MALAD KANDIVALI EDUCATION SOCIETY'S

NAGINDAS KHANDWALA COLLEGE OF COMMERCE, ARTS & MANAGEMENT STUDIES & SHANTABEN NAGINDAS KHANDWALA COLLEGE OF SCIENCE

MALAD [W], MUMBAI – 64

AUTONOMOUS INSTITUTION

(Affiliated To University Of Mumbai)

Reaccredited 'A' Grade by NAAC | ISO 9001:2015 Certified

CERTIFICATE

Name: Ms. Zeenat Hafeez Fazale Rab

Roll No: ___578_____ Programme: BSc IT Semester: V

This is certified to be a bonafide record of practical works done by the above student in the college laboratory for the course **CLOUD COMPUTING (Course Code:2154UITCCPR)** for the partial fulfilment of Fifth Semester of BSc IT during the academic year 2021-22.

The journal work is the original study work that has been duly approved in the year 2021-22 by the undersigned.

_____ _____

External Examiner Mrs. Niramaye Deshpande
(Subject-In-Charge)

Date of Examination: (College Stamp)

Name: Zeenat Hafeez Fazale Rab

Class: T.Y. B.Sc. IT Sem- V **Roll No: 578**

Subject: CLOUD COMPUTING (Course Code: 2154UITCCPR)

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Practical 1

Aim: Creating and running virtual machines on Hosted Hypervisors Type 1 – KVM

NOTE: The Practical is not implemented because Laptop is not suppporting it.

Theory:

Kernel-based Virtual Machine (KVM) is open source software that is a full virtualization solution for Linux on x86 hardware containing virtualization extensions (Intel VT or AMD-V). KVM consists of a kernel module, kvm.ko, which provides the core virtualization infrastructure, and a processor-specific module, kvm-intel.ko or kvm-amd.ko, depending on the CPU manufacturer (Intel or AMD). Multiple virtual machines running unmodified Linux or Windows images can can be run using KVM.

A wide variety of guest operating systems work with KVM, including many versions of Linux, BSD, Solaris, Windows, Haiku, ReactOS, and the AROS Research Operating System. Each virtual machine has private virtualized hardware: a network card, disk, graphics adapter, etc. The kernel component of KVM is included in Linux, as of the 2.6.20 kernel version.

KVM's performance is good, but not as good as that of some of the more mature products, such as VMware or VirtualBox. For example, network and graphics speeds are noticeably slower with KVM. In general, KVM performance can offer near-native speed, thanks to its use of Intel VT or AMD-V extensions. As an open source product, it is being very actively developed and is constantly improving

Step 1: Verifying Hardware Support

$ egrep -c '(svm|vmx)' /proc/cpuinfo

Step 2: Installing the KVM Package

$ sudo apt-get install qemu-kvm libvirt-bin bridge-utils virt-manager

Step 3: Adding Your User Account to KVM

$ sudo adduser [username] libvirtd

Step 4: Verifying Successful Installation

$ virsh -c qemu:///system list

Step 5: After the successful installation of KVM, you can start working with it

Step 6: Now create a sample virtual machine through the manager

Step 7: You can create a new virtual machine through the File Menu, Create a new virtual

Machine icon on the toolbar, or through the right-click menu at QEMU/KVM entry under the 'Name'

column.

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Step 8: Select your installation option from the four available options and click the Forward button.

selecting the Local install Media option as the ISO file is already downloaded on my system.

Step 9: Choose the location for installing media. You can wish to install it through a CD ROM or DVD, use an ISO image of the installation package.

Step 10: For 64 bit systems, you can even choose more than 2 GB from the memory available on the host computer. Through this dialog, you can also select the CPU number from the available processors of your system.

Step 11: Click the Forward button after enabling storage.

Step12: Click the Finish button. The installation of your new VM will begin depending on your choices and the installation options you provided.

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Practical 2

Aim: Creating and running virtual machines on Hypervisors Type 1 – ESXI

Theory:

A hypervisor is a form of virtualization software used in Cloud hosting to divide and allocate the resources on various pieces of hardware. The program which provides partitioning, isolation or abstraction is called virtualization hypervisor. The hypervisor is a hardware virtualization technique that allows multiple guest operating systems (OS) to run on a single host system at the same time. A hypervisor is sometimes also called a virtual machine manager(VMM).

The hypervisor runs directly on the underlying host system. It is also known as “Native Hypervisor” or “Bare metal hypervisor”. It does not require any base server operating system. It has direct access to hardware resourcesExamples of Type 1 hypervisors include VMware ESXi, Citrix XenServer and Microsoft Hyper-V hypervisor.

1. ESXI Host is bare metal Type 1 Hypervisor.
2. It is directly install on Physical Server
3. Use to assing Virtual Resources(Cpu, RAM, NIC,Disk) to the Virtual Enviroment.
4. Provide high-speed performance
5. Occupies less than 150 MB of space for installation of ESXI Hostin the system
6. Reduces data center space, power and IT administrative requirements.
7. Consolidate multiple servers onto fewer physical devices

Step 1: Install VMware

Step 2: agree the T&C and click on next

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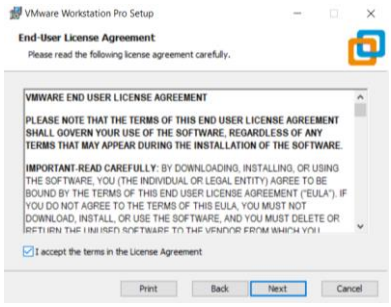
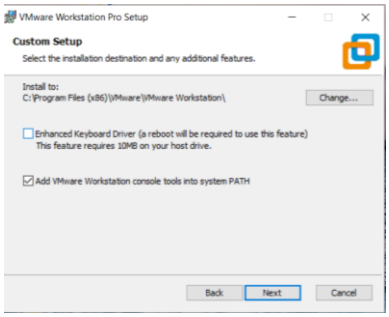
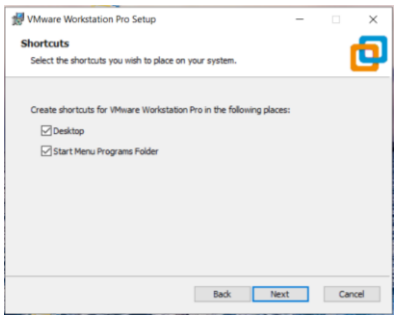


Step 3: select location for installation





Step 4: After Installing VMware click finish button

Step 5: Create new virtual machine wizard

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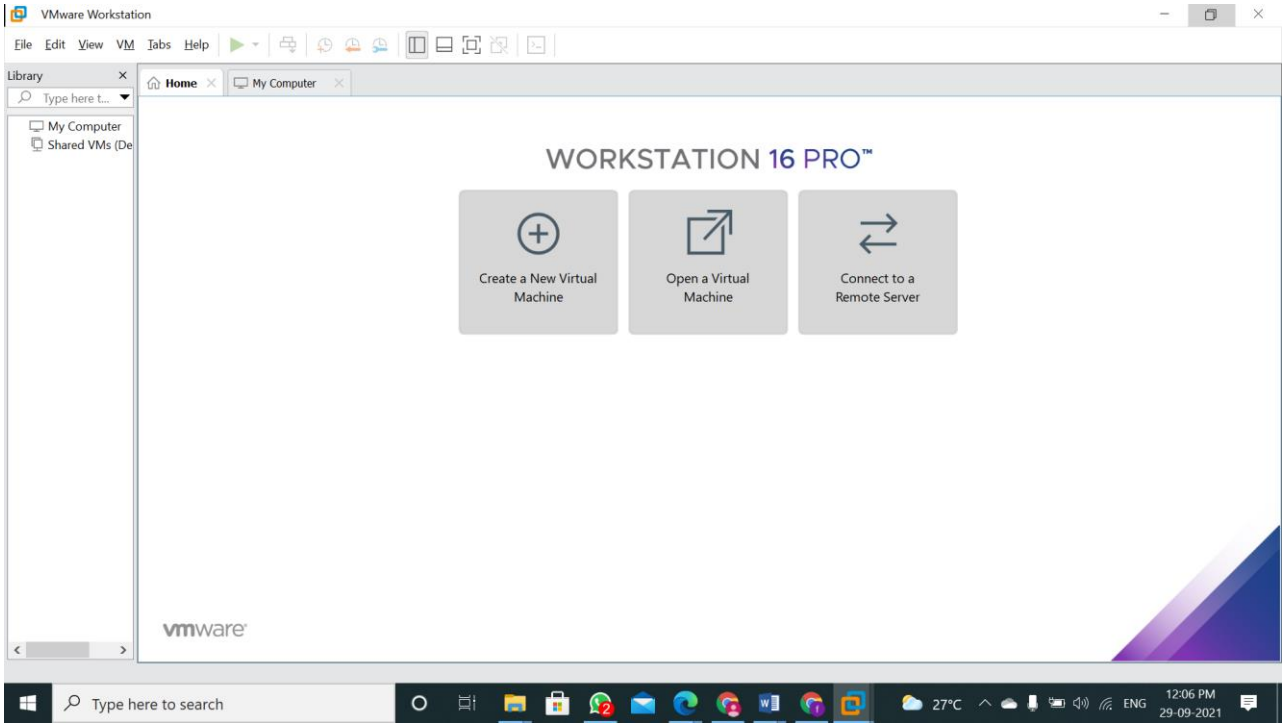

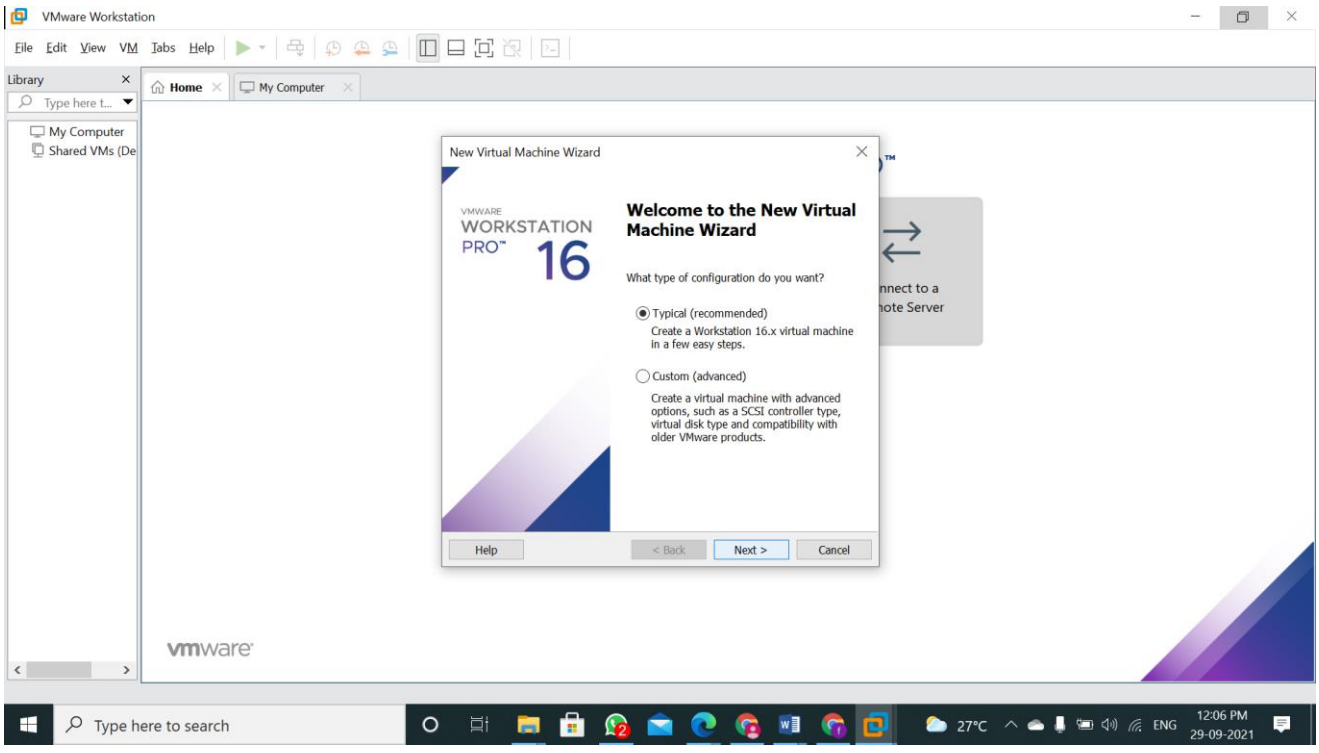

Step 6: choose your ISO image file

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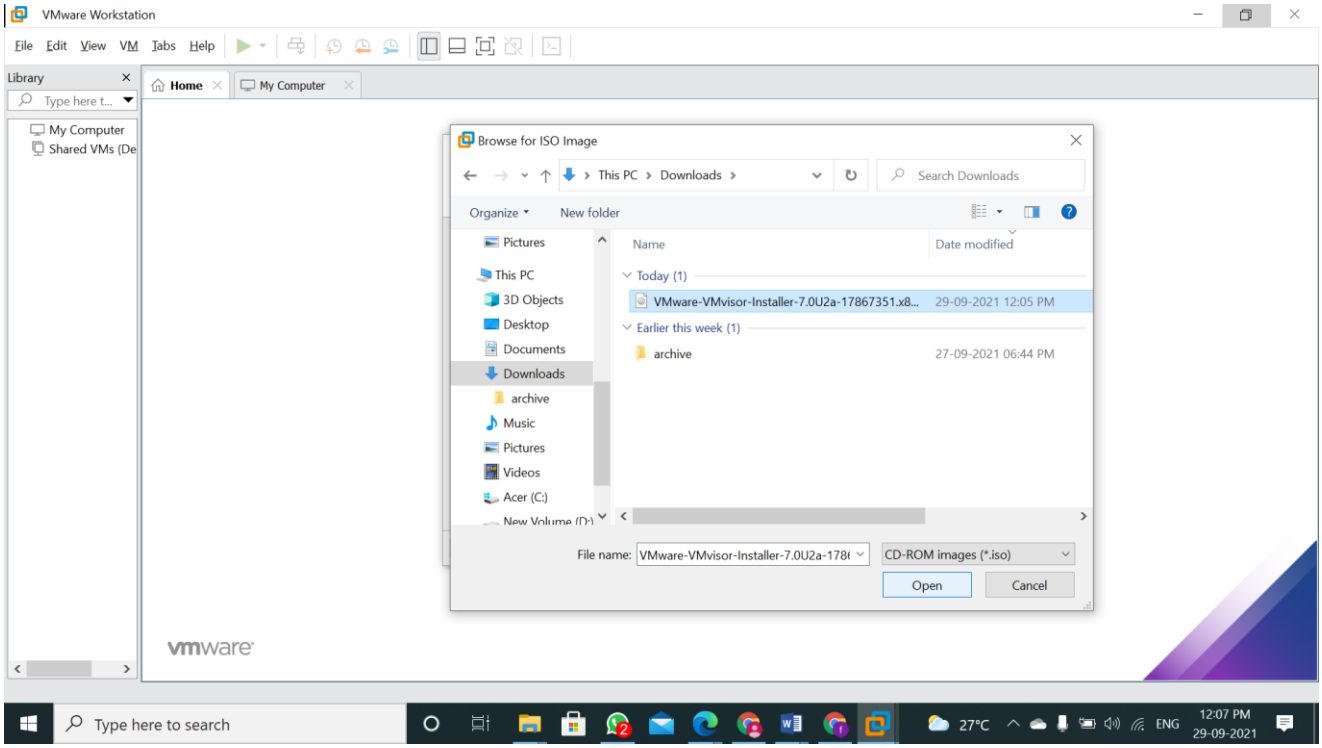
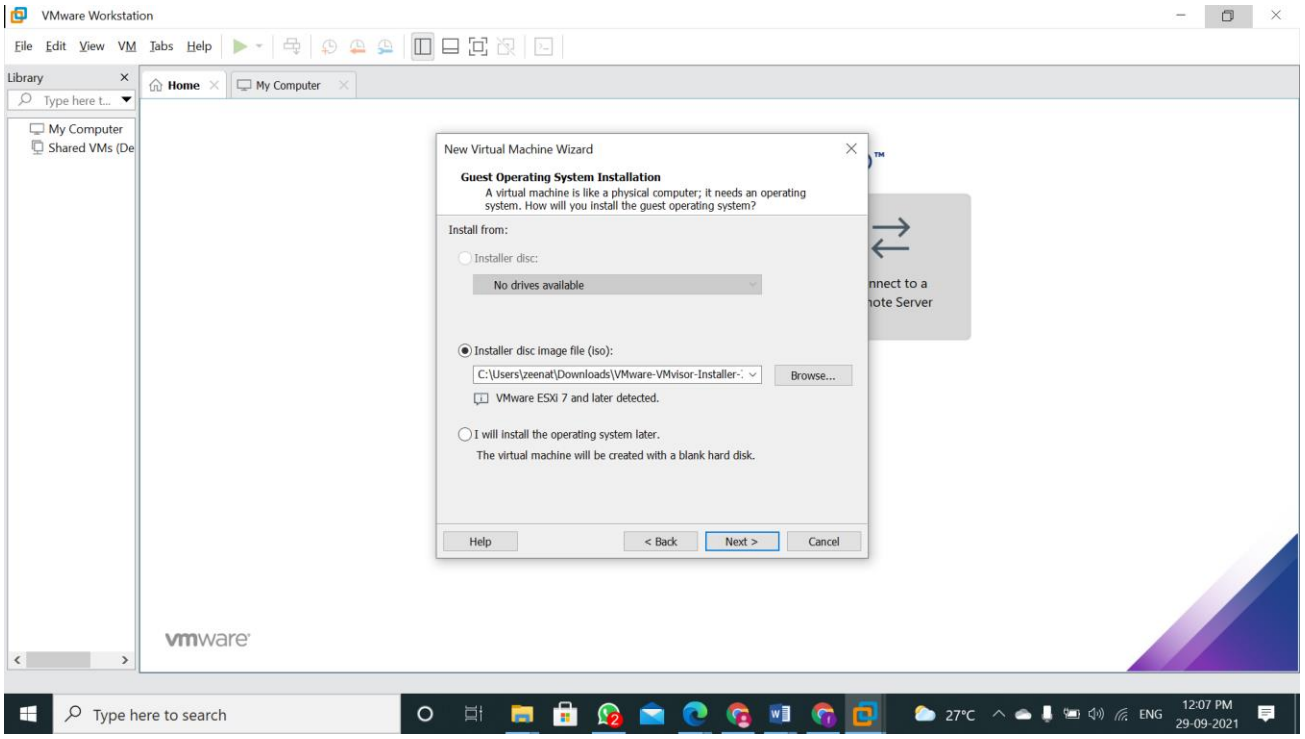


Step 7: choose option I will install operating system later



Step 8: Name the Virtual Machine.

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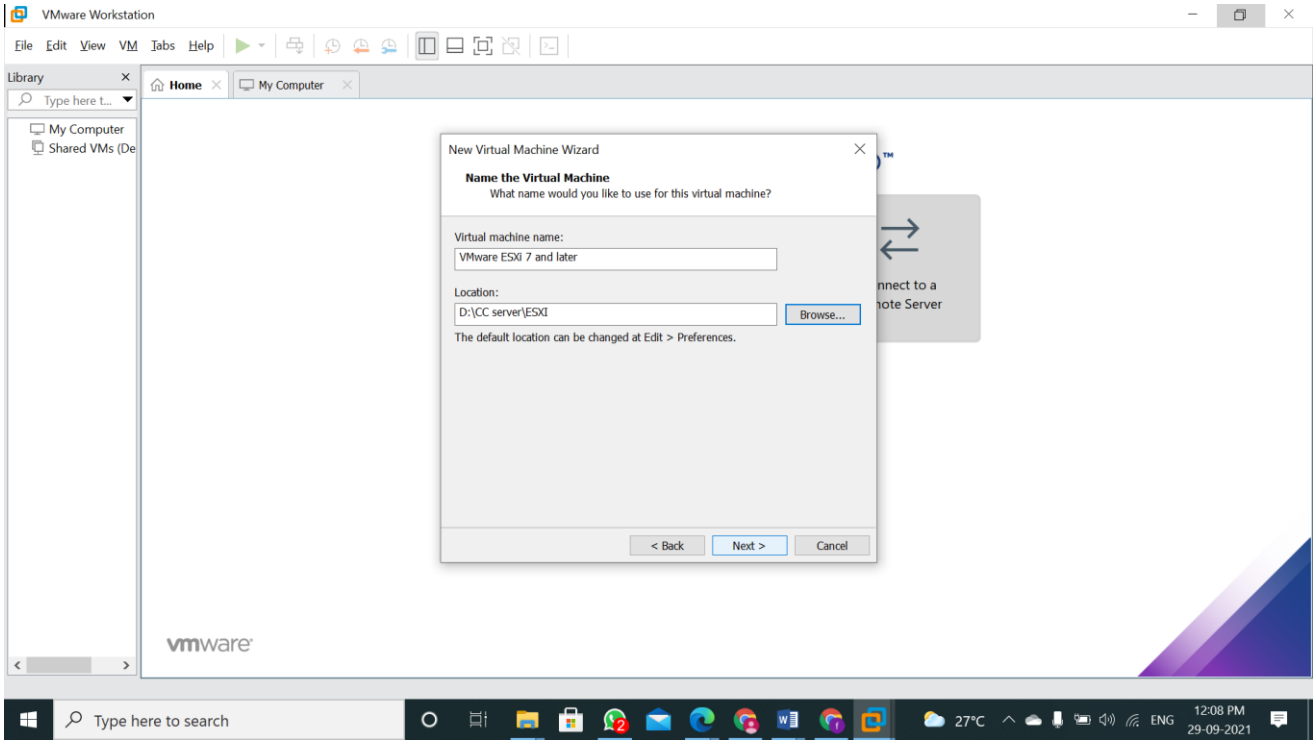
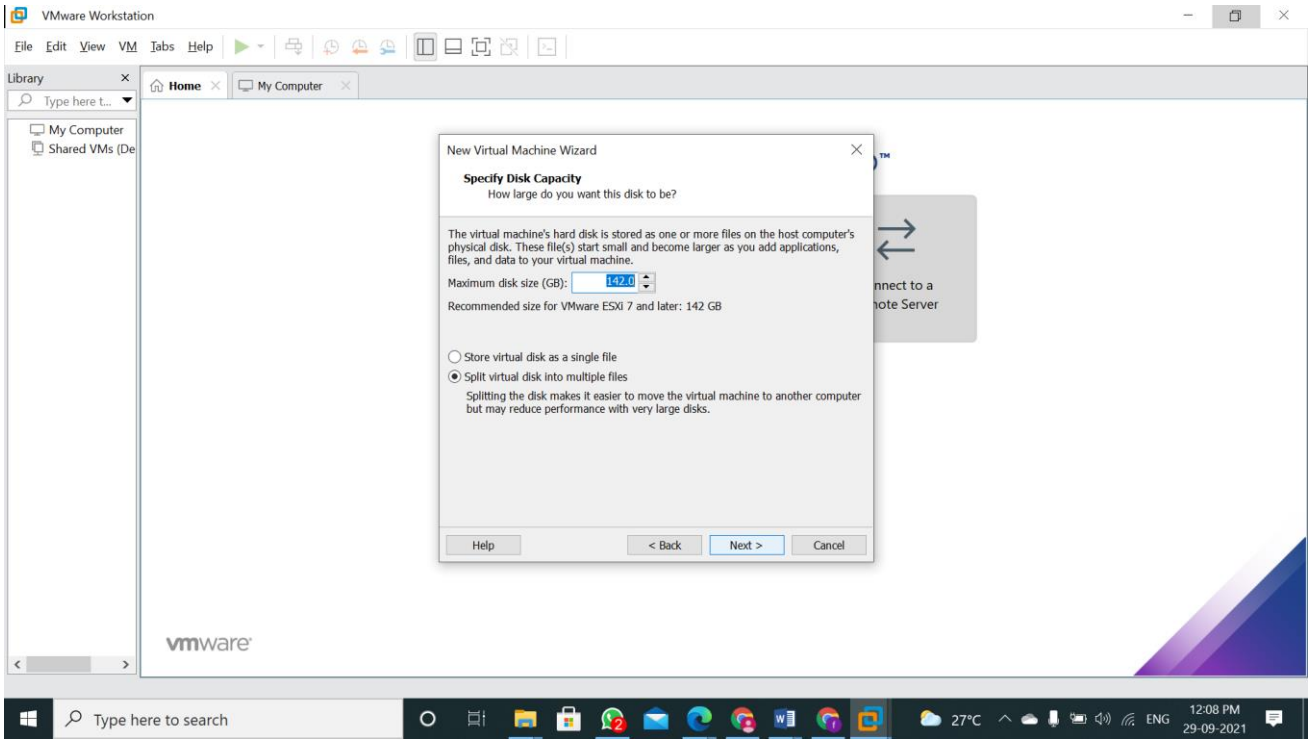
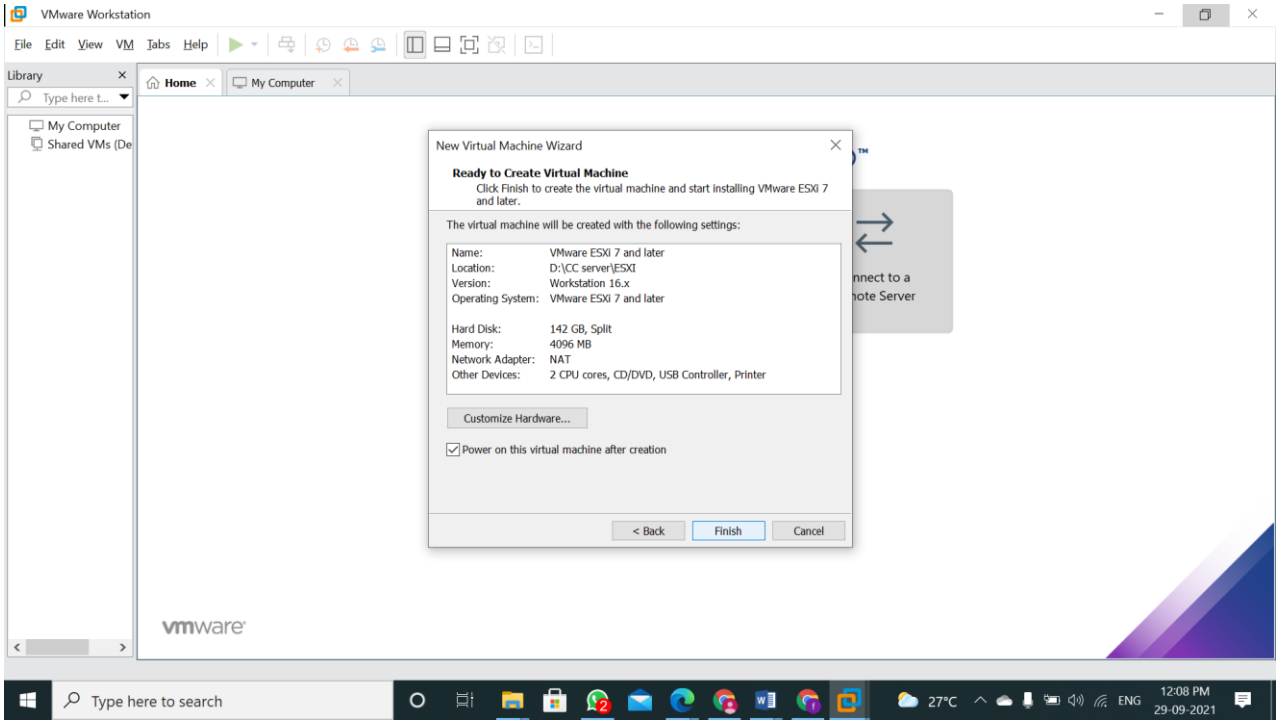


Step 9: Specify the amount of memory and click next

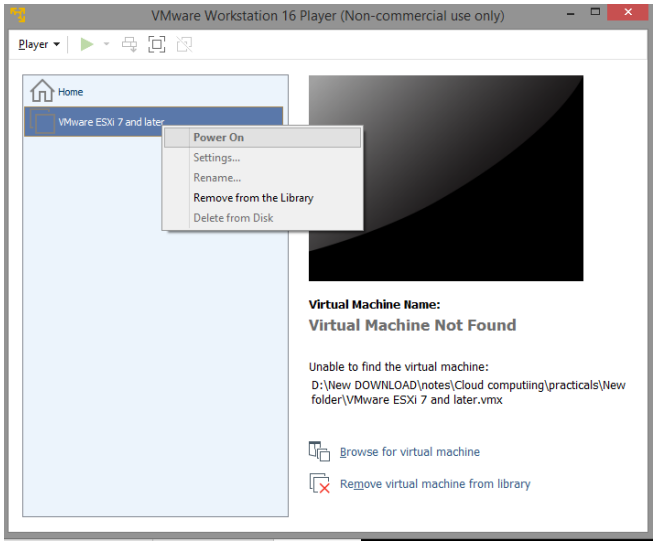


Step 10: Click on finish

Name: Zeenat **Class: TYIT** **Roll no: 578**

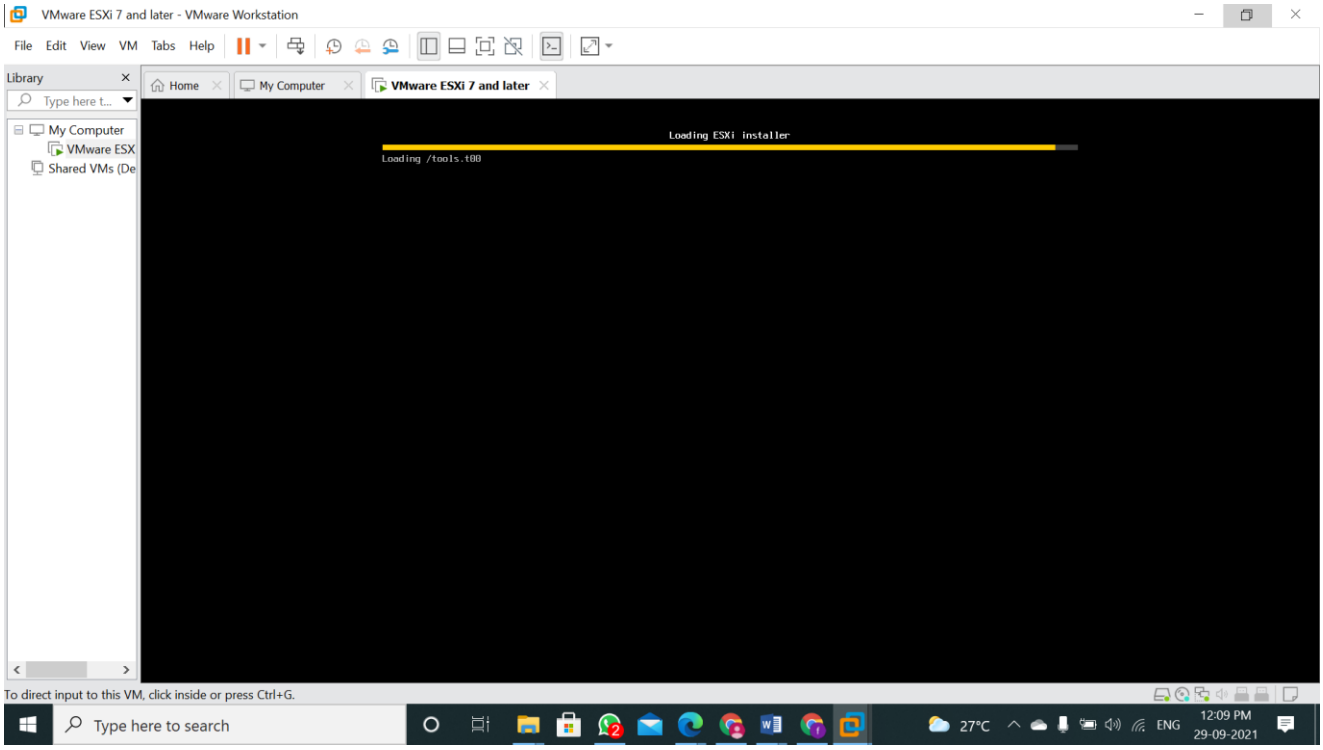


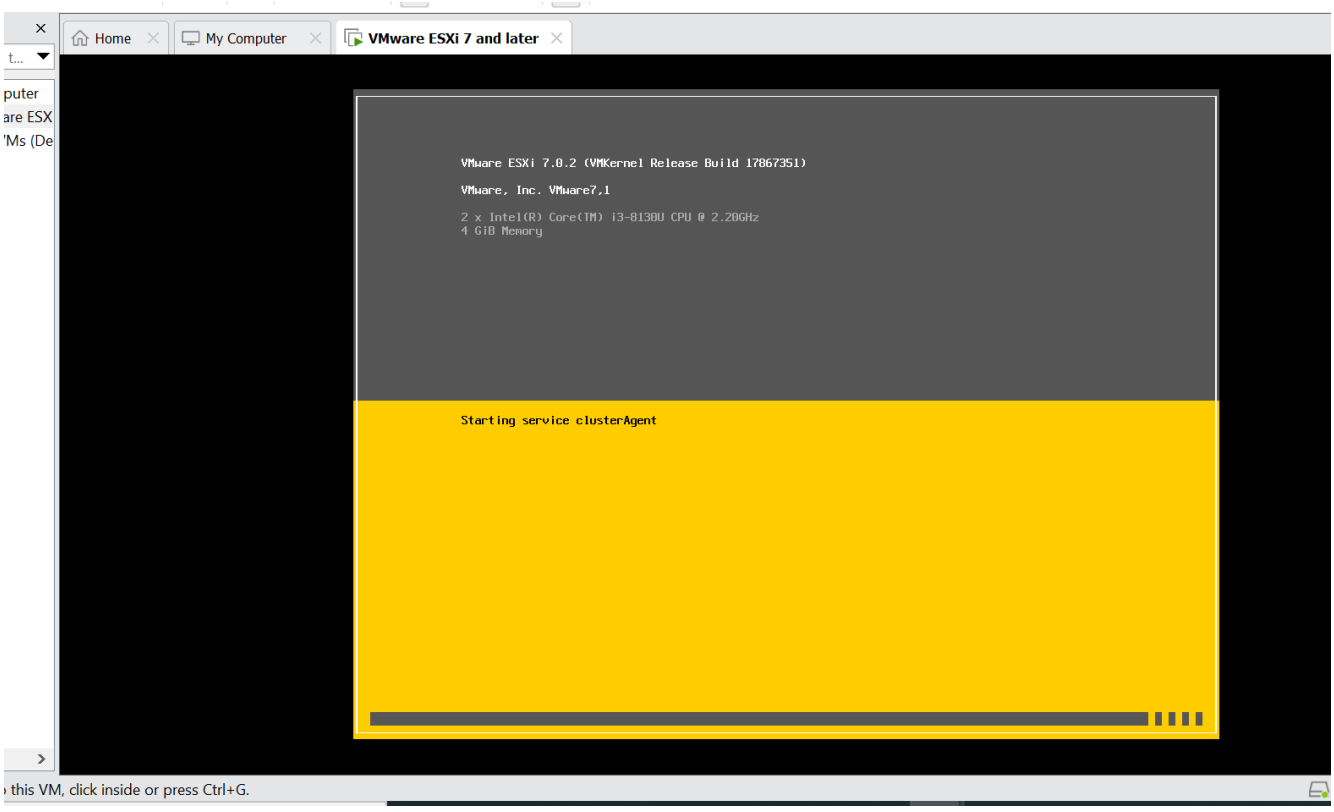
Step 11: Start VMware 16 with ESXI server



Step 12: Loading process of ESXI server.

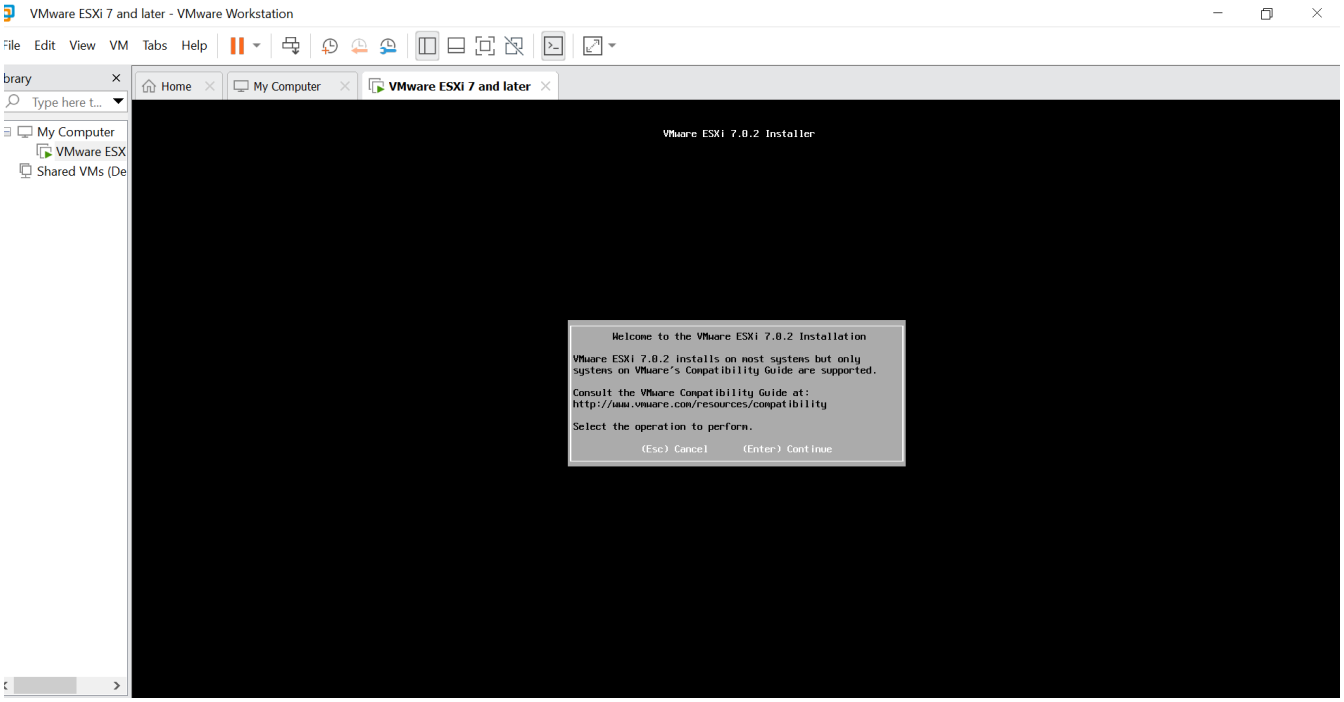
Name: Zeenat **Class: TYIT** **Roll no: 578**



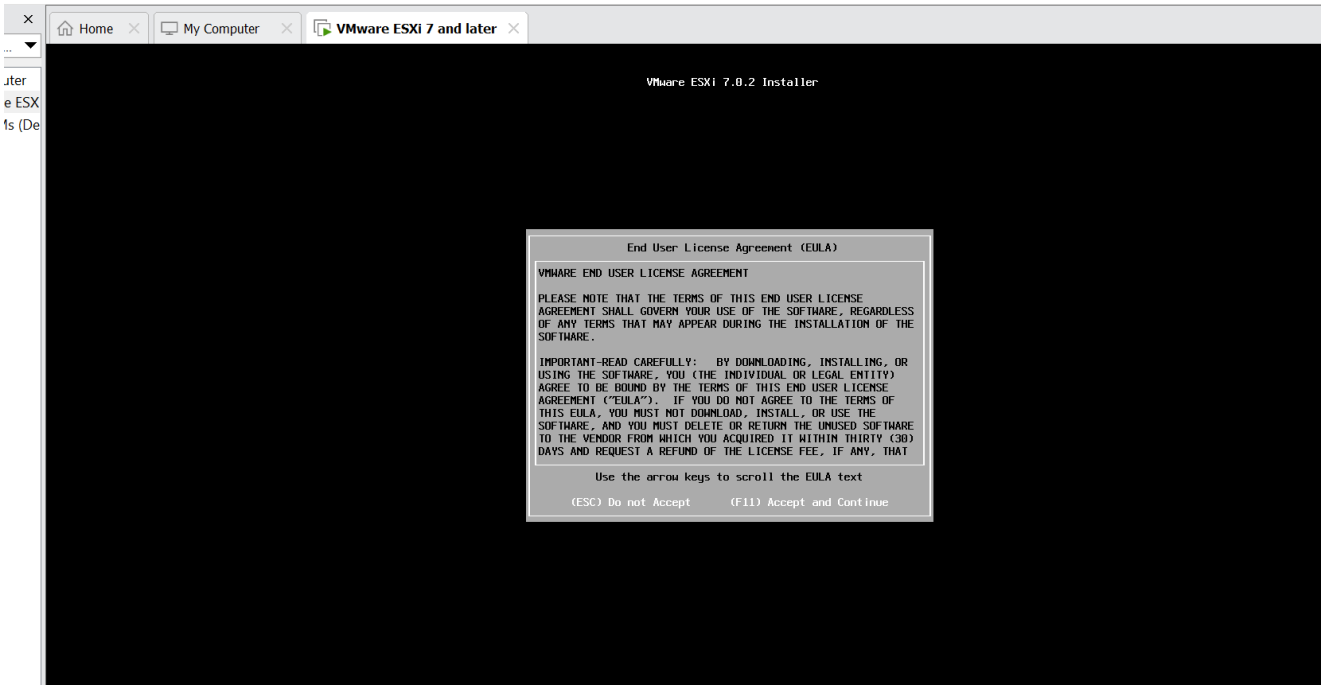


Step 13: Welcome to the Installation

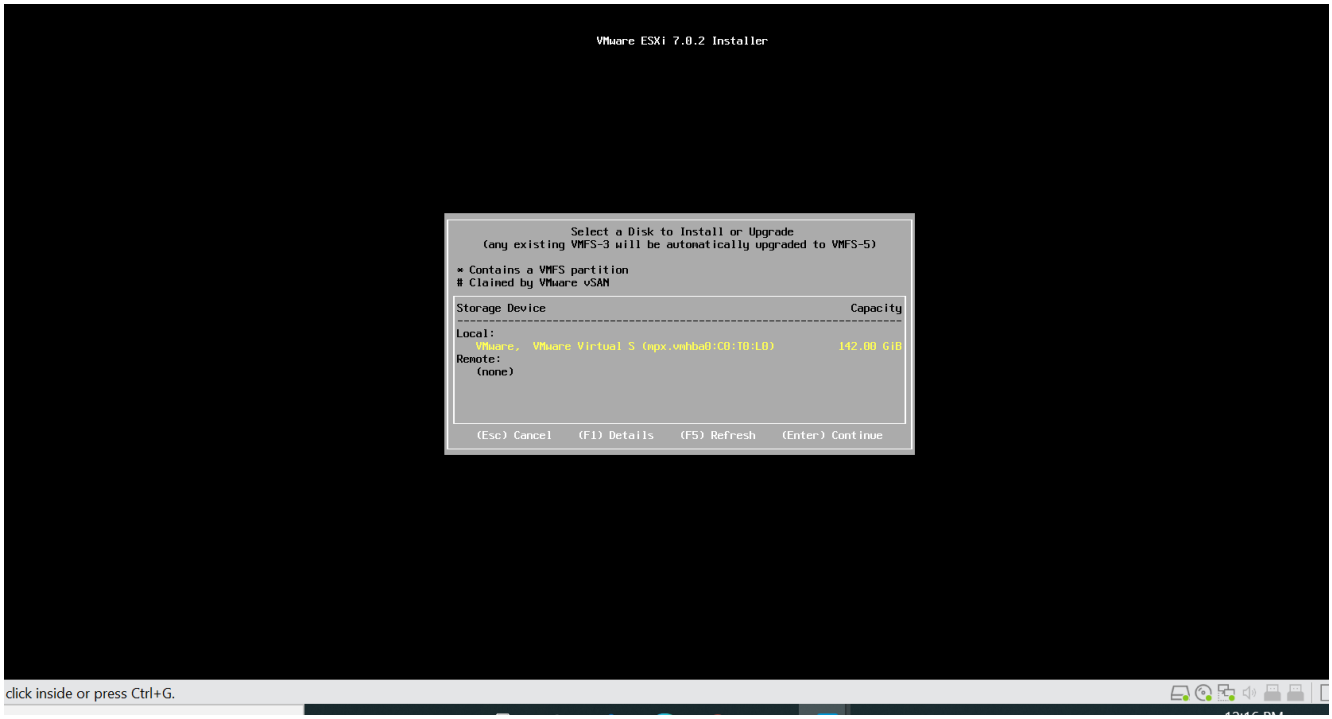
Name: Zeenat **Class: TYIT** **Roll no: 578**

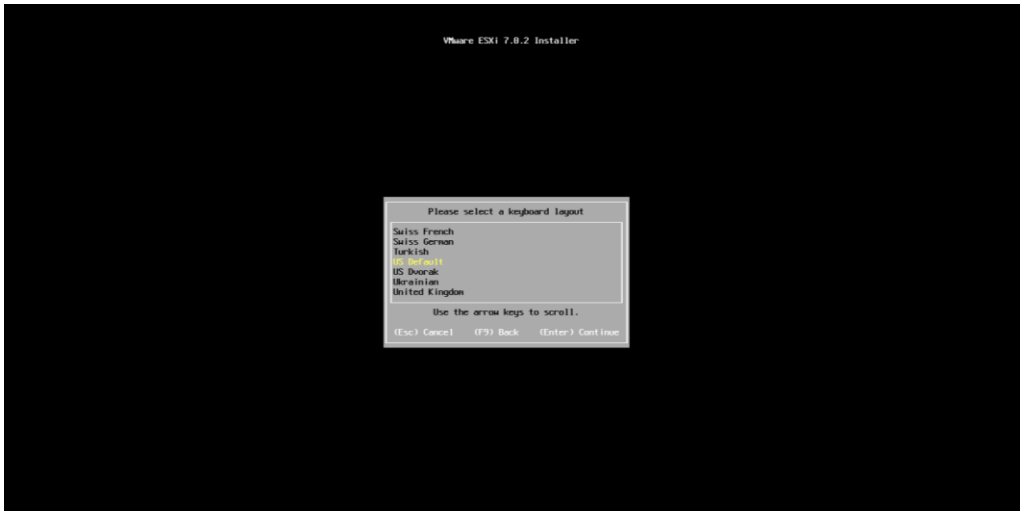


Step 14: Accept End User License Agreement (EULA)



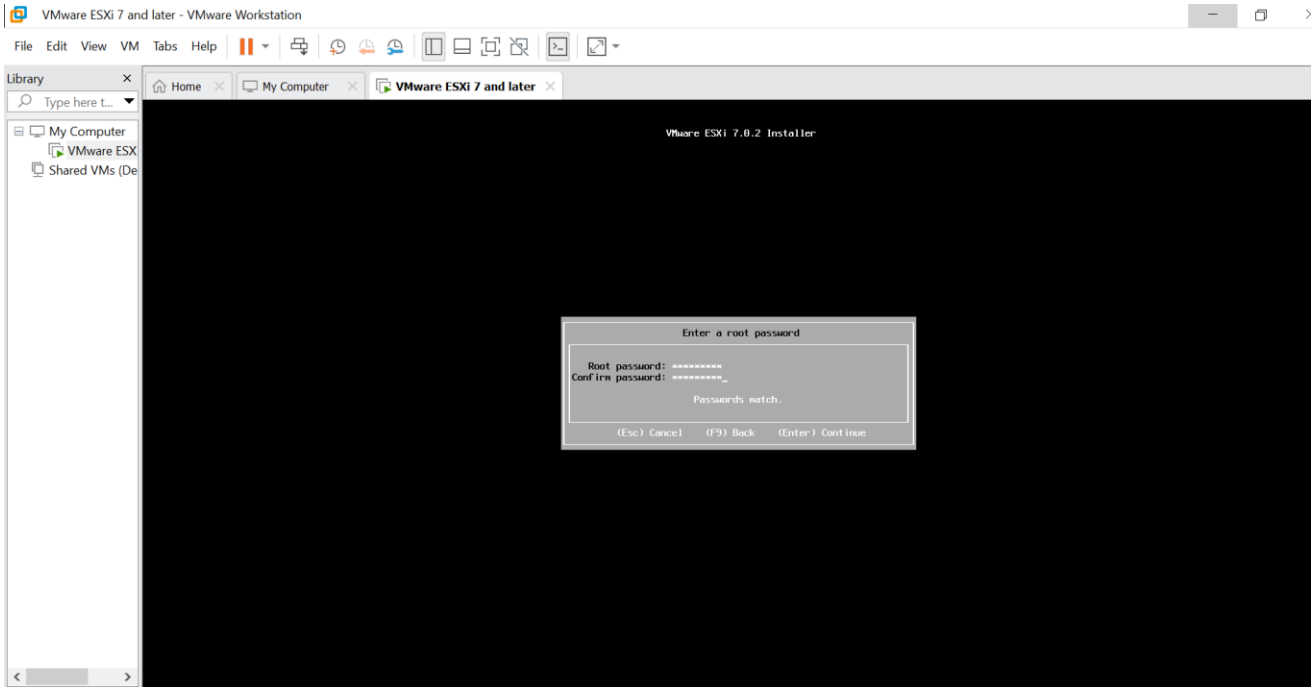
Name: Zeenat **Class: TYIT** **Roll no: 578**



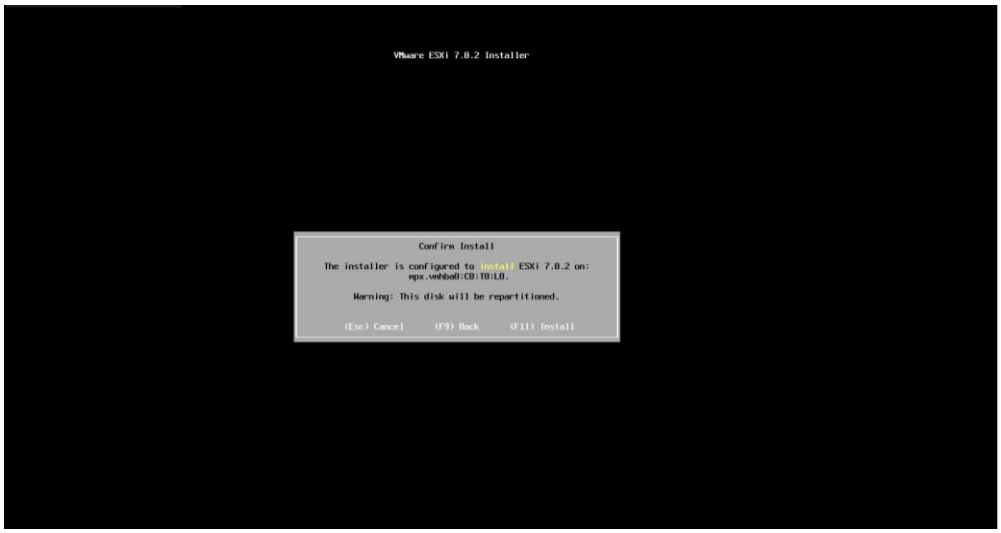


Step 15: Provide Password for Root User

Name: Zeenat **Class: TYIT** **Roll no: 578**



Step 16: Scanning System

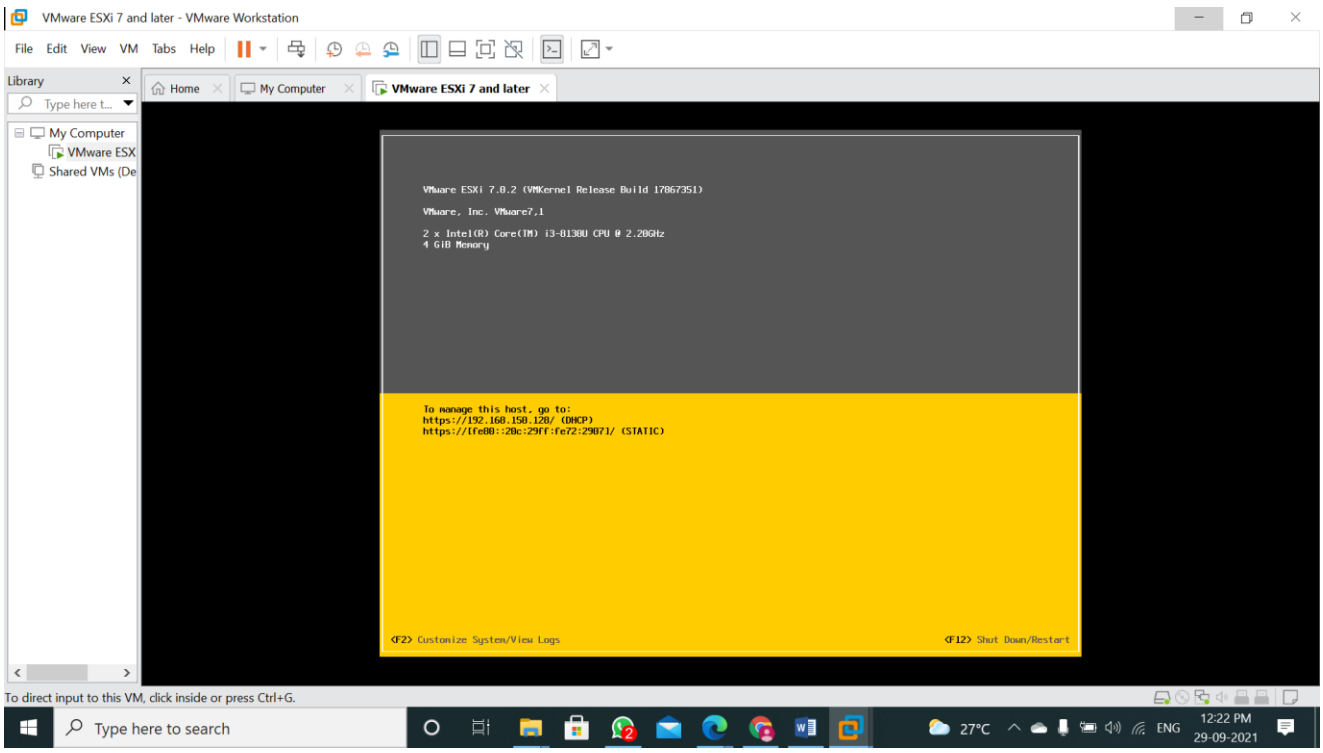


Step 17: Confirm installation

Name: Zeenat **Class: TYIT** **Roll no: 578**

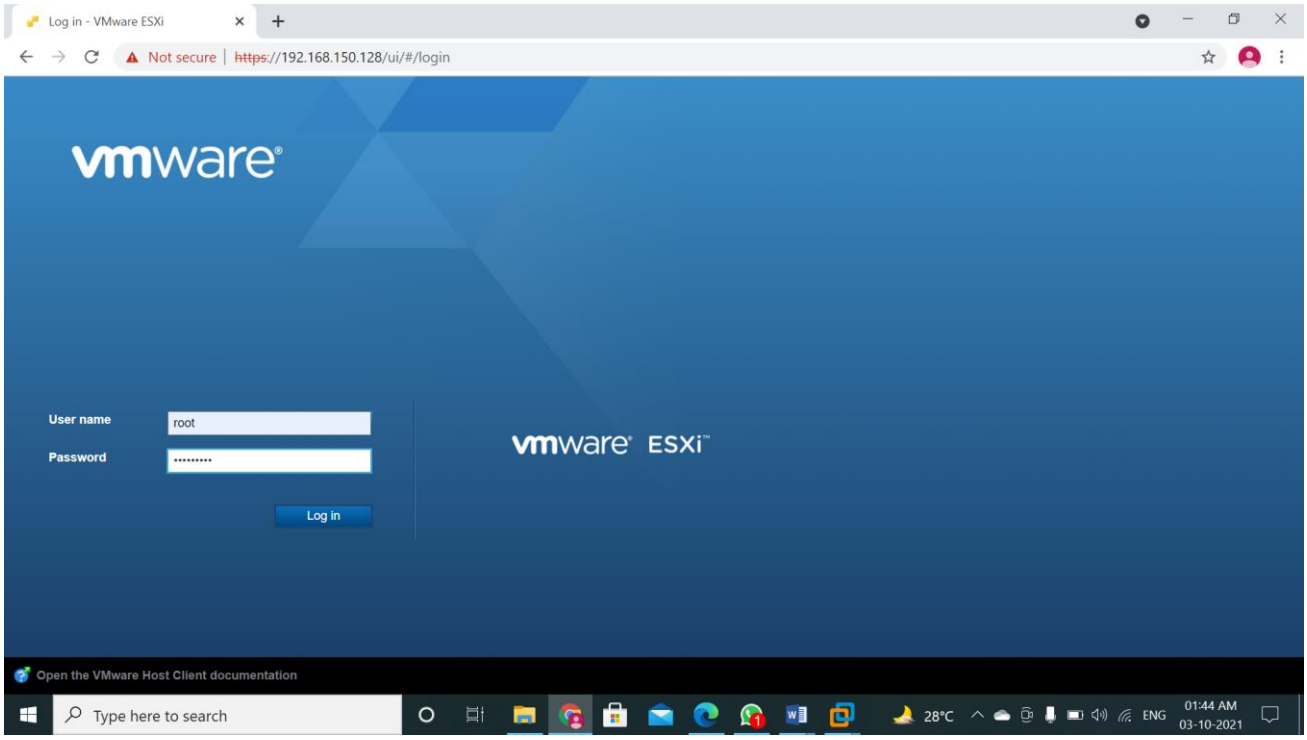
Step 18: Press Enter.

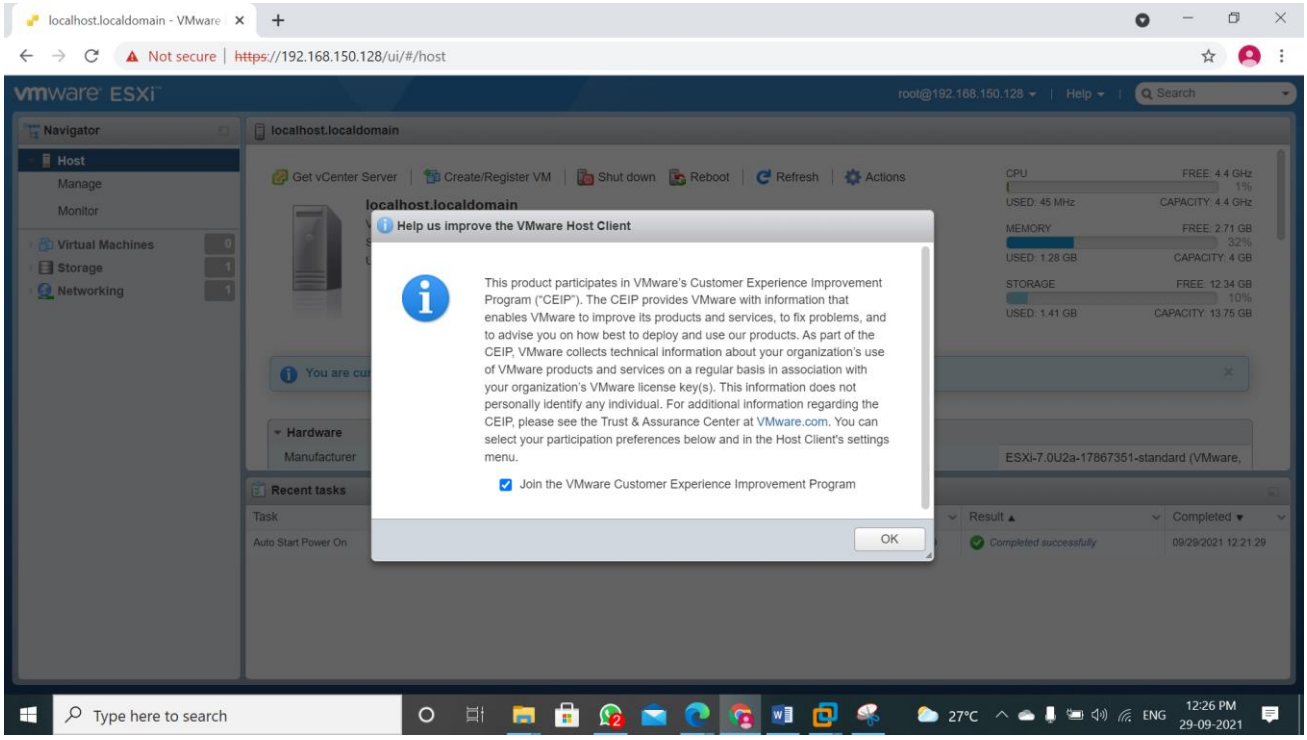
Name: Zeenat **Class: TYIT** **Roll no: 578**



Step 19: Open the VMware vsphere Client and enter the following IP address.

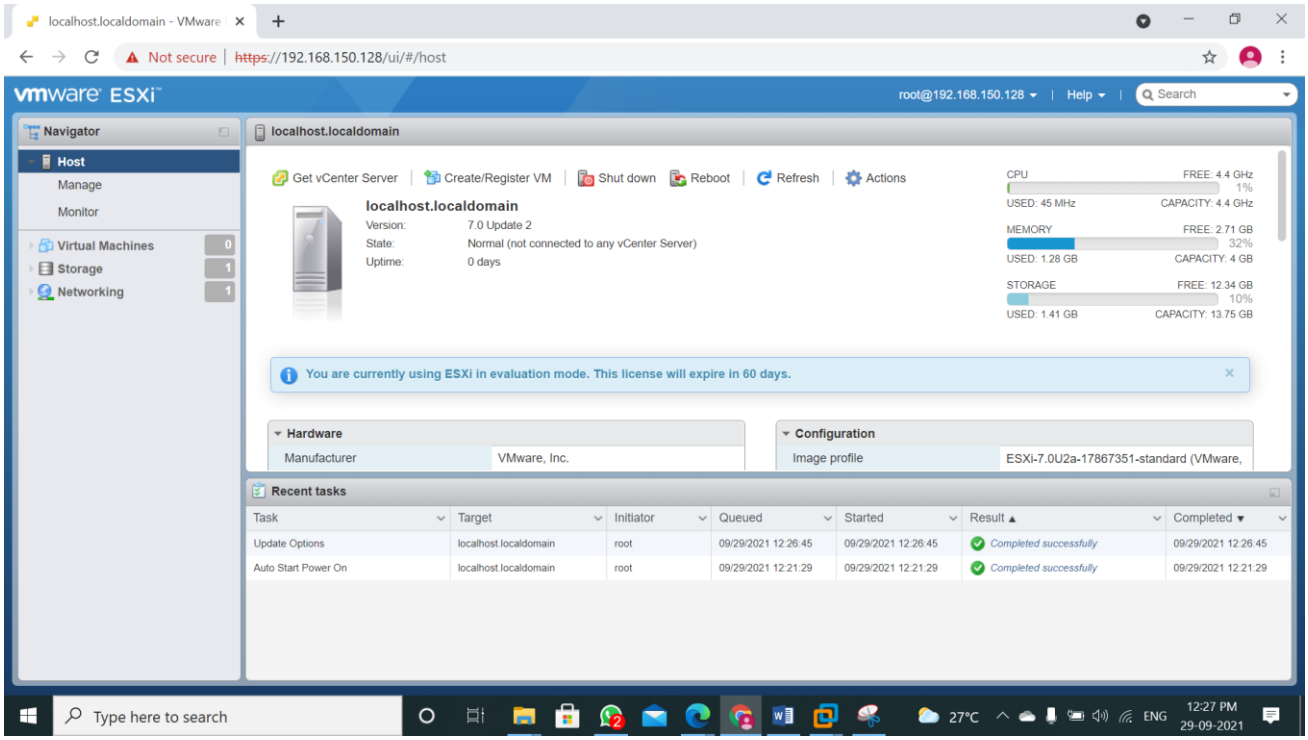
Name: Zeenat **Class: TYIT** **Roll no: 578**

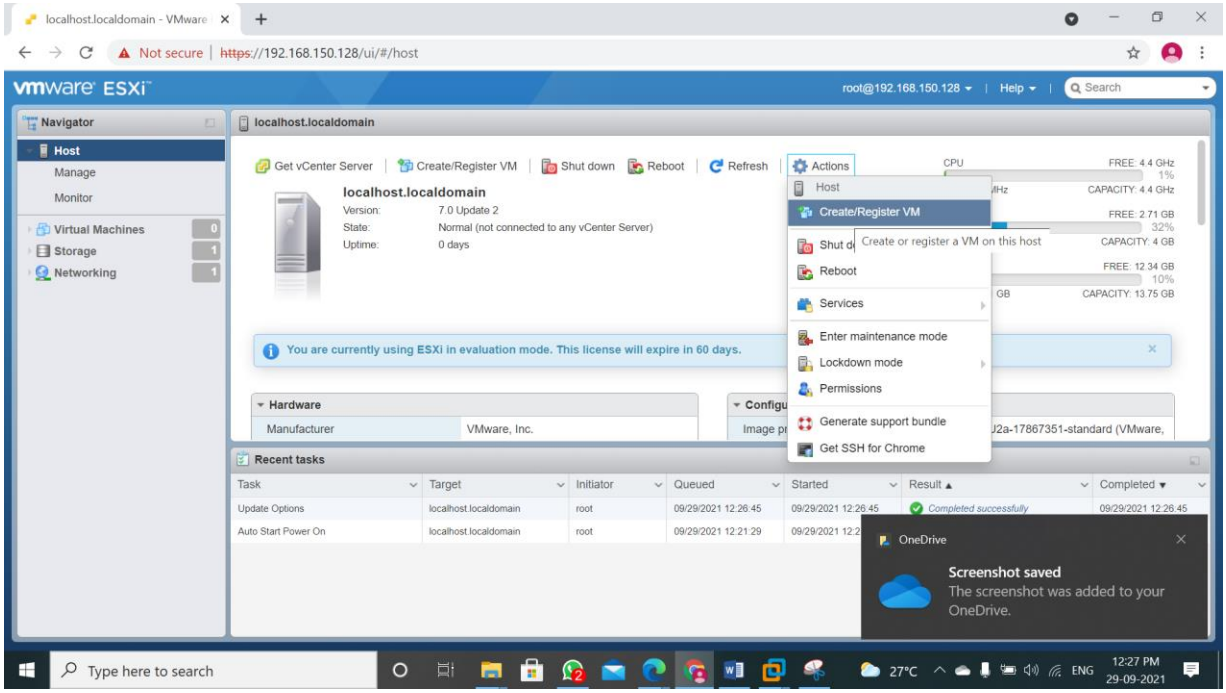




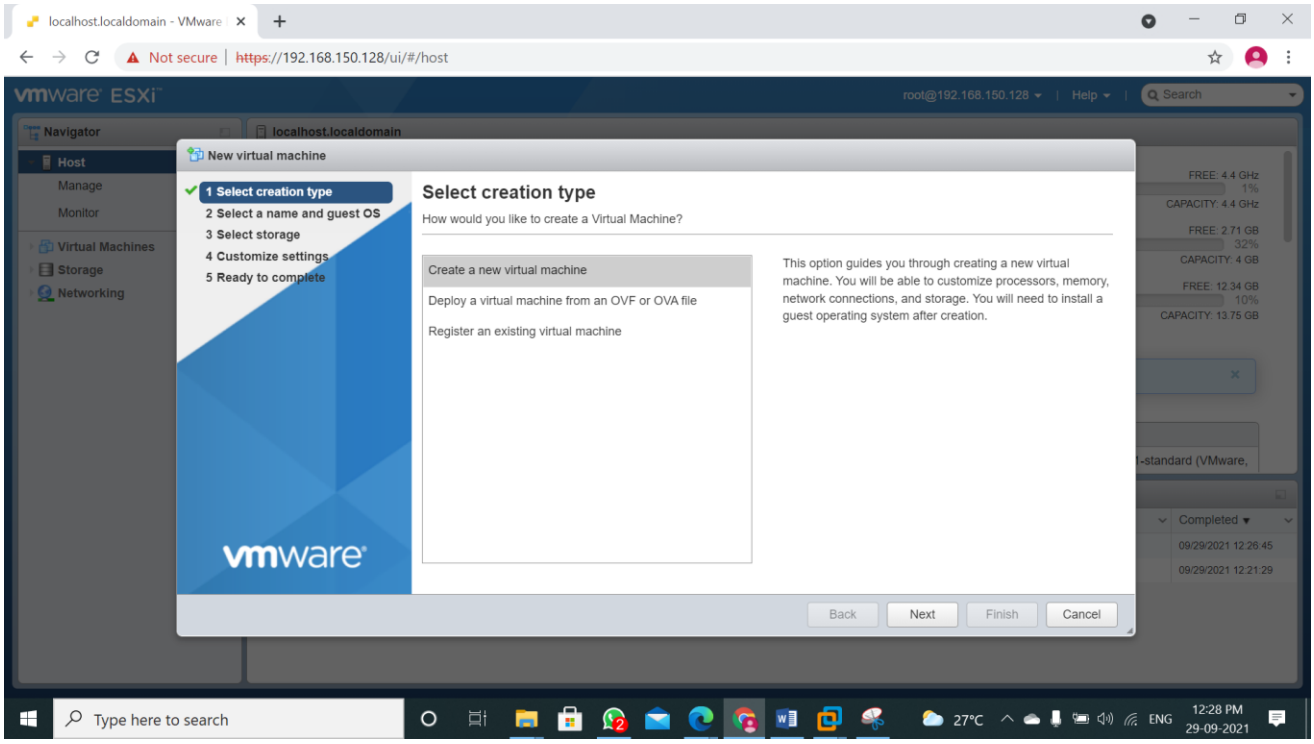
Step 20: Click on Action > create new virtual machine

Name: Zeenat **Class: TYIT** **Roll no: 578**

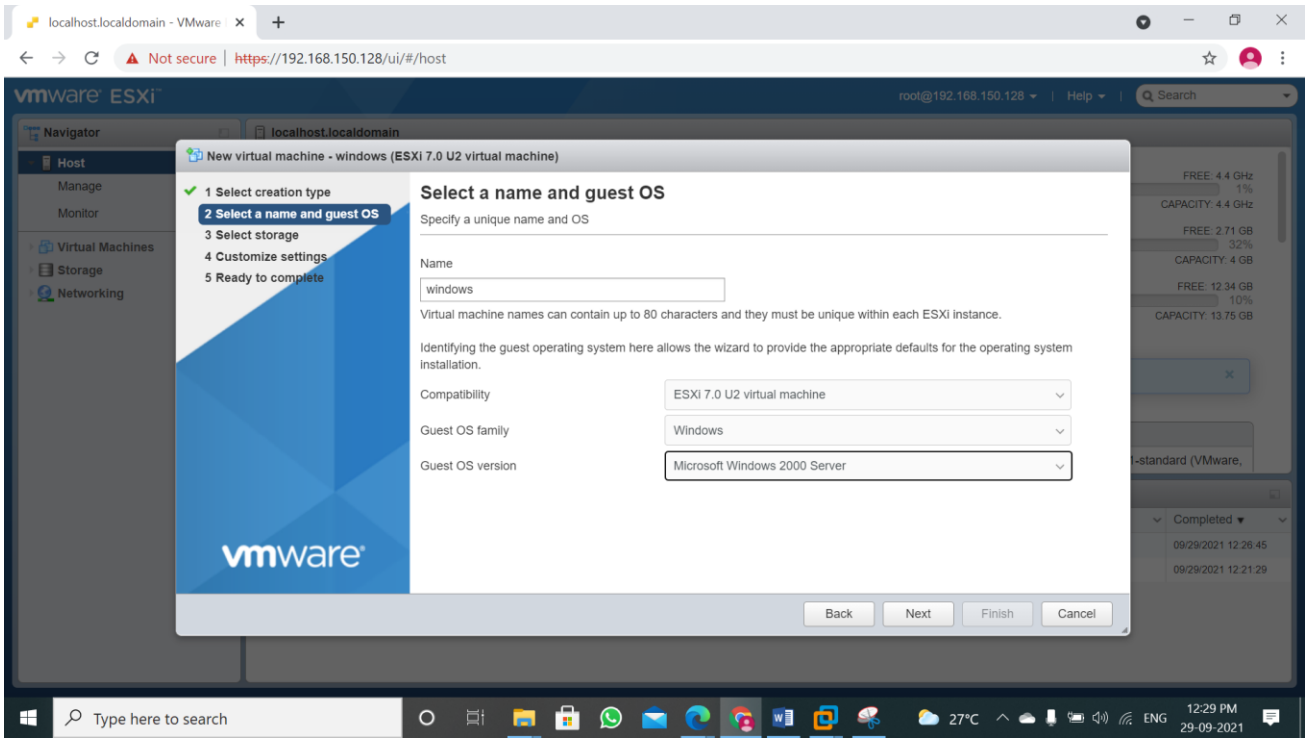




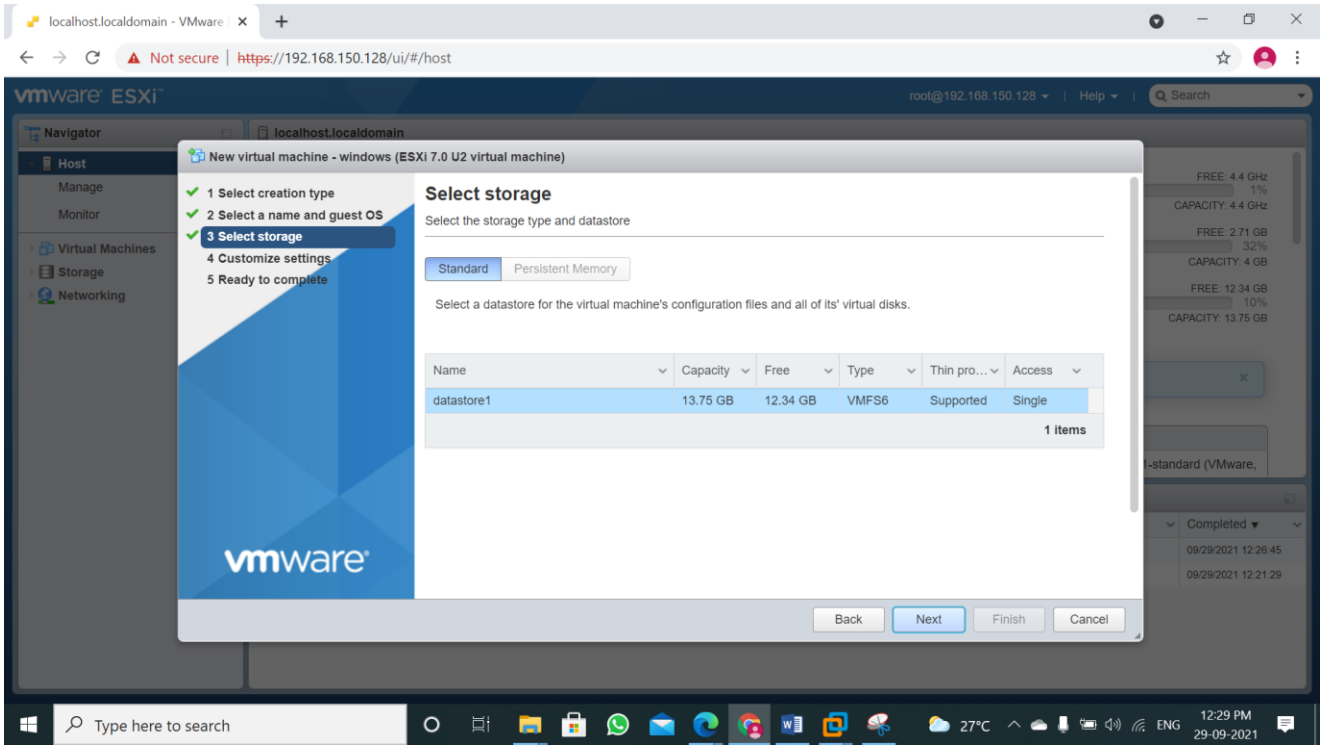
Name: Zeenat **Class: TYIT** **Roll no: 578**



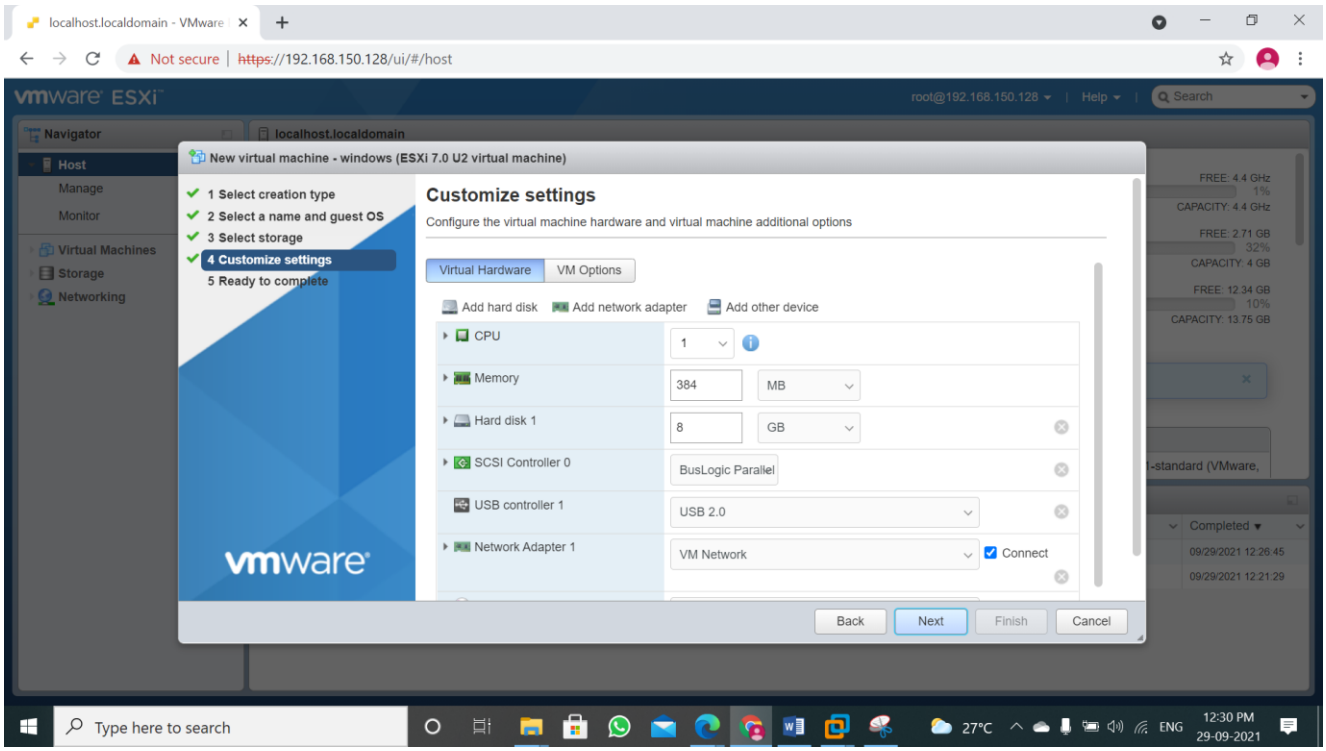
Step 21: Name window and keep os version Microsoft windows 2000



Name: Zeenat **Class: TYIT** **Roll no: 578**

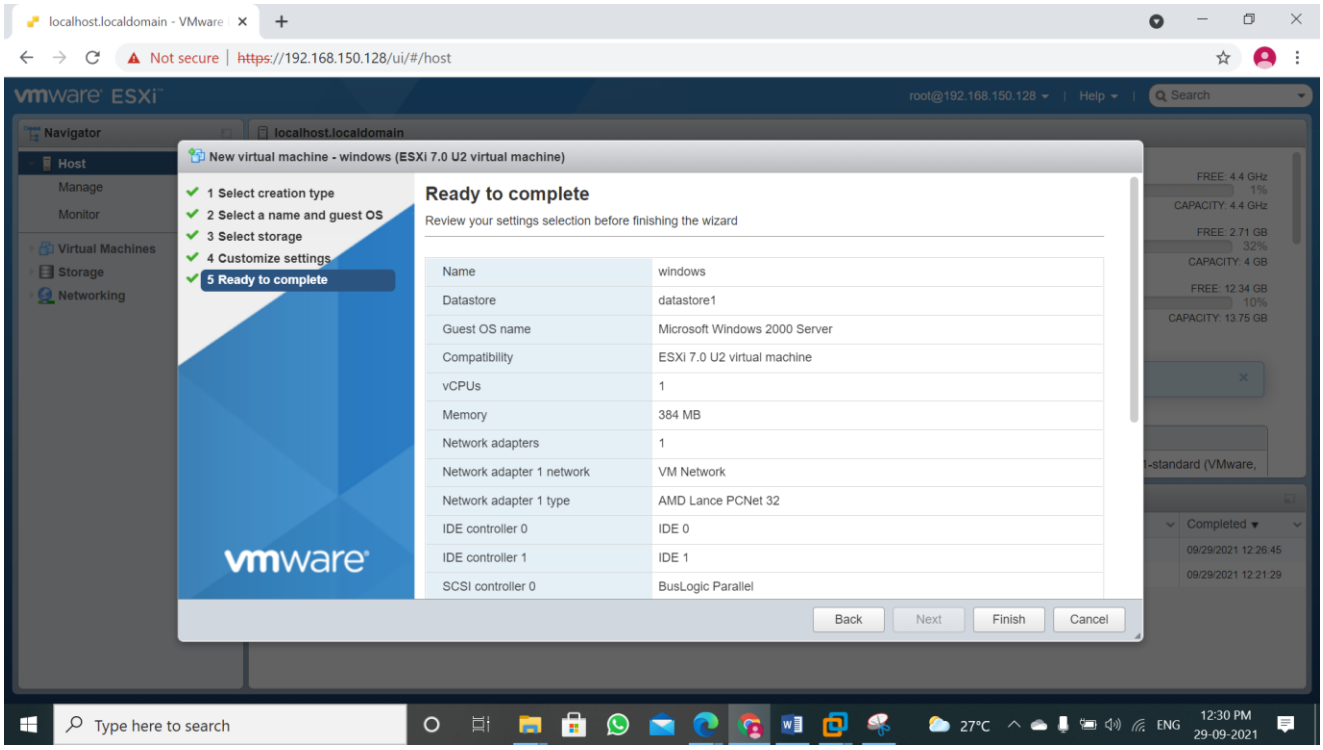


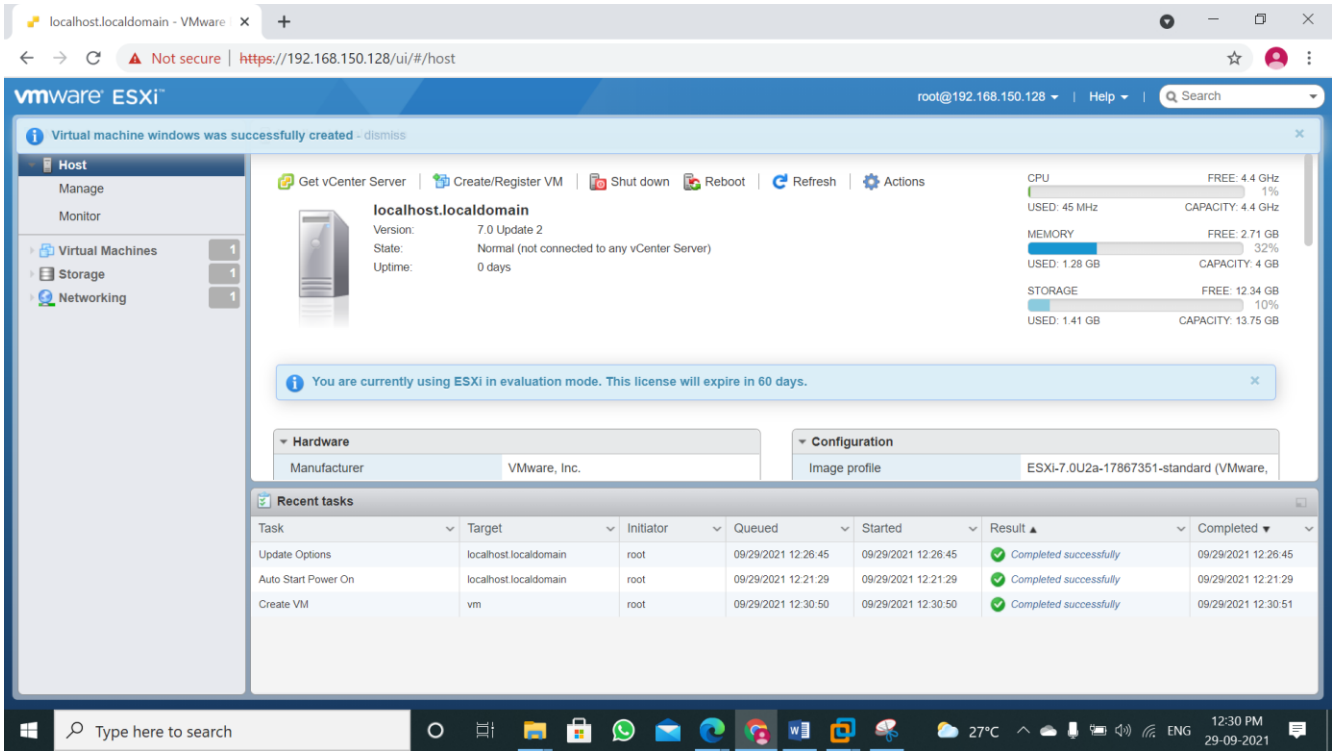
Step 22: Confirm the configuration



Step 23: Finish the installation

Name: Zeenat **Class: TYIT** **Roll no: 578**





Name: Zeenat **Class: TYIT** **Roll no: 578**

Practical 3

Aim: Study and Implement Software as a service.

Collaborating on Presentations:

The components of the traditional office suite to move into the cloud is the presentation application. Microsoft PowerPoint has ruled the desktop forever, and it's proven difficult to offer competitive functionality in a web-based application; if nothing else, slides with large graphics are slow to upload and download in an efficient manner. The Presentation is actually a collaboration on a specific novel, either on the first day that we work on the novel orthe last day that we finishitup. Firstday presentations will cover an introduction; last day presentations will present a game that represents our discussions about this text.

Collaborating on Word Processing:

A word processor is software or a device that allows users to create, edit, and print documents. It enables you to write text, store it electronically, display it on a screen, modify it by entering commands and characters from the keyboard, and print it. Of all computer applications, word processing is the most common. Today, most word processors are delivered either as a cloud service or as software that users can install on a PC or mobile device

Google Docs:

Google Docs is a free Web-based application in which documents and spreadsheets can be created, edited and stored online. Files can be accessed from any computer with an Internet connection and a full-featured Web browser. Google Docs is a part of a comprehensilve package of online applications offered by and associated with Google.

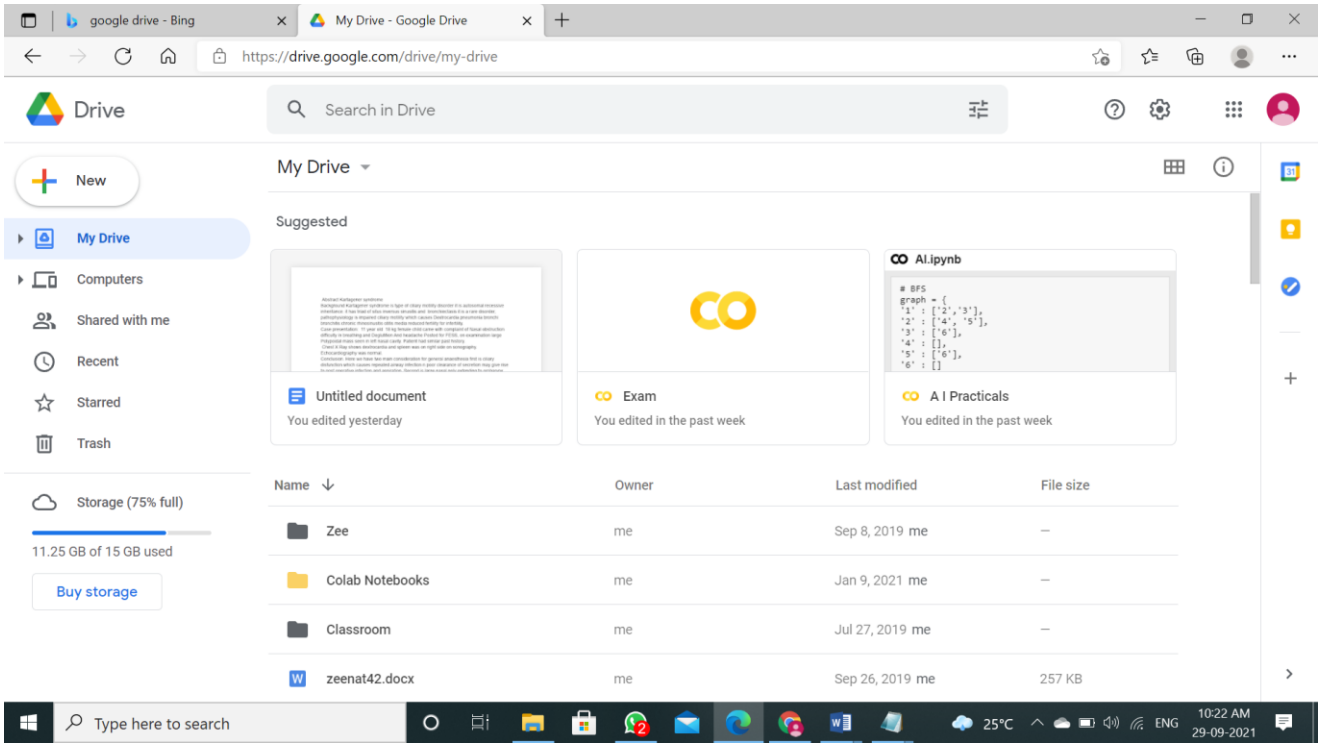
Google Presentations:

Google first offered a presentation program for Google Docs in 2007. Google's free presentation software has been named Google Slides since 2012.

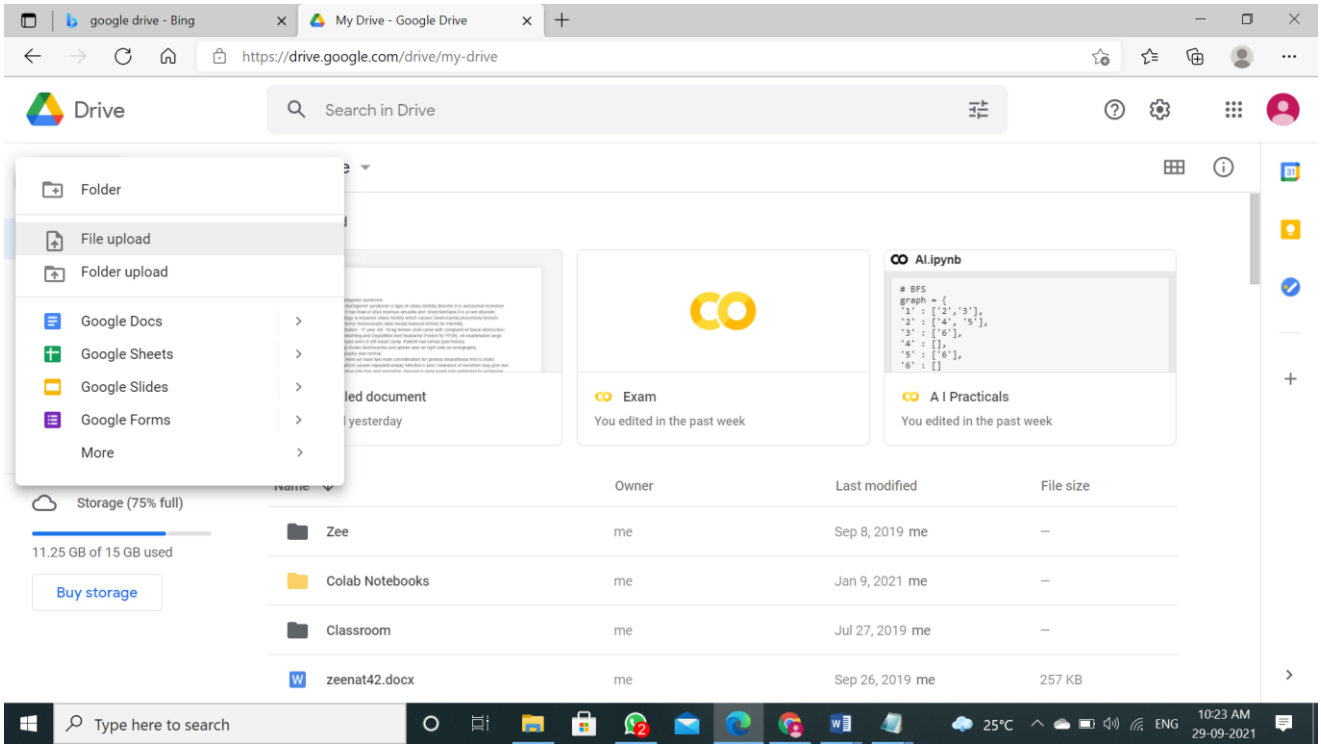
PROCEDURE:

Step 1: Sign into Google Drive website using Google account. If you don't have nay account create a account. Google Drive will allow you to store your files in the cloud, as well as create documents and forms through the Google Drive web Interface.

Name: Zeenat **Class: TYIT** **Roll no: 578**

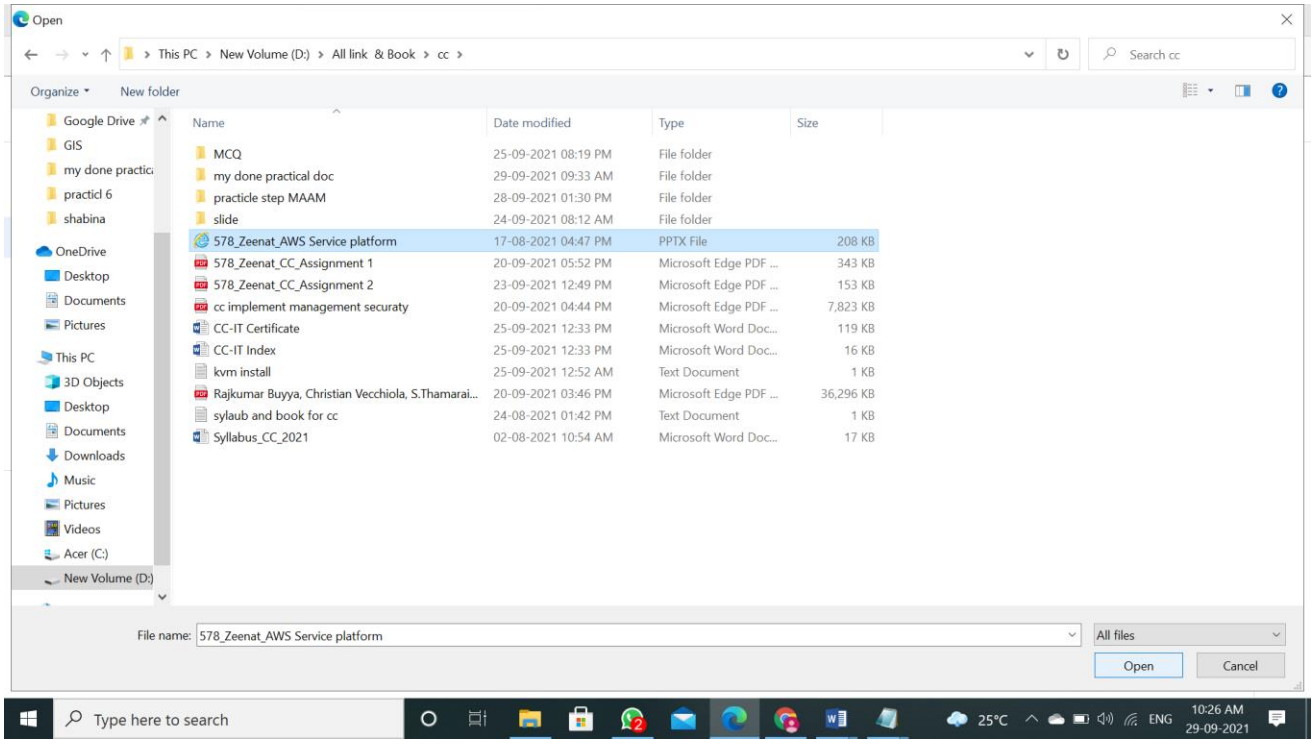


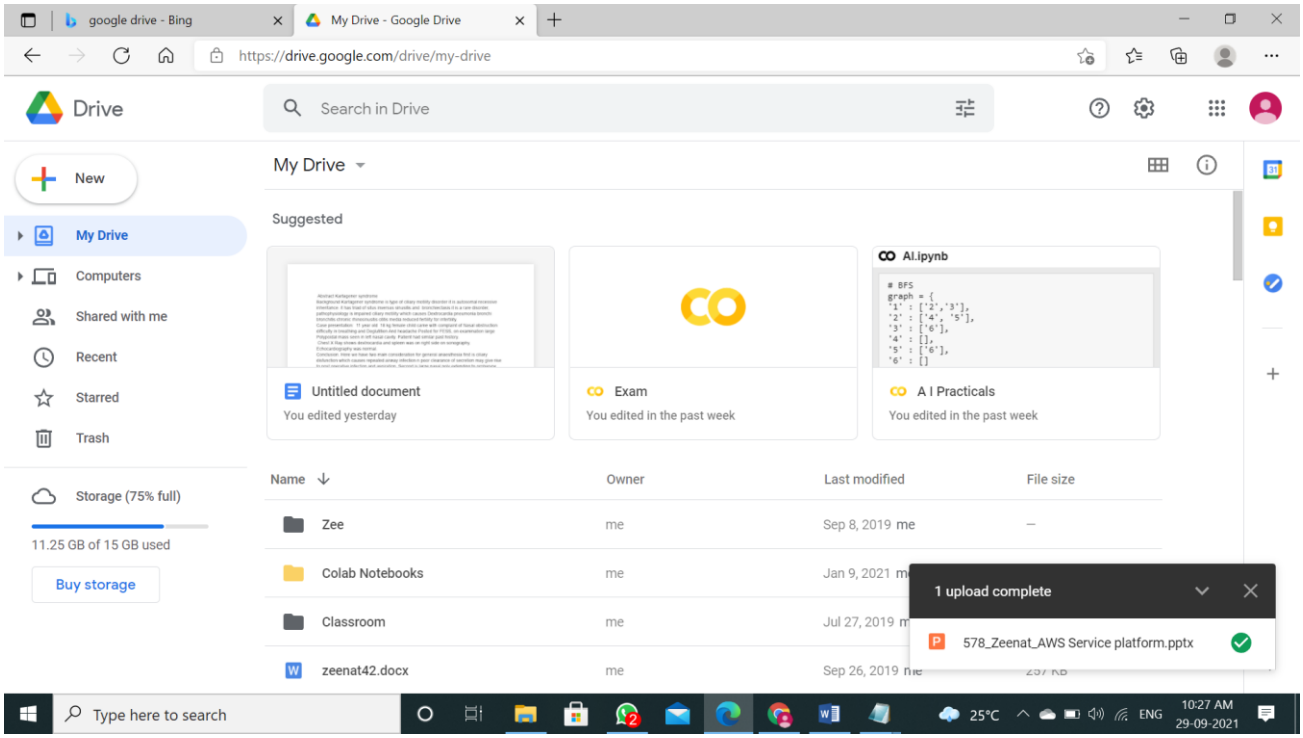
Step 2: Add files to your drive. There are 2 ways to add files - You can create or you can upload from your computer. To create new file click NEW button, to upload click file upload or folder upload.



Step 3: You can now Upload a File after clicking on the Button.

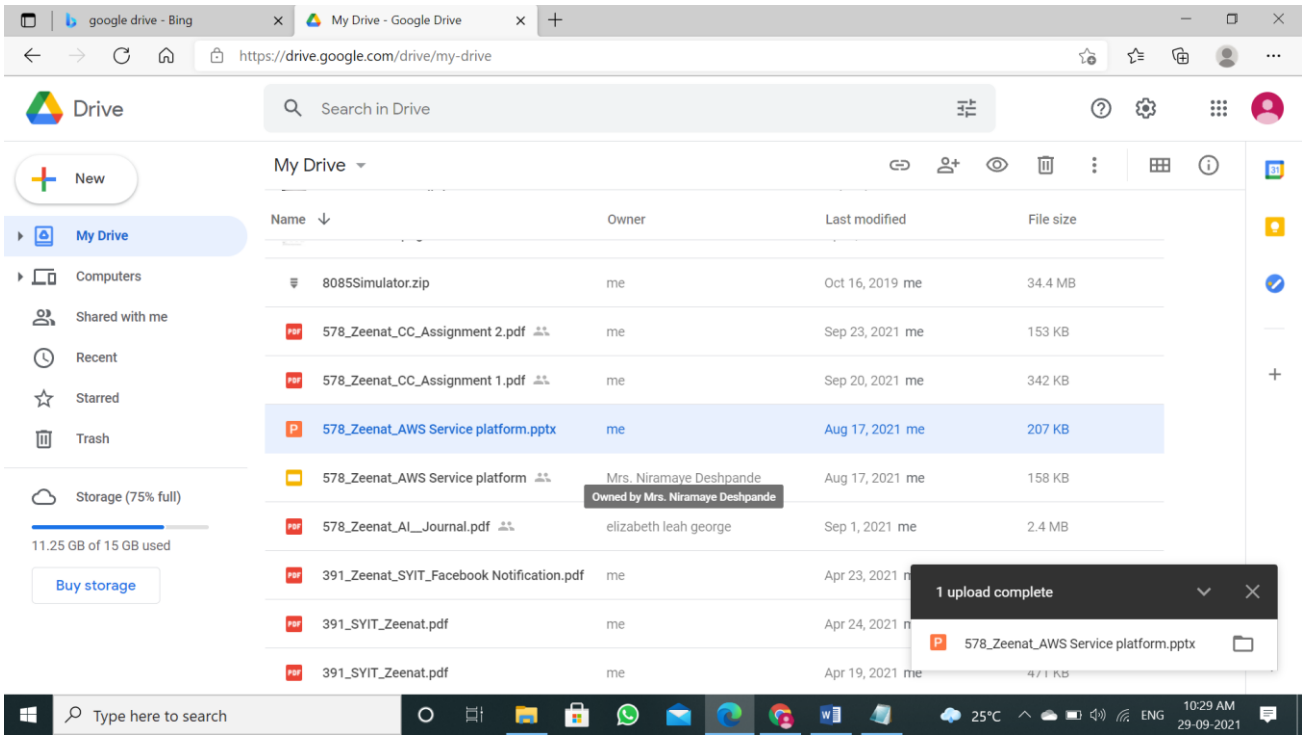
Name: Zeenat **Class: TYIT** **Roll no: 578**





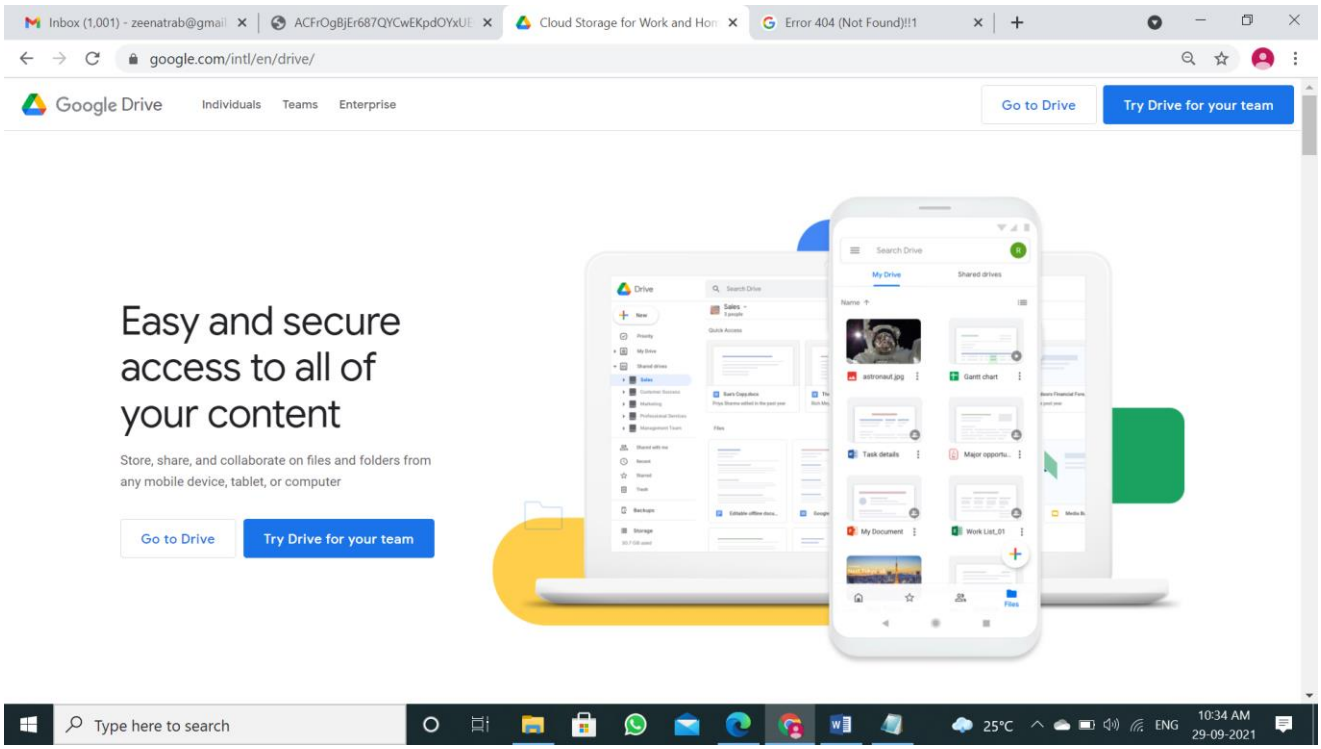
Name: Zeenat **Class: TYIT** **Roll no: 578**

Step 4: File successfully uploaded on Google Drive.



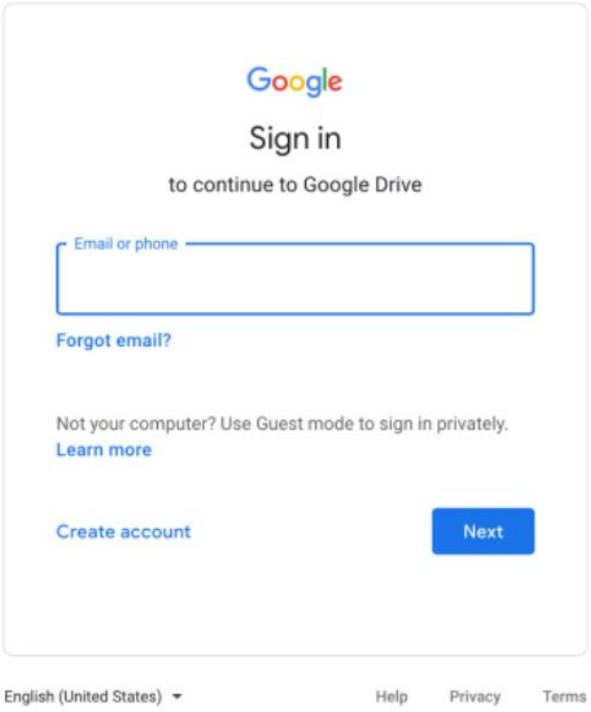
Step 5: Uploading File on Google Slides:

Step 6: In a web browser (Chrome, Safari, etc), open Google Drive or click on this link: https://www.google.com/intl/en/drive/

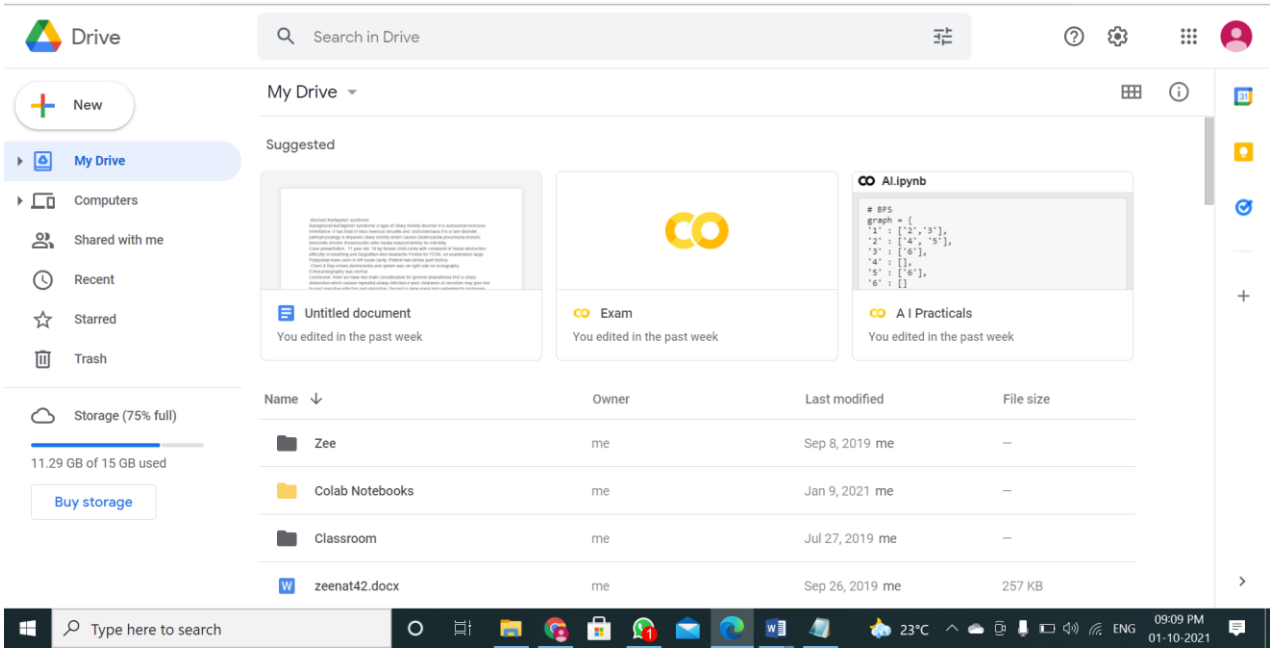


Name: Zeenat **Class: TYIT** **Roll no: 578**

Step 7: Click on GO TO DRIVE and Log in with your Gmail Credentials (your gmail email address and password)



Step 8: Select "New" in the upper left-hand corner of the screen



Step 9: Select the desired PowerPoint presentation that you downloaded from Etsy (it has to be a file ending in .PPTX) and select OPEN

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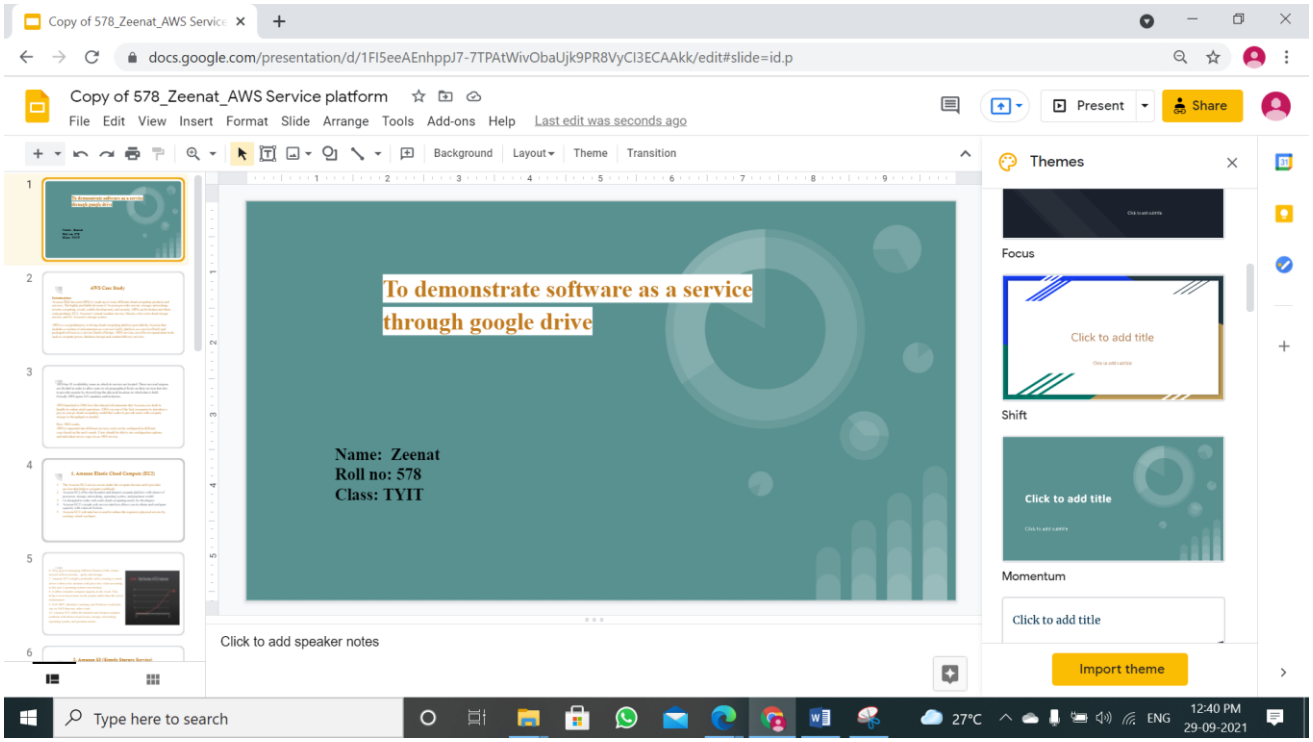
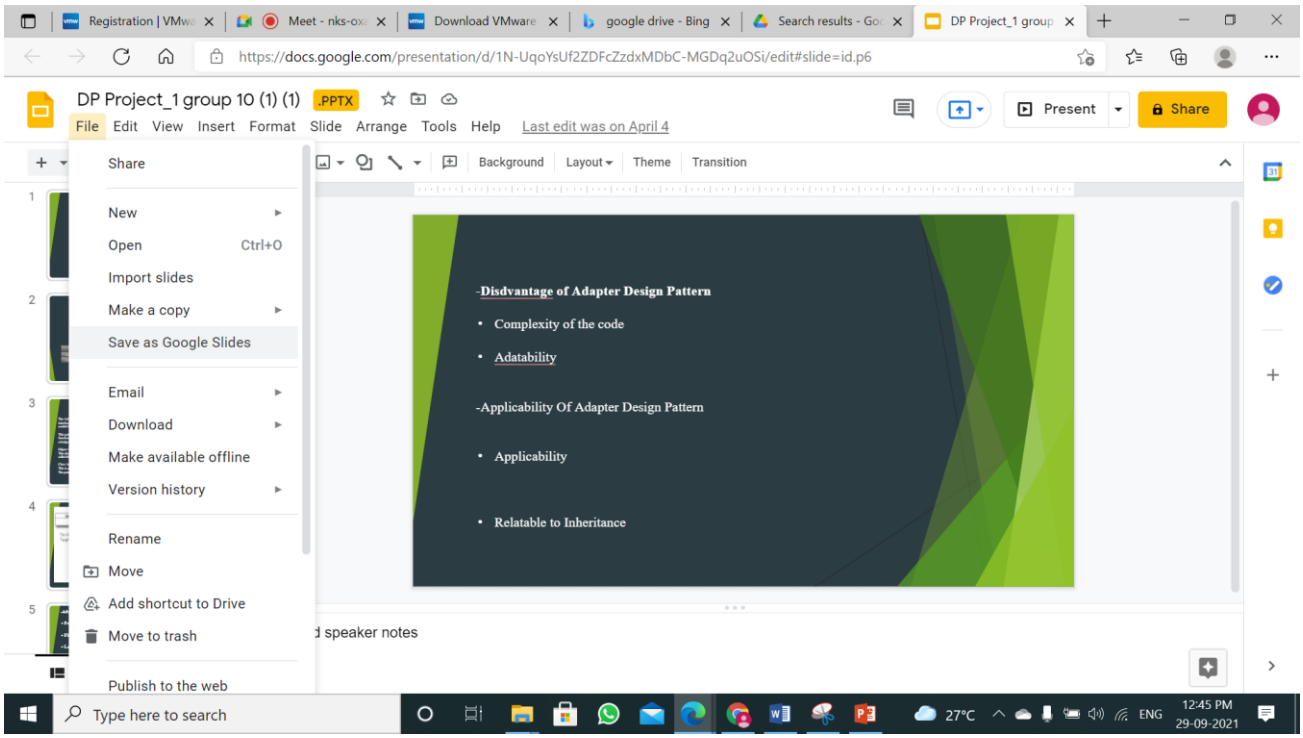
Step 10: After uploading the PPTX file, right-click the file image and select “Open With,” then select “Google Slides.” …

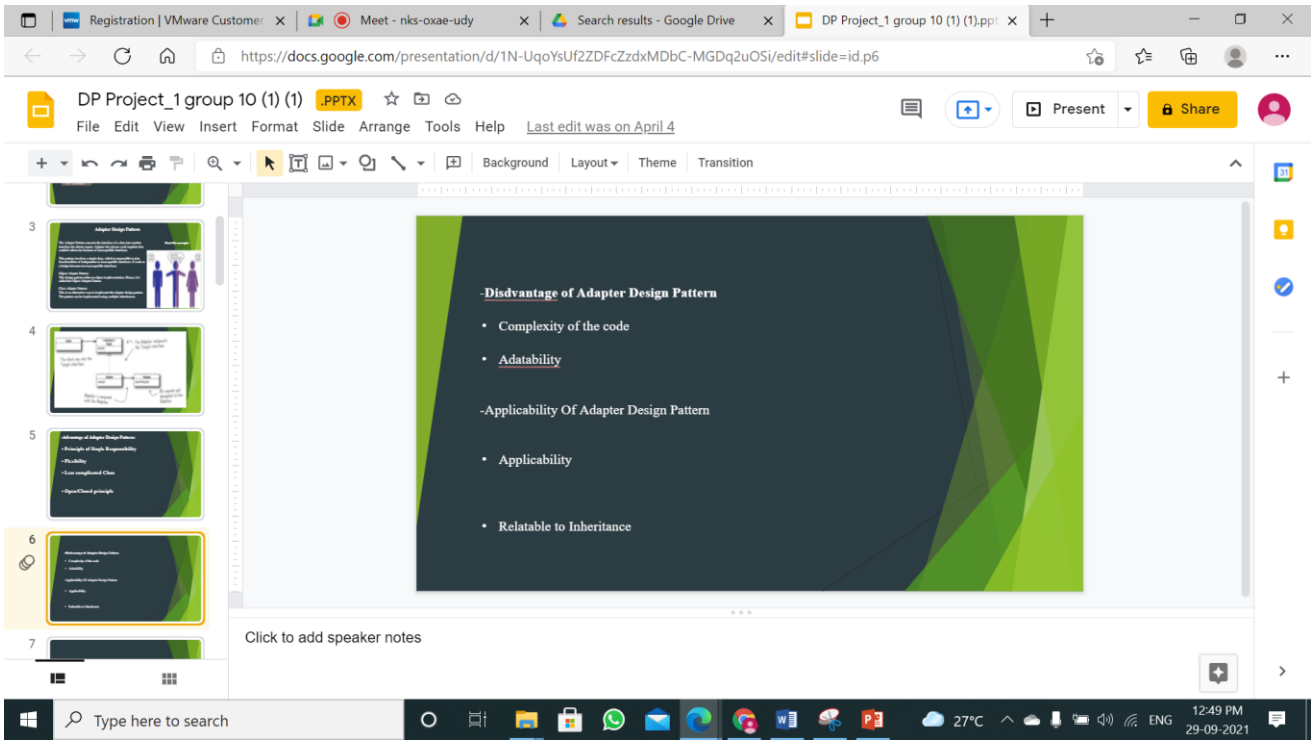


Step 11: Select “File.” at the top of the page on the left… Select “Save as Google Slides.

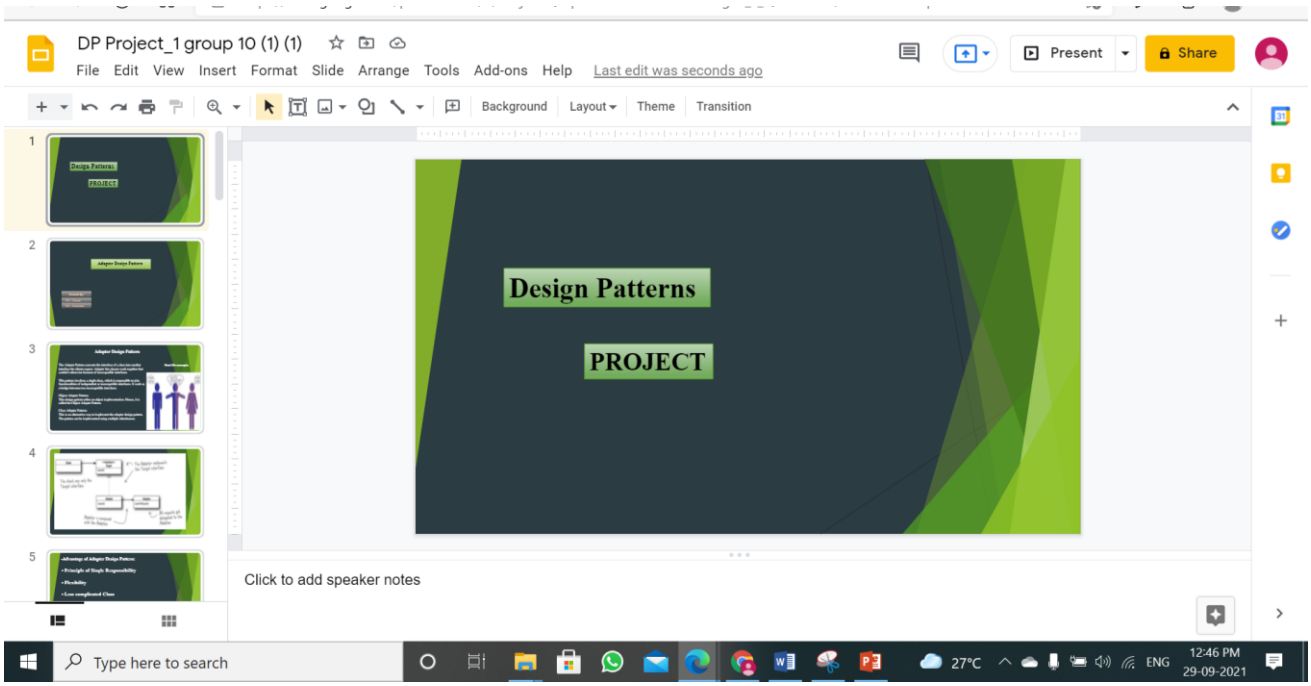


Name: Zeenat **Class: TYIT** **Roll no: 578**

Step 12: The file will open in a new tab and will no longer have the PPTX label at the top.

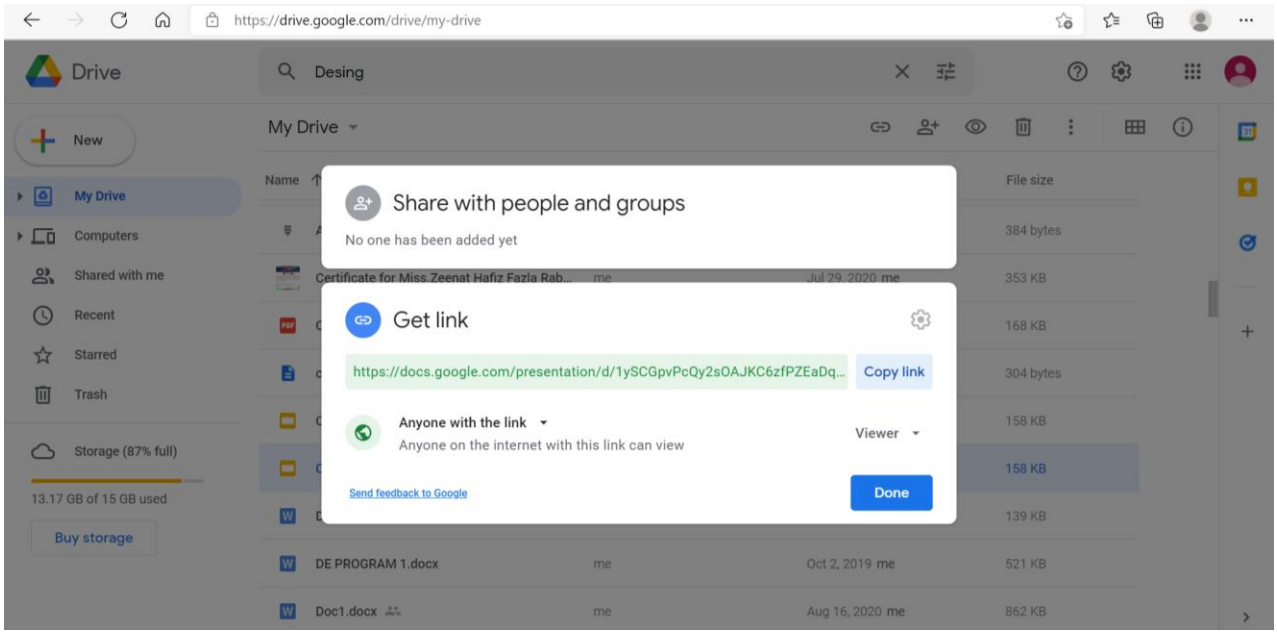


Step 13: Close the tab of the original PPTX file and start editing your NEW file in Google Slides



Step 14: To Share Document link with anyone

Name: Zeenat **Class: TYIT** **Roll no: 578**



CONCLUSION:

Google Docs provide an efficient way for storage of data. It fits well in storage as a sevice(SaaS).

It has varied options to create documents, PPT's and also spreadsheets. It saves document automatically after few seconds and can be shared anywhere on the Internet at a click of a button.

Name: Zeenat **Class: TYIT** **Roll no: 578**

Practical 4

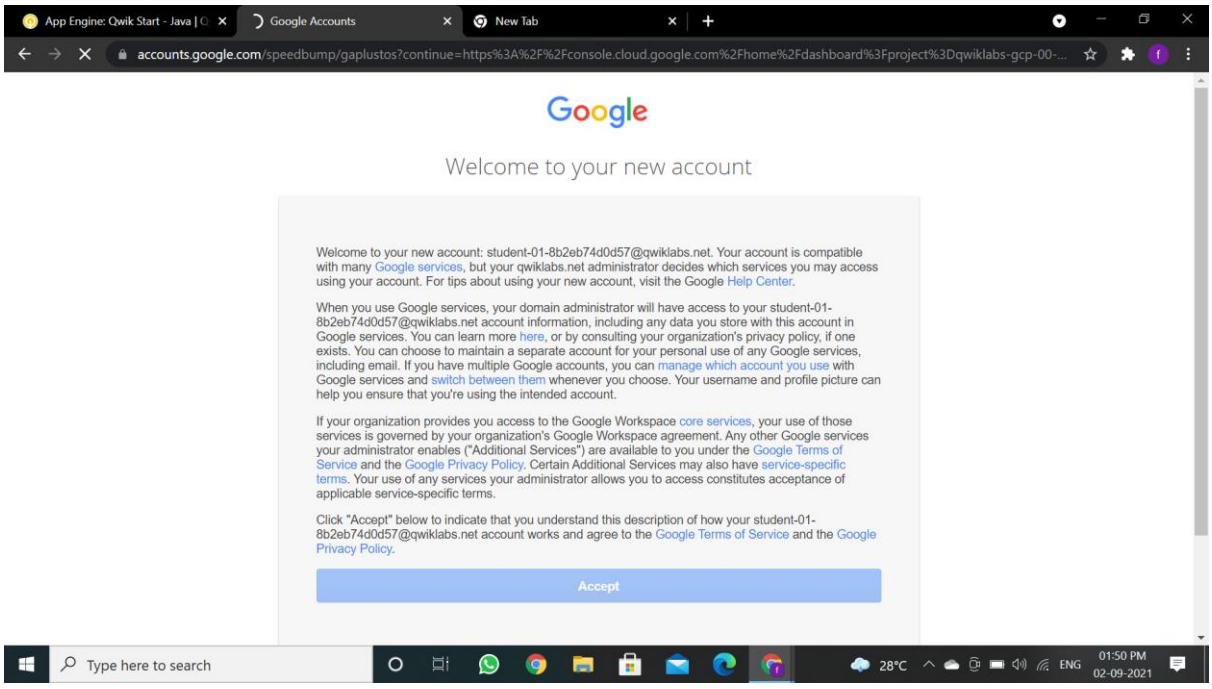
Aim: To demonstrate PaaS with Google App Engine.

Theroy:

Google App Engine is a Paas(Platfrom as a service) service model for cloud computing. Google App Engine makes it easy to build an application that runs reliably, even under heavy load and with large amounts of data. The Google App Engine environment includes the following features

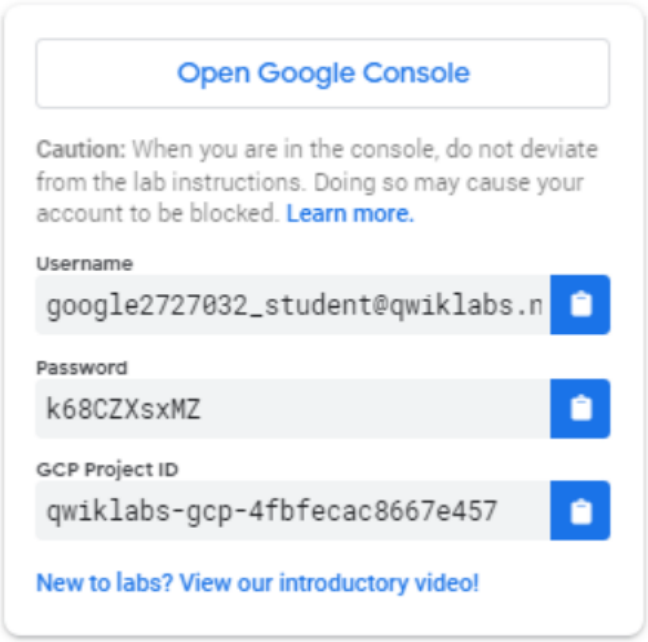
1. Dynamic web serving, with full support for common web technologies
2. Persistent storage with queries, sorting, and transactions
3. Automatic scaling and load balancing
4. APIs for authenticating users and sending email using Google Accounts
5. A fully featured local development environment that simulates Google App Engine on your computer.

Step 1: Create account

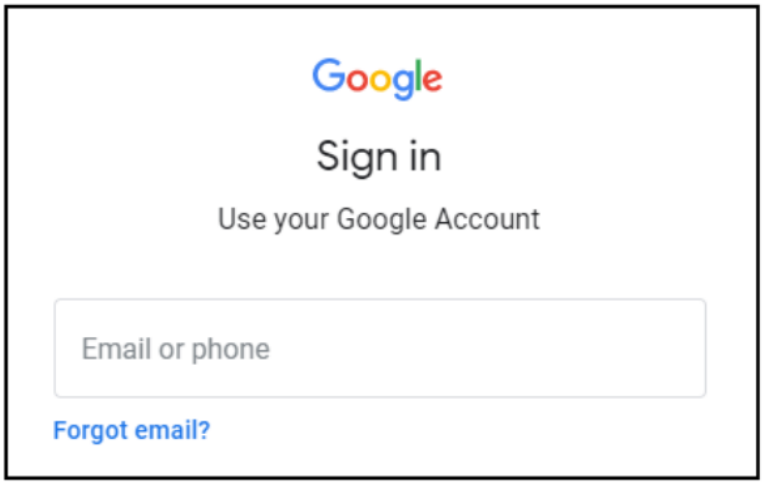


Step 2: Click the **Start Lab** button. If you need to pay for the lab, a pop-up opens for you to select your payment method. On the left is a panel populated with the temporary credentials that you must use for this lab.

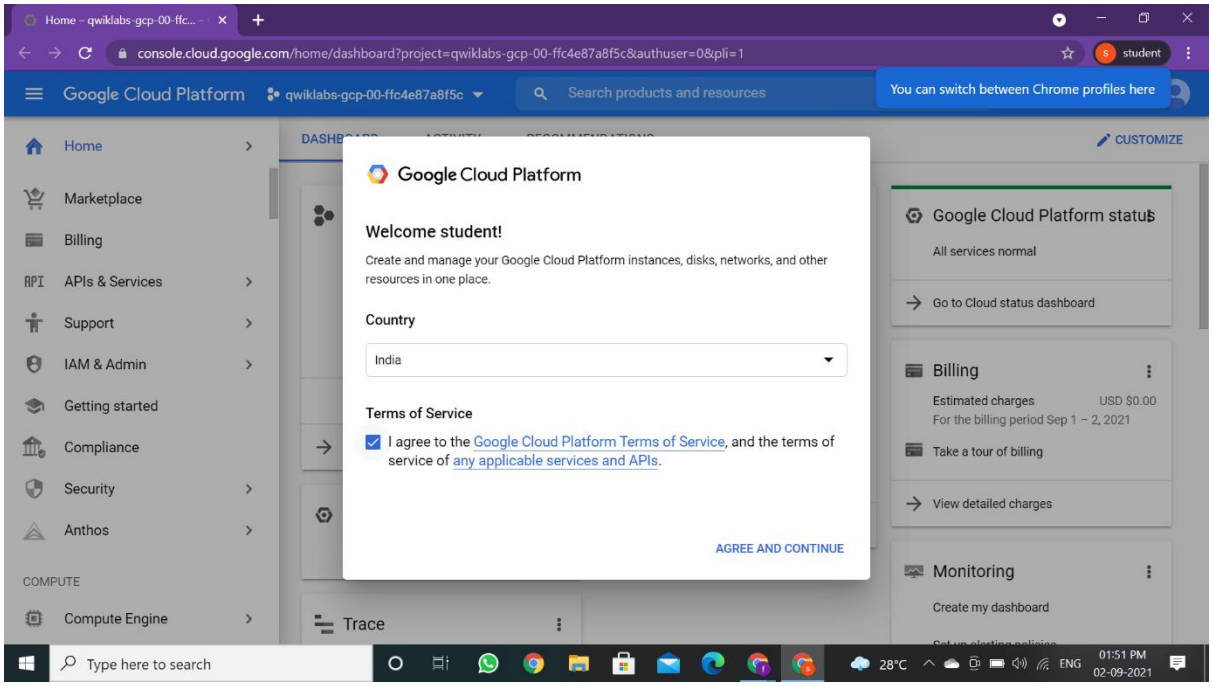
Name: Zeenat **Class: TYIT** **Roll no: 578**



Step 3: Copy the username, and then click **Open Google Console**. The lab spins up resources, and then opens another tab that shows the **Sign in** page.



Name: Zeenat **Class: TYIT** **Roll no: 578**

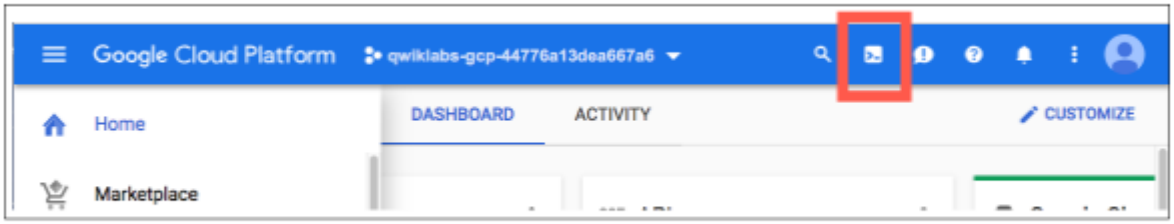


Step 4: In the **Sign in** page, paste the username that you copied from the Connection Details panel. Then copy and paste the password.

Activate Cloud Shell

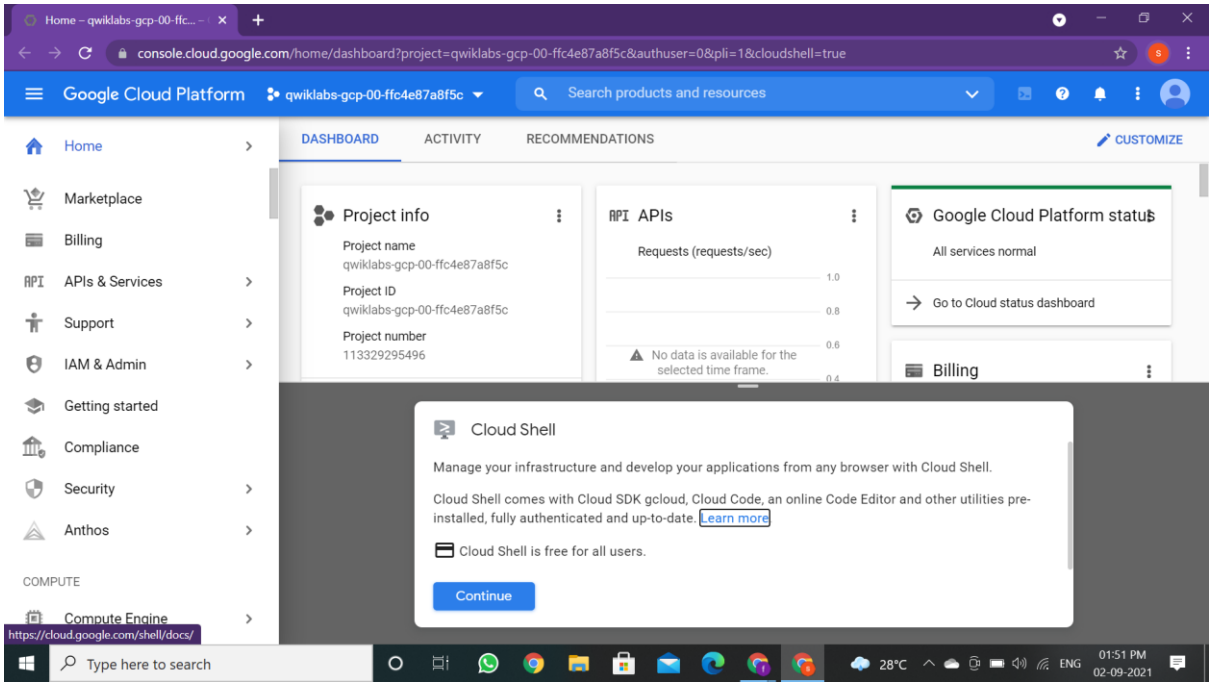
Step 5: Cloud Shell is a virtual machine that is loaded with development tools. It offers a persistent 5GB home directory and runs on the Google Cloud. Cloud Shell provides command-line access to your Google Cloud resources.

In the Cloud Console, in the top right toolbar, click the **Activate Cloud Shell** button.



Click **Continue**.

Name: Zeenat **Class: TYIT** **Roll no: 578**



Step 6: It takes a few moments to provision and connect to the environment. When you are connected, you are already authenticated, and the project is set to your *PROJECT_ID*. For example:

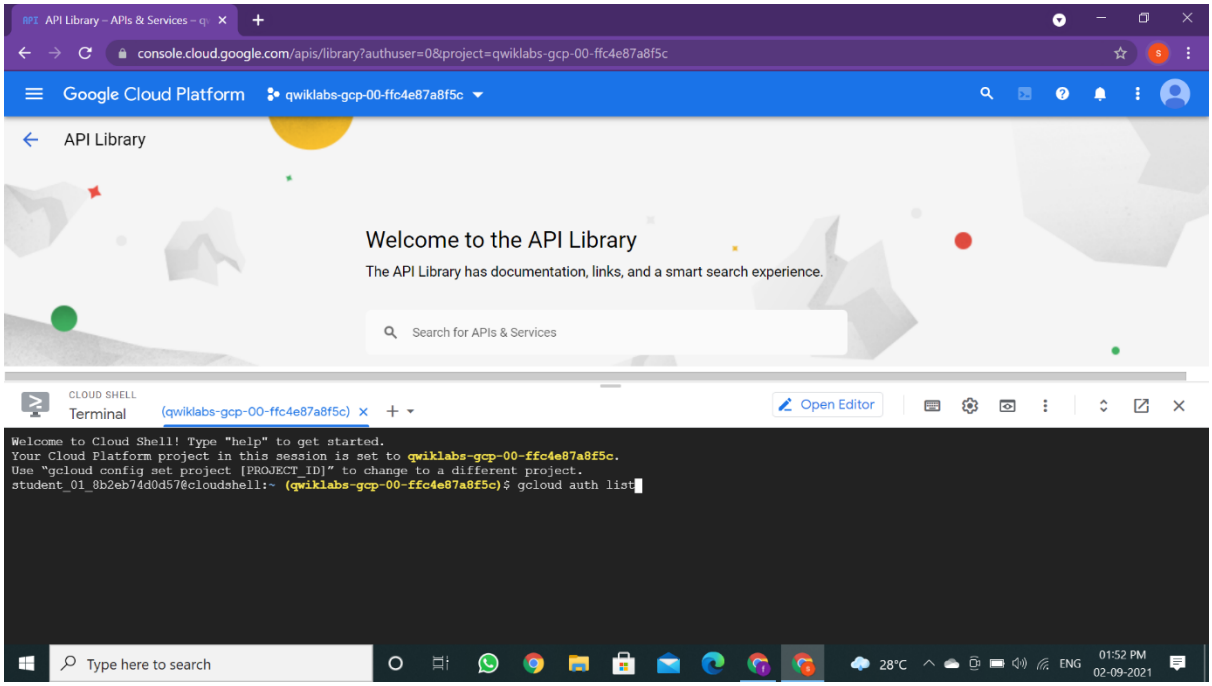
gcloud is the command-line tool for Google Cloud. It comes pre-installed on Cloud Shell and supports tab-completion.

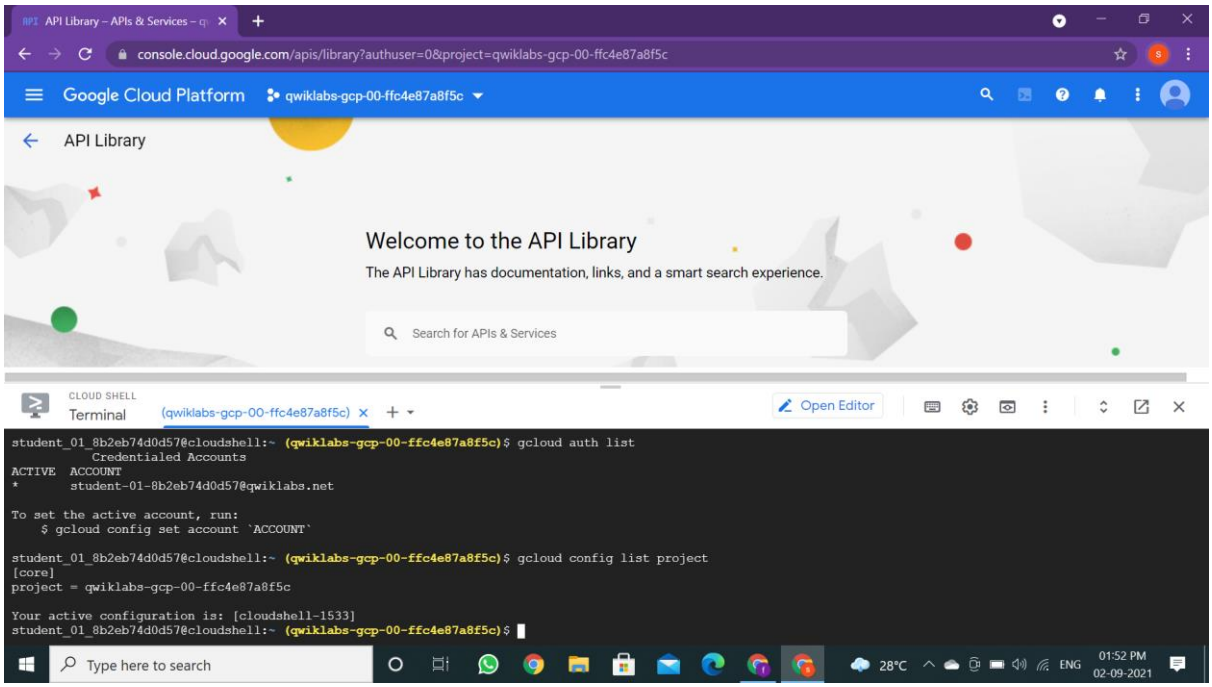
Step 7: You can list the active account name with this command:

gcloud auth list

gcloud config list project

Name: Zeenat **Class: TYIT** **Roll no: 578**



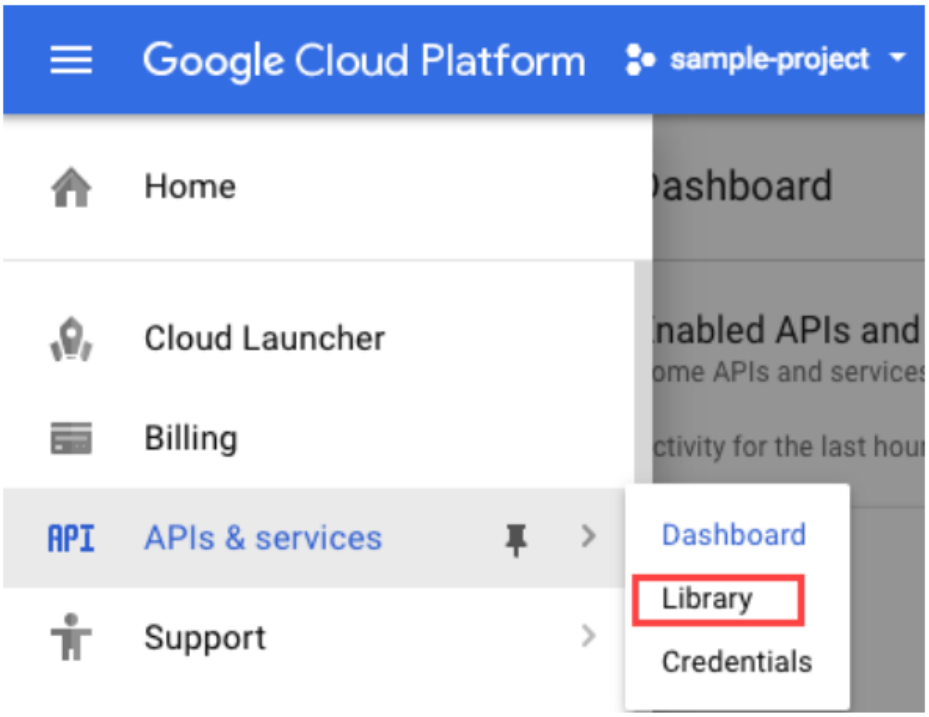


Step 8: Enable Google App Engine Admin API

The App Engine Admin API enables developers to provision and manage their App Engine Applications.

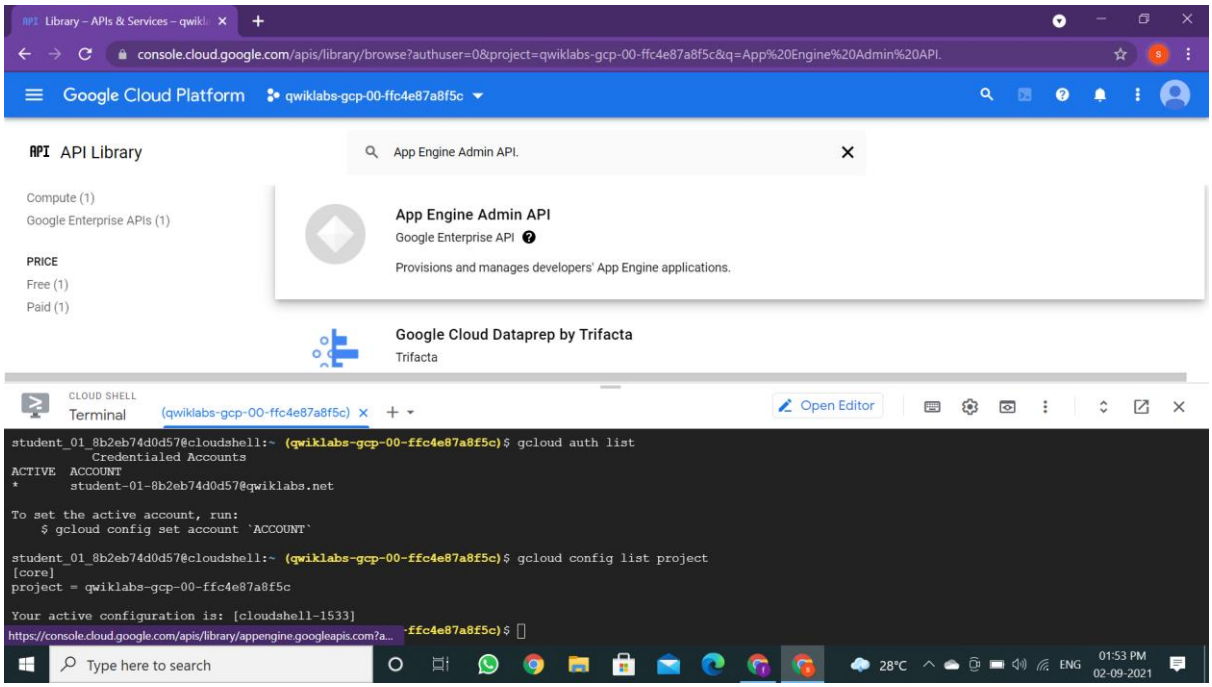
1. In the left-hand menu click on **APIs & Services** > **Library**.

Name: Zeenat **Class: TYIT** **Roll no: 578**



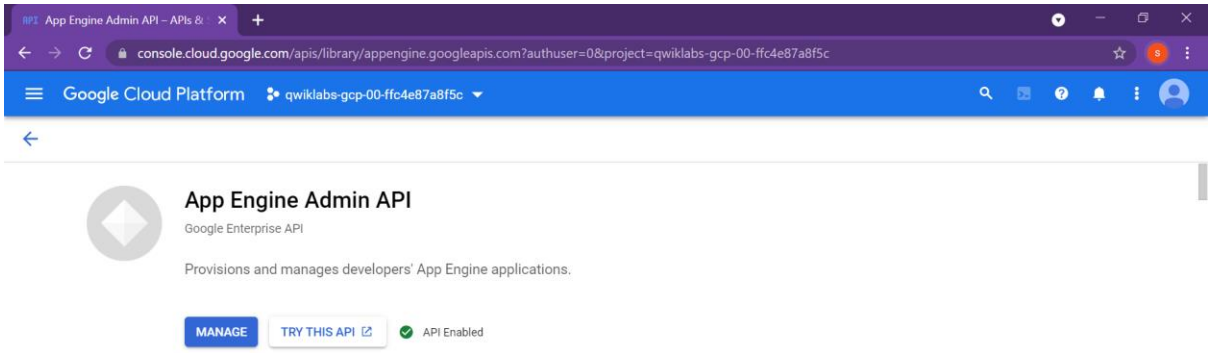
Step9 : Type "App Engine Admin API" in the search box.

2. Click **App Engine Admin API**.



3. Click **Enable** if it isn't already set. Your page should now resemble the following:

Name: Zeenat **Class: TYIT** **Roll no: 578**



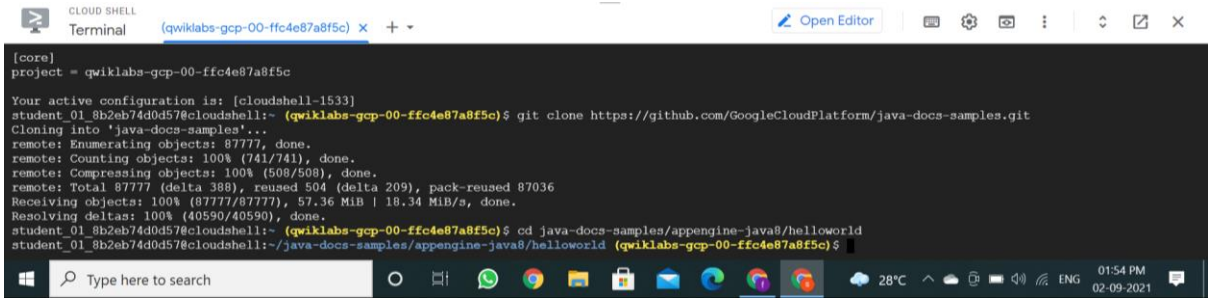
Download the Hello World app

1. Open a Cloud Shell session and run the following command to clone the Hello World sample app repository:

   git clone https://github.com/GoogleCloudPlatform/java-docs-samples.git

2. Then go to the directory that contains the sample code:

   cd java-docs-samples/appengine-java8/helloworld



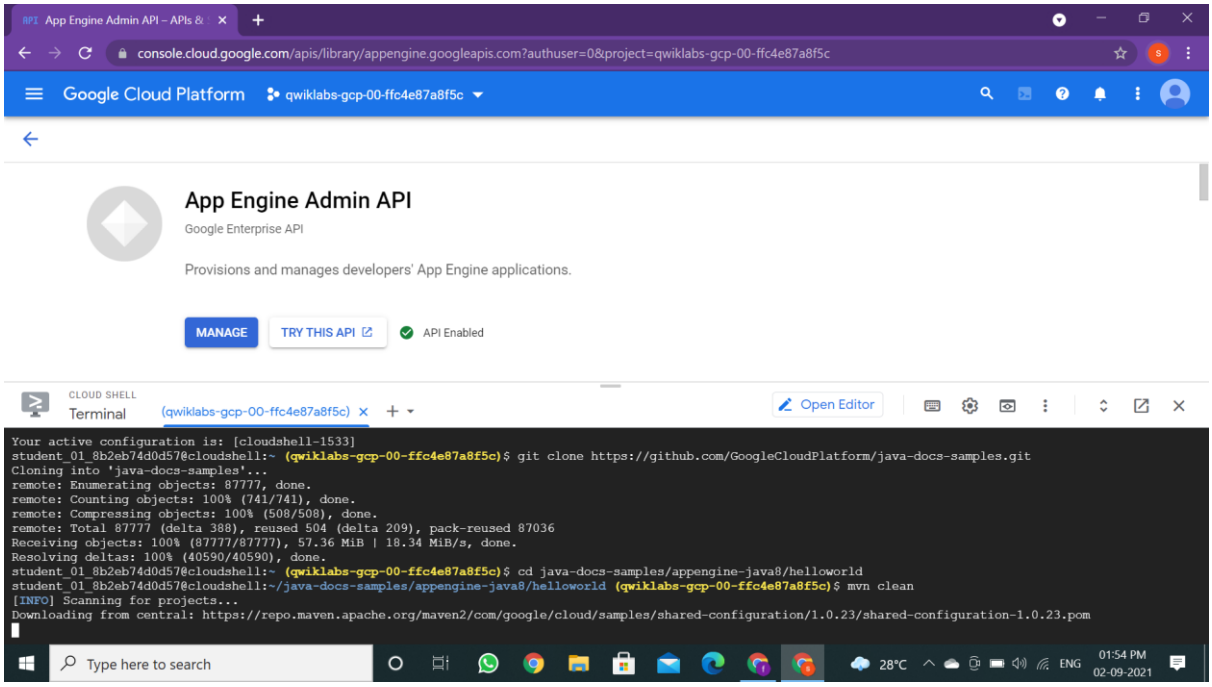
Test the application using the development server

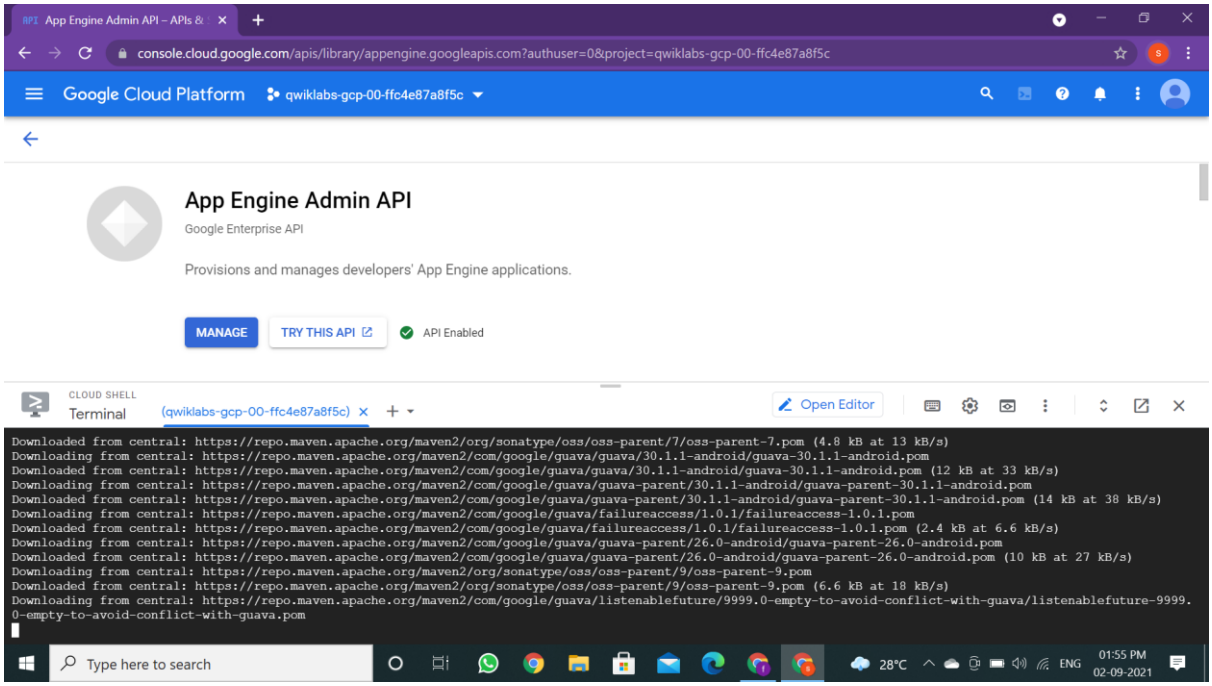
To get the development server running, you'll download Maven to manage compiling your app and starting the development server.

1. Run the following commands to configure your Maven environment:

   mvn clean
   mvn package

Name: Zeenat **Class: TYIT** **Roll no: 578**

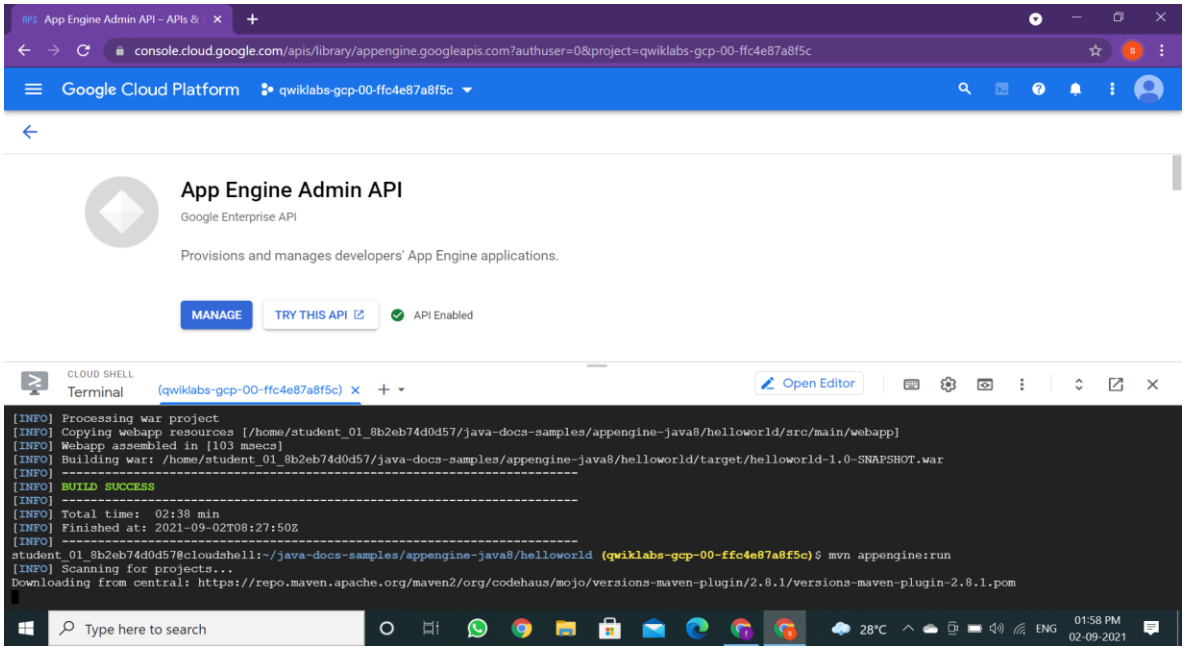


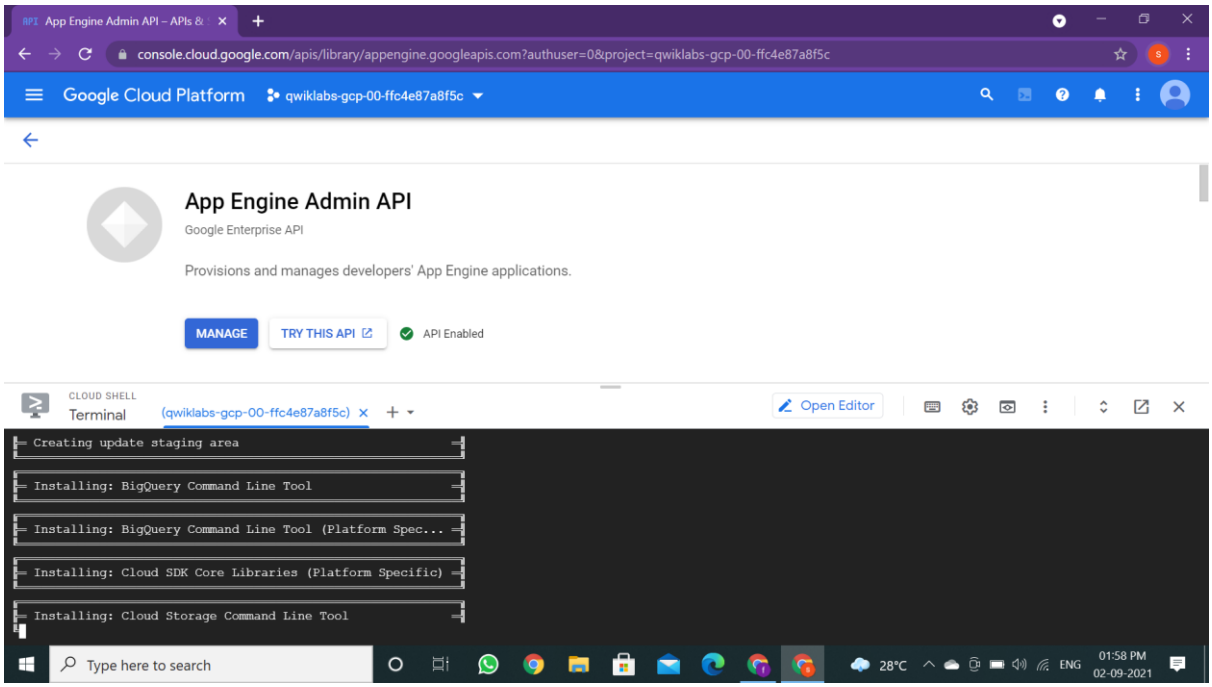


2. Enter the following Maven command to download and install Maven and run the app:

   mvn appengine:run

Name: Zeenat **Class: TYIT** **Roll no: 578**

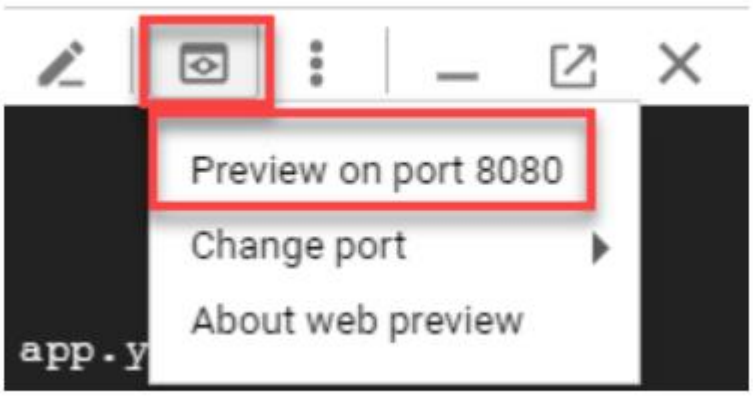




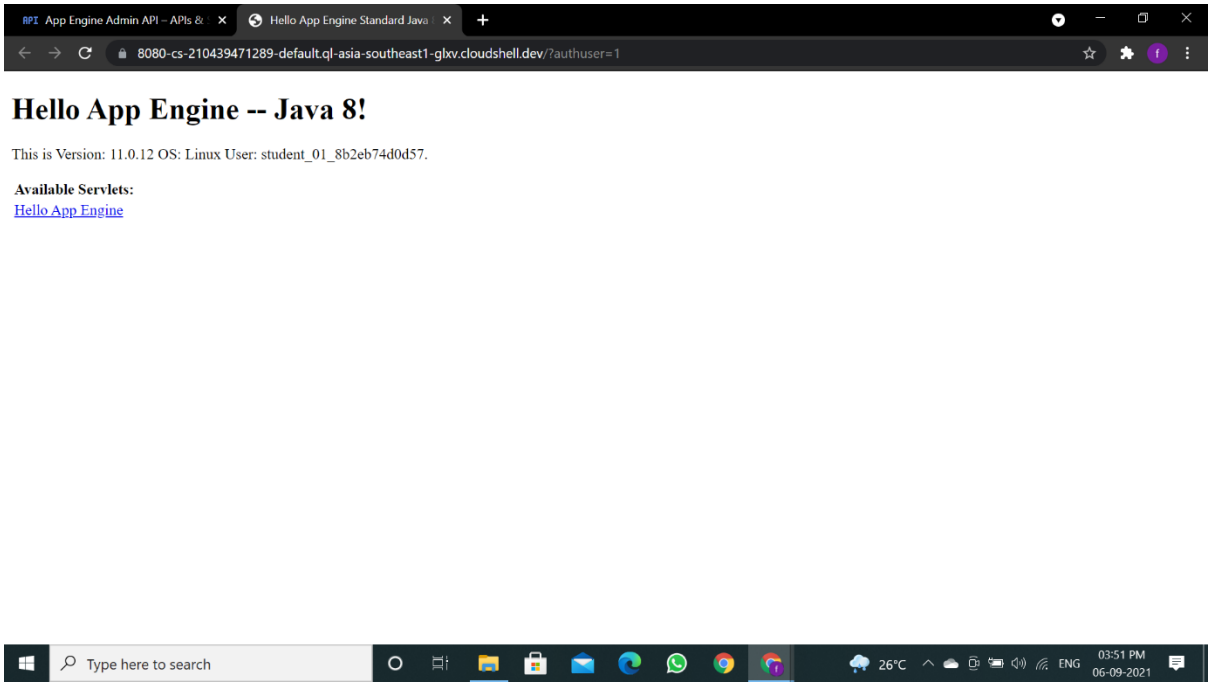
The development server is listening for requests on port 8080 when you see the following last line of output:

3. View the app by clicking the **Web preview** button > **Preview on port 8080**:

Name: Zeenat **Class: TYIT** **Roll no: 578**



page should resemble the following:

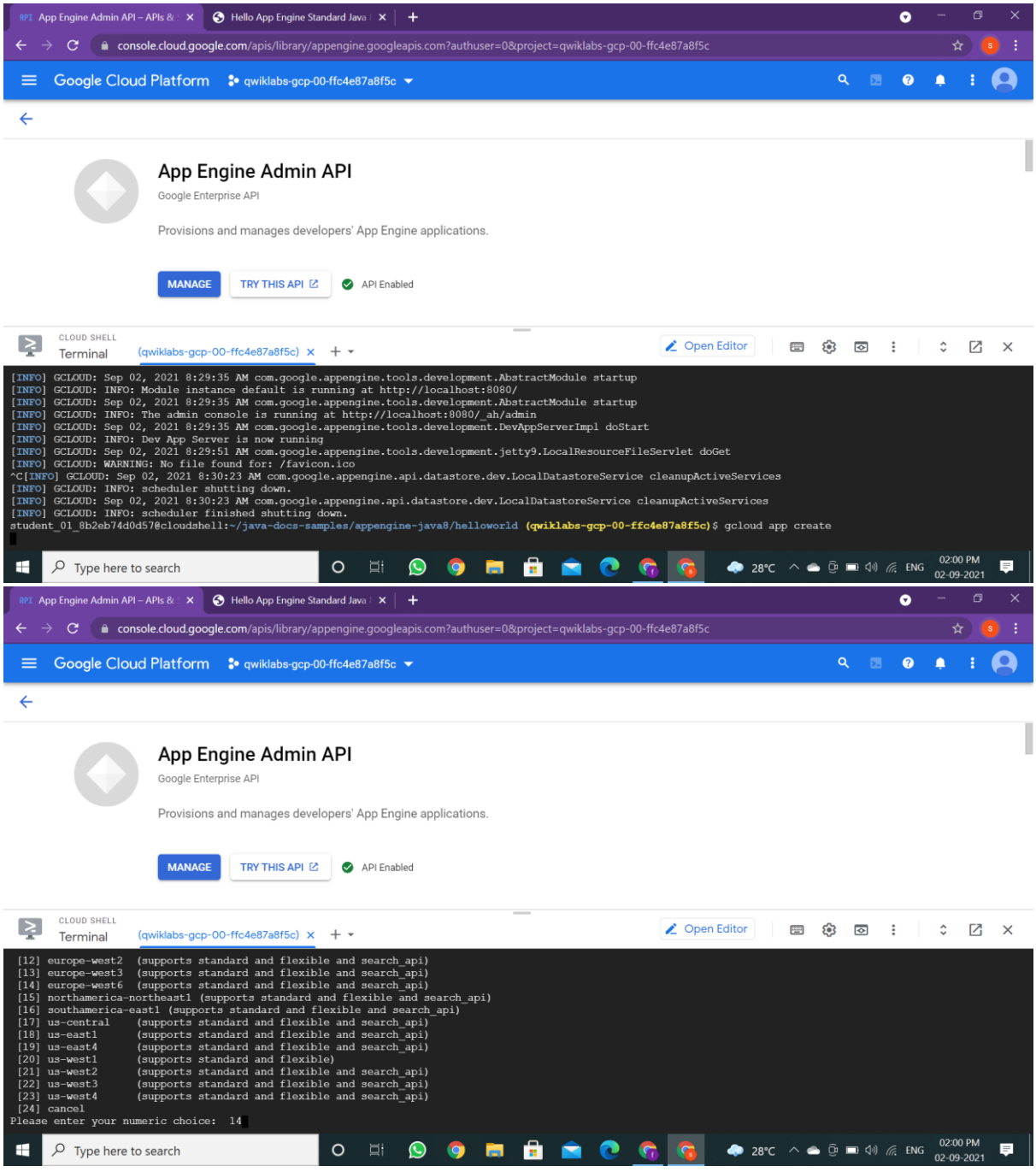


Deploy your app

Now you'll create an application on an App Engine with the following command

gcloud app create

Name: Zeenat **Class: TYIT** **Roll no: 578**



2. Open the pom.xml file with the following command:

   nano pom.xml

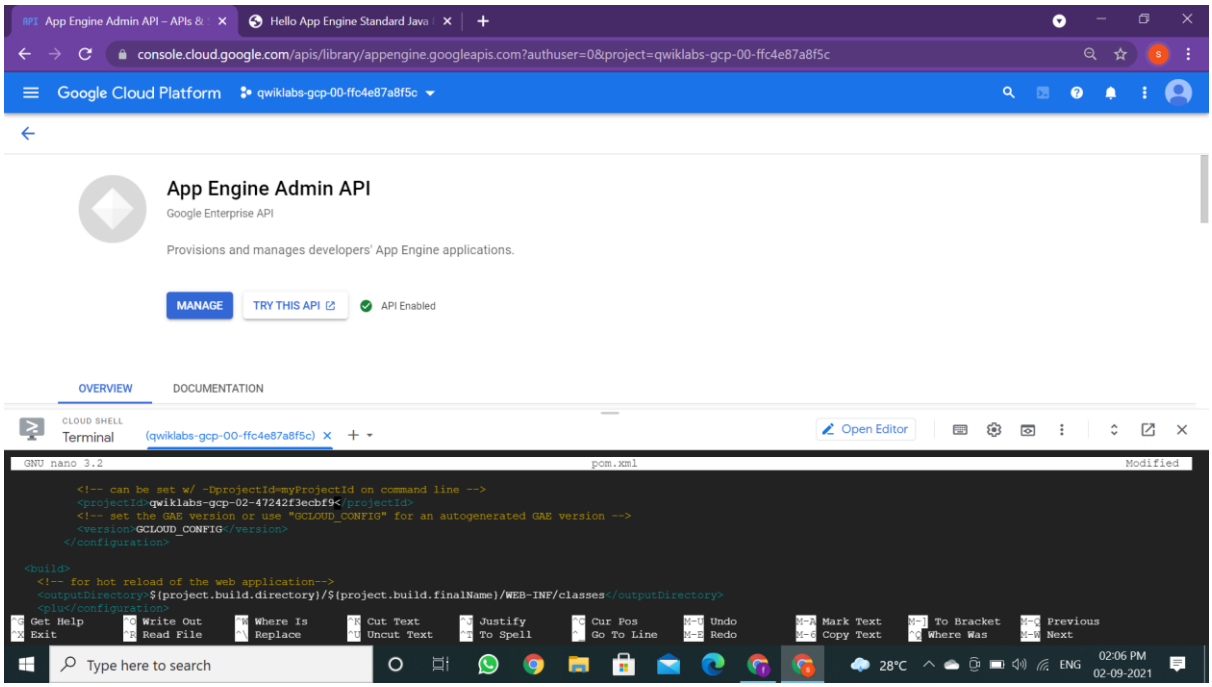
3. Key down towards the bottom of the page until you find this section:

   <version>2.2.0</version>

```
<configuration>
    <!-- can be set w/ -DprojectId=myProjectId on command line -->
<projectId>myProjectId</projectId>
  <!-- set the GAE version or use "GCLOUD_CONFIG" for an autogenerated GAE version -->
  <version>GCLOUD_CONFIG</version>
</configuration>
```

4. Change myProjectId to your Qwiklabs Project ID. Ensure this section resembles the following before moving on:

```
<configuration>
  <!-- can be set w/ -DprojectId=myProjectId on command line -->
  <projectId>qwiklabs-gcp-02-47242f3ecbf9</projectId>
  <!-- set the GAE version or use "GCLOUD_CONFIG" for an autogenerated GAE version -->
  <version>GCLOUD_CONFIG</version>
</configuration>
```

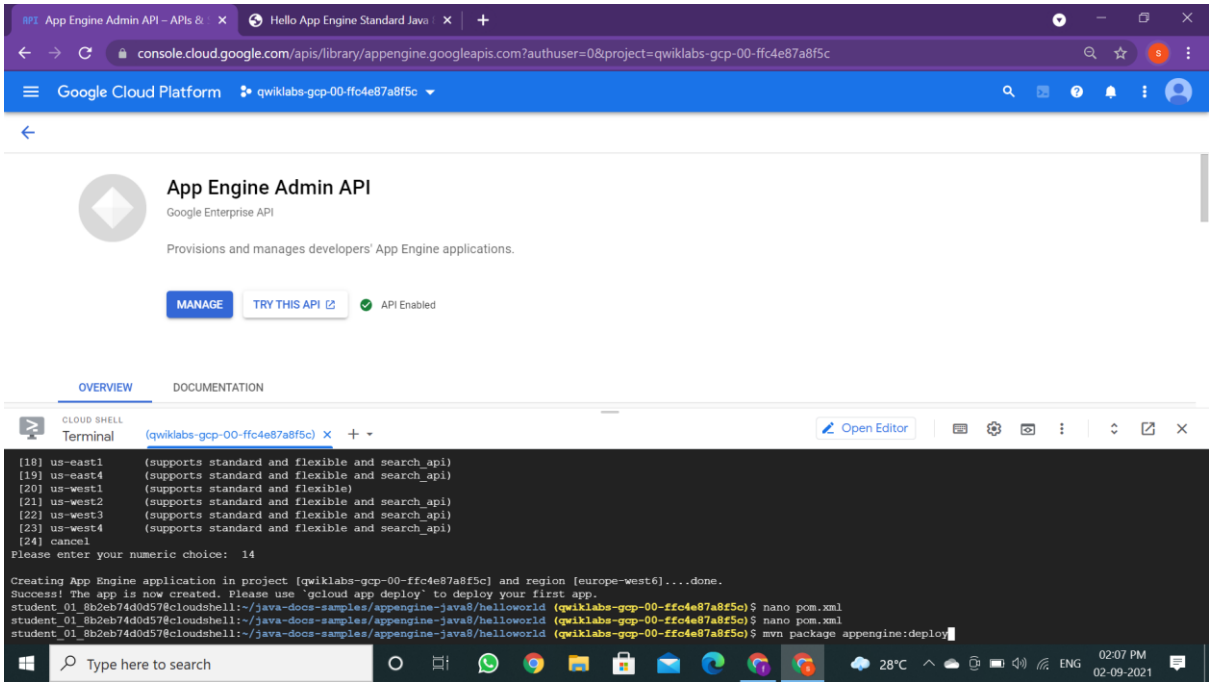


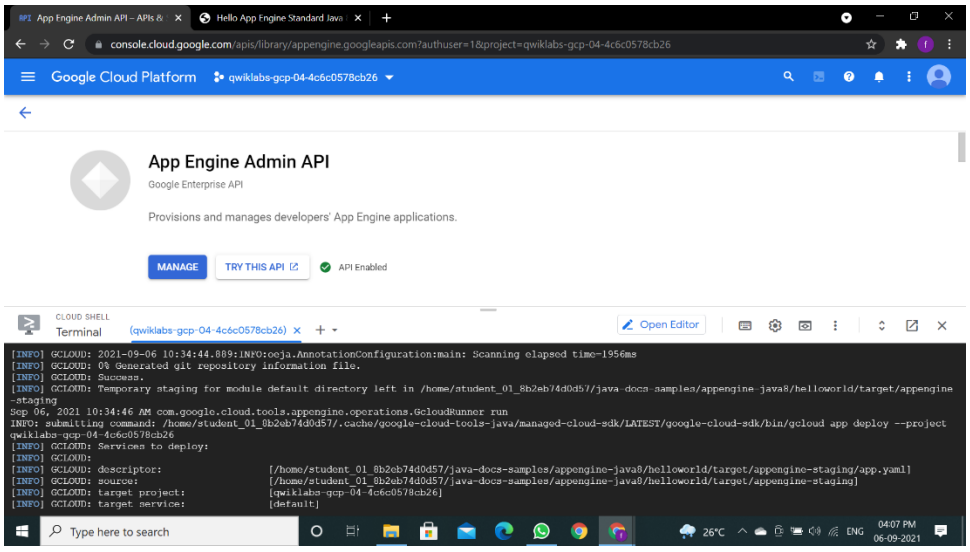
5. Now exit nano and save the file with **CTRL** + **X** --> **Y** --> **Enter**.

6. **DO NOT** use the gcloud app deploy command as stated in the output to deploy your app. Instead, run the following command to deploy your application:

mvn package appengine:deploy

Name: Zeenat **Class: TYIT** **Roll no: 578**



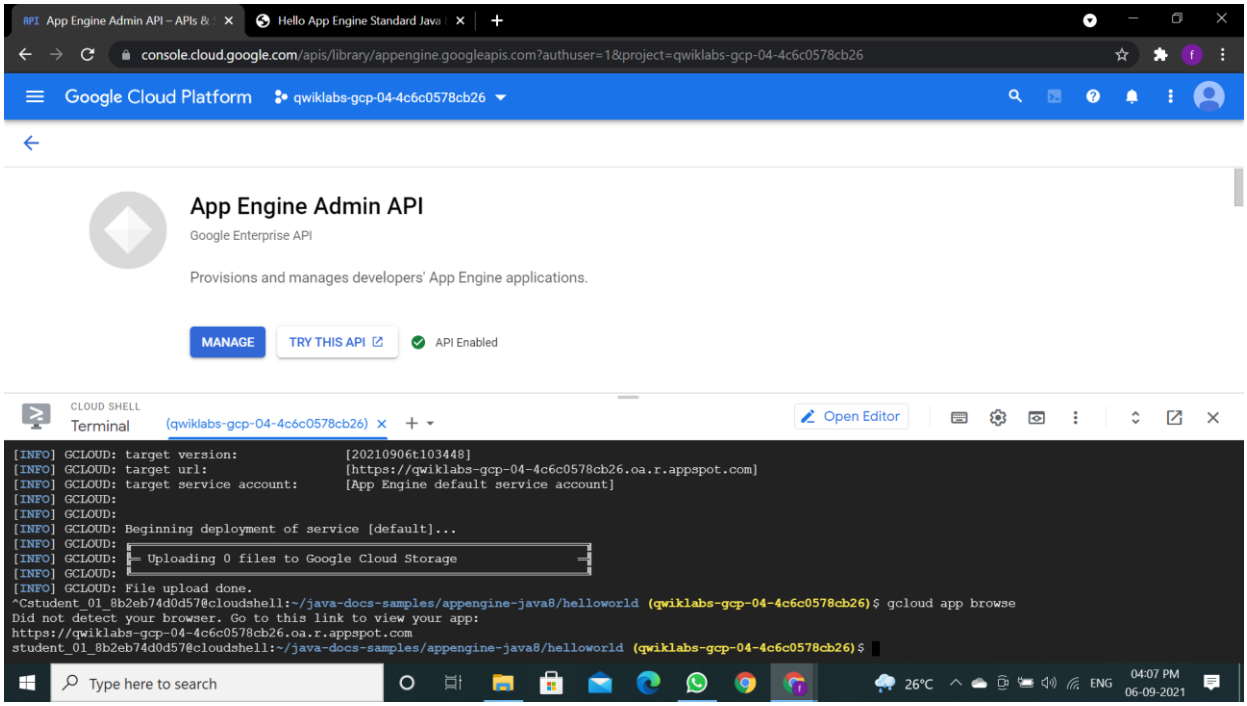


To launch your browser, enter the following command then click on the link it provides.

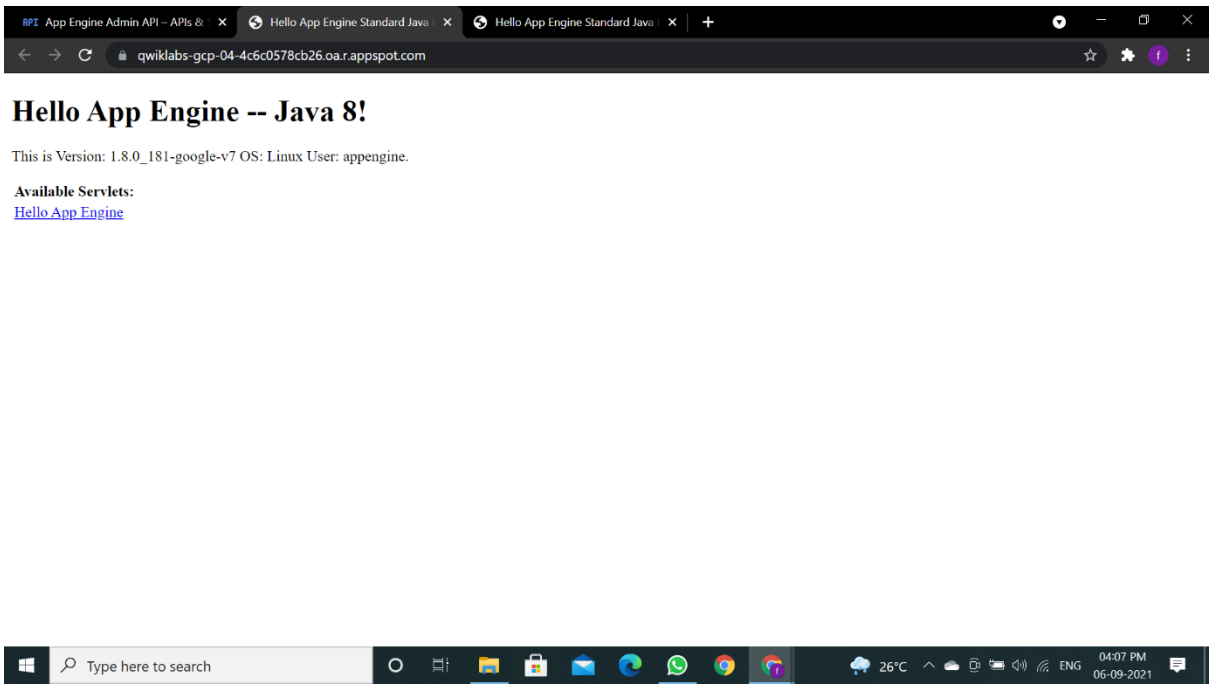
gcloud app browse

Example output; your link will be different:

Name: Zeenat **Class: TYIT** **Roll no: 578**

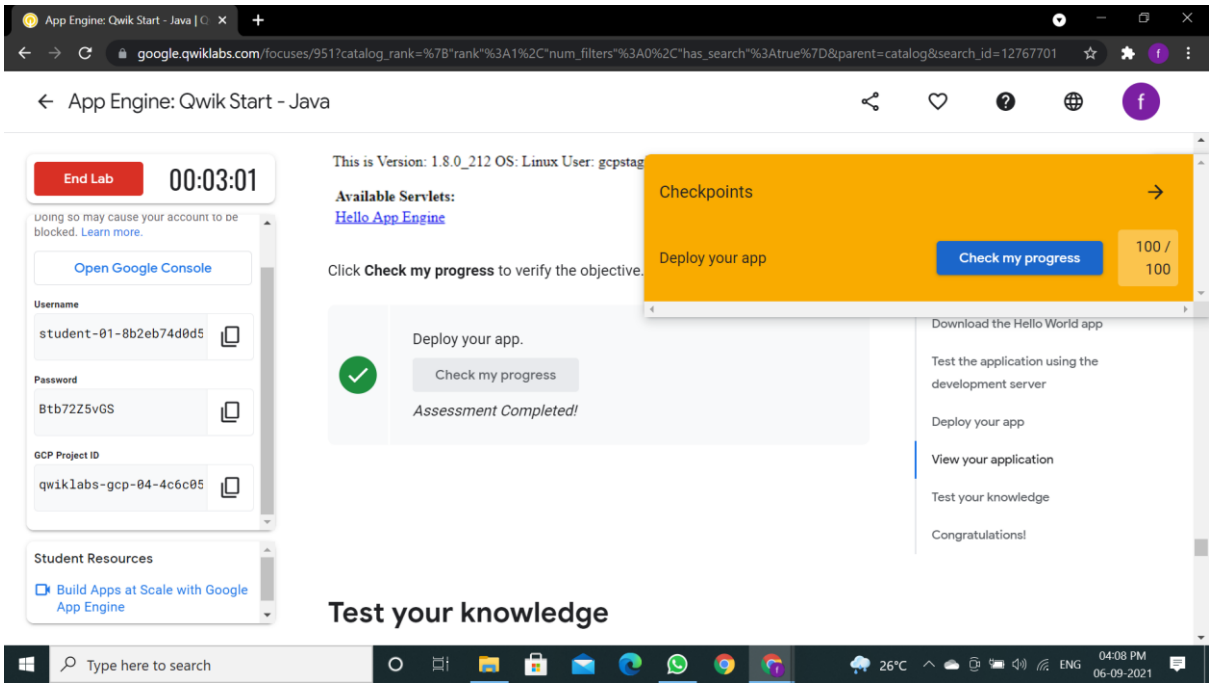


Your application is deployed and you can read the short message in your browser:



Click **Check my progress** to verify the objective.

Name: Zeenat **Class: TYIT** **Roll no: 578**



Name: Zeenat **Class: TYIT** **Roll no: 578**

Practical 5

Aim: To implement Infrastructure as a service using OwnCloud.

Theory:

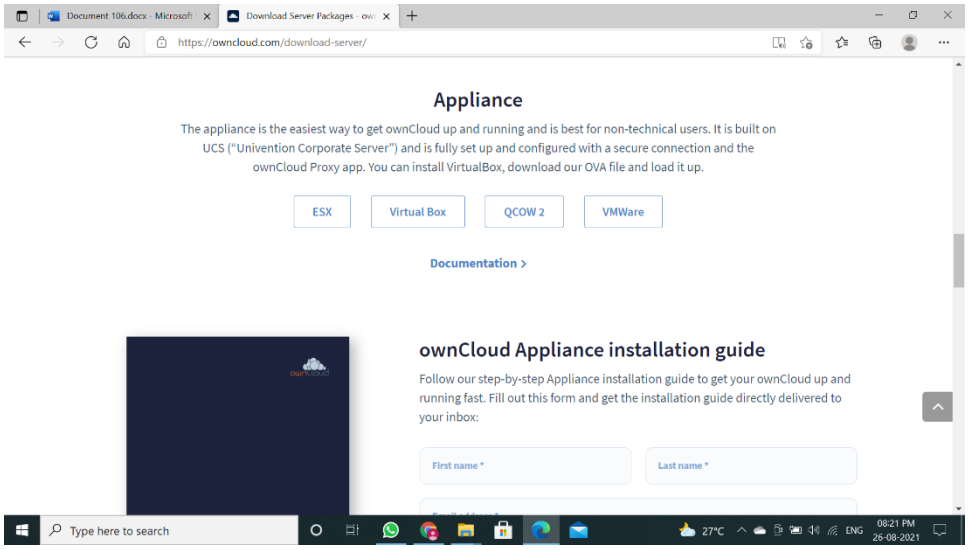
OwnCloud is a self-hosted, open source file syncing and sharing server. Like Dropbox, Google Drive, Box and more for the "big guys", ownCloud gives you access to your files, calendar, contacts, and other data. You can sync all (or part of it) between your devices and share files with others.

OwnCloud supports extensions that allow it to function like Google Drive, with online document editing, calendar and contacts syncing, and more. Its opening avoids the quotas imposed on the storage space or the number of connected clients, instead of having strict limits (for example in the storage space or the number of users), the limits are determined by the physical capacities of the server.

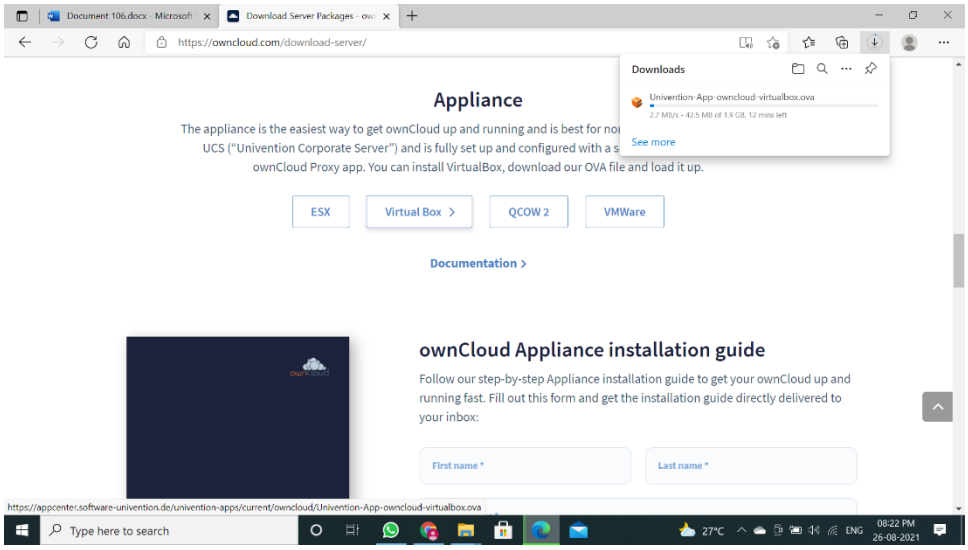
Step1:DownloadtheOwnCloudXServerfromthelink(Itonlyworkswith64bit system).

https://owncloud.com/download/

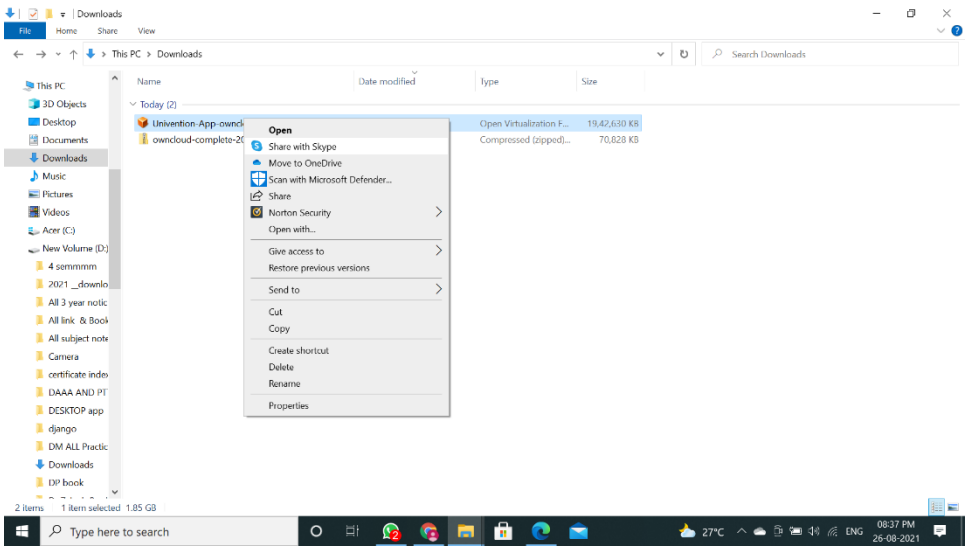
Here I've demonstrated for VirtualBox. So click the Virtual Box button.



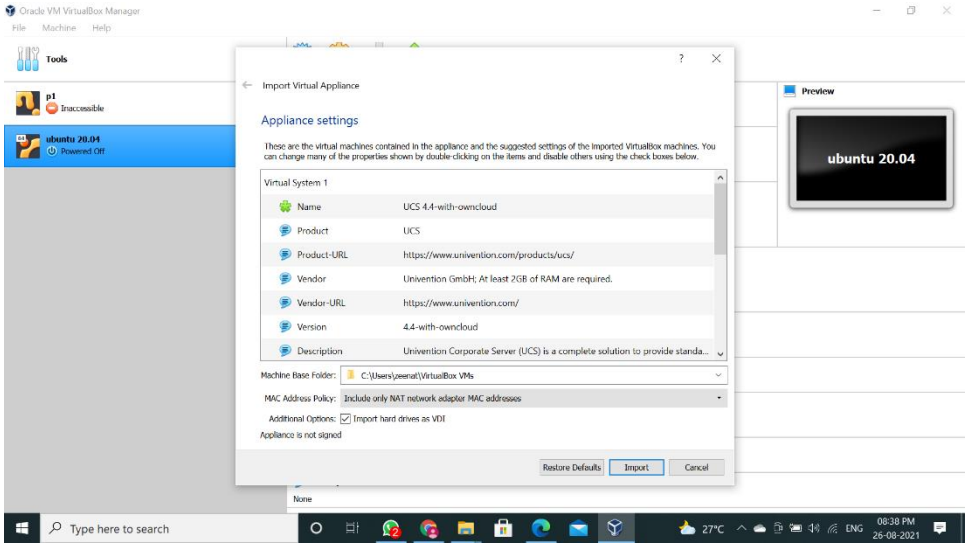
Name: Zeenat **Class: TYIT** **Roll no: 578**



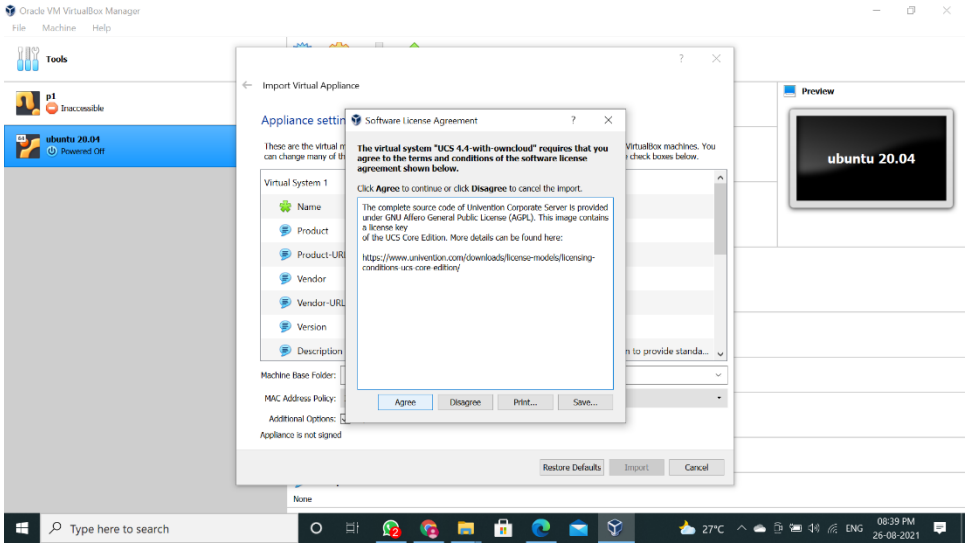
Step 2: Now Double click the application. It will directly take you to the VirtualBox

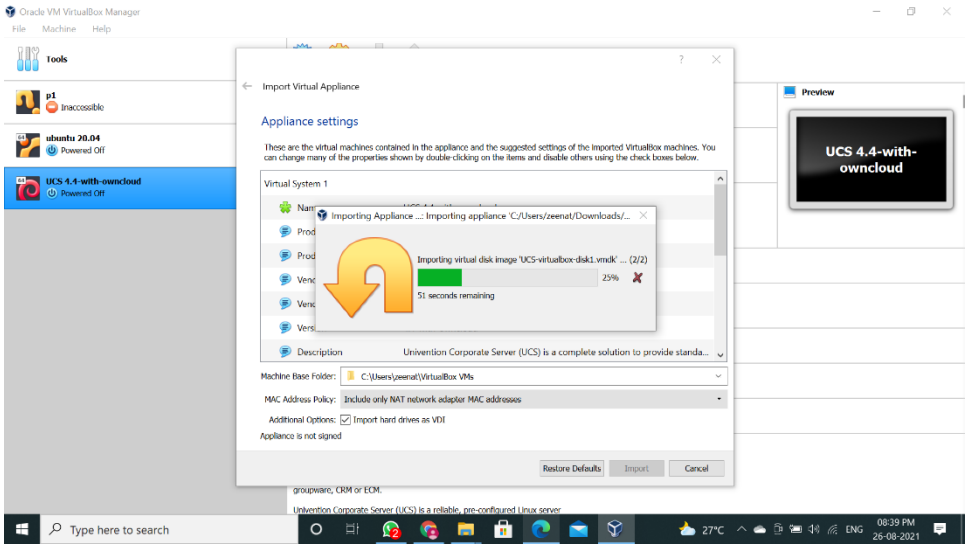


Step 3: Click on Import. Wait till the importing gets finished.

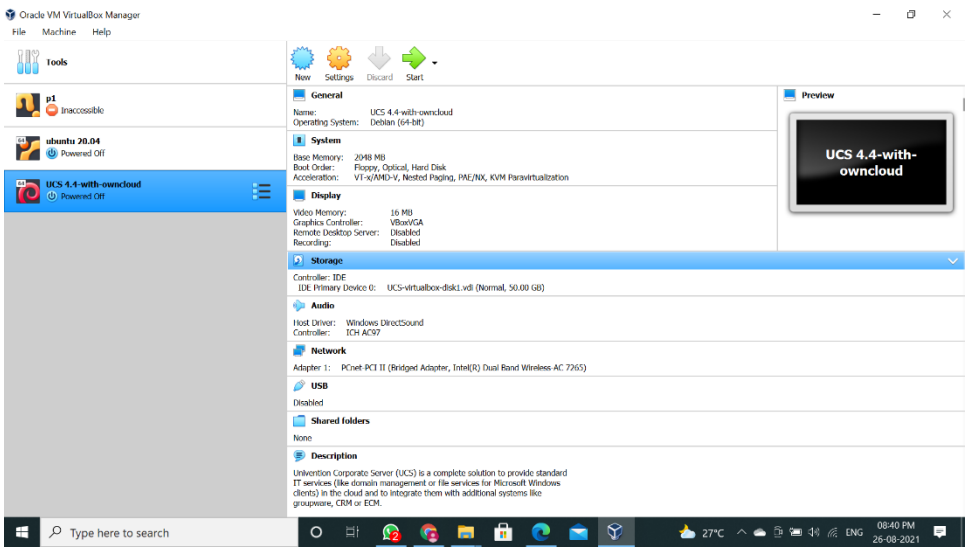


Name: Zeenat **Class: TYIT** **Roll no: 578**



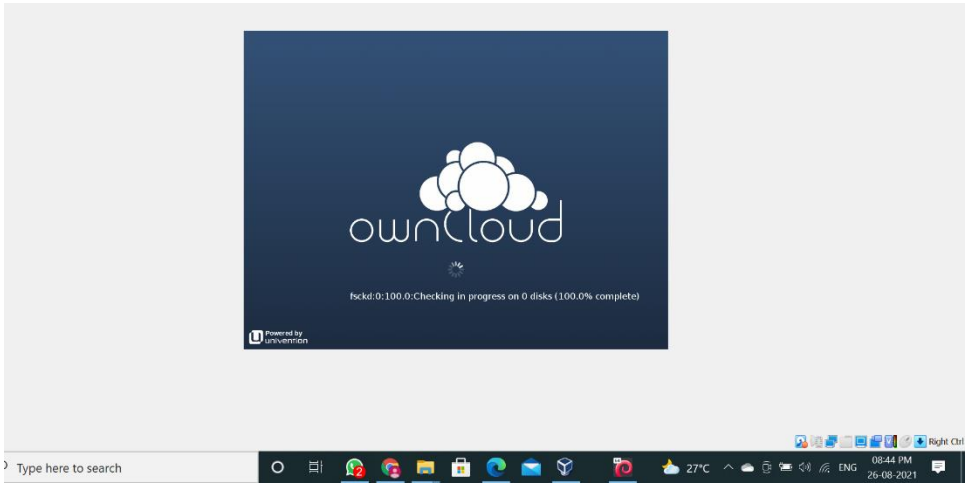


Step 4: Once import is done agree T&C.

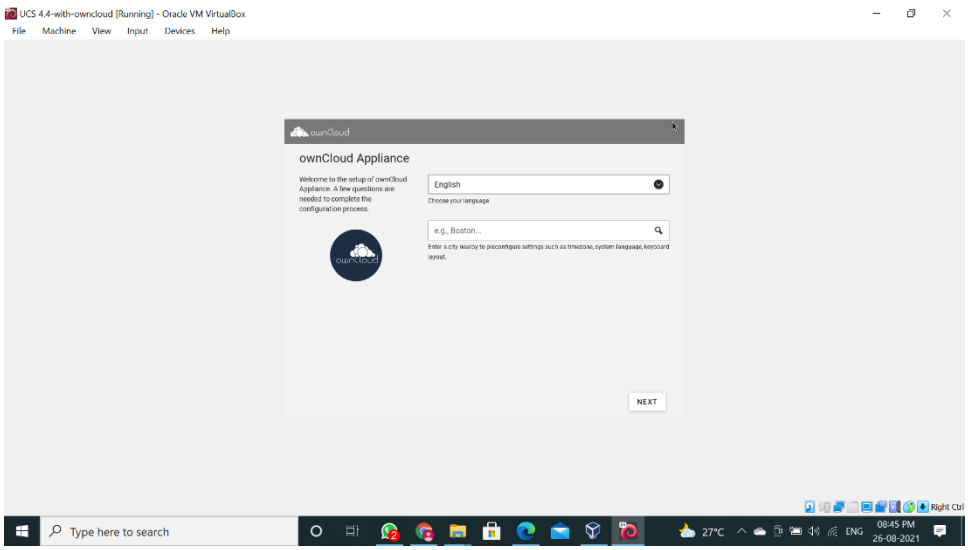


Name: Zeenat **Class: TYIT** **Roll no: 578**

Step 5: Click on "Power on this virtual machine" and following window will appear.

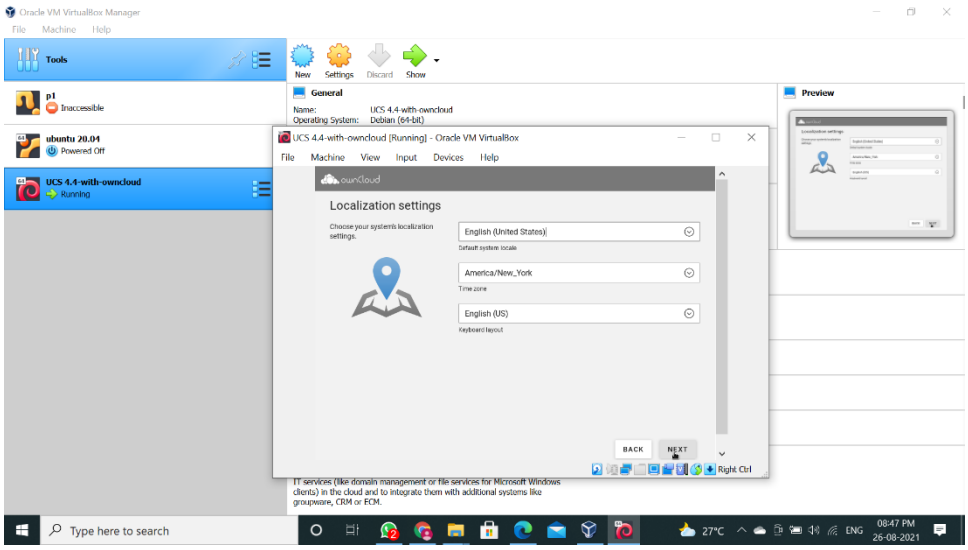


Step 6: On next window it will ask you for your “city”, don’t enter any city name in it and just click “NEXT” (Most important step please don’t enter any city name in it otherwise it will not read keyboard entries).

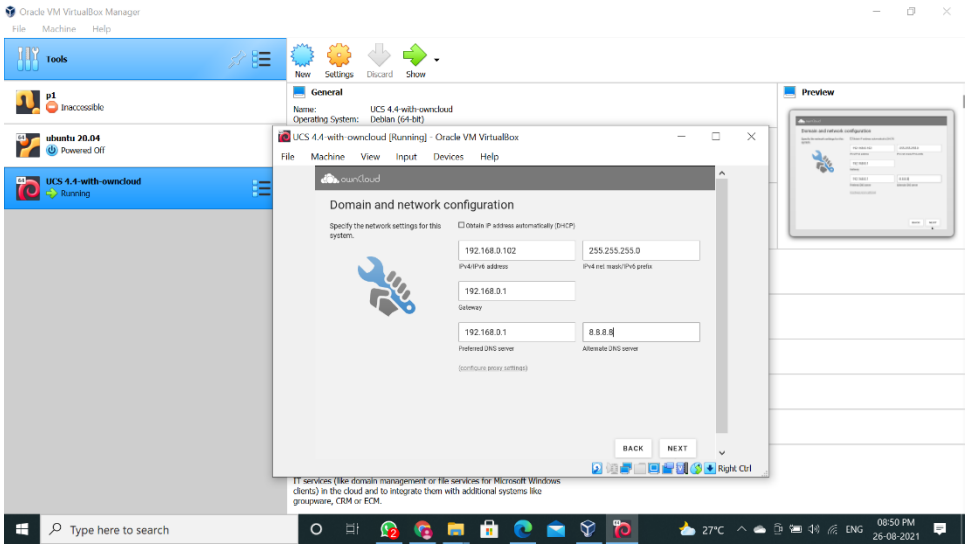


Step 7: Just click “NEXT” on “Localization settings” window.

Name: Zeenat **Class: TYIT** **Roll no: 578**

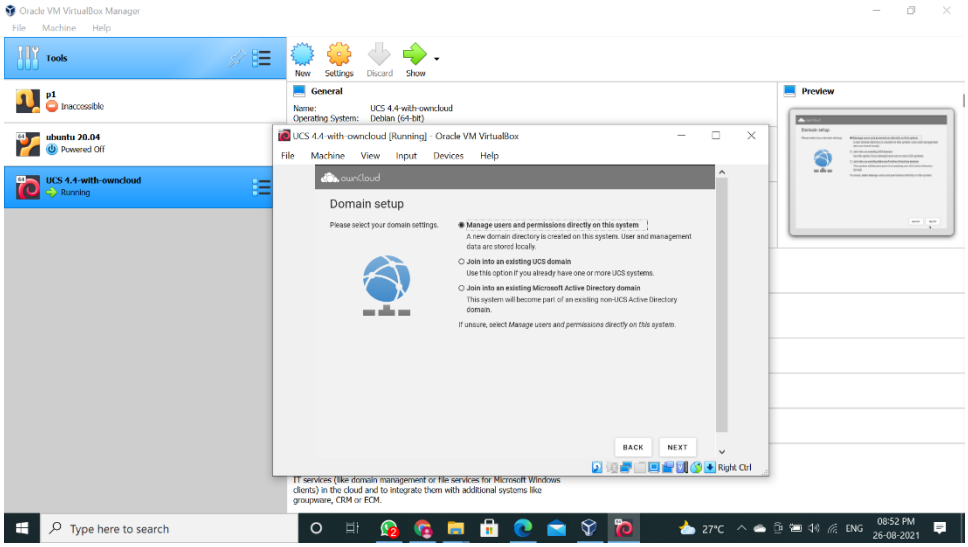


Step 8: It will fetch IP Address, Net Mask and Gateway from DHCP, don't change anything, also uncheck "Obtain IP address automatically (DHCP)", mention an "Alternate DNS Server" and just click "NEXT".

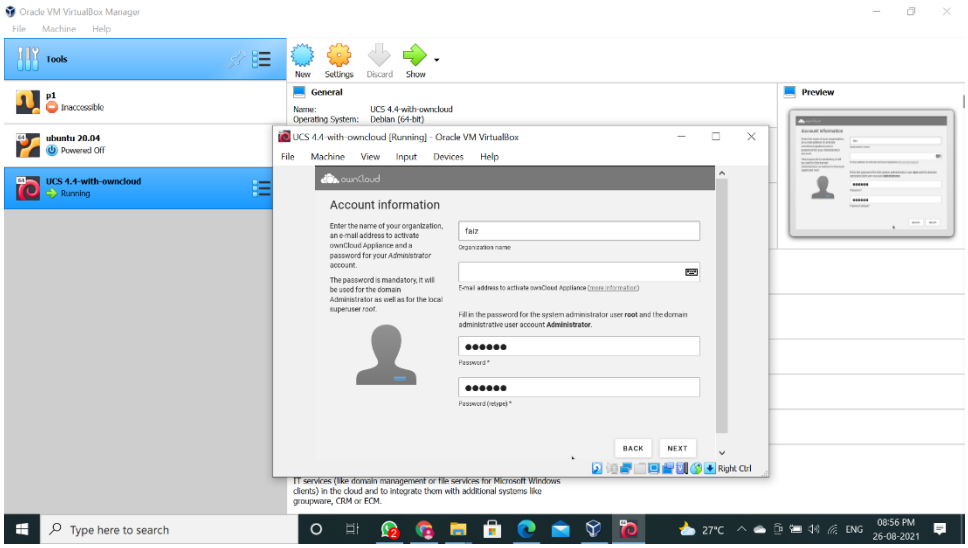


Step 9: In Domain setup click "NEXT"

Name: Zeenat **Class: TYIT** **Roll no: 578**

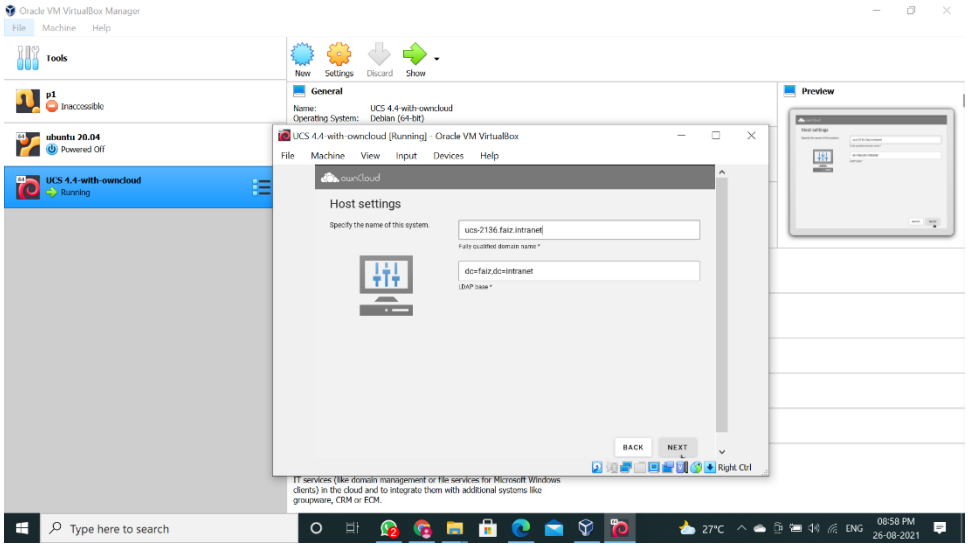


Step 10: Now Account information window will appear, enter details in it. Remember that password we are setting is for “root” and “Administrator”, click on “NEXT

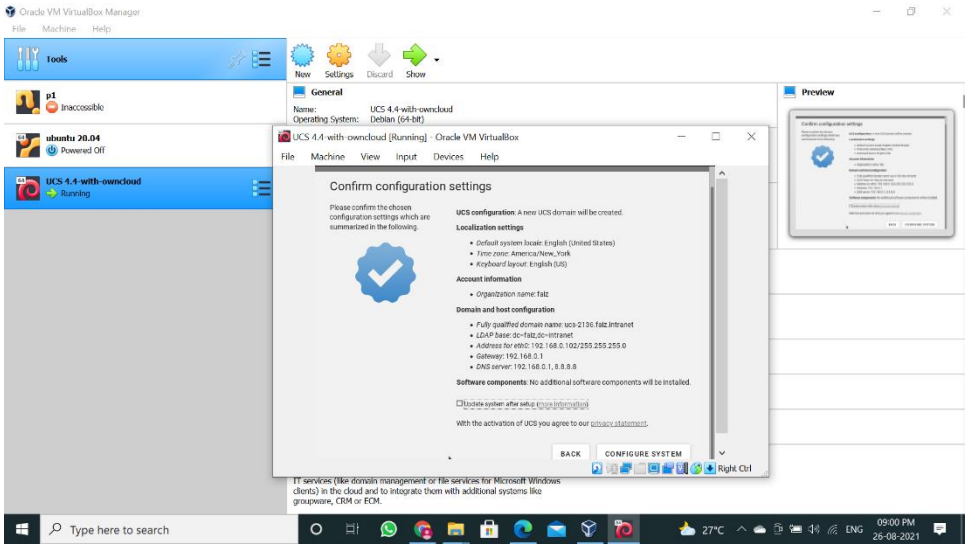


Step 11: On next window it will show you Fully Qualified domain name and LDAP base, click on “NEXT”.

Name: Zeenat **Class: TYIT** **Roll no: 578**

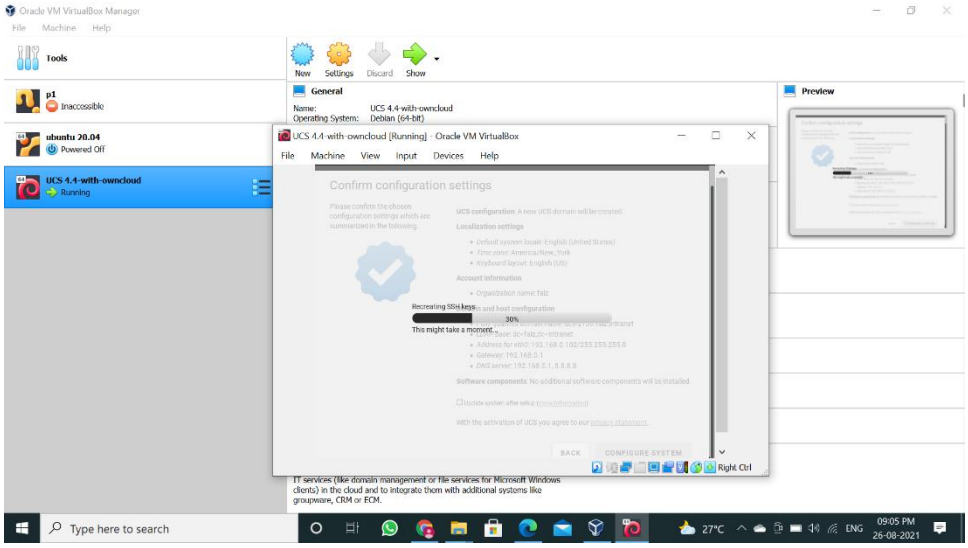


Step 12: Itwillshowtheconfigurationsettingsforowncloudscrolldownalittleandclickon“CONFIGURE SYSTEM”

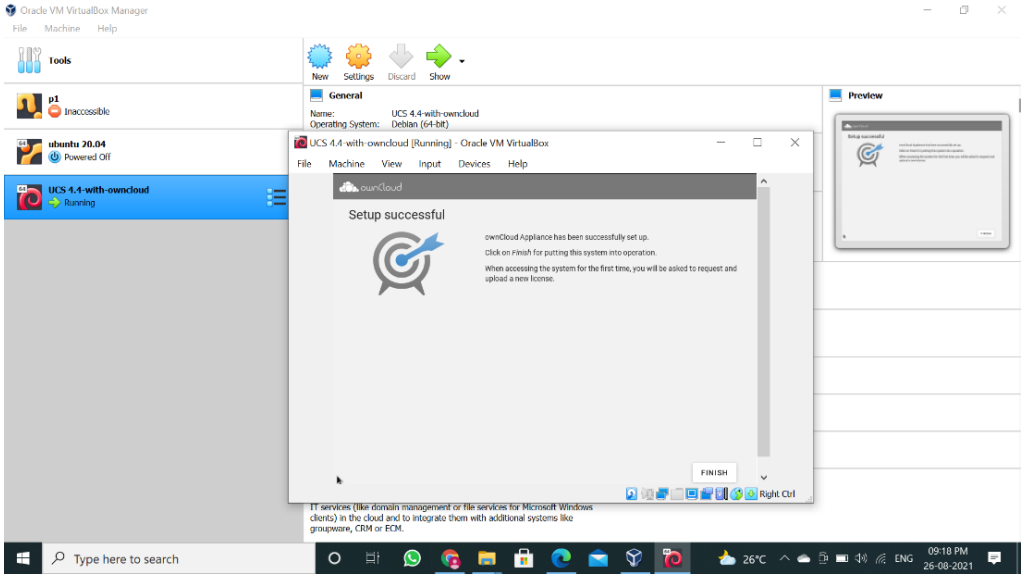


Step 13: It will take time to setup.

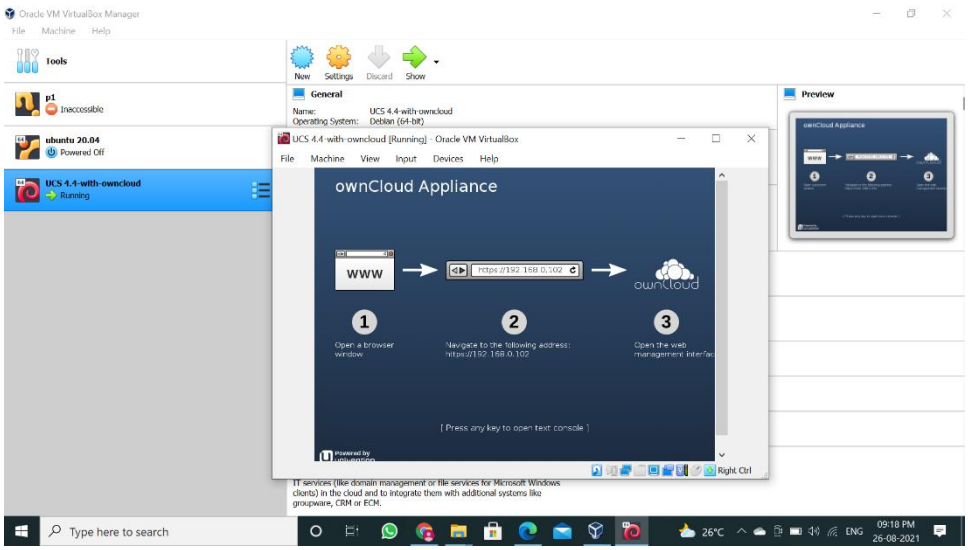
Name: Zeenat **Class: TYIT** **Roll no: 578**



Step 14: The setup is done now click on “FINISH”.

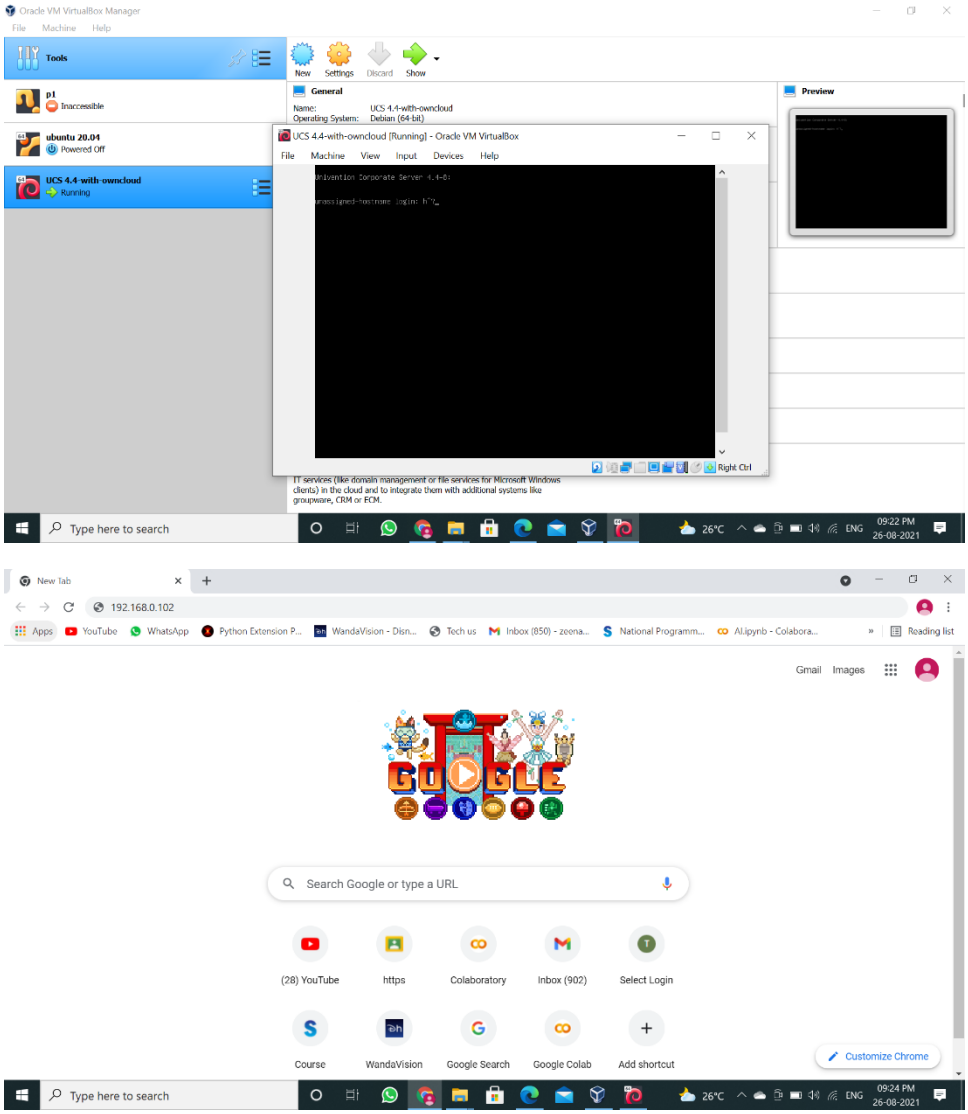


Step 15: Now on next window press any button.



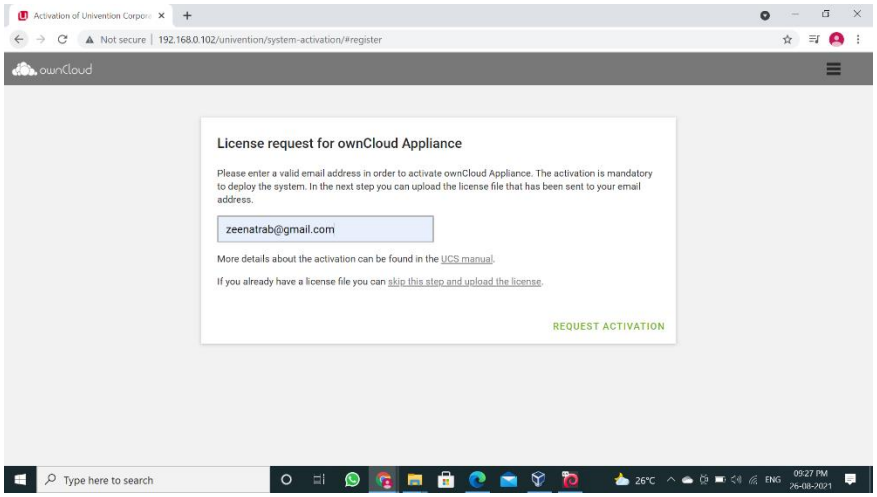
Name: Zeenat **Class: TYIT** **Roll no: 578**

Step 16: Now you can see the IP address on top right-hand side, open the browser and enter system's IP address in URL bar and press enter.

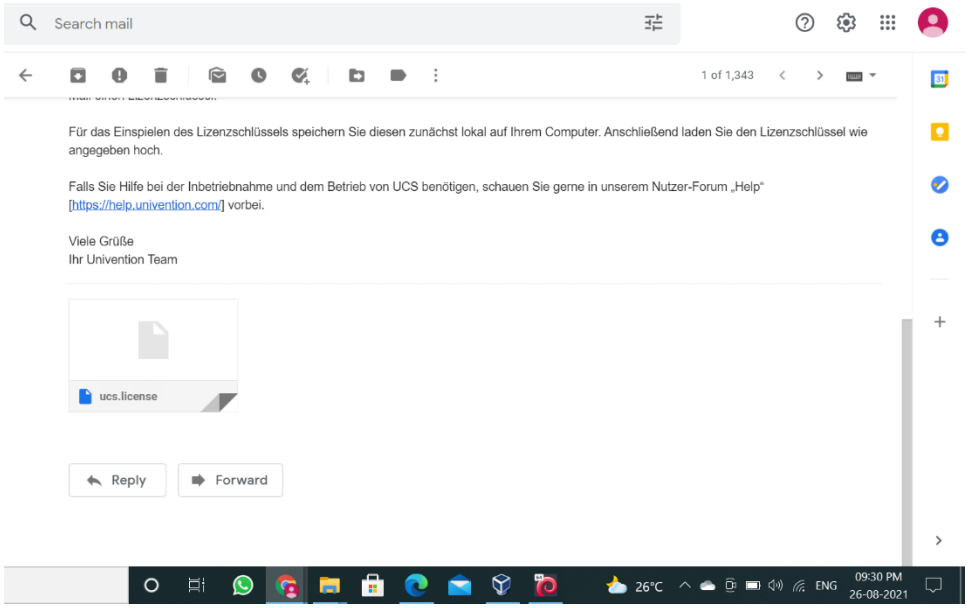


Step 17: It will ask you for Email ID to send license, enter your Email ID and click "REQUEST ACTIVATION".

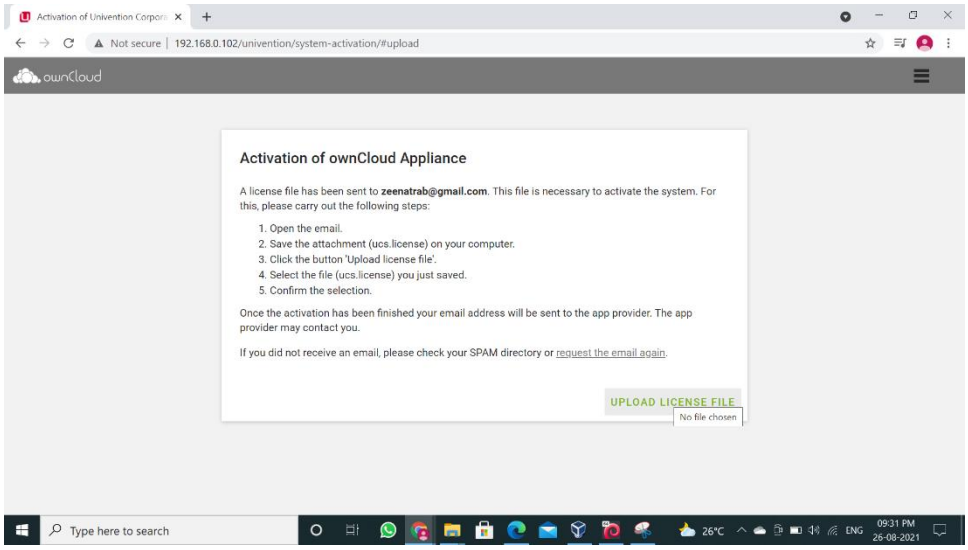
Name: Zeenat **Class: TYIT** **Roll no: 578**



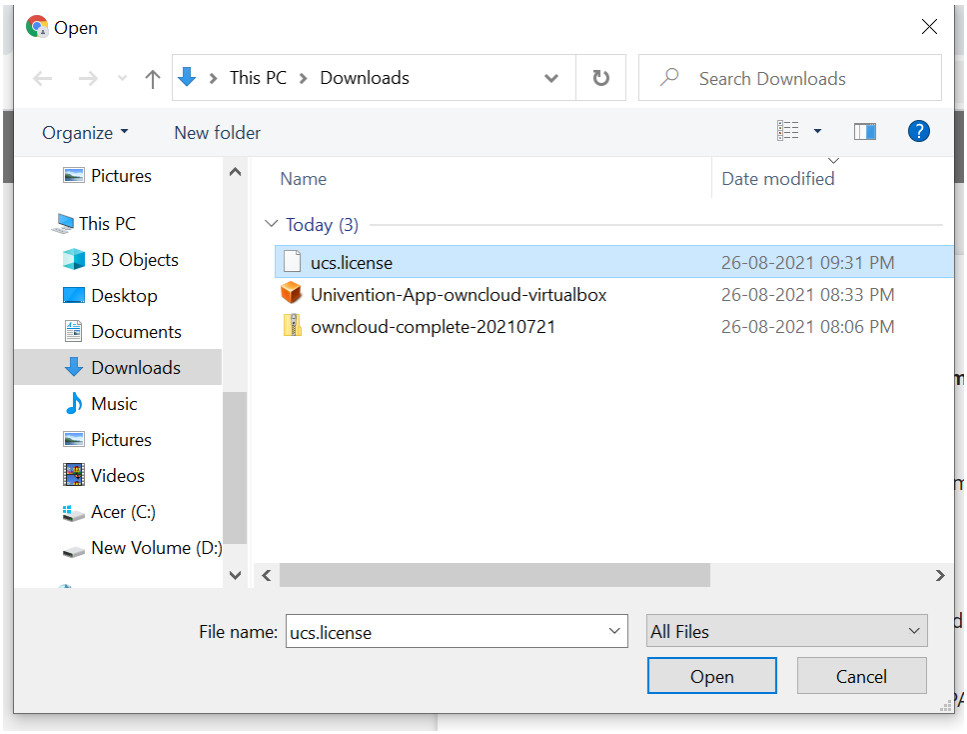
Step 18: Check your mailbox you will receive the license from OwnCloud, download it



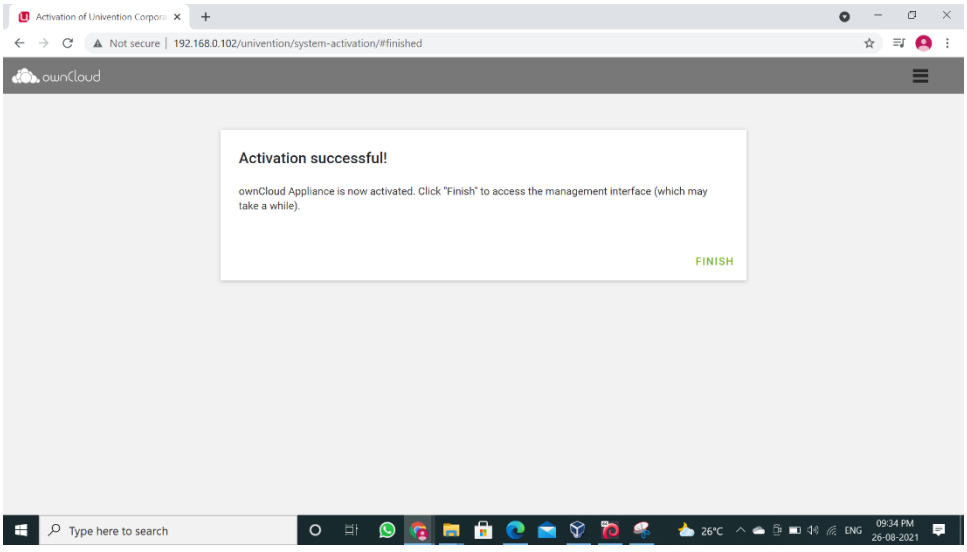
Step 19: Get back to OwnCloud and click on “UPLOAD LICENSE FILE”



Step 20: Now select the license file and click “Open”.

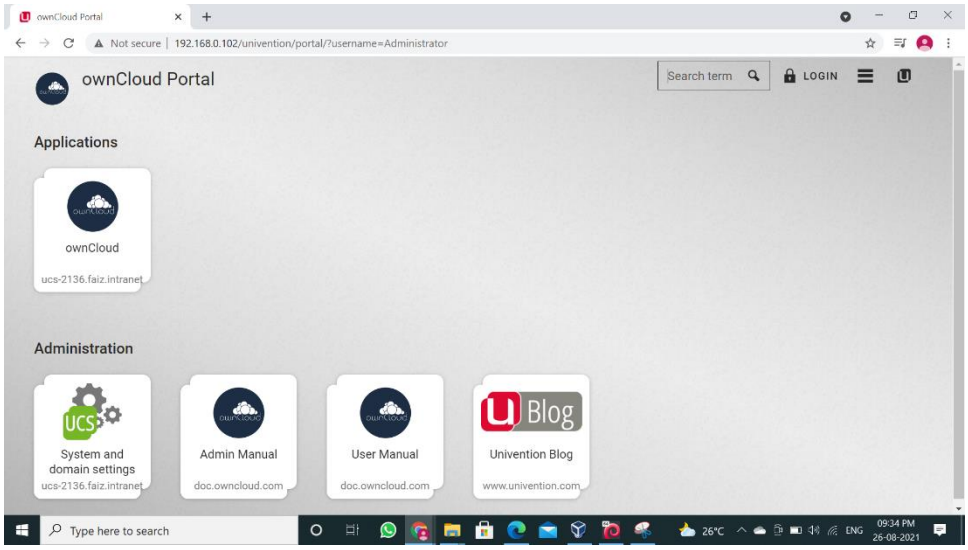


Step 21: On next page click on “FINISH”.

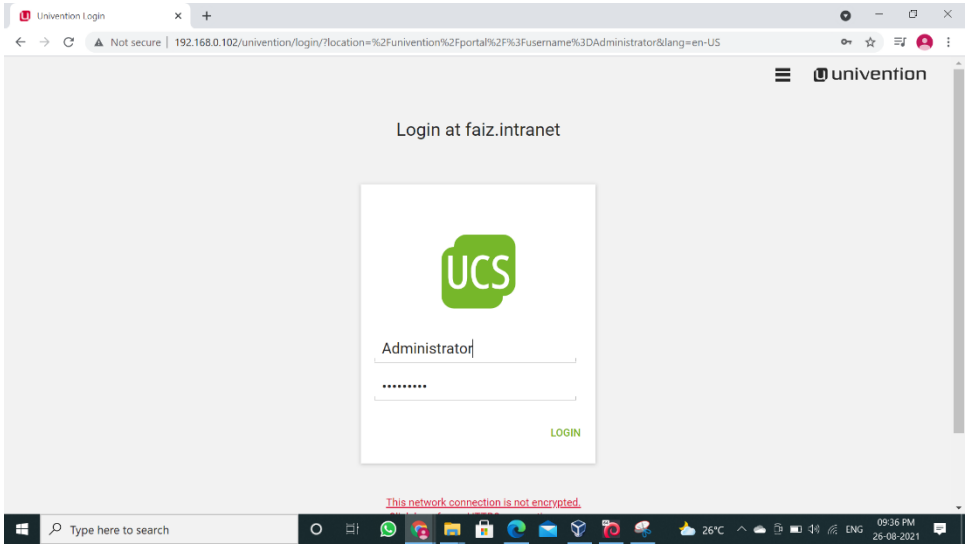


Step 22: We have installed OwnCloud, now just try logging in with “Administrator” as userfor that click on “LOGIN” button.

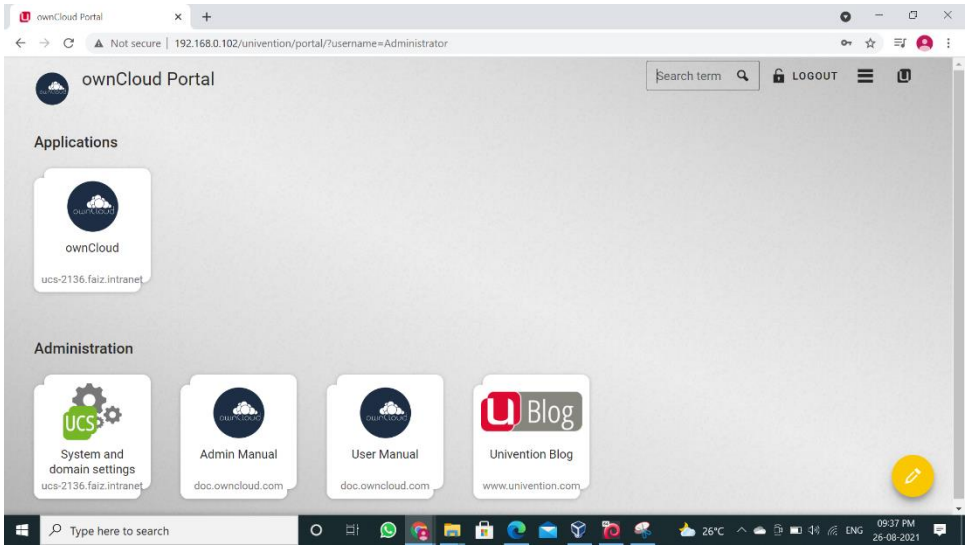
Name: Zeenat **Class: TYIT** **Roll no: 578**



Step 23: Enter "Administrator" as user name and the password which you set during setting up process and click on "LOGIN".

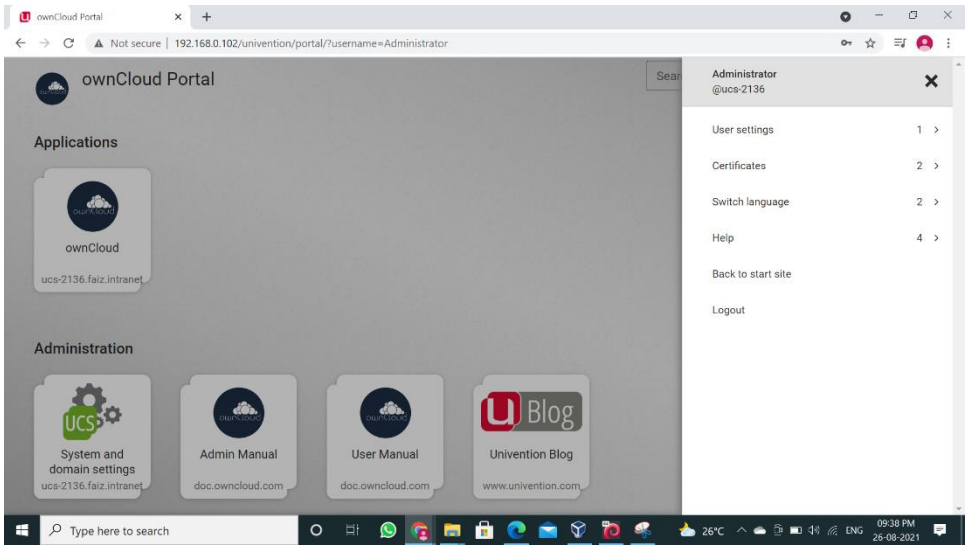


Step 24: After we have logged in successfully, now click on hamburger menu button.



Name: Zeenat **Class: TYIT** **Roll no: 578**

Step 25: Now we successfully completed OwnCloud installation.



CONCLUSION:

We have installed OwnCloud as bare metal hypervisor and implemented it. It provides access to computing resources inavirtual environment. With the help of Infrastructure as a service we can build our own IT platform.

Name: Zeenat **Class: TYIT** **Roll no: 578**

Practical 6

Aim: Understanding Infrastructure as a Service in Open-nebula and Eucalyptus

1. Eucalyptus & OpenNebula are major Open-Source Cloud-Computing Software Platforms
2. Manage the provisioning of virtual machines for a cloud providing IaaS
3. Commercial cloud services charge, by the hour, for CPU time
4. It might be more cost effective for the organization to purchase hardware to create its own private cloud.
5. These software products are designed to allow an organization to set up a private group of machines as their own cloud.
6. These two frameworks represent two different points of interest in the design space of this particular type of opensource cloud.

Eucalyptus:

• EUCALYPTUS stands for Elastic Utility Computing Architecture for Linking Your Program To Useful System.

• It is open source software that was developed by University of California-Santa Barbara for Cloud Computing to implement Infrastructure as a Service.

• Eucalyptus provide an EC2 -compatible cloud Computing Platform and S3- compatible Cloud Storage thus its services are available through EC2/S3 compatible APIs.

• The Eucalyptus system is composed of a 5 main components interacting together; Client, Cloud Controller, Storage Controller (Walrus), Cluster Controller and a Node Controller.

Node Controller

• Is installed in each compute node to control VM activities, including the execution, inspection and termination of VM instances.

Cluster Controller

• Runs on 1 machine per cluster & works as an intermediary between the cloud & node controller.

Storage Controller

• Warlus is a component that provides storage services for storing virtual machine images and user’s data.

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Cloud Controller

• It is the user's entry point into the Eucalyptus system and only one instance is run on the system. It provides users with a way managing the system.

• The cloud controller is built using the Enterprise service bus providing decoupling from the services' implementation.

Client

• The client component provides the user with a way to access the Eucalyptus system (cloud controller).

• Eucalyptus provides two interfaces;

• One is a WDSL which is a SOAP client interface similar to AWS EC2 interface called euca2ools.

• Another interface is a HTTP query based interface.

Constructing a Virtual Machine:

1. A user uses the euca2ools front-end to request a VM.

2. The VM template disk image is pushed to a compute node

3. This disk image is padded to the correct size and packaged for use by the hypervisor on the compute node.

4. The compute node sets up network bridging to provide a virtual NIC with a virtual MAC.

5. On the head node the dhcp is set up with the MAC/IP pair

6. VM is spawned on the VMM.

7. The user can now SSH directly into the VM.

OpenNebula

• OpenNebula tends to a greater level of centralization and customizability (especially for end-users).

• The idea of OpenNebula is a pure private cloud, in which users actually log into the head node to access cloud functions.

• OpenNebula, by default, uses a shared file system, typically NFS, for all disk images files and all files for actually running the OpenNebula functions.

• In order to spawn a VM, the user provides a configuration file containing parameters which would be fed into the VMM command line. This allows for memory, processor, network and disk resources to be requested for essentially any configuration.

• OpenNebula is also very centralized, especially in its default configuration with an NFS filesystem.

Constructing A Virtual Machine

1. A user uses ssh to login to the head node.
2. The user uses the onevm command to request a VM.
3. The VM template disk image is copied and a copy is padded to the correct size and configuration within the NFS directory on the head node.
4. The one process on the head node uses ssh to log into a compute node.
5. The compute node sets up network bridging to provide a virtual NIC with a virtual MAC.
6. Files needed by the VMM on the compute node will be pulled to the compute node via the NFS.
7. VM is spawned on the VMM.
8. The user can now SSH directly into the VM.

Name: Zeenat **Class: TYIT** **Roll no: 578**

Practical 7

Aim: Study and Implementation User Management inCloud

OBJECTIVE: From this experiment the student will be able,

- Is to understand how to create user's accounts.
- Manage user and group of user's accounts.
- To explore OwnCloud.

OUTCOME: The learner will be able to,

- Installing and using Administrative features of ownCloud Technology
- User Management
- Access same with 2 different credentials

THEORY:

- OwnCloud is a suite of client–server software for creating and using file hosting services. OwnCloud functionally has similarities to the widely used Dropbox.
- The primary functional difference between ownCloud and Dropbox is that ownCloud does not offer data centre capacity to host stored files.
- The Server Edition of ownCloud is free and open-source, thereby allowing anyone to install and operate it without charge on their own private server.
- OwnCloud supports extensions that allow it to work like Google Drive, with online document editing, calendar and contact synchronization, and more.
- Its openness avoids enforced quotas on storage space or the number of connected clients, instead of having hard limits (for example on storage space or number of users) limits are determined by the physical capabilities of the server.
- On the User management page of your ownCloud Web UI you can:
  1. Create new users
  2. View all of your users in a single scrolling window
  3. Filter users by group
  4. See what groups they belong to
  5. Edit their full names and passwords
  6. See their data storage locations
  7. View and set quotas
  8. Create and edit their email addresses
  9. Send an automatic email notification to new users
  10. Delete them with a single click

Name: Zeenat **Class: TYIT** **Roll no: 578**

- Granting Administrator Privileges to a User – OwnCloud has two types of administrators:

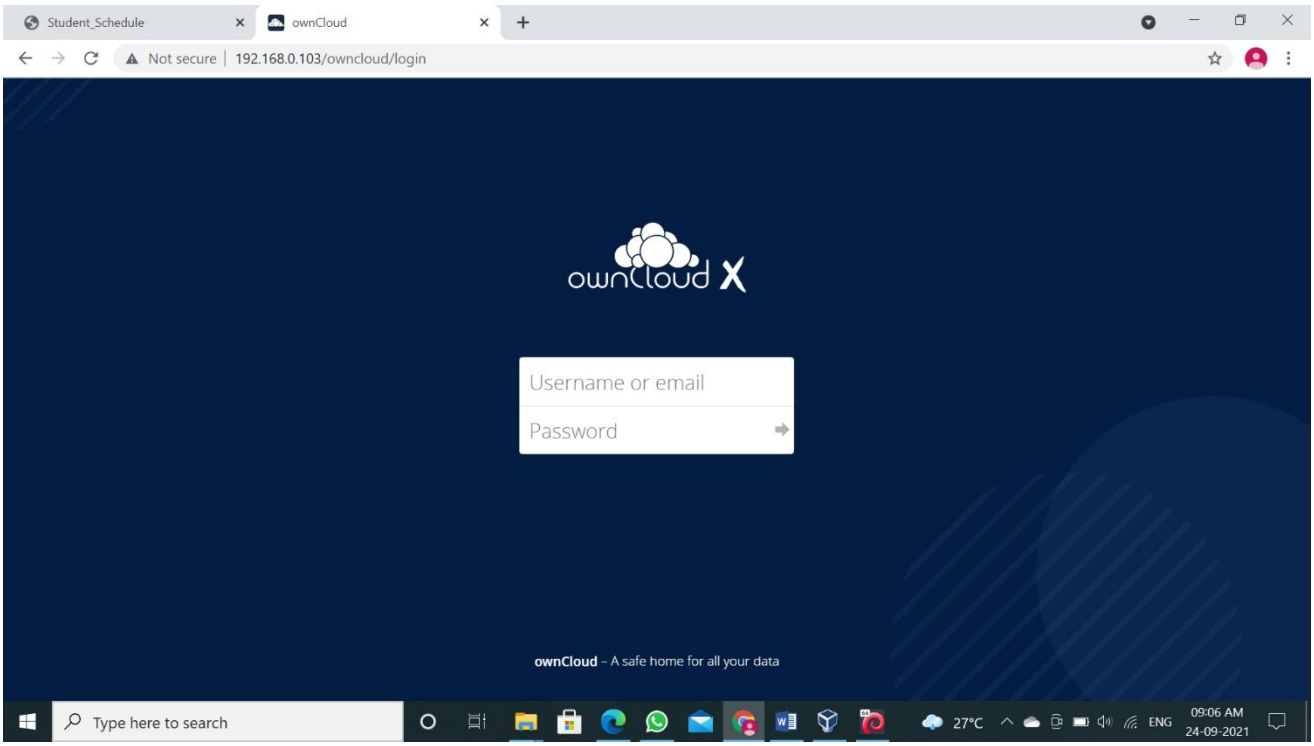
1. **Group administrators** – It has the rights to create, edit and delete users in their assigned groups. Group administrators cannot access system settings, or add or modify users in the groups that they are not Group Administrators for. Use the dropdown menus in the Group Admin column to assign group admin privileges.

2. **Super Administrators** – It has full rights on your ownCloud server, and can access and modify all settings. To assign the Super Administrators role to a user, simply add them to the admin group.

PROCEDURE:

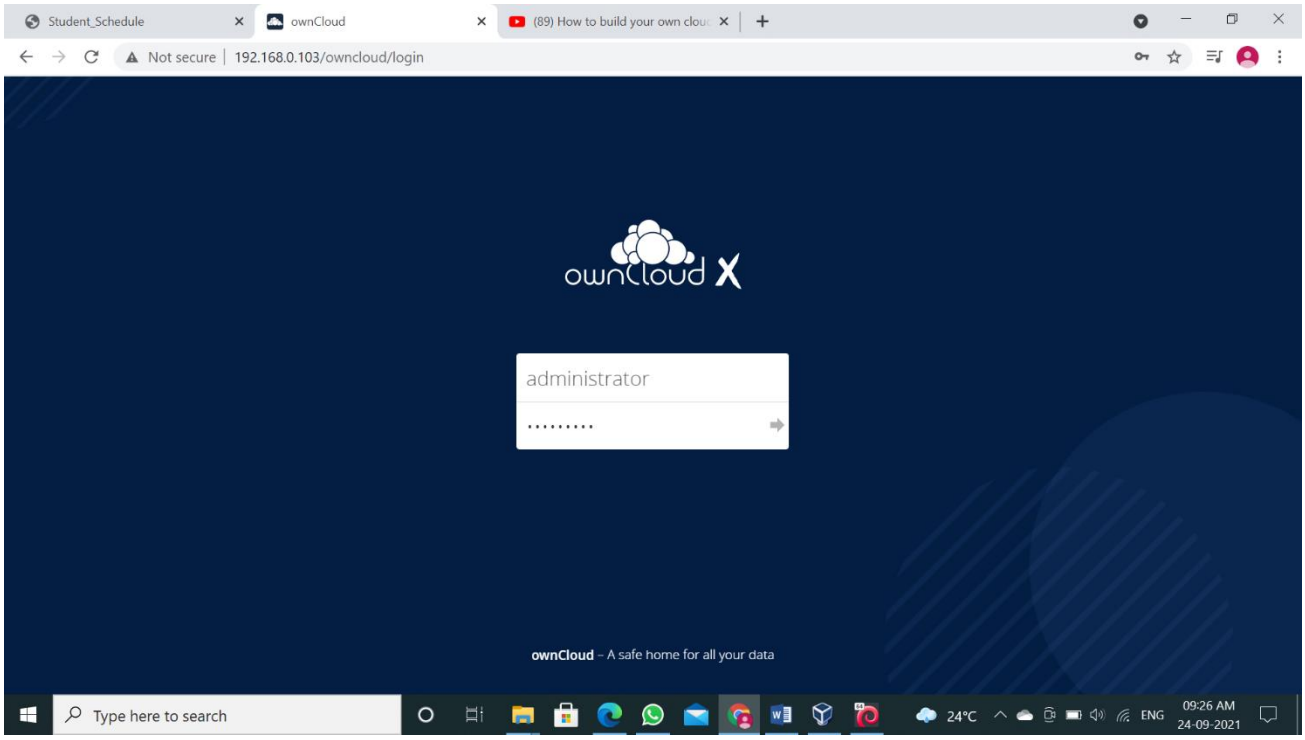
Step 1: Open browser and type "localhost/owncloud/" in URL bar and press "enter".

Note: If the user is doing it for first time, it will the user for SignUp. Provide the username and password and finish the setup.

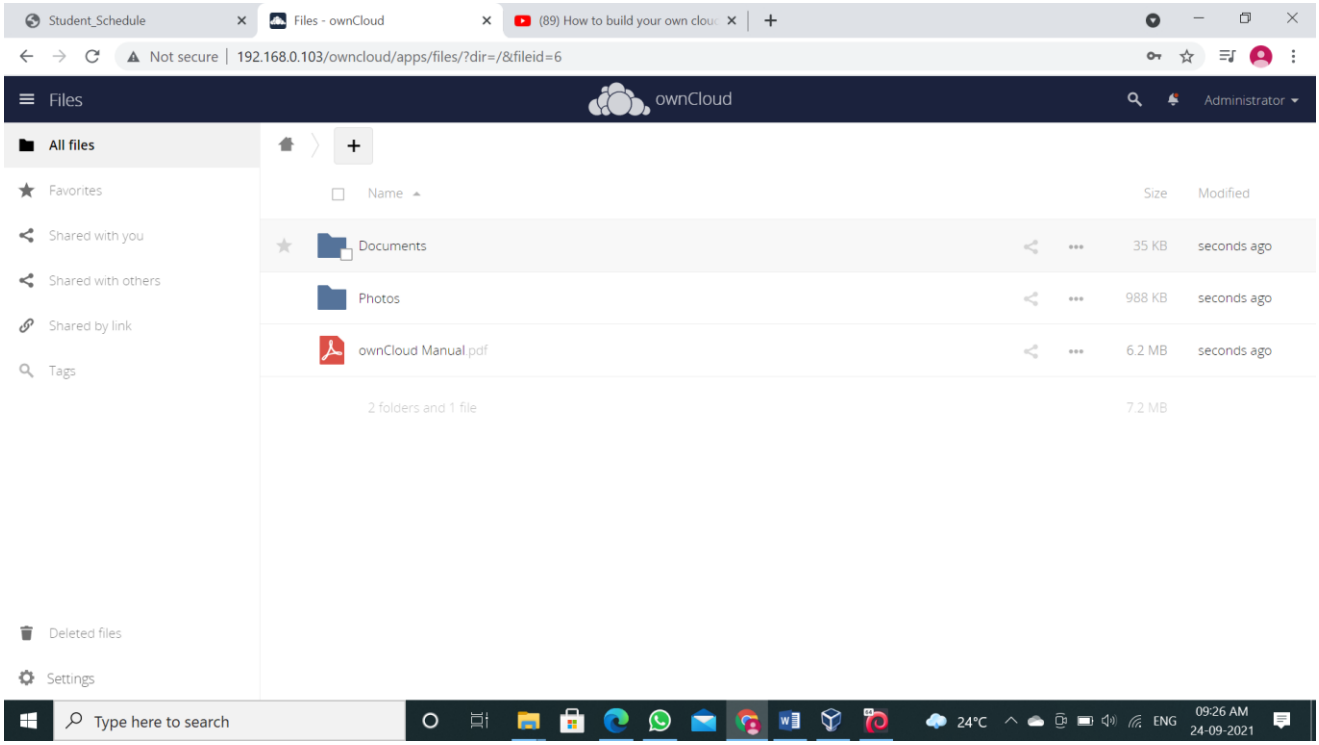


Step 3: Enter admin name and password which you have set while creating account and click on "Log in".

Name: Zeenat **Class: TYIT** **Roll no: 578**

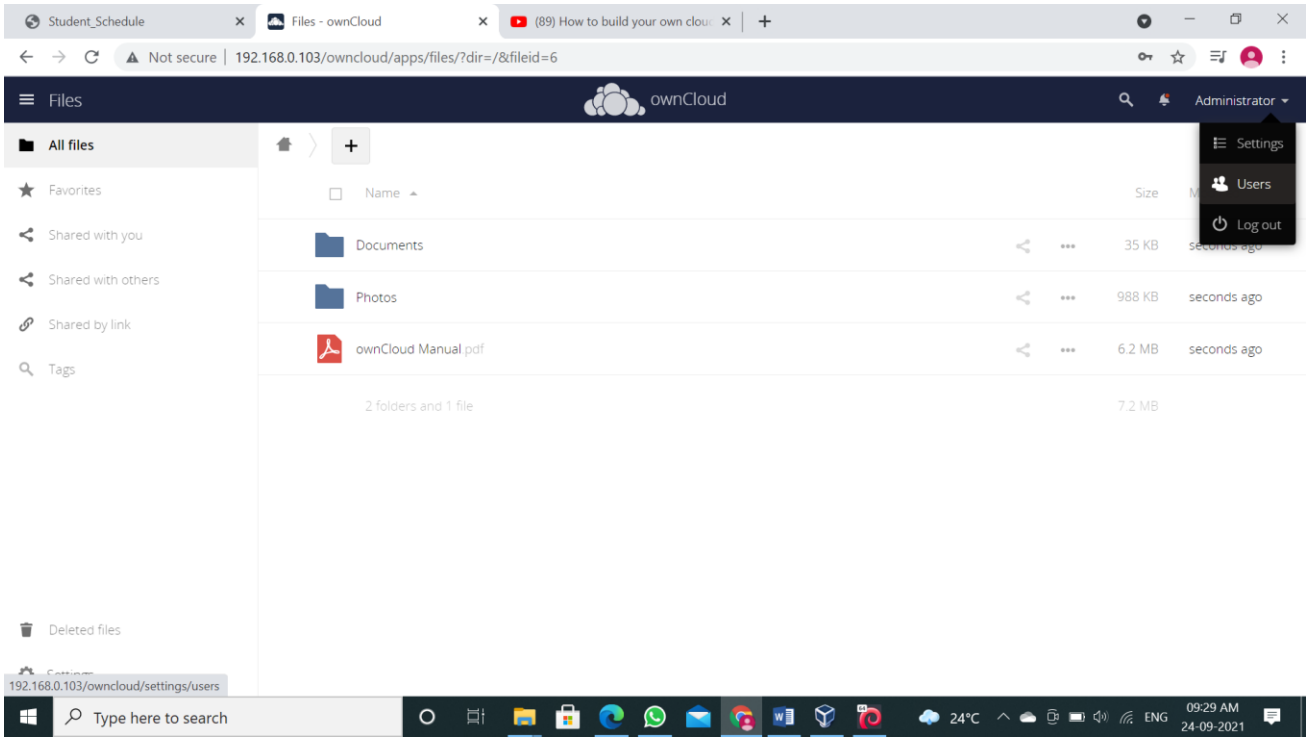


Step 4: Following dashboard will get load.

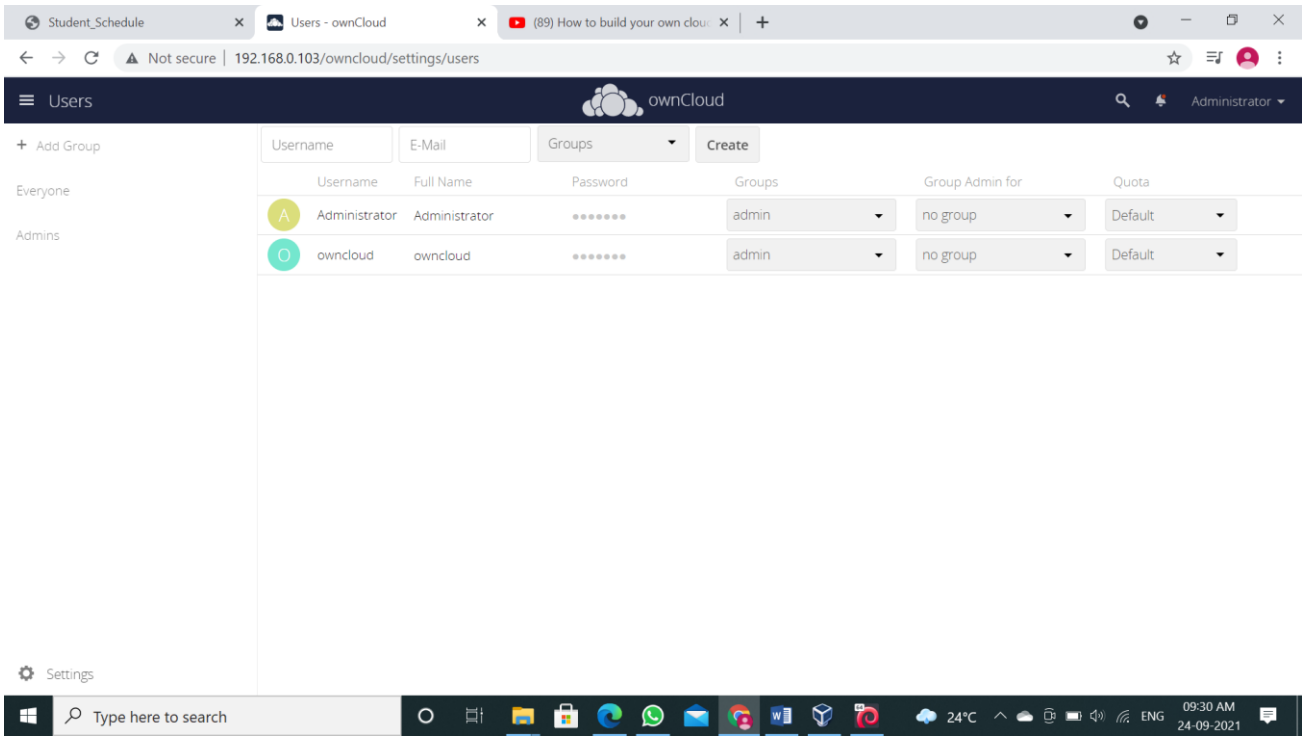


Step 5: Now go to “Users”.

Name: Zeenat **Class: TYIT** **Roll no: 578**

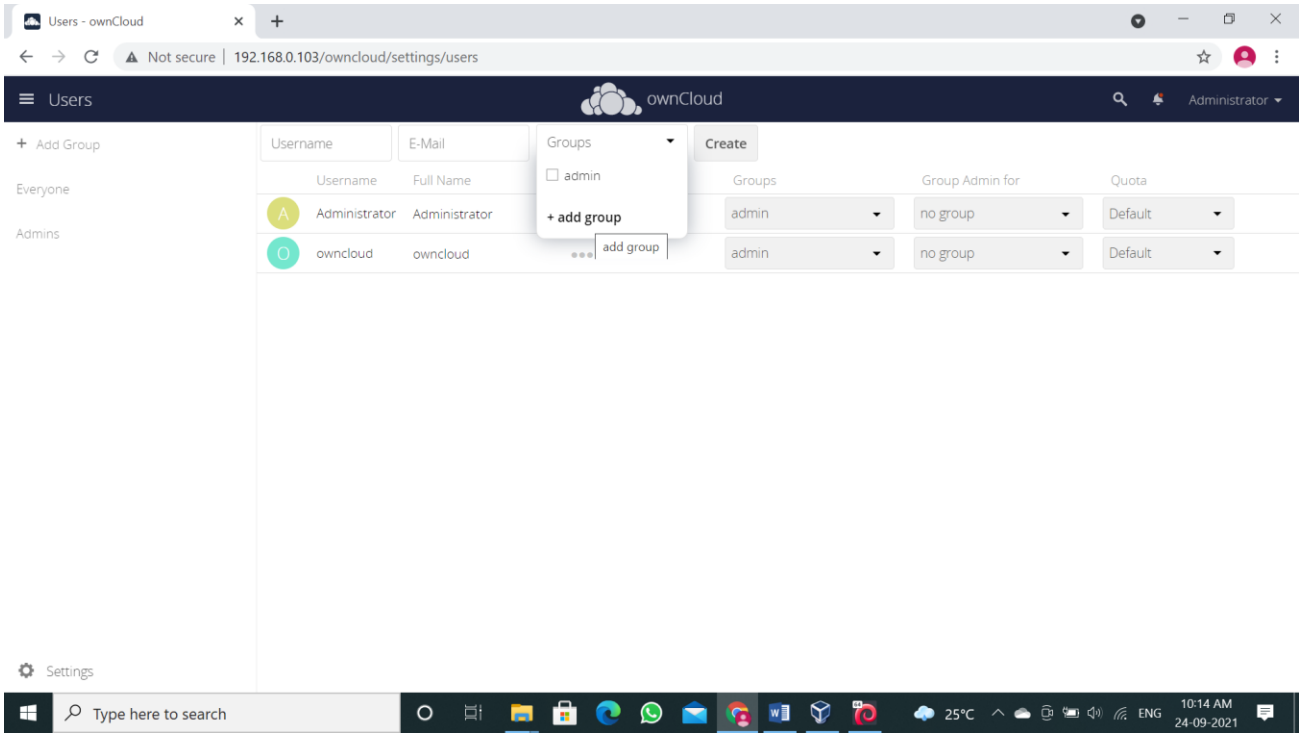


Step 6: You can see that there is only user which is admin, which is in Group admin

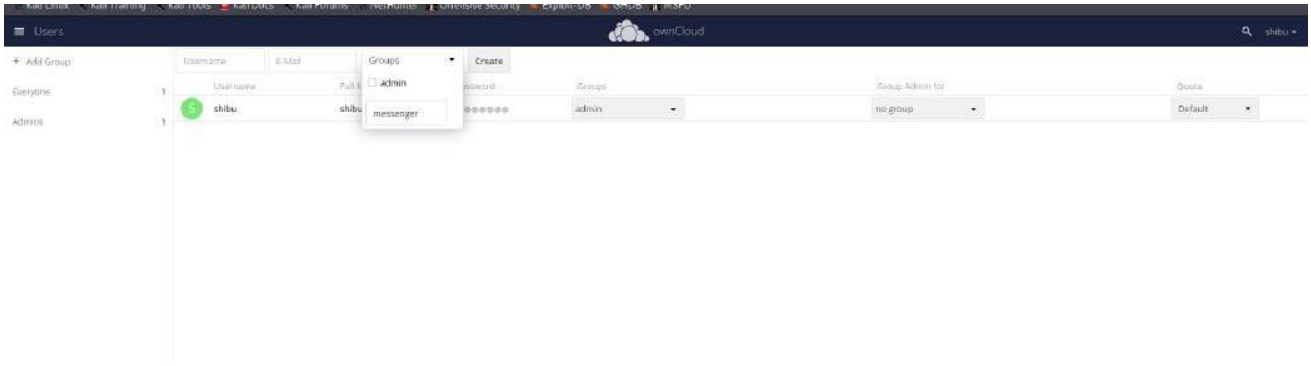


Step 7: Now let's add group, for that go to "Group" > "add group".

Name: Zeenat **Class: TYIT** **Roll no: 578**

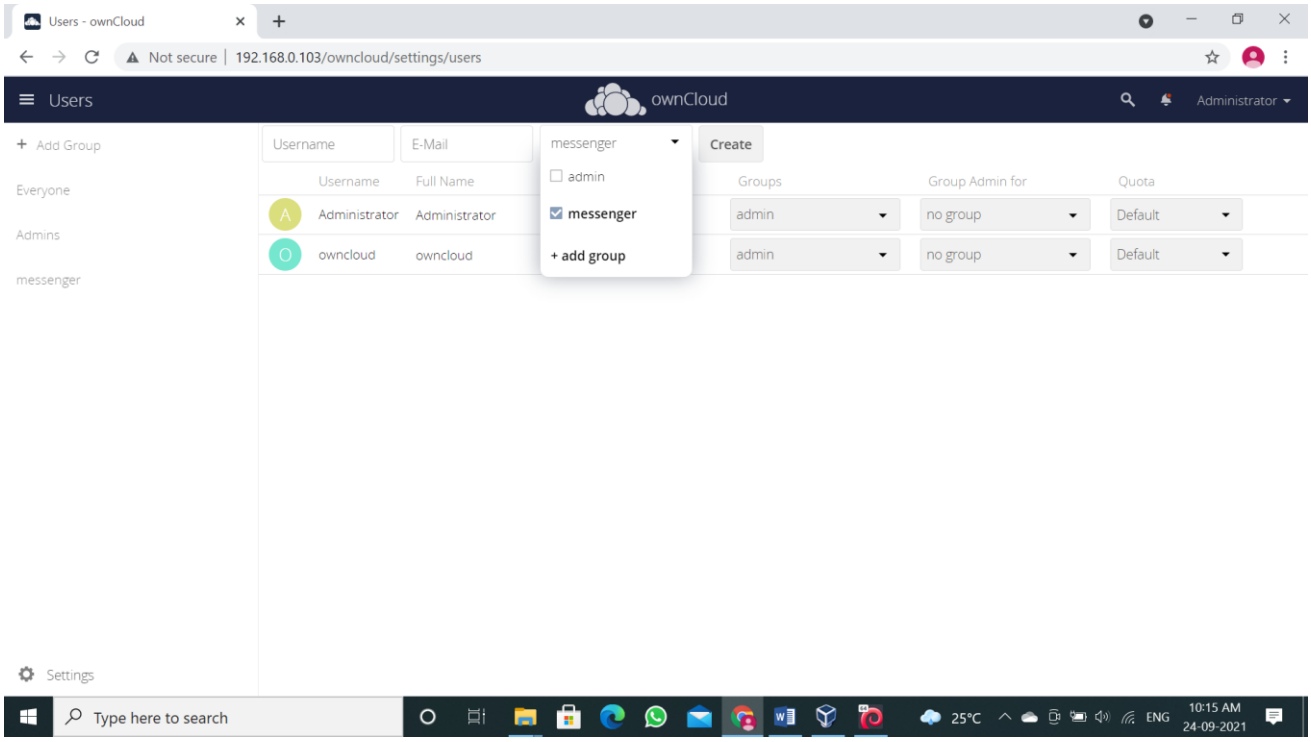


Step 8: Enter group name and press “enter”.

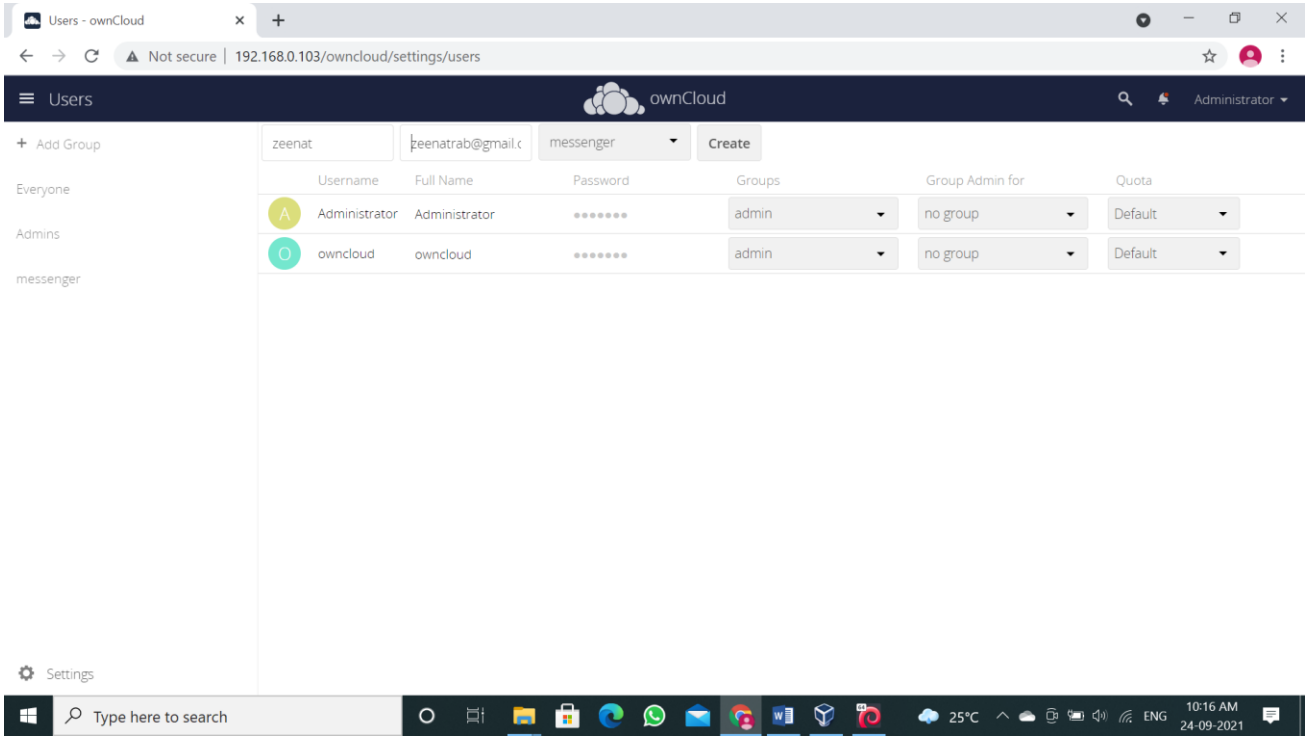


Step 9: Our group has been added, now select it.

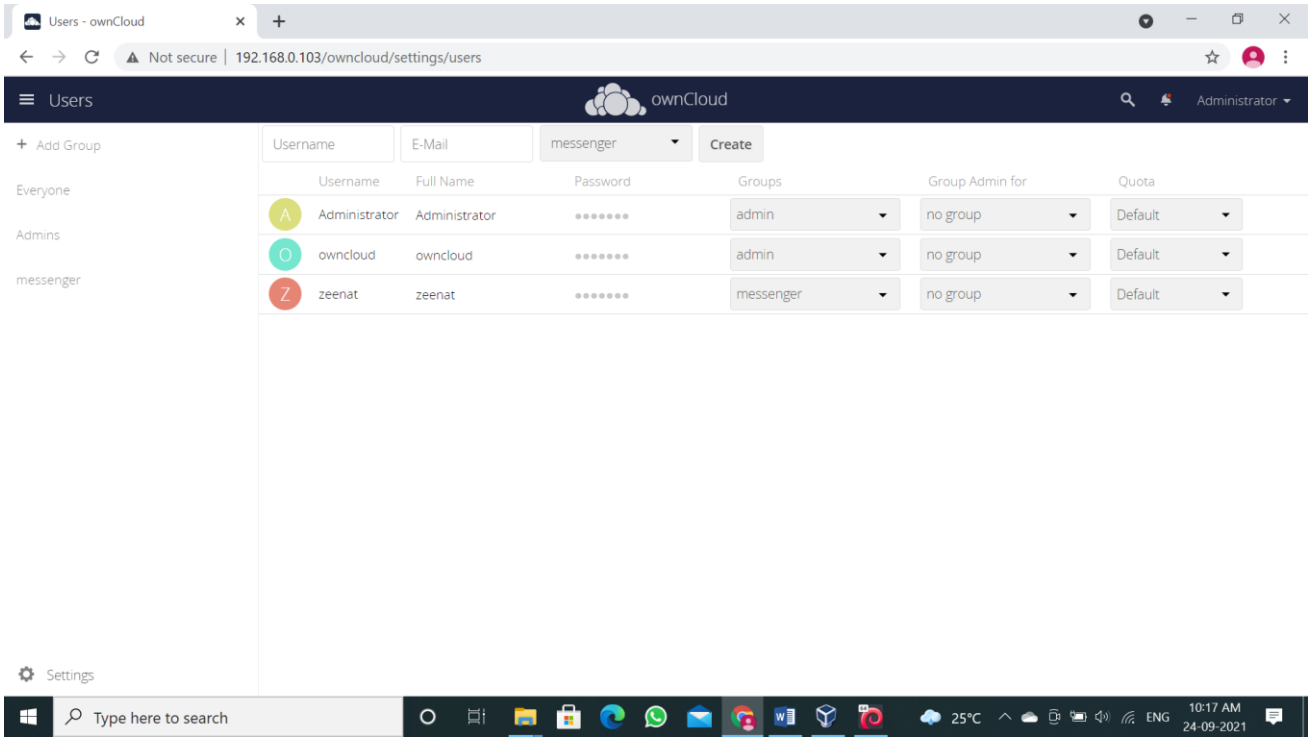
Name: Zeenat **Class: TYIT** **Roll no: 578**



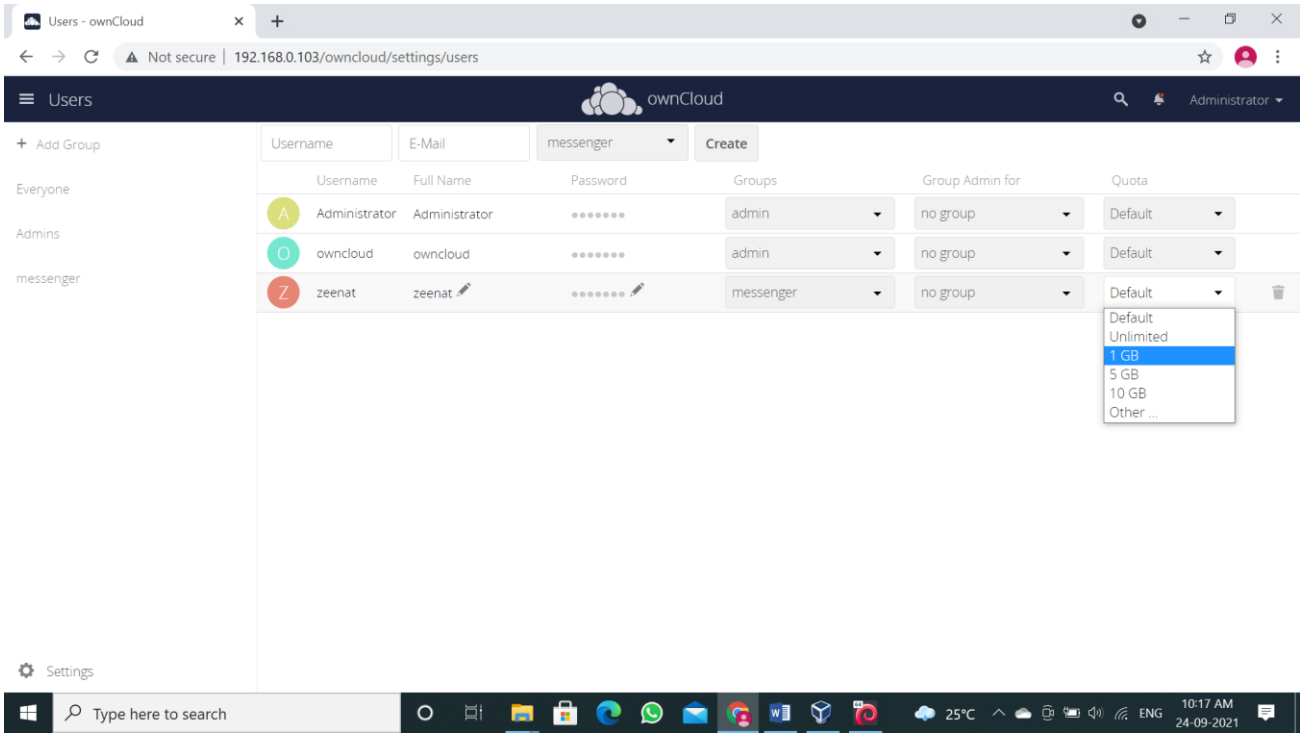
Step 10: Now enter “Username” and “E-mail” for the user and click on “Create”.



Name: Zeenat **Class: TYIT** **Roll no: 578**

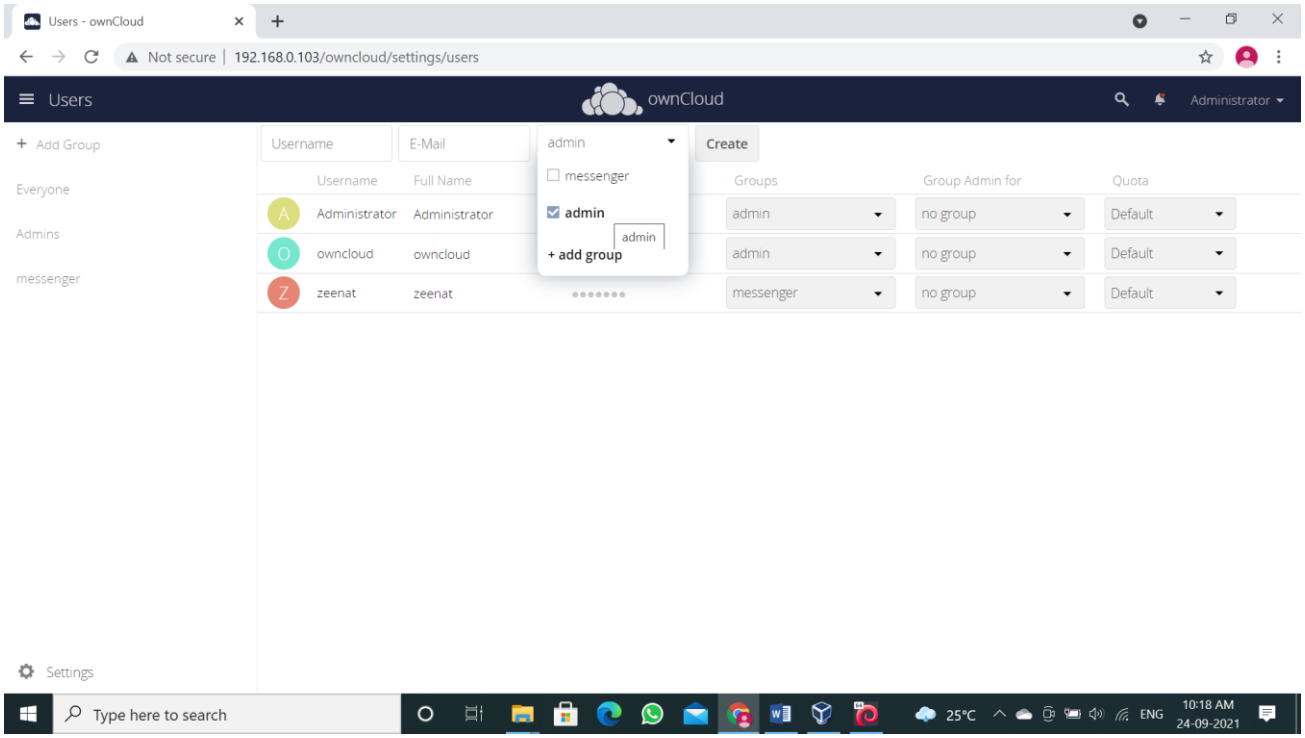


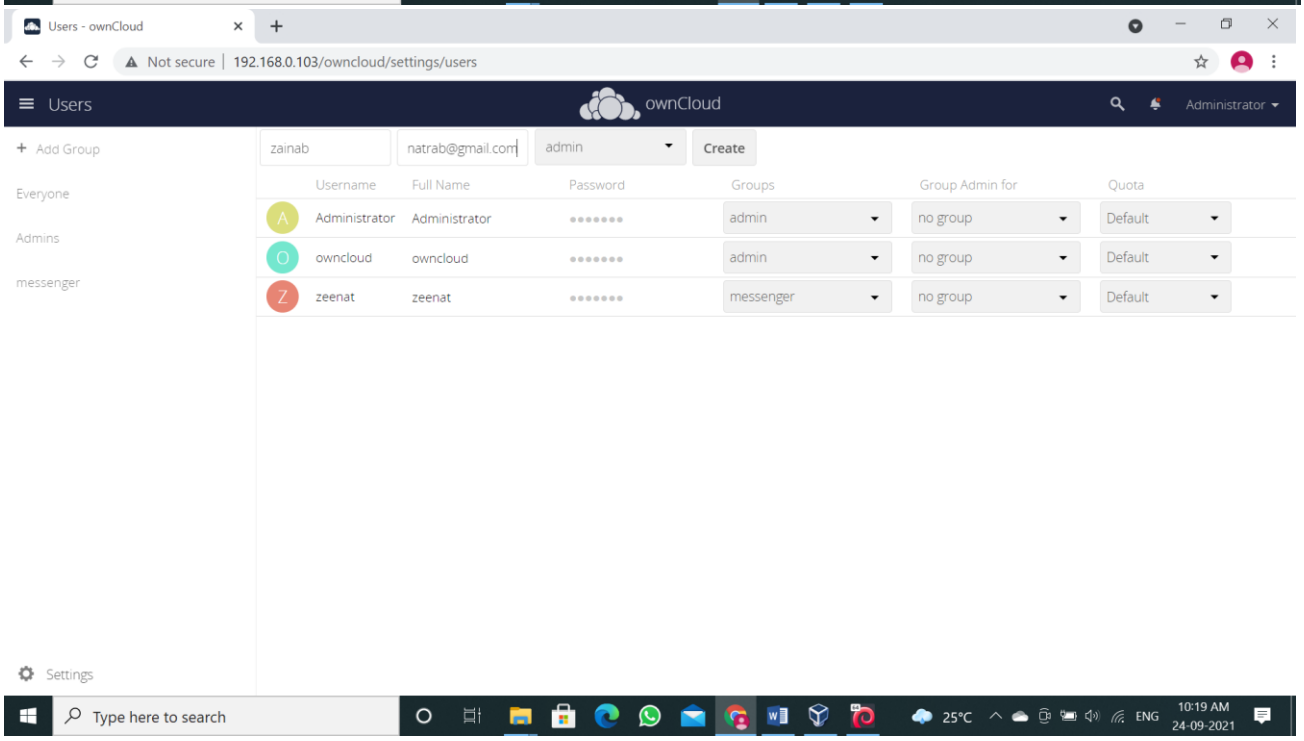
Step 11: Our user is been added we can change the storage limit for the new user.



Step 12: Let’s add another user but this time in “admin” group

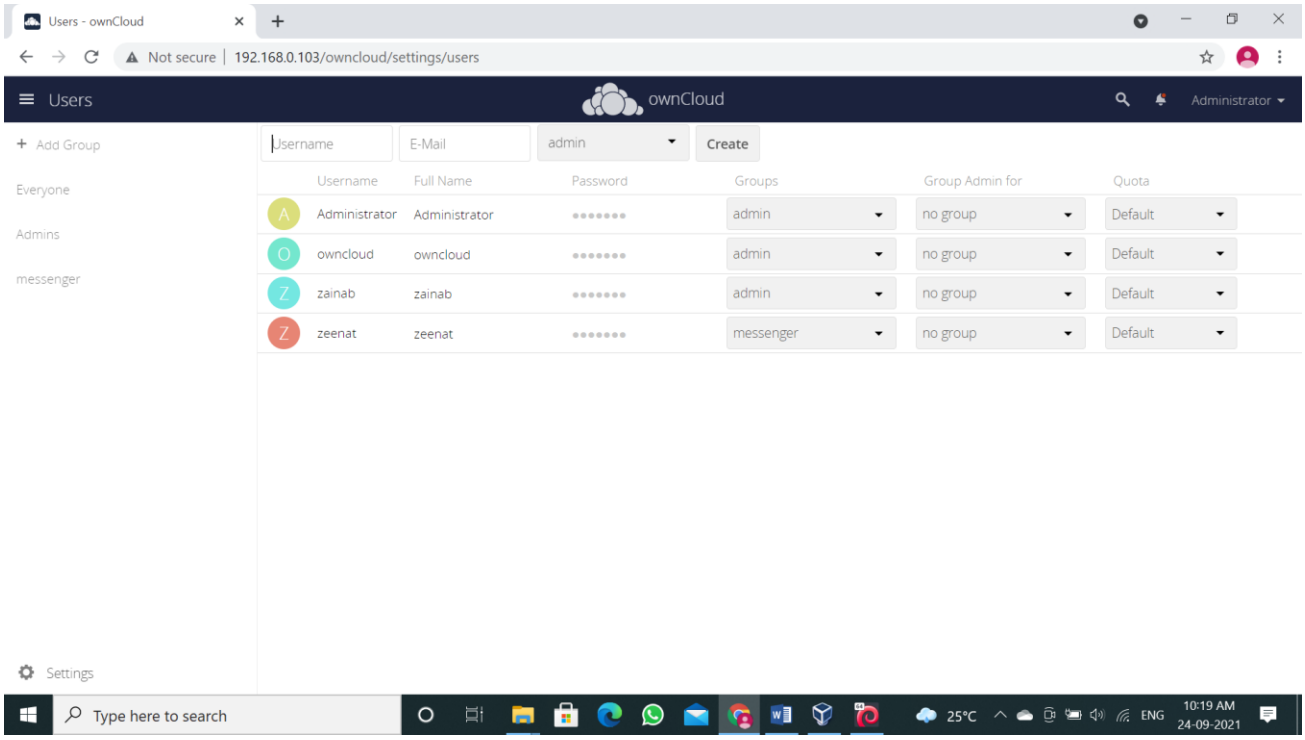
Name: Zeenat **Class: TYIT** **Roll no: 578**





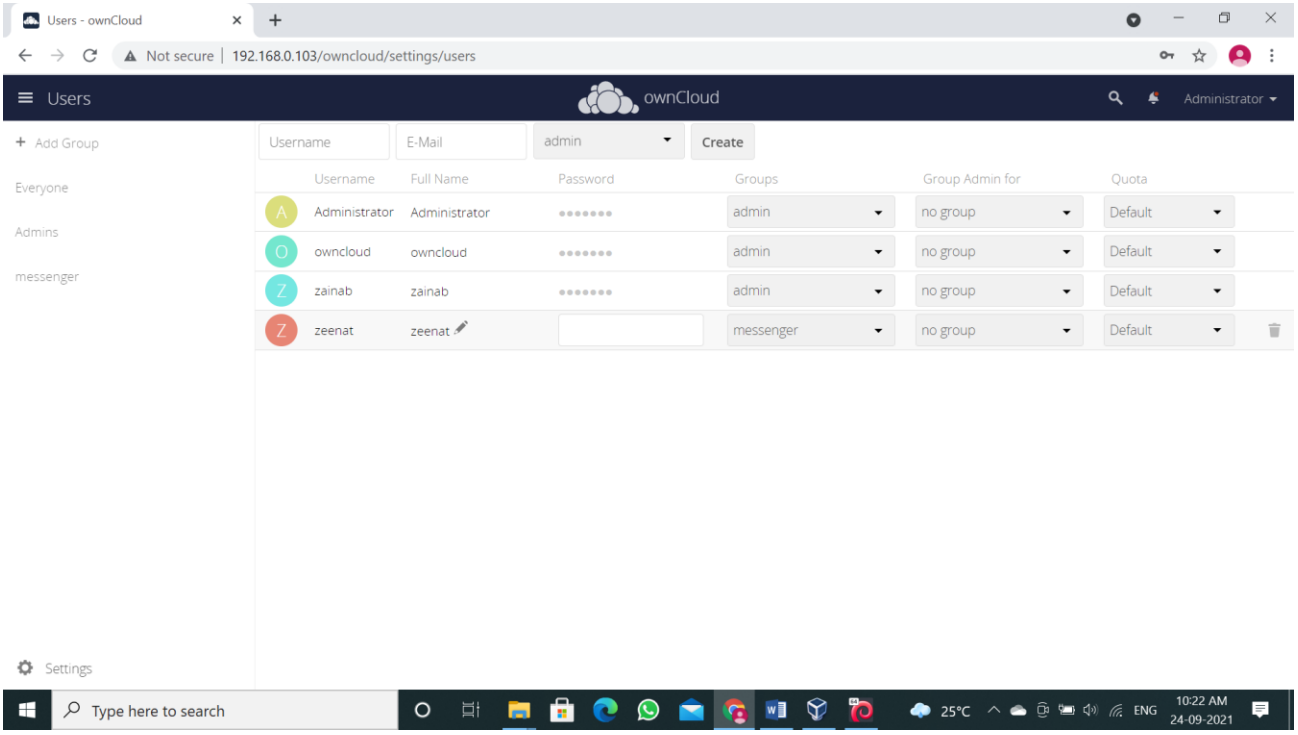
Step 13: If it shows “admin, admin” in group just click on it and uncheck one “admin”.

Name: Zeenat **Class: TYIT** **Roll no: 578**



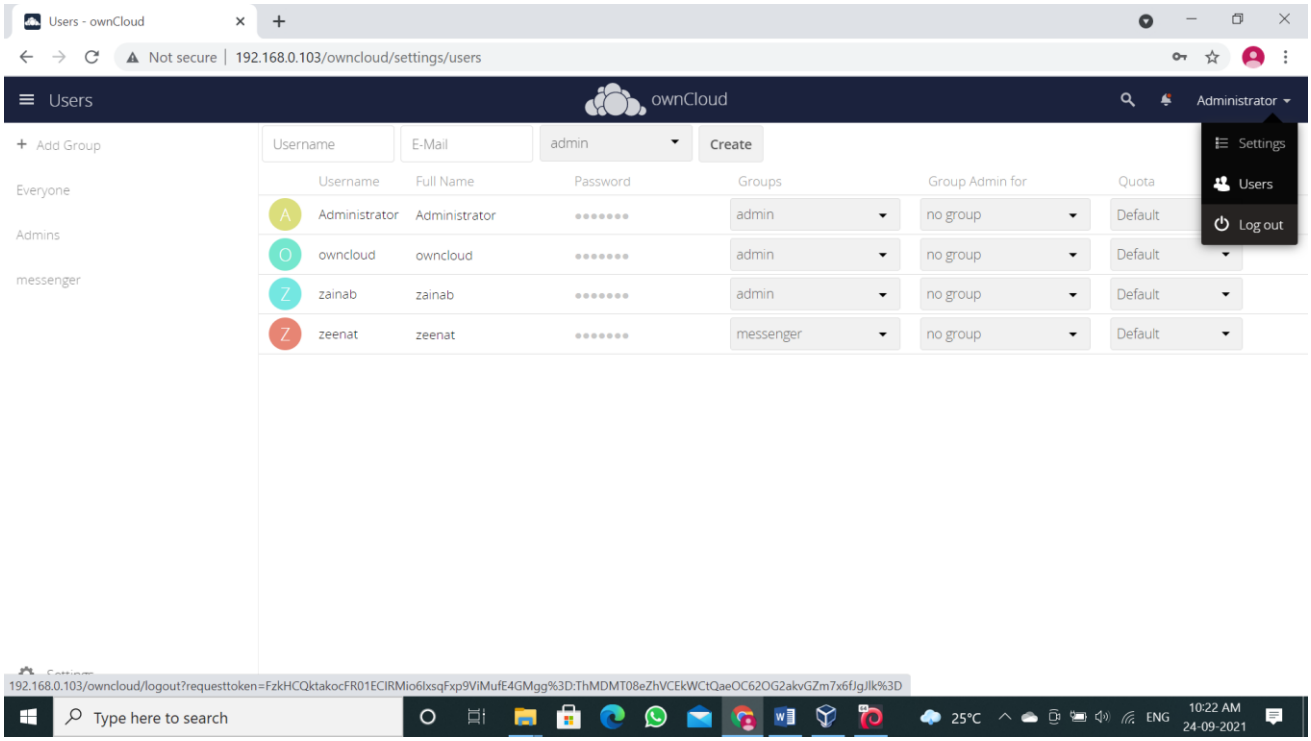
Note: Sometimes it fails to register user in "admin" group so please check before logging out. You can check by refreshing the page.

Step 14: Before Logging out from admin account, set new password in the password field.

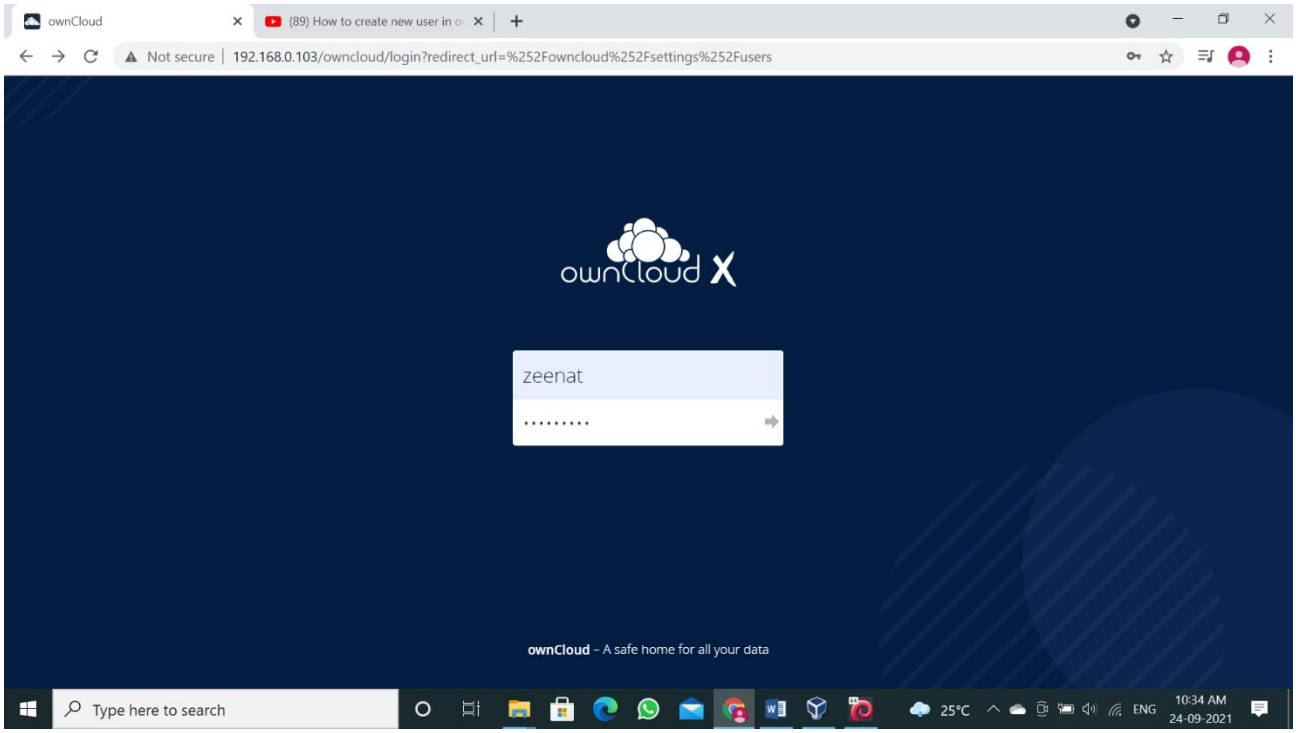


Name: Zeenat **Class: TYIT** **Roll no: 578**

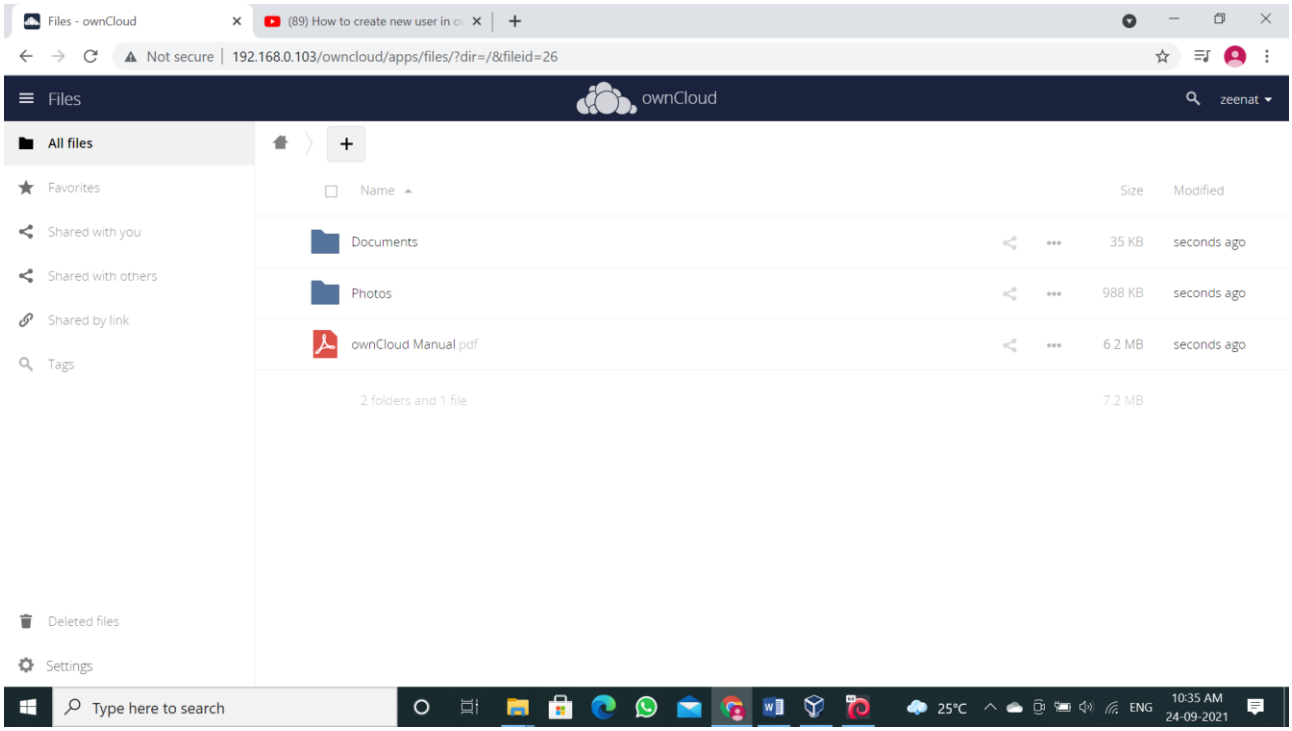
Step 15: Now “Log out” from the admin account.



Step 16: Try log in with user you just created.

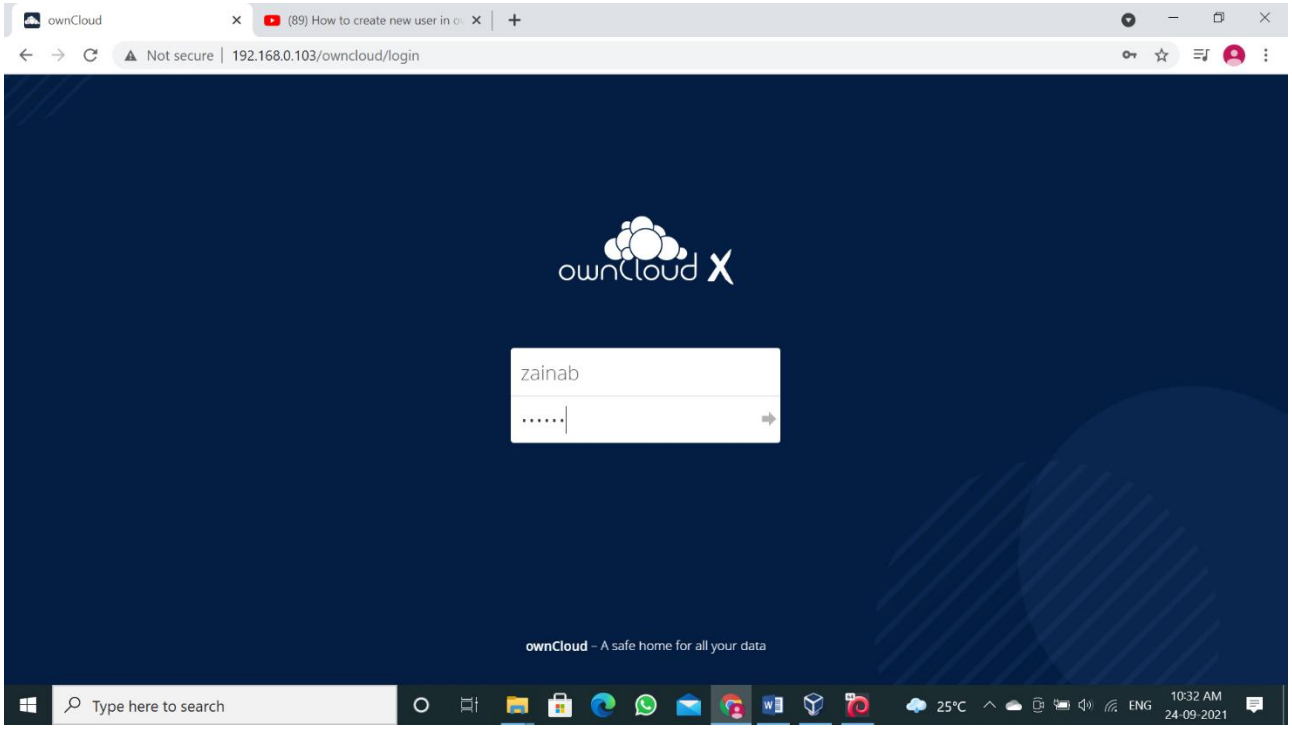


Name: Zeenat **Class: TYIT** **Roll no: 578**



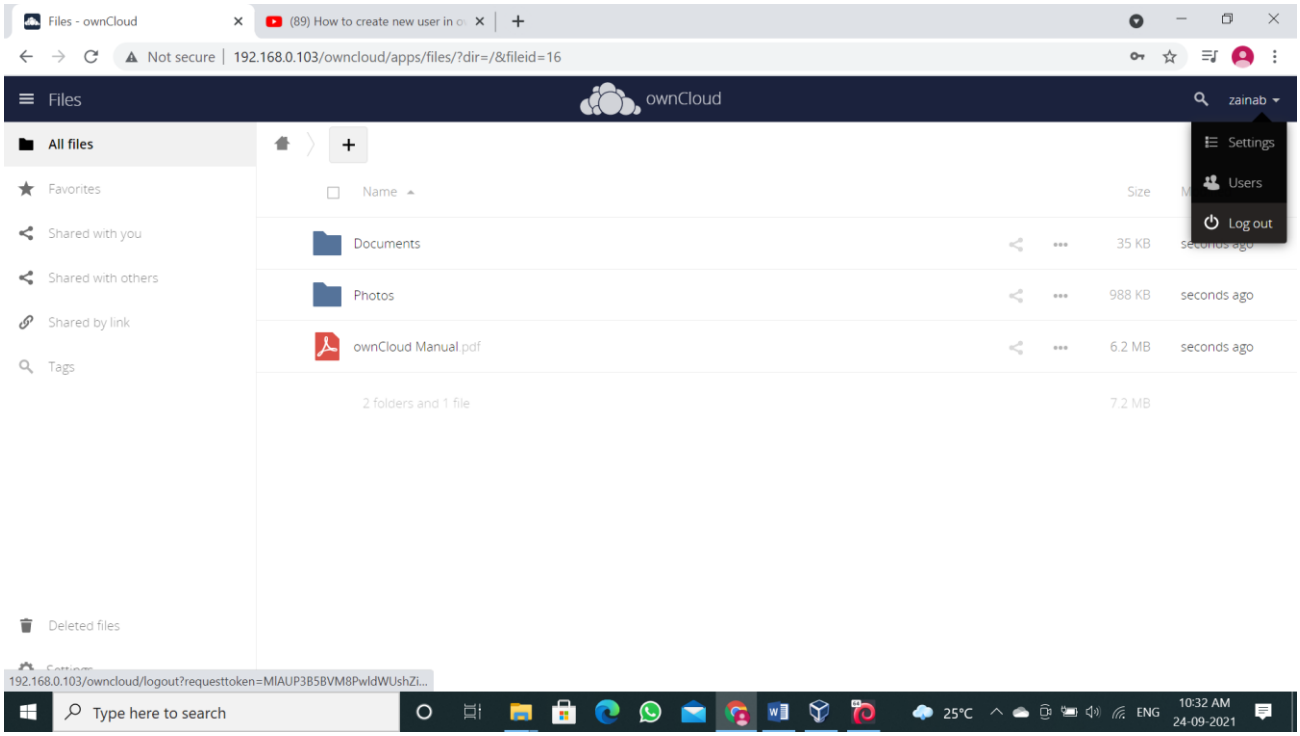
Yes, it has successfully logged in. As you can see this user don't have any privilege link adding users and creating group because it's not in "admin" group, now "log out" from the account.

Step 17: Now let's try to log in from the user account who is in "admin" group.



Name: Zeenat **Class: TYIT** **Roll no: 578**

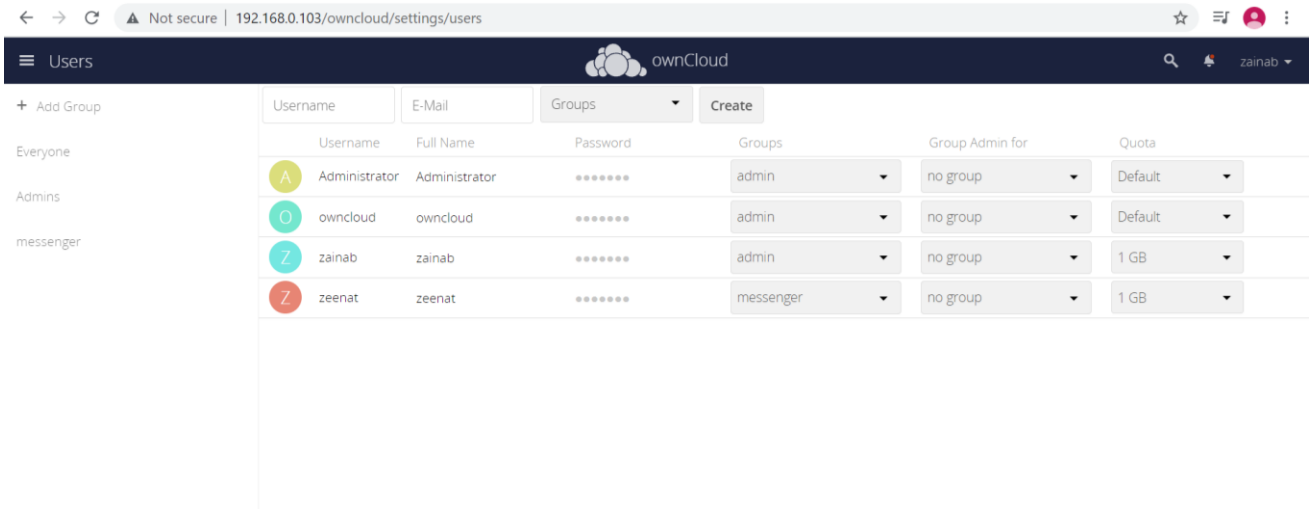
Step 18: Enter login details and click on “Log in”.



As you can see this user has the privileges of admin because he is in “admin” group.

Note: If it doesn’t show the privilege then go to admin account and check if this user group is “admin” group.

This user has all the rights that admin possess like adding or deleting user



CONCLUSION:

OwnCloud only stands to grow in popularity as people and enterprises become more concerned about the true security of their data, given the recent leaks we have seen from the NSA and the co-operation of companies such as Google or Apple in sharing user data. With OwnCloud you maintain control of your data and no-one else will be able to access it.

Name: Zeenat **Class: TYIT** **Roll no: 578**

Practical 8

Aim: Study Cloud Security Management.

OBJECTIVE: From this experiment the student will be able,

- To understand the security features of Cloud.
- To learn the technique of application security management and its complexity
- To understand the importance of cloud security management from application point of view

OUTCOME: The learner will be able to

- Student can study and implement single-sign-on.
- To use current techniques, skills, and tools necessary for computing practice.
- To match the industry requirements in the domains of Database management, Programming and Networking with the required management skills.

THEORY:

Multi-Factor Authentication (MFA) – Multi Factor Authentication (MFA) is an authentication method that requires the user to provide two or more verification factors to gain access to a resource such as an application, online account, or a VPN. MFA is a core component of a strong identity and access management (IAM) policy.

Rather than just asking for a username and password, MFA requires one or more additional verification factors, which decreases the likelihood of a successful cyber-attack.

Importance – The main benefit of MFA is it will enhance your organization's security by requiring your users to identify themselves by more than a username and password. While important, usernames and passwords are vulnerable to brute force attacks and can be stolen by third parties.

Enforcing the use of an MFA factor like a thumbprint or physical hardware key means increased confidence that your organization will stay safe from cyber criminals.

Working of MFA – MFA works by requiring additional verification information (factors). One of the most common MFA factors that users encounter are one-time passwords (OTP). OTPs are those 4 – 8 digits codes that you often receive via email, SMS or some sort of mobile app.

With OTPs a new code is generated periodically or each time an authentication request is submitted.

Name: Zeenat **Class: TYIT** **Roll no: 578**

The code is generated based upon a seed value that is assigned to the user when they first register and some other factor which could simply be a counter that is incremented or a time value.

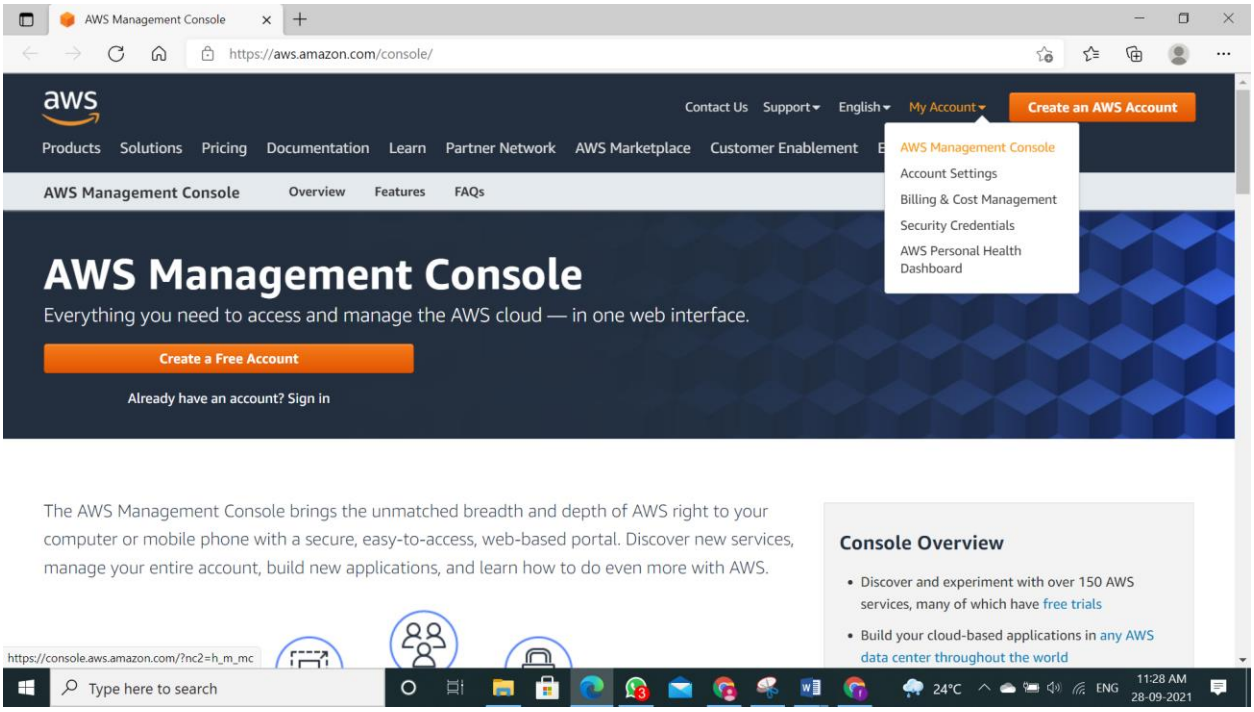
Three Main Types of MFA Authentication Methods

- Things you know (knowledge), such as a password or PIN
- Things you have (possession), such as a badge or smartphone
- Things you are (inherence), such as a biometric like fingerprints or voice recognition

PROCEDURE:

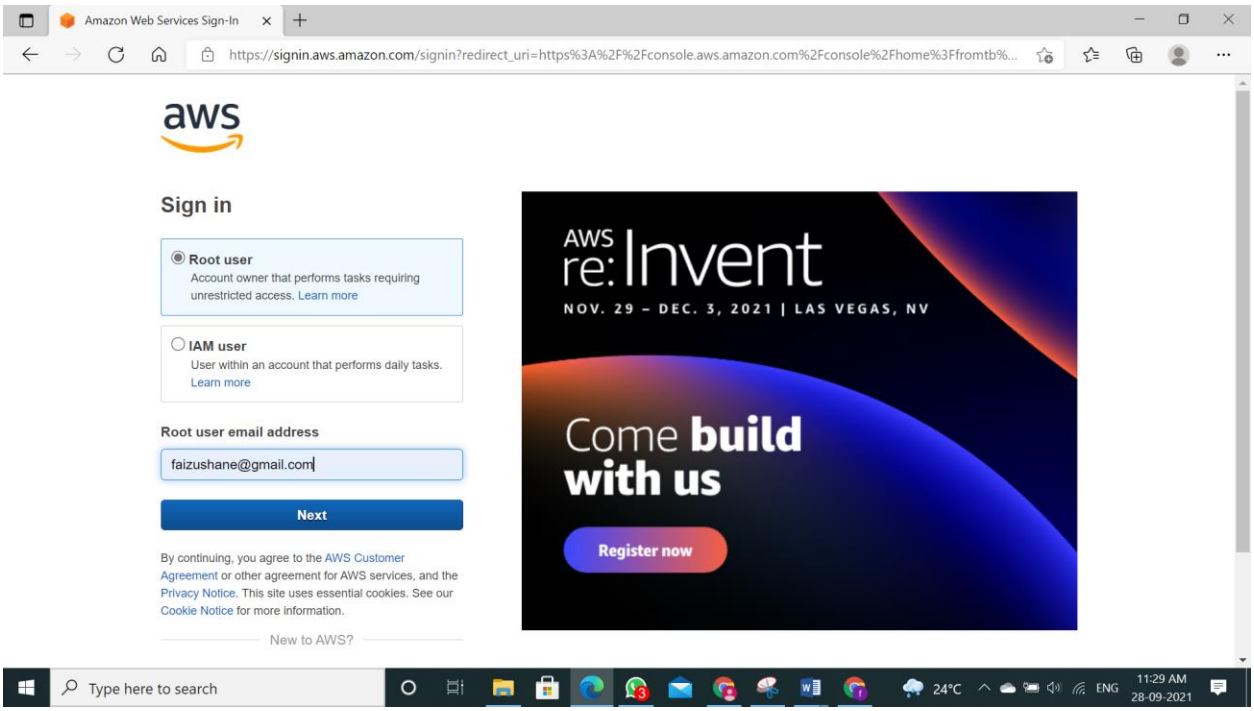
Click on the link: https://aws.amazon.com/console/

Step 1: Go to "My Account" > "AWS Management Console".

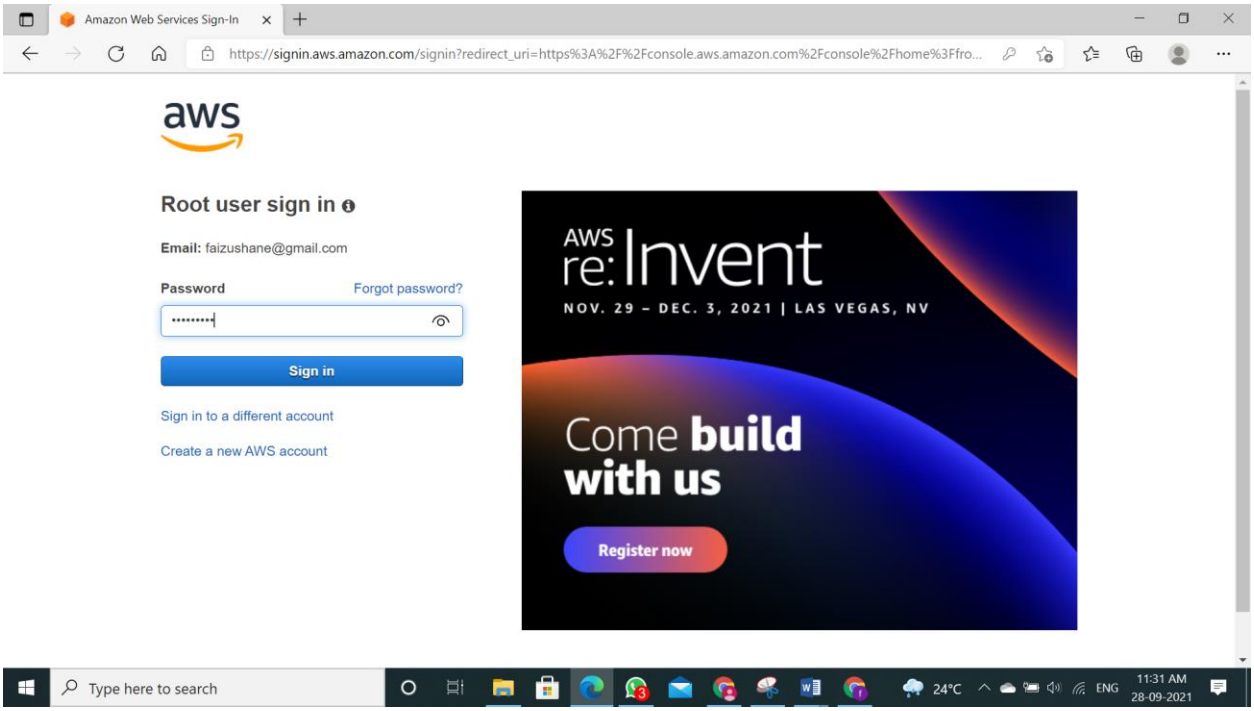


Step 2: Just login to your user's account.

Name: Zeenat **Class: TYIT** **Roll no: 578**



Step 3: Click on "Sign In".



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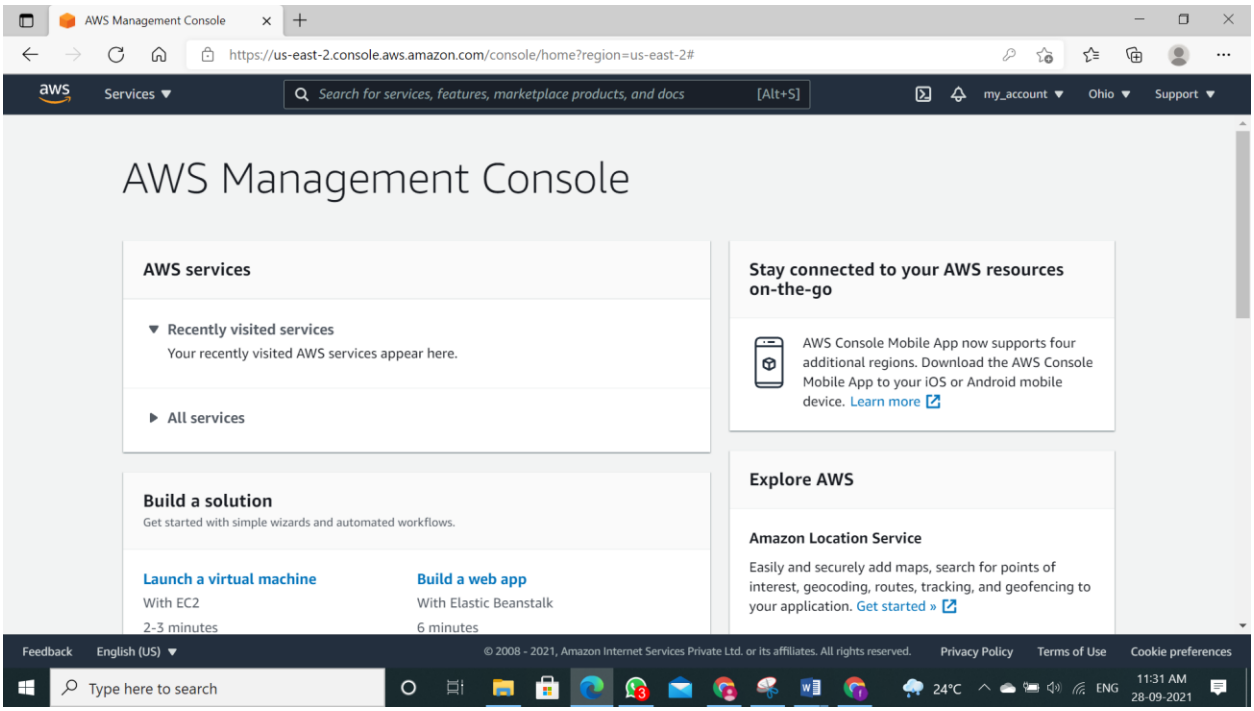
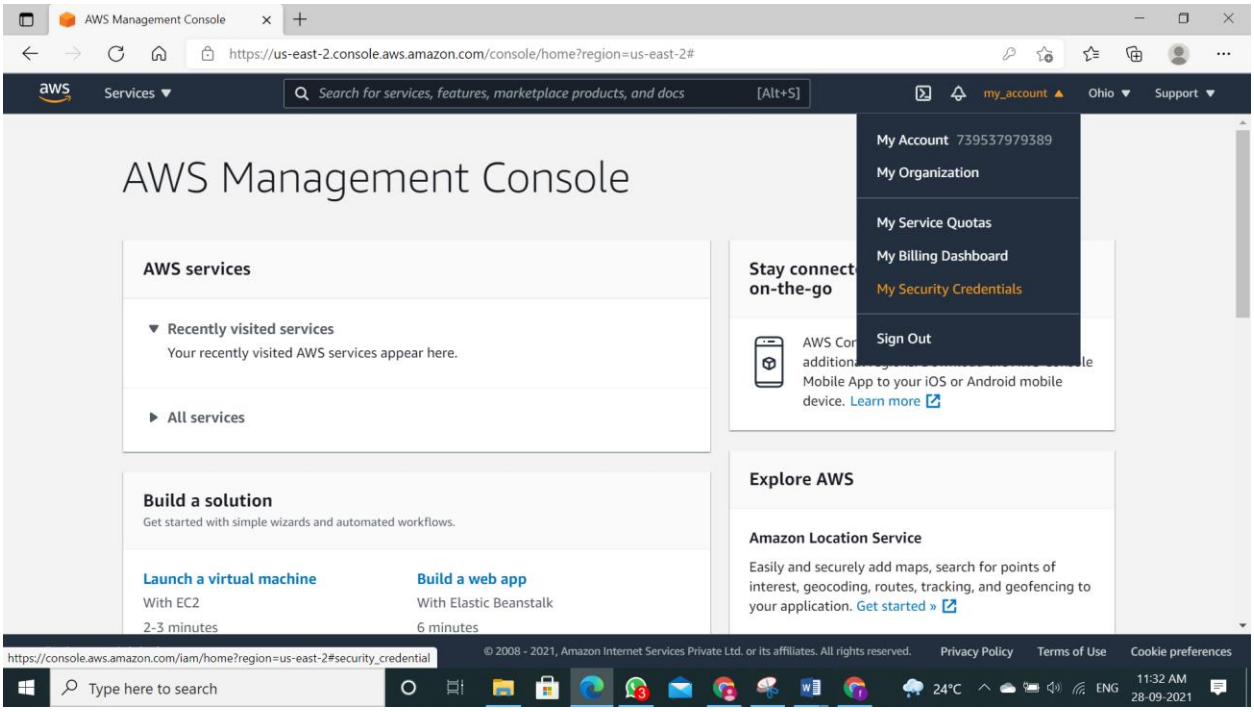
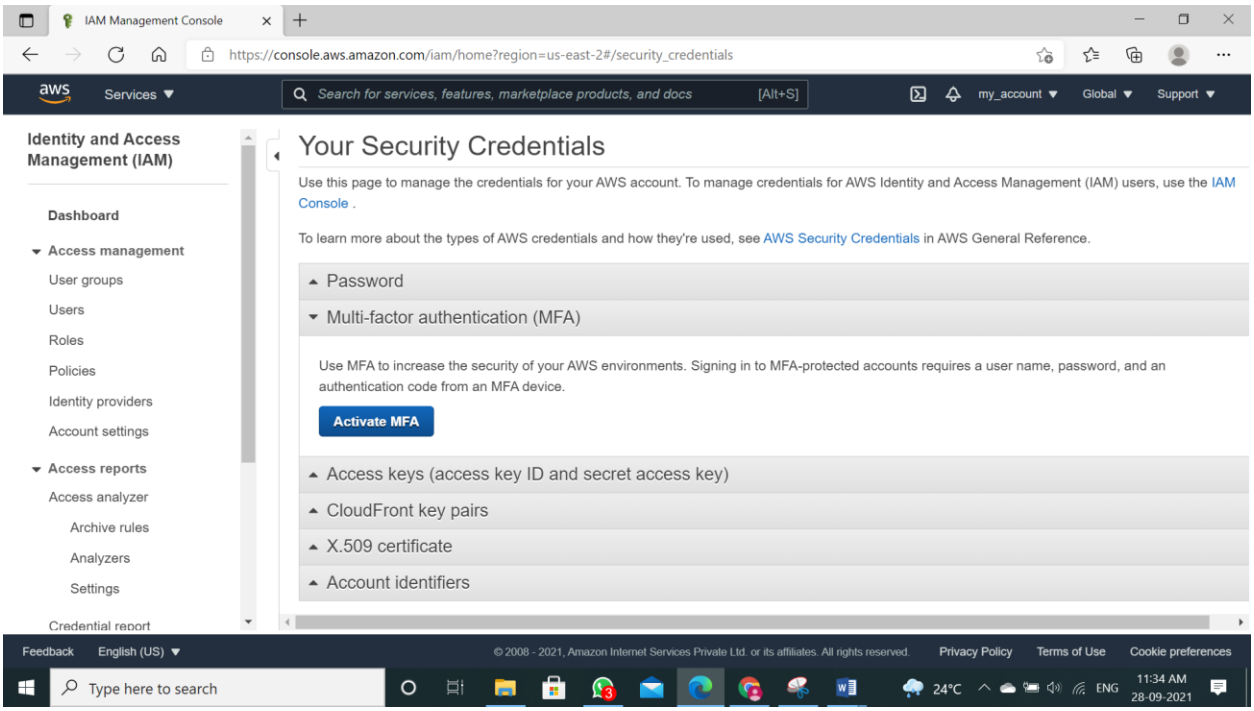


Step 4: Once you logged in go to "My security credentials".

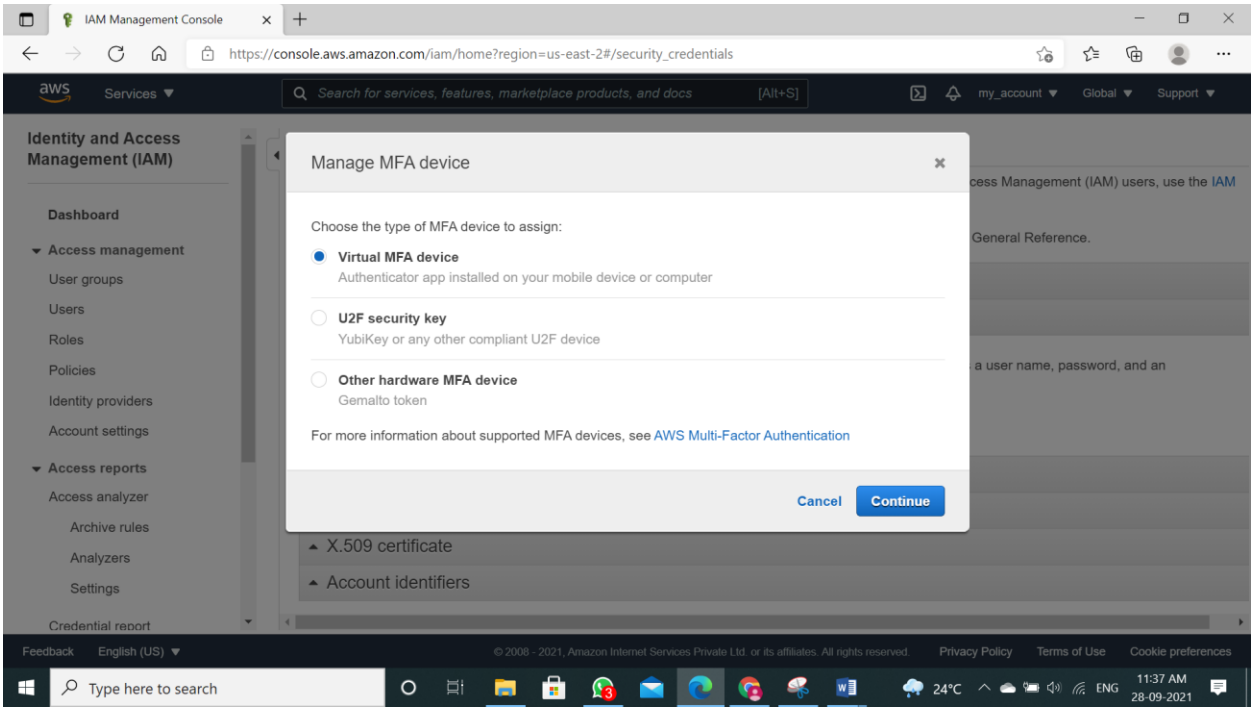


Step 5: Scroll down you will find “Multi-factor authentication (MFA)”. Click on “Assign MFA device”

Name: Zeenat **Class: TYIT** **Roll no: 578**

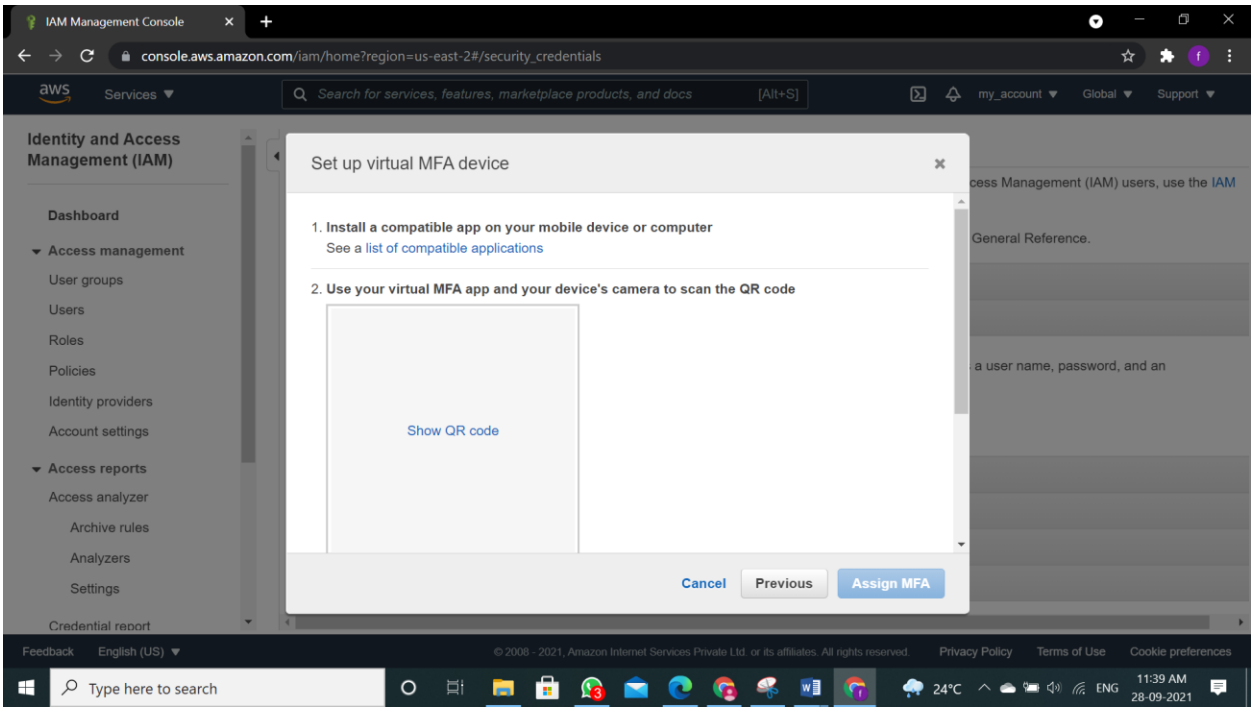


Step 6: We will select first option “Virtual MFA device” and click on “Continue”

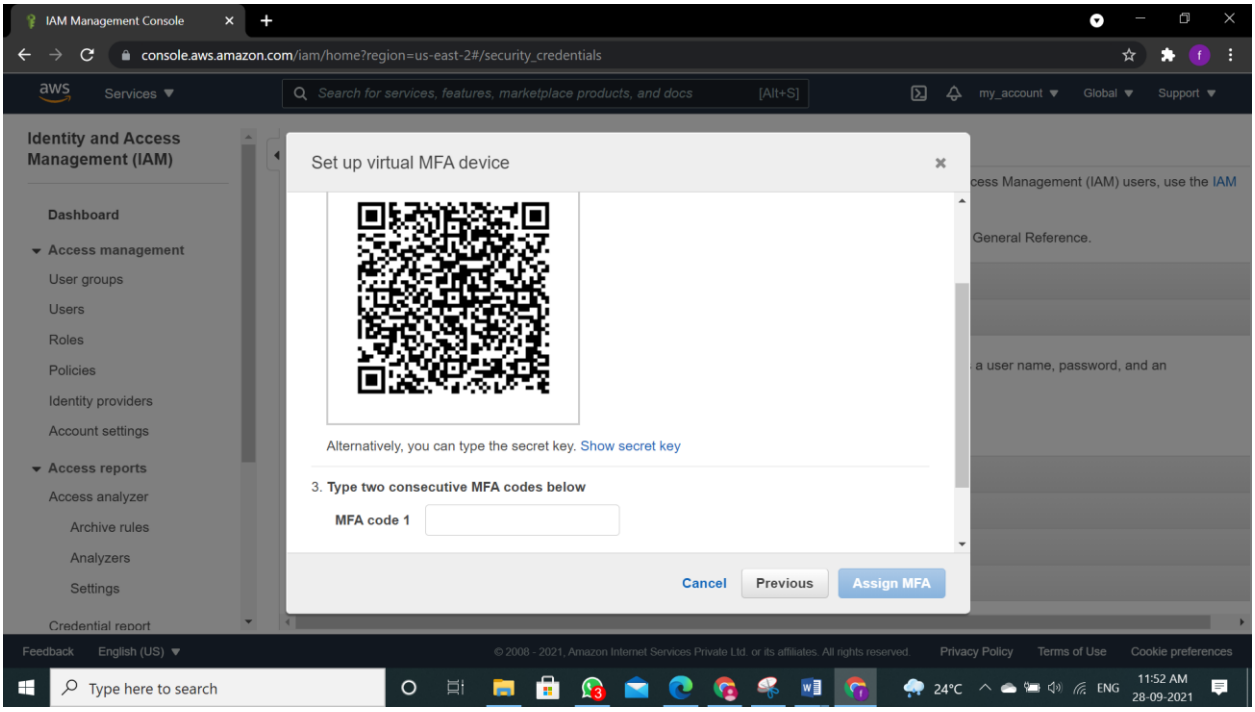


Step 7: So, concept is we will use third party app to generate OTP which will help us to authenticate ourselves during logging in. It will add a security layer to our account. Now we have to download “2FA Authenticator (2FAS)” app on our mobile.

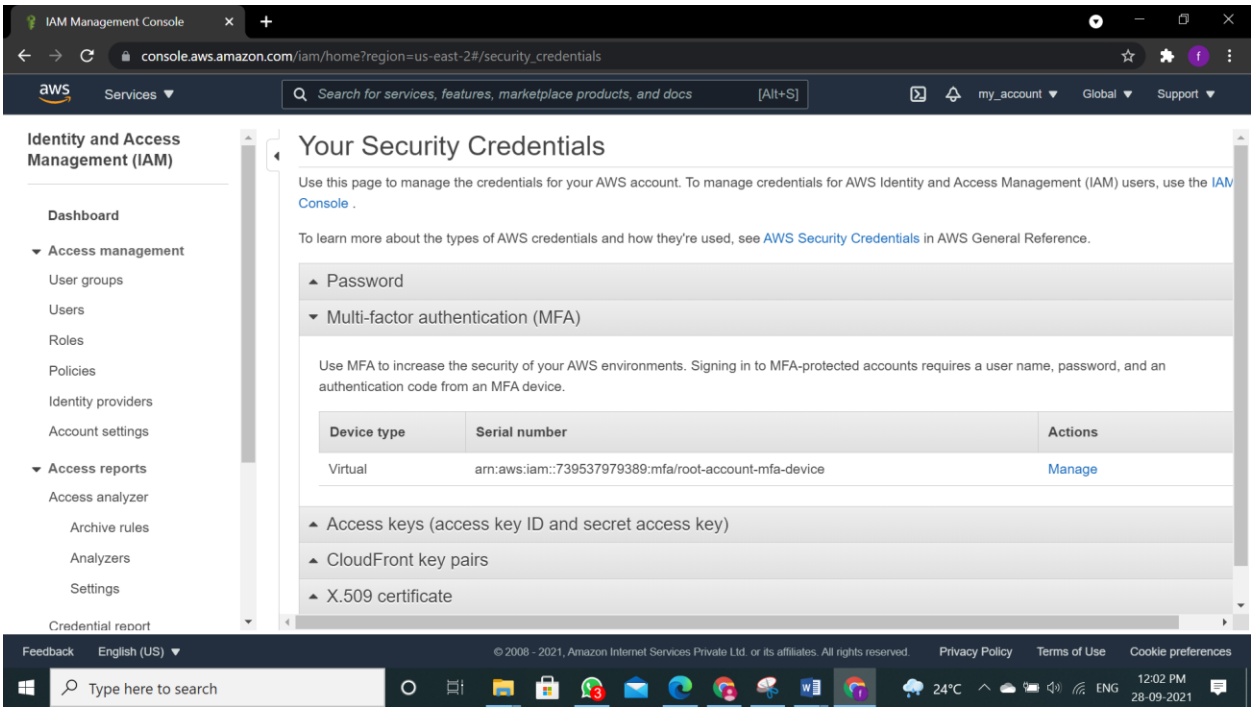
Name: Zeenat **Class: TYIT** **Roll no: 578**



Step 8: Click on "Show QR code" to display QR code.



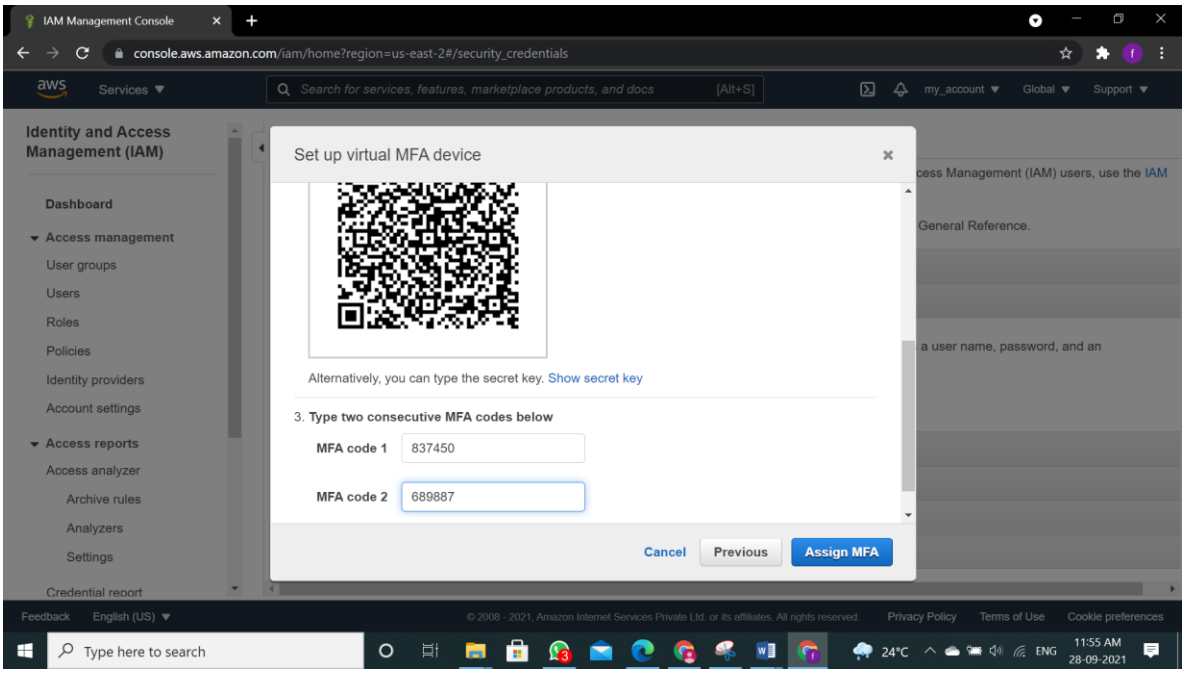
Name: Zeenat **Class: TYIT** **Roll no: 578**



Step 9: Open the 2FA Authenticator (2FAS) app click on continue.

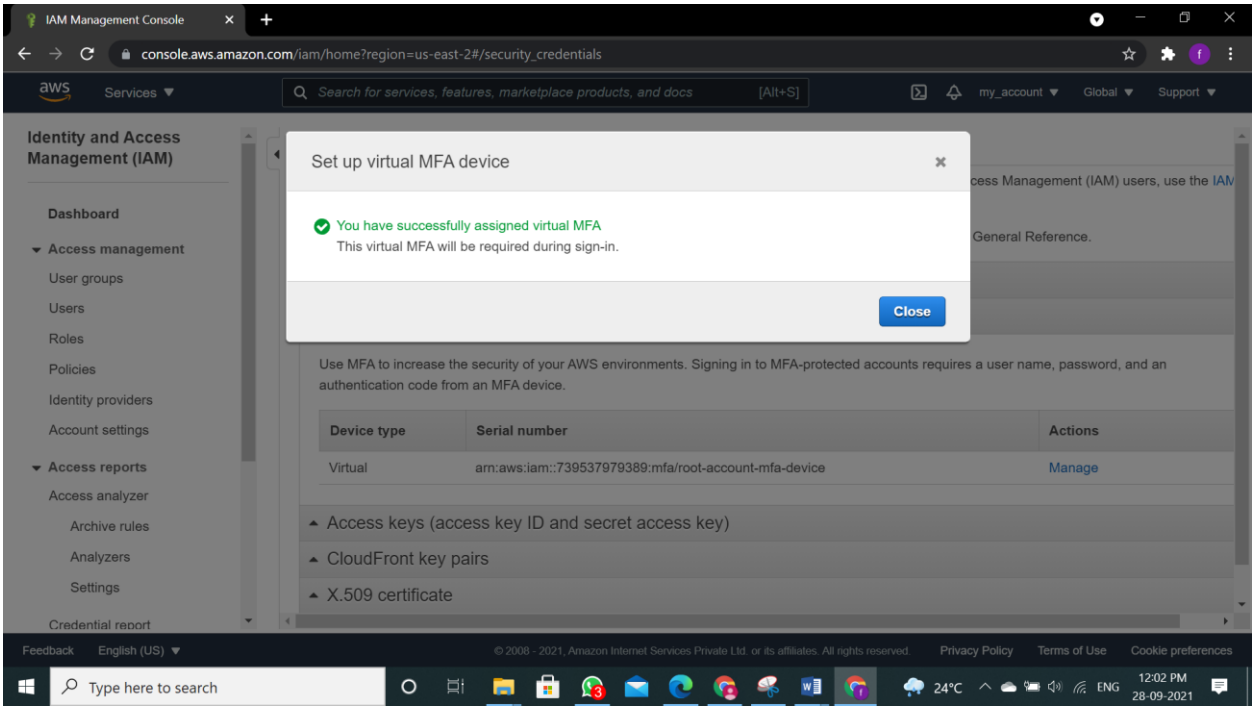
Step 10: And click on “Scan QR code”.

Step 11: First, we have to enter 2 OTP which we will receive on app and click “Assign MFA”.

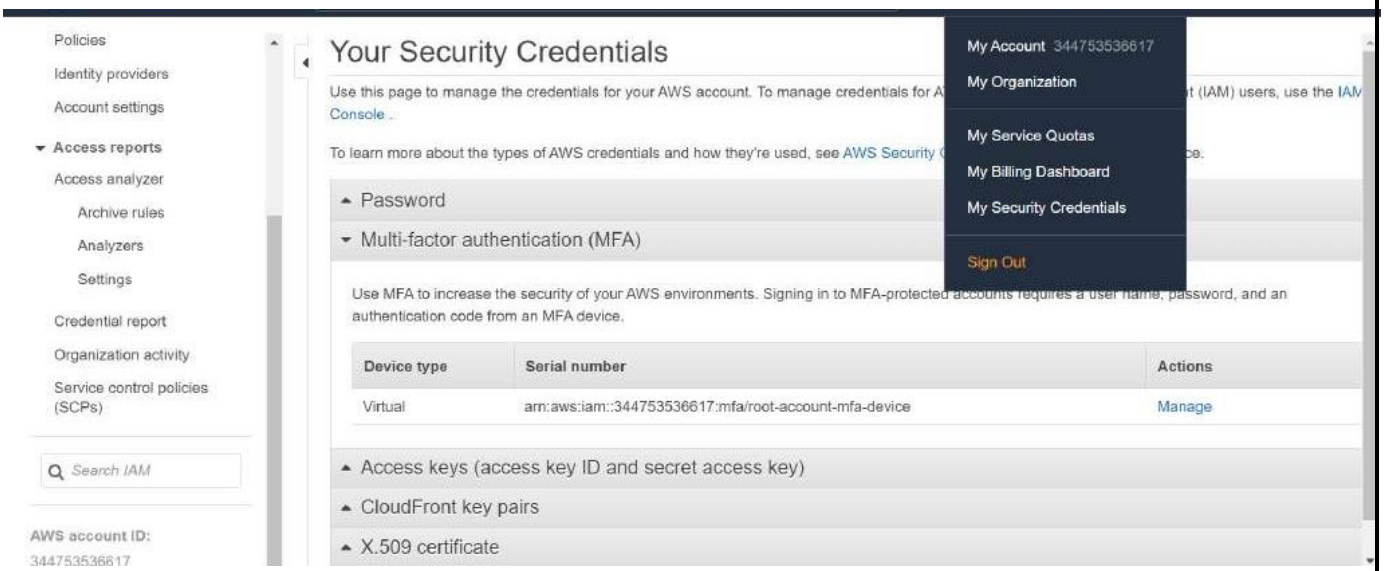


Name: Zeenat **Class: TYIT** **Roll no: 578**

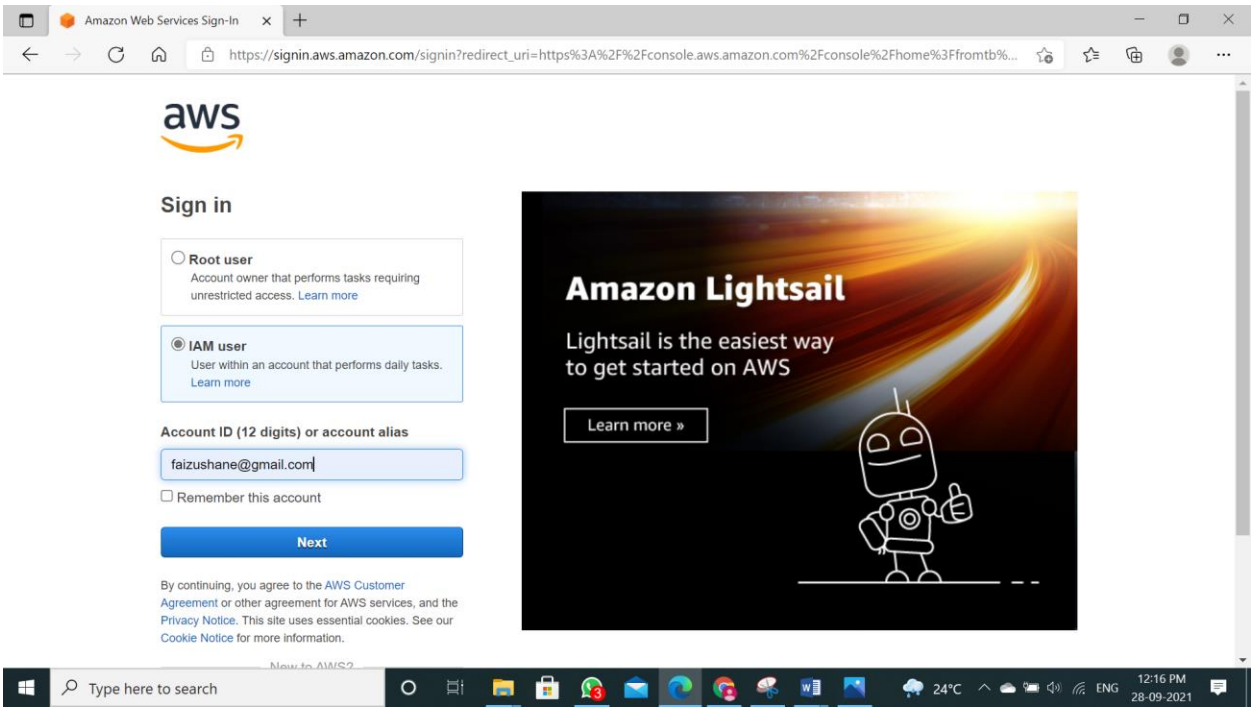
Step 12: Click on "Close"

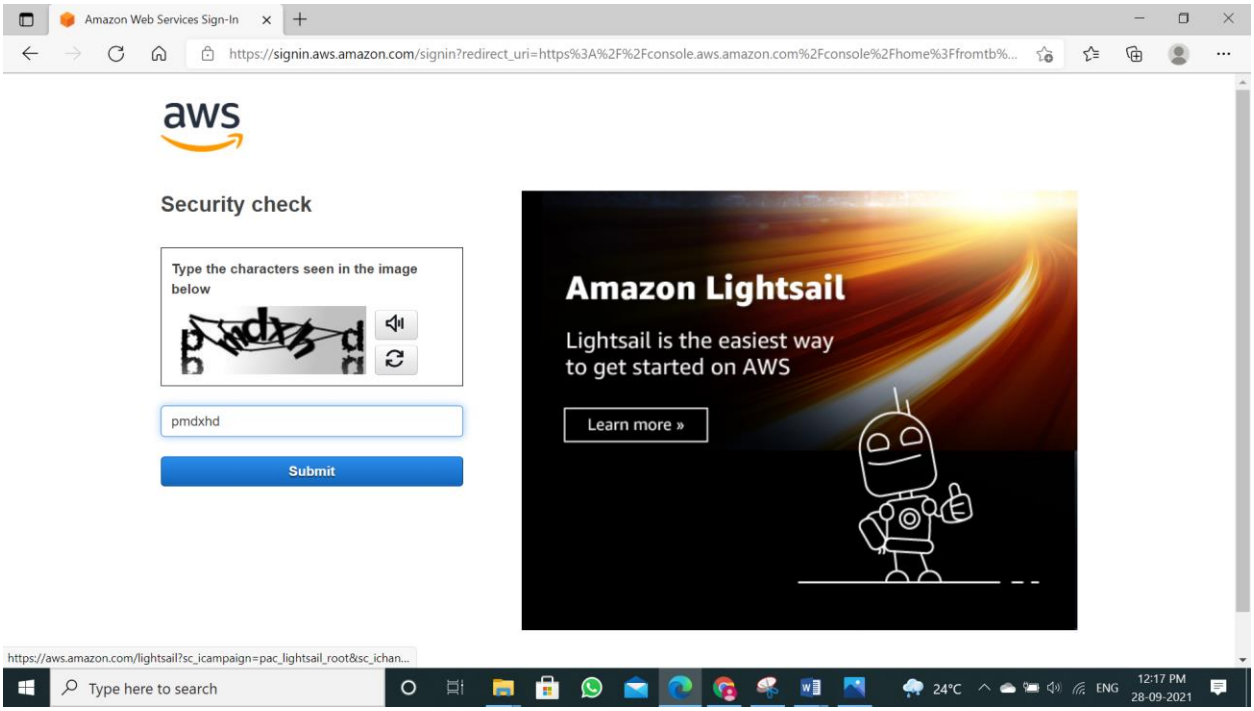


Step 13: Log out from the account.



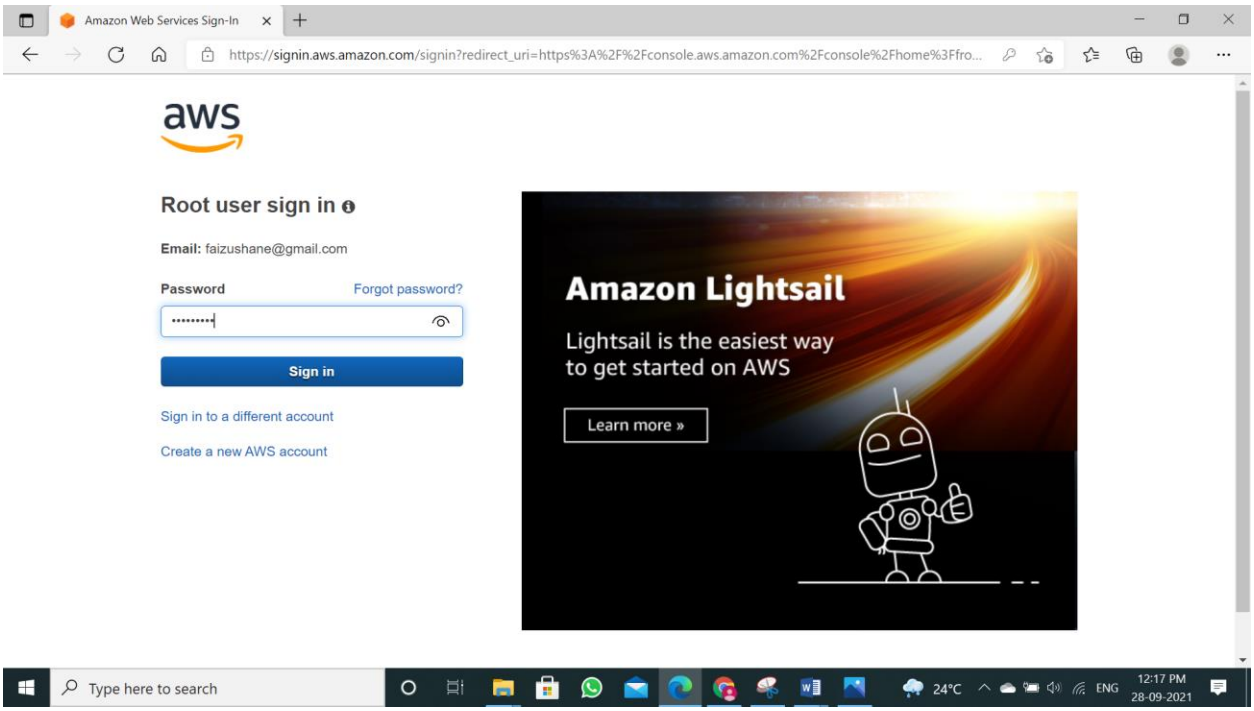
Name: Zeenat **Class: TYIT** **Roll no: 578**



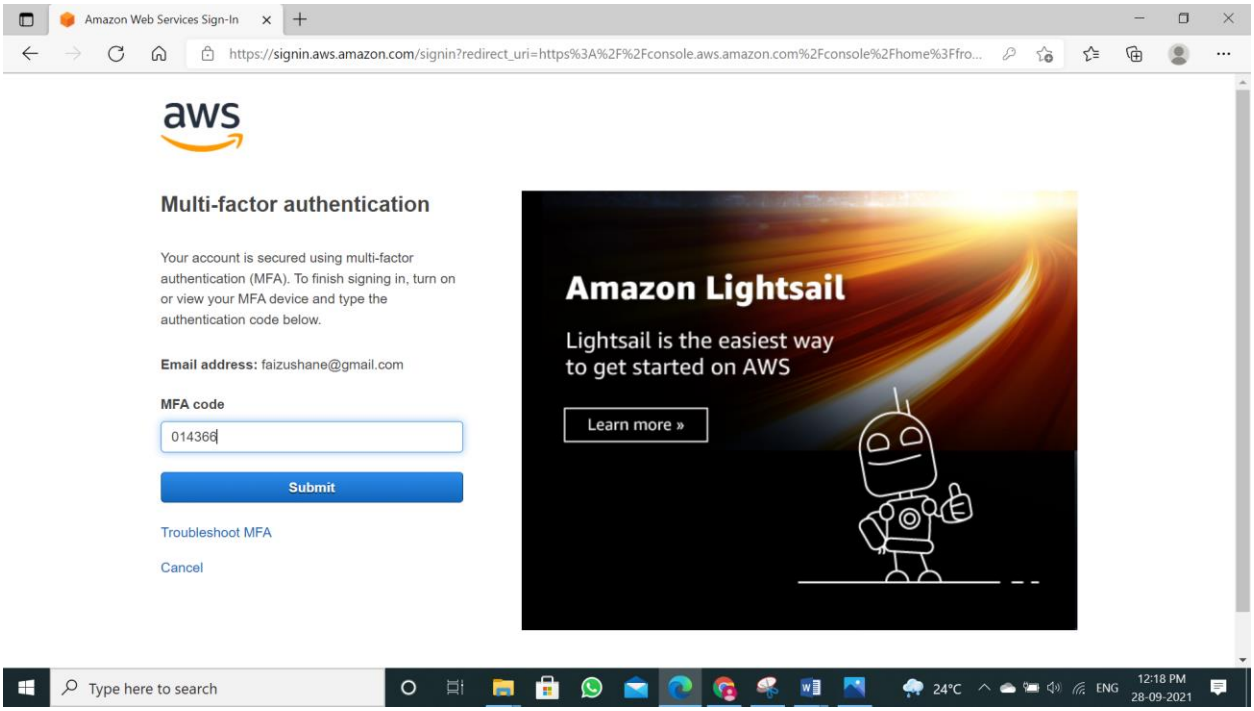


Step 14: Now again try to log in to your account

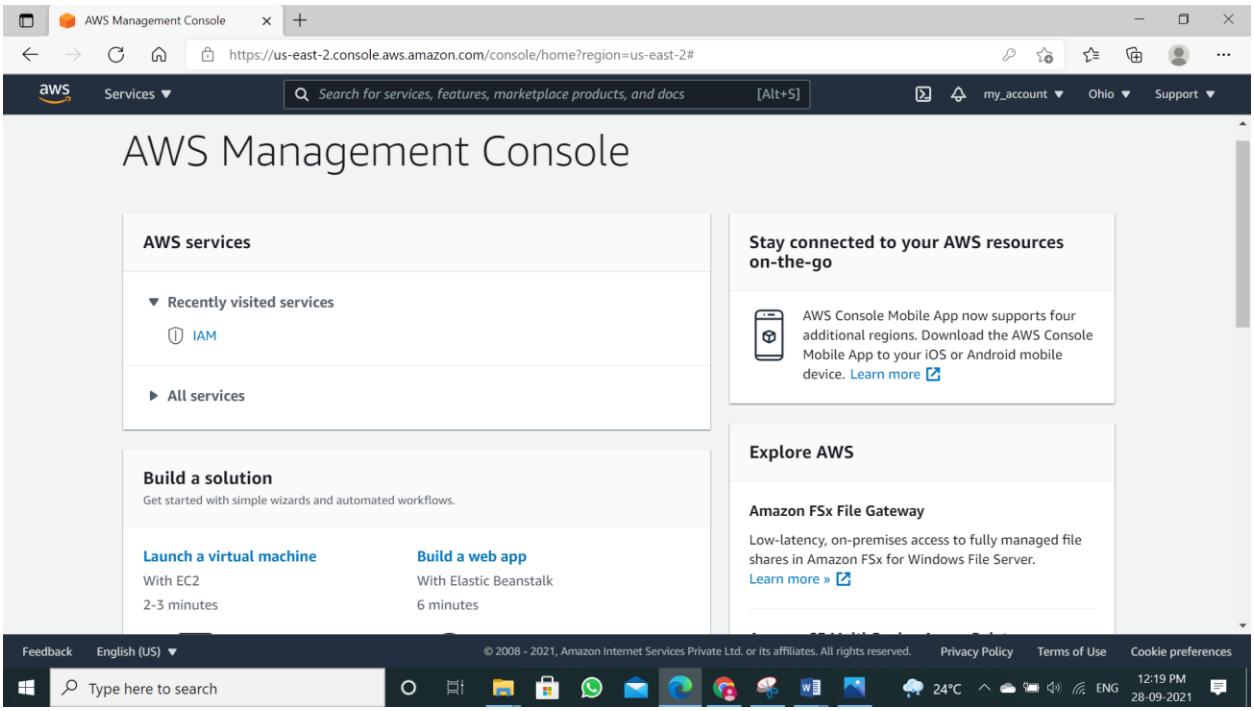
Name: Zeenat **Class: TYIT** **Roll no: 578**



Step 15: It will ask for MFA code. You get new code after every 30 seconds, just enter the valid MFA code and click on “Submit” to login.



Name: Zeenat **Class: TYIT** **Roll no: 578**



CONCLUSION:

We have studied how to secure the cloud and its data. Amazon AWS provides the best security with its extended facilities and services like MFA device. It also gives you the ability to add your own permissions and policies for securing data more encrypted.