Ex no 1 **Install Virtual box Workstation with different flavours of Linux on top of windows 10**

Date:

Aim:

To Install Virtual box Workstation with of Linux on top of windows10.

Procedure:

Step 1- Download Link

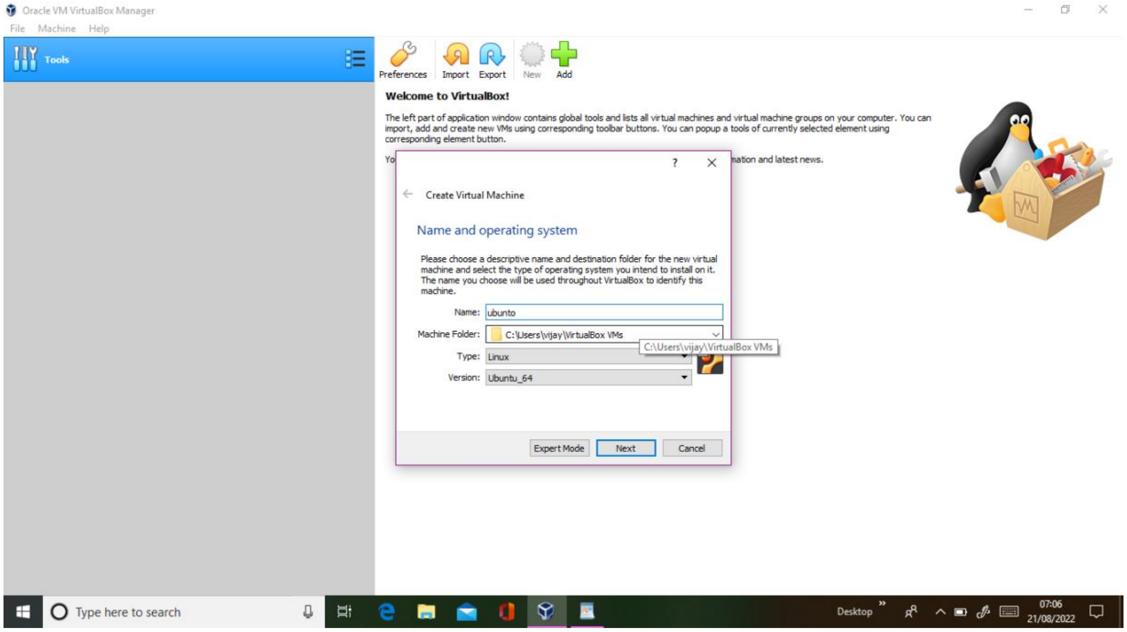
Link for downloading the software

https://www.techspot.com/downloads/ 4481-virtualbox.html

Download Ubuntu
https://ubuntu.com/download/desktop/thankyou?version=22.04.1&architecture=amd64#download

Download the software for windows.

Step 2 -Click a Add key & Create Name & Next Step



Welcome to VirtualBox!

The left part of application window contains global tools and lists all virtual machines and virtual machine groups on your computer. You can import, add and create new VMs using corresponding toolbar buttons. You can popup a tools of currently selected element using corresponding element button.

Yo ... mation and latest news.

Create Virtual Machine

Name and operating system

Please choose a descriptive name and destination folder for the new virtual machine and select the type of operating system you intend to install on it. The name you choose will be used throughout VirtualBox to identify this machine.

Name: ubunto

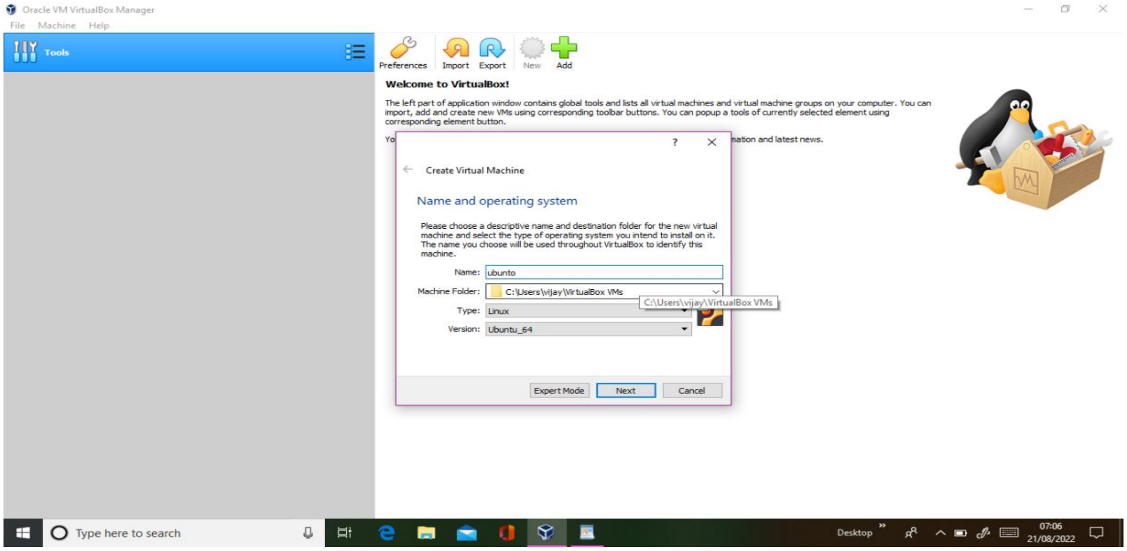
Machine Folder: C:\Users\vijay\VirtualBox VMs

C:\Users\vijay\VirtualBox VMs

Type: Linux

Version: Ubuntu_64

Step 3 - Memory Allocated



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Name: ubunto

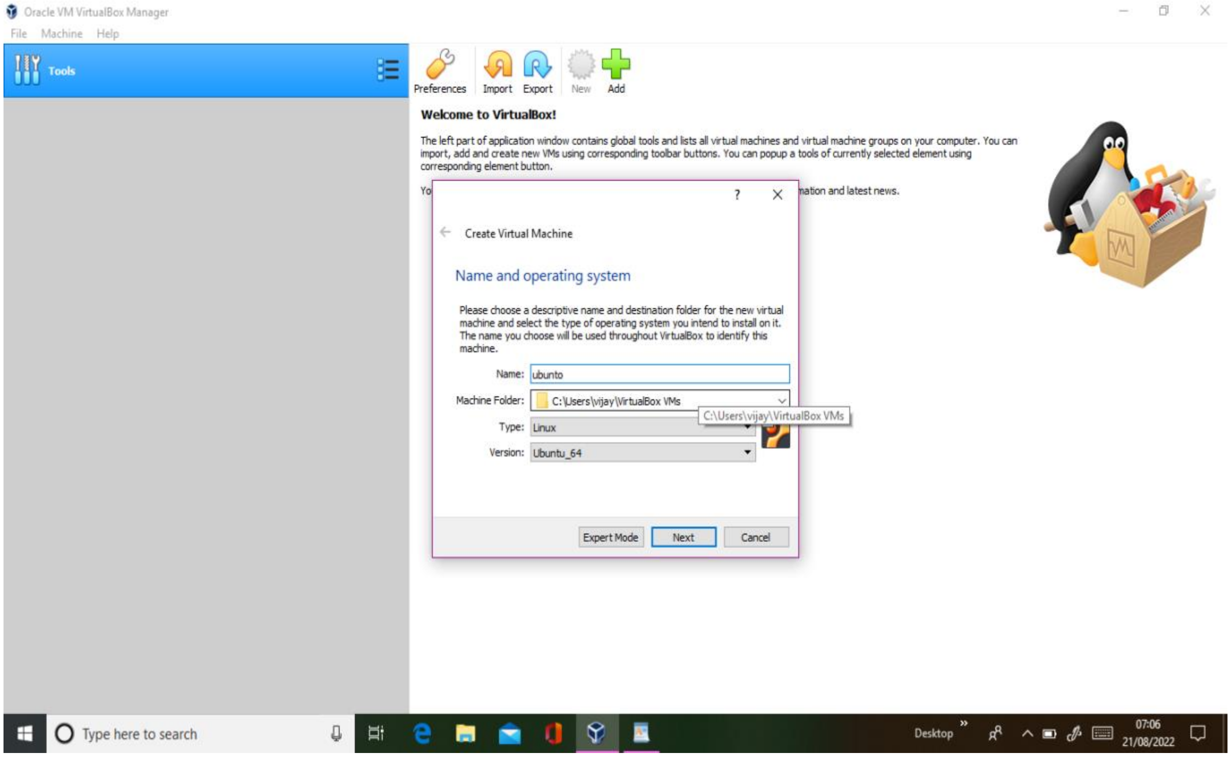
Machine Folder: C:\Users\vijay\VirtualBox VMs

C:\Users\vijay\VirtualBox VMs

Type: Linux

Version: Ubuntu_64

Step 4 – Select Create a virtual hard disk now & click create



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Yo ation and latest news.

Create Virtual Machine

Name and operating system

Please choose a descriptive name and destination folder for the new virtual machine and select the type of operating system you intend to install on it. The name you choose will be used throughout VirtualBox to identify this machine.

Name: ubunto

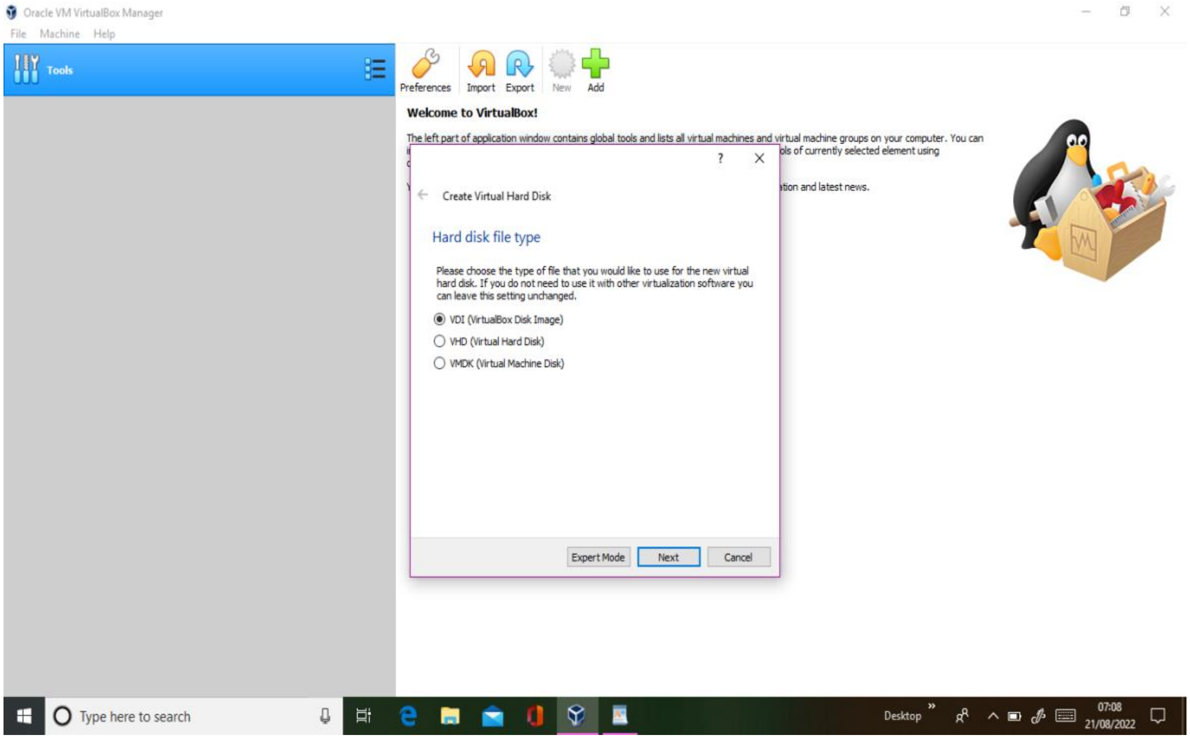
Machine Folder: C:\Users\vijay\VirtualBox VMs

C:\Users\vijay\VirtualBox VMs

Type: Linux

Version: Ubuntu_64

Step 5 – Choose VDI & Click to Next



Create Virtual Hard Disk

Hard disk file type

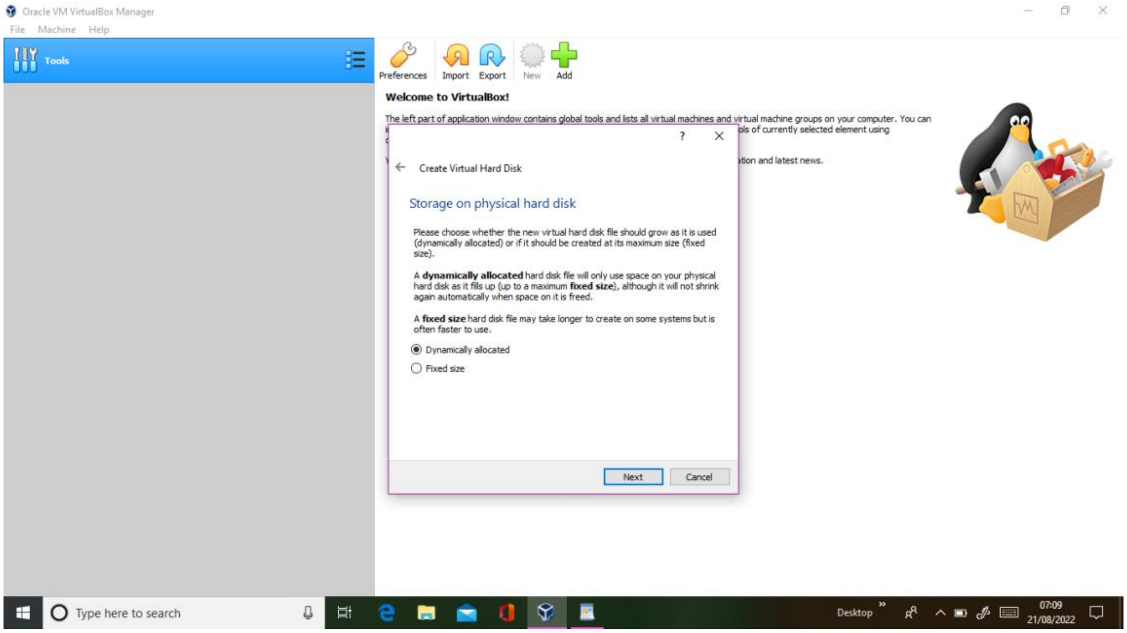
Please choose the type of file that you would like to use for the new virtual hard disk. If you do not need to use it with other virtualization software you can leave this setting unchanged.

● VDI (VirtualBox Disk Image)

○ VHD (Virtual Hard Disk)

○ VMDK (Virtual Machine Disk)

Step 6 - Choose Dynamically Allocated Click to Next



Create Virtual Hard Disk

Storage on physical hard disk

Please choose whether the new virtual hard disk file should grow as it is used (dynamically allocated) or if it should be created at its maximum size (fixed size).

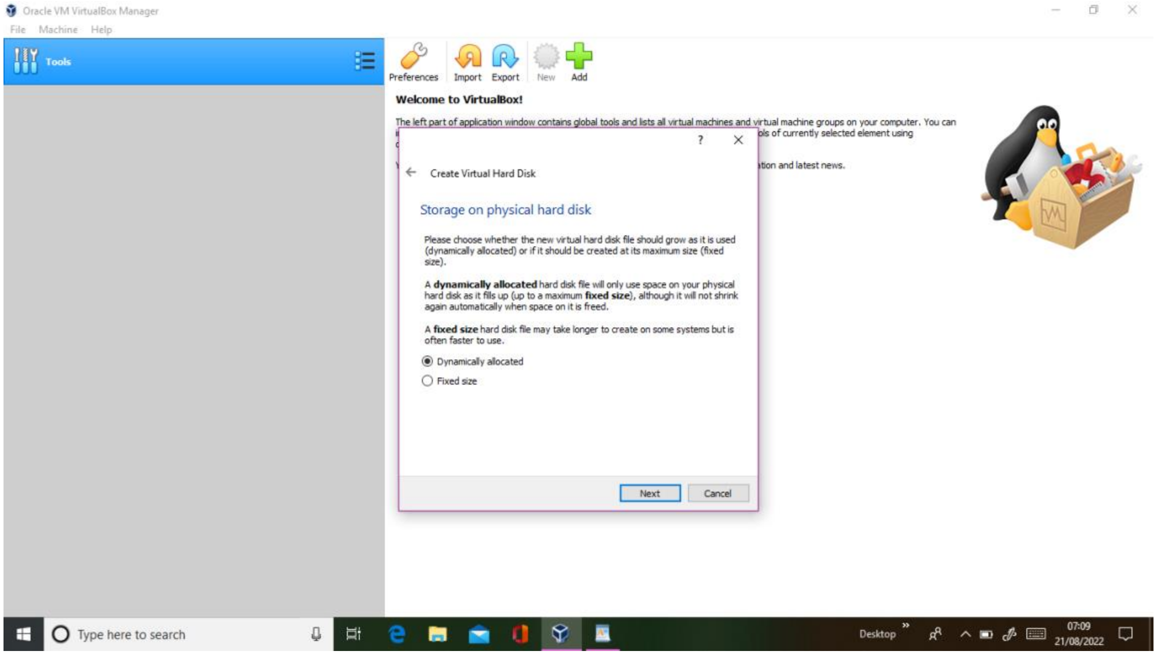
A **dynamically allocated** hard disk file will only use space on your physical hard disk as it fills up (up to a maximum **fixed size**), although it will not shrink again automatically when space on it is freed.

A **fixed size** hard disk file may take longer to create on some systems but is often faster to use.

● Dynamically allocated

○ Fixed size

Step 7 - Choose location and size Click to Create



Welcome to VirtualBox!

The left part of application window contains global tools and lists all virtual machines and virtual machine groups on your computer. You can

ols of currently selected element using

tion and latest news.

Create Virtual Hard Disk

Storage on physical hard disk

Please choose whether the new virtual hard disk file should grow as it is used (dynamically allocated) or if it should be created at its maximum size (fixed size).

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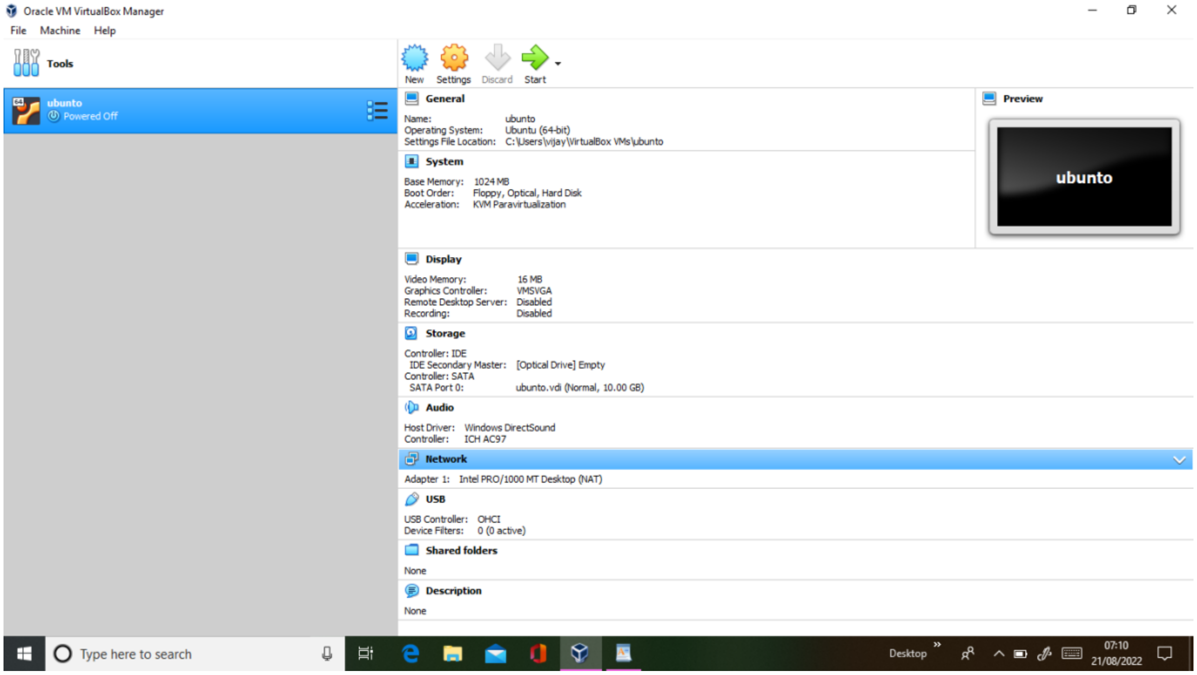
A **fixed size** hard disk file may take longer to create on some systems but is often faster to use.

● Dynamically allocated

○ Fixed size

Next Cancel

Step 8 -Click Start on Pop -up of the windows



General

Name: ubunto
Operating System: Ubuntu (64-bit)
Settings File Location: C:\Users\vijay\VirtualBox VMs\ubunto

System

Base Memory: 1024 MB
Boot Order: Floppy, Optical, Hard Disk
Acceleration: KVM Paravirtualization

Display

Video Memory: 16 MB
Graphics Controller: VMSVGA
Remote Desktop Server: Disabled
Recording: Disabled

Storage

Controller: IDE
IDE Secondary Master: [Optical Drive] Empty
Controller: SATA
SATA Port 0: ubunto.vdi (Normal, 10.00 GB)

Audio

Host Driver: Windows DirectSound
Controller: ICH AC97

Network

Adapter 1: Intel PRO/1000 MT Desktop (NAT)

USB

USB Controller: OHCI
Device Filters: 0 (0 active)

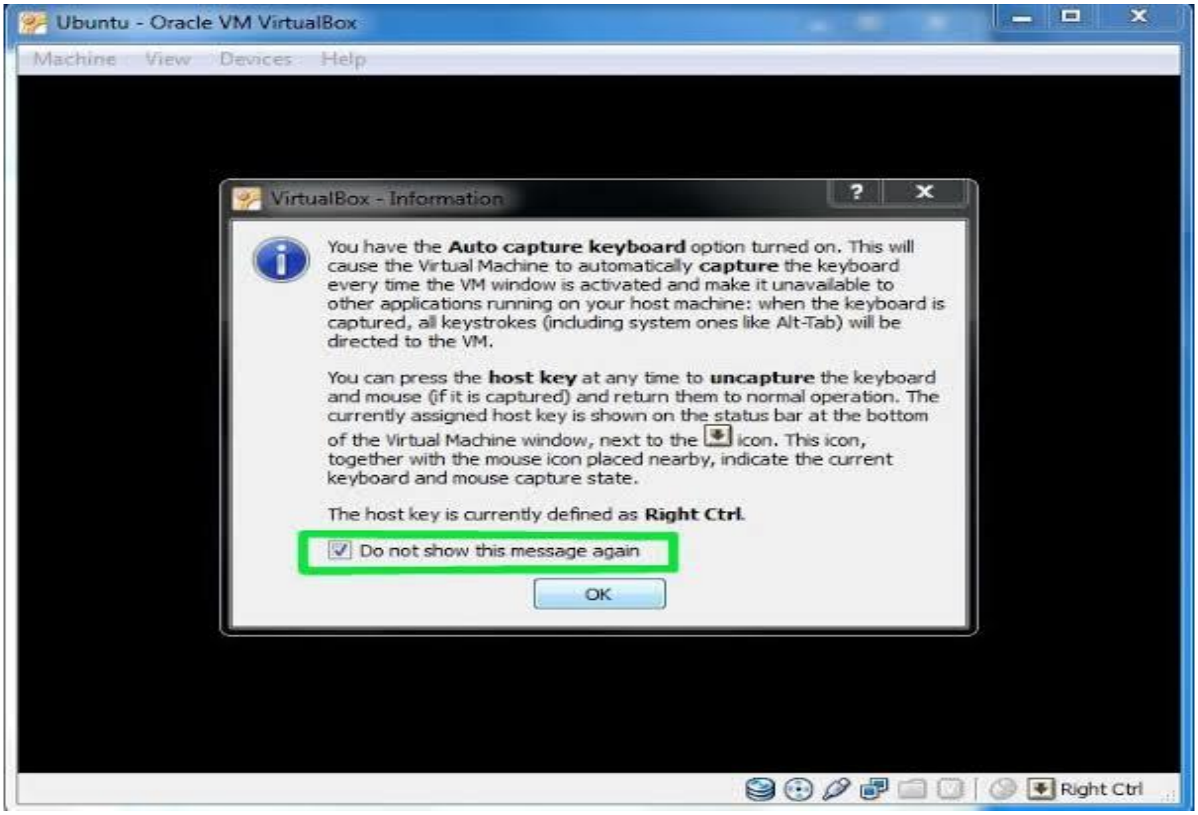
Shared folders

None

Description

None

Step 9 – Select check box and Click ok



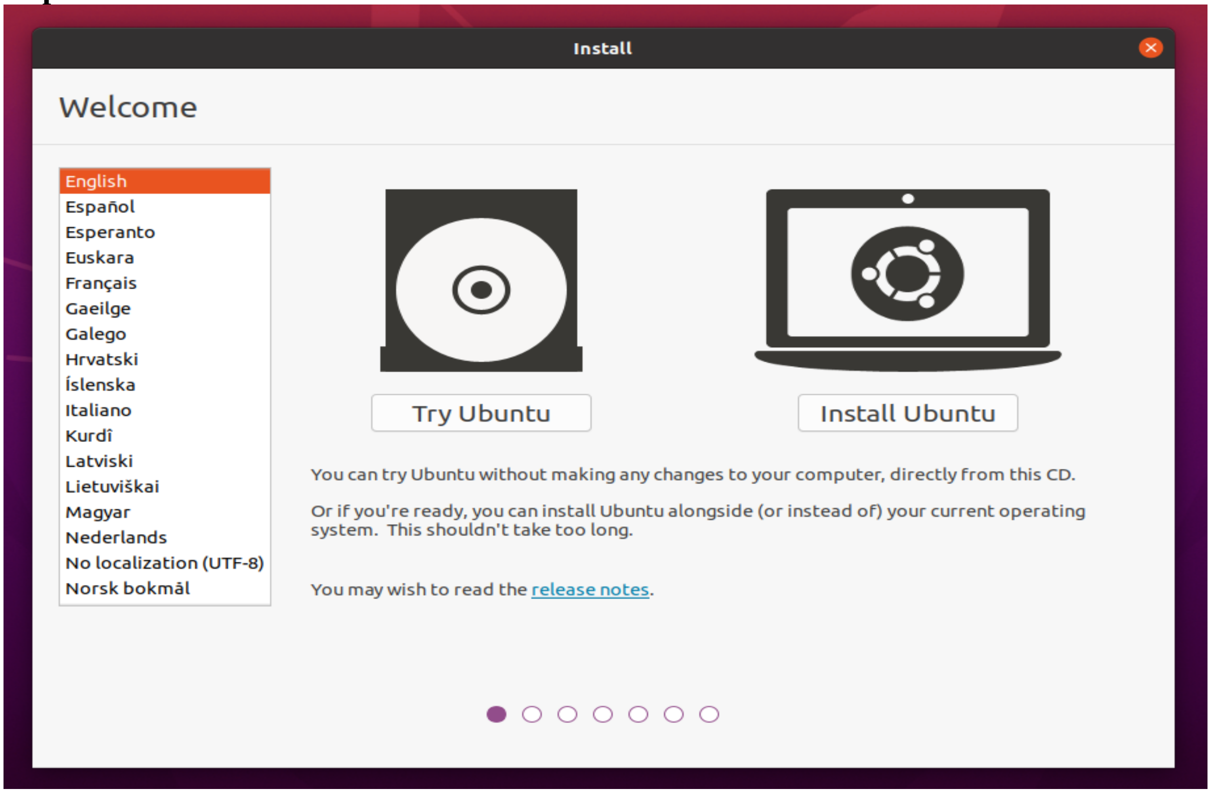
You have the **Auto capture keyboard** option turned on. This will cause the Virtual Machine to automatically **capture** the keyboard every time the VM window is activated and make it unavailable to other applications running on your host machine: when the keyboard is captured, all keystrokes (including system ones like Alt-Tab) will be directed to the VM.

You can press the **host key** at any time to **uncapture** the keyboard and mouse (if it is captured) and return them to normal operation. The currently assigned host key is shown on the status bar at the bottom of the Virtual Machine window, next to the icon. This icon, together with the mouse icon placed nearby, indicate the current keyboard and mouse capture state.

The host key is currently defined as **Right Ctrl**.

☑ Do not show this message again

Step 10 -Select Install Ubuntu

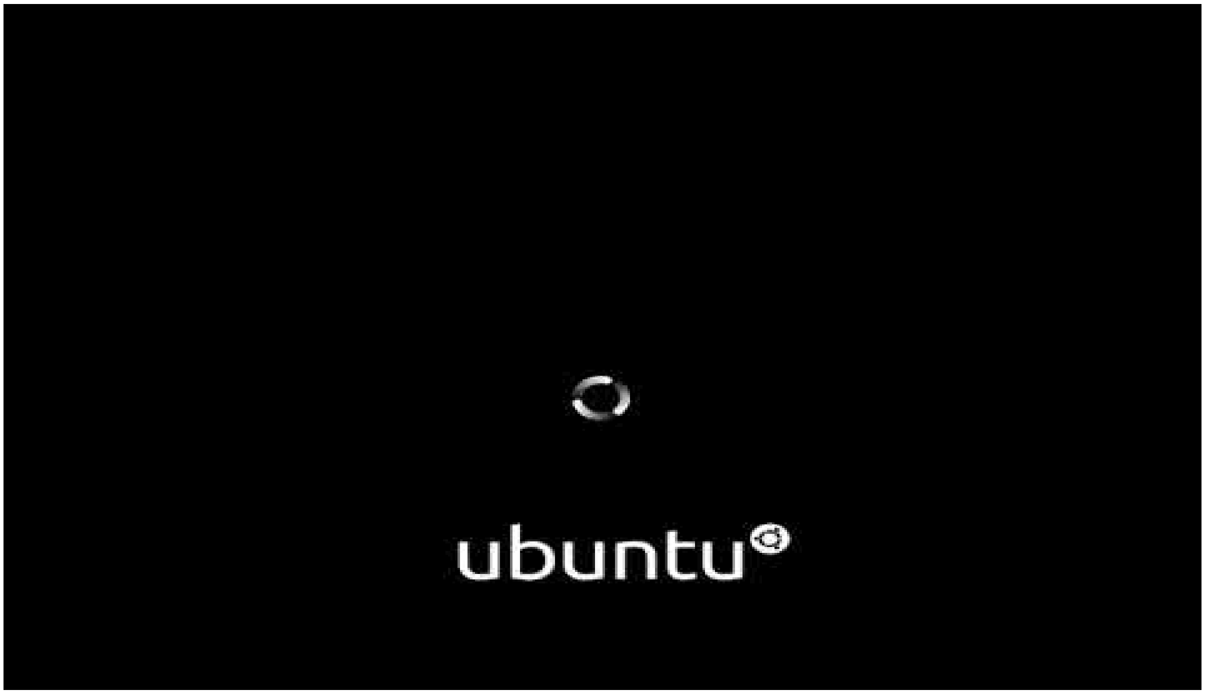


You can try Ubuntu without making any changes to your computer, directly from this CD.

Or if you're ready, you can install Ubuntu alongside (or instead of) your current operating system. This shouldn't take too long.

You may wish to read the release notes.

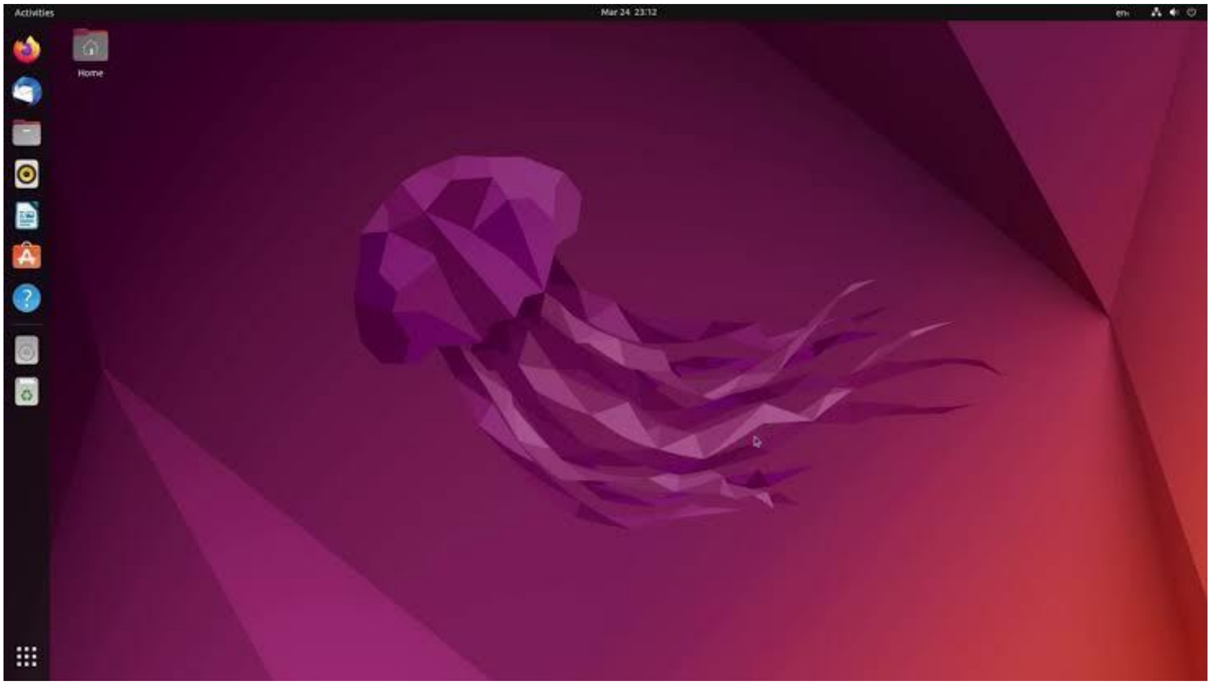
Step 11 - Ubuntu is Running



Result:

Thus the procedure to Install Virtual box Workstation with of Linux on top of windows10 was executed successfully

Output:



Ex no: 2 Install a C compiler in the virtual machine created using virtual box and execute Simple Programs

Date:

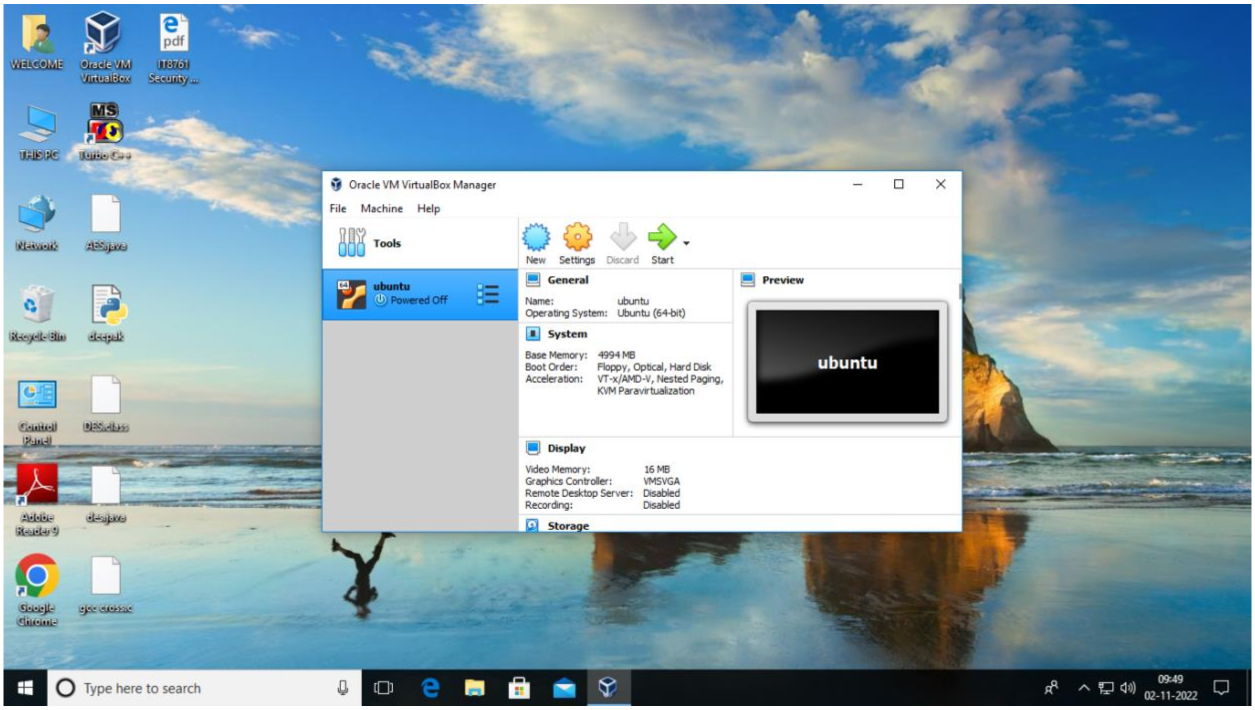
Aim:

To install a c compiler is the virtual machine created using virtual box and execute simple programs

Procedure:

Step1: Download virtual box and install ubuntu

Step 2: Click Start



Name: ubuntu
Operating System: Ubuntu (64-bit)

Base Memory: 4994 MB
Boot Order: Floppy, Optical, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging, KVM Paravirtualization

Video Memory: 16 MB
Graphics Controller: VMSVGA
Remote Desktop Server: Disabled
Recording: Disabled

Step 3: Open Terminal

Step 4 : Type ‘sudo apt install gcc’ to install the c compiler

Step 5 : Type ‘gcc --version to check for the version

Step 6 : Provide command ‘touch filename.c’ so that a new file is created in desktop

Step 7 : Open the file folder & type the following ‘C Program’ for further execution

Step 8 : Save the program in the file folder

Step 9 : Now return to terminal to proceed further with execution of the program

Step 10 : Type “ls” on Terminal to see all files under current folder

Step 11 : Type “gcc hello.c” to compile

Step 12 : On Successful compilation,type “./a.out” to run the C program in terminal in ubuntu

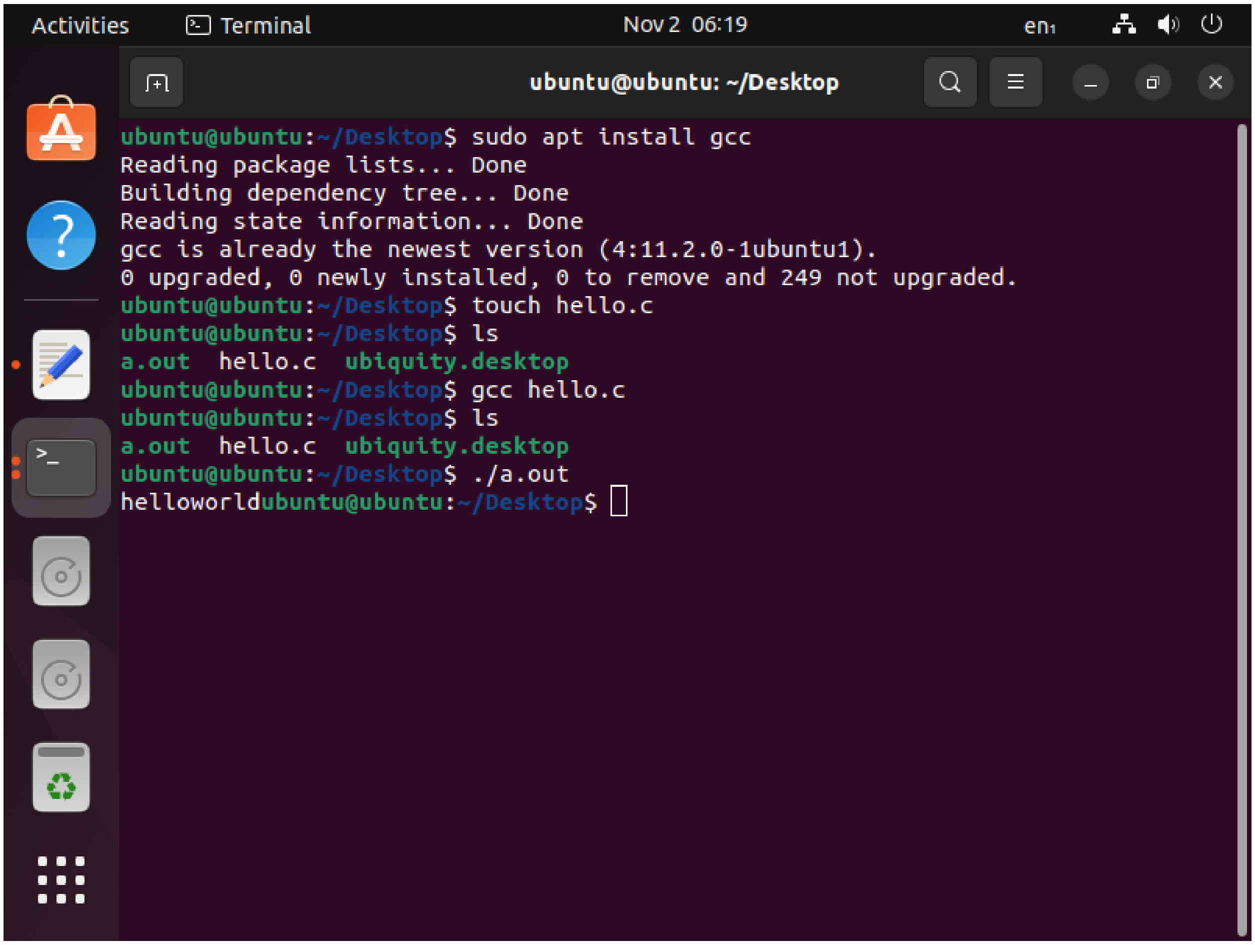
Program:

```
#include<stdio.h>
Void main()
{
  Printf(“helloworld”);
}
```

Result:

Thus to install a c compiler is the virtual machine created using virtual box and to execute simple programs was executed successfully

Output:



```
ubuntu@ubuntu:~/Desktop$ sudo apt install gcc
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
gcc is already the newest version (4:11.2.0-1ubuntu1).
0 upgraded, 0 newly installed, 0 to remove and 249 not upgraded.
ubuntu@ubuntu:~/Desktop$ touch hello.c
ubuntu@ubuntu:~/Desktop$ ls
a.out  hello.c  ubiquity.desktop
ubuntu@ubuntu:~/Desktop$ gcc hello.c
ubuntu@ubuntu:~/Desktop$ ls
a.out  hello.c  ubiquity.desktop
ubuntu@ubuntu:~/Desktop$ ./a.out
helloworldubuntu@ubuntu:~/Desktop$ 
```

Ex no: 3 **Install Google App Engine. Create hello world app simple web applications**

Date: **using python**

Aim:

To perform the installation of the Google App Engine Software Development Kit (SDK) on a Microsoft Windows and running a simple application.

Procedure:

The App Engine SDK allows you to run Google App Engine Applications on your local computer. It simulates the run-time environment of the Google App Engine infrastructure.

Step 1: To install python

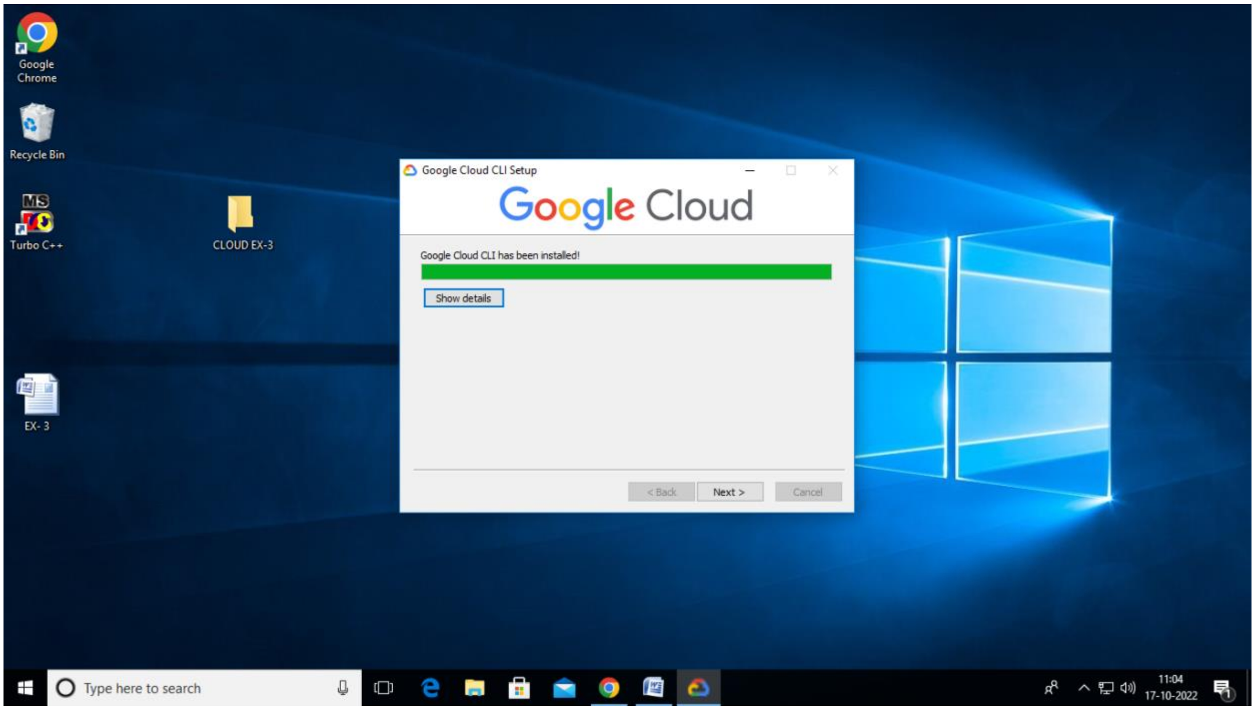
Download and Install Python 2.5.4 from:

http://www.python.org/download/releases/2.5.4/

Step 2: **To install Google App Engine**

Download and Install the Google App Engine SDK by going to:

http://code.google.com/appengine/downloads.html



Google Cloud CLI Setup

Google Cloud CLI has been installed!

Download the Windows installer – the simplest thing is to download it to your Desktop.

Double Click on the Google Application Engine installer.

Click through the installation wizard, and it should install the App Engine.

Step 3: **Making of the First Application**

Make a folder for your Google App Engine applications. I am going to make the folder on my desktop.

Make two subfolders app.yaml and index.py.

Using a text editor, create a file called app.yaml and index.py with the following contents.

app.yaml

```
runtime: python27
api_version: 1
threadsafe: false
handlers:
- url: /
script: index.py
```

index.py

```
print (‘welcome to cloud lab’);
```

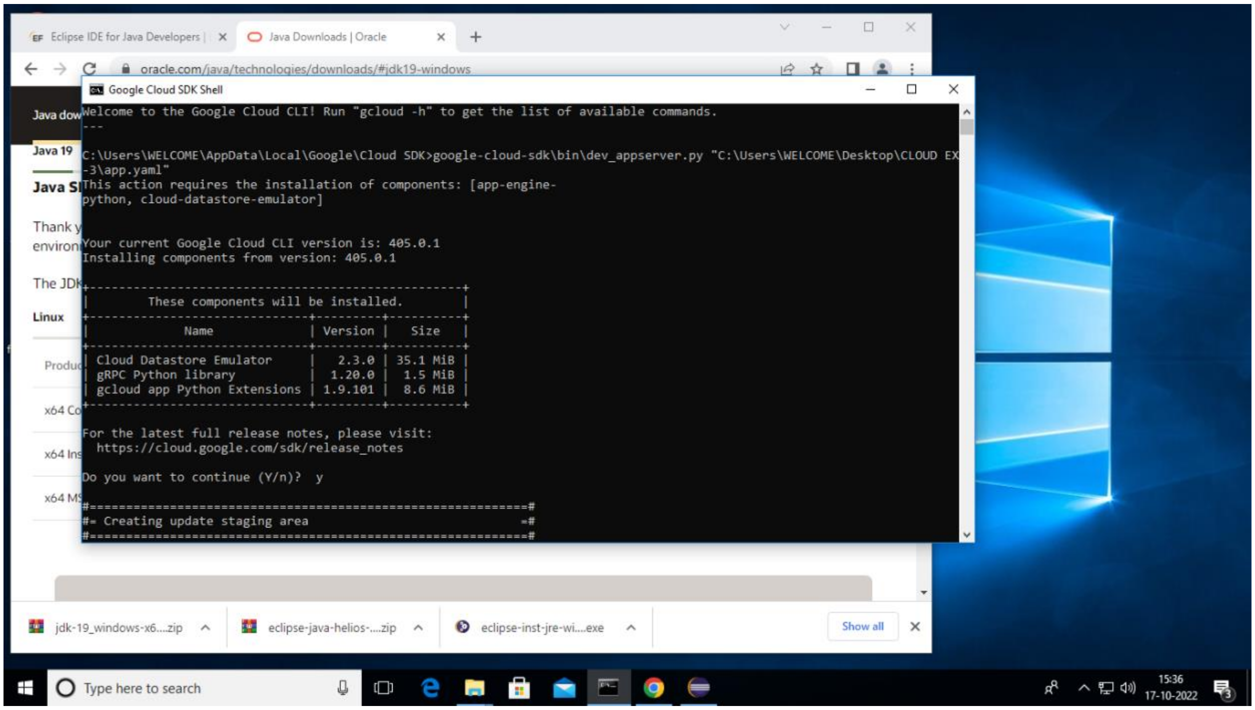
Step 4: Run the program

```
Google-cloud-sdk\bin\dev_appserver.py “app.yaml”
```

Result:

Thus the installation of the Google App Engine Software Development Kit (SDK) on a Microsoft Windows and running a simple application was executed successfully.

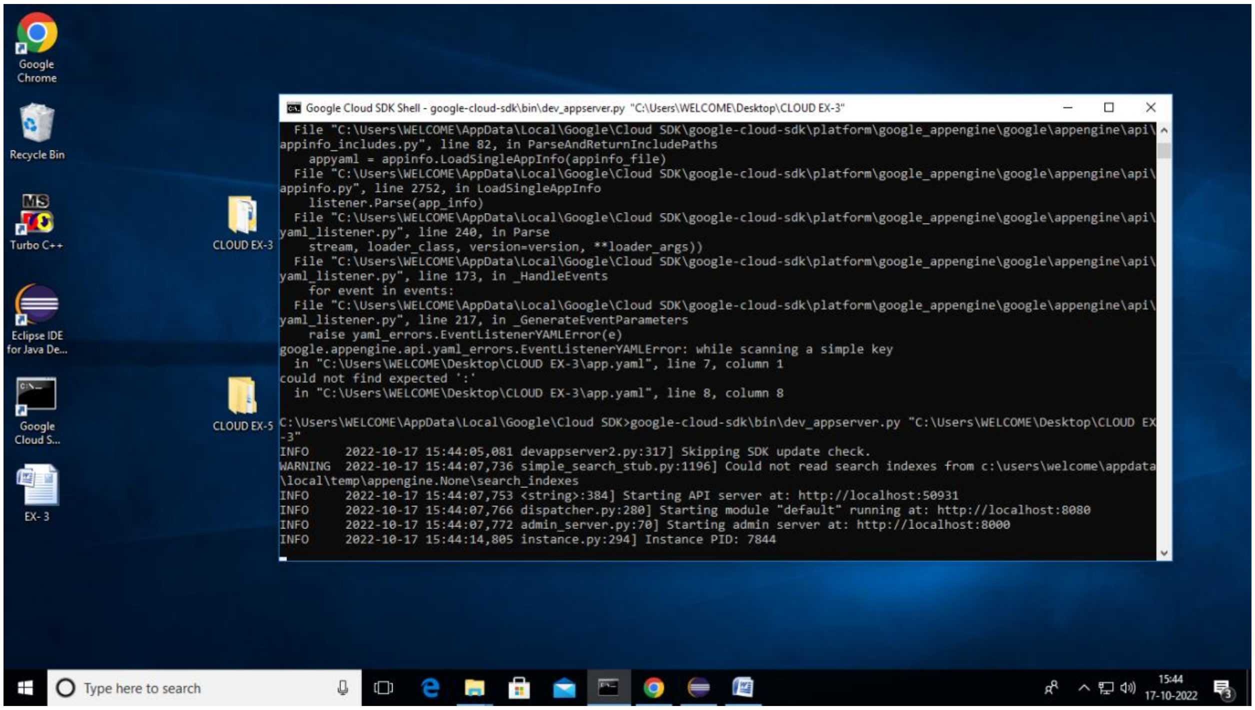
Output:



Google Cloud SDK Shell

```
Welcome to the Google Cloud CLI! Run "gcloud -h" to get the list of available commands.
---

C:\Users\WELCOME\AppData\Local\Google\Cloud SDK>google-cloud-sdk\bin\dev_appserver.py "C:\Users\WELCOME\Desktop\CLOUD EX
-3\app.yaml"
This action requires the installation of components: [app-engine-
python, cloud-datastore-emulator]


Your current Google Cloud CLI version is: 405.0.1
Installing components from version: 405.0.1

+----------------------------------------------------+
|         These components will be installed.        |
+-----------------------------+----------+-----------+
|             Name            | Version  |    Size   |
+-----------------------------+----------+-----------+
| Cloud Datastore Emulator    |    2.3.0 |  35.1 MiB |
| gRPC Python library         |   1.20.0 |   1.5 MiB |
| gcloud app Python Extensions |  1.9.101 |   8.6 MiB |
+-----------------------------+----------+-----------+

For the latest full release notes, please visit:
  https://cloud.google.com/sdk/release_notes

Do you want to continue (Y/n)?  y

#============================================================#
#= Creating update staging area                             =#
#============================================================#
```

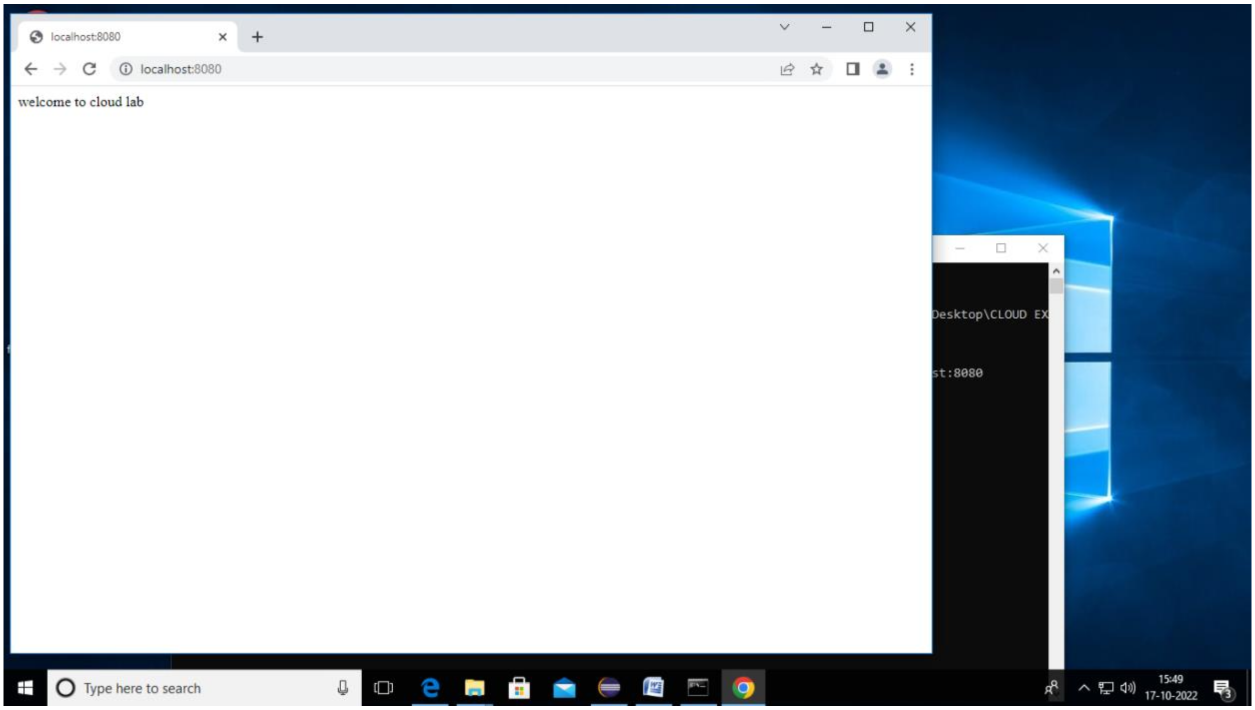
Eclipse IDE for Java Developers
Java Downloads | Oracle
oracle.com/java/technologies/downloads/#jdk19-windows
jdk-19_windows-x6....zip
eclipse-java-helios-....zip
eclipse-inst-jre-wi....exe
Show all
Type here to search
15:36
17-10-2022



Google Cloud SDK Shell - google-cloud-sdk\bin\dev_appserver.py "C:\Users\WELCOME\Desktop\CLOUD EX-3"

```
  File "C:\Users\WELCOME\AppData\Local\Google\Cloud SDK\google-cloud-sdk\platform\google_appengine\google\appengine\api\
appinfo_includes.py", line 82, in ParseAndReturnIncludePaths
    appyaml = appinfo.LoadSingleAppInfo(appinfo_file)
  File "C:\Users\WELCOME\AppData\Local\Google\Cloud SDK\google-cloud-sdk\platform\google_appengine\google\appengine\api\
appinfo.py", line 2752, in LoadSingleAppInfo
    listener.Parse(app_info)
  File "C:\Users\WELCOME\AppData\Local\Google\Cloud SDK\google-cloud-sdk\platform\google_appengine\google\appengine\api\
yaml_listener.py", line 240, in Parse
    stream, loader_class, version=version, **loader_args))
  File "C:\Users\WELCOME\AppData\Local\Google\Cloud SDK\google-cloud-sdk\platform\google_appengine\google\appengine\api\
yaml_listener.py", line 173, in _HandleEvents
    for event in events:
  File "C:\Users\WELCOME\AppData\Local\Google\Cloud SDK\google-cloud-sdk\platform\google_appengine\google\appengine\api\
yaml_listener.py", line 217, in _GenerateEventParameters
    raise yaml_errors.EventListenerYAMLError(e)
google.appengine.api.yaml_errors.EventListenerYAMLError: while scanning a simple key
  in "C:\Users\WELCOME\Desktop\CLOUD EX-3\app.yaml", line 7, column 1
could not find expected ':'
  in "C:\Users\WELCOME\Desktop\CLOUD EX-3\app.yaml", line 8, column 8

C:\Users\WELCOME\AppData\Local\Google\Cloud SDK>google-cloud-sdk\bin\dev_appserver.py "C:\Users\WELCOME\Desktop\CLOUD EX
-3"
INFO     2022-10-17 15:44:05,081 devappserver2.py:317] Skipping SDK update check.
WARNING  2022-10-17 15:44:07,736 simple_search_stub.py:1196] Could not read search indexes from c:\users\welcome\appdata
\local\temp\appengine.None\search_indexes
INFO     2022-10-17 15:44:07,753 <string>:384] Starting API server at: http://localhost:50931
INFO     2022-10-17 15:44:07,766 dispatcher.py:280] Starting module "default" running at: http://localhost:8080
INFO     2022-10-17 15:44:07,772 admin_server.py:70] Starting admin server at: http://localhost:8000
INFO     2022-10-17 15:44:14,805 instance.py:294] Instance PID: 7844
```

http://localhost:8080 into browser and to see application as follows:



welcome to cloud lab

```
Desktop\CLOUD EX

st:8080
```

Ex no: 4 **Use GAE Launcher to launch the web Application**

Date:

Aim:

To Use GAE Launcher to launch the web application.

Procedure:

Step1:Download google cloud SDK.

python and google cloud SDK set the python part in the google app engine launcher.

https://cloud.google.com/sdk/docs/install

Step 2: **Install python.**

http://www.python.org/download/releases/2.5.4/

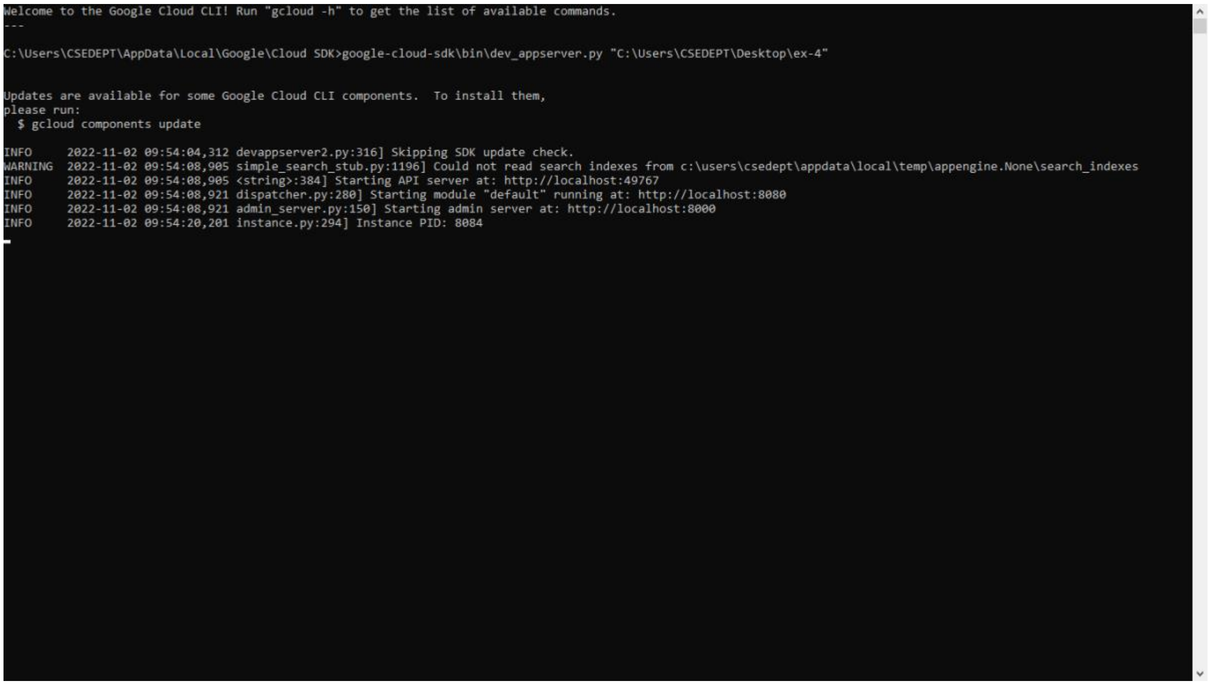
Step 3: Making of the First Application

Make a folder for your Google App Engine applications. I am going to make the

folder on my desktop.

Make four subfolders app.yaml , index.html,main.py and result.html.

Using a text editor, create a file called app.yaml , index.html, main.py and result.html with the following contents.



```
Welcome to the Google Cloud CLI! Run "gcloud -h" to get the list of available commands.
---

C:\Users\CSEDEPT\AppData\Local\Google\Cloud SDK>google-cloud-sdk\bin\dev_appserver.py "C:\Users\CSEDEPT\Desktop\ex-4"


Updates are available for some Google Cloud CLI components.  To install them,
please run:
  $ gcloud components update

INFO     2022-11-02 09:54:04,312 devappserver2.py:316] Skipping SDK update check.
WARNING  2022-11-02 09:54:08,905 simple_search_stub.py:1196] Could not read search indexes from c:\users\csedept\appdata\local\temp\appengine.None\search_indexes
INFO     2022-11-02 09:54:08,905 <string>:384] Starting API server at: http://localhost:49767
INFO     2022-11-02 09:54:08,921 dispatcher.py:280] Starting module "default" running at: http://localhost:8080
INFO     2022-11-02 09:54:08,921 admin_server.py:150] Starting admin server at: http://localhost:8000
INFO     2022-11-02 09:54:20,201 instance.py:294] Instance PID: 8084
```

Program:

App.yaml:

```
runtime: python27
threadsafe: true
handlers:
- url: /
script: main.app
```

index.html:

```
<html>
<Style>
WeatherText {
    font-family: ‘lato’,sans-serif;
font-size: 24px;
text-align: center;
}
WeatherForm {
padding: 20px;
}
    Weather Submit {
color: white;
background-color: #083375;
padding: 5px 20px;
border-radius: 5px;
margin-top: 20px;
}
WeatherSubmit:hover {
cursor: pointer;
}
body {
display: flex;
justify-content: center;
align-items: center;
}
```

```
. card{
border: 2px solid black;
width: 50%;
justify-content: center;
align-items: center;
}
<style>
<head>
<title class=”alignct”>Post Office Finder</title>
<link
href=”https://fonts.googleapis.com/css2?family=Lato:wght@400;700&display=swap”
rel=”stylesheet”
/>
<head>
<body>
<div class=”card”>
<h2 class=”weatherText”>Post Office Finder Using WebApp</h2>
<h1 id=”error_head” style=”display: none”
value=”{{error}}”>{{error}}</h1>
<form class=”weather Text” id=”weatherForm action=”/”
method=”post”>
Location Zip Code:
<input
class=”weather Text”
id=”weather Input”
type=”text”
name=”zipCode”
/><br/>
<input
class=”weatherText”
id=”weatherSubmit”
type=”submit
value=”Submit”/>
```

```
<button
id=”weather Submit”
class=”weather Text”
onclick=”document.getElementById(
‘weatherInput’).value = “ “>
Clear
</button>
</form>
</div>
<!-- <script>
let err = document.getElementById(‘error_head’);
function myFunction() {
alert(‘Please Enter the Valid Pin Code!’);
}
if (err) {
myFunction();
}
</script>-->
</body>
</html>
```

Main.py

```
import os
import json
import urllib
import webapp2
from google.appengine.ext.webapp import template
class MainPage(webapp2.RequestHandler):
def get(self):
template_values = {}
path = os.path.join(os.path.dirname(__file__), ‘index.html’)
self.response.out.write(template.render(path, template_values))
def post(self):
pincode = self.request.get(‘zipCode’)
```

```
if not pincode.isnumeric() or not len(pincode) == 6:
template_values = {
“error”: “Incorrect Pin Code (String / False Code entered)”
}
path = os.path.join(os.path.dirname(__file__), ‘index.html’)
return self.response.out.write(template.render(path, template_values))
url = “https://api.postalpincode.in/pincode/”+pincode
data = urllib.urlopen(url).read()
data = json.loads(data)
if(data[0][‘Status’] == ‘Success’):
post_office = data[0][‘PostOffice’][0][‘State’]
   name = data[0][‘PostOffice’][0][‘Name’]
   block = data[0][‘PostOffice’][0][‘Block’]
   district = data[0][‘PostOffice’][0][‘District’]
template_values = {
  “post_office”:post_office,
  “name”: name,
  “block”: block,
  “district”: district
}
path = os.path.join(os.path.dirname(__file__), ‘results.html’)
self.response.out.write(template.render(path, template_values))
else:
template_values = {}
path = os.path.join(os.path.dirname(__file__), ‘error.html’)
self.response.out.write(template.render(path, template_values))
app = webapp2.WSGIApplication([(’/’, MainPage)], debug=True)
```

result.html

```
<!DOCTYPE html>
<html lang=”en”>
<style>
body {
display: flex;
justify-content: center;
align-items: center;
}
#weatherResults {
background-color: #83e9c2;
font-family: ‘Lato’, sans-serif;
font-size: 24px;
padding: 30px;
display: inline-block;
text-align: center;
margin: 20px;
margin-top: 10%;
border: 2px solid black;
border-radius: 5px;
}
</style>
<head>
<meta charset=”UTF-8” />
<title>Post Office Information</title>
<link
href=”https://fonts.googleapis.com/css2?family=Lato:wght@400;700&amp;display=swap”
rel=”stylesheet”
/>
</head>
<body>
<div id=”weatherResults”>
<table>
<tr>
<th>
<h3>State of Post Office: </h3>
</th>
<th>
<h3>{{ post_office }}</h3>
```

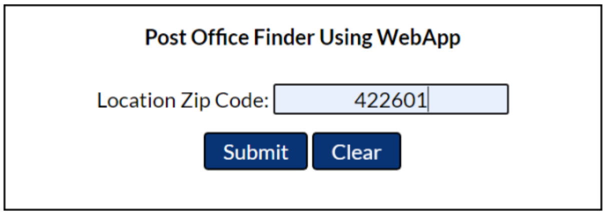
```
</th>
</tr>
<tr>
<th>
<h3>Name of Post Office :</h3>
</th>
<th>
<h3>{{ name }}</h3>
</th>
</tr>
<tr>
<th>
<h3>Block of Post Office:</h3>
</th>
<th>
<h3>{{ block }}</h3>
</th>
</tr>
<tr>
<th>
<h3>District of Post Office:</h3>
</th>
<th>
<h3>{{ district }}</h3>
</th>
</tr>
</table>
<a href=http://localhost:8080/<h4>Back to the Home page</h4></a>
</div>
</body>
</html>
```

Result:

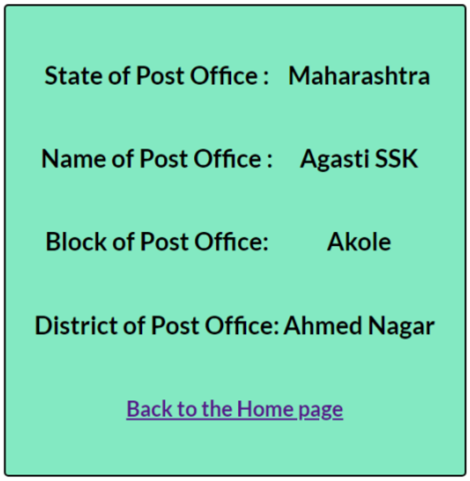
Thus the GAE Launcher to launch the web application was executed successfully.

Output:

Press F11 to exit full screen


Post Office Finder Using WebApp

Location Zip Code: 422601

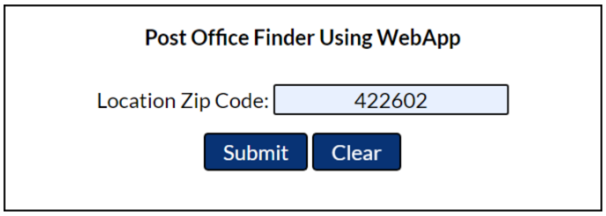

State of Post Office : Maharashtra

Name of Post Office : Agasti SSK

Block of Post Office: Akole

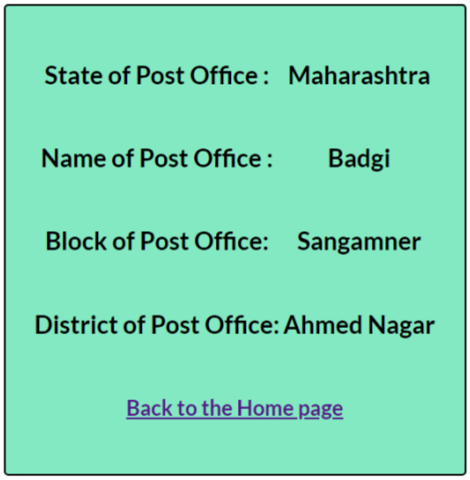
District of Post Office: Ahmed Nagar

Back to the Home page



Post Office Finder Using WebApp

Location Zip Code: 422602



State of Post Office : Maharashtra

Name of Post Office : Badgi

Block of Post Office: Sangamner

District of Post Office: Ahmed Nagar

Ex.no : 5 Simulate a cloud scenario using Cloudsim and run a scheduling algorithm that is not present in Cloudsim.

Date :

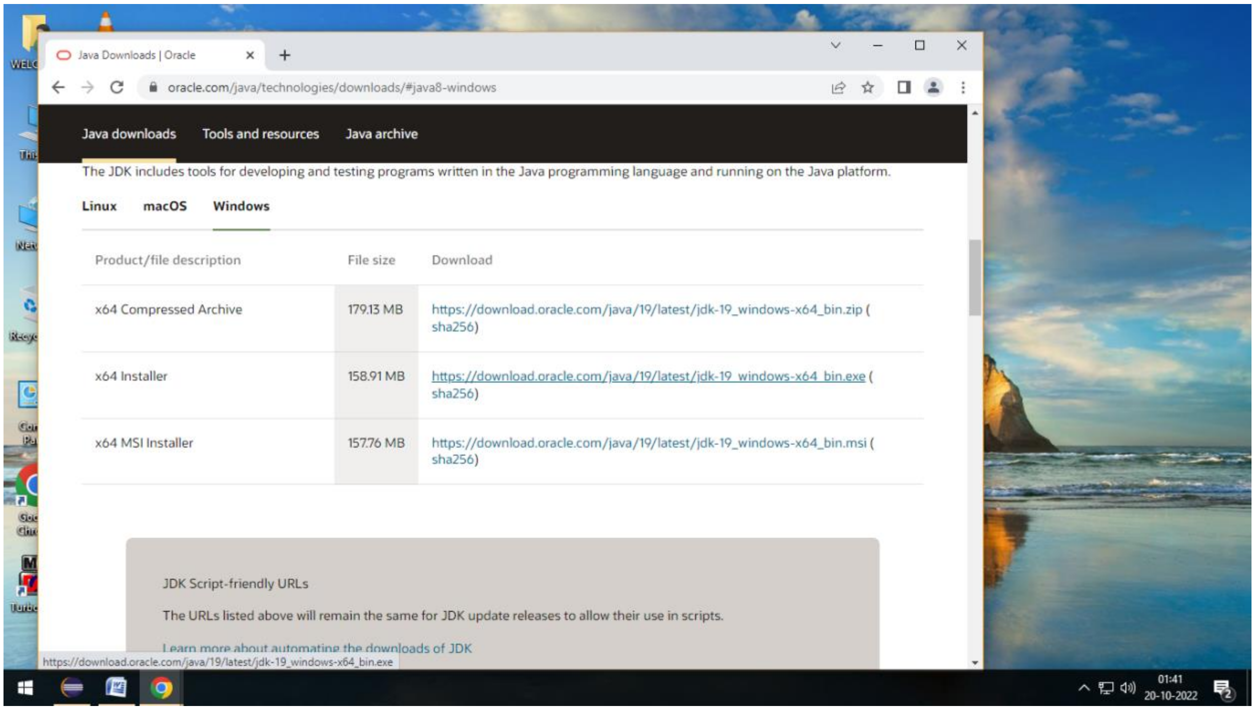
Aim :

To Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.

To use cloudsim in eclipse:

Step 1: Download CloudSim install ablefiles from https://code.google.com/p/cloudsim/downloads/lis tand unzip

Step 2: Install java jdk



The JDK includes tools for developing and testing programs written in the Java programming language and running on the Java platform.

Linux macOS **Windows**

Product/file description	File size	Download
x64 Compressed Archive	179.13 MB	https://download.oracle.com/java/19/latest/jdk-19_windows-x64_bin.zip (sha256)
x64 Installer	158.91 MB	https://download.oracle.com/java/19/latest/jdk-19_windows-x64_bin.exe (sha256)
x64 MSI Installer	157.76 MB	https://download.oracle.com/java/19/latest/jdk-19_windows-x64_bin.msi (sha256)

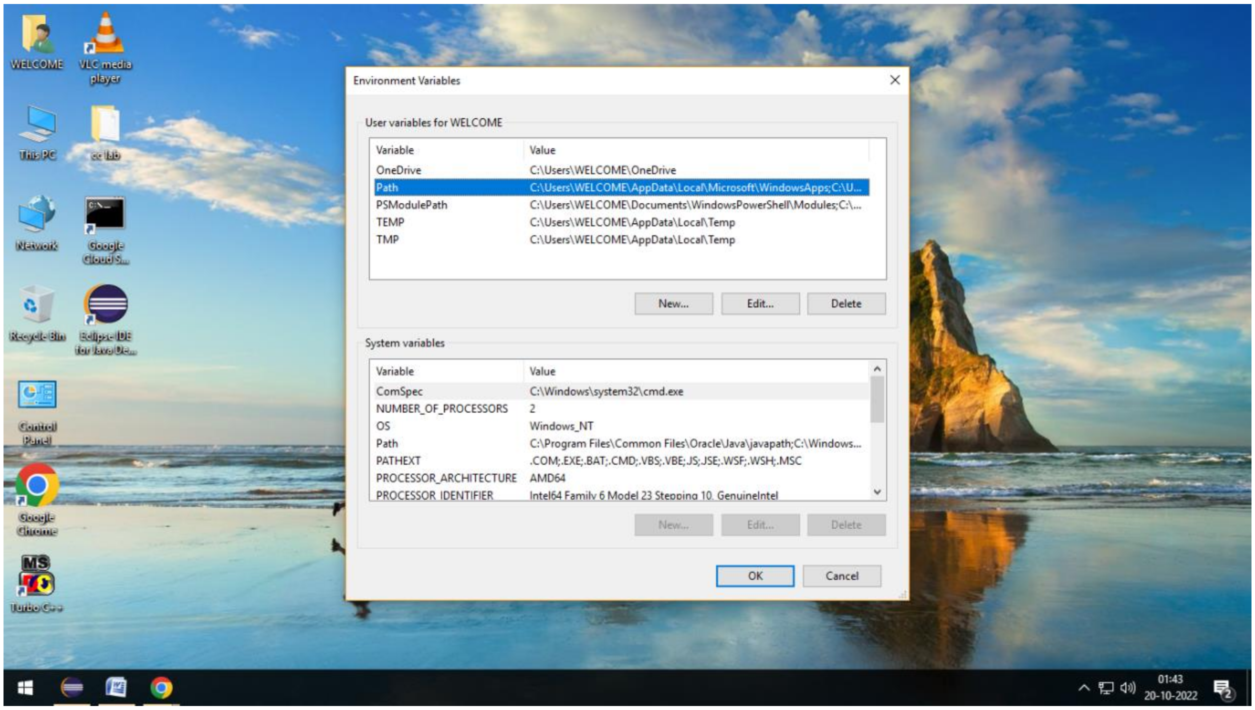
JDK Script-friendly URLs

The URLs listed above will remain the same for JDK update releases to allow their use in scripts.

Learn more about automating the downloads of JDK

https://download.oracle.com/java/19/latest/jdk-19_windows-x64_bin.exe

Step 3: Environment variable for your account



Environment Variables

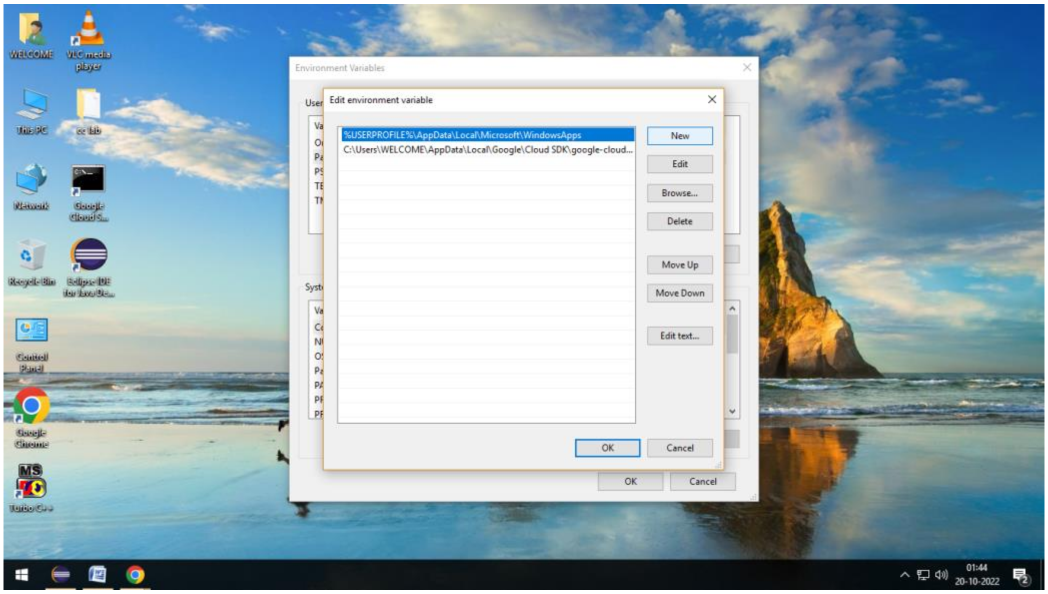
User variables for WELCOME

Variable	Value
OneDrive	C:\Users\WELCOME\OneDrive
Path	C:\Users\WELCOME\AppData\Local\Microsoft\WindowsApps;C:\U...
PSModulePath	C:\Users\WELCOME\Documents\WindowsPowerShell\Modules;C:\...
TEMP	C:\Users\WELCOME\AppData\Local\Temp
TMP	C:\Users\WELCOME\AppData\Local\Temp

System variables

Variable	Value
ComSpec	C:\Windows\system32\cmd.exe
NUMBER_OF_PROCESSORS	2
OS	Windows_NT
Path	C:\Program Files\Common Files\Oracle\Java\javapath;C:\Windows...
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC
PROCESSOR_ARCHITECTURE	AMD64
PROCESSOR_IDENTIFIER	Intel64 Family 6 Model 23 Stepping 10, GenuineIntel

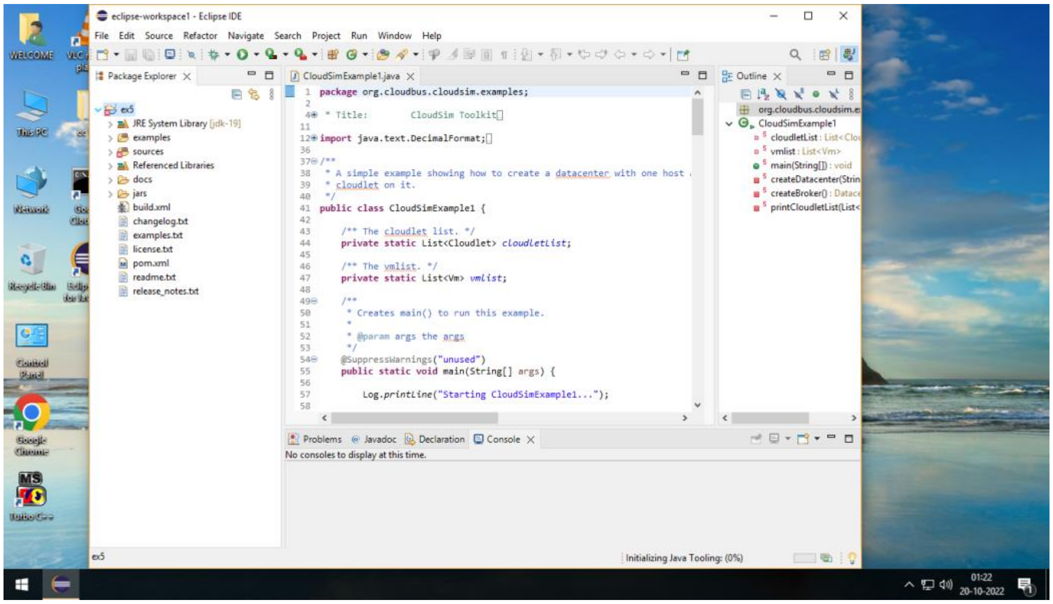
Step 4: Go to new paste set path for java bin



Edit environment variable

```
%USERPROFILE%\AppData\Local\Microsoft\WindowsApps
C:\Users\WELCOME\AppData\Local\Google\Cloud SDK\google-cloud...
```

Step 5: Go to example



eclipse-workspace1 - Eclipse IDE

CloudSimExample1.java

```
package org.cloudbus.cloudsim.examples;

 * Title:        CloudSim Toolkit
 
import java.text.DecimalFormat;

/**
 * A simple example showing how to create a datacenter with one host 
 * cloudlet on it.
 */
public class CloudSimExample1 {

    /** The cloudlet list. */
    private static List<Cloudlet> cloudletList;

    /** The vmlist. */
    private static List<Vm> vmlist;

    /**
     * Creates main() to run this example.
     *
     * @param args the args
     */
    @SuppressWarnings("unused")
    public static void main(String[] args) {

        Log.printLine("Starting CloudSimExample1...");

```

No consoles to display at this time.

program

package org.cloudbus.cloudsim.examples;

import java.text.DecimalFormat;

import java.util.ArrayList;

import java.util.Calendar;

```
import java.util.LinkedList;
import java.util.List;
import org.cloudbus.cloudsim.Cloudlet;
import org.cloudbus.cloudsim.CloudletSchedulerTimeShared;
import org.cloudbus.cloudsim.Datacenter;
import org.cloudbus.cloudsim.DatacenterBroker;
import org.cloudbus.cloudsim.DatacenterCharacteristics;
import org.cloudbus.cloudsim.Host;
import org.cloudbus.cloudsim.Log;
import org.cloudbus.cloudsim.Pe;
import org.cloudbus.cloudsim.Storage;
import org.cloudbus.cloudsim.UtilizationModel;
import org.cloudbus.cloudsim.UtilizationModelFull;
import org.cloudbus.cloudsim.Vm;
import org.cloudbus.cloudsim.VmAllocationPolicySimple;
import org.cloudbus.cloudsim.VmSchedulerTimeShared;
import org.cloudbus.cloudsim.core.CloudSim;
import org.cloudbus.cloudsim.provisioners.BwProvisionerSimple;
import org.cloudbus.cloudsim.provisioners.PeProvisionerSimple;
import org.cloudbus.cloudsim.provisioners.RamProvisionerSimple;
/*** A simple example showing how to create
* a datacenter with one host and run two
* cloudlets on it. The cloudlets run in
* VMs with the same MIPS requirements.
* The cloudlets will take the same time to
* complete the execution.
*/public class CloudSimExample2 {
/** The cloudlet list. */
private static List&lt;Cloudlet&gt; cloudletList;
/** The vmlist. */
private static List&lt;Vm&gt; vmlist;
/*** Creates main() to run this example
*/public static void main(String[] args) {
Log.printLine(&quot;Starting CloudSimExample2...&quot;);
try {
// First step: Initialize the CloudSim package. It should be called
// before creating any entities.
int num_user = 1; // number of cloud users
Calendar calendar = Calendar.getInstance();
boolean trace_flag = false; // mean trace events
// Initialize the CloudSim library
CloudSim.init(num_user, calendar, trace_flag);
// Second step: Create Datacenters
//Datacenters are the resource providers in CloudSim. We need at list one of them
to run a CloudSim simulation
@SuppressWarnings(&quot;unused&quot;)
Datacenter datacenter0 =
createDatacenter(&quot;Datacenter_0&quot;);
//Third step: Create Broker
DatacenterBroker broker = createBroker();
```

```
int brokerId = broker.getId();

//Fourth step: Create one virtual machine

vmlist = new ArrayList&lt;Vm&gt;();

//VM description

int vmid = 0;

int mips = 250;

long size = 10000; //image size (MB)

int ram = 512; //vm memory (MB)

long bw = 1000;int pesNumber = 1; //number of cpus

String vmm = &quot;Xen&quot;; //VMM name

//create two VMs

Vm vm1 = new Vm(vmid, brokerId, mips, pesNumber, ram, bw, size, vmm, new

CloudletSchedulerTimeShared());

vmid++;

Vm vm2 = new Vm(vmid, brokerId, mips, pesNumber, ram, bw, size, vmm, new

CloudletSchedulerTimeShared());

//add the VMs to the vmList

vmlist.add(vm1);

vmlist.add(vm2);

//submit vm list to the broker

broker.submitVmList(vmlist);

//Fifth step: Create two Cloudlets

cloudletList = new ArrayList&lt;Cloudlet&gt;();

//Cloudlet properties

int id = 0;
```

```
pesNumber=1;
long length = 250000;
long fileSize = 300;
long outputSize = 300;
UtilizationModel utilizationModel = new UtilizationModelFull();
Cloudlet cloudlet1 = new Cloudlet(id, length, pesNumber, fileSize, outputSize,
utilizationModel, utilizationModel, utilizationModel);
cloudlet1.setUserId(brokerId);
id++;
Cloudlet cloudlet2 = new Cloudlet(id, length, pesNumber, fileSize, outputSize,
utilizationModel, utilizationModel, utilizationModel);
cloudlet2.setUserId(brokerId);
//add the cloudlets to the list
cloudletList.add(cloudlet1);
cloudletList.add(cloudlet2);
//submit cloudlet list to the broker
broker.submitCloudletList(cloudletList);
//bind the cloudlets to the vms. This way, the broker
// will submit the bound cloudlets only to the specific VM
broker.bindCloudletToVm(cloudlet1.getCloudletId(),vm1.getId());
broker.bindCloudletToVm(cloudlet2.getCloudletId(),vm2.getId());
// Sixth step: Starts the simulation
CloudSim.startSimulation();
// Final step: Print results when simulation is over
List&lt;Cloudlet&gt; newList = broker.getCloudletReceivedList();
```

```
CloudSim.stopSimulation();
printCloudletList(newList);
Log.printLine(&quot;CloudSimExample2 finished!&quot;);
}catch (Exception e) {
e.printStackTrace();
Log.printLine(&quot;The simulation has been terminated due to an unexpected error&quot;);
}}
private static Datacenter createDatacenter(String name){
// Here are the steps needed to create a PowerDatacenter:
// 1. We need to create a list to store
// our machine
List&lt;Host&gt; hostList = new ArrayList&lt;Host&gt;();
// 2. A Machine contains one or more PEs or CPUs/Cores.
// In this example, it will have only one core.
List&lt;Pe&gt; peList = new ArrayList&lt;Pe&gt;();
int mips = 1000;
// 3. Create PEs and add these into a list.
peList.add(new Pe(0, new PeProvisionerSimple(mips))); // need to store Pe id and
MIPS Rating
//4. Create Host with its id and list of PEs and add them to the list of machines
int hostId=0;
int ram = 2048; //host memory (MB)
long storage = 1000000; //host storage
int bw = 10000;
hostList.add(
new Host(
hostId,
new RamProvisionerSimple(ram),
new BwProvisionerSimple(bw),
storage,
peList,
new VmSchedulerTimeShared(peList)
)); // This is our machine
// 5. Create a DatacenterCharacteristics object that stores the
// properties of a data center: architecture, OS, list of
// Machines, allocation policy: time- or space-shared, time zone
// and its price (G$/Pe time unit).
String arch = &quot;x86&quot;; // system architecture
String os = &quot;Linux&quot;; // operating system
String vmm = &quot;Xen&quot;;
double time_zone = 10.0; // time zone this resource located
double cost = 3.0; // the cost of using processing in this resource
double costPerMem = 0.05; // the cost of using memory in this resource
double costPerStorage = 0.001; // the cost of using storage in this resource
double costPerBw = 0.0; // the cost of using bw in this resource
LinkedList&lt;Storage&gt; storageList = new LinkedList&lt;Storage&gt;(); //we are not adding
SAN devices by now
DatacenterCharacteristics characteristics = new DatacenterCharacteristics(
arch, os, vmm, hostList, time_zone, cost, costPerMem, costPerStorage, costPerBw);
// 6. Finally, we need to create a PowerDatacenter object.
```

```
Datacenter datacenter = null;
try {datacenter = new Datacenter(name, characteristics, new
VmAllocationPolicySimple(hostList), storageList, 0);
} catch (Exception e) {e.printStackTrace();
}return datacenter;}
//We strongly encourage users to develop their own broker policies, to submit vms and
cloudlets according
//to the specific rules of the simulated scenario
private static DatacenterBroker createBroker(){
DatacenterBroker broker = null;
try {
broker = new DatacenterBroker(&quot;Broker&quot;);
} catch (Exception e) {
e.printStackTrace();
return null;}return broker;
}/*** Prints the Cloudlet objects
* @param list list of Cloudlets*/
private static void printCloudletList(List&lt;Cloudlet&gt; list) {
int size = list.size();
Cloudlet cloudlet;
String indent = &quot; &quot;;
Log.printLine();
Log.printLine(&quot;========== OUTPUT ==========&quot;);
Log.printLine(&quot;Cloudlet ID&quot; + indent + &quot;STATUS&quot; + indent +
&quot;Data center ID&quot; + indent + &quot;VM ID&quot; + indent + &quot;Time&quot; +
indent + &quot;Start Time&quot; +

indent + &quot;Finish Time&quot;);

DecimalFormat dft = new DecimalFormat(&quot;###.##&quot;);

for (int i = 0; i &lt; size; i++) {

cloudlet = list.get(i);

Log.print(indent + cloudlet.getCloudletId() + indent + indent);

if (cloudlet.getCloudletStatus() == Cloudlet.SUCCESS){

Log.print(&quot;SUCCESS&quot;);

Log.printLine( indent + indent + cloudlet.getResourceId() + indent + indent + indent

+ cloudlet.getVmId() +

indent + indent + dft.format(cloudlet.getActualCPUTime()) + indent + indent +

dft.format(cloudlet.getExecStartTime())+

indent + indent + dft.format(cloudlet.getFinishTime()));

}}}}
```

Result:

Thus Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim was executed successfully.

Output

```
Starting CloudSimExample2...
Initialising...
Starting CloudSim version 3.0
Datacenter_0 is starting...
Broker is starting...
Entities started.
0.0: Broker: Cloud Resource List received with 1 resource(s)
0.0: Broker: Trying to Create VM #0 in Datacenter_0
0.0: Broker: Trying to Create VM #1 in Datacenter_0
0.1: Broker: VM #0 has been created in Datacenter #2, Host #0
0.1: Broker: VM #1 has been created in Datacenter #2, Host #0
0.1: Broker: Sending cloudlet 0 to VM #0
0.1: Broker: Sending cloudlet 1 to VM #1
1000.1: Broker: Cloudlet 0 received
1000.1: Broker: Cloudlet 1 received
1000.1: Broker: All Cloudlets executed. Finishing...
1000.1: Broker: Destroying VM #0
1000.1: Broker: Destroying VM #1
Broker is shutting down...
Simulation: No more future events
CloudInformationService: Notify all CloudSim entities for shutting down.
Datacenter_0 is shutting down...
Broker is shutting down...
Simulation completed.
```

Simulation completed.

========== OUTPUT ==========

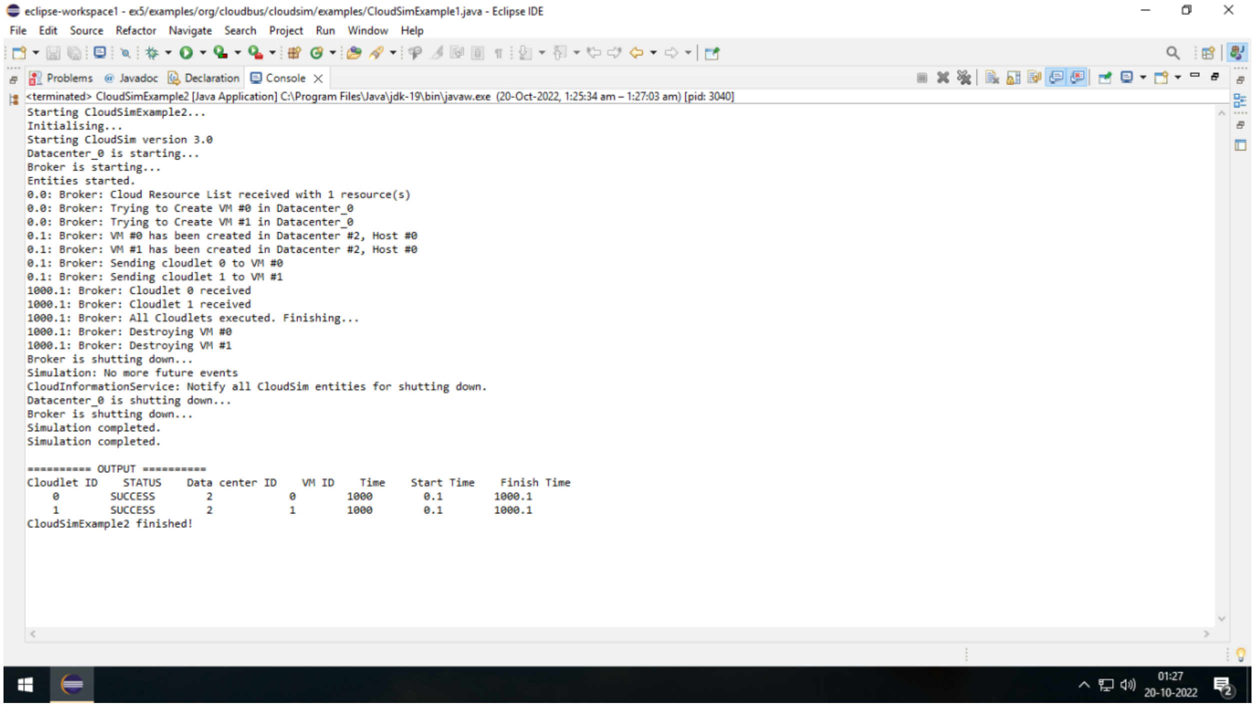
Cloudlet ID STATUS Data center ID VM ID Time Start Time Finish

Time

0 SUCCESS 2 0 1000 0.1 1000.1

1 SUCCESS 2 1 1000 0.1 1000.1

CloudSimExample2 finished!


eclipse-workspace1 - ex5/examples/org/cloudbus/cloudsim/examples/CloudSimExample1.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Problems @ Javadoc Declaration Console
01:27
20-10-2022

```
<terminated> CloudSimExample2 [Java Application] C:\Program Files\Java\jdk-19\bin\javaw.exe  (20-Oct-2022, 1:25:34 am – 1:27:03 am) [pid: 3040]
Starting CloudSimExample2...
Initialising...
Starting CloudSim version 3.0
Datacenter_0 is starting...
Broker is starting...
Entities started.
0.0: Broker: Cloud Resource List received with 1 resource(s)
0.0: Broker: Trying to Create VM #0 in Datacenter_0
0.0: Broker: Trying to Create VM #1 in Datacenter_0
0.1: Broker: VM #0 has been created in Datacenter #2, Host #0
0.1: Broker: VM #1 has been created in Datacenter #2, Host #0
0.1: Broker: Sending cloudlet 0 to VM #0
0.1: Broker: Sending cloudlet 1 to VM #1
1000.1: Broker: Cloudlet 0 received
1000.1: Broker: Cloudlet 1 received
1000.1: Broker: All Cloudlets executed. Finishing...
1000.1: Broker: Destroying VM #0
1000.1: Broker: Destroying VM #1
Broker is shutting down...
Simulation: No more future events
CloudInformationService: Notify all CloudSim entities for shutting down.
Datacenter_0 is shutting down...
Broker is shutting down...
Simulation completed.
Simulation completed.

========== OUTPUT ==========
Cloudlet ID    STATUS    Data center ID    VM ID    Time    Start Time    Finish Time
    0         SUCCESS        2              0        1000       0.1         1000.1
    1         SUCCESS        2              1        1000       0.1         1000.1
CloudSimExample2 finished!
```

Ex no: 6 Find a procedure to transfer the files from one virtual machine to another virtual machine.

Date:

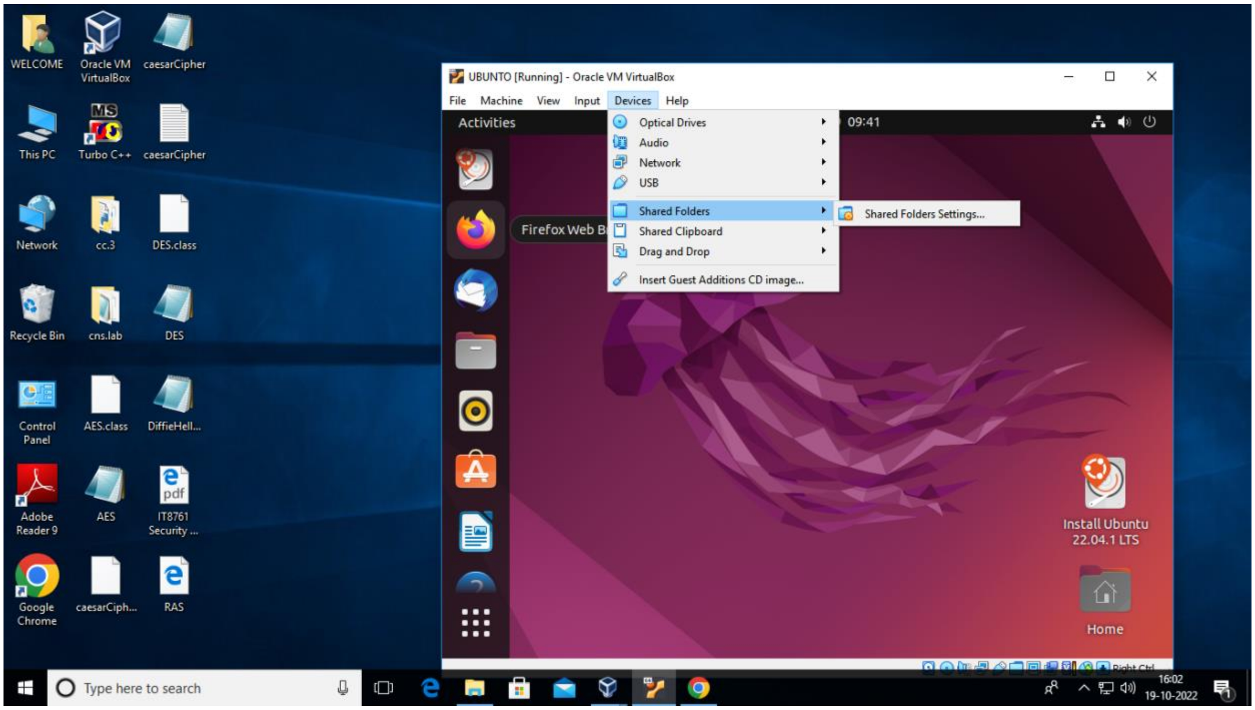
Aim:

To find a procedure to transfer the files from one virtual machine to another virtual machine.

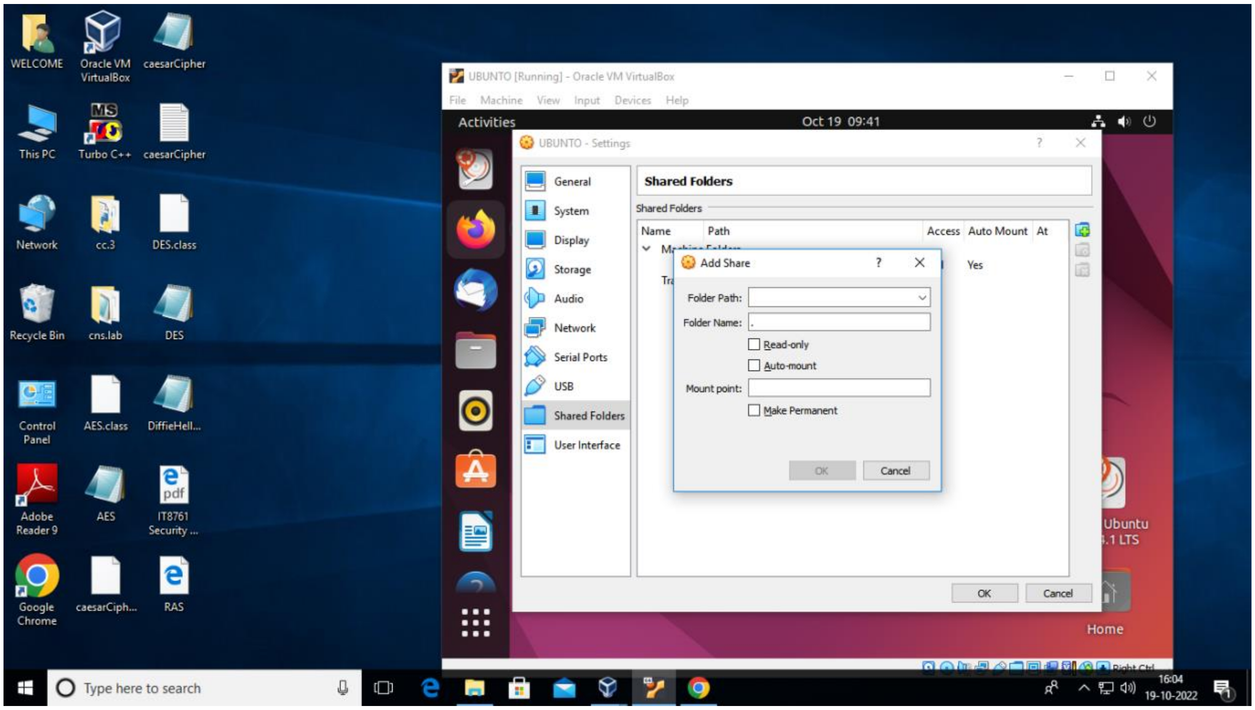
Procedure:

Step 1: Install Ubuntu.

Step 2: go to device option.



Step 3: open the share folder



Add Share

Folder Path:

Folder Name:

☐ Read-only

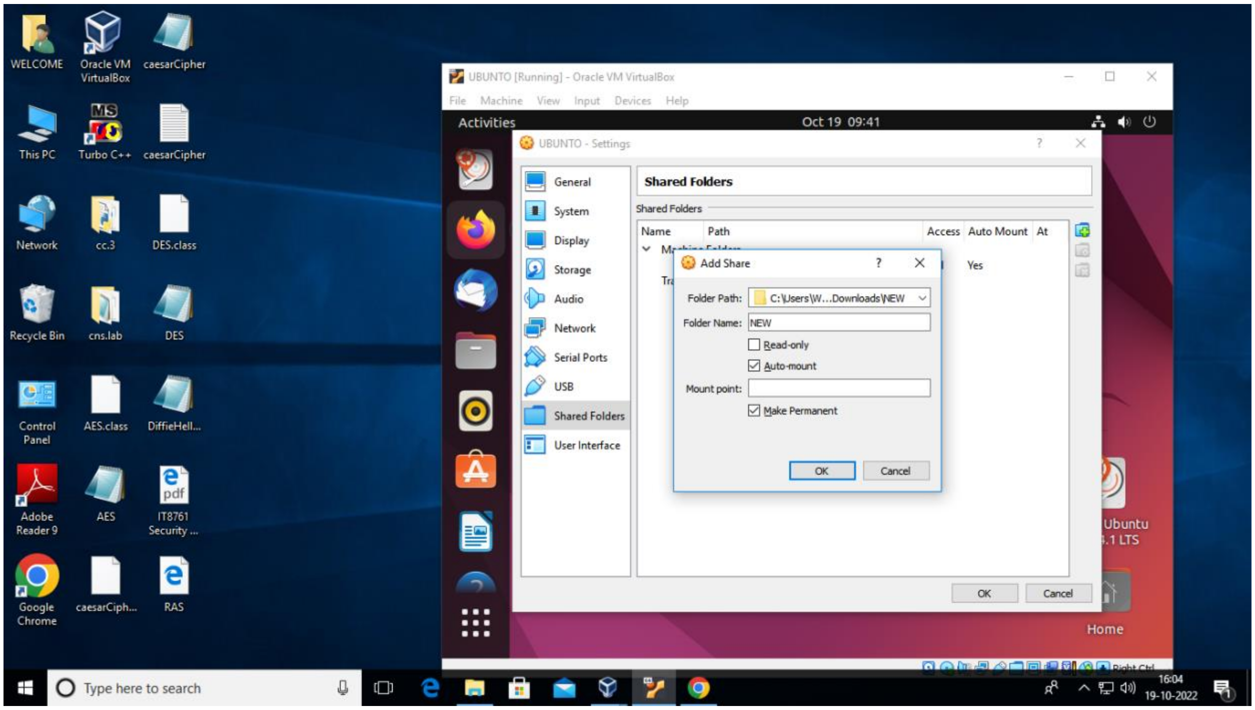
☐ Auto-mount

Mount point:

☐ Make Permanent

OK Cancel

Step 4: Choose the folder in windows.



Add Share

Folder Path: C:\Users\W...\Downloads\NEW

Folder Name: NEW

☐ Read-only

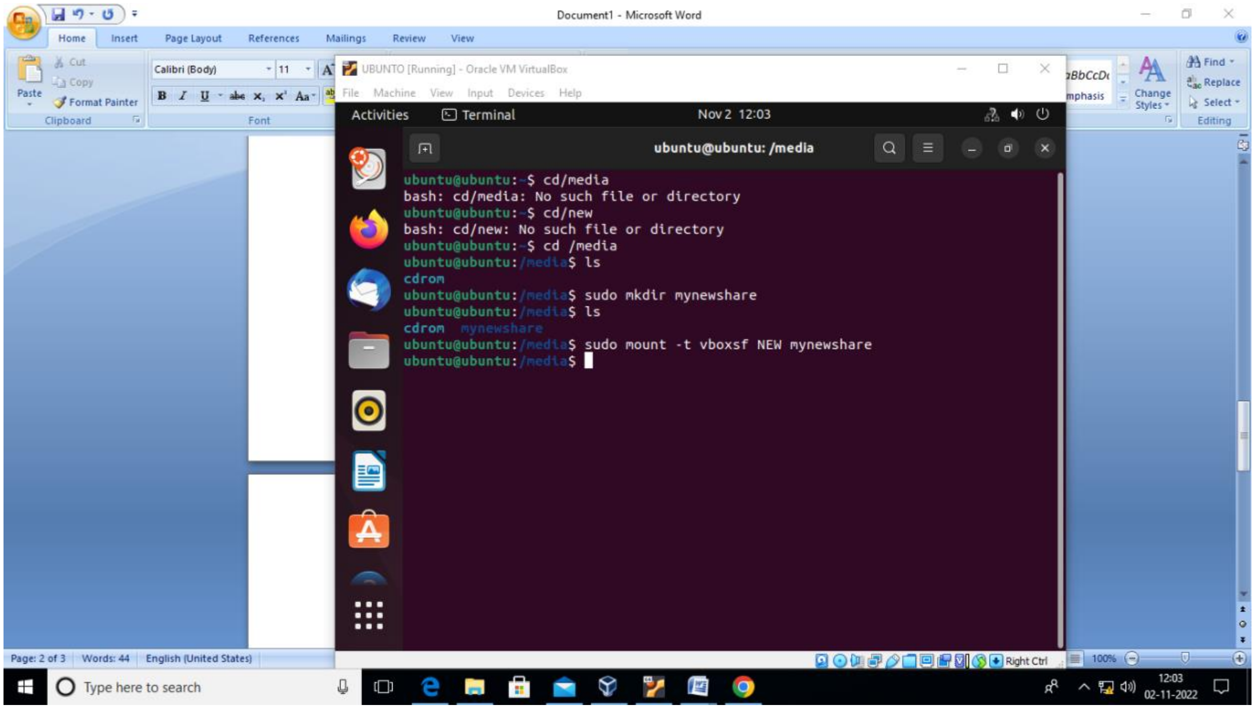
☑ Auto-mount

Mount point:

☑ Make Permanent

OK Cancel

Step 5: write the command.



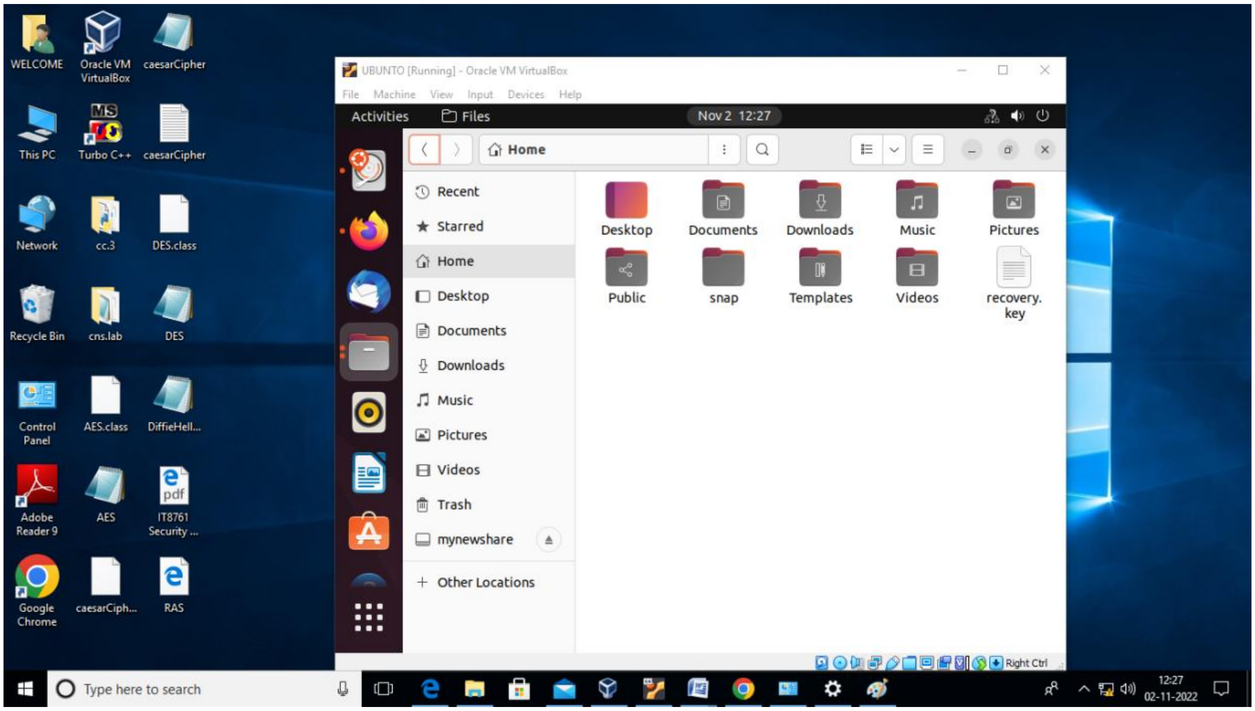
```
ubuntu@ubuntu:~$ cd/media
bash: cd/media: No such file or directory
ubuntu@ubuntu:~$ cd/new
bash: cd/new: No such file or directory
ubuntu@ubuntu:~$ cd /media
ubuntu@ubuntu:/media$ ls
cdrom
ubuntu@ubuntu:/media$ sudo mkdir mynewshare
ubuntu@ubuntu:/media$ ls
cdrom  mynewshare
ubuntu@ubuntu:/media$ sudo mount -t vboxsf NEW mynewshare
ubuntu@ubuntu:/media$ 
```

Document1 - Microsoft Word
UBUNTO [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Nov 2 12:03
ubuntu@ubuntu: /media
Type here to search
12:03
02-11-2022

Result

Thus the Find a procedure to transfer the files from one virtual machine to another virtual machine was executed successfully.

Output



WELCOME
Oracle VM VirtualBox
caesarCipher
This PC
Turbo C++
caesarCipher
Network
cc.3
DES.class
Recycle Bin
cns.lab
DES
Control Panel
AES.class
DiffieHell...
Adobe Reader 9
AES
IT8761 Security ...
Google Chrome
caesarCiph...
RAS
UBUNTO [Running] - Oracle VM VirtualBox
File
Machine
View
Input
Devices
Help
Activities
Files
Nov 2 12:27
Home
Recent
Starred
Home
Desktop
Documents
Downloads
Music
Pictures
Videos
Trash
mynewshare
Other Locations
Desktop
Documents
Downloads
Music
Pictures
Public
snap
Templates
Videos
recovery.key
Right Ctrl
Type here to search
12:27
02-11-2022

Ex no: 7 **Install Hadoop single node cluster and run simple applications**

Date: **like wordcount**

Aim:

To install Hadoop single node cluster and run simple applications like wordcount.

Procedure:

Step 1: To download the Java 8 Package. Save this file in your home directory.

Step 2: Extract the Java Tar File and install Java SE development kit 8 and set destination directory to C:/Java.

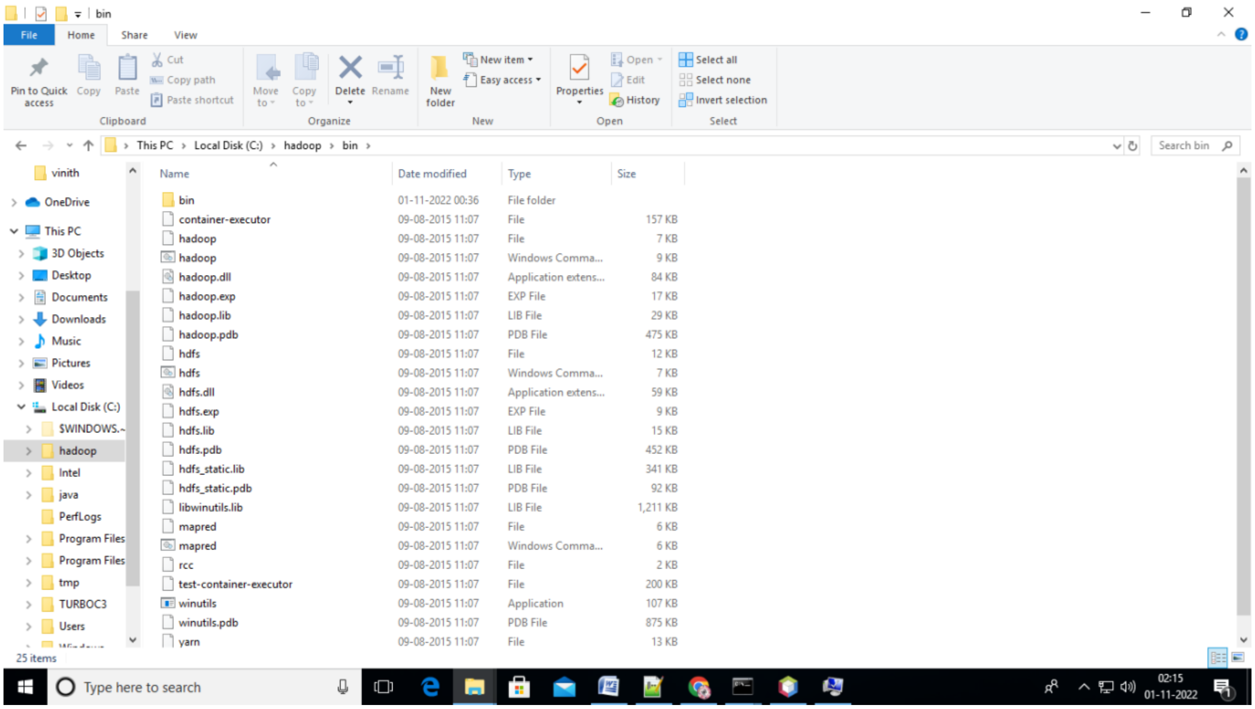
Step 3: Now merge this "Java" folder with the folder that is in program file named "java".

Step 4: Download the Hadoop 3.3.0 Package.

Step 5: Extract the Hadoop tar File.

Step 6: Edit the system environment variables by adding a new variable JAVA_HOME and value (path of JDK bin folder).

Step 7: Download the Hadoop Configuration files then extract it to paste the bin folder to Hadoop bin.



Name	Date modified	Type	Size
bin	01-11-2022 00:36	File folder	
container-executor	09-08-2015 11:07	File	157 KB
hadoop	09-08-2015 11:07	File	7 KB
hadoop	09-08-2015 11:07	Windows Comma...	9 KB
hadoop.dll	09-08-2015 11:07	Application extens...	84 KB
hadoop.exp	09-08-2015 11:07	EXP File	17 KB
hadoop.lib	09-08-2015 11:07	LIB File	29 KB
hadoop.pdb	09-08-2015 11:07	PDB File	475 KB
hdfs	09-08-2015 11:07	File	12 KB
hdfs	09-08-2015 11:07	Windows Comma...	7 KB
hdfs.dll	09-08-2015 11:07	Application extens...	59 KB
hdfs.exp	09-08-2015 11:07	EXP File	9 KB
hdfs.lib	09-08-2015 11:07	LIB File	15 KB
hdfs.pdb	09-08-2015 11:07	PDB File	452 KB
hdfs_static.lib	09-08-2015 11:07	LIB File	341 KB
hdfs_static.pdb	09-08-2015 11:07	PDB File	92 KB
libwinutils.lib	09-08-2015 11:07	LIB File	1,211 KB
mapred	09-08-2015 11:07	File	6 KB
mapred	09-08-2015 11:07	Windows Comma...	6 KB
rcc	09-08-2015 11:07	File	2 KB
test-container-executor	09-08-2015 11:07	File	200 KB
winutils	09-08-2015 11:07	Application	107 KB
winutils.pdb	09-08-2015 11:07	PDB File	875 KB
yarn	09-08-2015 11:07	File	13 KB

Step 8: Go to Hadoop folder->etc->Hadoop and edit 5 files with the following code.

core-site.xml

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

mapred-site.xml

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

yarn-site.xml

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

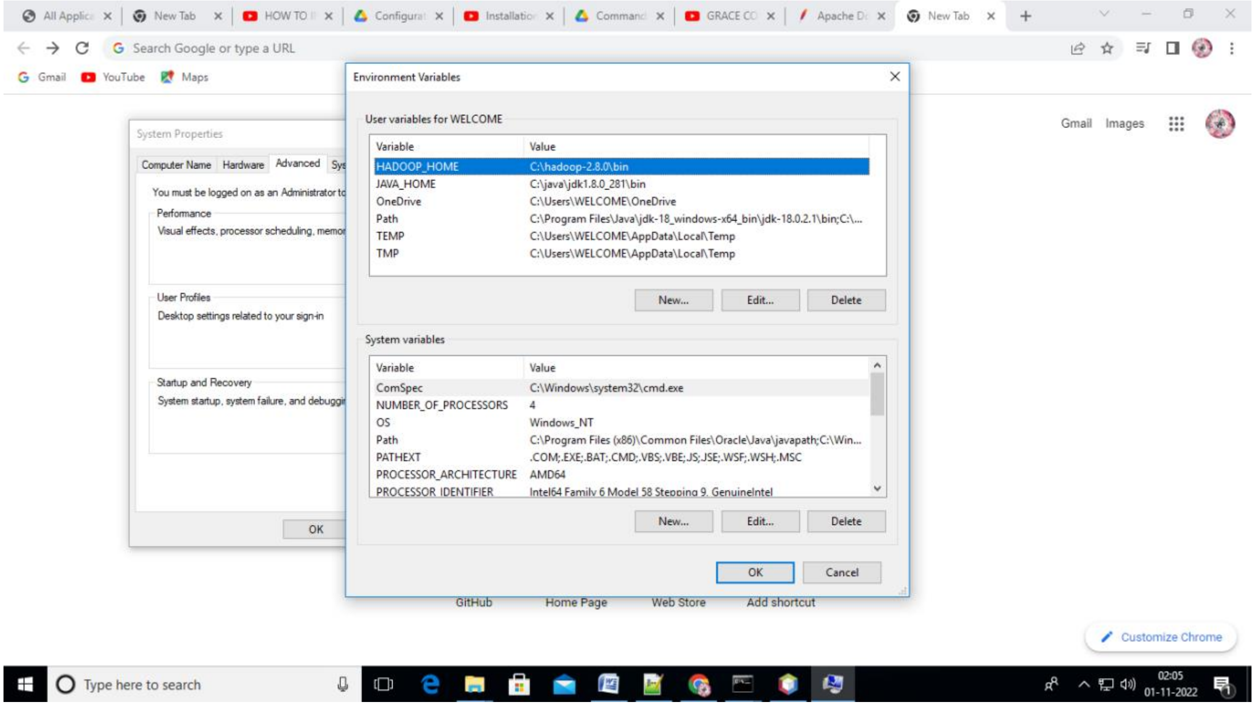
Create folder “data” under “C:\Hadoop”
Create folder “datanode” under “C:\Hadoop\data”
Create folder “namenode” under “C:\Hadoop\data”

hdfs-site.xml

```
<configuration>
 <property>
<name>dfs.replication</name>
 <value>1</value>
 </property>
 <property>
 <name>dfs.namenode.name.dir</name>
 <value>C:\hadoop\data\namenode</value>
 </property>
 <property>
 <name>dfs.datanode.data.dir</name>
 <value>C:\hadoop\data\datanode</value>
 </property>
</configuration>
```

Step 9: In hadoop-env.cmd update “JAVA_HOME” with JDK path.

Step 10: Now set path variable name “HADOOP_HOME” and value (path of bin folder inside hadoop folder).



Environment Variables

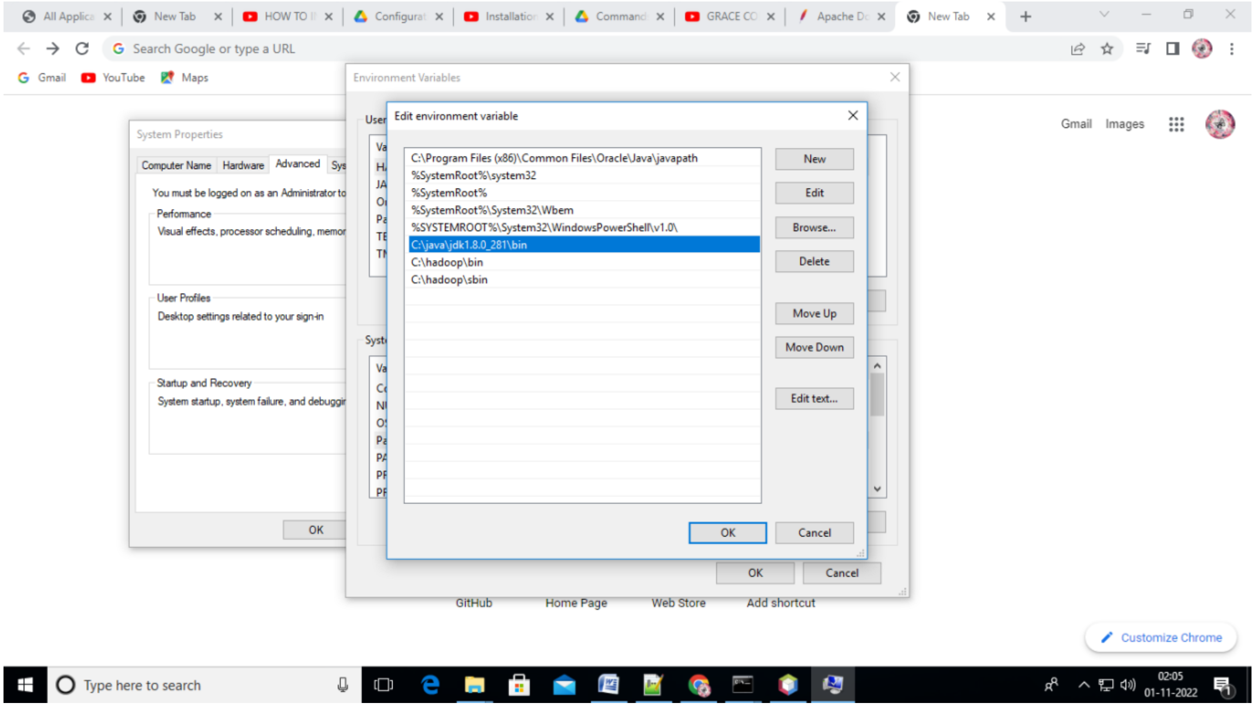
User variables for WELCOME

Variable	Value
HADOOP_HOME	C:\hadoop-2.8.0\bin
JAVA_HOME	C:\java\jdk1.8.0_281\bin
OneDrive	C:\Users\WELCOME\OneDrive
Path	C:\Program Files\Java\jdk-18_windows-x64_bin\jdk-18.0.2.1\bin;C:\...
TEMP	C:\Users\WELCOME\AppData\Local\Temp
TMP	C:\Users\WELCOME\AppData\Local\Temp

System variables

Variable	Value
ComSpec	C:\Windows\system32\cmd.exe
NUMBER_OF_PROCESSORS	4
OS	Windows_NT
Path	C:\Program Files (x86)\Common Files\Oracle\Java\javapath;C:\Win...
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC
PROCESSOR_ARCHITECTURE	AMD64
PROCESSOR_IDENTIFIER	Intel64 Family 6 Model 58 Stepping 9, GenuineIntel

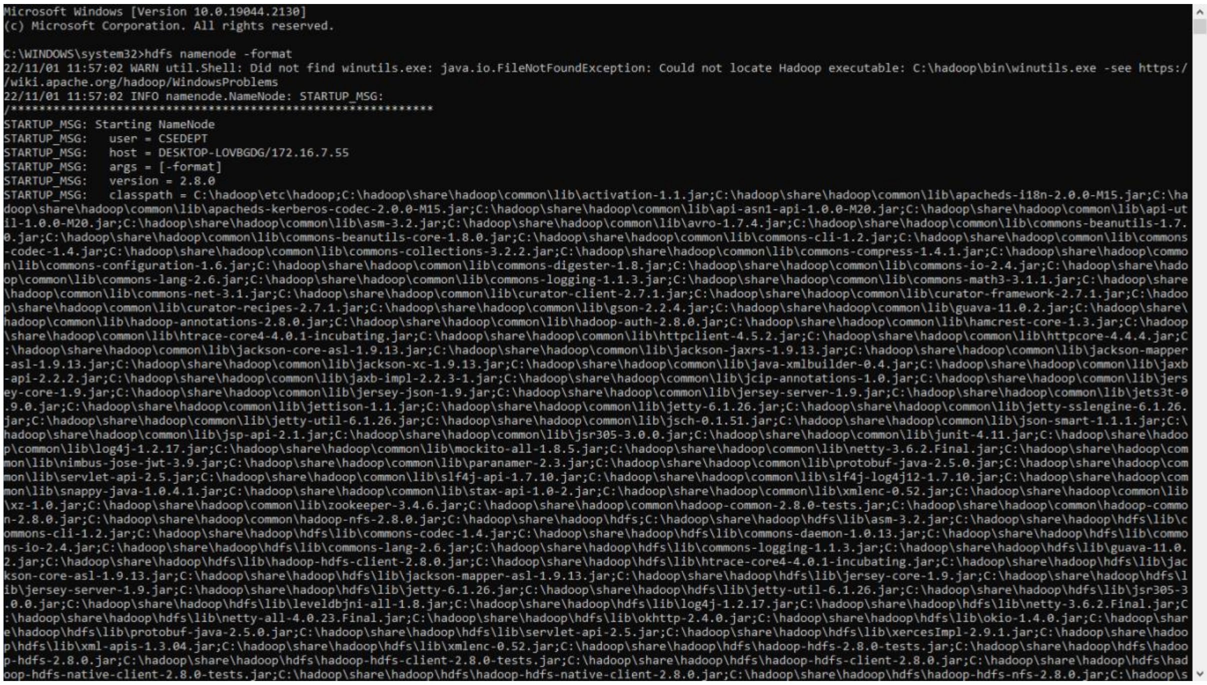
Step 11: Edit path in system variable and add both “bin” and “sbin” path here.



Edit environment variable

```
C:\Program Files (x86)\Common Files\Oracle\Java\javapath
%SystemRoot%\system32
%SystemRoot%
%SystemRoot%\System32\Wbem
%SYSTEMROOT%\System32\WindowsPowerShell\v1.0\
C:\java\jdk1.8.0_281\bin
C:\hadoop\bin
C:\hadoop\sbin
```

Step 12: Run “cmd” as administrator and connect to hadoop server.
->hdfs namenode –format



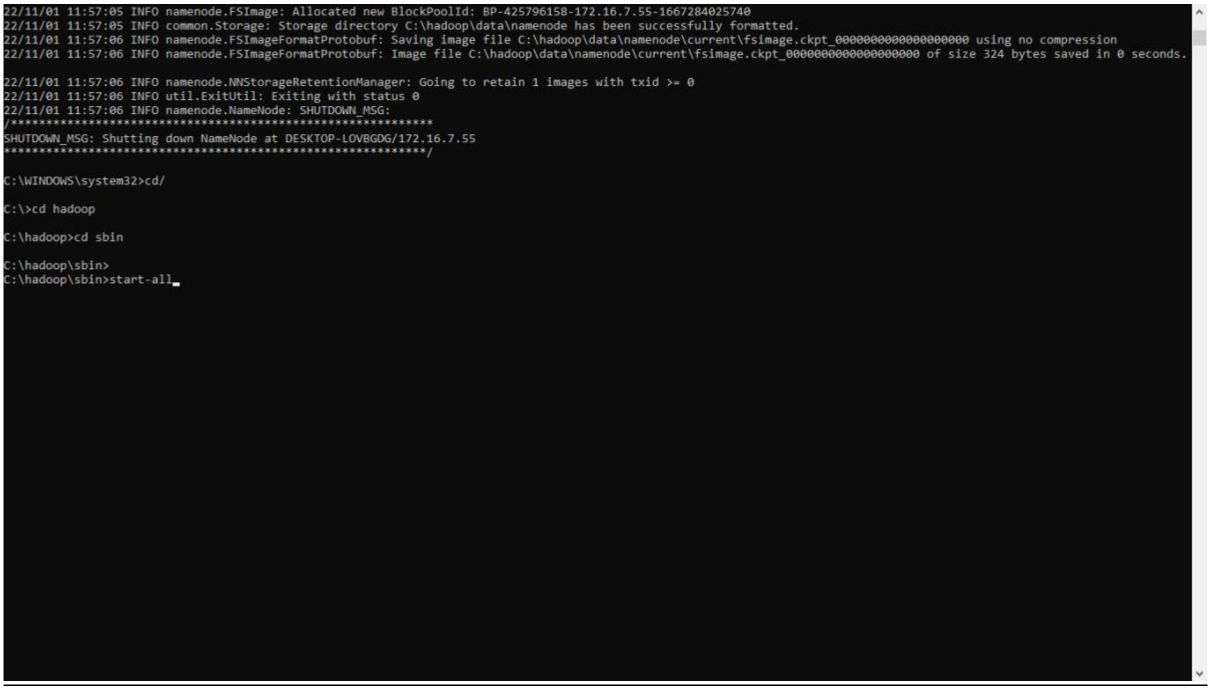
```
Microsoft Windows [Version 10.0.19044.2130]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>hdfs namenode -format
22/11/01 11:57:02 WARN util.Shell: Did not find winutils.exe: java.io.FileNotFoundException: Could not locate Hadoop executable: C:\hadoop\bin\winutils.exe -see https:/
/wiki.apache.org/hadoop/WindowsProblems
22/11/01 11:57:02 INFO namenode.NameNode: STARTUP_MSG:
/************************************************************
STARTUP_MSG: Starting NameNode
STARTUP_MSG:   user = CSEDEPT
STARTUP_MSG:   host = DESKTOP-LOVBGDG/172.16.7.55
STARTUP_MSG:   args = [-format]
STARTUP_MSG:   version = 2.8.0
STARTUP_MSG:   classpath = C:\hadoop\etc\hadoop;C:\hadoop\share\hadoop\common\lib\activation-1.1.jar;C:\hadoop\share\hadoop\common\lib\apacheds-i18n-2.0.0-M15.jar;C:\ha
doop\share\hadoop\common\lib\apacheds-kerberos-codec-2.0.0-M15.jar;C:\hadoop\share\hadoop\common\lib\api-asn1-api-1.0.0-M20.jar;C:\hadoop\share\hadoop\common\lib\api-ut
il-1.0.0-M20.jar;C:\hadoop\share\hadoop\common\lib\asm-3.2.jar;C:\hadoop\share\hadoop\common\lib\avro-1.7.4.jar;C:\hadoop\share\hadoop\common\lib\commons-beanutils-1.7.
0.jar;C:\hadoop\share\hadoop\common\lib\commons-beanutils-core-1.8.0.jar;C:\hadoop\share\hadoop\common\lib\commons-cli-1.2.jar;C:\hadoop\share\hadoop\common\lib\commons
-codec-1.4.jar;C:\hadoop\share\hadoop\common\lib\commons-collections-3.2.2.jar;C:\hadoop\share\hadoop\common\lib\commons-compress-1.4.1.jar;C:\hadoop\share\hadoop\commo
n\lib\commons-configuration-1.6.jar;C:\hadoop\share\hadoop\common\lib\commons-digester-1.8.jar;C:\hadoop\share\hadoop\common\lib\commons-io-2.4.jar;C:\hadoop\share\hado
op\common\lib\commons-lang-2.6.jar;C:\hadoop\share\hadoop\common\lib\commons-logging-1.1.3.jar;C:\hadoop\share\hadoop\common\lib\commons-math3-3.1.1.jar;C:\hadoop\share
\hadoop\common\lib\commons-net-3.1.jar;C:\hadoop\share\hadoop\common\lib\curator-client-2.7.1.jar;C:\hadoop\share\hadoop\common\lib\curator-framework-2.7.1.jar;C:\hadoo
p\share\hadoop\common\lib\curator-recipes-2.7.1.jar;C:\hadoop\share\hadoop\common\lib\gson-2.2.4.jar;C:\hadoop\share\hadoop\common\lib\guava-11.0.2.jar;C:\hadoop\share\
hadoop\common\lib\hadoop-annotations-2.8.0.jar;C:\hadoop\share\hadoop\common\lib\hadoop-auth-2.8.0.jar;C:\hadoop\share\hadoop\common\lib\hamcrest-core-1.3.jar;C:\hadoop
\share\hadoop\common\lib\htrace-core4-4.0.1-incubating.jar;C:\hadoop\share\hadoop\common\lib\httpclient-4.5.2.jar;C:\hadoop\share\hadoop\common\lib\httpcore-4.4.4.jar;C
:\hadoop\share\hadoop\common\lib\jackson-core-asl-1.9.13.jar;C:\hadoop\share\hadoop\common\lib\jackson-jaxrs-1.9.13.jar;C:\hadoop\share\hadoop\common\lib\jackson-mapper
-asl-1.9.13.jar;C:\hadoop\share\hadoop\common\lib\jackson-xc-1.9.13.jar;C:\hadoop\share\hadoop\common\lib\java-xmlbuilder-0.4.jar;C:\hadoop\share\hadoop\common\lib\jaxb
-api-2.2.2.jar;C:\hadoop\share\hadoop\common\lib\jaxb-impl-2.2.3-1.jar;C:\hadoop\share\hadoop\common\lib\jcip-annotations-1.0.jar;C:\hadoop\share\hadoop\common\lib\jers
ey-core-1.9.jar;C:\hadoop\share\hadoop\common\lib\jersey-json-1.9.jar;C:\hadoop\share\hadoop\common\lib\jersey-server-1.9.jar;C:\hadoop\share\hadoop\common\lib\jets3t-0
.9.0.jar;C:\hadoop\share\hadoop\common\lib\jettison-1.1.jar;C:\hadoop\share\hadoop\common\lib\jetty-6.1.26.jar;C:\hadoop\share\hadoop\common\lib\jetty-sslengine-6.1.26.
jar;C:\hadoop\share\hadoop\common\lib\jetty-util-6.1.26.jar;C:\hadoop\share\hadoop\common\lib\jsch-0.1.51.jar;C:\hadoop\share\hadoop\common\lib\json-smart-1.1.1.jar;C:\
hadoop\share\hadoop\common\lib\jsp-api-2.1.jar;C:\hadoop\share\hadoop\common\lib\jsr305-3.0.0.jar;C:\hadoop\share\hadoop\common\lib\junit-4.11.jar;C:\hadoop\share\hadoo
p\common\lib\log4j-1.2.17.jar;C:\hadoop\share\hadoop\common\lib\mockito-all-1.8.5.jar;C:\hadoop\share\hadoop\common\lib\netty-3.6.2.Final.jar;C:\hadoop\share\hadoop\com
mon\lib\nimbus-jose-jwt-3.9.jar;C:\hadoop\share\hadoop\common\lib\paranamer-2.3.jar;C:\hadoop\share\hadoop\common\lib\protobuf-java-2.5.0.jar;C:\hadoop\share\hadoop\com
mon\lib\servlet-api-2.5.jar;C:\hadoop\share\hadoop\common\lib\slf4j-api-1.7.10.jar;C:\hadoop\share\hadoop\common\lib\slf4j-log4j12-1.7.10.jar;C:\hadoop\share\hadoop\com
mon\lib\snappy-java-1.0.4.1.jar;C:\hadoop\share\hadoop\common\lib\stax-api-1.0-2.jar;C:\hadoop\share\hadoop\common\lib\xmlenc-0.52.jar;C:\hadoop\share\hadoop\common\lib
\xz-1.0.jar;C:\hadoop\share\hadoop\common\lib\zookeeper-3.4.6.jar;C:\hadoop\share\hadoop\common\hadoop-common-2.8.0-tests.jar;C:\hadoop\share\hadoop\common\hadoop-commo
n-2.8.0.jar;C:\hadoop\share\hadoop\common\hadoop-nfs-2.8.0.jar;C:\hadoop\share\hadoop\hdfs;C:\hadoop\share\hadoop\hdfs\lib\asm-3.2.jar;C:\hadoop\share\hadoop\hdfs\lib\c
ommons-cli-1.2.jar;C:\hadoop\share\hadoop\hdfs\lib\commons-codec-1.4.jar;C:\hadoop\share\hadoop\hdfs\lib\commons-daemon-1.0.13.jar;C:\hadoop\share\hadoop\hdfs\lib\commo
ns-io-2.4.jar;C:\hadoop\share\hadoop\hdfs\lib\commons-lang-2.6.jar;C:\hadoop\share\hadoop\hdfs\lib\commons-logging-1.1.3.jar;C:\hadoop\share\hadoop\hdfs\lib\guava-11.0.
2.jar;C:\hadoop\share\hadoop\hdfs\lib\hadoop-hdfs-client-2.8.0.jar;C:\hadoop\share\hadoop\hdfs\lib\htrace-core4-4.0.1-incubating.jar;C:\hadoop\share\hadoop\hdfs\lib\jac
kson-core-asl-1.9.13.jar;C:\hadoop\share\hadoop\hdfs\lib\jackson-mapper-asl-1.9.13.jar;C:\hadoop\share\hadoop\hdfs\lib\jersey-core-1.9.jar;C:\hadoop\share\hadoop\hdfs\l
ib\jersey-server-1.9.jar;C:\hadoop\share\hadoop\hdfs\lib\jetty-6.1.26.jar;C:\hadoop\share\hadoop\hdfs\lib\jetty-util-6.1.26.jar;C:\hadoop\share\hadoop\hdfs\lib\jsr305-3
.0.0.jar;C:\hadoop\share\hadoop\hdfs\lib\leveldbjni-all-1.8.jar;C:\hadoop\share\hadoop\hdfs\lib\log4j-1.2.17.jar;C:\hadoop\share\hadoop\hdfs\lib\netty-3.6.2.Final.jar;C
:\hadoop\share\hadoop\hdfs\lib\netty-all-4.0.23.Final.jar;C:\hadoop\share\hadoop\hdfs\lib\okhttp-2.4.0.jar;C:\hadoop\share\hadoop\hdfs\lib\okio-1.4.0.jar;C:\hadoop\shar
e\hadoop\hdfs\lib\protobuf-java-2.5.0.jar;C:\hadoop\share\hadoop\hdfs\lib\servlet-api-2.5.jar;C:\hadoop\share\hadoop\hdfs\lib\xercesImpl-2.9.1.jar;C:\hadoop\share\hadoo
p\hdfs\lib\xml-apis-1.3.04.jar;C:\hadoop\share\hadoop\hdfs\lib\xmlenc-0.52.jar;C:\hadoop\share\hadoop\hdfs\hadoop-hdfs-2.8.0-tests.jar;C:\hadoop\share\hadoop\hdfs\hadoo
p-hdfs-2.8.0.jar;C:\hadoop\share\hadoop\hdfs\hadoop-hdfs-client-2.8.0-tests.jar;C:\hadoop\share\hadoop\hdfs\hadoop-hdfs-client-2.8.0.jar;C:\hadoop\share\hadoop\hdfs\had
oop-hdfs-native-client-2.8.0-tests.jar;C:\hadoop\share\hadoop\hdfs\hadoop-hdfs-native-client-2.8.0.jar;C:\hadoop\share\hadoop\hdfs\hadoop-hdfs-nfs-2.8.0.jar;C:\hadoop\s
```

-> C:\WINDOWS\system32>cd/

->C:\>cd hadoop

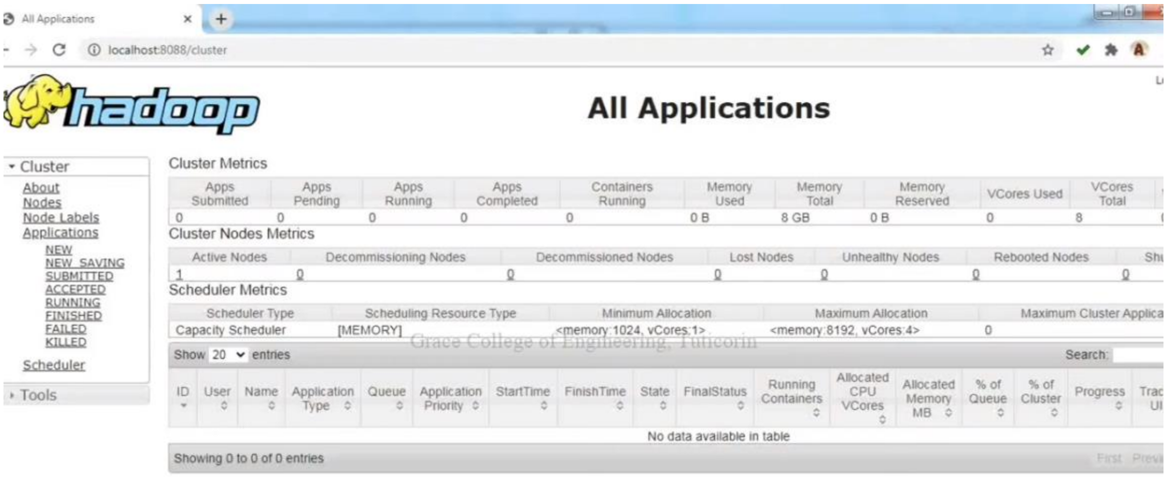
->C:\hadoop>cd sbin

-> C:\hadoop\sbin>start-all



```
22/11/01 11:57:05 INFO namenode.FSImage: Allocated new BlockPoolId: BP-425796158-172.16.7.55-1667284025740
22/11/01 11:57:05 INFO common.Storage: Storage directory C:\hadoop\data\namenode has been successfully formatted.
22/11/01 11:57:06 INFO namenode.FSImageFormatProtobuf: Saving image file C:\hadoop\data\namenode\current\fsimage.ckpt_0000000000000000000 using no compression
22/11/01 11:57:06 INFO namenode.FSImageFormatProtobuf: Image file C:\hadoop\data\namenode\current\fsimage.ckpt_0000000000000000000 of size 324 bytes saved in 0 seconds.

22/11/01 11:57:06 INFO namenode.NNStorageRetentionManager: Going to retain 1 images with txid >= 0
22/11/01 11:57:06 INFO util.ExitUtil: Exiting with status 0
22/11/01 11:57:06 INFO namenode.NameNode: SHUTDOWN_MSG:
/************************************************************
SHUTDOWN_MSG: Shutting down NameNode at DESKTOP-LOVBGDG/172.16.7.55
************************************************************/

C:\WINDOWS\system32>cd/

C:\>cd hadoop

C:\hadoop>cd sbin

C:\hadoop\sbin>
C:\hadoop\sbin>start-all_
```

-> C:\hadoop\sbin>jps



All Applications

Cluster Metrics

Apps Submitted	Apps Pending	Apps Running	Apps Completed	Containers Running	Memory Used	Memory Total	Memory Reserved	VCores Used	VCores Total
0	0	0	0	0	0 B	8 GB	0 B	0	8

Cluster Nodes Metrics

Active Nodes	Decommissioning Nodes	Decommissioned Nodes	Lost Nodes	Unhealthy Nodes	Rebooted Nodes	Shu
1	0	0	0	0	0	0

Scheduler Metrics

Scheduler Type	Scheduling Resource Type	Minimum Allocation	Maximum Allocation	Maximum Cluster Applica
Capacity Scheduler	[MEMORY]	<memory:1024, vCores:1>	<memory:8192, vCores:4>	0

Show 20 entries Search:

ID	User	Name	Application Type	Queue	Application Priority	StartTime	FinishTime	State	FinalStatus	Running Containers	Allocated CPU VCores	Allocated Memory MB	% of Queue	% of Cluster	Progress	Trac UI
No data available in table																

Showing 0 to 0 of 0 entries

C:\hadoop\sbin>cd..

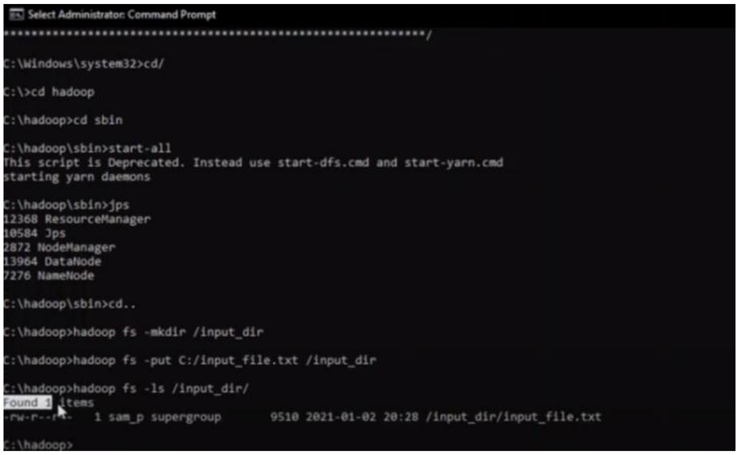
->Make input directory in HDFS

-hadoop fs -mkdir /input_dir

C:\hadoop>hadoop fs -mkdir /input_dir

->Copy the input text file in the input directory.

-hadoop fs -put C:/input_file.txt /input_dir



```
************************************************************/

C:\Windows\system32>cd/

C:\>cd hadoop

C:\hadoop>cd sbin

C:\hadoop\sbin>start-all
This script is Deprecated. Instead use start-dfs.cmd and start-yarn.cmd
starting yarn daemons

C:\hadoop\sbin>jps
12368 ResourceManager
10584 Jps
2872 NodeManager
13964 DataNode
7276 NameNode

C:\hadoop\sbin>cd..

C:\hadoop>hadoop fs -mkdir /input_dir

C:\hadoop>hadoop fs -put C:/input_file.txt /input_dir

C:\hadoop>hadoop fs -ls /input_dir/
Found 1 items
-rw-r--r--   1 sam_p supergroup       9510 2021-01-02 20:28 /input_dir/input_file.txt

C:\hadoop>
```

->Verify input_file.txt available in HDFS input directory.

-hadoop fs -ls /input_dir/

->You can verify content.

-hadoop dfs -cat /input_dir/input_file.txt

->Now work for word count.

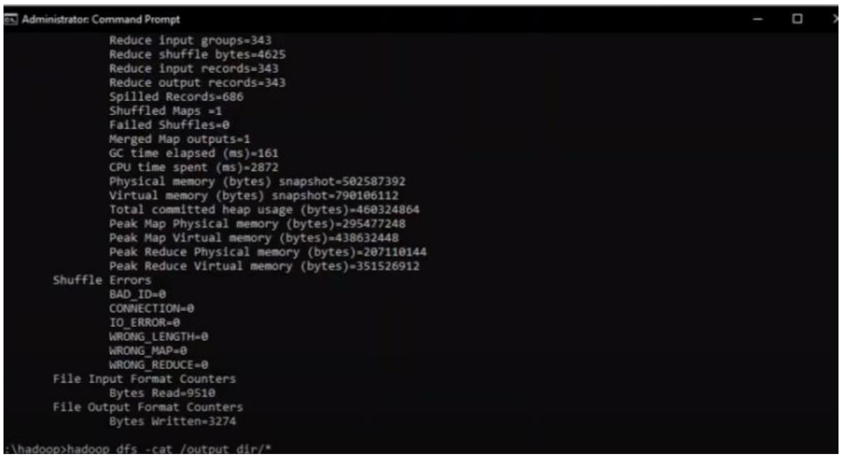
-hadoop jar C:/hadoop/share/hadoop/mapreduce/hadoop-mapreduce-examples-3.3.0.jar wordcount /input_dir /output_dir

Result:

Thus the Hadoop single node cluster was installed and wordcount program was executed successfully.

Output:

-hadoop dfs -cat /output_dir/*



```
                Reduce input groups=343
                Reduce shuffle bytes=4625
                Reduce input records=343
                Reduce output records=343
                Spilled Records=686
                Shuffled Maps =1
                Failed Shuffles=0
                Merged Map outputs=1
                GC time elapsed (ms)=161
                CPU time spent (ms)=2872
                Physical memory (bytes) snapshot=502587392
                Virtual memory (bytes) snapshot=790106112
                Total committed heap usage (bytes)=460324864
                Peak Map Physical memory (bytes)=295477248
                Peak Map Virtual memory (bytes)=438632448
                Peak Reduce Physical memory (bytes)=207110144
                Peak Reduce Virtual memory (bytes)=351526912
        Shuffle Errors
                BAD_ID=0
                CONNECTION=0
                IO_ERROR=0
                WRONG_LENGTH=0
                WRONG_MAP=0
                WRONG_REDUCE=0
        File Input Format Counters
                Bytes Read=9510
        File Output Format Counters
                Bytes Written=3274

:\hadoop>hadoop dfs -cat /output dir/*
```