

Practical 1

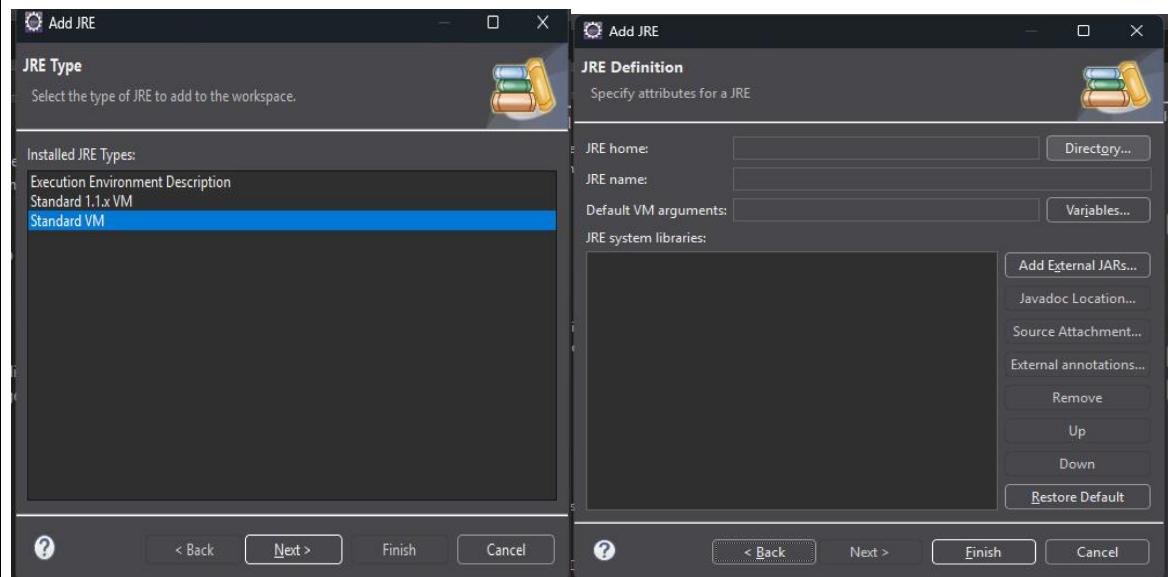
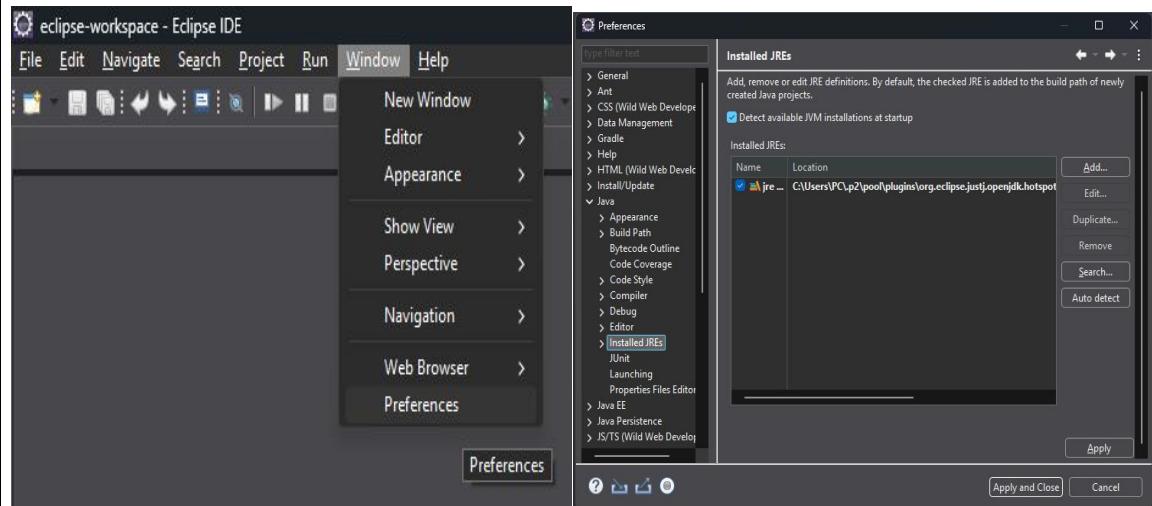
Aim: Using the software like JDK 1.8, Eclipse IDE, Apache tomcat server 7.0 Servlets, Spring framework design and develop web applications using MVC Framework.

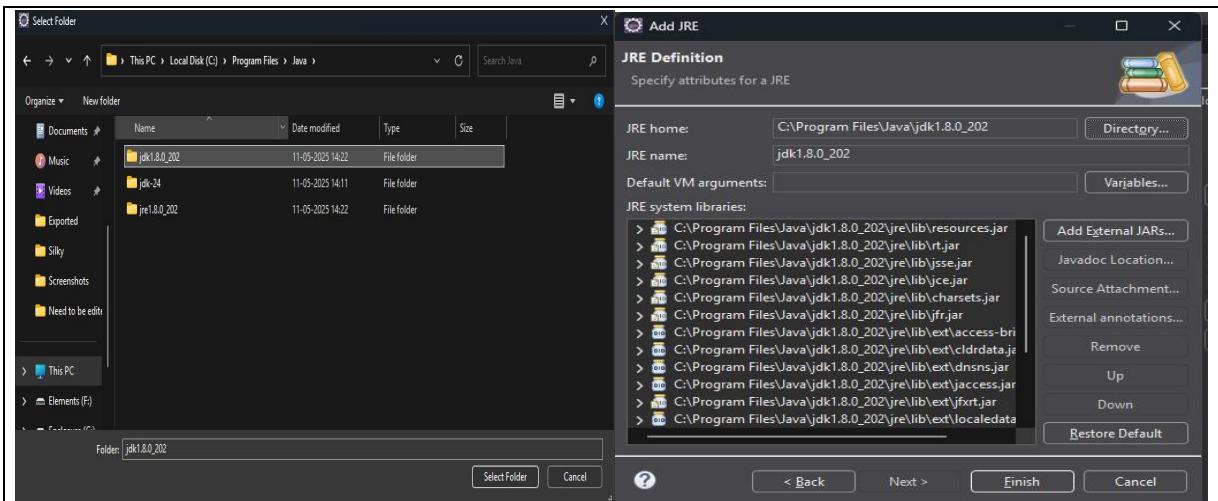
Steps:

Step 1: Download and Install Eclipse IDE. Run installer file > Select Eclipse IDE for Enterprise Java and Web Developers > Install then Launch.

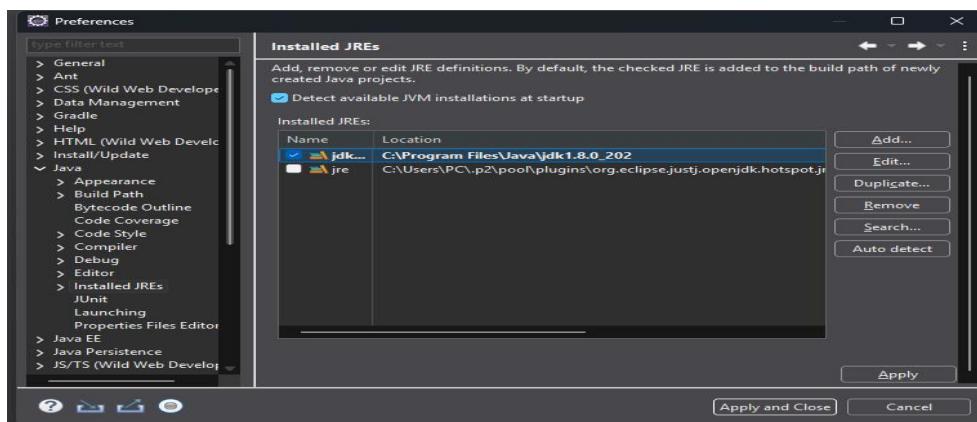
Step 2: Download and install JDK 8 and add it to Eclipse IDE.

Step 3: Open Eclipse IDE click Window>Preferences>Installed JREs> Add>Standard VM> Click Directory> Give path of jdk location C:\Program Files>Java>jdk1.8.0_202> Click Finish.

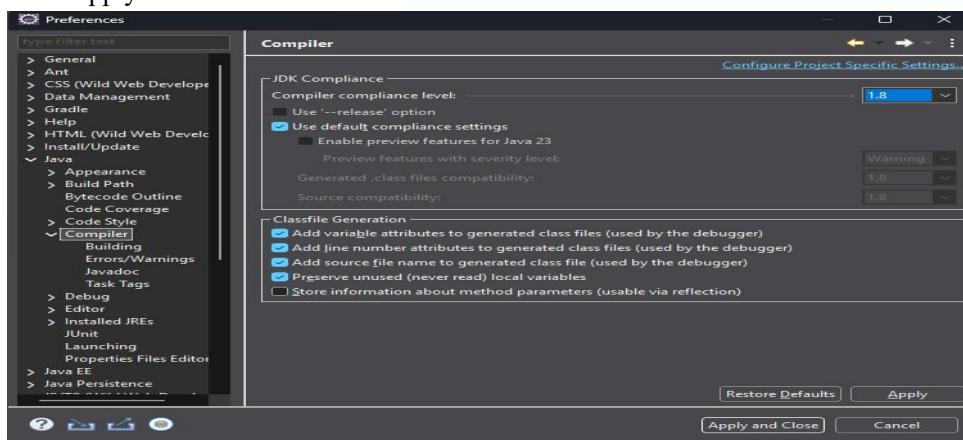




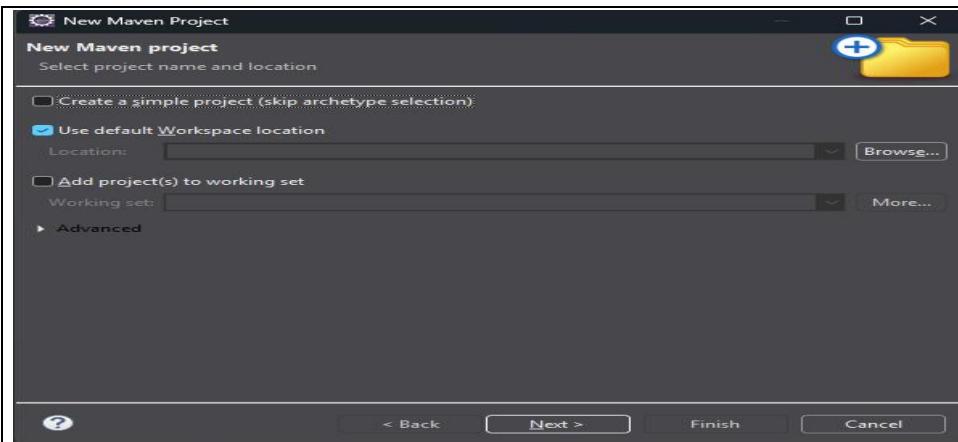
Step 4: Uncheck jre and click jdk and Apply.



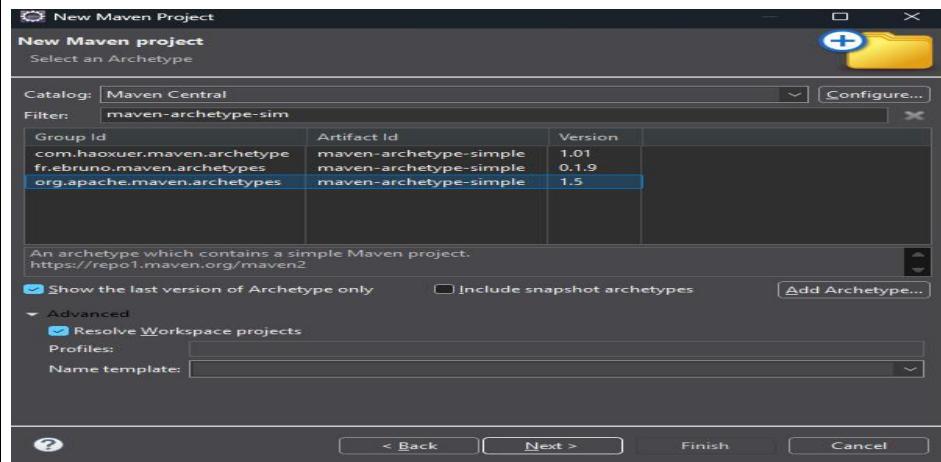
Step 5: Click on Window> Preferences> Java> Compiler select 1.8 from compiler compliance level and click Apply and Close.



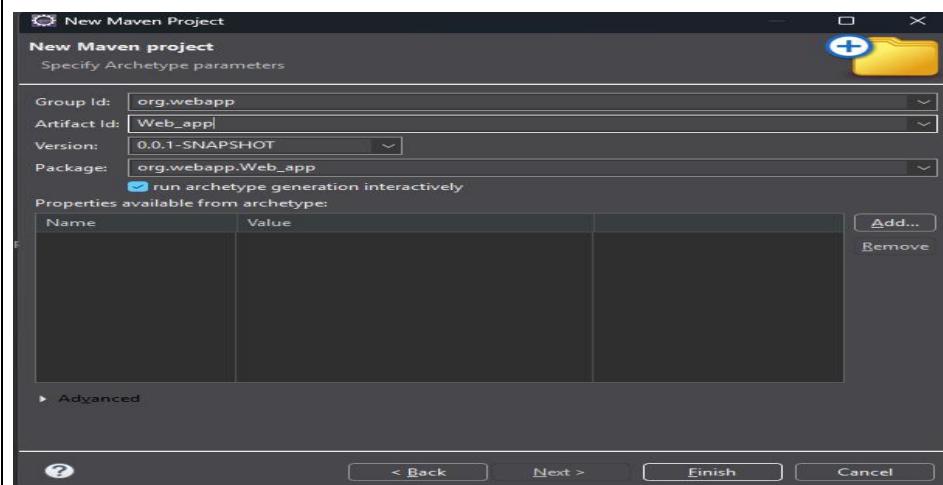
Step 6: File> New > Maven Project.



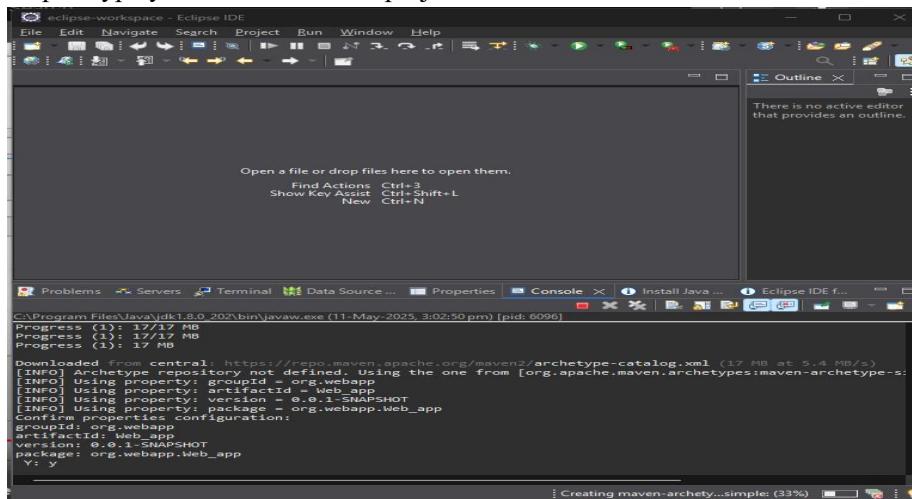
Step 7: In Catalog select Maven Central> Select archetype as maven-archetype-simple> Next>



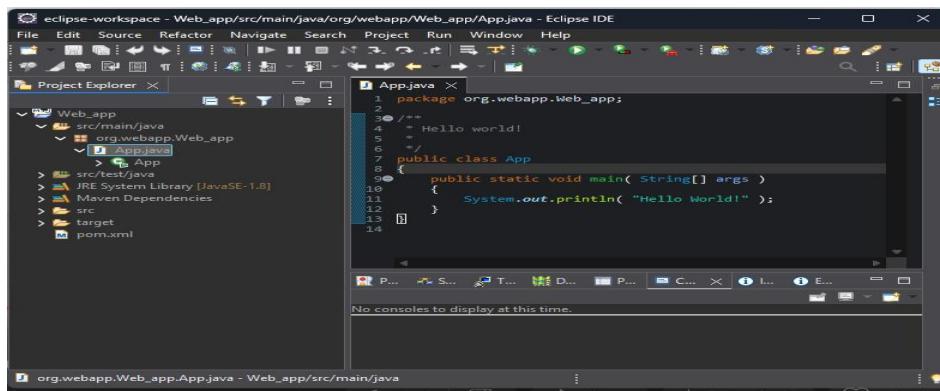
Step 8: Fill details and click Finish.



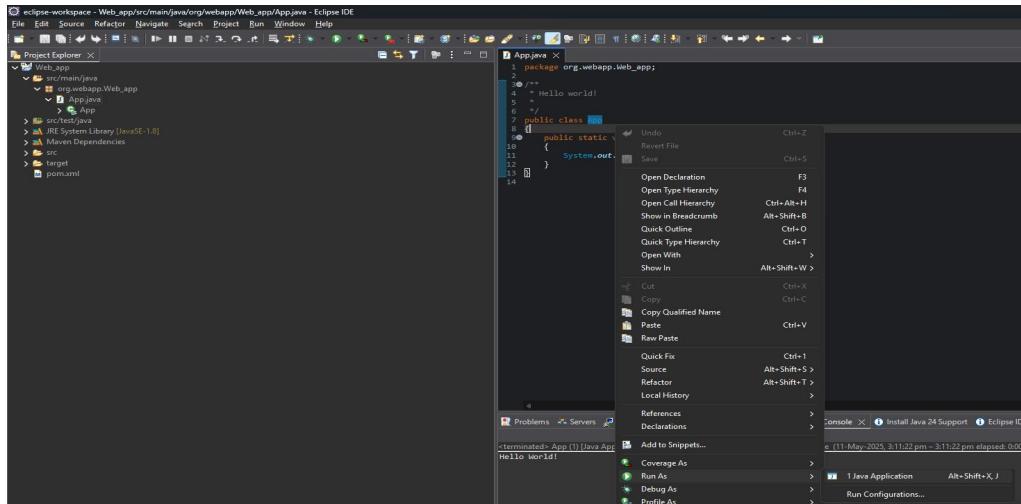
Step 9 Type y in console to build project.



Step 10: Folder structure will look like following window open App.java.



Step 11: Right Click on App.java file then Run As > Java Application. Application will run and show the output.



Step 12: Here is pom.xml file content.

eclipse-workspace - Web_app/pom.xml - Eclipse IDE

File Edit Navigate Search Project Run Design Window Help

Project Explorer App.java Web_app/pom.xml

```
1 <http://maven.apache.org/xsd/maven-4.0.0.xsd (xsi:schemaLocation with catalog)
2 <?xml version="1.0" encoding="UTF-8"?>
3 <project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
4   xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
5   <modelVersion>4.0.0</modelVersion>
6
7   <groupId>org.webapp</groupId>
8   <artifactId>Web_app</artifactId>
9   <version>0.0.1-SNAPSHOT</version>
10
11   <name>Web_app</name>
12   <description>A simple Web app.</description>
13   <url>http://www.example.com/url</url>
14
15   <properties>
16     <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
17     <maven.compiler.source>8</maven.compiler.source>
18     <maven.compiler.target>8</maven.compiler.target>
19   </properties>
20
21   <dependencies>
22     <dependency>
23       <groupId>junit</groupId>
24       <artifactId>junit</artifactId>
25       <version>3.8.1</version>
26     </dependency>
27   </dependencies>
28
29   <build>
```

Overview Dependencies Dependency Hierarchy Effective POM pom.xml

Problems Servers Terminal Data Source Explorer Properties Console Install Java 24... Eclipse IDE for... Help

<terminated> App (1) [Java Application] C:\Program Files\Java\jdk1.8.0_202\bin\java.exe - (11-May-2025, 3:11:22 pm - 3:11:22 pm elapsed: 0:00:00.227) [pi Hello World!

pom.xml - Web_app

eclipse-workspace - Web_app/pom.xml - Eclipse IDE

File Edit Navigate Search Project Run Design Window Help

Project Explorer App.java Web_app/pom.xml

```
29 <build>
30   <pluginManagement><!-- lock down plugins versions to avoid using Maven defaults (may be moved to parent pom) -->
31   <plugins>
32     <plugin>
33       <groupId>org.apache.maven.plugins</groupId>
34       <artifactId>maven-clean-plugin</artifactId>
35       <version>3.4.0</version>
36     </plugin>
37     <plugin>
38       <groupId>org.apache.maven.plugins</groupId>
39       <artifactId>maven-site-plugin</artifactId>
40       <version>3.8.0</version>
41     </plugin>
42     <plugin>
43       <groupId>org.apache.maven.plugins</groupId>
44       <artifactId>maven-project-info-reports-plugin</artifactId>
45       <version>3.6.1</version>
46       <configuration>
47         <reports>
48           <report>http://maven.apache.org/ref/current/maven-core/default-bindings.html#Plugin_bindings_for_jar_packaging</report>
49         </reports>
50       </configuration>
51     </plugin>
52     <plugin>
53       <groupId>org.apache.maven.plugins</groupId>
54       <artifactId>maven-compiler-plugin</artifactId>
55       <version>3.15.0</version>
56     </plugin>
57     <plugin>
58       <groupId>org.apache.maven.plugins</groupId>
59       <artifactId>maven-jar-plugin</artifactId>
60       <version>3.4.2</version>
61     </plugin>
62     <plugin>
63       <groupId>org.apache.maven.plugins</groupId>
64       <artifactId>maven-install-plugin</artifactId>
65       <version>3.1.2</version>
66     </plugin>
67     <plugin>
68       <groupId>org.apache.maven.plugins</groupId>
69       <artifactId>maven-deploy-plugin</artifactId>
70       <version>3.1.2</version>
71     </plugin>
72   </pluginManagement>
73
74   <reporting>
75     <plugins>
76       <plugin>
77         <groupId>org.apache.maven.plugins</groupId>
78         <artifactId>maven-project-info-reports-plugin</artifactId>
79       </plugin>
80     </plugins>
81   </reporting>
82 </build>
```

Overview Dependencies Dependency Hierarchy Effective POM pom.xml

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Practical 2

Aim: Installing and configuring the required platform for Google App Engine

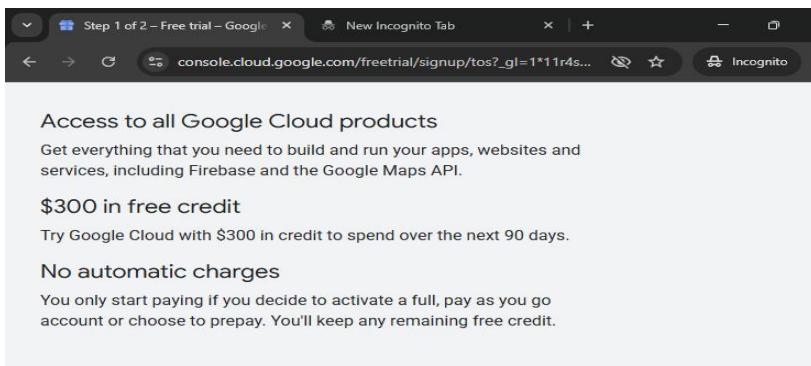
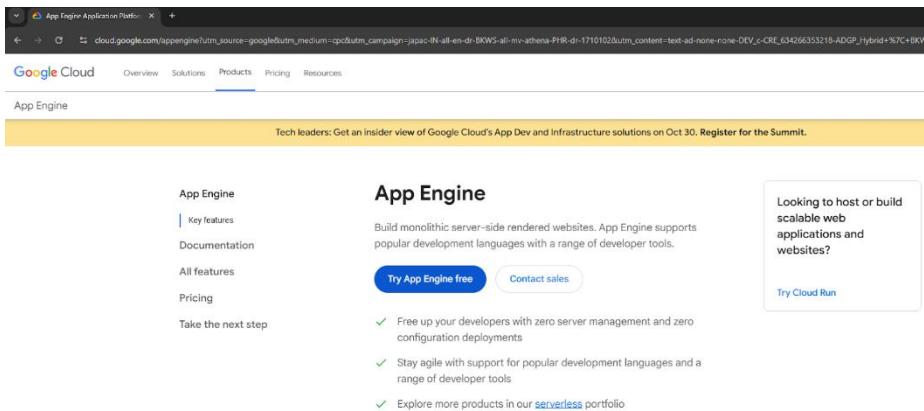
Implementation:

A. Making Google App Engine account

Open your google account and go to the following link

<https://cloud.google.com/appengine>

1. Click on Try App Engine free button

A screenshot of the 'Step 1 of 2 Account information' form. It shows a profile picture of Junaid Ansari, his email (junaidansari3198@gmail.com), and a 'Switch account' link. There is a 'Country' dropdown set to 'India'. Below the form, there is a terms of service agreement and an 'Agree & continue' button.

3. This page will appear, add country and choose other in describes and click Continue.

Step 2 of 2 – Free trial – Google Cloud

Access to all Google Cloud products
Get everything that you need to build and run your apps, websites and services, including Firebase and the Google Maps API.

\$300 in free credit
Try Google Cloud with \$300 in credit to spend over the next 90 days.

No automatic charges
You only start paying if you decide to activate a full, pay as you go account or choose to prepay. You'll keep any remaining free credit.

Step 2
We use payment methods you won't be charged until you start using Google Cloud.

Payments Create a payments profile
Your payment method Google Cloud will be used to pay for Google Cloud services.

Payment Add payment method
Please click here to add a payment method.

Start free

Create a payments profile

Only organisation profiles can have multiple users. If you select an individual profile, you agree that use of your profile is for your trade, business, craft or profession. In some countries, this selection affects your tax options. Your profile type can't be changed after signing up. [Learn more about payments profiles](#)

Profile type
Organisation

Organisation name
Organisation name is required

Legal name
Legal name required

Street address
Street address required

Apt, suite, etc. (optional)

Town/City
Town/City required

PIN code

State

[Cancel](#) [Create](#)

4. Add your card details (Visa or MasterCard only) and do the payment of Rs. 2 Fill this according to your purpose.

Step 2 of 2 – Free trial – Google Cloud

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Get everything that you need to build and run your apps, websites and services, including Firebase and the Google Maps API.

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Scan QR code to use UPI

Google Cloud
Complete this action within 4:57

Instructions
Scan this QR code using any of the 50+ UPI apps.
Paytm Paytm Paytm
Approve UPI AutoPay in the app. This isn't a charge. You'll only be charged for your usage if you activate a full account.

[Cancel](#)

5. Now click start for free

Step 2 of 2 – Free trial – Google Cloud

Access to all Google Cloud products
Get everything that you need to build and run your apps, websites and services, including Firebase and the Google Maps API.

\$300 in free credit
Try Google Cloud with \$300 in credit to spend over the next 90 days.

No automatic charges
You only start paying if you decide to activate a full, pay as you go account or choose to prepay. You'll keep any remaining free credit.

Try Google Cloud for free

Step 2
We use payment methods you won't be charged until you start using Google Cloud.

Payments Create a payments profile
Your payment method Google Cloud will be used to pay for Google Cloud services.

Payment Add payment method
Available payment methods are based on your currency (INR) and payment setting. [Learn more about payment methods](#)

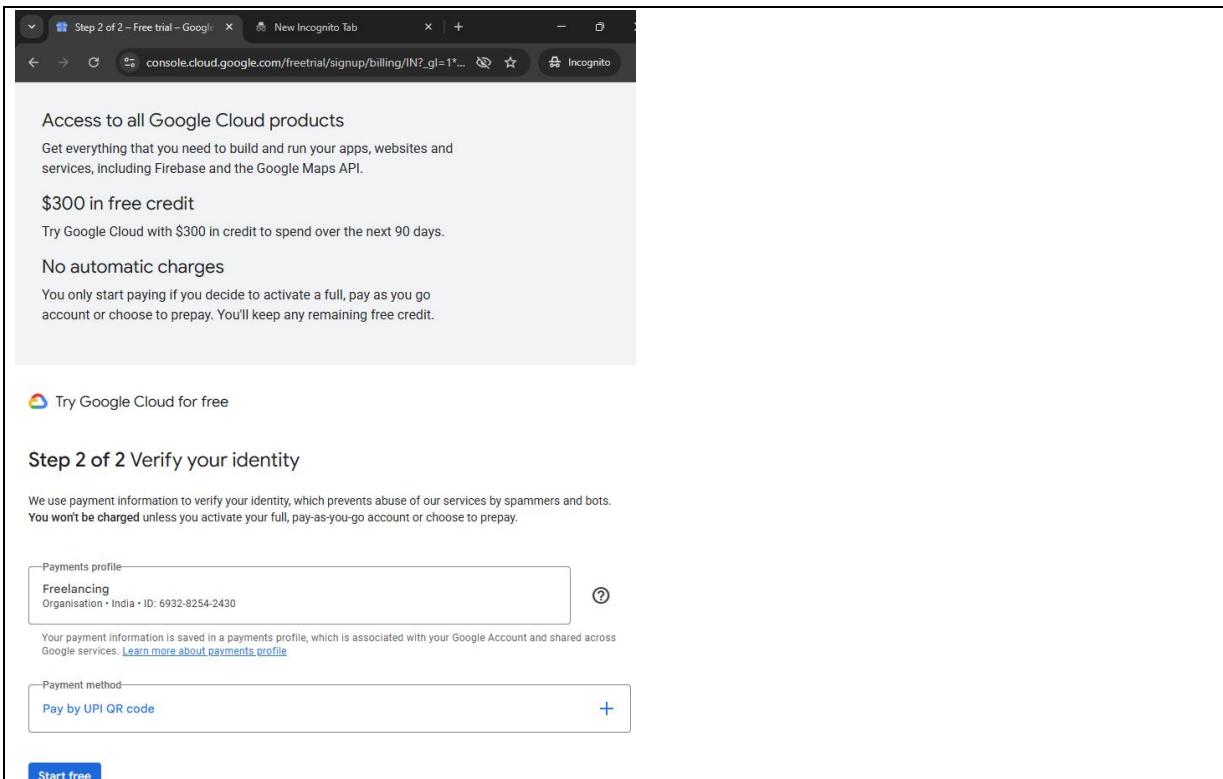
Add payment method

Add credit or debit card

Pay by UPI QR code

Pay with NetBanking

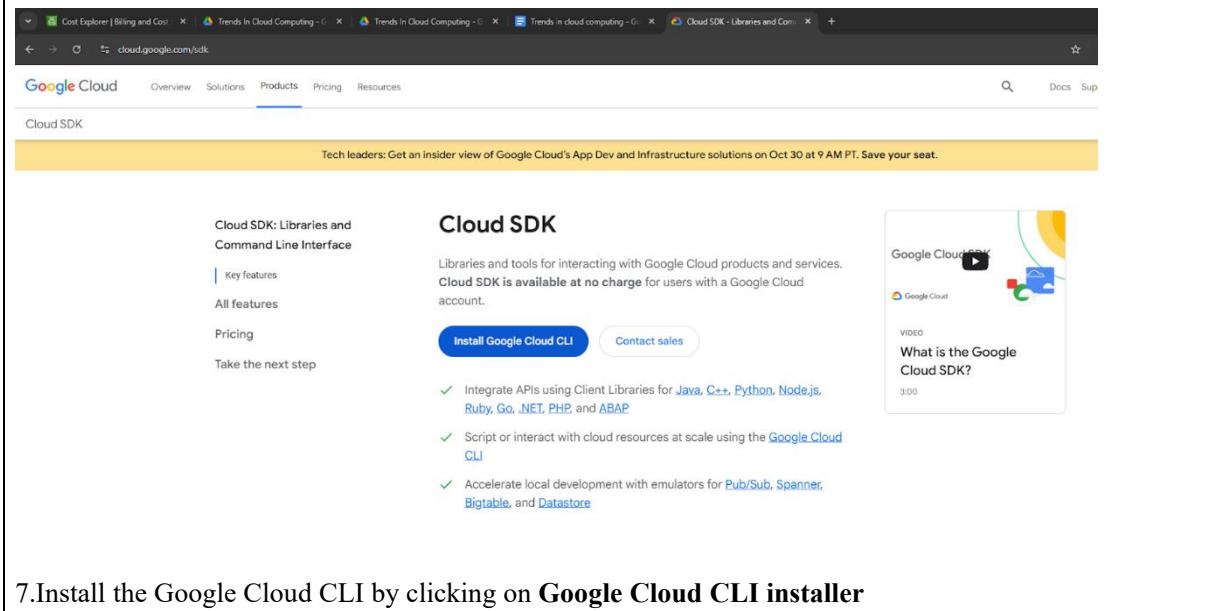
[Cancel](#)

A screenshot of a web browser showing the "Step 2 of 2 – Free trial" page. The URL is console.cloud.google.com/freetrial/signup/billing/IN7_gI=1*. The page displays information about Google Cloud products, \$300 in free credit, and no automatic charges. It also shows a "Try Google Cloud for free" button. Below this, the "Step 2 of 2 Verify your identity" section is shown, which includes fields for "Payments profile" (set to "Freelancing") and "Payment method" (set to "Pay by UPI QR code"). A "Start free" button is at the bottom.

After all procedure we will get,

B. Using GAE account, to download Google Cloud SDK.

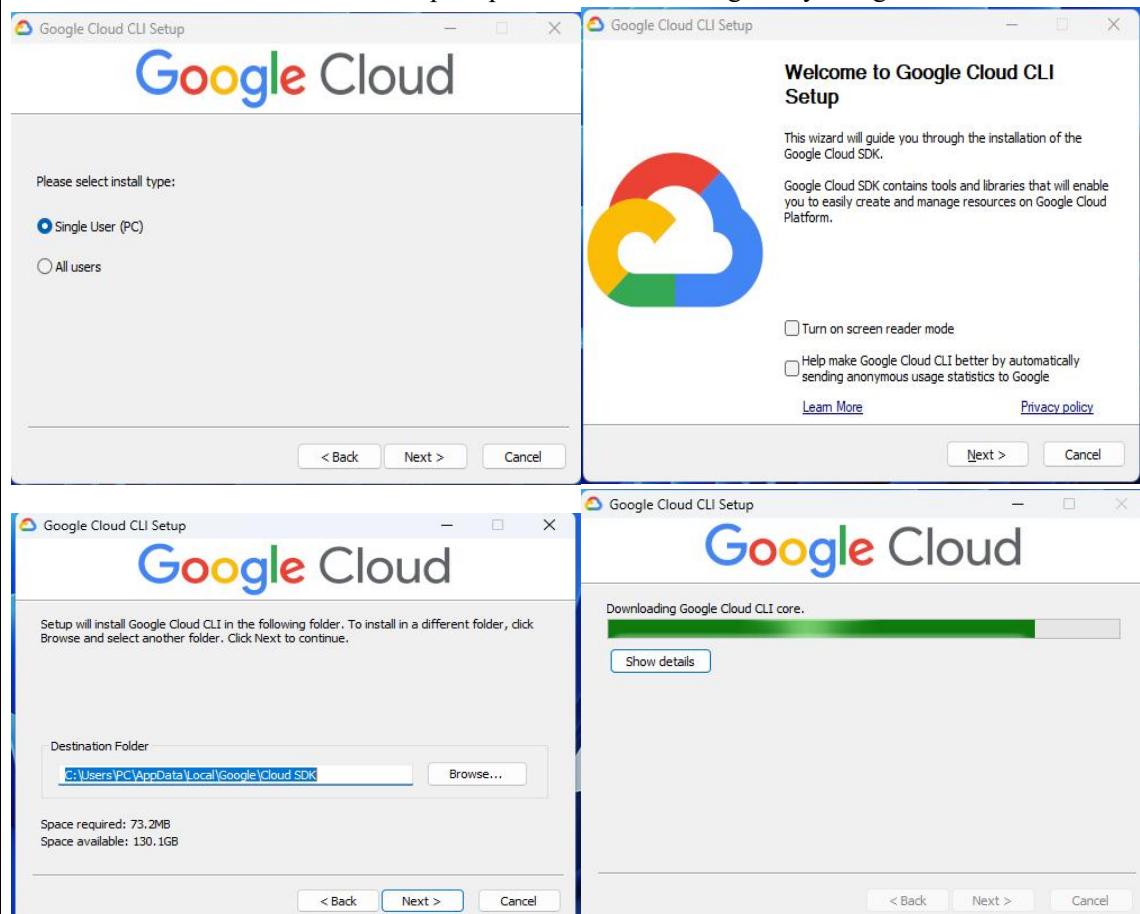
6.Go to google and search **google cloud sdk**, go to site <https://cloud.google.com/sdk> then Get Started.

A screenshot of the "Cloud SDK - Libraries and Command Line Interface" page on Google Cloud. The URL is cloud.google.com/sdk. The page features a "Cloud SDK" section with a "Cloud SDK: Libraries and Command Line Interface" heading. It includes links for "Key features", "All features", "Pricing", and "Take the next step". A "Install Google Cloud CLI" button is prominent. To the right, there's a video player titled "What is the Google Cloud SDK?" with a duration of 3:00. The page also includes a "Tech leaders: Get an insider view of Google Cloud's App Dev and Infrastructure solutions on Oct 30 at 9 AM PT. Save your seat." banner.

The screenshot shows a web browser displaying the Google Cloud SDK documentation at cloud.google.com/sdk/docs/install-sdk. The main content is titled "Installing the latest gcloud CLI version (521.0.0)". It includes a note about proxy/firewall settings and steps for Windows users. A PowerShell command is provided for download:

```
(New-Object Net.WebClient).DownloadFile("https://dl.google.com/dl/cloudsdk/channels/rapid/ & $env:Temp\GoogleCloudSDKInstaller.exe")
```

8.Launch the installer and follow the prompts. The installer is signed by Google LLC.



After installing it will ask for log in as shown.

```
Welcome to the Google Cloud CLI! Run "gcloud -h" to get the list of available commands.
Welcome! This command will take you through the configuration of gcloud.

Your current configuration has been set to: [default]
You can skip diagnostics next time by using the following flag:
  gcloud init --skip-diagnostics

Network diagnostic detects and fixes local network connection issues.
Checking network connection...done.
Reachability Check passed.
Network diagnostic passed (1/1 checks passed).

You must sign in to continue. Would you like to sign in (Y/n)? y
Your browser has been opened to visit:

  https://accounts.google.com/o/oauth2/auth?response_type=code&client_id=32555940559.ap
ps.googleusercontent.com&redirect_uri=http%3A%2Flocalhost%3A8085%2F&scope=openid+https%
3A%2Fwww.googleapis.com%2Fauth%2Fuserinfo.email+https%3A%2Fwww.googleapis.com%2Fa
uth%2Fcloud-platform+https%3A%2Fwww.googleapis.com%2Fauth%2Fappengine.admin+https%3A%2F
%2Fwww.googleapis.com%2Fauth%2Fsqlservice.login+https%3A%2F%2Fwww.googleapis.com%2Fauth%2
Fcomputehttp%3A%2Fwww.googleapis.com%2Fauth%2Faccounts.reauth&state=9pDJXgsVqTgxREyg
ewW8r6mAVqZ6&access_type=offline&code_challenge=078eavcmo2r0sibaAizTFbQWhl1abKphXVCn2o
a23s&code_challenge_method=S256

You are signed in as: [junaidalam3198@gmail.com].
Pick cloud project to use:
[1] ardent-time-422911-r0
[2] hallowed-name-458512-aul
[3] learned-alcove-422911-g7
[4] pacific-plating-458711-i5
[5] videocall-16bbbb
[6] Enter a project ID
[7] Create a new project
Please enter numeric choice or text value (must exactly match list item): 5

Your current project has been set to: [videocall-16bbbb].
```

Select 8 from it, close this and open Google Cloud SDK Shell. It will look like: Add the installer path in system

```
You are signed in as: [junaidalam3198@gmail.com].
Pick cloud project to use:
[1] ardent-time-422911-r0
[2] hallowed-name-458512-aul
[3] learned-alcove-422911-g7
[4] pacific-plating-458711-i5
[5] videocall-16bbbb
[6] Enter a project ID
[7] Create a new project
Please enter numeric choice or text value (must exactly match list item): 5

Your current project has been set to: [videocall-16bbbb].
```

Not setting default zone/region (this feature makes it easier to use [gcloud compute] by setting an appropriate default value for the zone and region flag). See <https://cloud.google.com/compute/docs/gcloud-compute> section on how to set default compute region and zone manually. If you would like [gcloud init] to be able to do this for you the next time you run it, make sure the Compute Engine API is enabled for your project on the <https://console.developers.google.com/apis> page.

Created a default .boto configuration file at [C:\Users\PC\.boto]. See this file and [\[https://cloud.google.com/storage/docs/gsutil/commands/config\]](https://cloud.google.com/storage/docs/gsutil/commands/config) for more information about configuring Google Cloud Storage. The Google Cloud CLI is configured and ready to use!

* Commands that require authentication will use junaidalam3198@gmail.com by default
* Commands will reference project 'videocall-16bbbb' by default
Run 'gcloud help config' to learn how to change individual settings

This gcloud configuration is called [default]. You can create additional configurations if you work with multiple accounts and/or projects.
Run 'gcloud topic configurations' to learn more.

Some things to try next:

- * Run 'gcloud --help' to see the Cloud Platform services you can interact with. And run 'gcloud help COMMAND' to get help on any gcloud command.
- * Run 'gcloud topic --help' to learn about advanced features of the CLI like arg files and output formatting
- * Run 'gcloud cheat-sheet' to see a roster of go-to 'gcloud' commands.

C:\Users\PC\AppData\Local\Google\Cloud SDK>

```
C:\Users\PC\AppData\Local\Google\Cloud SDK>gcloud components install app-engine-java

Restarting command:
$ gcloud components install app-engine-java

C:\Users\PC\AppData\Local\Google\Cloud SDK>
```

```
[cmd] cmd.exe /c ""C:\Users\PCVAp + ~
Your current Google Cloud CLI version is: 521.0.0
Installing components from version: 521.0.0

+-----+
| These components will be installed. |
+-----+
| Name | Version | Size |
+-----+
| Cloud Datastore Emulator | 2.3.1 | 36.2 MiB |
| gRPC Python library (Platform Specific) | 1.70.6 | 4.0 MiB |
| gcloud app Java Extensions | 2.0.35 | 118.9 MiB |
| gcloud app Python Extensions | 1.9.114 | 3.8 MiB |
+-----+

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

Once started, canceling this operation may leave your SDK installation in an inconsistent state.

Do you want to continue (Y/n)? y
Performing in place update...

=====#
#= Downloading: Cloud Datastore Emulator      =
#= Downloading: gRPC Python library           =
#= Downloading: gRPC Python library (Platform Specific) =
#= Downloading: gcloud app Java Extensions   =
#= Downloading: gcloud app Python Extensions =
#= Installing: Cloud Datastore Emulator       =
#= Installing: gRPC Python library             =
#= Installing: gRPC Python library (Platform Specific) =
#= Installing: gcloud app Java Extensions     =
#= Installing: gcloud app Python Extensions   =

Performing post processing steps...done.
Update done!
Press any key to continue . . .
```

Practical 3

Aim: Studying the features of the GAE PaaS model.

Platform as a Service (PaaS) – What is it?

PaaS is a category of cloud computing services that provide a computing platform and a solution stack as a service.

Along with software as a service (SaaS) and infrastructure as a service (IaaS), it is a service model of cloud computing. In this model, the consumer creates the software using tools and/or libraries from the provider/vendor. The consumer also controls software deployment and configuration settings.

The provider provides the networks, servers, storage and other services. PaaS offerings facilitate the deployment of applications without the cost and complexity of buying and managing the underlying hardware and software and provisioning hosting capabilities.

PaaS Key Features

1. Services to develop, test, deploy, host and maintain applications in the same integrated development environment
2. Web-based management/administration consoles
 - ✓ Reducing the need for system administration/dev ops
 - ✓ Resource utilization monitoring capabilities
 - ✓ Easily identify bottlenecks
 - ✓ Multi-tenant architecture
 - ✓ Certain PaaS offerings attempt to support use of the application by many concurrent users, by providing concurrency management, scalability, fail-over and security
 - ✓ Support for development team collaboration
 - ✓ Pay for what you use billing model

PaaS – Popular offerings

Heroku

One of the first cloud platforms, has been in development since June 2007, when it supported only the Ruby programming language, but has since added support for Java, Node.js, Scala, Clojure, Python and (undocumented) PHP

Windows Azure

Microsoft's cloud computing platform used to build, deploy and manage applications through a global network of Microsoft-managed datacenters

dotCloud

Founded in 2008 by Solomon Hykes, dotCloud is the first application platform designed from the ground up for modern service-oriented development

Cloud Foundry

Developed by VMware released under the terms of the Apache License 2.0

Primarily written in Ruby

AppCloud runs on Cloud Foundry

Since it is open sourced, ActiveState has created a commercial distribution of the Cloud Foundry software for enterprises to host their own private PaaS

Engine Yard

A San Francisco, California based, privately held platform as a service company focused on Ruby on Rails and PHP, and recently announced support for Node.js deployment and management

Google App Engine (often referred to as GAE or simply App Engine, and also used by the acronym GAE/J)

A cloud computing platform for developing and hosting web applications in Google-managed data centers

Applications are sandboxed and run across multiple servers

Offers automatic scaling for web applications—as the number of requests increases for an application, App Engine automatically allocates more resources for the web application to handle the additional demand

Is free up to a certain level of consumed resources. Fees are charged for additional storage, bandwidth, or instance hours required by the application

First released as a preview version in April 2008, and came out of preview in September 2011

What is Google App Engine?

Google App Engine lets you run web applications on Google's infrastructure. App Engine applications are easy to build, easy to maintain, and easy to scale as your traffic and data storage needs grow. With App Engine, there are no servers to maintain: You just upload your application, and it's ready to serve your users.

The Application Environment

Google App Engine makes it easy to build an application that runs reliably, even under heavy load and with large amounts of data. App Engine includes the following features:

Dynamic web serving, with full support for common web technologies

Persistent storage with queries, sorting and transactions

Automatic scaling and load balancing

APIs for authenticating users and sending email using Google Accounts

A fully featured local development environment that simulates Google App Engine on your computer

Your application can run in one of three runtime environments: the Go environment, the Java environment, and the Python environment, which gives you a choice of Python 2.5 or Python 2.7.

Why App Engine?

Pros

Easy to Get Started

Automatic Scalability

The Reliability, Performance, and Security of Google's Infrastructure

Costs less

There is a generous free usage quota and you only pay for what you use

Cons

Sandboxed environment limits the scope of your application

Although we can pay for certain additional resources, there are some that have a hard limit

Traditional Way

Write your code...

1. Configure & Deploy Web server (Apache/Tomcat)
2. Configure & Deploy SQL database
3. Maintain all of these infrastructure
4. Cost of building and maintaining the infrastructure

App Engine Way

5. Write your code
6. A set of simple configurations to let App Engine know how to serve your application

Tools Bundled with the SDK

- Development Server
- Uploading and Managing an App
- Uploading and Downloading Data
- ProtoRPC
- webapp Framework
- Local Unit Testing
- Appstats

Included Libraries (Python 2.5)

Django, PyCrypto, YAML, zipimport

Included Libraries (Python 2.7)

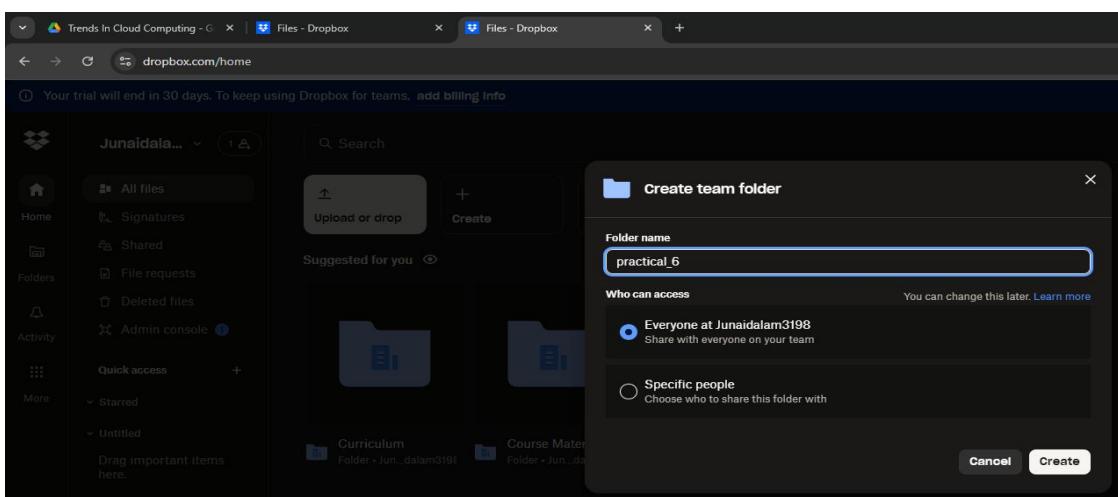
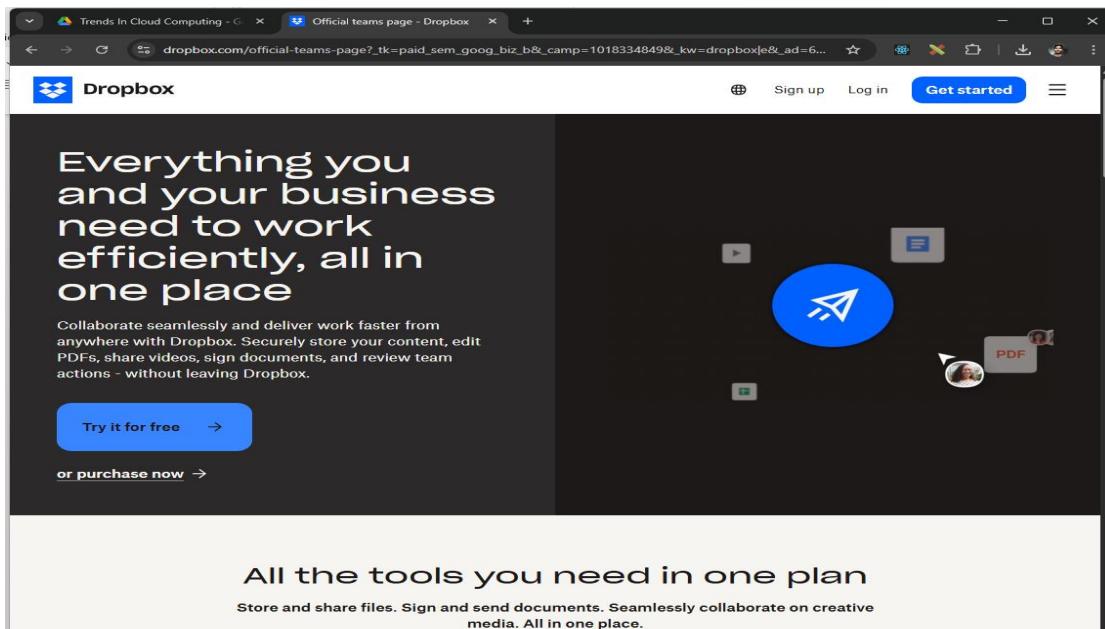
Jinja2, PIL, webapp2, etc

Practical 4

Aim: Creating an application in Dropbox to store data securely. Develop a source code using Dropbox API for updating and retrieving files.

Implementation:

1. Go to <https://www.dropbox.com/> and create an account. You can sign in with your Google account.
2. Click on **Continue with 2 GB Dropbox Basic plan** at the end of the page. Create a ‘Prac6’ folder.



- Go to <https://www.dropbox.com/developers> and click on **Create app**.
- Click on generate, copy the generated access token and App key into a notepad file for later use.

DBX Platform

Develop apps for 700 million Dropbox users

Whether you're building your business or optimizing internal workflows, the DBX Platform lets you add Dropbox features to your apps, such as file storage, sharing, previews, and search.

[Create apps](#) →
 Or click here to view documentation →



Get started today with a few lines of code

Create a new app on the DBX Platform

1. Choose an API

Scopred access NEW
 Select the level of access your app needs to Dropbox data. [Learn more](#)
2. Choose the type of access you need

App folder – Access to a single folder created specifically for your app.
 Full Dropbox – Access to all files and folders in a user's Dropbox.
3. Name your app

cloud_app

I agree to [Dropbox API Terms and Conditions](#)

[Create app](#)

cloud_app_for_trends_in_cloud_computing

Settings Permissions Branding Analytics

Creating a Dropbox app

- Configure app settings
Name your app and choose initial settings.
- Select access scopes
Choose the access scopes, or specific permissions, that your app needs to interact with Dropbox. We recommend starting small and adding more permissions later if you need them. [Get started](#)
- Add branding
Give your users important information about your Dropbox app. Should comply with the Dropbox developer branding guide. [Get started](#)

Status	Development	Apply for production
Development users	Only you	Enable additional users
Permission type	Scopred App (App Folder) <small>(i)</small>	
App folder name	cloud_app_for_trends_in_cloud_computing	Change
App key	1ejv7cdnd4skun5	Show
App secret		

Scopes App (App Folder) [Change](#)

App folder name: cloud_app_for_trends_in_cloud_computing

App key: ieJv7cdnd4skun5

App secret: Show

OAuth 2.

Redirect URIs

https:// (http allowed for localhost) [Add](#)

Allow public clients (Implicit Grant & PKCE) [Allow](#)

Generated access token [Generate](#)

Chooser / Saver / Embedder domains

example.com [Add](#)

If using the Chooser, the Saver, or the Embedder on a website, add the domain of that site.

Webhooks

Webhook URIs [Add](#)

https:// [Add](#)

[Delete app](#)

Go to permissions and check all the following boxes. After that click on submit.

Collaboration

Permissions that allow your app to view and manage sharing and collaboration settings

<input checked="" type="checkbox"/> sharing.write	View and manage your Dropbox sharing settings and collaborators
<input type="checkbox"/> sharing.read	View your Dropbox sharing settings and collaborators
<input checked="" type="checkbox"/> file_requests.write	View and manage your Dropbox file requests
<input type="checkbox"/> file_requests.read	View your Dropbox file requests
<input checked="" type="checkbox"/> contacts.write	View and manage your manually added Dropbox contacts
<input type="checkbox"/> contacts.read	View your manually added Dropbox contacts

OpenID Scopes

Scopes used for OpenID Connect.
At this time, team-scoped apps **cannot** request OpenID Connect scopes.
OpenID scopes must be explicitly set in the "scope" parameter on /oauth2/authorize to be requested.

Connect

Permissions that allow your app to access user login info

<input checked="" type="checkbox"/> profile	Read basic profile info
<input type="checkbox"/> openid	Required for OpenID Connect flow
<input checked="" type="checkbox"/> email	Read basic email info

cloud_app_for_trends_in_cloud_computing

[Settings](#) [Permissions](#) [Branding](#) [Analytics](#)

Individual Scopes Individual scopes include the ability to view and manage a user's files and folders. [View Documentation](#)

Account Info

Permissions that allow your app to view and manage Dropbox account info

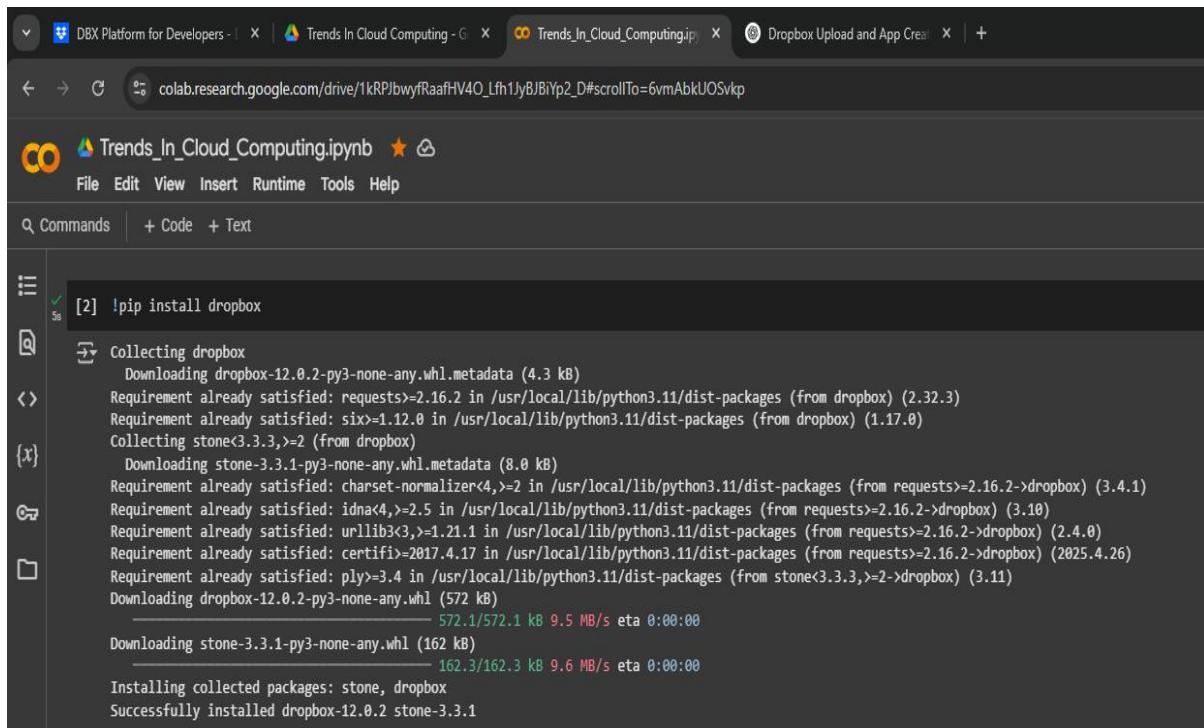
<input checked="" type="checkbox"/> account_info.write	View and edit basic information about your Dropbox account such as your profile photo
<input type="checkbox"/> account_info.read	View basic information about your Dropbox account such as your username, email, and country

Files and folders

Permissions that allow your app to view and manage files and folders

<input checked="" type="checkbox"/> files.metadata.write	View and edit information about your Dropbox files and folders
<input type="checkbox"/> files.metadata.read	View information about your Dropbox files and folders
<input checked="" type="checkbox"/> files.content.write	Edit content of your Dropbox files and folders
<input checked="" type="checkbox"/> files.content.read	View content of your Dropbox files and folders

Go to <https://colab.research.google.com/>, create a new notebook and write the following code. Create a notepad file with some texts, upload it to dropbox folder 'Prac6'.



```
[2] !pip install dropbox
Collecting dropbox
  Downloading dropbox-12.0.2-py3-none-any.whl.metadata (4.3 kB)
Requirement already satisfied: requests>=2.16.2 in /usr/local/lib/python3.11/dist-packages (from dropbox) (2.32.3)
Requirement already satisfied: six>=1.12.0 in /usr/local/lib/python3.11/dist-packages (from dropbox) (1.17.0)
Collecting stone<3.3.3,>=2 (from dropbox)
  Downloading stone-3.3.1-py3-none-any.whl.metadata (8.0 kB)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.11/dist-packages (from requests>=2.16.2->dropbox) (3.4.1)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.11/dist-packages (from requests>=2.16.2->dropbox) (3.18)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.11/dist-packages (from requests>=2.16.2->dropbox) (2.4.0)
Requirement already satisfied: certifi=>2017.4.17 in /usr/local/lib/python3.11/dist-packages (from requests>=2.16.2->dropbox) (2025.4.26)
Requirement already satisfied: ply>=3.4 in /usr/local/lib/python3.11/dist-packages (from stone<3.3.3,>=2->dropbox) (3.11)
  Downloading dropbox-12.0.2-py3-none-any.whl (572 kB)
    572.1/572.1 kB 9.5 MB/s eta 0:00:00
  Downloading stone-3.3.1-py3-none-any.whl (162 kB)
    162.3/162.3 kB 9.6 MB/s eta 0:00:00
Installing collected packages: stone, dropbox
Successfully installed dropbox-12.0.2 stone-3.3.1
```

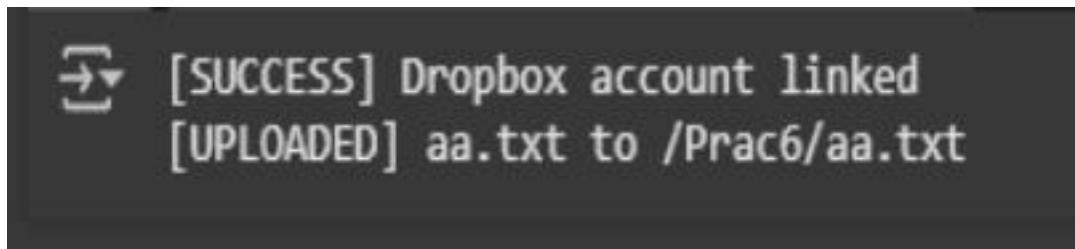
```
import dropbox
dropbox_access_token='Enter you own oauth token' # Enter your own access token
# Create and write to a file named 'aa.txt' in current working directory
file_name = "aa.txt"
with open(file_name, "w") as f:
    f.write("This is a sample text for Dropbox upload.")

# Define the Dropbox path (remote path)
dropbox_path = f"/Prac6/{file_name}" # Automatically matches file name

# Connect to Dropbox and upload the file
client = dropbox.Dropbox(dropbox_access_token)
print("[SUCCESS] Dropbox account linked")

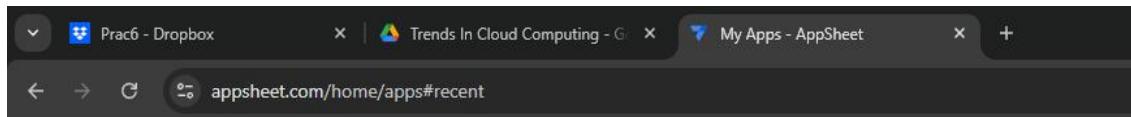
with open(file_name, "rb") as f:
    client.files_upload(f.read(), dropbox_path, mode=dropbox.files.WriteMode.overwrite)

print(f"[UPLOADED] {file_name} to {dropbox_path}")
```



7. Go to <https://www.exceldemystified.com/learn-excel/sample-data/> get your data sample from here and also upload the excel file in dropbox folder ‘Prac6’.

8. Go to <https://about.appspot.com/home/> sign in with Google. Create a new app. Choose the sample for the data.



AppSheet

Create

Recent (2) Apps Databases

- App Start with existing data
- Database Start with a template
- Owned by me Blank app
- Templates

Prac6 - Dropbox Trends In Cloud Computing - G My Apps - AppSheet

appsheets.com/home/apps#recent

AppSheet

Create

Recent (2) Apps Databases

Recent

Shared with me Simple Inventory

Owned by me IT Ticketing

Templates

Create a new app

App name: Simple Inventory

Category: Inventory Management

Cancel Choose your data

Select data source

- AppSheet Database
- Google Sheets junaidalam3198@gmail.com + google
- Google Forms junaidalam3198@gmail.com + google
- Dropbox junaidalam3198@gmail.com + dropbox-1

+ New source

← Choose a Sheet/Table

X

- > Administrative
- > Course Materials
- > Curriculum
- ✓ Junaid Alam
 - ✓ Apps
 - ✓ cloud_app_for_trends_in_cloud_computing
 - ✓ Prac6
 - Inventory-Records-Sample-Data.xlsx
- > Junaidalam3198 Team Folder

The screenshot shows a mobile application interface for managing inventory records. At the top, there are three icons: a square, a rectangle, and a circle. To the right of these are a blue switch labeled "Edit", a magnifying glass icon, a checkmark icon, and a refresh/circular arrow icon.

The main area displays a list of items:

Item Name	SKU	Action
Anti-Glare Screen Protector	SP141	trash edit
Cable Management Kit	SP134	trash edit
CPU	SP123	trash edit
CPU Cooler	SP130	trash edit
Desk Chair	SP111	trash edit
Desk Lamp	SP112	trash edit

At the bottom of the list, there is a blue button with a white plus sign (+). Below the list, the text "Inventory Records Data" is visible.

Application Created with the drop box excel data.

Practical 5

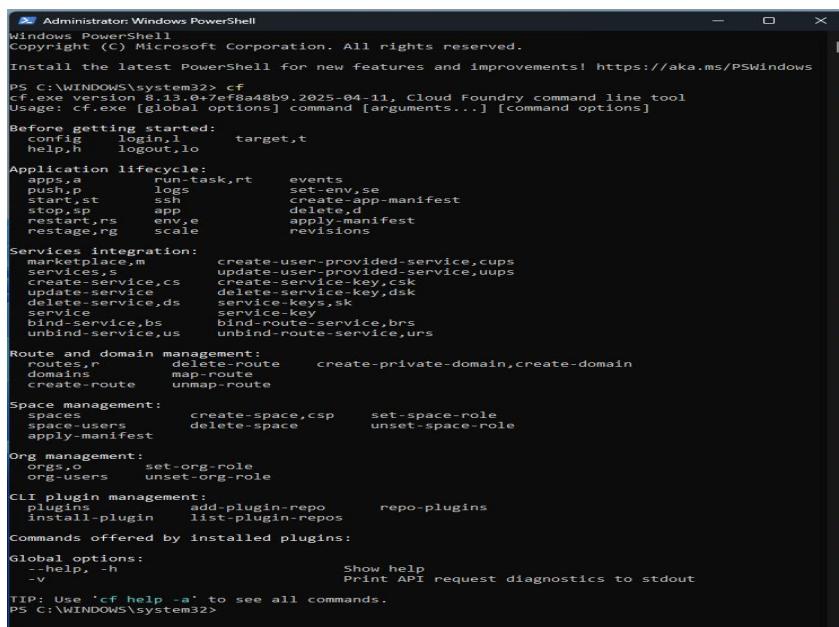
Aim: Installing Cloud Foundry in localhost and exploring CF commands

Implementation:

1. Installing Windows Powershell for CloudFoundry from github link.

<https://github.com/cloudfoundry/cli/releases>

2, Install the file and set a system path. Then open the Windows Powershell. Type >cf to check, and if you're getting the information regarding CF, then you've successfully installed it.



```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows
PS C:\WINDOWS\system32> cf
cf.exe version 8.13.0+7ef8a48b9.2025-04-11, Cloud Foundry command line tool
Usage: cf.exe [global options] command [arguments...] [command options]

Before getting started:
  config      login,1      target,t
  help,h      logout,lo

Application lifecycle:
  apps,a    run-task,rt   events
  deploy,d  logs          start-app,sa
  start,sts  ssh           create-app-manifest
  stop,sp   app           delete,d
  restart,rs env,e        apply-manifest
  restage,rg scale         revisions

Services integration:
  mk-service,m create-user-provided-service,cups
  services,s  update-user-provided-service,uups
  create-service,cs create-service-key,csk
  update-service delete-service-key,dsk
  unbind-service,ds start-service,ssk
  service      service-key
  bind-service,bs bind-route-service,brs
  unbind-service,us unbind-route-service,urs

Route and domain management:
  routes,r   delete-route  create-private-domain,create-domain
  domains,d  map-route     map-route
  create-route unmap-route

Space management:
  spaces,s   create-space,csp  set-space-role
  space-users delete-space   unset-space-role
  apply-manifest

Org management:
  orgs,o    set-org-role
  org-users unset-org-role

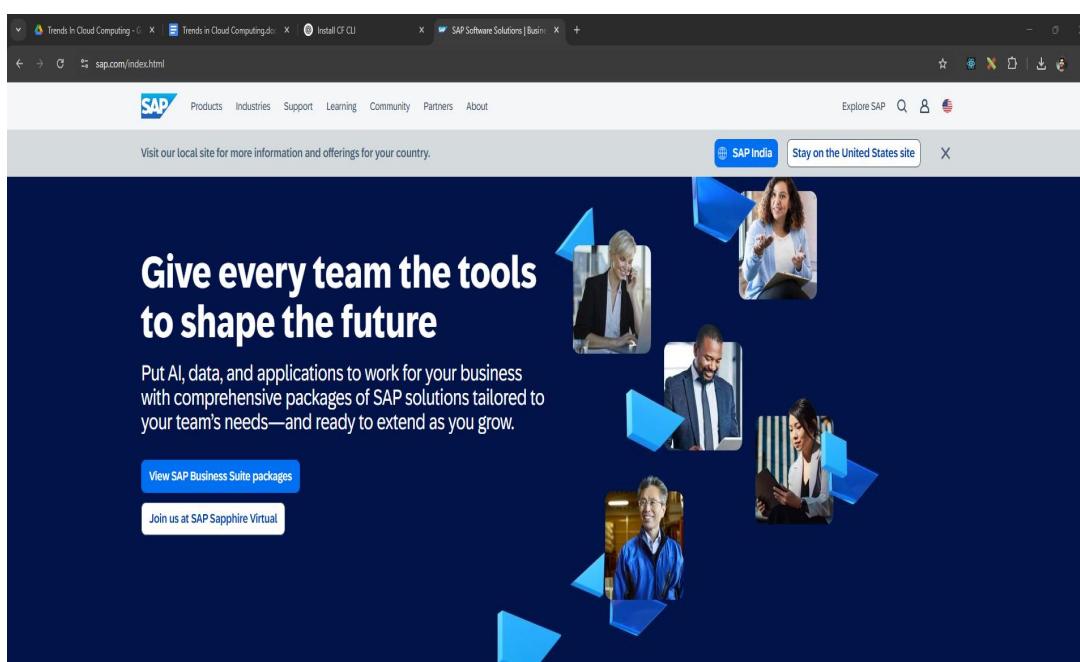
CLI plugin management:
  plugins    add-plugin-repo  repo-plugins
  install-plugin list-plugin-repos

Commands offered by installed plugins:

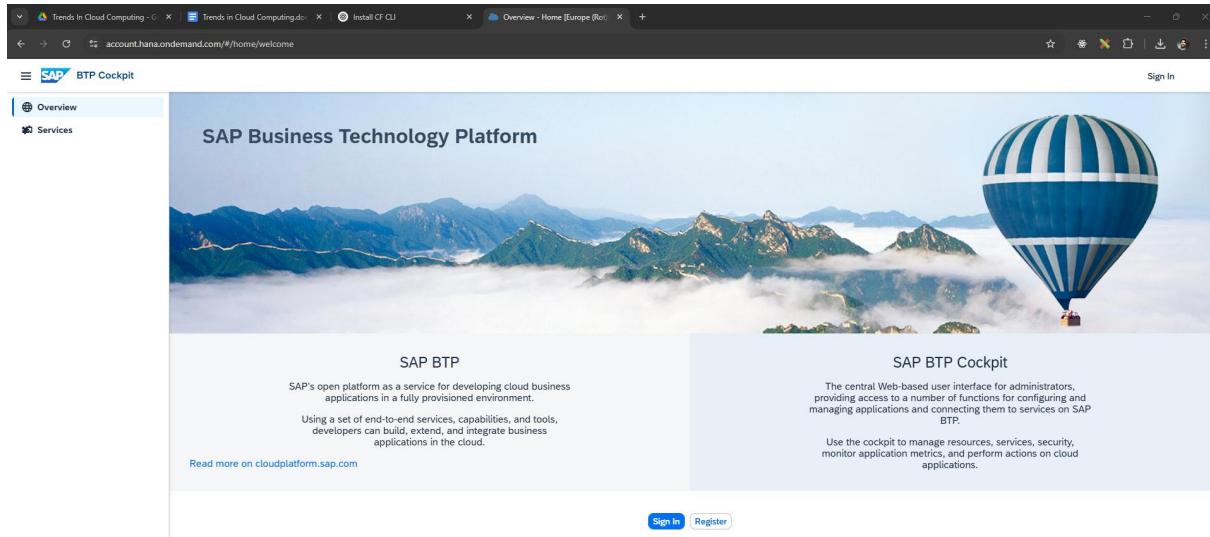
Global options:
  -help, -h           Show help
  -v                  Print API request diagnostics to stdout
TIP: Use 'cf help -a' to see all commands.
PS C:\WINDOWS\system32>
```

Exploring Commands

Register to SAP account for cloud foundry runtime. <https://www.sap.com/india/account.html>

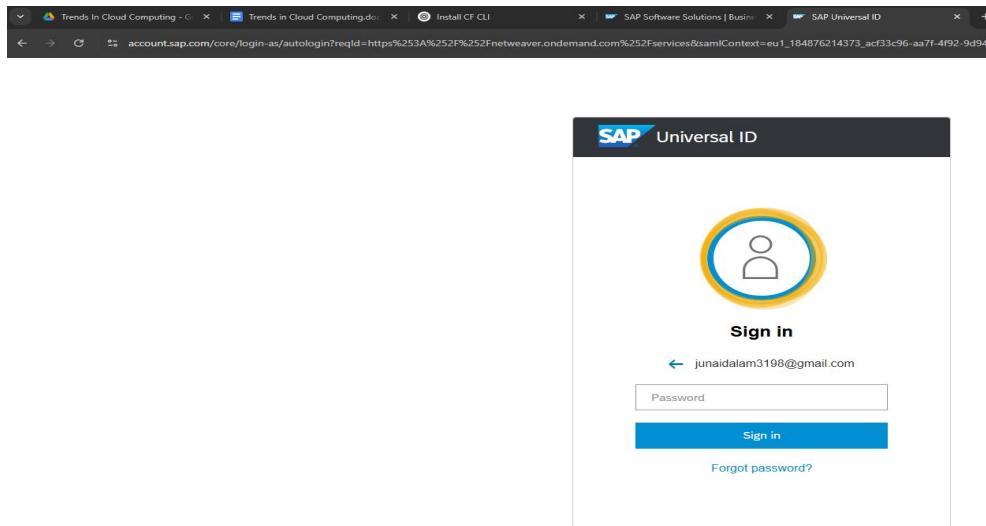


3. Link your SAP account to SAP Universal ID then go to
<https://account.hana.ondemand.com/#/home/welcome>



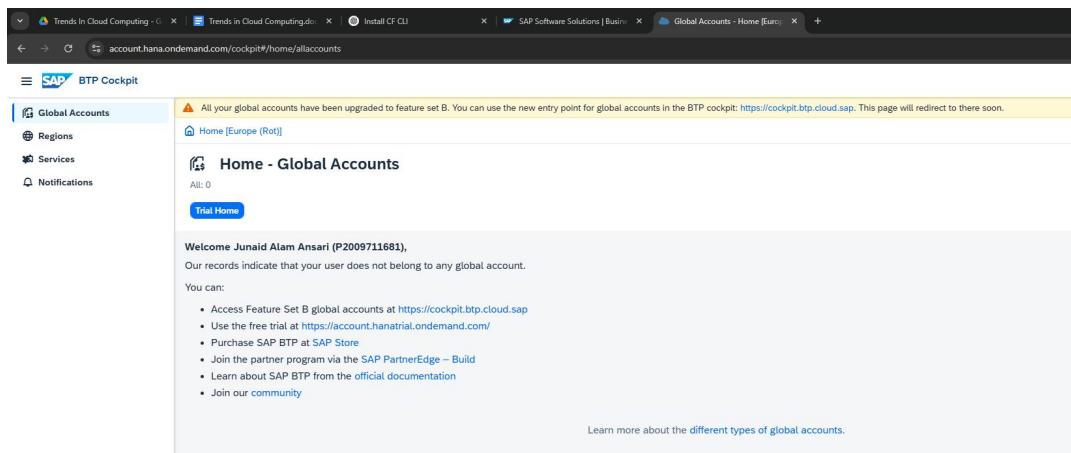
The screenshot shows the SAP BTP Cockpit interface. At the top, there's a navigation bar with tabs like Overview, Services, and a sign-in button. The main content area features a large image of a hot air balloon over mountains. Below the image, there are two sections: 'SAP BTP' and 'SAP BTP Cockpit'. The SAP BTP section describes it as an open platform for developing cloud business applications. The SAP BTP Cockpit section provides a brief overview of its functions. At the bottom right, there are 'Sign In' and 'Register' buttons.

4. Now sign in using SAP Universal ID.



The screenshot shows the SAP Universal ID sign-in page. It features a large yellow circular icon with a person icon inside. Below the icon, the word 'Sign in' is centered. To the left of the icon, there's a back arrow and the email address 'junaidalam3198@gmail.com'. Below the email is a password input field and a blue 'Sign in' button. To the right of the button is a 'Forgot password?' link.

5. Following page will open



The screenshot shows the 'Home - Global Accounts' page. A message at the top states that all global accounts have been upgraded to feature set B and provides a link to the BTP cockpit. The main content area displays a welcome message for 'Junaid Alam Ansari (P2009711681)' and a note that the user does not belong to any global account. It lists several actions one can take, such as accessing Feature Set B global accounts or purchasing SAP BTP. At the bottom, there's a link to learn more about different types of global accounts.

6. Now click on Trial home following page will appear.

The screenshot shows the "Welcome to SAP BTP Trial" page. At the top, there is a banner with the text "Learn how to create and deploy cloud apps and gain access to a comprehensive set of platform services." Below the banner is a button labeled "Go To Your Trial Account".

Under the banner, there is a section titled "Quick Tool Access" with three items:

- SAP Business Application Studio: Develop business applications using SAP's next-generation, Web-based IDE.
- CLI for BTP: Manage your trial account using the command-line interface.
- APIs for SAP BTP: Manage, build, and extend the core capabilities of SAP BTP.

Below this is a section titled "Start with Tutorials" containing three cards:

- Jump Start Your SAP HANA Cloud, SAP HANA Database Data and Analytics: Beginner, 1h 50m, Open Tutorial.
- Build an SAP Fiori Elements App Using the ABAP RESTful Application Programming Model (RAP) Application Development: Beginner, 1h 25m, Open Tutorial.
- Connectivity to Non-SAP Applications Using SAP Integration Suite Integration: Beginner, 1h 50m, Open Tutorial.

7. Now click on **Go To Your Trial Account**. This page will look like following window

The screenshot shows the "Global Account: dcbf29b1trial - Account Explorer" page. The left sidebar includes sections for Account Explorer, Resource Providers, Boosters, System Landscape, Entitlements, Security, and Usage. The main area displays the "Subaccounts (1)" tab, showing a single subaccount named "trial" with details: Environment: Multi-Environment, Provider: Microsoft Azure, Region: Singapore, and Changed On: 21 May 2025, 09:14:02 ...

8. Now create a sub account I have named it **trial**. Click on subaccount **trial**. Following page will appear

The screenshot shows the "Subaccount: trial - Overview" page. The left sidebar includes sections for Overview, Services, Cloud Foundry, HTML Applications, Connectivity, Security, Entitlements, and Usage Analytics. The main area displays the "General" tab, showing the following details:

Subdomain:	dcbf29b1trial
Tenant ID:	2ccb4388-888e-4cd0-bb00-9525ffa2737a
Region:	Singapore
Environment:	Multi-Environment

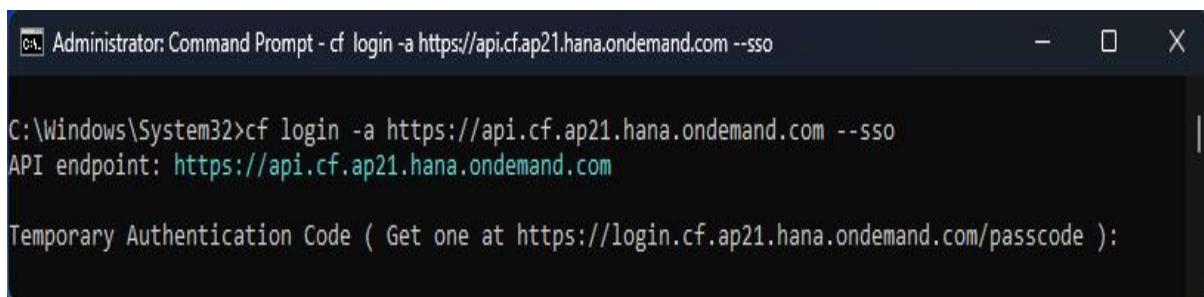
Below this, the "Cloud Foundry Environment" section shows:

- API Endpoint: <https://api.cf.ap21.hana.ondemand.com>
- Org Name: **dcbf29b1trial**
- Org ID: **7cde8d11-10af-4052-b22b-43747c69f617**
- Org Memory Limit: **4,096MB**

At the bottom right, there is a "Spaces (1)" section with a table:

Name	Applications	Service Instances
dev	0	0

9. Now login to cloud foundry cli. Type command `cf login -a https://api.cf.ap21.hana.ondemand.com --sso`

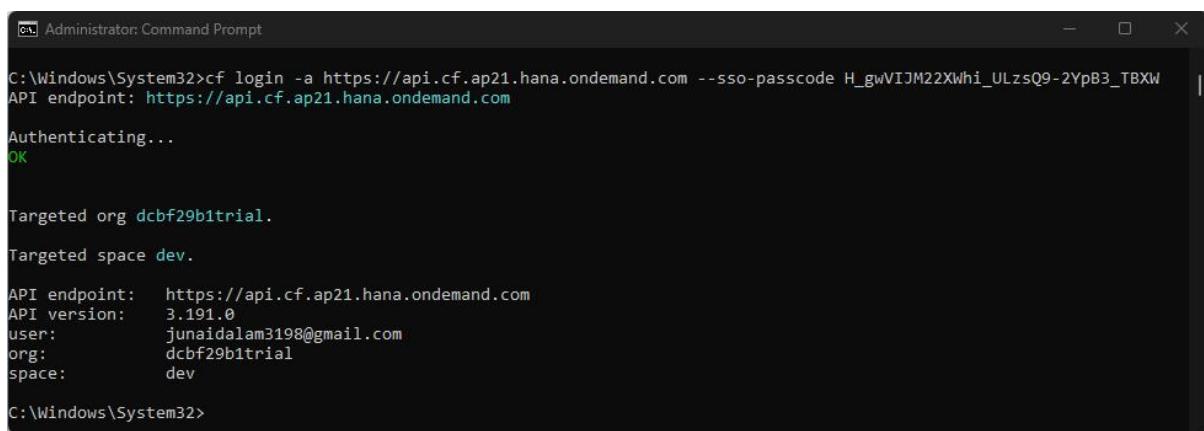


```
C:\Windows\System32>cf login -a https://api.cf.ap21.hana.ondemand.com --sso
API endpoint: https://api.cf.ap21.hana.ondemand.com

Temporary Authentication Code ( Get one at https://login.cf.ap21.hana.ondemand.com/passcode ):
```

10. Now click on <https://login.cf.ap21.hana.ondemand.com/passcode> this link by ctrl+click then after sign in temporary token will be shown copy the temporary token. Now type following command.

`cf login -a https://api.cf.ap21.hana.ondemand.com --sso-passcode`
`UM_9hI3Qidn4l31O5bWJF0mFxWi2zZVw`



```
C:\Windows\System32>cf login -a https://api.cf.ap21.hana.ondemand.com --sso-passcode H_gwVIJM22XWhi_ULzsQ9-2YpB3_TBXW
API endpoint: https://api.cf.ap21.hana.ondemand.com

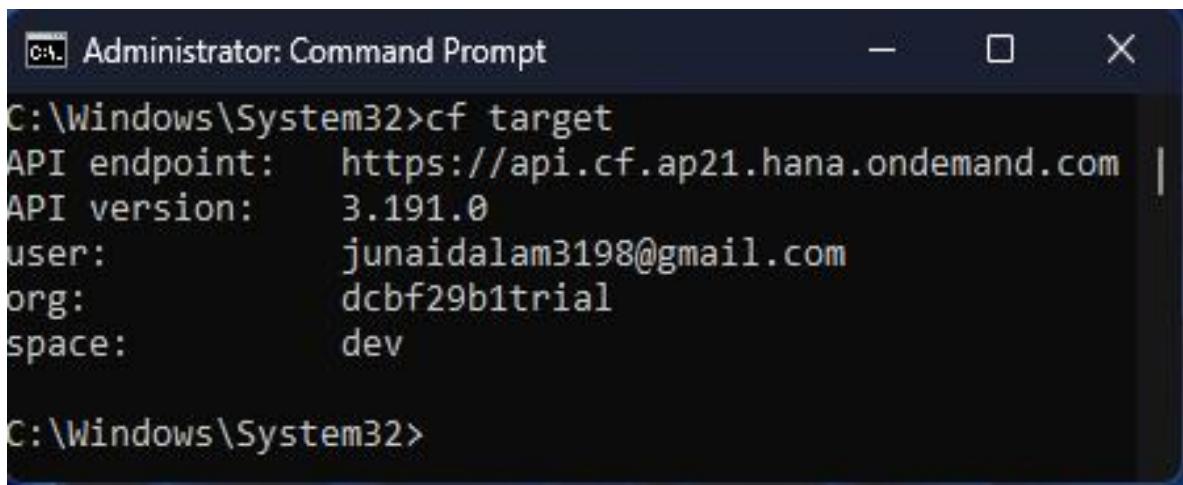
Authenticating...
OK

Targeted org dcbf29b1trial.
Targeted space dev.

API endpoint: https://api.cf.ap21.hana.ondemand.com
API version: 3.191.0
user: junaidalam3198@gmail.com
org: dcbf29b1trial
space: dev

C:\Windows\System32>
```

11. Now type `cf target` it will show the target.



```
C:\Windows\System32>cf target
API endpoint: https://api.cf.ap21.hana.ondemand.com
API version: 3.191.0
user: junaidalam3198@gmail.com
org: dcbf29b1trial
space: dev

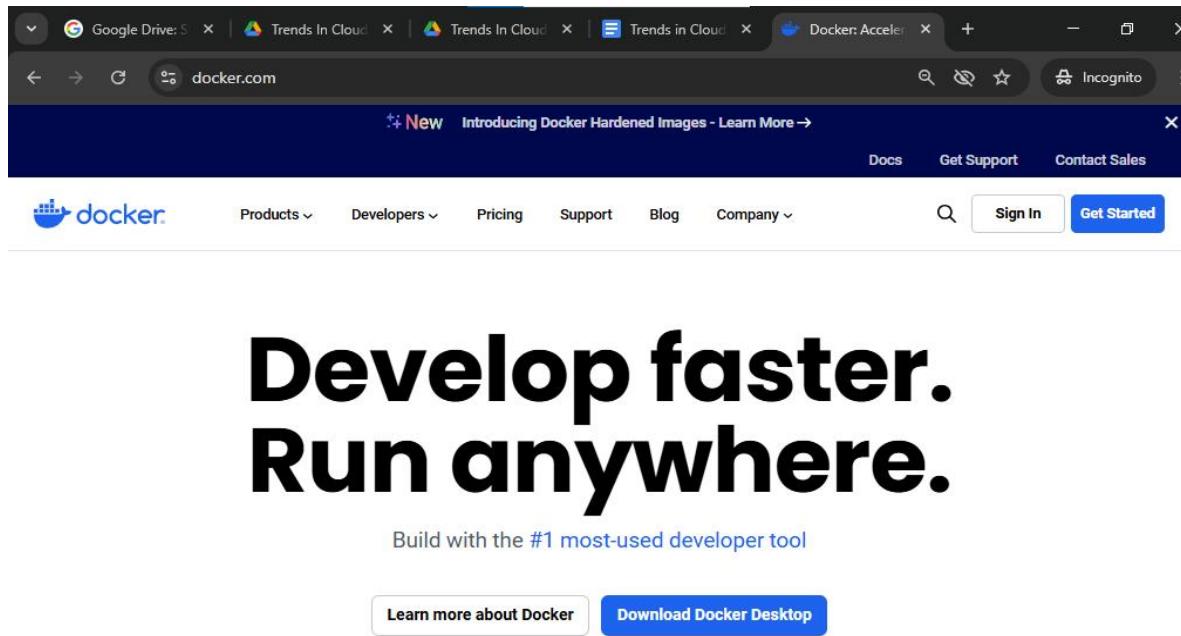
C:\Windows\System32>
```

Practical 6

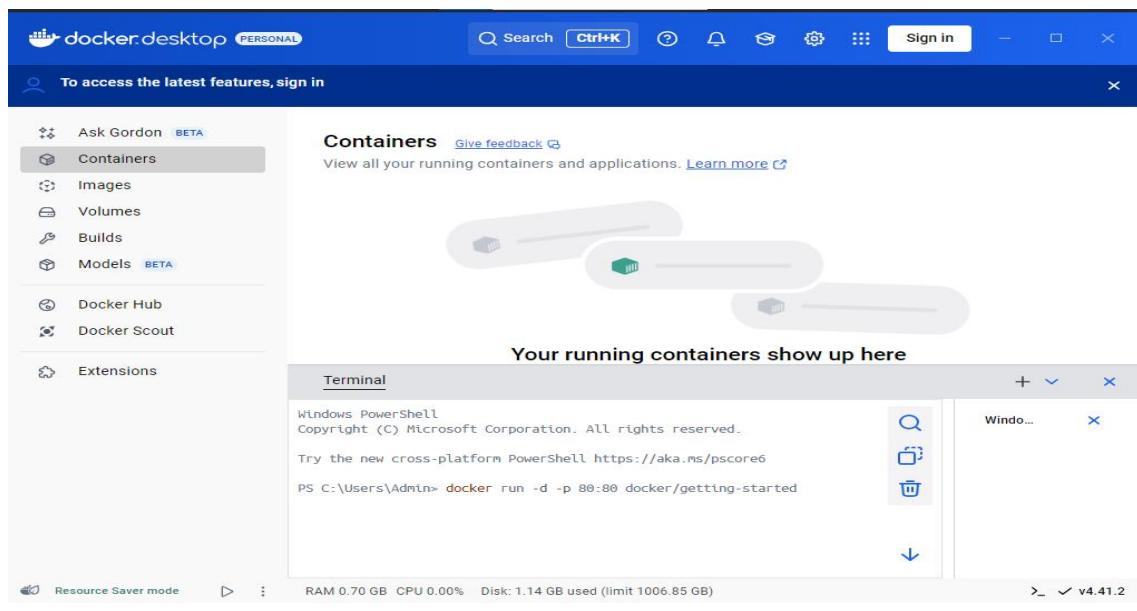
Aim: Installing and configuring dockers in localhost and running multiple images on a docker platform.

Implementation:

1. Installing Docker Desktop <https://www.docker.com> click on **Download Docker Desktop** for windows.



- Docker will prompt for wsl download. Otherwise download WSL using administrator privilege of the powershell command `wsl --install`. It would install WSL.
- Now after installation open Docker. Docker engine will start click on this sign >_ to start terminal. Now type `docker run -d -p 80:80 docker/getting-started`



1. Now new image will be created and it would be shown in Images tab.

The screenshot shows the Docker Desktop interface with the 'Images' tab selected in the sidebar. The main area displays a table of local and Docker Hub images. A single row is visible for the 'docker/getting-started' image, which is the latest tag of the official Docker image. The table includes columns for Name, Tag, Image ID, Created, and Size.

	Name	Tag	Image ID	Created	Size
	docker/getting-started	latest	d79336f4812b	2 years ago	73.89 MB

2. Now to see all container type **docker container ls -a** or simply click on Containers tab.

The screenshot shows the Docker Desktop interface with the 'Containers' tab selected in the sidebar. The main area displays a table of running containers. Two containers are listed: 'angry_stonebraker' and 'eloquent_german'. Both are running the 'docker/gett' image on port 80. The table includes columns for Name, Container ID, Image, Port(s), CPU usage, and Actions.

	Name	Container ID	Image	Port(s)	CPU (%)	Actions
	angry_stonebraker	332b4283fbac	docker/gett	80:80	N/A	
	eloquent_german	a0f8411368b3	docker/gett	80:80	N/A	

The screenshot shows the Docker Desktop interface with the 'Containers' tab selected in the sidebar. A terminal window is open at the bottom, displaying the command 'docker container ls -a'. The output lists all containers, including the two from the previous screenshot, along with their status (Created or Exited). The terminal window has a search bar and a file manager sidebar.

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS
332b4283fbac	docker/getting-started:latest	"/docker-entrypoint..."	23 minutes ago	Created
a0f8411368b3	docker/getting-started	"./docker-entrypoint..."	27 minutes ago	Exited (255)