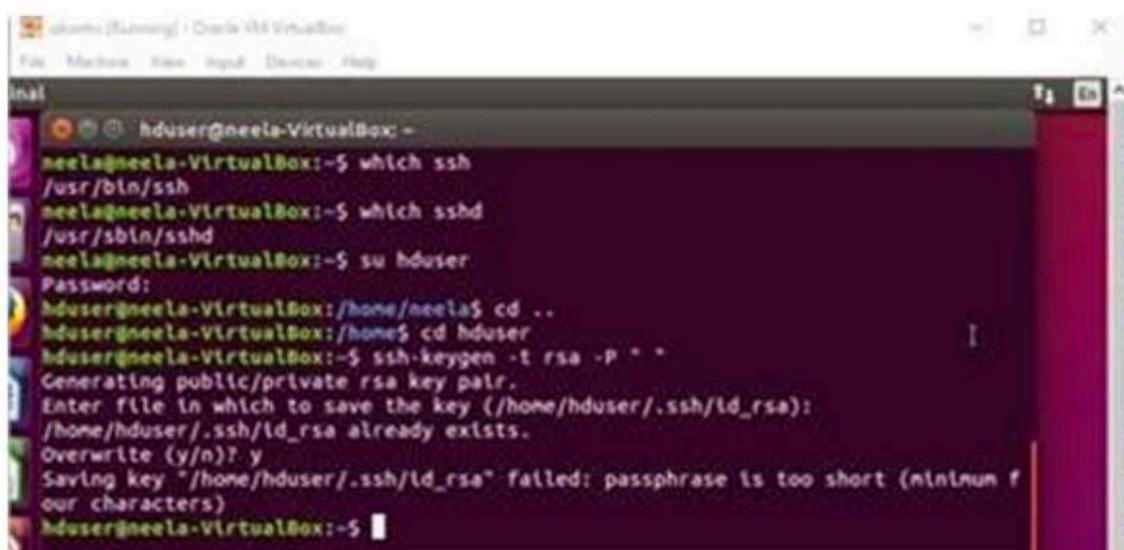
```
Ubuntu [Running] - Oracle VM VirtualBox  
File Machine View Input Devices Help  
neela@neela-VirtualBox:~$ java -version  
java version "1.8.0_101"  
Java(TM) SE Runtime Environment (build 1.8.0_101-b13)  
Java HotSpot(TM) Client VM (build 25.101-b13, mixed mode)  
neela@neela-VirtualBox:~$
```

```
Ubuntu [Running] - Oracle VM VirtualBox  
File Machine View Input Devices Help  
neela@neela-VirtualBox:~$ java -version  
java version "1.8.0_101"  
Java(TM) SE Runtime Environment (build 1.8.0_101-b13)  
Java HotSpot(TM) Client VM (build 25.101-b13, mixed mode)  
neela@neela-VirtualBox:~$ sudo addgroup hadoop  
addgroup: The group 'hadoop' already exists.  
neela@neela-VirtualBox:~$
```

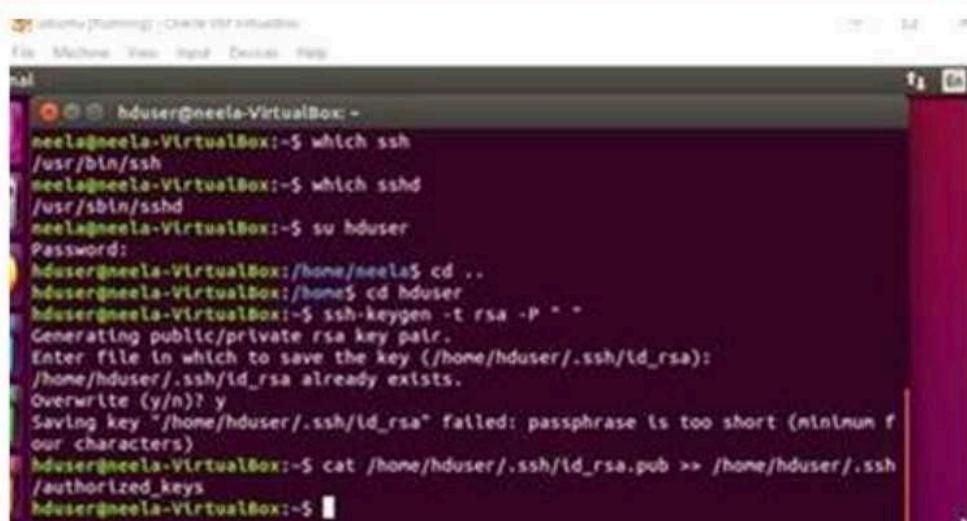
```
Ubuntu [Running] - Oracle VM VirtualBox  
File Machine View Input Devices Help  
neela@neela-VirtualBox:~$ java -version  
java version "1.8.0_101"  
Java(TM) SE Runtime Environment (build 1.8.0_101-b13)  
Java HotSpot(TM) Client VM (build 25.101-b13, mixed mode)  
neela@neela-VirtualBox:~$ sudo addgroup hadoop  
addgroup: The group 'hadoop' already exists.  
neela@neela-VirtualBox:~$ sudo adduser -ingroup hadoop hduser  
adduser: The user 'hduser' already exists.  
neela@neela-VirtualBox:~$
```



```
Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
neela
neela@neela-VirtualBox:~$ which ssh
/usr/bin/ssh
neela@neela-VirtualBox:~$ which sshd
/usr/sbin/sshd
neela@neela-VirtualBox:~$
```



```
Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
neela
neela@neela-VirtualBox:~$ which ssh
/usr/bin/ssh
neela@neela-VirtualBox:~$ which sshd
/usr/sbin/sshd
neela@neela-VirtualBox:~$ su hduser
Password:
hduser@neela-VirtualBox:/home/neela$ cd ..
hduser@neela-VirtualBox:/home$ cd hduser
hduser@neela-VirtualBox:~$ ssh-keygen -t rsa -P ""
Generating public/private rsa key pair.
Enter file in which to save the key (/home/hduser/.ssh/id_rsa):
/home/hduser/.ssh/id_rsa already exists.
Overwrite (y/n)? y
Saving key "/home/hduser/.ssh/id_rsa" failed: passphrase is too short (minimum f
our characters)
hduser@neela-VirtualBox:~$
```



```
Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
neela
hduser@neela-VirtualBox:~$ which ssh
/usr/bin/ssh
neela@neela-VirtualBox:~$ which sshd
/usr/sbin/sshd
neela@neela-VirtualBox:~$ su hduser
Password:
hduser@neela-VirtualBox:/home/neela$ cd ..
hduser@neela-VirtualBox:/home$ cd hduser
hduser@neela-VirtualBox:~$ ssh-keygen -t rsa -P ""
Generating public/private rsa key pair.
Enter file in which to save the key (/home/hduser/.ssh/id_rsa):
/home/hduser/.ssh/id_rsa already exists.
Overwrite (y/n)? y
Saving key "/home/hduser/.ssh/id_rsa" failed: passphrase is too short (minimum f
our characters)
hduser@neela-VirtualBox:~$ cat /home/hduser/.ssh/id_rsa.pub >> /home/hduser/.ssh
/authorized_keys
hduser@neela-VirtualBox:~$
```



```
Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
neela
hduser@neela-VirtualBox:~$ su hduser
Password:
hduser@neela-VirtualBox:~$ sudo nano ~/.bashrc
```

Ubuntu (Running) - Oracle VM VirtualBox

File Machine View Input Devices Help

hduser@neela-VirtualBox:~

GNU nano 2.4.2 File: /home/hduser/.bashrc

```
#!/bin/bash

if [ -z $BASH ]; then
    if [ -f /usr/share/bash-completion/bash_completion ]; then
        . /usr/share/bash-completion/bash_completion
    elif [ -f /etc/bash_completion ]; then
        . /etc/bash_completion
    fi
fi

#HADOOP VARIABLES START
export JAVA_HOME=/usr/lib/jvm/java-8-oracle
export HADOOP_HOME=/usr/local/hadoop
export PATH=$PATH:$HADOOP_HOME/bin
export PATH=$PATH:$HADOOP_HOME/sbin
export HADOOP_MAPRED_HOME=$HADOOP_HOME
export HADOOP_COMMON_HOME=$HADOOP_HOME
export HADOOP_HDFS_HOME=$HADOOP_HOME
export YARN_HOME=$HADOOP_HOME
export HADOOP_COMMON_LIB_NATIVE_DIR=$HADOOP_HOME/lib/native
export HADOOP_OPTS="-Djava.library.path=$HADOOP_HOME/lib"
#HADOOP VARIABLES END
```

Get Help Write Out Where Is Cut Text Justify Cur Pos
Exit Read File Replace Uncut Text To Spell Go To Line

Ubuntu (Running) - Oracle VM VirtualBox

File Machine View Input Devices Help

hduser@neela-VirtualBox:~\$ su hduser

Password:

hduser@neela-VirtualBox:/home/neela\$ cd ..

hduser@neela-VirtualBox:/home\$ cd hduser

hduser@neela-VirtualBox:~\$ cd /usr/local/hadoop/etc/hadoop

hduser@neela-VirtualBox:/usr/local/hadoop/etc/hadoop\$ which javac

/usr/bin/javac

hduser@neela-VirtualBox:/usr/local/hadoop/etc/hadoop\$ readlink -f /usr/bin/javac

/usr/lib/jvm/java-8-oracle/bin/javac

hduser@neela-VirtualBox:/usr/local/hadoop/etc/hadoop\$ sudo nano hadoop-env.sh

Ubuntu (Running) - Oracle VM VirtualBox

File Machine View Input Devices Help

hduser@neela-VirtualBox:/usr/local/hadoop/etc/hadoop

GNU nano 2.4.2 File: hadoop-env.sh

```
#!/bin/bash

# Unless required by applicable law or agreed to in writing, software
# distributed under the License is distributed on an "AS IS" BASIS,
# WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
# See the License for the specific language governing permissions and
# limitations under the License.

# Set Hadoop-specific environment variables here.

# The only required environment variable is JAVA_HOME. All others are
# optional. When running a distributed configuration it is best to
# set JAVA_HOME in this file, so that it is correctly defined on
# remote nodes.

# The java implementation to use.
export JAVA_HOME=/usr/lib/jvm/java-8-oracle

# THE JAVAC implementation to use. Javac is required to run secure datanodes
# that bind to privileged ports to provide authentication of data transfer
# protocol. Javac is not required if SASL is configured for authentication of
```

Get Help Write Out Where Is Cut Text Justify Cur Pos
Exit Read File Replace Uncut Text To Line Go To Line

```
nal
hduser@neela-VirtualBox: /usr/local/hadoop/etc/hadoop
hduser@neela-VirtualBox:/usr/local/hadoop/etc/hadoop$ sudo nano core-site.xml
```

```
GNU nano 2.4.2           File: core-site.xml

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WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License. See accompanying LICENSE file.

-->

<!-- Put site-specific property overrides in this file. -->

<configuration>
<property>
<name>fs.default.name</name>
<value>hdfs://localhost:9000</value>
</property>
</configuration>
```

```
Ubuntu (Running) - Oracle VM VirtualBox
File Machine View Input Devices Help
nal
hduser@neela-VirtualBox: /usr/local/hadoop/etc/hadoop
hduser@neela-VirtualBox:/usr/local/hadoop/etc/hadoop$ sudo nano hdfs-site.xml
```

```
GNU nano 2.4.2           File: hdfs-site.xml

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WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the license. See accompanying LICENSE file.

-->

<!-- Put site-specific property overrides in this file. -->

<configuration>
<property>
<name>dfs.replication</name>
<value>1</value>
</property>
<property>
<name>dfs.namenode.name.dir</name>
<value>/file:/usr/local/hadoop_store/hdfs/namenode</value>
</property>
<property>
<name>dfs.datanode.data.dir</name>
<value>/file:/usr/local/hadoop_store/hdfs/datanode</value>
</property>
</configuration>
```

```
nal
hduser@neela-VirtualBox: /usr/local/hadoop/etc/hadoop
hduser@neela-VirtualBox:/usr/local/hadoop/etc/hadoop$ sudo nano yarn-site.xml
```

EXPERIMENT - 7

AIM:

To create a one node Hadoop cluster using virtual box.

DESCRIPTION:

1. Open VirtualBox.
2. Create a virtual machine using the image of Hadoop installed ubuntu OS. Check the hadoop installation using the commands:
 - a. Login to hduser using the command: su hduser
 - b. Move to the folder /usr/local/hadoop/bin folder
 - c. hadoop version
4. Create namenode and datanode and configuring using the commands:
 - a. Login to hduser
 - b. Move to folder /usr/local/hadoop
 - c. sudo chown –R hduser: hadoop /usr/local/hadoop
 - d. move to the folder ~ using: cd ~
 - e. sudo mkdir –p /usr/local/hadoop_store/hdfs/namenode
 - f. sudo mkdir –p /usr/local/hadoop_store/hdfs/datanode
 - g. sudo chown –R hduser:hadoop /usr/local/hadoop_store
5. Formatting namenode using the following commands:
 - a. Login to hduser
 - b. Move to the folder /usr/local/hadoop_store/hdfs/namenode
 - c. hadoop namenode –format
6. Starting Hadoop using the following commands:
 - a. Login to hduser
 - b. Move to the folder /usr/local/hadoop/sbin
 - c. start-all.sh
7. Checking Hadoop using the following commands:
 - a. Login to hduser
 - b. Move to the folder /usr/local/hadoop/sbin
 - c. Jps
 - d. If datanode is not seen, then follow the steps:
 - i. stop-all.sh
 - ii. sudo rm –r /usr/local/hadoop_store/hdfs/datanode/current
 - iii. Move to the folder /usr/local/hadoop_store/hdfs/namenode
 - iv. hadoop namenode –format
 - v. Move to the folder /usr/local/hadoop/sbin
 - vi. start-all.sh
 - vii. jps
 - e. netstat –plten | grep java

f. to check hadoop, open the browser, type: http://localhost:50070

8. creating hdfs input directory:

- a. login to hduser
- b. move to the folder /usr/local/hadoop/sbin
- c. hadoop fs -mkdir /user
- d. hadoop fs -ls /
- e. hadoop fs -mkdir /user/input

9. copying a file into hdfs directory:

- a. login to hduser
- b. move to the folder /usr/local/hadoop/sbin
- c. hadoop fs -put /home/neela/file.txt /user/input
- d. hadoop fs -ls /user/input
- e. hadoop fs -cat /user/input/file.txt

10. stopping hadoop:

- a. login to hduser
- b. move to the folder /usr/local/hadoop/sbin
- c. stop-all.sh

OUTPUT



```
hduser@neela-VirtualBox:/usr/local/hadoop/bin
hduser@neela-VirtualBox:/home/neela$ cd /usr/local/hadoop/bin
hduser@neela-VirtualBox:/usr/local/hadoop/bin$ hadoop
Usage: hadoop [--config confdir] COMMAND
      where COMMAND is one of:
        fs                  run a generic filesystem user client
        version             print the version
        jar <jar>            run a jar file
        checksum [-a|-h]    check native hadoop and compression libraries availability
        distcp <srcurl> <desturl> copy file or directories recursively
        archive -archiveName NAME -p <parent path> <src>* <dest> create a hadoop archive
        classpath           prints the class path needed to get the
                           interact with credential providers
        credential          Hadoop jar and the required libraries
        daemonlog           get/set the log level for each daemon
        trace               view and modify Hadoop tracing settings
        or
        CLASSNAME          run the class named CLASSNAME

Most commands print help when invoked w/o parameters.
hduser@neela-VirtualBox:/usr/local/hadoop/bin$ hadoop version
Hadoop 2.6.0
Subversion https://git-wip-us.apache.org/repos/asf/hadoop.git -r e349d499ecb8d22
0fb499dc5ed4c99cfc9e33bb1
Compiled by jenkins on 2014-11-33T21:10Z
Compiled with protoc 2.5.0
From source with checksum 18e43357c8f927c0895f1e9522859dd
This command was run using /usr/local/hadoop/share/hadoop/common/hadoop-common-2
+.6.0.jar
hduser@neela-VirtualBox:/usr/local/hadoop/bin$
```

```
hduser@neela-VirtualBox:/usr/local/hadoop_store/hdfs/namenode
hduser@neela-VirtualBox:/usr/local/hadoop/bin$ cd /usr/local/hadoop
hduser@neela-VirtualBox:/usr/local/hadoop$ sudo chown -R hduser:hadoop /usr/local/hadoop
P
[sudo] password for hduser:
hduser@neela-VirtualBox:/usr/local/hadoop$ cd ..
hduser@neela-VirtualBox:~$ cd hadoop
hduser@neela-VirtualBox:~/hadoop$ cd namenode
hduser@neela-VirtualBox:~/hadoop$ sudo mkdir -p /usr/local/hadoop_store/hdfs/namenode
hduser@neela-VirtualBox:~/hadoop$ sudo mkdir -p /usr/local/hadoop_store/hdfs/datanode
hduser@neela-VirtualBox:~/hadoop$ sudo chown -R hduser:hadoop /usr/local/hadoop_store
hduser@neela-VirtualBox:~/hadoop$ cd /usr/local/hadoop_store/hdfs/namenode
hduser@neela-VirtualBox:~/hadoop_store/hdfs/namenode$ hadoop namenode -format
```

```
hduser@neela-VirtualBox:~$ cd /usr/local/hadoop_store/hdfs/namenode
16/08/25 13:12:05 INFO util.GSet: 0.25% max memory 966.7 MB = 2.4 MB
16/08/25 13:12:05 INFO util.GSet: capacity      = 2^19 = 524288 entries
16/08/25 13:12:05 INFO namenode.FSNamesystem: dfs.namenode.safemode.threshold-pct = 0.9
9990000128746033
16/08/25 13:12:05 INFO namenode.FSNamesystem: dfs.namenode.safemode.min.datanodes = 0
16/08/25 13:12:05 INFO namenode.FSNamesystem: dfs.namenode.safemode.extension    = 300
00
16/08/25 13:12:05 INFO namenode.FSNamesystem: Retry cache on namenode is enabled
16/08/25 13:12:05 INFO namenode.FSNamesystem: Retry cache will use 0.03 of total heap a
nd retry cache entry expiry time is 600000 millis
16/08/25 13:12:05 INFO util.GSet: Computing capacity for map NameNodeRetryCache
16/08/25 13:12:05 INFO util.GSet: VM type      = 32-bit
16/08/25 13:12:05 INFO util.GSet: 0.0299999993294477408 max memory 966.7 MB = 297.0 KB
16/08/25 13:12:05 INFO util.GSet: capacity      = 2^16 = 65536 entries
16/08/25 13:12:05 INFO namenode.NNConf: ACLs enabled? false
16/08/25 13:12:05 INFO namenode.NNConf: XAttrs enabled? true
16/08/25 13:12:05 INFO namenode.NNConf: Maximum size of an xattr: 16384
Re-format filesystem in Storage Directory /usr/local/hadoop_store/hdfs/namenode ? (Y or
N) Y
16/08/25 13:12:10 INFO namenode.FSImage: Allocated new BlockPoolId: BP-3846372228-127.0
.1.1-1472110930012
16/08/25 13:12:10 INFO common.Storage: Storage directory /usr/local/hadoop_store/hdfs/n
amenode has been successfully formatted.
16/08/25 13:12:10 INFO namenode.NNStorageRetentionManager: Going to retain 1 images wit
h txid >= 0
16/08/25 13:12:10 INFO util.ExitUtil: Exiting with status 0
16/08/25 13:12:10 INFO namenode.NameNode: SHUTDOWN_MSG:
/*****
SHUTDOWN_MSG: Shutting down NameNode at neela-VirtualBox@127.0.1.1
*****/
hduser@neela-VirtualBox:~$ cd /usr/local/hadoop_store/hdfs/namenode$
```

```
hduser@neela-VirtualBox:~$ cd /usr/local/hadoop/sbin
hduser@neela-VirtualBox:~$ cd /usr/local/hadoop_store/hdfs/namenode$ cd /usr/local/hadoop/sbin
hduser@neela-VirtualBox:~$ start-all.sh
```

```
hduser@neela-VirtualBox:~$ cd /usr/local/hadoop/sbin
hduser@neela-VirtualBox:~$ cd /usr/local/hadoop_store/hdfs/namenode$ cd /usr/local/hadoop/sbin
hduser@neela-VirtualBox:~$ start-all.sh
This script is Deprecated. Instead use start-dfs.sh and start-yarn.sh
16/08/25 13:14:31 WARN util.NativeCodeLoader: Unable to load native-hadoop library for yo
ur platform... using builtin-java classes where applicable
Starting namenodes on [localhost]
localhost: starting namenode, logging to /usr/local/hadoop/logs/hadoop-hduser-namenode-ne
ela-VirtualBox.out
localhost: starting datanode, logging to /usr/local/hadoop/logs/hadoop-hduser-datanode-ne
ela-VirtualBox.out
Starting secondary namenodes [0.0.0.0]
0.0.0.0: starting secondarynamenode, logging to /usr/local/hadoop/logs/hadoop-hduser-sec
ondarynamenode-neela-VirtualBox.out
16/08/25 13:14:54 WARN util.NativeCodeLoader: Unable to load native-hadoop library for yo
ur platform... using builtin-java classes where applicable
starting yarn daemons
starting resourcemanager, logging to /usr/local/hadoop/logs/yarn-hduser-resourcemanager-n
eela-VirtualBox.out
localhost: starting nodemanager, logging to /usr/local/hadoop/logs/yarn-hduser-nodenanager
-neela-VirtualBox.out
hduser@neela-VirtualBox:~$
```

```
hduser@neela-VirtualBox:~$ /usr/local/hadoop/sbin$ jps
2997 NodeManager
2856 ResourceManager
3321 Jps
2410 NameNode
2719 SecondaryNameNode
hduser@neela-VirtualBox:~$ /usr/local/hadoop/sbin$ stop-all.sh
This script is Deprecated. Instead use stop-dfs.sh and stop-yarn.sh
16/08/25 13:16:13 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Stopping namenodes on [localhost]
localhost: stopping namenode
localhost: no datanode to stop
Stopping secondary namenodes [0.0.0.0]
0.0.0.0: stopping secondarynamenode
16/08/25 13:16:29 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
stopping yarn daemons
stopping resourcemanager
localhost: stopping nodemanager
no proxyserver to stop
hduser@neela-VirtualBox:~$ /usr/local/hadoop/sbin$
```

```
hduser@neela-VirtualBox:~$ /usr/local/hadoop_store/hdfs/namenode
hduser@neela-VirtualBox:~$ /usr/local/hadoop/sbin$ jps
2997 NodeManager
2856 ResourceManager
3321 Jps
2410 NameNode
2719 SecondaryNameNode
hduser@neela-VirtualBox:~$ /usr/local/hadoop/sbin$ stop-all.sh
This script is Deprecated. Instead use stop-dfs.sh and stop-yarn.sh
16/08/25 13:16:13 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Stopping namenodes on [localhost]
localhost: stopping namenode
localhost: no datanode to stop
Stopping secondary namenodes [0.0.0.0]
0.0.0.0: stopping secondarynamenode
16/08/25 13:16:29 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
stopping yarn daemons
stopping resourcemanager
localhost: stopping nodemanager
no proxyserver to stop
hduser@neela-VirtualBox:~$ /usr/local/hadoop/sbin$ sudo rm -r /usr/local/hadoop_store/hdfs/datanode/current
hduser@neela-VirtualBox:~$ /usr/local/hadoop/sbin$ cd /usr/local/hadoop_store/hdfs/namenode
hduser@neela-VirtualBox:~$ /usr/local/hadoop_store/hdfs/namenode$ hadoop namenode -format
```

```
hadoop@neela-VirtualBox:/usr/local/hadoop_store/hdfs/namenode$ ./start-dfs.sh
16/08/25 13:18:39 INFO util.GSet: VM type      = 32-bit
16/08/25 13:18:39 INFO util.GSet: 0.25% max memory 966.7 MB = 2.4 MB
16/08/25 13:18:39 INFO util.GSet: capacity     = 2^19 = 524288 entries
16/08/25 13:18:39 INFO namenode.FSNamesystem: dfs.namenode.safemode.threshold-pct = 0.999
0000128746633
16/08/25 13:18:39 INFO namenode.FSNamesystem: dfs.namenode.safemode.min.datanodes = 0
16/08/25 13:18:39 INFO namenode.FSNamesystem: dfs.namenode.safemode.extension = 30000
16/08/25 13:18:39 INFO namenode.FSNamesystem: Retry cache on namenode is enabled
16/08/25 13:18:39 INFO namenode.FSNamesystem: Retry cache will use 0.03 of total heap and
retry cache entry expiry time is 600000 millis
16/08/25 13:18:39 INFO util.GSet: Computing capacity for map NameNodeRetryCache
16/08/25 13:18:39 INFO util.GSet: VM type      = 32-bit
16/08/25 13:18:39 INFO util.GSet: 0.029999999329447746N max memory 966.7 MB = 297.6 KB
16/08/25 13:18:39 INFO util.GSet: capacity     = 2^16 = 65536 entries
16/08/25 13:18:39 INFO namenode.NNConf: ACLs enabled? false
16/08/25 13:18:39 INFO namenode.NNConf: XAttrs enabled? true
16/08/25 13:18:39 INFO namenode.NNConf: Maximum size of an xattr: 16384
Re-format filesystem in Storage Directory /usr/local/hadoop_store/hdfs/namenode ? (Y or N)
Y
16/08/25 13:18:47 INFO namenode.FSImage: Allocated new BlockPoolId: BP-1852965487-127.0.1.1-1472111327758
16/08/25 13:18:47 INFO common.Storage: Storage directory /usr/local/hadoop_store/hdfs/namenode has been successfully formatted.
16/08/25 13:18:48 INFO namenode.NNStorageRetentionManager: Going to retain 1 images with
txId >= 0
16/08/25 13:18:48 INFO util.ExitUtil: Exiting with status 0
16/08/25 13:18:48 INFO namenode.NameNode: SHUTDOWN_MSG:
*****Shutdown Message*****SHUTDOWN_MSG: Shutting down NameNode at neela-VirtualBox/127.0.1.1
*****Shutdown Message*****hadoop@neela-VirtualBox:/usr/local/hadoop_store/hdfs/namenode$
```

```
hadoop@neela-VirtualBox:/usr/local/hadoop$ bin
hadoop@neela-VirtualBox:/usr/local/hadoop_store/hdfs/namenode$ cd /usr/local/hadoop/sbin
hadoop@neela-VirtualBox:/usr/local/hadoop/sbin$ start-all.sh
This script is deprecated. Instead use start-dfs.sh and start-yarn.sh
16/08/25 13:20:50 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-Java classes where applicable
Starting namenodes on [localhost]
localhost: starting namenode, logging to /usr/local/hadoop/logs/hadoop-hduser-namenode-neela-VirtualBox.out
localhost: starting datanode, logging to /usr/local/hadoop/logs/hadoop-hduser-datanode-neela-VirtualBox.out
Starting secondary namenodes [0.0.0.0]
0.0.0.0: starting secondarynamenode, logging to /usr/local/hadoop/logs/hadoop-hduser-secondarynamenode-neela-VirtualBox.out
16/08/25 13:21:09 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-Java classes where applicable
starting yarn daemons
starting resourcemanager, logging to /usr/local/hadoop/logs/yarn-hduser-resourcemanager-neela-VirtualBox.out
localhost: starting nodemanager, logging to /usr/local/hadoop/logs/yarn-hduser-nodemanager-neela-VirtualBox.out
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ jps
4577 ResourceManager
5013 Jps
4104 NameNode
4253 DataNode
4781 NodeManager
4429 SecondaryNameNode
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$
```

```
Ubuntu [Running] - Oracle VM VirtualBox  
File Machine View Input Devices Help  
all  
Hduser@neela-VirtualBox:~$ /usr/local/hadoop/bin$ netstat -plten | grep java  
(Not all processes could be identified, non-owned process info  
will not be shown, you would have to be root to see it all.)  
tcp        0      0 0.0.0.0:50020          0.0.0.0:*              LISTEN      1001  
32641    4253/java  
tcp        0      0 127.0.0.1:9000        0.0.0.0:*              LISTEN      1001  
32513    4104/java  
tcp        0      0 0.0.0.0:50090        0.0.0.0:*              LISTEN      1001  
34726    4429/java  
tcp        0      0 0.0.0.0:50070        0.0.0.0:*              LISTEN      1001  
32505    4104/java  
tcp        0      0 0.0.0.0:50010        0.0.0.0:*              LISTEN      1001  
33381    4253/java  
tcp        0      0 0.0.0.0:50075        0.0.0.0:*              LISTEN      1001  
33386    4253/java  
tcp6       0      0 ::1:8032           ::*                  LISTEN      1001  
35851    4577/java  
tcp6       0      0 ::1:8033           ::*                  LISTEN      1001  
35859    4577/java  
tcp6       0      0 ::1:42276          ::*                  LISTEN      1001  
49163    4701/java  
tcp6       0      0 ::1:8040           ::*                  LISTEN      1001  
49169    4701/java  
tcp6       0      0 ::1:8042           ::*                  LISTEN      1001  
49174    4701/java  
tcp6       0      0 ::1:8088          ::*                  LISTEN      1001  
35855    4577/java  
tcp6       0      0 ::1:13562          ::*                  LISTEN      1001  
49173    4701/java  
tcp6       0      0 ::1:8030           ::*                  LISTEN      1001  
35845    4577/java
```

```
Ubuntu [Running] - Oracle VM VirtualBox  
File Machine View Input Devices Help  
NameNode Information  
localhost:50070/hdfs/namenode-overview  
Hadoop Overview Datanodes Snapshot Startup Progress Utilities  
Overview 'localhost:9000' (active)  


|                |                                                            |
|----------------|------------------------------------------------------------|
| Started:       | Thu Aug 25 13:20:54 IST 2016                               |
| Version:       | 2.6.0, r13496499e:cb0d220fb99dc5ed4c99c8f9e33bb1           |
| Compiled:      | 2014-11-13T21:10Z by jenkins from (detached from r1349649) |
| Cluster ID:    | CID-7c7ea477-4596-41ba-924c-2fee743b591b                   |
| Block Pool ID: | BP-1852965487-127.0.1.1-1472111327758                      |

  
Summary  
Security is off.  
Safemode is off.
```

The screenshot shows a Mozilla Firefox browser window with the title "Datanode Information". The URL in the address bar is "localhost:50070/dfshealth.html#tab-datanode". The page has a green header bar with tabs: Hadoop, Overview, Datanodes, Snapshot, Startup Progress, Utilities. The main content area is titled "Datanode Information" and displays the status "In operation". Below this, there is a table with the following data:

Node	Last contact	Admin State	Capacity	Used	Non DFS Used	Remaining	Blocks	Block pool used	Failed Volumes	Version
neela-VirtualBox (127.0.0.1:50010)	2	In Service	6.76 GB	24 KB	5.32 GB	1.44 GB	0	24 KB (0%)	0	2.6.0

The screenshot shows a terminal window with the title "Terminal". The user is logged in as "hduser@neela-VirtualBox" and is navigating to the directory "/usr/local/hadoop/sbin". The user runs the command "hadoop fs -mkdir /user" followed by "hadoop fs -ls /". The terminal output shows the creation of the "/user" directory and its contents. The user then runs "hadoop fs -ls /user/" again, which shows the same results.

```
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ su hduser
Password:
hduser@neela-VirtualBox:/home/neela$ cd /usr/local/hadoop/sbin
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -mkdir /user
16/08/25 14:05:39 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -ls /
16/08/25 14:05:59 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 1 items
drwxr-xr-x  - hduser supergroup          0 2016-08-25 14:05 /user
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -mkdir /user/input
16/08/25 14:06:32 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -ls /user/
16/08/25 14:07:09 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 1 items
drwxr-xr-x  - hduser supergroup          0 2016-08-25 14:06 /user/input
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$
```

```
hduser@neela-VirtualBox:~$ cd /usr/local/hadoop/bin  
drwxr-xr-x - hduser supergroup          0 2016-08-25 14:06 ./user/input  
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -put /home/neela/file.txt /user/input  
16/08/25 14:08:55 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable  
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -put /home/neela/file.txt /user/input  
16/08/25 14:09:37 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable  
Found 1 item  
-rw-r--r-- 1 hduser supergroup      784 2016-08-25 14:08 /user/input/file.txt  
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -cat /user/input/file.txt  
16/08/25 14:10:00 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable  
Alzheimer's virtual reality app simulates dementia  
2 June 2016 Last updated at 19:13 BST  
A virtual reality app has been launched to provide a sense of what it is like to live with different forms of dementia.  
A Walk Through Dementia was created by the charity Alzheimer's Research UK.  
It has been welcomed by other experts in the field.  
We will increasingly be asked for help by people with dementia, and having had some insight into what may be happening for them will improve how we can help, said Tula Brannelly from the University of Southampton.  
A woman living with the condition and her husband told the Today programme why they supported the Android app's creation.  
Visitors to St Pancras International station in London can try out the app until 1700 on Saturday 4 June.  
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$
```

```
hduser@neela-VirtualBox:~$ cd /usr/local/hadoop/bin  
drwxr-xr-x - hduser supergroup          0 2016-08-25 14:06 ./user/input  
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ stop-all.sh  
This script is Deprecated. Instead use stop-dfs.sh and stop-yarn.sh  
16/08/25 14:11:39 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable  
Stopping namenodes on [localhost]  
localhost: stopping namenode  
localhost: stopping datanode  
Stopping secondary namenodes [0.0.0.0]  
0.0.0.0: stopping secondarynamenode  
16/08/25 14:12:03 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable  
stopping yarn daemons  
stopping resourcemanager  
localhost: stopping nodemanager  
no proxyserver to stop  
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$
```

EXPERIMENT - 8

AIM:

To familiarize with HDFS commands.

DESCRIPTION:

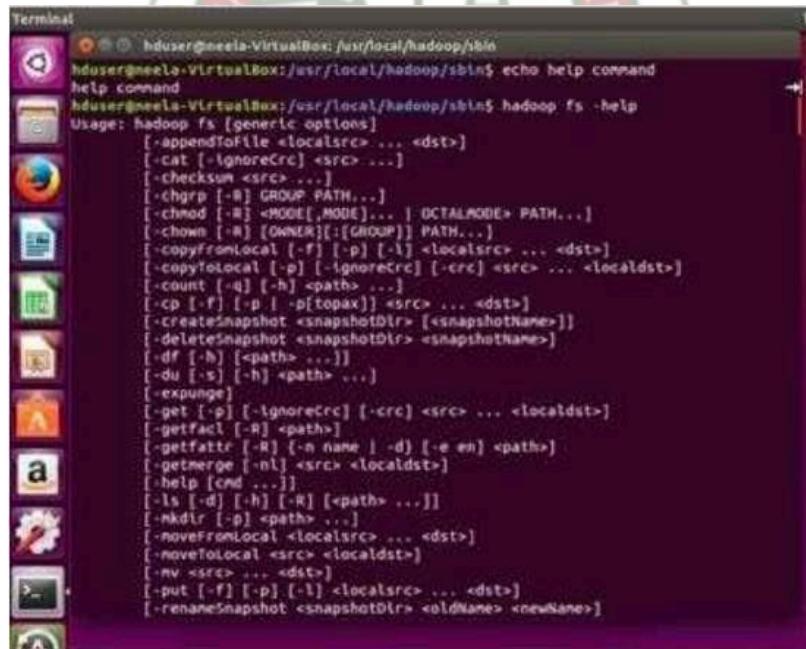
1. Open the virtualbox image which has Hadoop installed.
2. Log in using hduser account.
3. Execute different HDFS commands in the virtual machine image.

COMMANDS

1. help:

Used to display commands with options.

\$ hadoop fs –help



```
hduser@neela-VirtualBox: /usr/local/hadoop/sbin$ echo help command
help command
hduser@neela-VirtualBox: /usr/local/hadoop/sbin$ hadoop fs -help
Usage: Hadoop fs [generic options]
  [-appendToFile <localsrc> ... <dst>]
  [-cat [-ignoreCrc] <src> ...]
  [-checksum <src> ...]
  [-chgrp [-R] GROUP PATH...]
  [-chmod [-R] <MODE[,MODE]... | OCTALMODE> PATH...]
  [-chown [-R] (OWNER|:(GROUP)) PATH...]
  [-copyFromLocal [-f] [-p] [-l] <localsrc> ... <dst>]
  [-copyToLocal [-p] [-ignoreCrc] [-crc] <src> ... <localdst>]
  [-count [-q] [-h] <path> ...]
  [-cp [-f] [-p] [-p[topax]] <src> ... <dst>]
  [-createSnapshot <snapshotDir> [<snapshotName>]]
  [-deleteSnapshot <snapshotDir> <snapshotName>]
  [-df [-h] [<path> ...]]
  [-du [-s] [-h] <path> ...]
  [-expunge]
  [-get [-p] [-ignoreCrc] [-crc] <src> ... <localdst>]
  [-getfacl [-R] <path>]
  [-getfattr [-R] [-n name | -d] [-e en] <path>]
  [-getmerge [-nl] <src> <localdst>]
  [-help [cmd ...]]
  [-ls [-d] [-h] [-R] [<path> ...]]
  [-mkdir [-p] <path> ...]
  [-moveFromLocal <localsrc> ... <dst>]
  [-moveToLocal <src> <localdst>]
  [-mv <src> ... <dst>]
  [-put [-f] [-p] [-l] <localsrc> ... <dst>]
  [-renameSnapshot <snapshotDir> <oldName> <newName>]
```

2. ls

List the contents that match the specified file pattern. If path is not specified, the contents of /user/<currentUser> will be listed.

```
$ hadoop fs -ls /  
$ hadoop fs -lsr /
```

```
Terminal  
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -mkdir /user/input  
18/07/24 20:34:05 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-Java classes where applicable  
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -ls /  
18/07/24 20:34:14 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-Java classes where applicable  
Found 1 items  
drwxr-xr-x  - hduser supergroup          0 2018-07-24 20:34 /user  
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -lsr /  
lsr: DEPRECATED: Please use 'ls -R' instead.  
18/07/24 20:34:52 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-Java classes where applicable  
drwxr-xr-x  - hduser supergroup          0 2018-07-24 20:34 /user  
drwxr-xr-x  - hduser supergroup          0 2018-07-24 20:34 /user/input  
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$
```

3. mkdir

It is similar to unix mkdir command and is used for creating directories in HDFS. Note: In order to create a sub directory /user/hadoop, its parent directory /user must already exist. Otherwise 'No such file or directory' error message will be returned.

```
$ hadoop fs -mkdir /user/hadoop/  
$ hadoop fs -mkdir /user/test/in
```

4. put

Copies files from local file system to HDFS. This is similar to -copyFromLocal command.
\$ hadoop fs -put sample.txt /user/data/

```
Terminal  
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ ls  
distribute-exclude.sh    slaves.sh      stop-all.sh  
hadoop-daemon.sh        start-all.cmd  stop-balancer.sh  
hadoop-daemons.sh       start-all.sh   stop-dfs.cmd  
hdfs-config.cmd         start-balancer.sh  stop-dfs.sh  
hdfs-config.sh          start-dfs.cmd   stop-secure-dns.sh  
httpfs.sh                start-dfs.sh    stop-yarn.cmd  
kns.sh                  start-secure-dns.sh  stop-yarn.sh  
mr-jobhistory-daemon.sh start-yarn.cmd  yarn-daemon.sh  
one.txt                 start-yarn.sh  yarn-daemons.sh  
refresh-namenodes.sh    stop-all.cmd  
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -put one.txt /user/tmp  
ut/  
18/07/24 20:37:20 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-Java classes where applicable  
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -ls /user/input/  
18/07/24 20:37:38 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-Java classes where applicable  
Found 1 items  
-rwxr--r--  1 hduser supergroup          09 2018-07-24 20:37 /user/input/one.txt  
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$
```

5. get

Copies files from HDFS to local file system. This is similar to -copyToLocal command.
\$ hadoop fs -get /user/data/sample.txt workspace/

6. cat

Similar to Unix cat command, it is used for displaying contents of a file.
\$ hadoop fs -cat /user/data/sample.txt

```
Terminal
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -ls /user/input/
18/07/24 20:39:54 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 1 items
-rw-r--r-- 1 hduser supergroup          69 2018-07-24 20:37 /user/input/one.txt
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -get /user/input/one.txt /home/hduser/
18/07/24 20:41:02 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ ls /home/hduser/
Desktop  Downloads  Music  Pictures  temp  Videos
Documents examples.desktop  one.txt  Public  Templates
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -cat /user/input/one.txt
18/07/24 20:41:52 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
This is a sample text file.
It is used to test for hadoop file system
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$
```

```
Ubuntu (Running) - Oracle VM VirtualBox
File   Machine   View   Tools   Devices   Help
terminal
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -cp /user/input/one.txt /user/
18/07/24 20:43:48 WARN util.NativeCodeLoader: unable to load native-hadoop library for your platform... using builtin-java classes where applicable
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -ls /user/
18/07/24 20:43:58 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 2 items
drwxr-xr-x  - hduser supergroup          0 2018-07-24 20:37 /user/input
-rw-r--r--  1 hduser supergroup          69 2018-07-24 20:43 /user/one.txt
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -mkdir /user1/
18/07/24 20:44:28 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs mv /user/one.txt /user1/
mv: Unknown command
Did you mean -mv? This command begins with a dash.
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -mv /user/one.txt /user1/
18/07/24 20:45:21 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -ls /user1/
18/07/24 20:45:31 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 1 items
-rw-r--r--  1 hduser supergroup          69 2018-07-24 20:43 /user1/one.txt
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -ls /user/
18/07/24 20:45:48 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 1 items
drwxr-xr-x  - hduser supergroup          0 2018-07-24 20:37 /user/input
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$
```

7. cp

Similar to Unix cp command, it is used for copying files from one directory to another within HDFS.

```
$ hadoop fs -cp /user/data/sample.txt /user/hadoop
```

8. mv

Similar to Unix mv command, it is used for moving a file from one directory to another within HDFS.

```
$ hadoop fs -mv /user/hadoop/sample.txt /user/test/
```

9. rm

Similar to Unix rm command, it is used for removing a file from HDFS. The command -r can be used for recursive delete.

```
$ hadoop fs -rm -r /user/test/sample.txt
```

```
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -ls /user/input/
18/07/24 20:47:06 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 1 items
-rw-r--r-- 1 hduser supergroup 69 2018-07-24 20:37 /user/input/one.txt
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -cp /user/input/one.txt /user/one/
18/07/24 20:47:30 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
cp: /user/one.txt: File exists
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -ls /user/one/
18/07/24 20:47:47 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 1 items
-rw-r--r-- 1 hduser supergroup 69 2018-07-24 20:43 /user/one.txt
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -rm /user/one.txt
18/07/24 20:48:05 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
18/07/24 20:48:06 INFO fs.TrashPolicyDefault: Namenode trash configuration: Delete interval = 0 minutes, EmptyInterval = 0 minutes.
Deleted /user/one.txt
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -ls /user/one/
18/07/24 20:48:11 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$
```

10. touchz:

This command can be used to create a file of zero length in HDFS.

```
$ hadoop fs -touchz URI
```

```
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -touchz /user/input/file1
18/07/24 21:05:42 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -ls /user/input/
18/07/24 21:05:58 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 3 items
-rw-r--r-- 1 hduser supergroup 0 2018-07-24 21:05 /user/input/file1
-rw-r--r-- 1 hduser supergroup 69 2018-07-24 20:37 /user/input/one.txt
-rw-r--r-- 1 hduser supergroup 69 2018-07-24 21:00 /user/input/two.txt
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$
```

EXPERIMENT - 9

AIM:

To write a program to use APIs of Hadoop to interact with it to display file content exist in HDFS.

DESCRIPTION:

1. Open the virtualbox image which has Hadoop installed.
2. Create the file HadoopFScat.java within the folder /home/hduser/
3. Download Hadoop-core-1.2.1.jar file from www.java
- 4 .Create a directory to collect class file: mkdir /home/hduser/fscat
5. Compile the java file HadoopFScat.java:
 - a. Move to the folder /usr/local/hadoop/sbin
 - b. start-all.sh
 - c. sudo /usr/lib/jvm/java-8-oracle/bin/javac -classpath/home/hduser/hadoopcore-1.2.1.jar -d/home/hduser/fscat/home/hduser/HadoopFScat.java
 - d. ls /home/hduser/fscat
6. Create jar file for HadoopFScat.java
 - a. Move to the folder /usr/local/hadoop/sbin
 - b. jar -cvf /home/hduser/fscat.jar -C /home/hduser/fscat/ .
7. Executing jar file for HadoopFScat.java
 - a. hadoop jar /home/hduser/fscat.jar HadoopFScat/user/input/file.txt

INSTITUTE OF TECHNOLOGY

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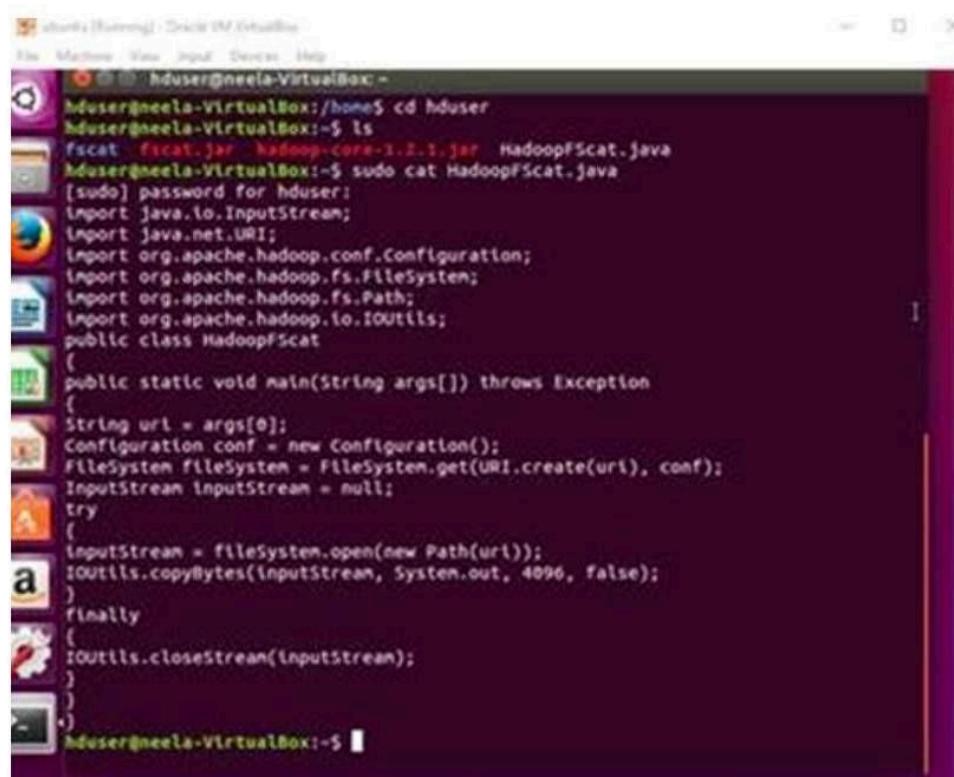
1979

CODE

```
//HadoopFScat.java
import
java.io.InputStream;
import java.net.URI;
import
org.apache.hadoop.conf.Configuration;
import
org.apache.hadoop.fs.FileSystem;
import org.apache.hadoop.fs.Path;
import
org.apache.hadoop.io.IOUtils;
public class HadoopFScat {
public static void main(String[] args) throws
Exception { String uri = args[0];
Configuration conf = new Configuration();
FileSystem fileSystem = FileSystem.get(URI.create(uri),
conf); InputStream inputStream = null;
```

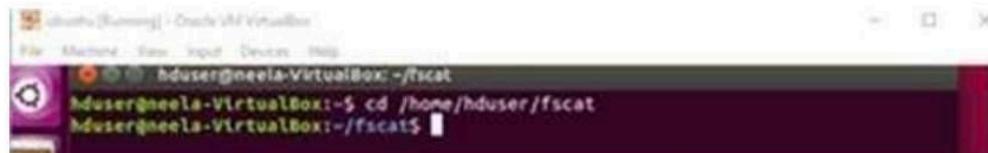
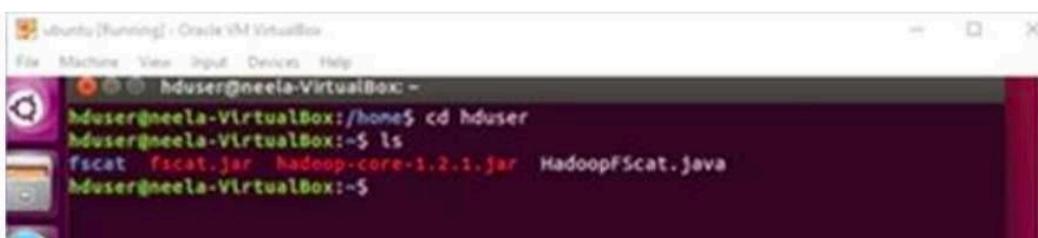
```
try{ inputStream = fileSystem.open(new Path(uri));
IOUtils.copyBytes(inputStream, System.out, 4096,
false);
}finally{
IOUtils.closeStream(inputStream); }
} }
```

OUTPUT



A screenshot of a terminal window titled "ubuntu [Running] - Oracle VM VirtualBox". The window shows a Java class named HadoopFScat being typed in. The code includes imports for java.io.InputStream, java.net.URI, org.apache.hadoop.conf.Configuration, org.apache.hadoop.fs.FileSystem, org.apache.hadoop.fs.Path, org.apache.hadoop.io.IOUtils, and a public class HadoopFScat with a main method. The user types the code and then presses Enter to execute it.

```
ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
hduser@neela-VirtualBox: ~
hduser@neela-VirtualBox:~$ cd hduser
hduser@neela-VirtualBox:~$ ls
fscat fscat.jar hadoop-core-1.2.1.jar HadoopFScat.java
hduser@neela-VirtualBox:~$ sudo cat HadoopFScat.java
[sudo] password for hduser:
import java.io.InputStream;
import java.net.URI;
import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.fs.FileSystem;
import org.apache.hadoop.fs.Path;
import org.apache.hadoop.io.IOUtils;
public class HadoopFScat
{
    public static void main(String args[]) throws Exception
    {
        String url = args[0];
        Configuration conf = new Configuration();
        FileSystem fileSystem = FileSystem.get(URI.create(url), conf);
        InputStream inputStream = null;
        try
        {
            inputStream = fileSystem.open(new Path(url));
            IOUtils.copyBytes(inputStream, System.out, 4096, false);
        }
        finally
        {
            IOUtils.closeStream(inputStream);
        }
    }
}
hduser@neela-VirtualBox:~$
```



```
hduser@neela-VirtualBox:~/hadoop$ cd hduser
hduser@neela-VirtualBox:~ ls
fscat.jar hadoop-core-1.2.1.jar HadoopFScat.java
hduser@neela-VirtualBox:~ sudo /usr/lib/jvm/java-8-oracle/bin/javac -classpath /home/hduser/hadoop-core-1.2.1.jar -d /home/hduser/fscat /home/hduser/HadoopFScat.java
hduser@neela-VirtualBox:~ ls /home/hduser/fscat
HadoopFScat.class
hduser@neela-VirtualBox:~ /usr/local/hadoop/sbin$ ls /home/hduser/fscat
HadoopFScat.class
hduser@neela-VirtualBox:~ /usr/local/hadoop/sbin$ cd /home/hduser/fscat
hduser@neela-VirtualBox:~/fscat$ javac -classpath /home/hduser/hadoop-core-1.2.1.jar -d /home/hduser/fscat /home/hduser/HadoopFScat.java
hduser@neela-VirtualBox:~/fscat$ ls /home/hduser/fscat
HadoopFScat.class
hduser@neela-VirtualBox:~/fscat$ jar -cvf /home/hduser/fscat.jar -C /home/hduser/fscat/ .
added manifest
adding: HadoopFScat.class(in = 1224) (out= 667)(deflated 45%)
hduser@neela-VirtualBox:~/fscat$ ls /home/hduser/fscat
HadoopFScat.jar
hduser@neela-VirtualBox:~/fscat$ sudo /usr/lib/jvm/java-8-oracle/bin/java -Xmx1024m -Xms1024m -Djava.library.path=/home/hduser/fscat -cp /home/hduser/fscat/HadoopFScat.jar /home/hduser/fscat
16/08/25 20:27:35 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-Java classes where applicable
Alzheimer's virtual reality app simulates dementia
2 June 2016 Last updated at 19:13 BST
A virtual reality app has been launched to provide a sense of what it is like to live with different forms of dementia.
A Walk Through Dementia was created by the charity Alzheimer's Research UK.
It has been welcomed by other experts in the field.
We will increasingly be asked for help by people with dementia, and having had some insight into what may be happening for them will improve how we can help, said Tula Brannelly from the University of Southampton.
A woman living with the condition and her husband told the Today programme why they supported the Android app's creation.
Visitors to St Pancras International station in London can try out the app until 1700 on Saturday 4 June.
```

EXPERIMENT - 10

AIM:

To write a program for word count using Map and Reduce task in Hadoop.

DESCRIPTION:

1. Open the virtualbox image which has Hadoop installed.
2. Create the file WordCount.java within the folder /home/hduser/
3. Create a directory to collect class file: mkdir /home/hduser/wc
4. Compile the java file WordCount.java:
 - a. Move to the folder hduser using: cd /home/hduser
 - b. sudo chown -R hduser:hadoop /usr/local/hadoop
 - c. sudo chown -R hduser:hadoop /usr/local/hadoop_store
 - d. Move to the folder /usr/local/hadoop/sbin
 - e. start-all.sh
 - f. jps
 - g. check all 6 components are listed
 - h. sudo /usr/lib/jvm/java-8-oracle/bin/javac -classpath/home/hduser/hadoop- core-1.2.1.jar -d /home/hduser/wc/home/hduser/WordCount.java
 - i. to see the class file: ls /home/hduser/wc
5. Create jar file for WordCount.java
 - a. Move to the folder /usr/local/hadoop/sbin
 - b. jar -cvf /home/hduser/wc.jar -C /home/hduser/wc/ .
6. Copy the file using:
 - a. hadoop fs -put /home/nsp/file.txt /user/input
 - b. check for file: hadoop fs -cat /user/input/file.txt
 - c. hadoop fs -ls /user (no need to create /user/output directory. If created, it will give error while executing)
7. Executing jar file wc.jar and check the output
 - a. hadoop jar /home/hduser/wc.jar WordCount /user/input /user/output
 - b. hadoop fs -ls /user/output
 - c. hadoop fs -cat /user/output/*

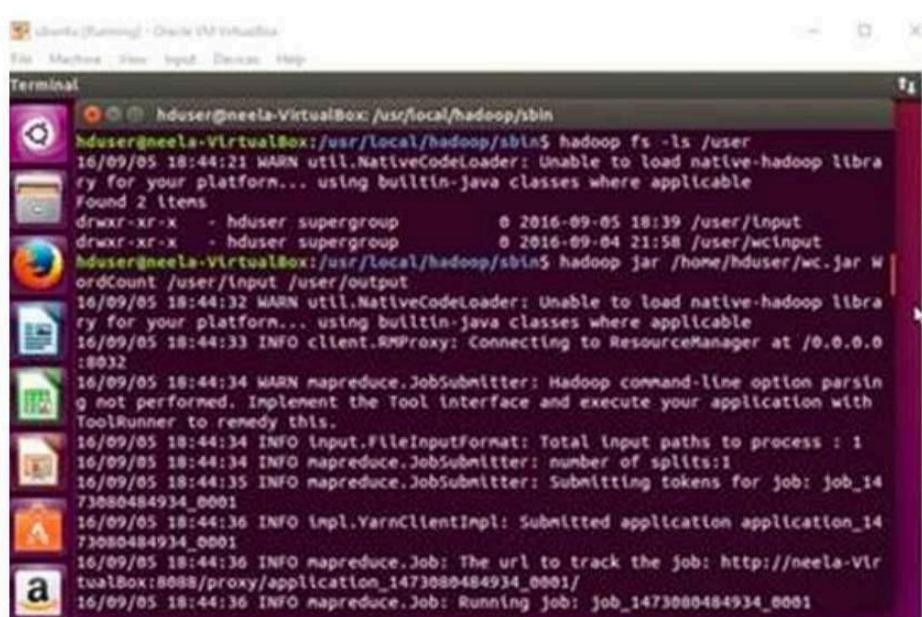
CODE

```
//WordCount.java
import java.io.IOException;
import java.util.StringTokenizer;
import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.fs.Path;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
```

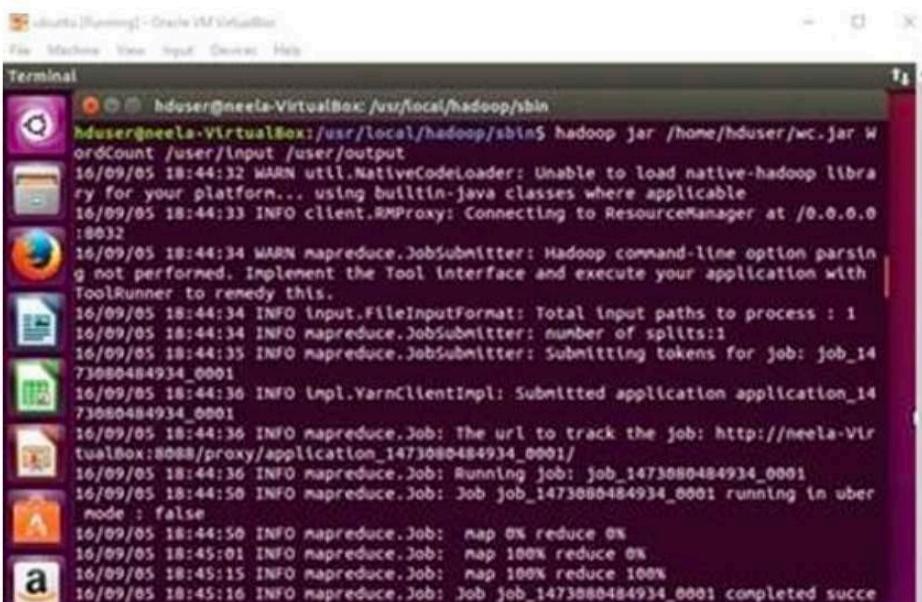
```
import org.apache.hadoop.mapreduce.Job;
import org.apache.hadoop.mapreduce.Mapper;
import org.apache.hadoop.mapreduce.Reducer;
import org.apache.hadoop.mapreduce.lib.input.FileInputFormat;
import org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;
public class WordCount {
    public static class TokenizerMapper
        extends Mapper<Object, Text, Text,
        IntWritable>{ private final static IntWritable one =
    new IntWritable(1); private Text word = new
    Text();
    public void map(Object key, Text value, Context context
    ) throws IOException, InterruptedException {
        StringTokenizer itr = new
        StringTokenizer(value.toString()); while
        (itr.hasMoreTokens()) {
            word.set(itr.nextToken())
            ; context.write(word,
            one);
        }
    }
    }
    public static class IntSumReducer
        extends
        Reducer<Text,IntWritable,Text,IntWritable> {
        private IntWritable result = new IntWritable();
        public void reduce(Text key, Iterable<IntWritable> values,Context context
        ) throws IOException,
        InterruptedException { int sum = 0;
        for (IntWritable val : values)
        { sum += val.get(); }
        result.set(sum);
        context.write(key,
        result);
    }
}
public static void main(String[] args) throws Exception {
    Configuration conf = new Configuration();
    Job job = Job.getInstance(conf, "word count");
    job.setJarByClass(WordCount.class);
    job.setMapperClass(TokenizerMapper.class);
    job.setCombinerClass(IntSumReducer.class);}
```

```
job.setReducerClass(IntSumReducer.class);
job.setOutputKeyClass(Text.class);
job.setOutputValueClass(IntWritable.class);
FileInputFormat.addInputPath(job, new
Path(args[0]));
FileOutputFormat.setOutputPath(job, new
Path(args[1]));
System.exit(job.waitForCompletion(true) ? 0 : 1); }
```

OUTPUT



```
hduser@neela-VirtualBox:~$ hadoop fs -ls /user
16/09/05 18:44:21 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 2 items
drwxr-xr-x  - hduser supergroup          0 2016-09-05 18:39 /user/input
drwxr-xr-x  - hduser supergroup          0 2016-09-04 21:58 /user/wcinput
hduser@neela-VirtualBox:~$ hadoop jar /home/hduser/wc.jar W
ordCount /user/input /user/output
16/09/05 18:44:32 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
16/09/05 18:44:33 INFO client.RMProxy: Connecting to ResourceManager at /0.0.0.0:8032
16/09/05 18:44:34 WARN mapreduce.JobSubmitter: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
16/09/05 18:44:34 INFO input.FileInputFormat: Total input paths to process : 1
16/09/05 18:44:34 INFO mapreduce.JobSubmitter: number of splits:1
16/09/05 18:44:35 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_14
73080484934_0001
16/09/05 18:44:36 INFO impl.YarnClientImpl: Submitted application application_14
73080484934_0001
16/09/05 18:44:36 INFO mapreduce.Job: The url to track the job: http://neela-Vir
tualBox:8088/proxy/application_1473080484934_0001/
16/09/05 18:44:36 INFO mapreduce.Job: Running job: job_1473080484934_0001
```



```
hduser@neela-VirtualBox:~$ hadoop jar /home/hduser/wc.jar W
ordCount /user/input /user/output
16/09/05 18:44:32 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
16/09/05 18:44:33 INFO client.RMProxy: Connecting to ResourceManager at /0.0.0.0:8032
16/09/05 18:44:34 WARN mapreduce.JobSubmitter: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
16/09/05 18:44:34 INFO input.FileInputFormat: Total input paths to process : 1
16/09/05 18:44:34 INFO mapreduce.JobSubmitter: number of splits:1
16/09/05 18:44:35 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_14
73080484934_0001
16/09/05 18:44:36 INFO impl.YarnClientImpl: Submitted application application_14
73080484934_0001
16/09/05 18:44:36 INFO mapreduce.Job: The url to track the job: http://neela-Vir
tualBox:8088/proxy/application_1473080484934_0001/
16/09/05 18:44:36 INFO mapreduce.Job: Running job: job_1473080484934_0001
16/09/05 18:44:50 INFO mapreduce.Job: Job job_1473080484934_0001 running in uber
mode : false
16/09/05 18:44:50 INFO mapreduce.Job: map 0% reduce 0%
16/09/05 18:45:01 INFO mapreduce.Job: map 100% reduce 0%
16/09/05 18:45:15 INFO mapreduce.Job: map 100% reduce 100%
16/09/05 18:45:16 INFO mapreduce.Job: Job job_1473080484934_0001 completed succe
```

```
Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Terminal
hduser@neela-VirtualBox: /usr/local/hadoop/sbin
WRONG_MAP=0
WRONG_REDUCE=0
File Input Format Counters
Bytes Read:784
File Output Format Counters
Bytes Written:860
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -ls /user/output
16/09/05 18:45:33 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 2 items
-rw-r--r--  1 hduser  supergroup          0 2016-09-05 18:45 /user/output/_SUCCESS
ss
-rw-r--r--  1 hduser  supergroup        860 2016-09-05 18:45 /user/output/part-r-00000
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$ hadoop fs -cat /user/output/*
16/09/05 18:45:52 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
1700   1
19:13   1
2       1
2016   1
4       1
A      3
Alzheimer's  2
```

```
Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Terminal
hduser@neela-VirtualBox: /usr/local/hadoop/sbin
said   1
sense  1
simulates  1
some   1
station 1
supported  1
the    7
them   1
they   1
to     3
told   1
try    1
until  1
updated 1
virtual 2
was    1
we    1
welcomed  1
what   2
why   1
will   2
with   3
woman  1
hduser@neela-VirtualBox:/usr/local/hadoop/sbin$
```