

**Hindi Vidya Prachar Samiti's**  
**RAMNIRANJAN JHUNJHUNWALA COLLEGE**  
**OF ARTS, SCIENCE & COMMERCE**  
**( EMPOWERED AUTONOMOUS)**

**Cloud Computing**



**Name:** Somnath Vijay Mugdal

**Roll No.:** 705

**Class:** MSc Data Science and Artificial Intelligence Part-I



# **Hindi Vidya Prachar Samiti's Ramniranjan Jhunjhunwala College of Arts, Science and Commerce**

## **Department of Data Science and Artificial Intelligence**

### **CERTIFICATE**

This is to certify Mr. Somnath Vijay Mugdal of Msc. Data Science and Artificial Intelligence Roll No 705 has successfully completed the practical of Cloud Computing during the Academic Year 2023-2024.

**Date :**

**(Prof. Sujata Kotian)**

**Prof-In-Charge**

**External Examiner**

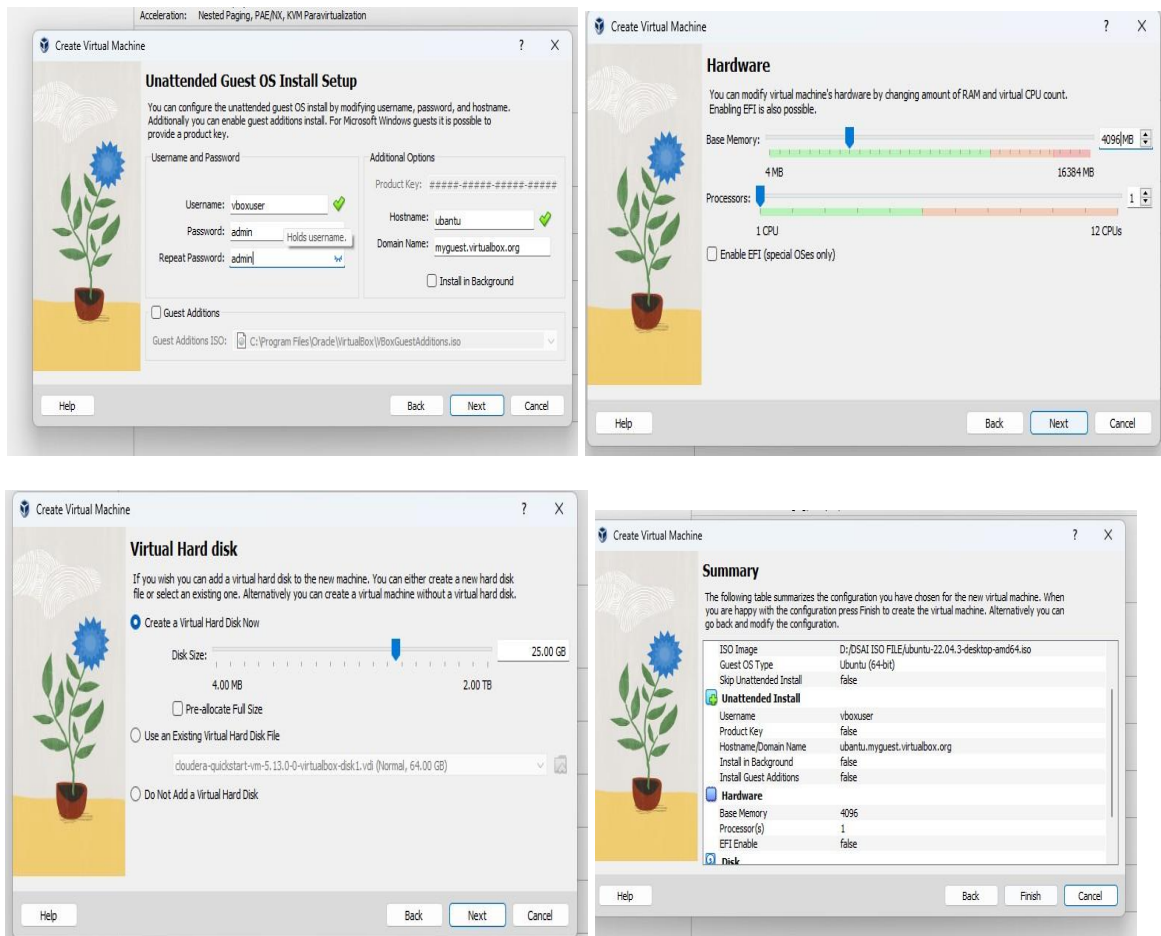
# Index

Sr.no	Practical Name	Date	Remaks
1	Install virtualbox/ VMware Workstation with different flavours of linux or windows OS on top of Windows	Feb 2, 2024	
2	Install Xen server and connect with Xen Client	Feb 7, 2024	
3	Install ExSi server and connect with VSphere	Feb 7, 2024	
4	Install a C compiler in virtual machine created using virtual box and execute a simple program	Feb 9, 2024	
5	To attach virtual block to virtual machine and check whether it holds the data even after the release of virtual machine	Feb 9, 2024	
6	Transfer files from one host machine to another virtual machine	Feb 14, 2024	
7	Installation of Google app engine. Launch aweb application using GAE launcher	Feb 14, 2024	
8	Using the software like JDK 1.7/1.8. design and develop web application using MVC Framework.	Feb 16, 2024	
9	Installing and configuring Dockers in local hostand running multiple images on a Docker Platform.	Feb 16, 2024	
10	Install and Configure Puppet	Feb 21, 2024	
11	Install and Configure IBM Bluemix	Feb 21, 2024	
12	Developing an ASP.NET web based application onthe Azure platform	Feb 23, 2024	

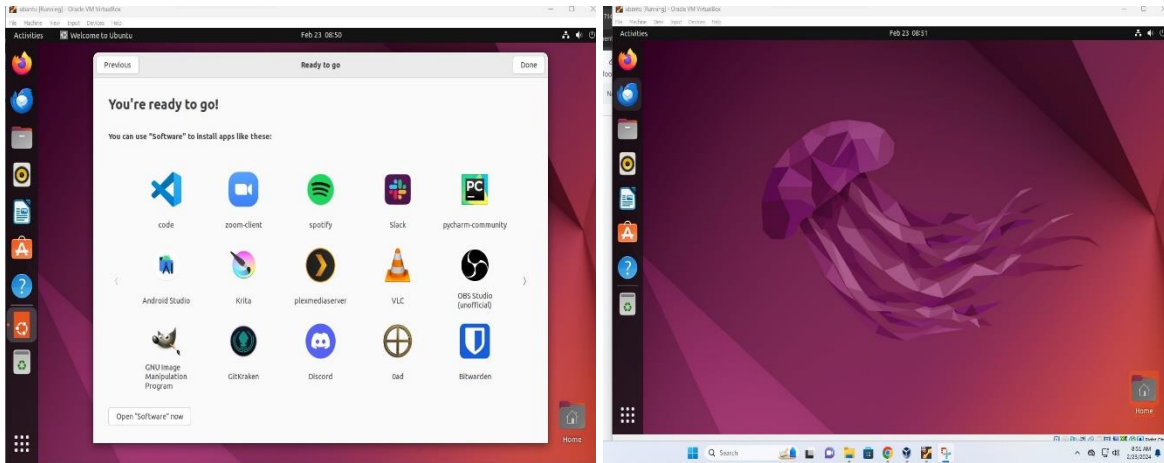
## Practical 1 - Install virtualbox/ VMware Workstation with different flavours of linux or windows OS on top of Windows.

### 1. Linux

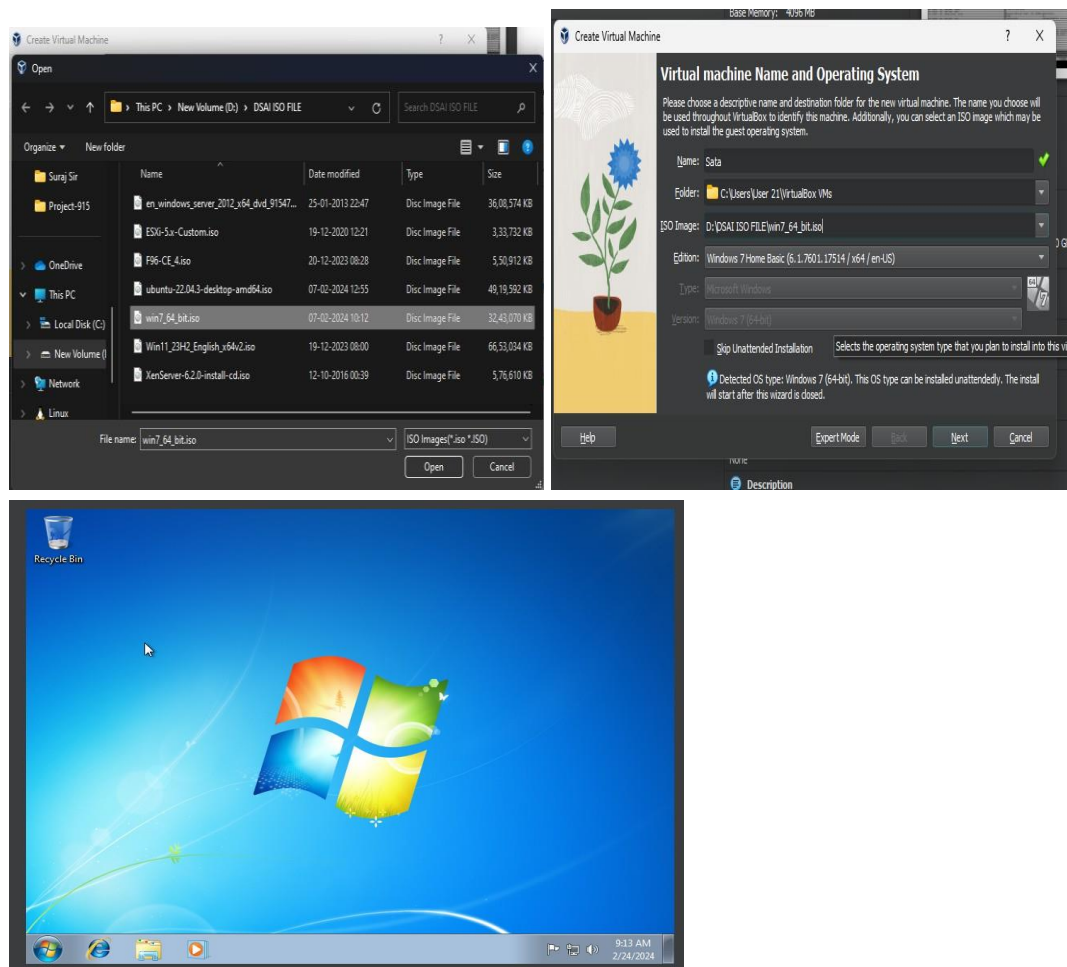
VirtualBox-New -Write Name & Iso Image -Other -DSAI ISO File - Select Ubuntu File - Next  
Change Password - Next  
Change Base Memory to 4GB - Next - Next -Finish



Skip - Next - Next - Next - Done



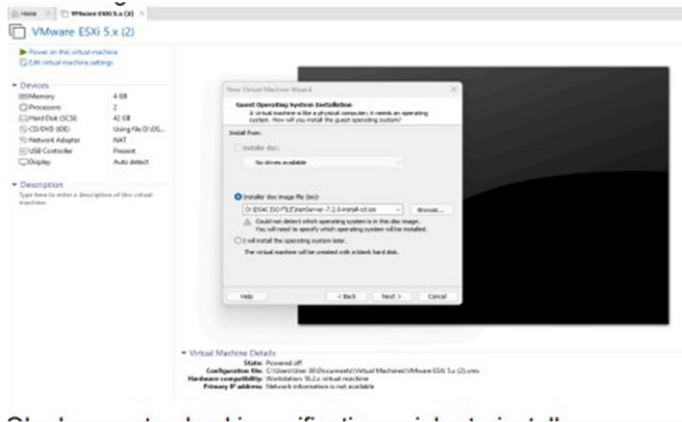
## 2. Windows



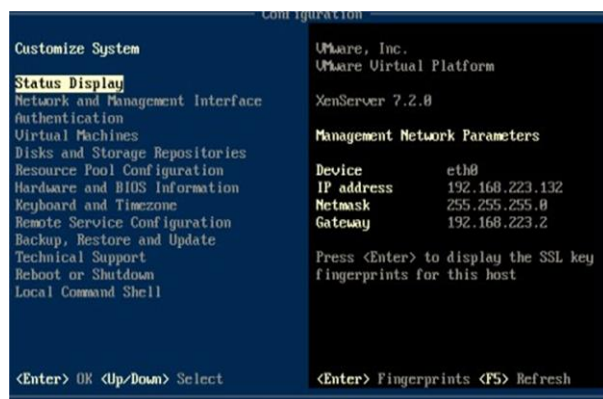
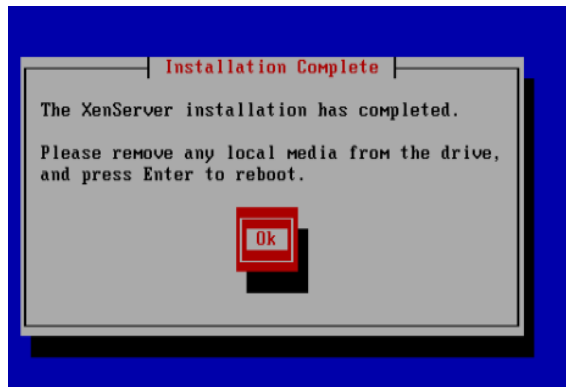
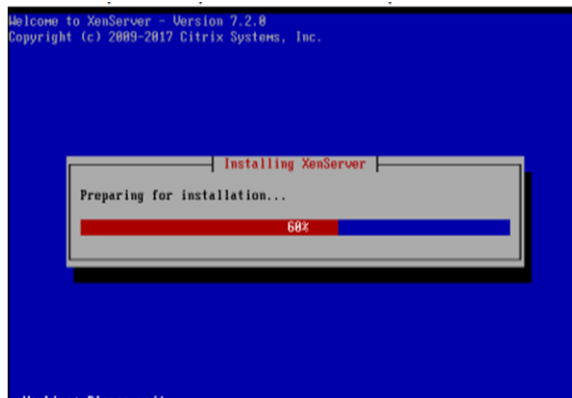
Signature:- \_\_\_\_\_

## Practical 2 - Install Xen server and connect with Xen Client.

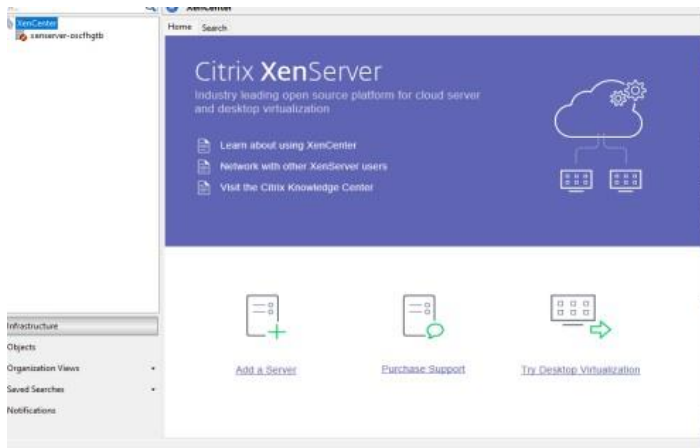
File -New virtual machine-Browser-xenserver7-other -other64.-maximum  
disksize-60-single file-finish



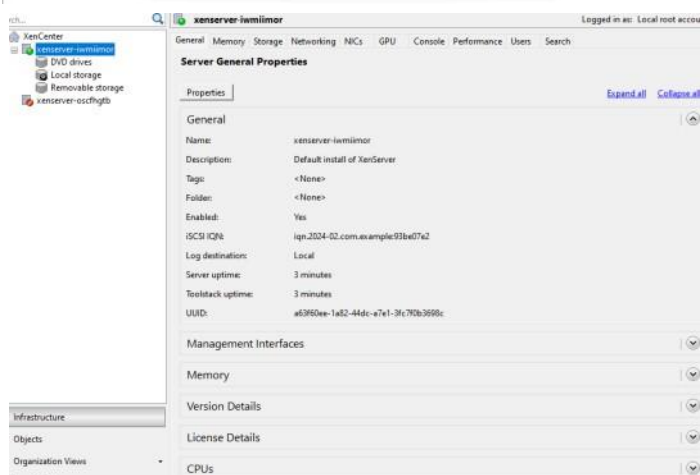
Ok-ok-accept eula-skip verification-usinh ntp-install xenserver



Copy IP address



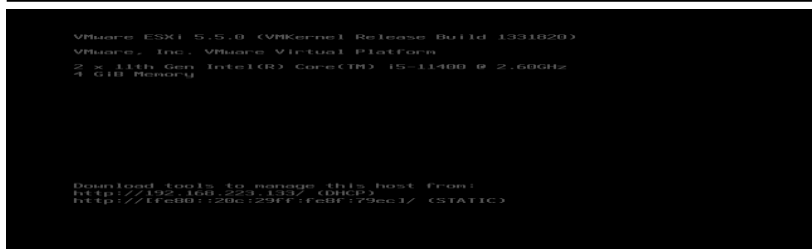
Add a server



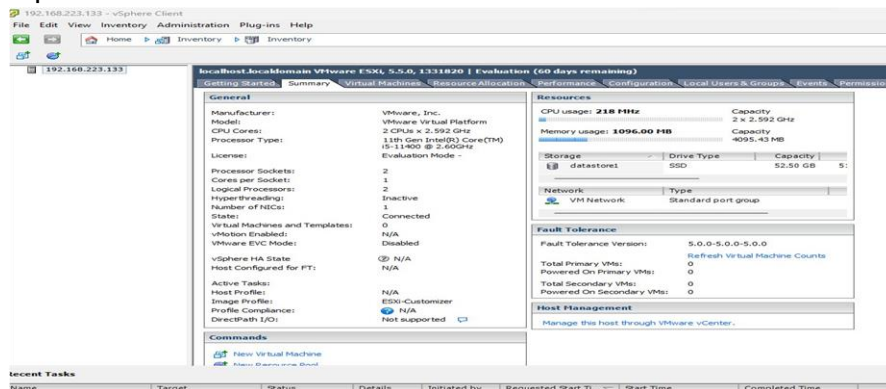
Signature:- \_\_\_\_\_

### Practical 3 - Install ExSi server and connect with VSphere.

#open VMware workstation pro  
Install exsi server



IP Address 192.168.223.133  
vsphere.....

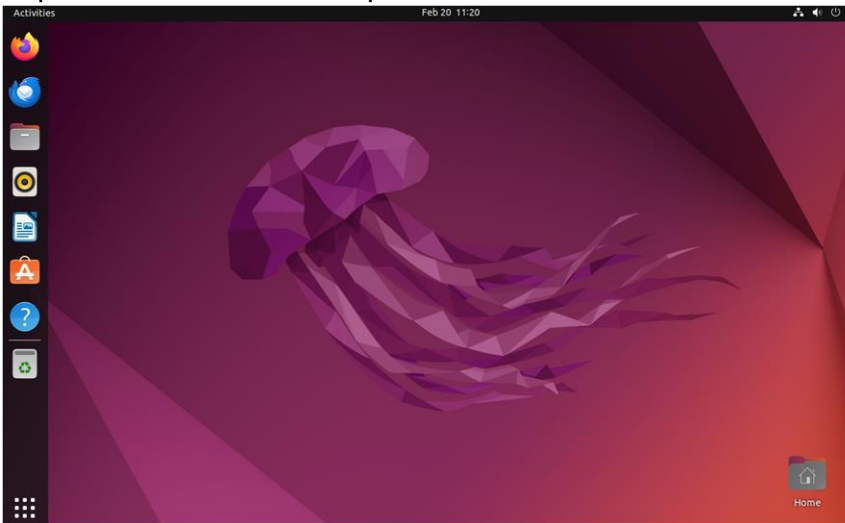


Signature:- \_\_\_\_\_



**Practical 4** - Install a C compiler in virtual machine created using virtual box and execute a simple program.

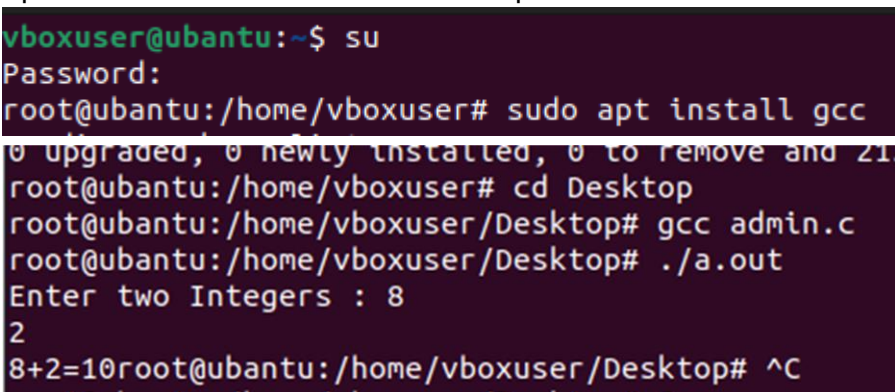
#Open vmware workstation pro



The screenshot shows a Linux desktop with a purple and red geometric background. A code editor window is open, displaying the following C code:

```
1 #include <stdio.h>
2 int main()
3     int number1 ,number2,sum;
4     printf("Enter two Integers : ");
5     scanf("%d %d" ,&number1, &number2);
6     // calculate sum
7     sum=number1+number2;
8     printf("%d+%d=%d",number1,number2,sum);
9     return 0;
10
```

Open terminal & Write a code to see output



The screenshot shows a terminal window with the following commands and output:

```
vboxuser@ubuntu:~$ su
Password:
root@ubuntu:/home/vboxuser# sudo apt install gcc
0 upgraded, 0 newly installed, 0 to remove and 21.
root@ubuntu:/home/vboxuser# cd Desktop
root@ubuntu:/home/vboxuser/Desktop# gcc admin.c
root@ubuntu:/home/vboxuser/Desktop# ./a.out
Enter two Integers : 8
2
8+2=10root@ubuntu:/home/vboxuser/Desktop# ^C
```

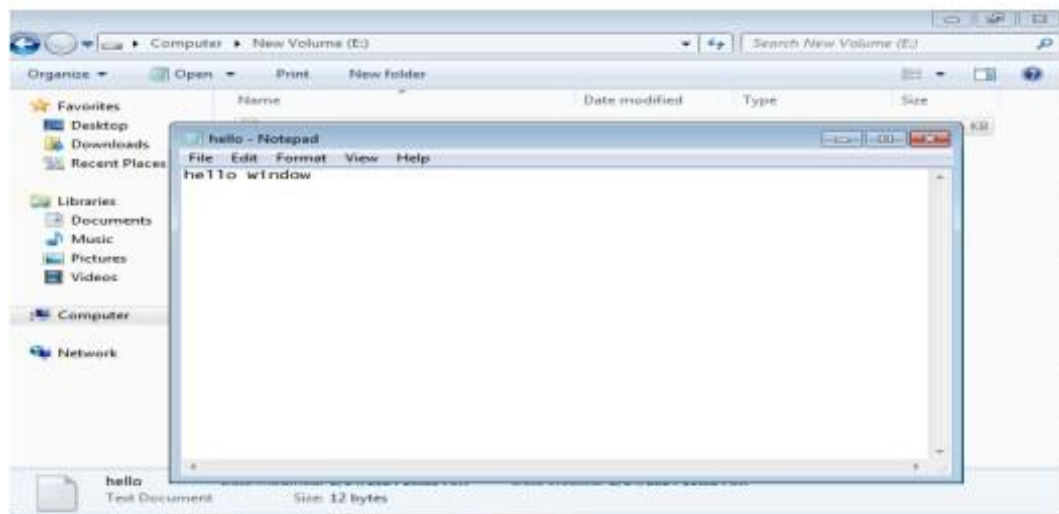
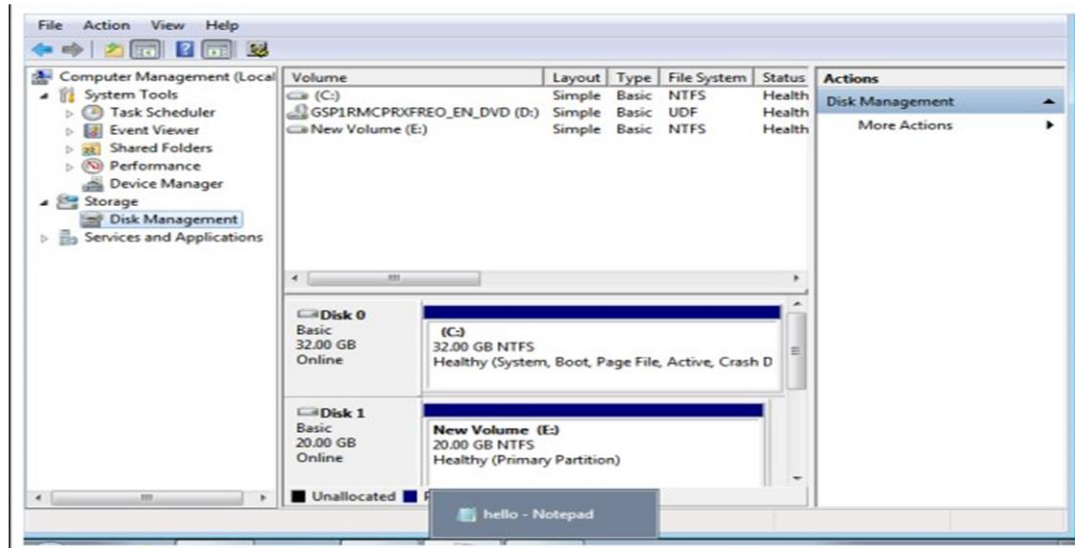
Signature:- \_\_\_\_\_

**Practical 5** - To attach virtual block to virtual machine and check whether it holds the data even after the release of virtual machine.

# open virtual box

Select SATA > storage > create a new volume

Control Panel-System and security-Administrative Tools-Computer Manager-Storage -Disk management -Initialize-New simple Volume  
Type on Notepad and Save it to the created Drive



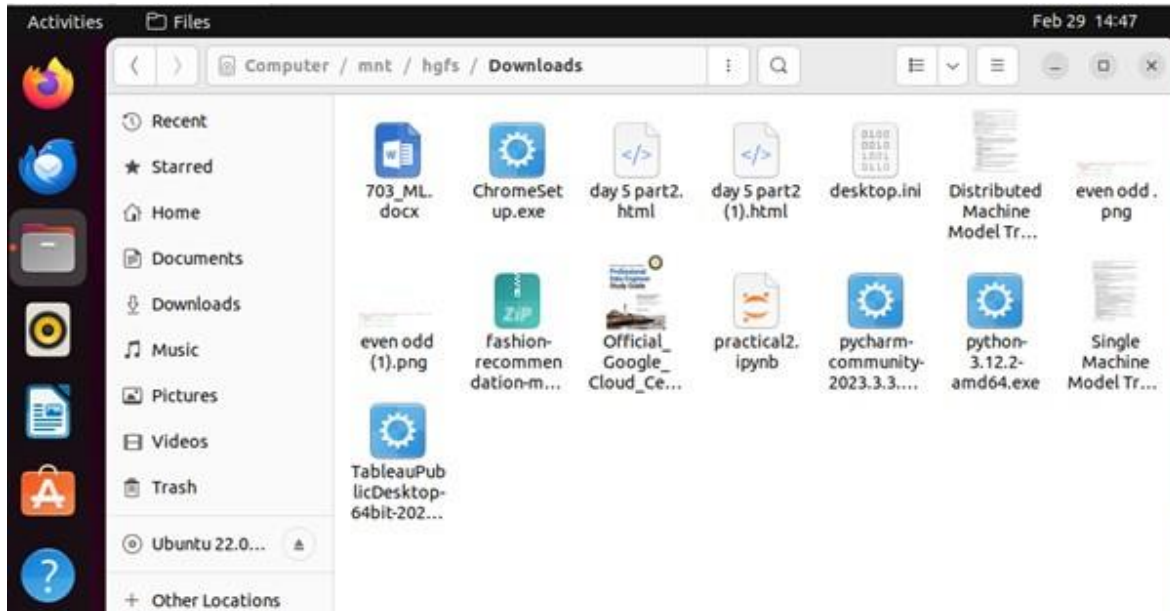
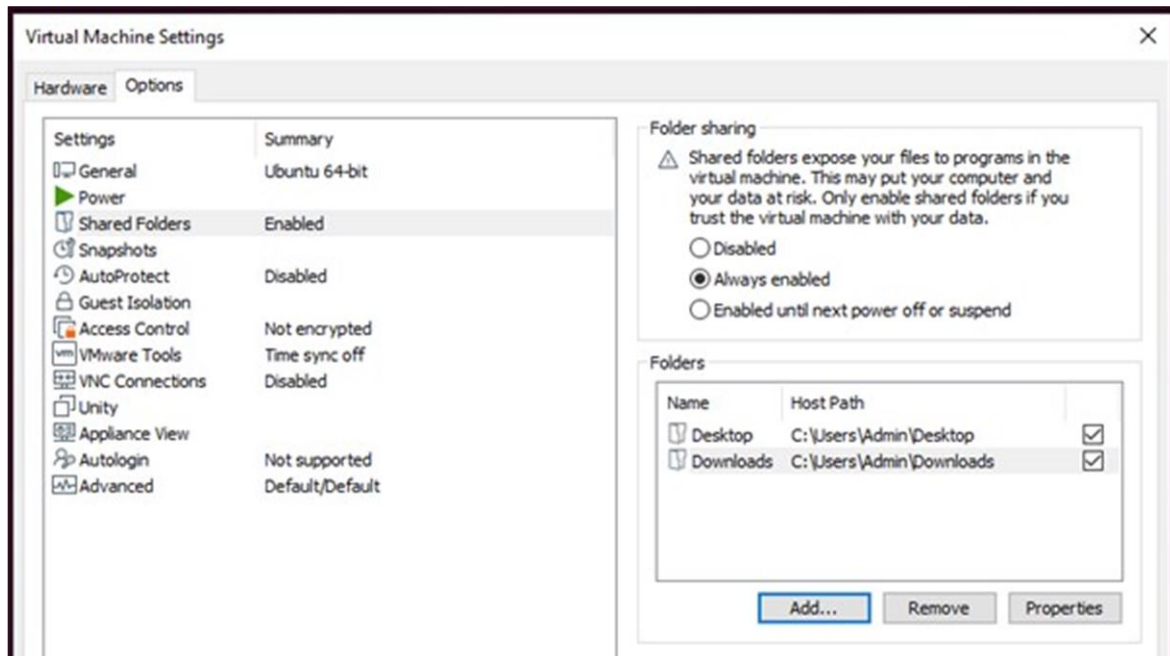
Signature:- \_\_\_\_\_

## Practical 6 - Transfer files from one host machine to another virtual machine.

#open VMware workstation pro

Start ubuntu

vm>setting>optional>shared folder-enable >always enabled>browser>go to mnt folder

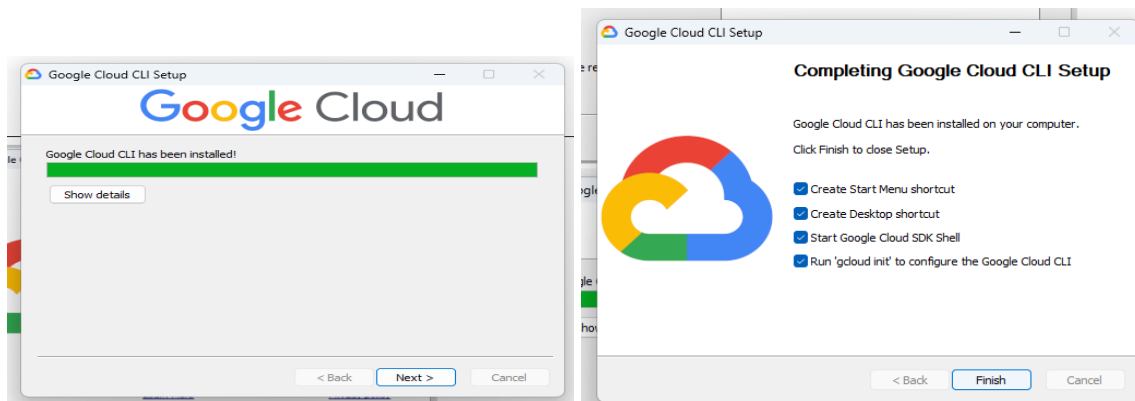
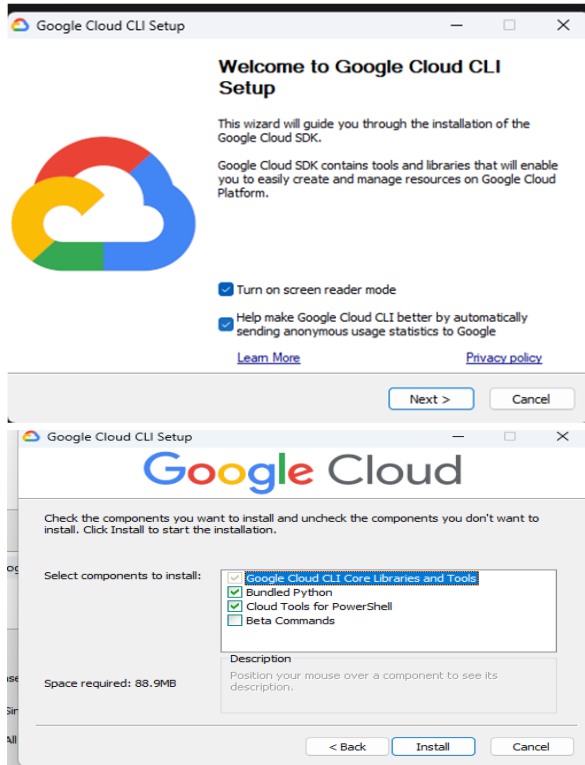


Signature:- \_\_\_\_\_

## Practical 7 - Installation of Google app engine. Launch a web application using GAE launcher.

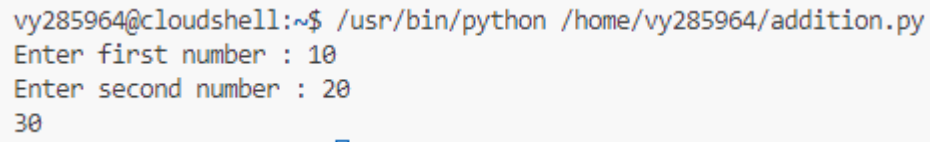
Download CloudSDK installer (Drive -cc prac Folder)

Open CloudSdk - Next \_ I Agree - Click SingleUser - Next -Next - Install



### Walkthrough in Cloud Shell Editor

```
a= int(input("Enter first number : "))  
b=int(input("Enter second number : "))  
c=a+b  
print(c)
```



A screenshot of a Cloud Shell terminal window. The prompt is 'vy285964@cloudshell:~\$'. The user has entered the command '/usr/bin/python /home/vy285964/addition.py'. The output shows the program's prompts and inputs: 'Enter first number : 10', 'Enter second number : 20', and the final result '30'. The terminal text is as follows:

```
vy285964@cloudshell:~$ /usr/bin/python /home/vy285964/addition.py  
Enter first number : 10  
Enter second number : 20  
30
```

Signature:- \_\_\_\_\_

**Practical 8** - Using the software like JDK 1.7/1.8. design and develop web application using MVC Framework.

**Employee**

```
// class that represents model
public class Employee {
// declare the variables
private String EmployeeName;
private String EmployeeID;
private String EmployeeDepartment;
// defining getter and setter methods
public String getID() {
return EmployeeID;
}
public void setID(String ID) {
this.EmployeeID=ID;
}
public String getName() {
return EmployeeName;
}
public void setName(String Name) {
this.EmployeeName=Name;
}
public String getDepartment() {
return EmployeeDepartment;
}
public void setDepartment(String Department) {
this.EmployeeDepartment=Department;
}
}
```

**EmployeeController**

```
// class which represent the controller
public class EmployeeController {
// declaring the variables model and view
private Employee model;
private EmployeeView view;
// constructor to initialize
public EmployeeController(Employee model,EmployeeView view){
this.model=model;
this.view=view;
}
// getter and setter method
```

```

public void setEmployeeName(String
name){ model.setName(name);
}
public String
getEmployeeName(){return
model.getName();
}
public void setEmployeeID(String ID){
model.setID(ID);
}
public String
getEmployeeID(){return
model.getID();
}
public void setEmployeeDepartment(String Department){
model.setDepartment(Department);
}
public String getEmployeeDepartment(){
return model.getDepartment();
}
// method to update view
public void updateview()
{
view.printEmployeeDetails(model.getName(),model.getID(),model.getDepartment());
}
}

```

### **EmployeeView**

// class which represent the

viewpublic class

EmployeeView {

// method to display the Employee details

public void printEmployeeDetails(String EmployeeName,String EmployeeID , String  
EmployeeDepartment) {

System.out.println("Employee Details:");

System.out.println("Name:"+EmployeeName);

System.out.println("EmployeeID:"+ EmployeeID);

System.out.println("Employee Department:"+EmployeeDepartment);

}

}

### **MVCmain**

// main class

public class MVCmain {

public static void main(String[] args){

// fetching the employee record based on the employee\_id from the database

Employee model = retrieveEmployeeFromDatabase();

// creating a view to write Employee details on console

EmployeeView view = new EmployeeView();

EmployeeController controller = new EmployeeController(model,view);

controller.updateview();

// update the model data

controller.setEmployeeName("Nirnay");

System.out.println("\n Employee Details after updating:");

controller.updateview();

}

private static Employee retrieveEmployeeFromDatabase(){

```
Employee abc = new Employee();  
abc.setName("anu");  
abc.setID("11");  
  
abc.setDepartment("salesforce");return  
abc;  
}  
}
```

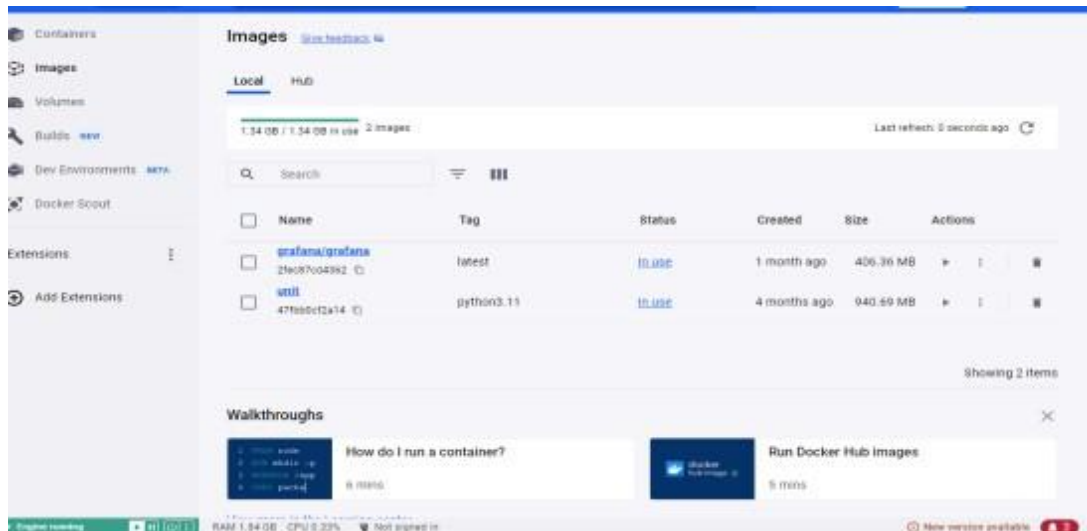
**Terminal** open cmd on download C:\Users\User38\Downloads>javac  
C:\Users\User38\Downloads>javac MVCmain.java  
C:\Users\User38\Downloads>java MVCmain

Signature:- \_\_\_\_\_



## Practical 9 - Installing and configuring Dockers in local host and running multiple images on a Docker Platform.

Install Docker > open docker > go without sign in > go to images



docker desktop

Search: nginx

Ctrl+K

Containers

Images

Volumes

Extensions

Docs

Images (51)

Containers (1)

Volumes (0)

Extensions (1)

Docs (1)

Hub Images (51)

Remote repositories (0)

Local Images (1)

nginx

1B+ · ★ 10K+

unit

100K+ · ★ 21

nginx/nginx

500M+ · ★ 88

nginx/nginx

500M+ · ★ 141

nginx/nginx

50M+ · ★ 36

nginx/nginx

1M+ · ★ 6

nginx/unit

10M+ · ★ 64

unit

php8.2

Pull

Run

DOCKER OFFICIAL IMAGE

100K+ · ★ 21

View on Hub

Updated 6 days ago

docker run unit:php8.2

Note: Additional parameters might be required. See full image description below to learn more.

Official build of NGINX Unit: Universal Web App Server

Quick reference

- Maintained by: [the Unit Docker Maintainers](#)
- Where to get help: [the GitHub issues page](#), the [NGINX Community Slack](#)

Supported tags and respective Dockerfile links

running

RAM 3.20 GB CPU 0.33% Signed in

New version available

nginxinc/nginx-s3-gateway:latest

17c02b82dc31

Exited (1) (0 s)

Logs

Inspect

Bind mounts

Exec

Files

Stats

```

2024-02-24 12:38:03 /docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform co
2024-02-24 12:38:03 /docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
2024-02-24 12:38:03 /docker-entrypoint.sh: Launching /docker-entrypoint.d/00-check-for-required-env.sh
2024-02-24 12:38:03 Required S3_BUCKET_NAME environment variable missing
2024-02-24 12:38:03 Required S3_SERVER environment variable missing
2024-02-24 12:38:03 Required S3_SERVER_PORT environment variable missing
2024-02-24 12:38:03 Required S3_SERVER_PROTO environment variable missing
2024-02-24 12:38:03 Required S3_REGION environment variable missing
2024-02-24 12:38:03 Required S3_STYLE environment variable missing
2024-02-24 12:38:03 Required ALLOW_DIRECTORY_LIST environment variable missing
2024-02-24 12:38:03 Required AWS_SIGS_VERSION environment variable missing
2024-02-24 12:38:03 Required AWS_ACCESS_KEY_ID environment variable missing
2024-02-24 12:38:03 Required AWS_SECRET_ACCESS_KEY environment variable missing
2024-02-24 12:38:03 S3_SERVER_PROTO contains an invalid value (). Valid values: http, https
2024-02-24 12:38:03 AWS_SIGS_VERSION contains an invalid value (). Valid values: 2, 4

```

Signature:- \_\_\_\_\_

## Practical 10 - Install and Configure Puppet.

Open command line with puppet (Run as administration)

start puppet

puppet config print rundir

```
C:/ProgramData/PuppetLabs/puppet/var/run
```

puppet config set rundir /var/run/puppetlabs/puppet

describe --list

```
These are the types known to puppet:
augeas          - @summary Apply a change or an array of change ...
cron            - @summary Installs and manages cron jobs
exec            - Executes external commands
file            - Manages files, including their content, owner ...
filebucket      - A repository for storing and retrieving file ...
group           - Manage groups
host            - @summary Installs and manages host entries
mount           - @summary Manages mounted filesystems, includi ...
notify          - Sends an arbitrary message, specified as a st ...
package         - Manage packages
resources       - This is a metatype that can manage other reso ...
schedule        - Define schedules for Puppet
scheduled_task  - @summary Installs and manages Windows Schedul ...
selboolean      - @summary Manages SELinux booleans on systems ...
selmodule       - @summary Manages loading and unloading of SEL ...
service         - Manage running services
ssh_authorized_key - @summary Manages SSH authorized keys
sshkey          - @summary Installs and manages ssh host keys
stage           - A resource type for creating new run stages
tidy            - Remove unwanted files based on specific crite ...
user            - Manage users
whit            - Whits are internal artifacts of Puppet's curr ...
yumrepo         - @summary The client-side description of a yum ...
zfs             - @summary Manage zfs
zone            - @summary Manages Solaris zones
zpool           - @summary Manage zpools
```

puppet describe file --provider

```

file
====
Manages files, including their content, ownership, and permissions.
The 'file' type can manage normal files, directories, and symlinks;
type should be specified in the 'ensure' attribute.
File contents can be managed directly with the 'content' attribute,
downloaded from a remote source using the 'source' attribute; the l
can also be used to recursively serve directories (when the 'recurse
attribute is set to 'true' or 'local'). On Windows, note that file
contents are managed in binary mode; Puppet never automatically tra
line endings.
**Autorequires:** If Puppet is managing the user or group that owns
file, the file resource will autorequire them. If Puppet is managin
parent directories of a file, the file resource autorequires them.
Warning: Enabling 'recurse' on directories containing large numbers
files slows agent runs. To manage file attributes for many files,
consider using alternative methods such as the 'chmod_r', 'chown_r'
or 'recursive_file_permissions' modules from the Forge.

Parameters
-----

```

puppet node find somenode.puppetlabs.lan --terminus plain  
--render-as yaml

```

--- !ruby/object:Puppet::Node
name: somenode.puppetlabs.lan
environment: production
parameters:
  aio_agent_version: 8.4.0
  dmi:
    manufacturer: ASUSTeK COMPUTER
    product:
      name: ASUS EXPERTCENTER D500TC
      serial_number: N3PFCG00C216118
      uuid: 354C50CA-7318-4642-BA54-4FDEB33896EC
  env_windows_installdir: C:\Program Files\Puppet Labs\Puppet
  facterversion: 4.5.2
  fips_enabled: false
  identity:
    privileged: true
    user: DESKTOP-C5MNMNK\User 21
  is_virtual: false
  kernel: windows
  kernelmajversion: '10.0'
  kernelrelease: 10.0.22621
  kernelversion: 10.0.22621
  memory:
    system:
      available: 10.38 GiB
      available_bytes: 11145252864
      capacity: 34.18%
      total: 15.77 GiB
      total_bytes: 16933945344
      used: 5.39 GiB
      used_bytes: 5788692480
  networking:
    dhcp: 172.16.0.1

```

puppet facts find

```

{
  "name": "desktop-c5mnmnk",
  "values": {
    "aio_agent_version": "8.4.0",
    "dmi": {
      "manufacturer": "ASUSTeK COMPUTER INC.",
      "product": {
        "name": "ASUS EXPERTCENTER D500TC_D500TC",
        "serial_number": "N3PFCG00C216118",
        "uuid": "354C50CA-7318-4642-BA54-4FDEB33896EC"
      }
    },
    "env_windows_installdir": "C:\\Program Files\\Puppet Labs\\Puppet",
    "facterversion": "4.5.2",

```

Signature:- \_\_\_\_\_

## Practical 11 - Install and Configure IBM Bluemix.

C:\Users\User 21>ibmcloud help

```
NAME:
  ibmcloud - A command line tool to interact with IBM Cloud
  Find more information at: https://ibm.biz/cli-docs

USAGE:
  [environment variables] ibmcloud [global options] command [arguments...] [command options]

VERSION:
  2.23.0+eca5d10-2024-01-31T20:36:03+00:00
```

C:\Users\User 21>ibmcloud plugin repo-plugins

Status	Name	Versions	Description
Not Installed	container-registry[cr]	1.3.5, 1.3.4, 1.3.1...	Manage IBM Cloud Container Registry content and configuration.
Not Installed	container-service[kubernetes-service/ks]	1.0.597, 1.0.596, 1.0.595...	Manage IBM Cloud Kubernetes Service clusters
Not Installed	cloud-functions[wsk/functions/fn]	1.0.79, 1.0.78, 1.0.76...	Manage IBM Cloud Functions
Not Installed	cloud-internet-services[cis]	1.15.11, 1.15.10, 1.15.8...	Manage IBM Cloud Internet Services

C:\Users\User 21>ibmcloud plugin install code-engine

```
Looking up 'code-engine' from repository 'IBM Cloud'...
Plug-in 'code-engine[ce] 1.49.5' found in repository 'IBM Cloud'
Attempting to download the binary file...
 58.66 MiB / 58.66 MiB [=====] 100.00% 1m24s
61513728 bytes downloaded
Installing binary...
OK
Plug-in 'code-engine 1.49.5' was successfully installed into C:\Users\User 21\.bluemix\plugins\code-engine. Use 'ibmcloud plugin show code-engine' to show its details.
```

C:\Users\User 21>ibmcloud plugin repo-plugins

Status	Name	Versions	Description
Installed	code-engine[ce]	1.49.5, 1.49.4, 1.49.3...	Manage code-engine components

C:\Users\User 21>ibmcloud plugin install -a



```

FAILED
Unable to download the plug-in binary from the URL https://download.clis.cloud.ibm.com/ibm-cloud-cli-plugin/tke/1.4.1/tke-windows-amd64-1.4.1.exe.
Error: Get "https://download.clis.cloud.ibm.com/ibm-cloud-cli-plugin/tke/1.4.1/tke-windows-amd64-1.4.1.exe": dial tcp: lookup download.clis.cloud.ibm.com: no such host
Try again later.

Installing plug-in 'cloud-object-storage[cos] 1.8.0'...
Attempting to download the binary file...
 16.28 MiB / 16.28 MiB [=====] 100.00% 26s
17072640 bytes downloaded
Installing binary...
OK
Plug-in 'cloud-object-storage 1.8.0' was successfully installed into C:\Users\User 21\bluemix\plugins\cloud-object-storage. Use 'ibmcloud plugin show cloud-object-storage' to show its details.

Installing plug-in 'event-streams[es] 2.5.1'...
Attempting to download the binary file...
 9.87 MiB / 9.87 MiB [=====] 100.00% 14s
10346496 bytes downloaded
Installing binary...
OK
Plug-in 'event-streams 2.5.1' was successfully installed into C:\Users\User 21\bluemix\plugins\event-streams. Use 'ibmcloud plugin show event-streams' to show its details.

```

C:\Users\User 21>ibmcloud plugin repo-plugins

```

Hyper Protect Virtual Server service
Installed secrets-manager[sm] 2.0.4, 2.0.3, 2.0.2... Manag
BM Cloud Secrets Manager secrets and secret groups.
Installed app-configuration[ac] 1.0.14, 1.0.13, 1.0.12... Inter
with IBM Cloud App Configuration service instance
Installed doi[doi] 0.4.5, 0.4.3, 0.4.2... Integ
e with DevOps Insights service
Installed logging 0.0.8, 0.0.7, 0.0.6... Manag
BM Cloud logging
Installed clouddant[cl] 0.2.0, 0.1.4, 0.1.3... Manag
loudant service
Installed hpcs-cert-mgr[hpcs-cert-mgr] 1.1.0, 1.0.0 Manag
he client certificates for IBM Cloud Hyper Protect Crypto Services
Installed atracker[at] 0.4.9, 0.4.8, 0.4.5... Manag
BM Cloud Activity Tracker Event Routing
Installed analytics-engine-v3[ae-v3] 2.5.0, 2.4.0, 2.3.0... Manag
erverless Spark instances and run applications
Installed cra[cra] 2.1.5, 2.1.4, 2.1.2... Integ
e with Code Risk Analyzer
Installed event-notifications[en] 1.3.1, 1.3.0, 1.2.0... IBM C
d Event Notifications.
Installed dvaas[watson-query] 1.0.2 Manag
ata virtualization as a service
Installed

```

ibmcloud plugin install container-  
service@1.0.506secrets-manager@0.1.25

```

Looking up 'container-service' from repository 'IBM Cloud'...
Looking up 'secrets-manager' from repository 'IBM Cloud'...
FAILED

```

ibmcloud plugin list

Plugin Name	Version	Status	Private endpoints supported
analytics-engine-v3[ae-v3]	2.5.0		false
app-configuration	1.0.14		true
atracker	0.4.9		true
catalogs-management	2.3.29		true
cbr	1.6.0		true
cloud-dns-services[dns/dns-svcs]	0.7.3		true
cloud-functions[wsk/functions/fn]	1.0.79		false
cloud-internet-services[cis]	1.15.11		true
cloud-object-storage	1.8.0		false
cloudant[cl]	0.2.0		true
code-engine[ce]	1.49.5		true
container-registry[cr]	1.3.5		true
container-service[kubernetes-service/ks]	1.0.597		false
cra	2.1.5		false
dl-cli	0.5.8		true
doi	0.4.5		false
dvaas	1.0.2		false
event-notifications[en]	1.3.1		false
event-streams[es]	2.5.1		true
hpcs-cert-mgr	1.1.0		false
hpnet	1.0.2		false

## ibmcloud plugin update

```
Checking upgrades for all installed plug-ins from repository 'IBM Cloud'...
No updates are available.
```

## ibmcloud plugin install container-registry

```
Looking up 'container-registry' from repository 'IBM Cloud'...
Plug-in 'container-registry[cr] 1.3.5' found in repository 'IBM Cloud'
Plug-in 'container-registry[cr] 1.3.5' was already installed. Do you want to re-install it or not? [y/N] > y
Attempting to download the binary file...
12.41 MiB / 12.41 MiB [=====] 100.00% 6s
13015040 bytes downloaded
Installing binary...
OK
Plug-in 'container-registry 1.3.5' was successfully installed into C:\Users\User 21\bluemix\plugins\container-registry. Use 'ibmcloud plugin show container-registry' to show its details.
```

## ibmcloud api cloud.ibm.com

```
Setting api endpoint...
OK
API endpoint: https://cloud.ibm.com
```

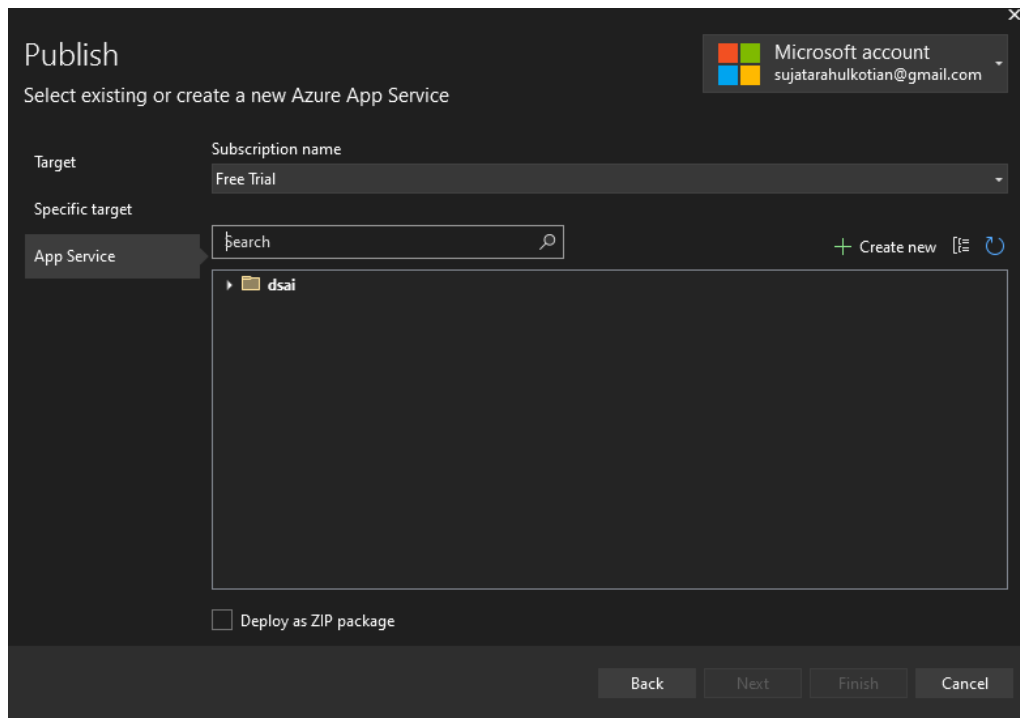
## ibmcloud api

```
API endpoint: https://cloud.ibm.com
```

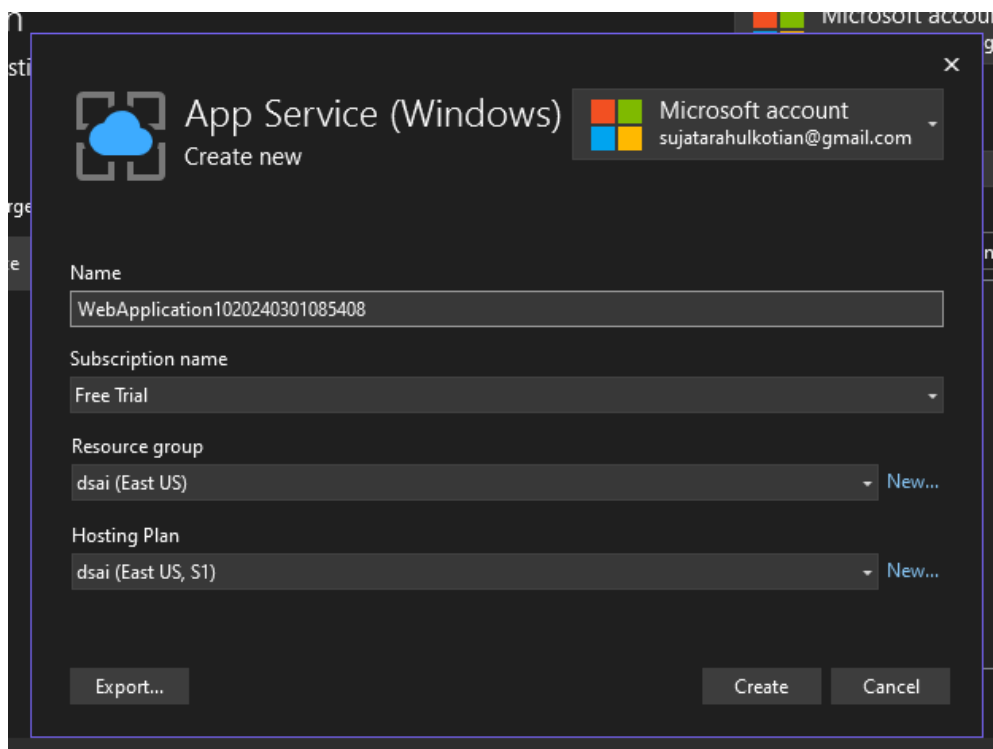
Signature:- \_\_\_\_\_

## Practical 12 - Developing an ASP.NET web based application on the Azure platform

Sign in to your Azure or Microsoft Account

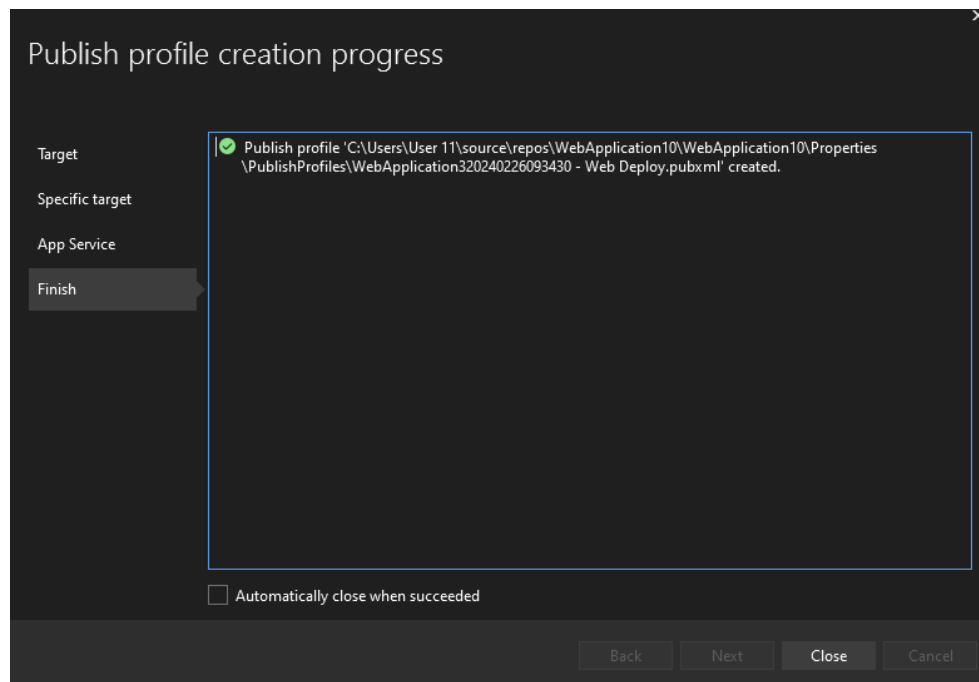


Click on “+Create New” Option

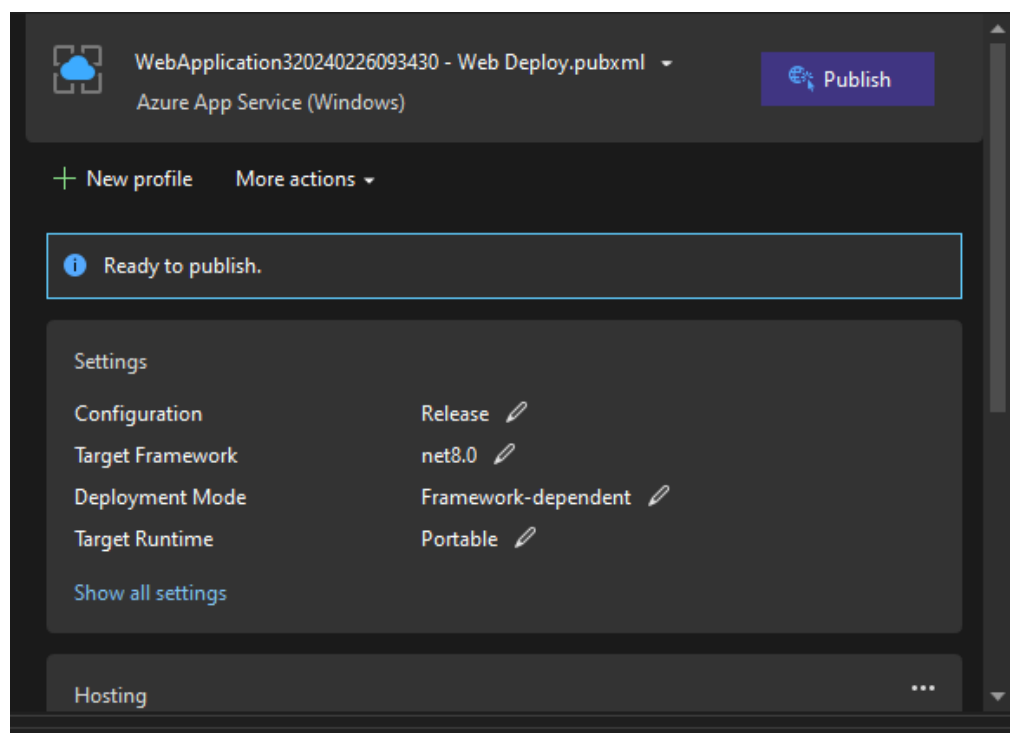


Click on “Create”





Click on Publish



Signature:- \_\_\_\_\_