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CC PRACTICAL 1- Infrastructure As A Service(IAAS)

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Master of Science (Data Science)

Practical-1 Infrastructure as a service using AWS.

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Writeup :-

Q1. CLOUD COMPUTING ARCHITECTURE

1. One of the most demanding technologies of the modern day is cloud computing, which is reshaping every corporation by offering virtualized services and resources on demand.
2. All sizes of organizations, from small to medium to large, use cloud computing services to store data and access it via the internet at any time, from any location.

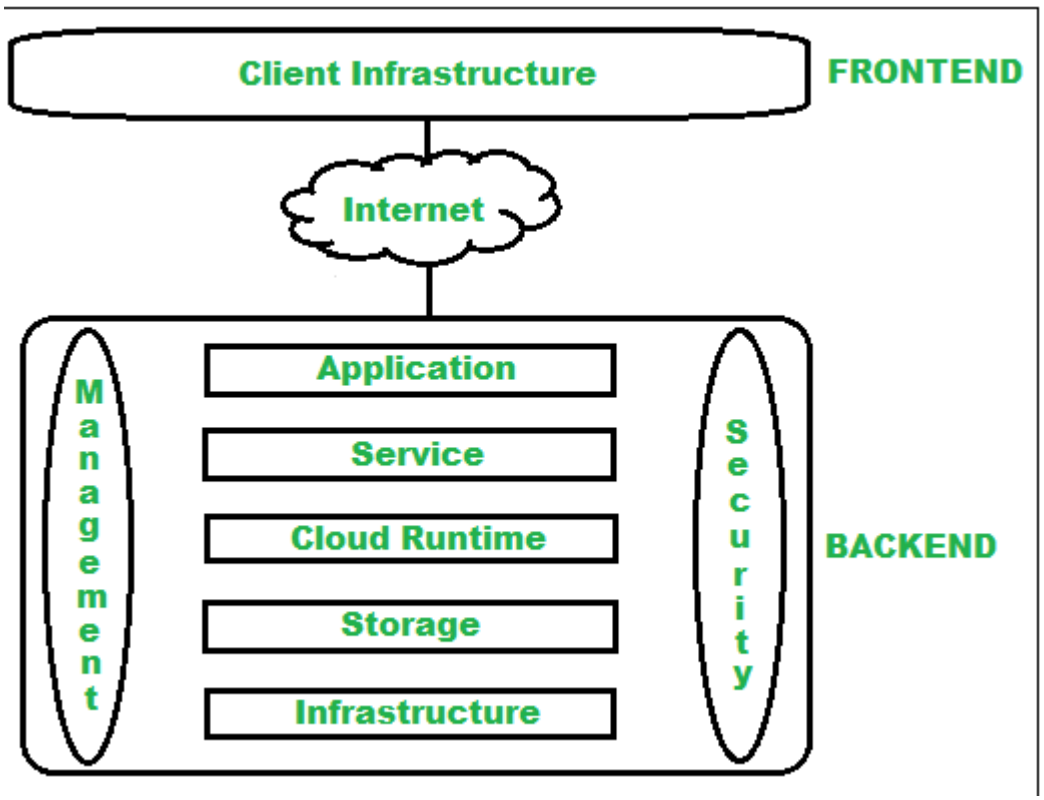


Fig: ARCHITECTURE OF CLOUD COMPUTING

3. Among the most crucial limitations that any cloud architecture should have are transparency, scalability, security, and intelligent monitoring.

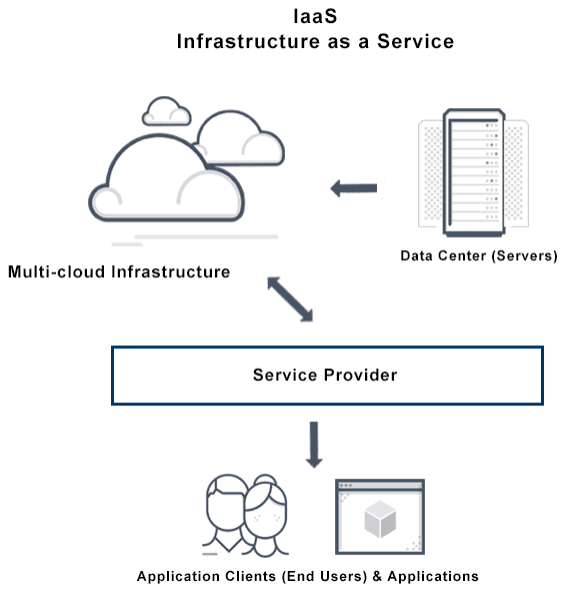
The architecture of cloud computing consists of two essential parts:

- Front End
- Back End

COMPONENTS:

1) **Client Infrastructure**:
2) **Application**
3) **Service**
4) **Runtime Cloud**
5) **Storage**
6) **Infrastructure**
7) **Management**
8) **Security**
9) **Internet**

Q2. IAAS



1. Hardware as a Service (HaaS) is another name for IaaS. It is a layer on the platform for cloud computing.
2. Conventional hosting services rented out IT infrastructure with pre-configured hardware for a certain amount of time. Regardless of the actual usage, the customer paid for the setup and labor
3. Maintaining IT infrastructure is no longer necessary for any firm thanks to the IaaS cloud computing platform layer.

IaaS is offered in three models: **public, private, and hybrid** cloud.

- The private cloud implies that the infrastructure resides at the customer-premise.
- In the case of public cloud, it is located at the cloud computing platform vendor's data center

- ❖ the hybrid cloud is a combination of the two in which the customer selects the best of both public cloud or private cloud.

IaaS provider provides the following services -

1) **Compute**
2) **Storage**
3) **Network**
4) **Load balancers**

Q3. AWS

1. An affiliate of Amazon.com, Amazon Web Services (AWS), has spent billions of dollars on global IT resources.
2. Account users of AWS can access on-demand IT services at no upfront cost through a pay-as-you-go pricing model.
3. Businesses utilize AWS to lower the capital costs associated with constructing their own private IT infrastructure, which may be costly depending on the size and kind of the business.
4. AWS has a physical fiber network of its own that links to Edge locations, Availability zones, and regions. Businesses save tons of money since AWS handles all maintenance costs as well.
5. Security of the cloud is the responsibility of AWS but Security in the cloud is the Customer's Responsibility. The Performance efficiency in the cloud has four main areas:-

- ❖ Selection
- ❖ Review
- ❖ Monitoring
- ❖ Tradeoff

Q4. AWS services

Cloud computing, or web services, is the term for the IT services that Amazon Web Services (AWS) started providing to the general public in 2006.
Important Cloud Services provided by AWS

1. **Compute**

1) **Amazon EC2**: Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides secure, resizable compute capacity in the cloud.
2) **AWS Lambda**: You can run code without worrying about managing servers with AWS Lambda, an event-driven, serverless computing service.
3) **AWS Elastic Beanstalk**: A platform called Beanstalk is plug-and-play, enabling the use of many programming languages and environments.

2. **Networking**

1) **Amazon VPC**: Your cloud-based network environment is called an Amazon VPC.
2) **Amazon Route 53**: A cloud-based DNS web service that is both highly available and scalable.
3. **Storage**

1) **Simple Storage Service (Amazon S3):** Amazon S3 allows users to store and retrieve any volume of data from any location on the internet.
2) **Amazon Glacier:** An incredibly affordable, long-lasting, and safe storage solution for long-term backup and data preservation.

4. **Databases**

1) **Relational database service (Amazon RDS):** This cloud-based solution simplifies the setup, management, and scalability of relational databases and also manages time-consuming database management operations
2) **Non-Relational Database**: Amazon DynamoDB is a quick and adaptable NoSQL database solution for any purpose, regardless of size that supports both document and key-value data models

Q5. EC2

1. Web hosting by Amazon The safe, scalable, and resizable EC2 web service is offered by the AWS cloud.
2. Amazon will handle infrastructure management in place of you, allowing you to start and stop an EC2 instance anytime you choose.
3. Depending on the amount of incoming traffic, you may scale up or down the EC2 instance.

USE CASES OF AMAZON EC2 (ELASTIC COMPUTE CLOUD)

1. **Application Deployment**
2. **Application Scaling**
3. **Deploying The ML Models**
4. **Hybrid Cloud Environment**

AWS EC2 **Instance Types**

Different Amazon EC2 instance types are designed for certain activities.

The AWS EC2 Instance Types are as follows:

- General Purpose Instances
- Compute Optimized Instances
- Memory-Optimized Instances
- Storage Optimized Instances
- Accelerated Computing Instances

Features of AWS EC2 (Elastic Compute Cloud)

1) AWS EC2 Functionality
   AWS EC2 Operating Systems
2) AWS EC2 Software
3) AWS EC2 Scalability and Reliability

OBJECTIVES TO BE IMPLEMENTED IN PRACTCALS:

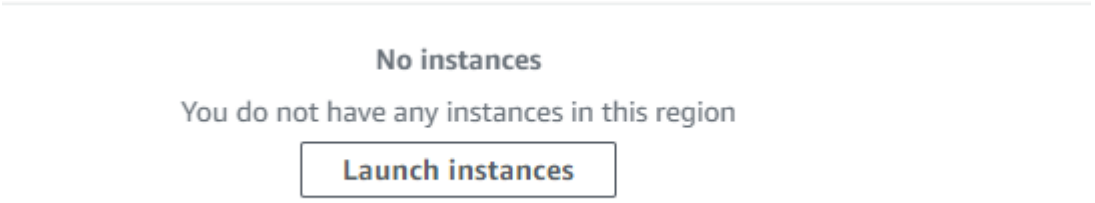
1. **Implement the windows machine using AWS ec2.**
2. **Implement Ubuntu machine using AWS ec2 and execute the Linux commands.**
   - **Disk information in human readable format**
   - **Create a folder with your name**
   - **Create a file with your cityname and add your address in it**
   - **Display the created file**
   - **Copy the contents of the created file in other file and print it**
   - **Install firefox/python 3**

PRAC1: IAAS with EC2

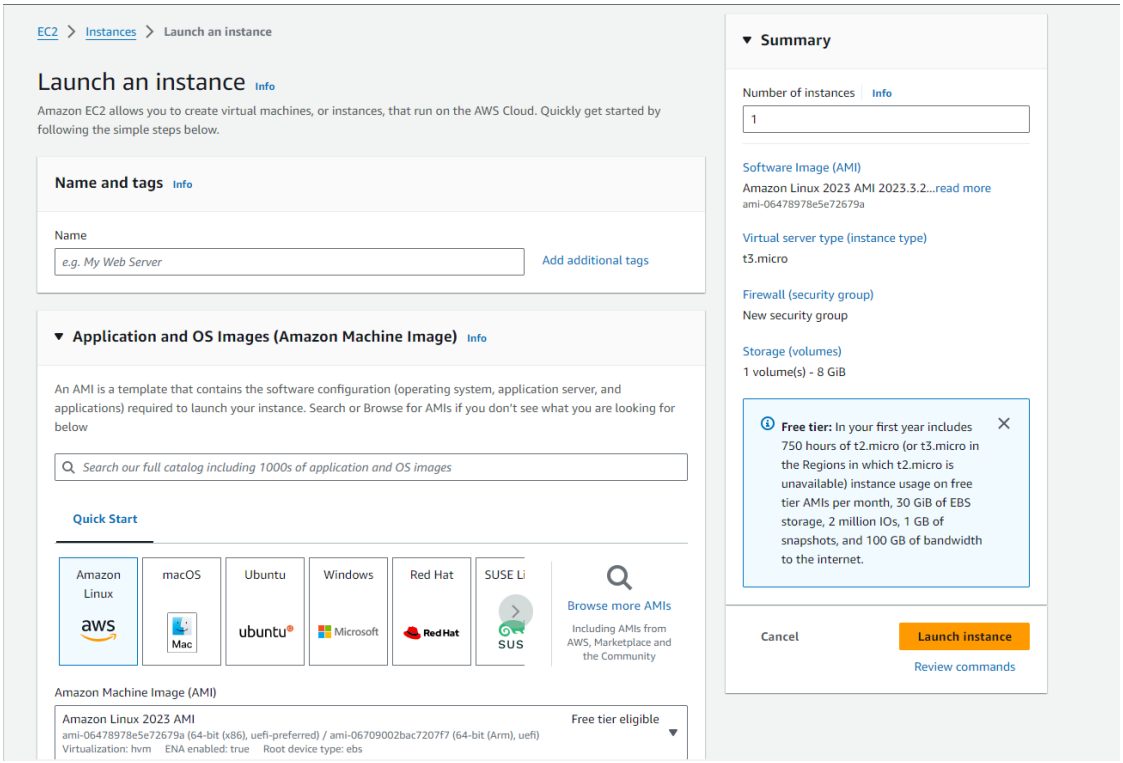
- Protocol
- IP
- Key
- Linux
- Putty

STEPS SCREENSHOTS:

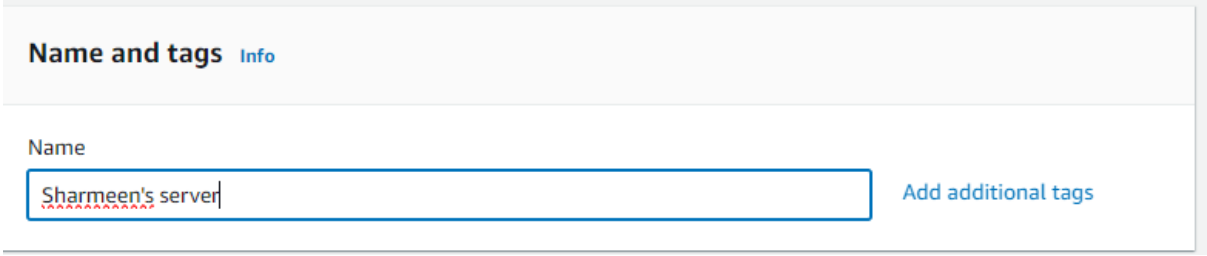
FOR Q1

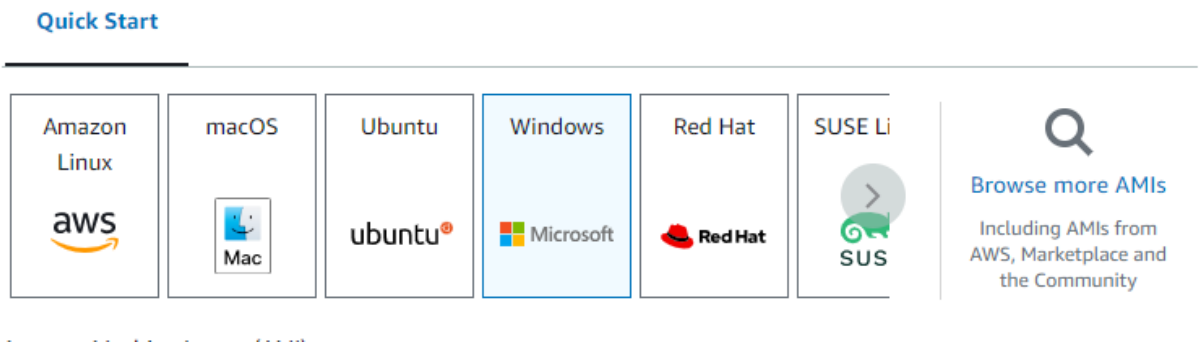


Click on EC2->Instances->launch an instance

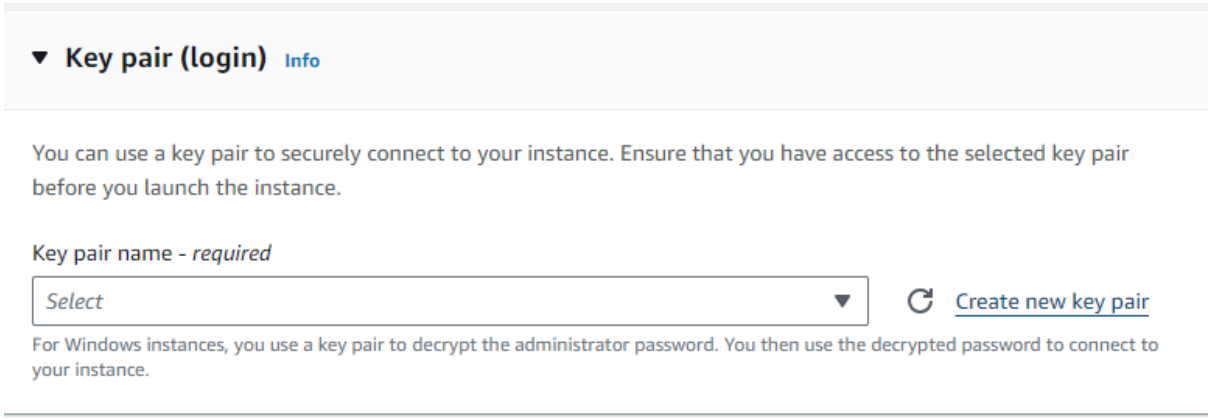


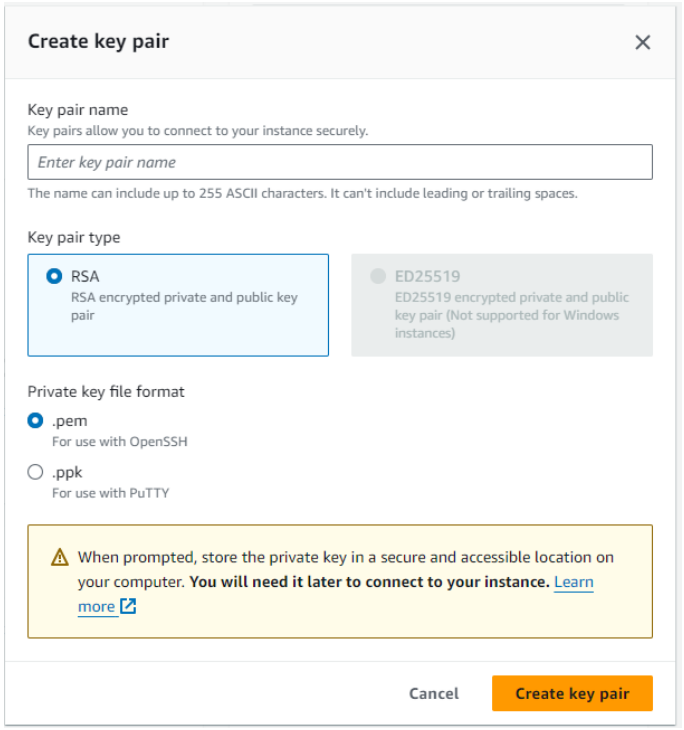
Give a name to server

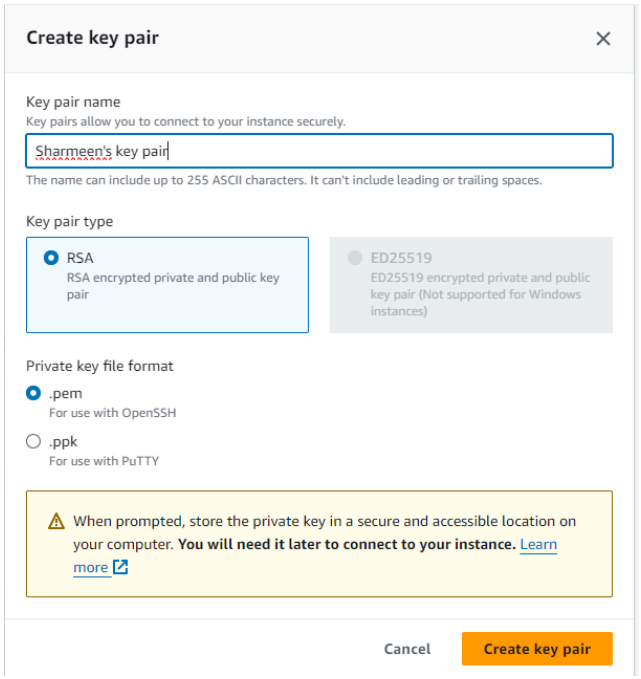


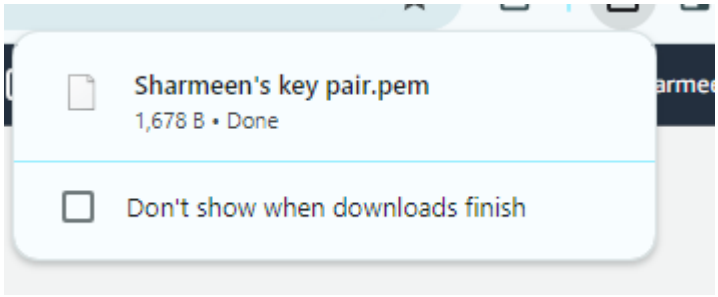


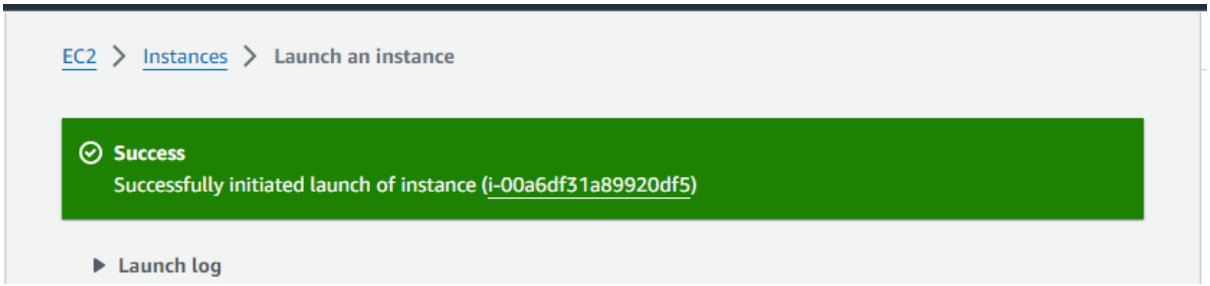
Create a key pair



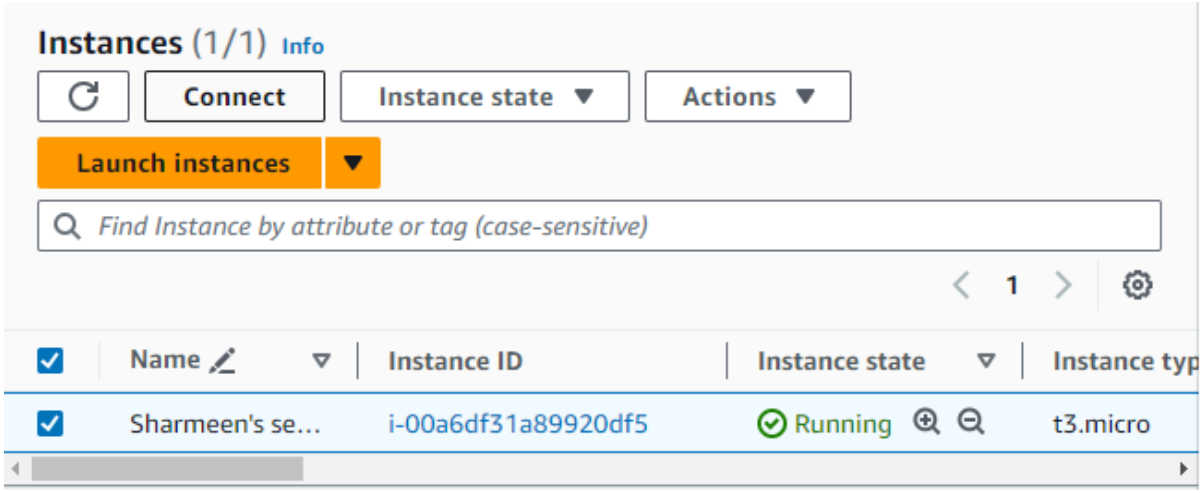




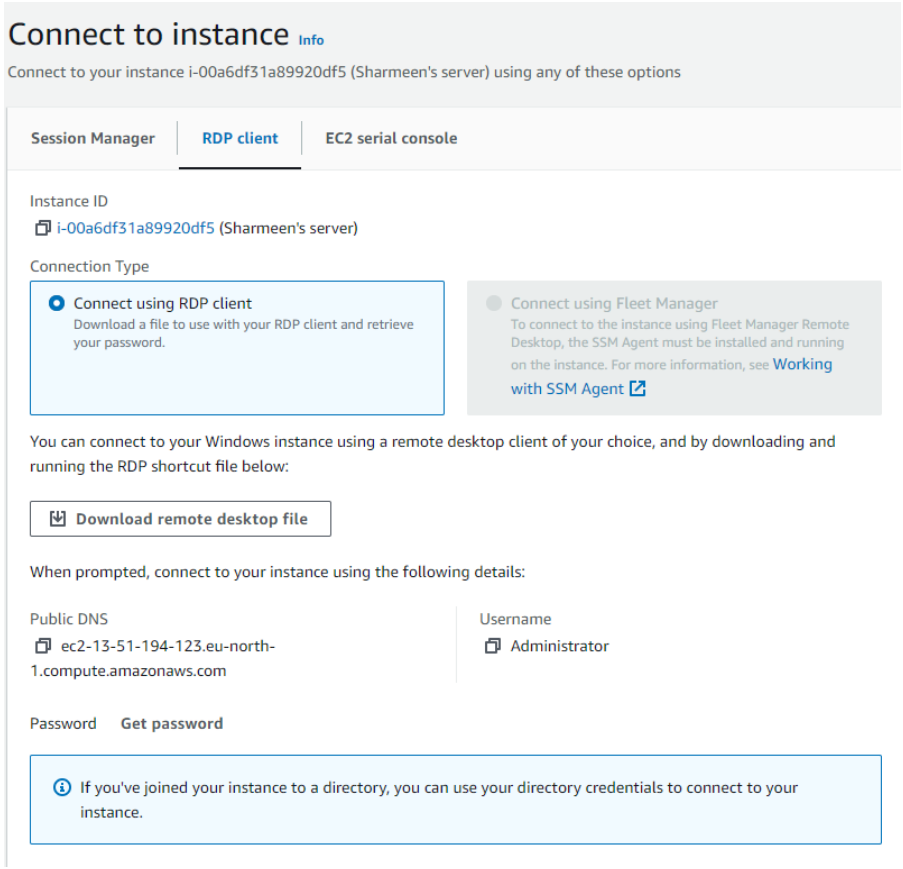




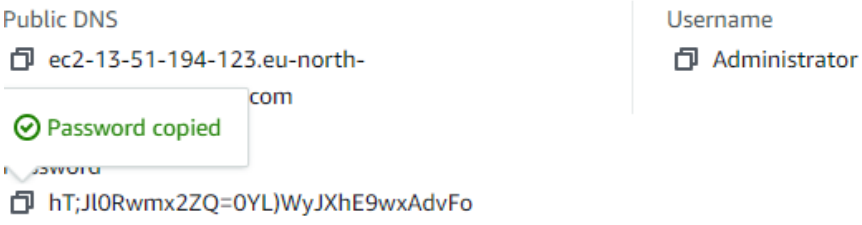
Go to instances again after completing above steps->will show status as running



Click and select -> connect above button



Copy the password that comes down

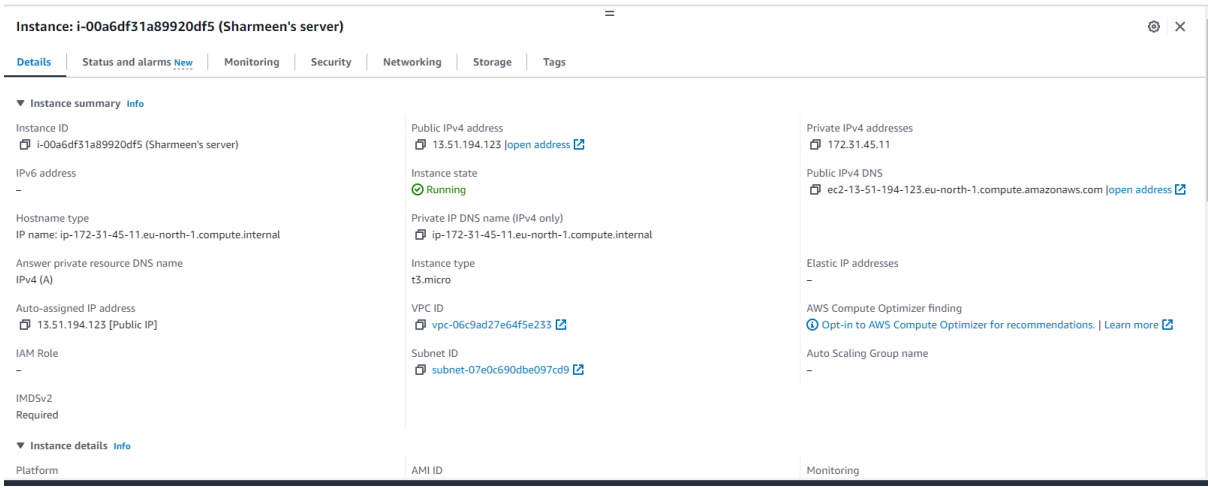


Open the downloaded remote desktop pem file

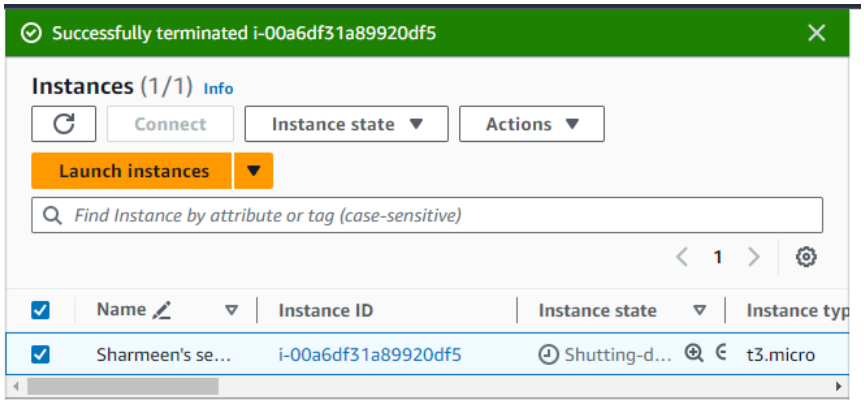
Click on yes-> a new desktop opens with is IAAS(your infrastructure as a service

Below is the information visible on dektop

You can download python to code as PAAS(Platform as a service)



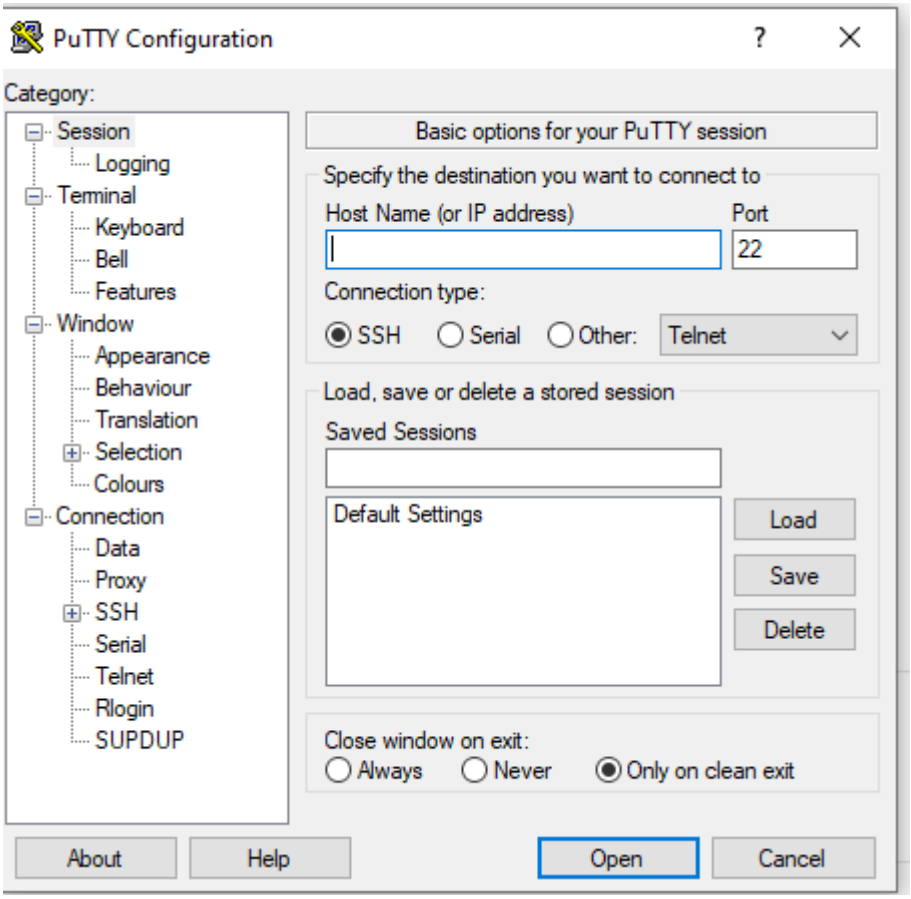
After finishing task, terminate the instance



FOR THE 2nd question's demonstration,

1. Install putty from web

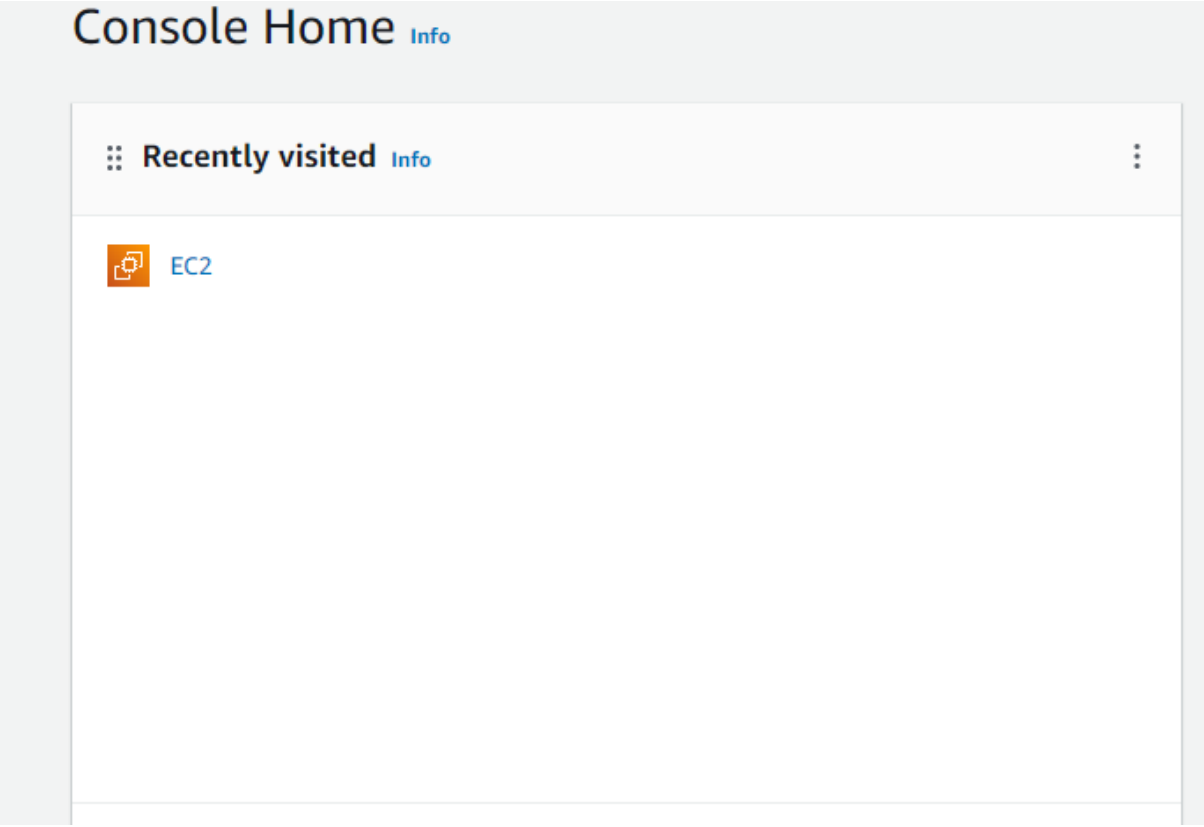
2. Will Get a dialog box like this



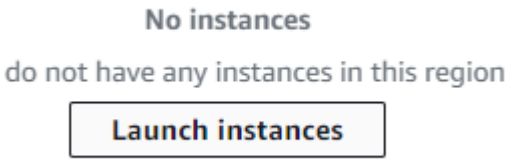
We need to know 3 things for this:

- IP address
- Authentication key
- Username

Go to instances-> EC2

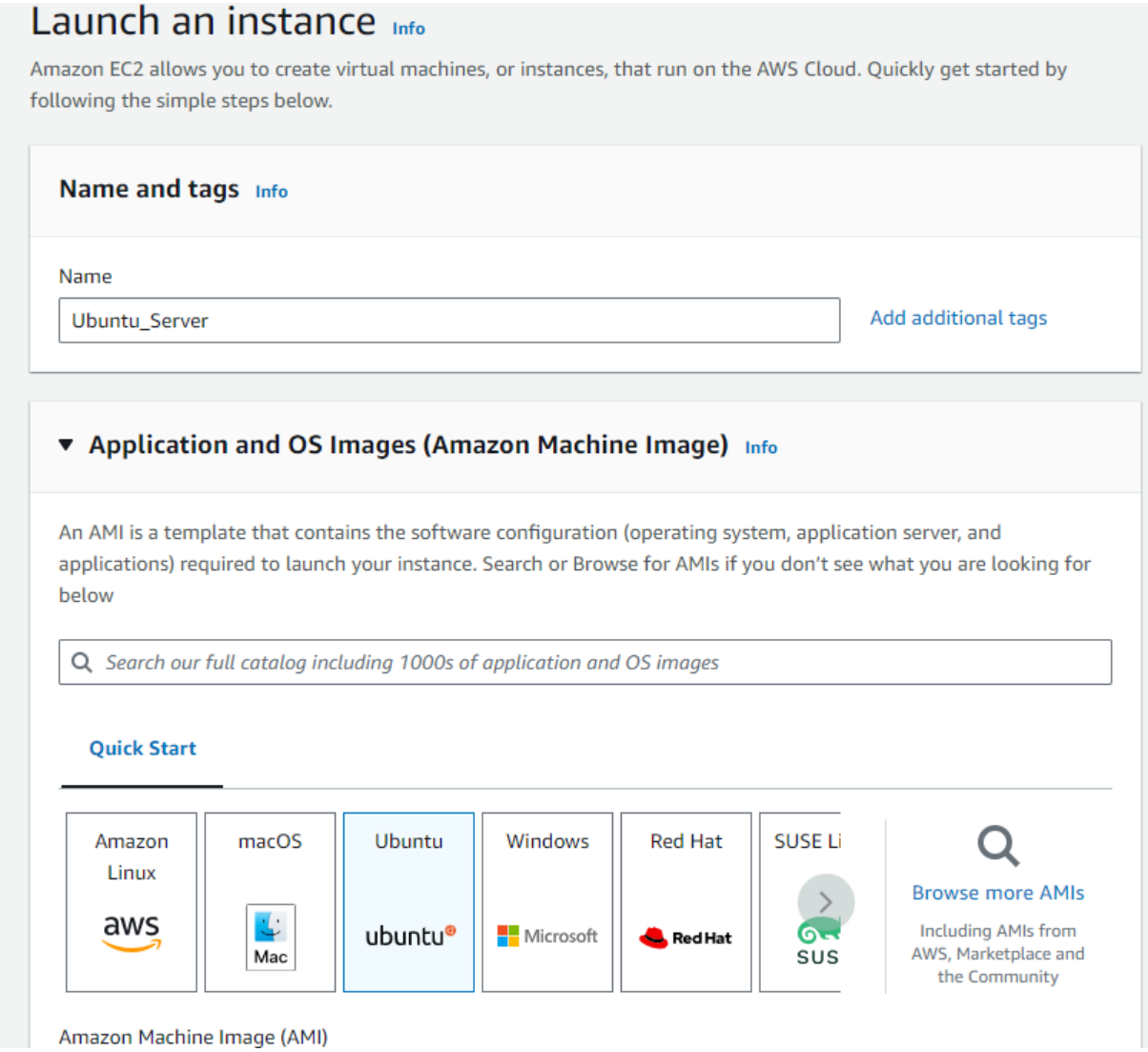


Click launch instance

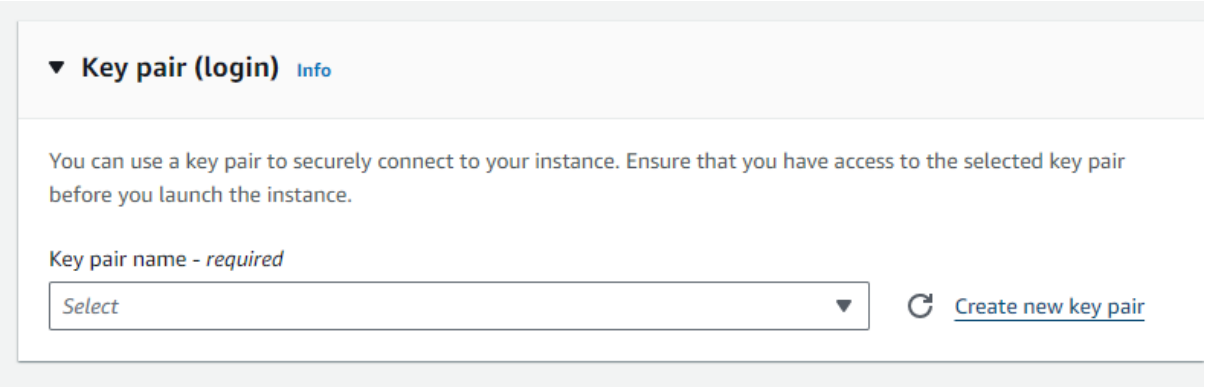


Will get a window like this as shown below

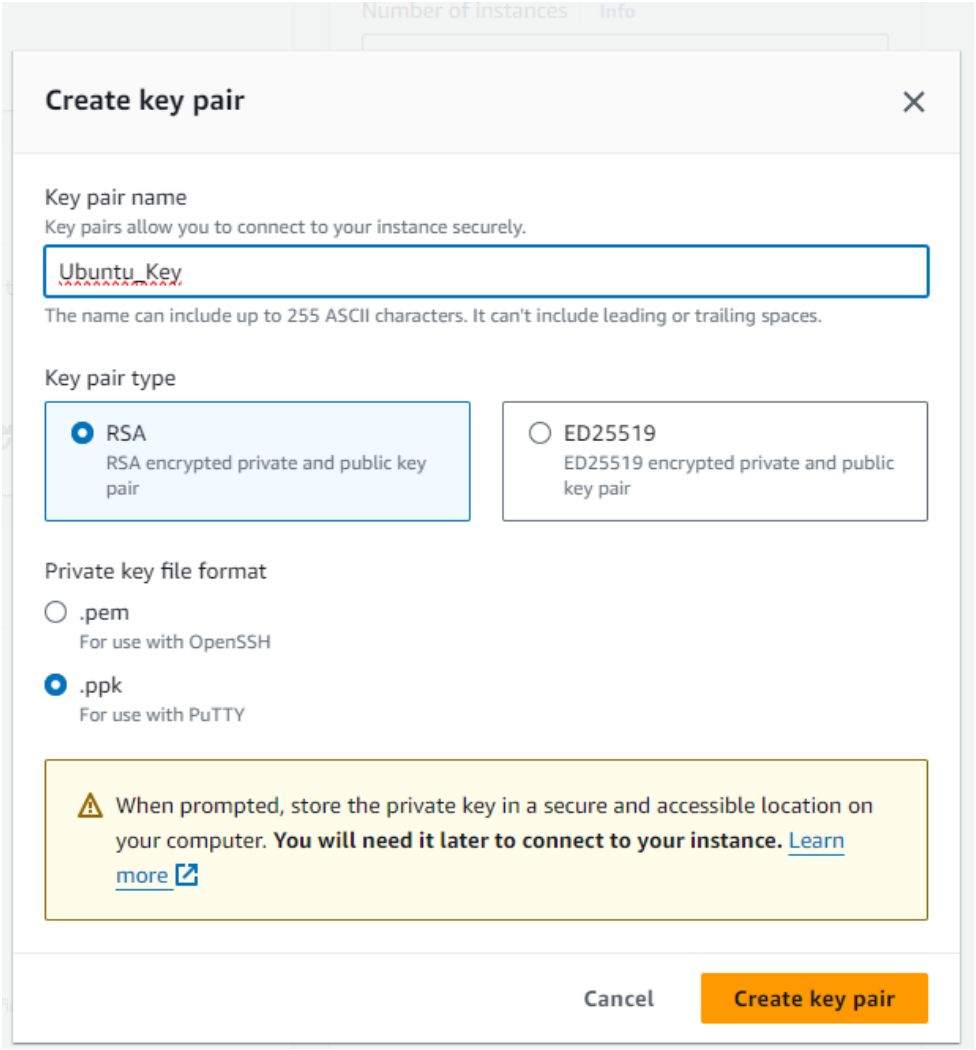
In that give a name to your instance, and select Ubuntu from the available AMI’s



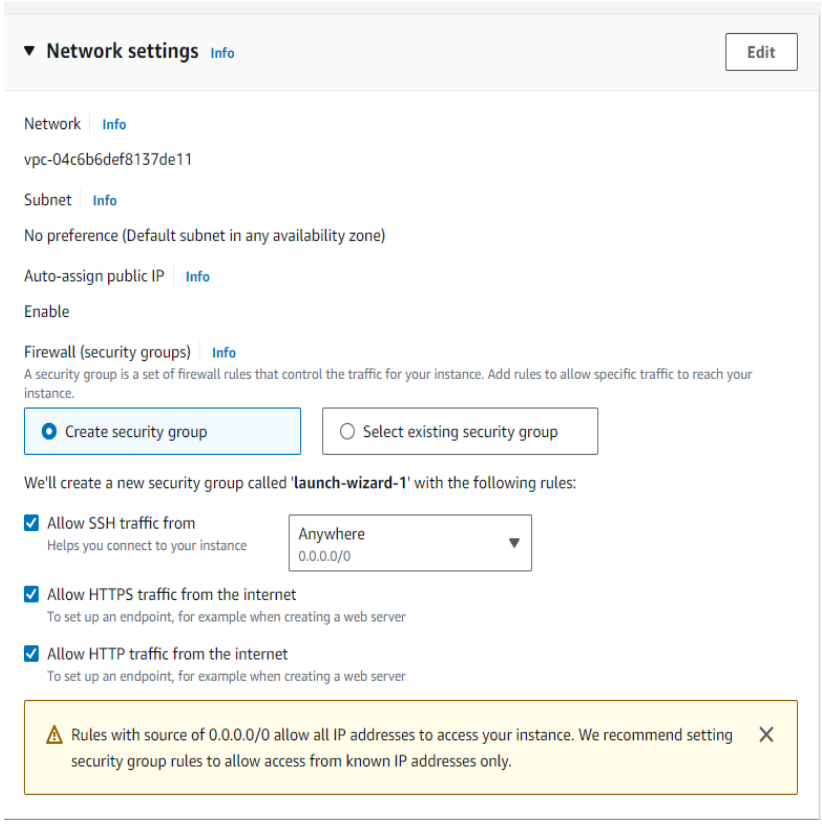
Go down to key pairs->click create new key pair



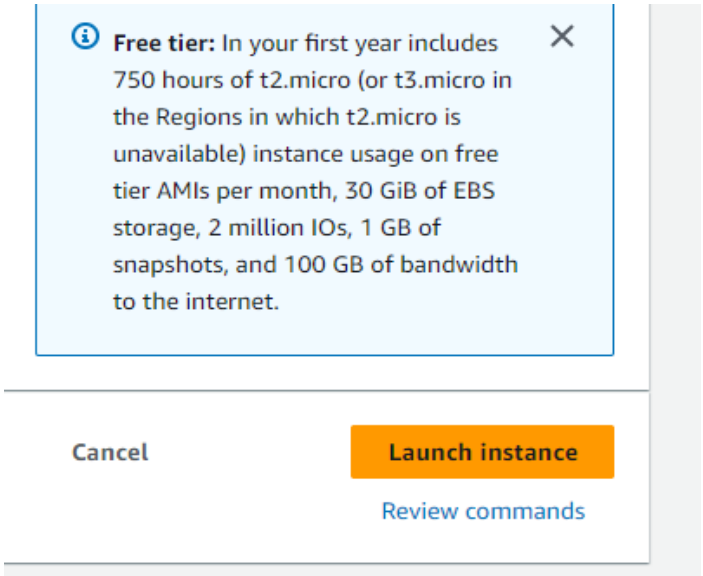
Dialog box will be this way below as shown->give key pair a name-> select .ppk extension for use with putty



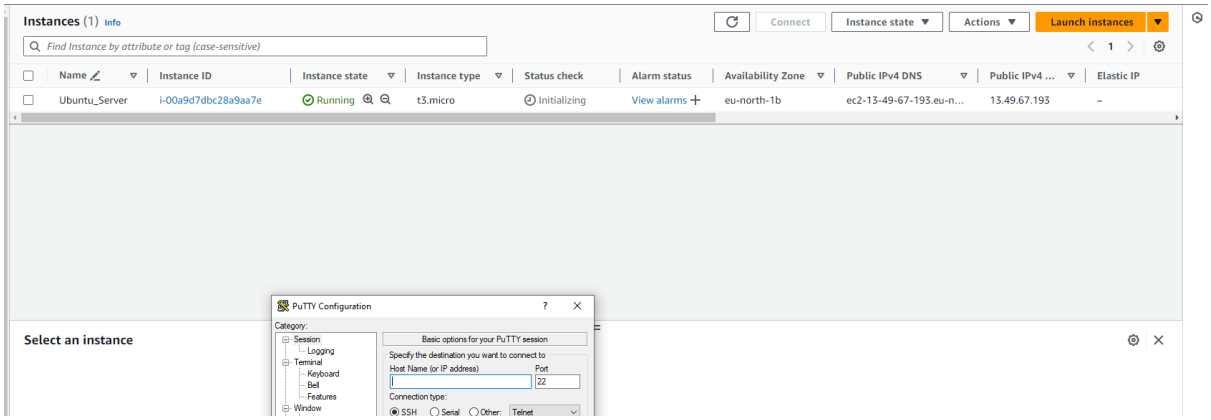
Go to network settings->select create security group below->tick on all checkboxes seen below that



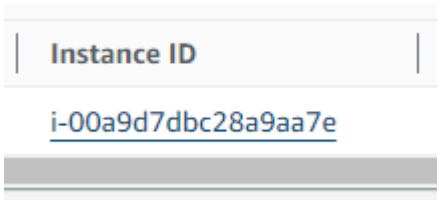
Click on launch instance



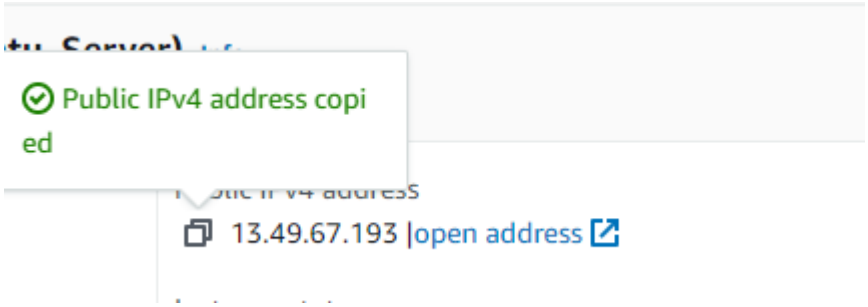
In that your instance ID name and its status will be displayed as shown below

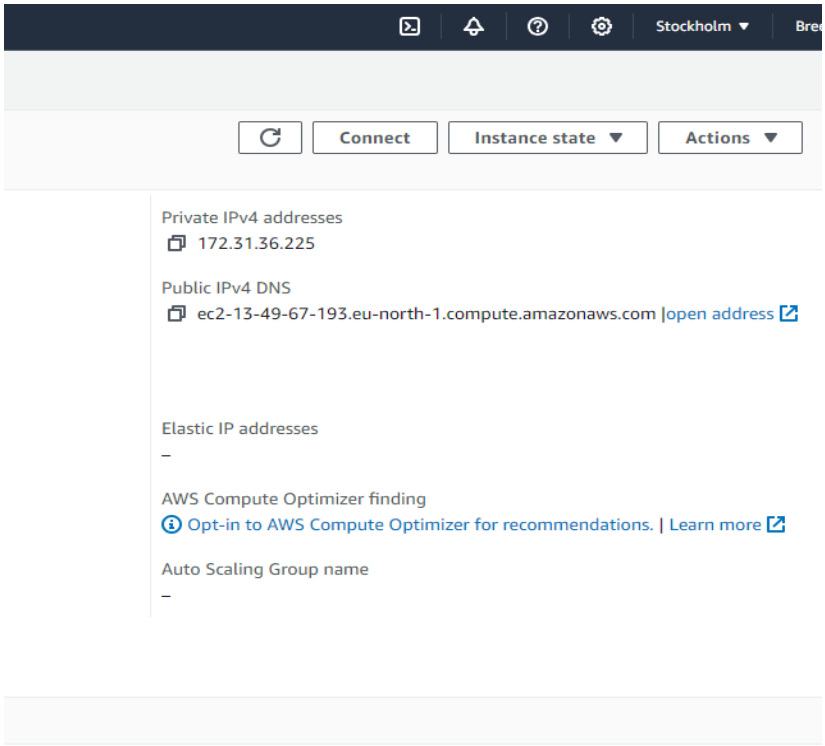


Click on the ID

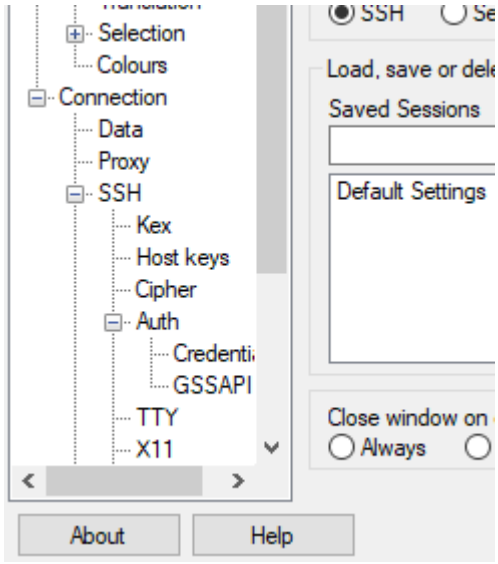


After that a new page opens with several addresses related to your server->in that copy your public IPv4 address

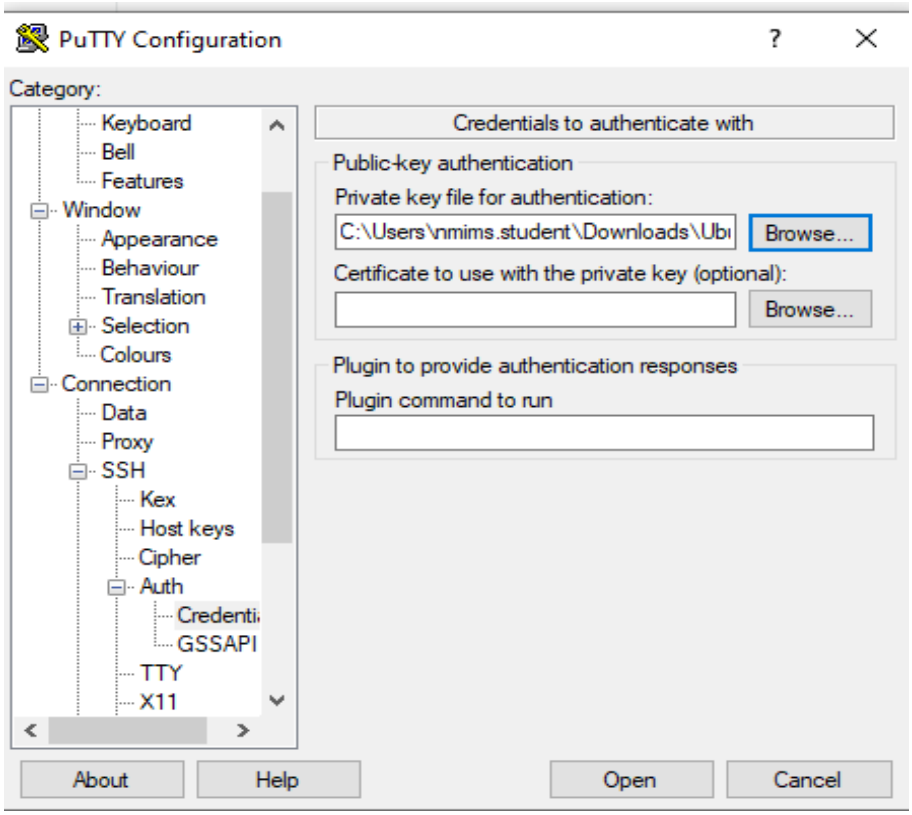




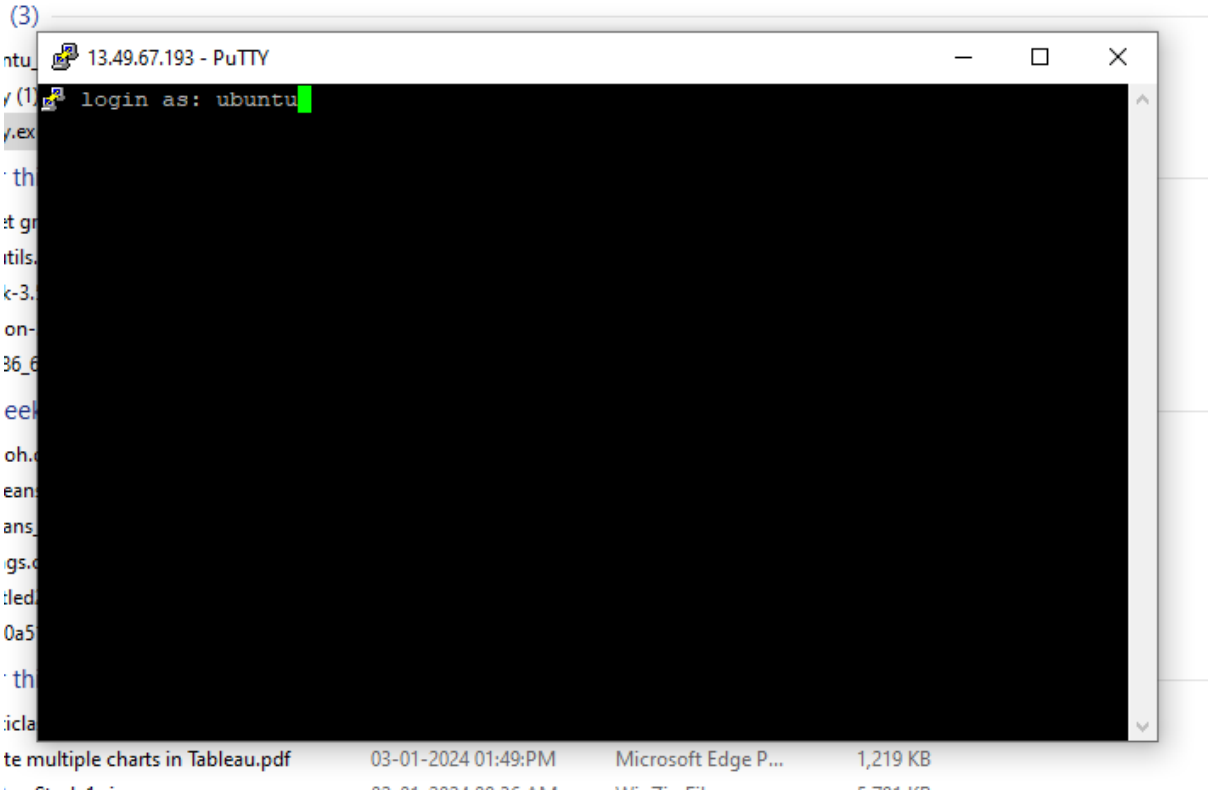
After that ->go to the previous dialog box of your putty configuration->select SSH option in the leftmost panel downside->in that select Auth->and select Credentials as shown below



In credentials->browse your private key file from device and select and put it there



After that click on open-> after that a new desktop will open with your selected ubuntu interface->in that put your login as **ubuntu**



It will authenticate and then allow you to use the interface

Type the commands

- **Ls**-for listing
- **Mkdir** -to make a directory
- **cd**-to change directory
- **touch**-to create empty files and modify file timestamps
- **cat**-reads each file parameter in sequence and writes to standard output
- **sudo apt-get install**-to install any software(eg.python)