Practical 1

Define a simple services like Converting Rs into Dollar and Call it from different platform like JAVA and .NET

Software Tools Required:

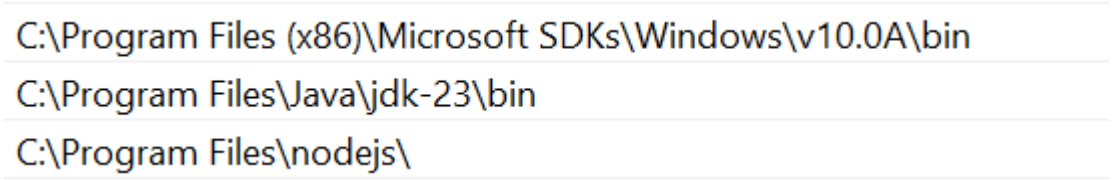
- **Code Editor**: Visual Studio Code (VS Code)
- **API Testing Software Application**: Postman
- **Framework**: Express.js (web framework)
- **Runtime Environment**: Node.js
- **Programming Languages**: JavaScript (for Node.js and Express.js), Java, C# (for .NET)

Downloads Required:

- Node.js: Node.js — Download Node.js®
- JDK: Java Downloads | Oracle India (x64 MSI Installer)
- Dotnet SDK: Download .NET 9.0 SDK (v9.0.101) - Windows x64 Installer
- Postman: Download Postman | Get Started for Free
  (Create Account/ Log in with Google)

After Downloading Node.js, JDK and Dotnet SDK, Set the Path in Environment Variable in User Variables > Path > Edit > New and Paste the Path for Node.js, JDK and Dotnet SDK

Demonstration:



Click OK to remaining opened Edit environment variable, Environment Variables and System Properties windows.

Now check the versions that shows path is set for Nodejs, Java JDK and Dotnet SDK

Here all versions are shown so path is set by checking versions for Nodejs, Java JDK and Dotnet SDK.

1. **Design the Currency Conversion Service:**

Create a simple API that takes an amount in Indian Rupees and returns the equivalent amount in US Dollars. You can use a simple formula for conversion, or you can fetch real-time exchange rates from a reliable source.

Example API endpoint:

POST/convert

Request:

"amount in rs": 1000

Response:

{

"amount in usd": 14.5

}

2. **Implement the Service:**

You can implement the service using any programming language and framework. For simplicity, let's use Node.js with Express in this example,

i. Set up a Node.js Project

Create a Project Directory

Example: Directory Path: Documents in C Drive

Create a Folder Name: Cloud_Computing_Pratical1

C: \Documents\Cloud_Computing_Practical1

Select the Directory Path, Cut (Backspace) and Type cmd and hit enter

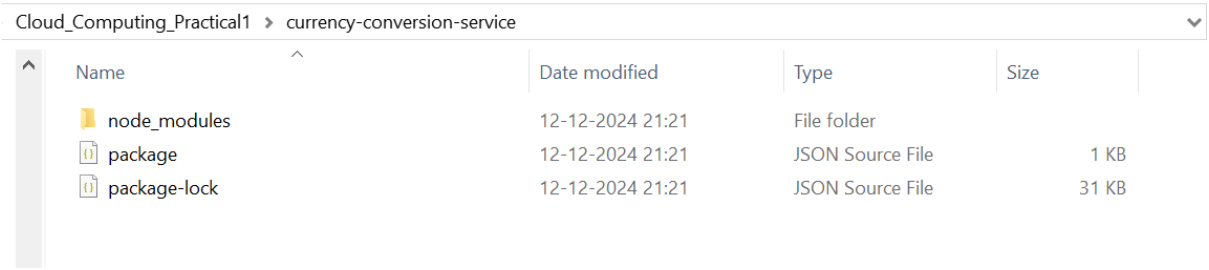
We will get inside the path now type the following commands

- mkdir currency-conversion-service : mkdir - Make directory
- cd currency-conversion-service : cd – change directory
- npm init -y : npm – node package manager initializes yes
- npm install express body-parser : To create simple server & handle incoming requests

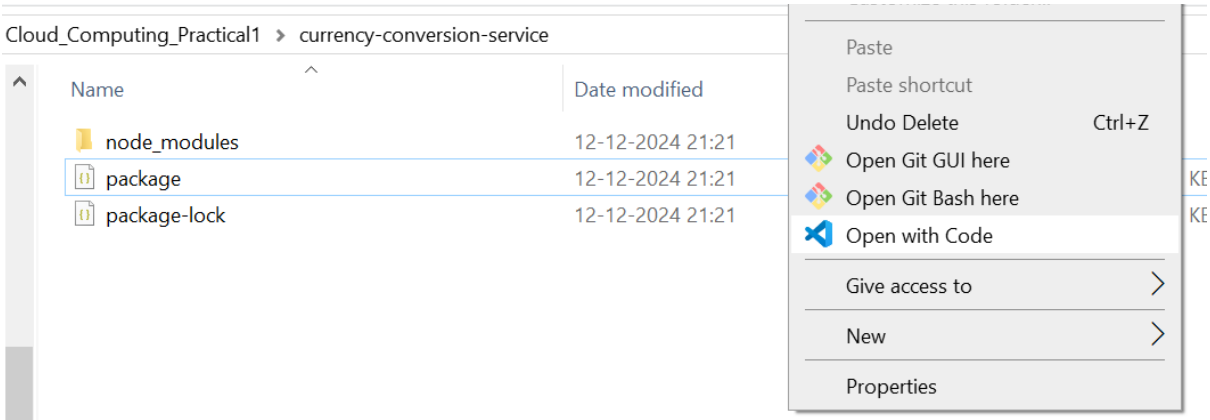
Demonstration:

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19045.5247]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Kishore\Documents\Cloud_Computing_Practical1>mkdir currency-conversion-service

C:\Users\Kishore\Documents\Cloud_Computing_Practical1>cd currency-conversion-service

C:\Users\Kishore\Documents\Cloud_Computing_Practical1\currency-conversion-service>npm init -y
Wrote to C:\Users\Kishore\Documents\Cloud_Computing_Practical1\currency-conversion-service\package.json:

{
  "name": "currency-conversion-service",
  "version": "1.0.0",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [],
  "author": "",
  "license": "ISC",
  "description": ""
}



C:\Users\Kishore\Documents\Cloud_Computing_Practical1\currency-conversion-service>npm install express body-parser

added 72 packages, and audited 73 packages in 3s

17 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities

C:\Users\Kishore\Documents\Cloud_Computing_Practical1\currency-conversion-service>
```

Inside currency-conversion-service > this is the folder architecture after initializing npm and express body-parser.



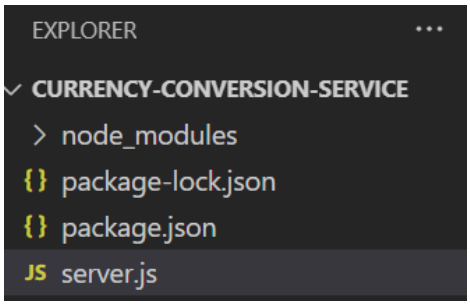
Now Open with VS Code



JavaScript (for Node.js and Express.js)

File Architecture:

Create a file to implement the service with JavaScript Programming language



Filename: server.js

Code:

```
const express = require('express');

const bodyParser = require('body-parser');

const app = express();

const port = 3000;

app.use(bodyParser.json());

app.post('/convert', (req, res) => {

    const amountInRs = req.body.amount_in_rs;

    // Perform the conversion (use a real exchange rate or a fixed rate for simplicity)

    const conversionRate = 0.0145;

    const amountInUsd = amountInRs * conversionRate;

    res.json({ amount_in_usd: amountInUsd });

});

app.listen(port, () => {

    console.log(`Currency conversion service running on http://localhost:${port}`);

});
```

Output:

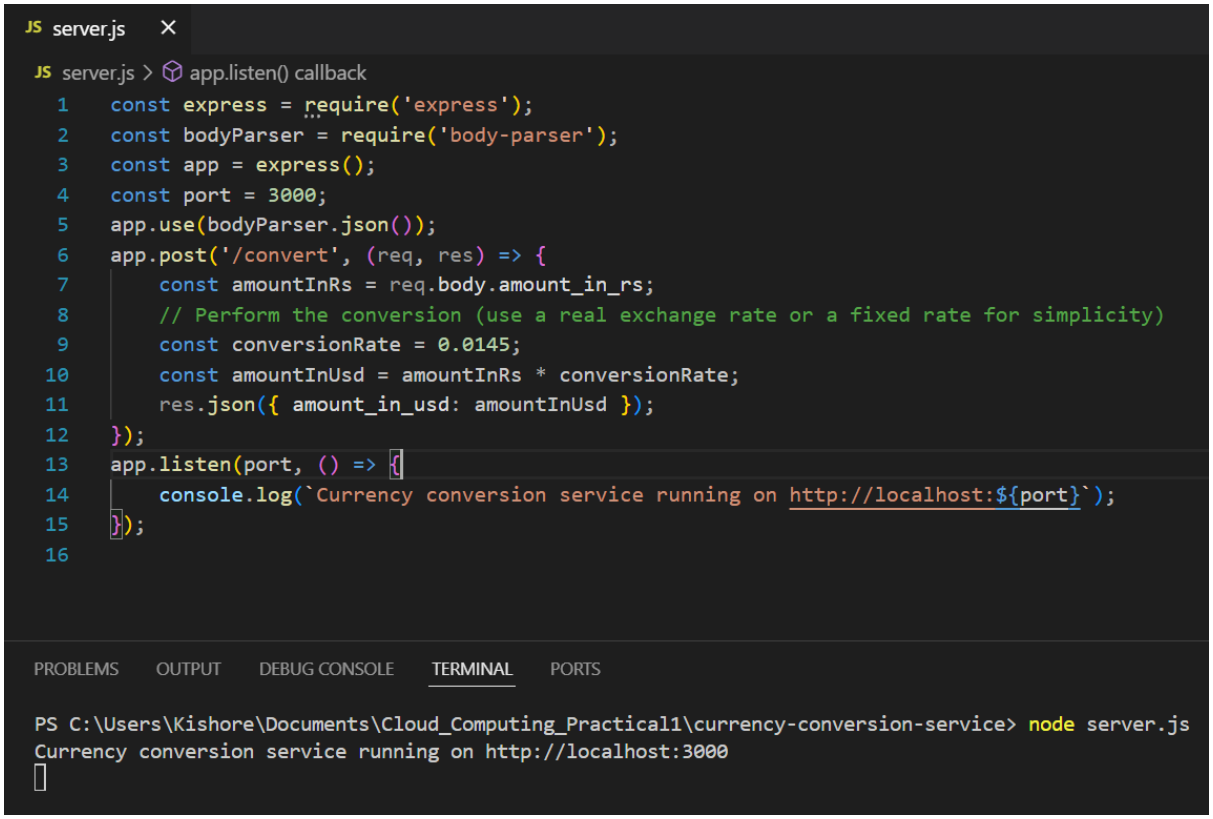
Click View > Terminal:

PS C:\Users\Kishore\Documents\Cloud_Computing_Practical1\currency-conversion-service> node server.js

Currency conversion service running on http://localhost:3000

The Output is successful indicating the service is running on http://localhost:3000

Demonstration:



Postman

API Testing Software Application to Test the API

Open Postman

Send a POST Request:

URL: http://localhost:3000/convert

Body: Set the body to raw JSON and include:

{

“amount_in _rs”: 1000

}

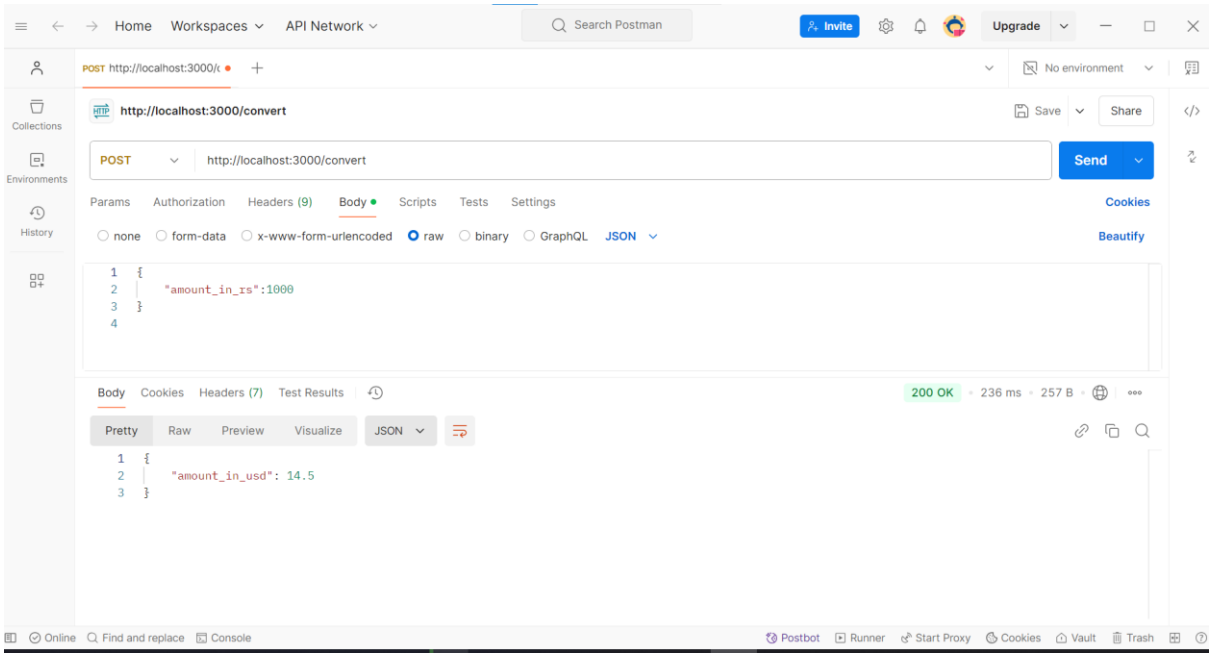
Response:

{

“amount_in _usd”: 14.5

}

Demonstration:



Successfully output retrieved in Postman to test API.

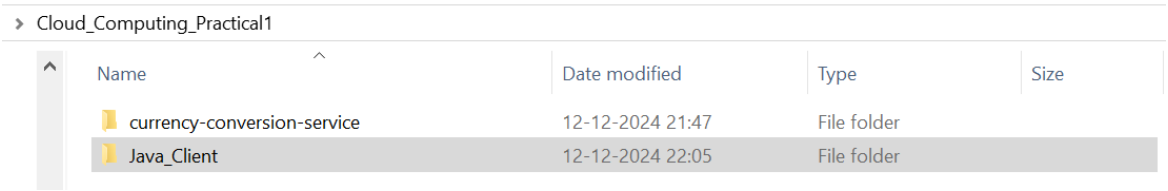
Now, to call from 2 different platforms Java and .NET Programming Language.

Java Programming Language

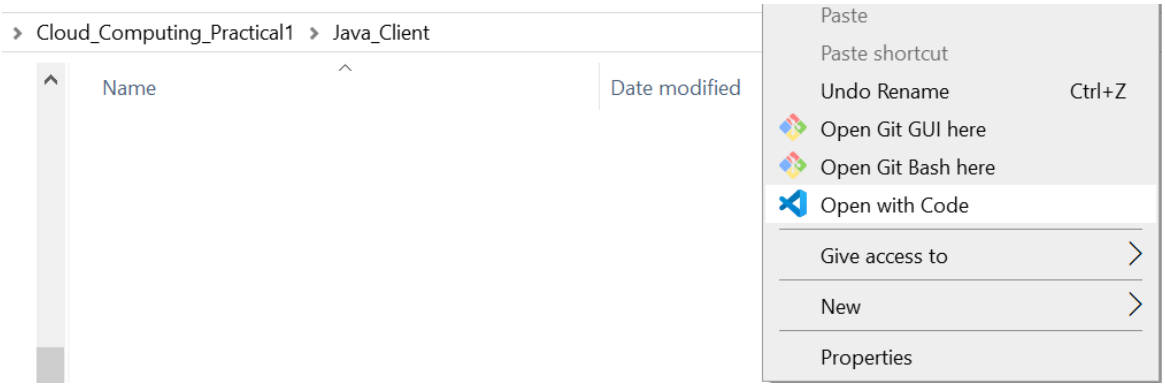
1. Java Client: Implement a Java Client to call the currency conversion service. You can use libraries like HttpClient for making HTTP requests.

Create folder name: Java_Client in Cloud_Computing_Practical1

Demonstration:

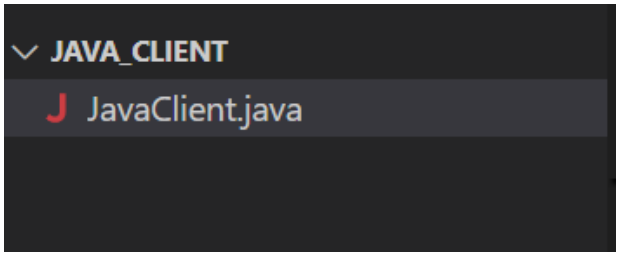


Open Java_Client and Open with VS Code



Extension: Install Java in VS Code

File Architecture:



Filename: JavaClient.java

Code:

```
import java.net.URI;
import java.net.http.HttpClient;
import java.net.http.HttpRequest;
import java.net.http.HttpResponse;
import java.net.http.HttpRequest.BodyPublishers;
import java.net.http.HttpResponse.BodyHandlers;


public class JavaClient {
    public static void main(String[] args) {
        HttpClient client = HttpClient.newHttpClient();
        String uri = "http://localhost:3000/convert";
        String requestBody = "{ \"amount_in_rs\": 1000 }";

        HttpRequest request = HttpRequest.newBuilder()
                .uri(URI.create(uri))
                .header("Content-Type", "application/json")
                .POST(BodyPublishers.ofString(requestBody))
                .build();

        client.sendAsync(request, BodyHandlers.ofString())
                .thenApply(HttpResponse::body)
                .thenAccept(System.out::println)
                .join();
    }
}
```

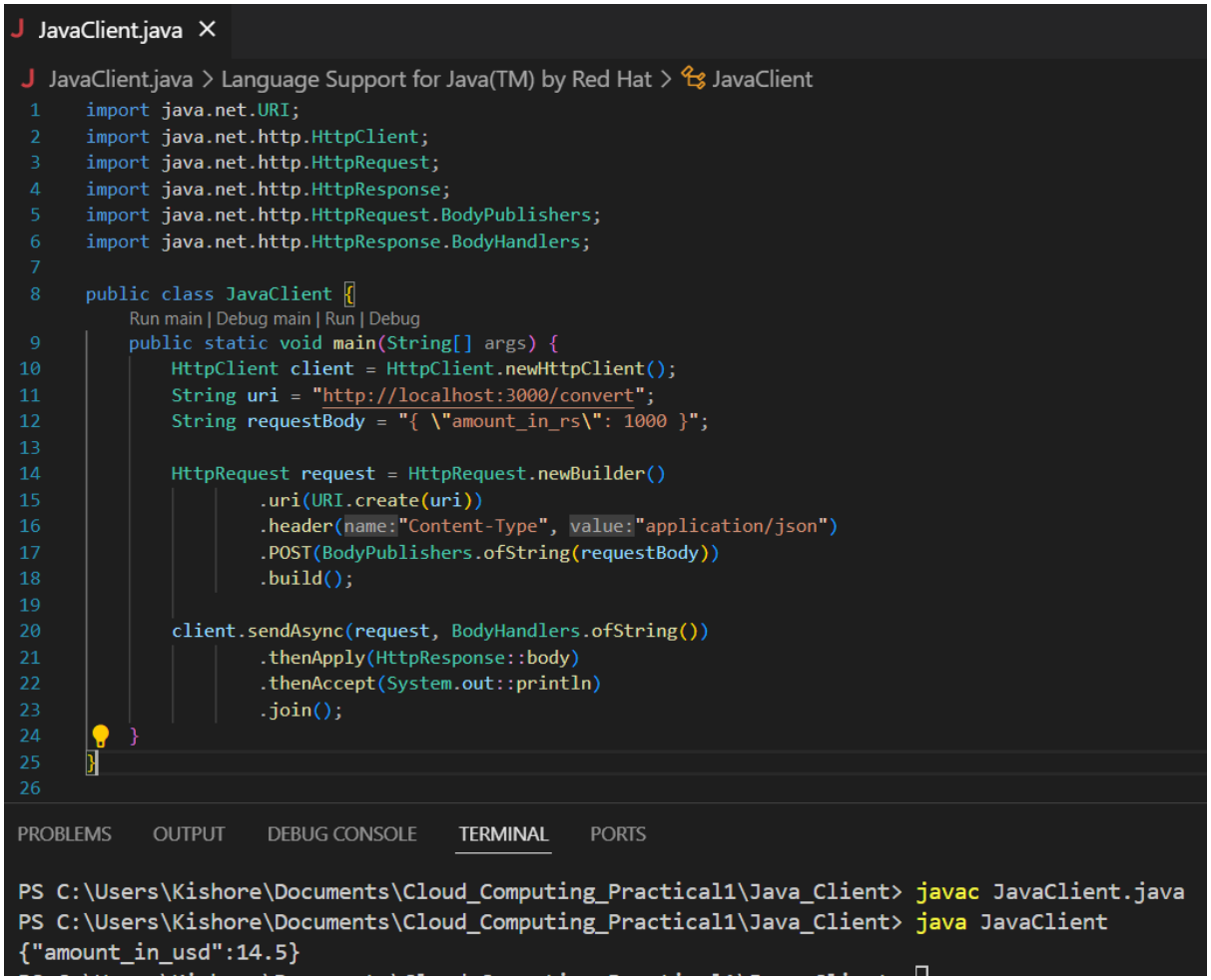
Output:

Click View > Terminal:

```
PS C:\Users\Kishore\Documents\Cloud_Computing_Practical1\Java_Client> javac JavaClient.java
PS C:\Users\Kishore\Documents\Cloud_Computing_Practical1\Java_Client> java JavaClient
{"amount_in_usd":14.5}
```

The Output is Successful that we called the server.js with making HTTP request

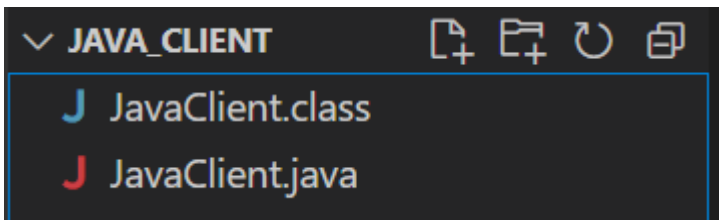
Demonstration:



The java command is used to run the compiled Java bytecode. It starts the JVM, loads the specified .class file, and then executes the main method of that class.

1. Ensure you have a .class file: This file is generated by compiling a .java file using the javac command.
2. Run the Java program: Use the java command followed by the name of the class (without the .class extension) to execute the program**.**

Here JavaClient.class file will be created after running the program

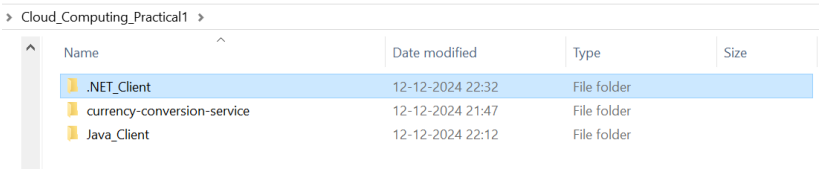


.NET Programming Language

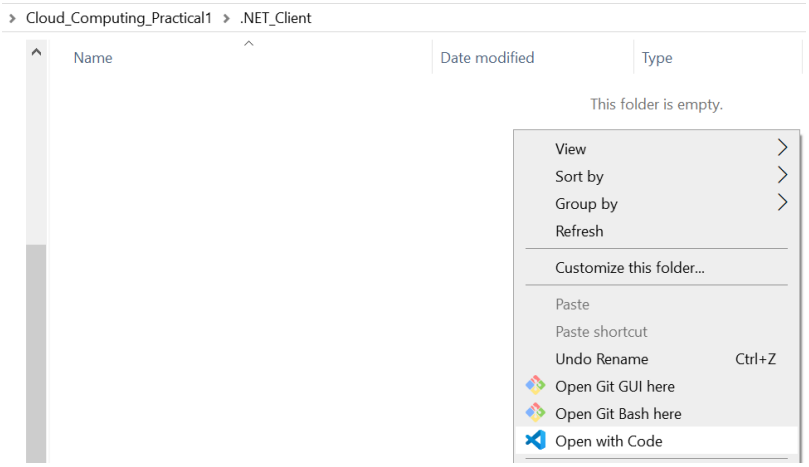
2. .NET Client: Implement a .NET Client to call the currency conversion service. You can use HttpClient in C#.

Create folder name: .NET_Client in Cloud_Computing_Practical1

Demonstration:

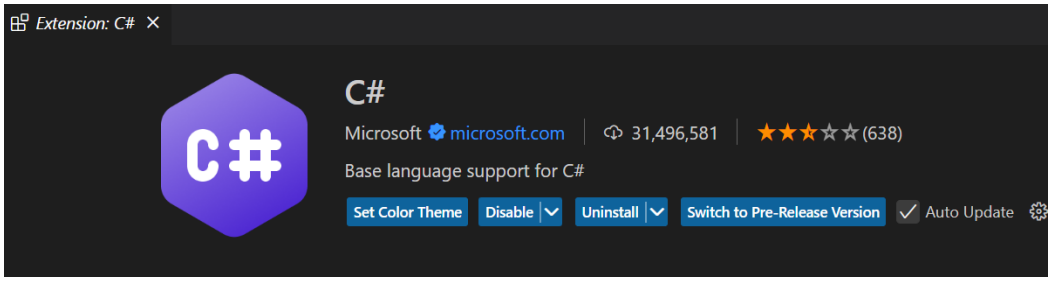


Open .NET_Client and Open with VS Code

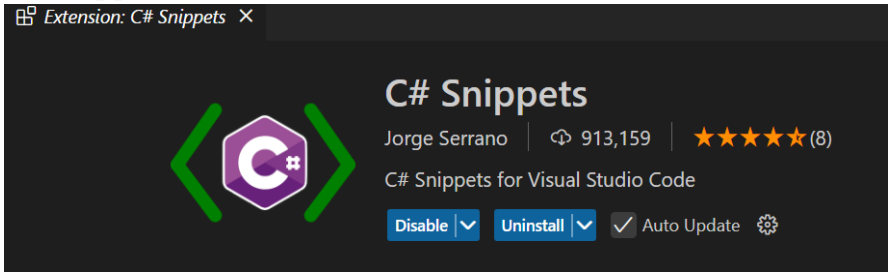


Extension: 4 Extensions needed to work in C#

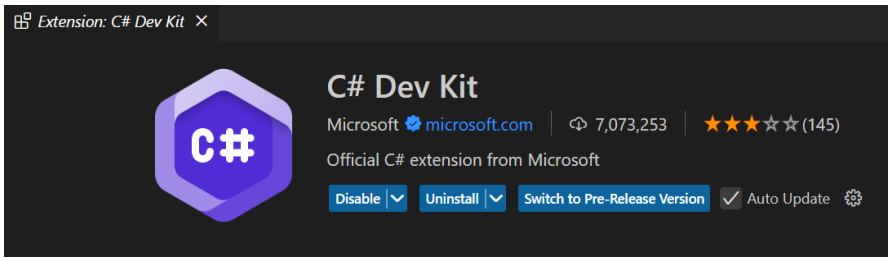
C#



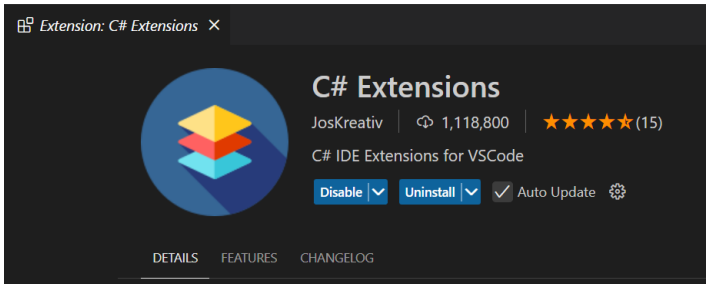
C# Snippet



C# Dev Kit



C# Extensions

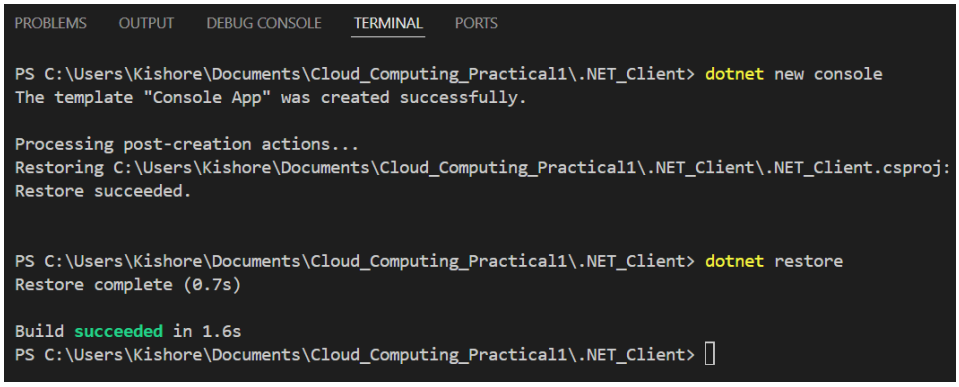


File Architecture:

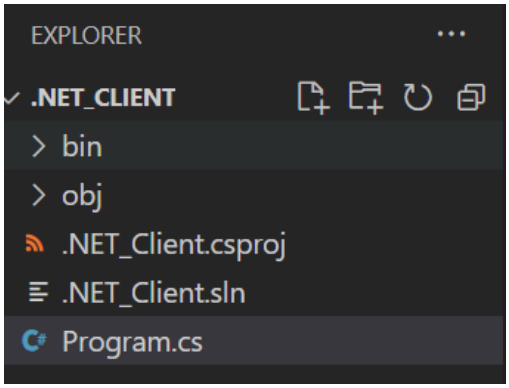
Click on View > Terminal and Type the following command

- dotnet new console
- dotnet restore

Demonstration:



After entering dotnet new console command the file architecture will generate the .NET Project with Program.cs file shown below.



Filename: Program.cs

Code:

```
using System;
using System.Net.Http;
using System.Text;
using System.Threading.Tasks;

class Program
{
    static async Task Main()
    {
        try
        {
            var client = new HttpClient();
            var apiUrl = "http://localhost:3000/convert";

            // Create the request body with correct JSON format
            var requestBody = new
            {
                amount_in_rs = 1000
            };
            var jsonRequestBody = System.Text.Json.JsonSerializer.Serialize(requestBody);

            // Send an HTTP POST request to the API with the request body
            var response = await client.PostAsync(apiUrl, new StringContent(jsonRequestBody,
Encoding.UTF8, "application/json"));

            // Check the response status code
            if (response.IsSuccessStatusCode)
            {
                Console.WriteLine("Response Code: " + response.StatusCode);
                Console.WriteLine("Response Body: " + await response.Content.ReadAsStringAsync());
            }
            else
            {
                Console.WriteLine("Error: " + response.StatusCode);
                Console.WriteLine("Details: " + await response.Content.ReadAsStringAsync());
            }
        }
        catch (HttpRequestException e)
        {
            Console.WriteLine("An error occurred: " + e.Message);
        }
    }
}
```

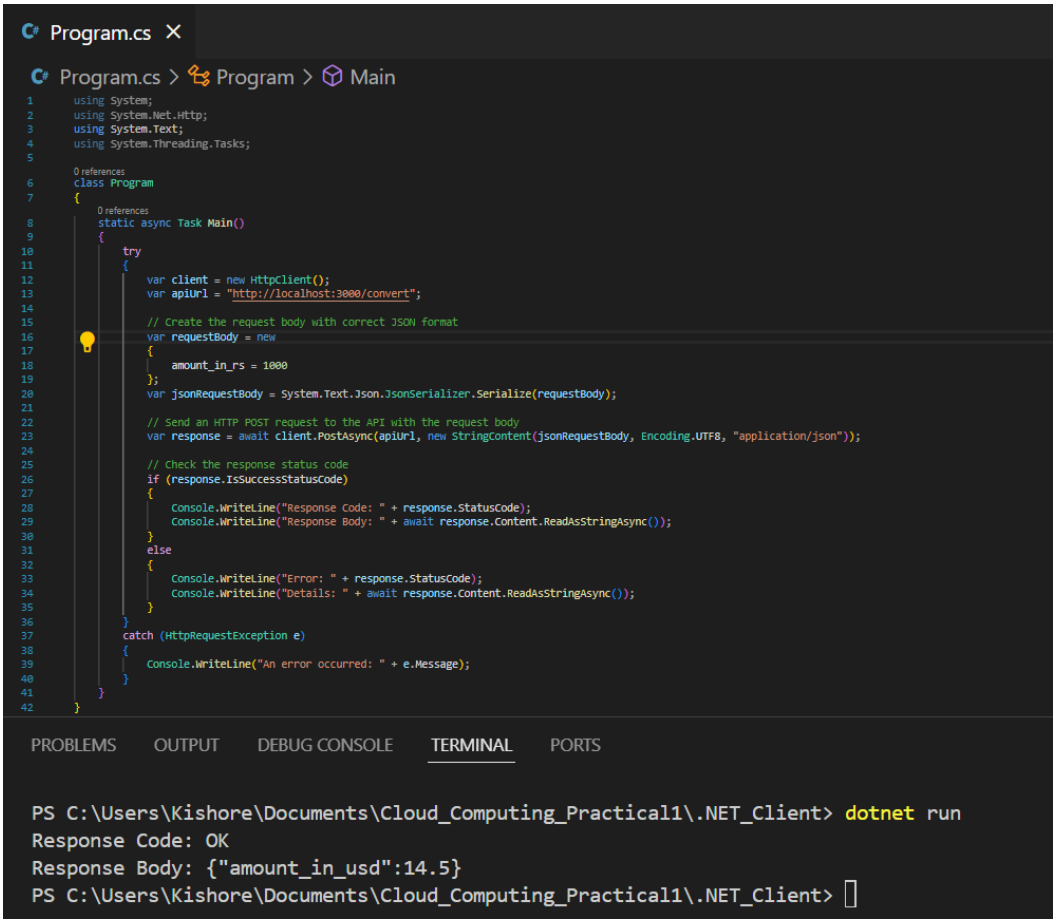
Output:

Click View > Terminal:

PS C:\Users\Kishore\Documents\Cloud_Computing_Practical1\.NET_Client> dotnet run
Response Code: OK
Response Body: {"amount_in_usd":14.5}

The Output is Successful that we called the server.js with making HTTP request

Demonstration:



Conclusion: The Practical worked successfully after creating currency conversion in postman with javascript and calling with Java and .NET by HTTP Requests.

Practical 2

Create a Simple SOAP service.

Software Tools Required:

- **Code Editor:** Eclipse IDE
- **Build Automation Tool:** Apache Maven
- **SOAP Testing Tool:** SOAPUI
- **Framework:** Apache CXF
- **Programming Language:** Java

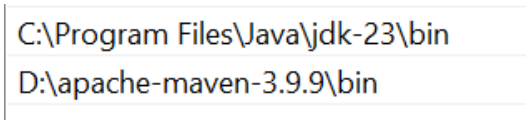
Downloads Required:

- Apache Maven: Download Apache Maven – Maven
- JDK: Java Downloads | Oracle India (x64 MSI Installer)
- Eclipse IDE: Eclipse downloads - Select a mirror | The Eclipse Foundation
- SOAP Testing Tool: Download REST & SOAP Automated API Testing Tool | Open Source | SoapUI (SoapUI Open Source)

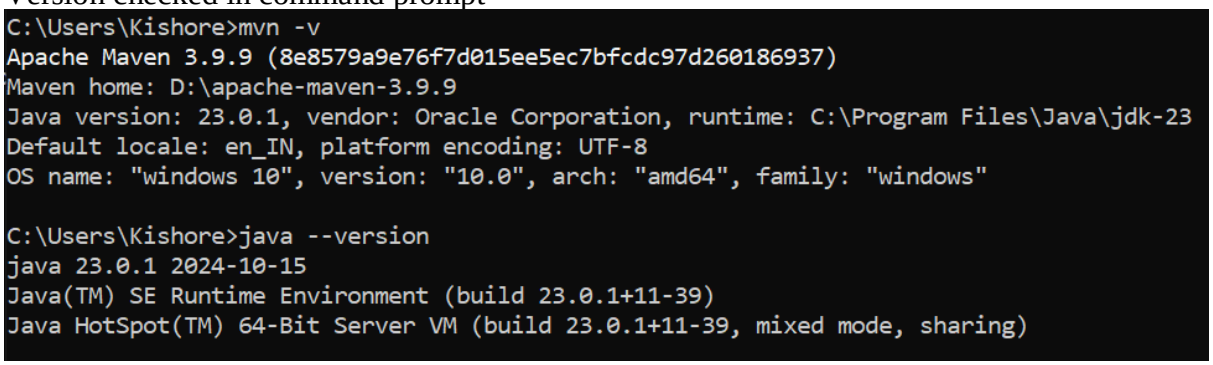
After Downloading JDK and Maven, Set the Path in Environment Variable in User Variables > Path > Edit > New and Paste the Path for JDK and Maven and check the versions for both in command prompt.

Demonstration:

Path Set



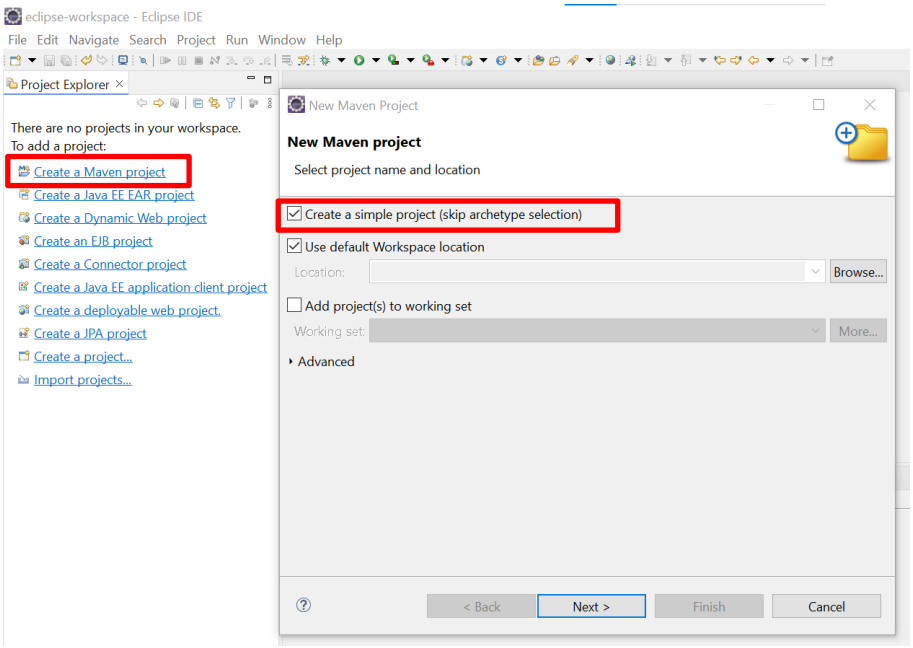
Version checked in command prompt



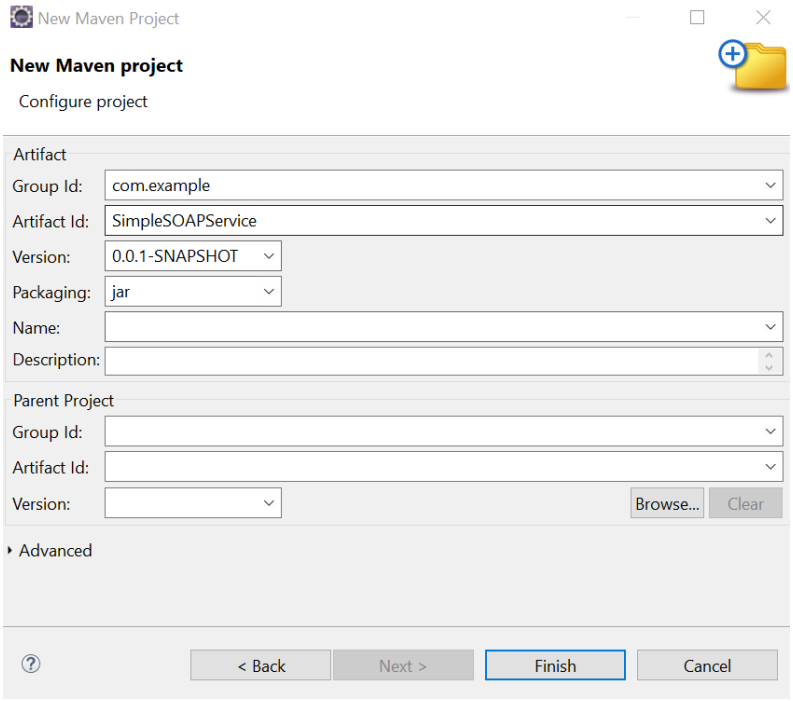
Java Programming Language

Project Name: SimpleSOAPService

Step 1: Open Eclipse IDE, Create a Maven Project, Check – Create a simple project (skip archetype selection) and Click Next.



Step 2: In New Maven Project window add the following details – Group id: com.example, Artifact Id: SimpleSOAPService and Version: 0.0.1- SNAPSHOT and click Finish



Step 3: After creating the Maven project, update the pom.xml to include the necessary dependencies for Apache CXF and JAX-WS. Here's the full pom.xml file.

pom.xml

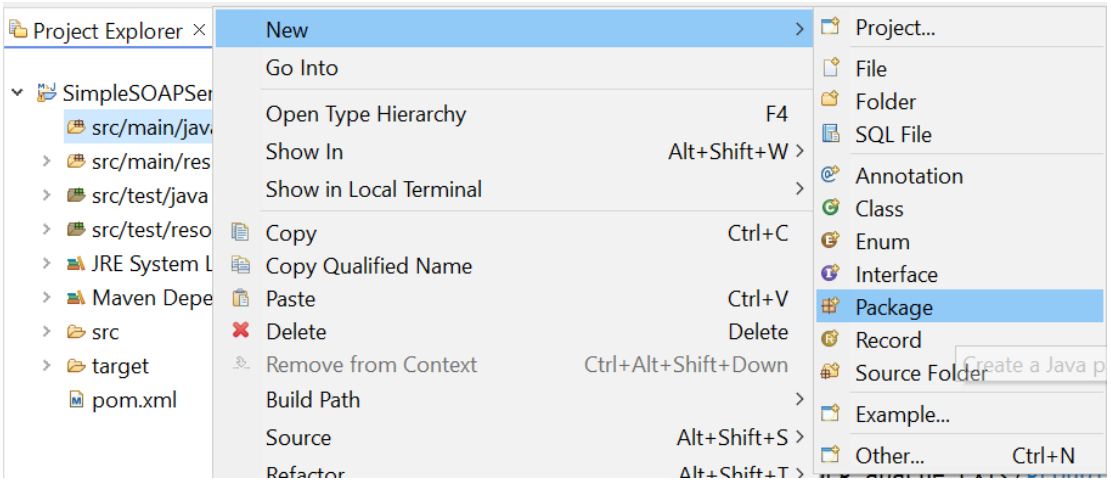
```
<project xmlns="http://maven.apache.org/POM/4.0.0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
https://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>
  <groupId>com.example</groupId>
  <artifactId>SimpleSOAPService</artifactId>
  <version>0.0.1-SNAPSHOT</version>
  <dependencies>
      <!-- Apache CXF for JAX-WS -->
      <dependency>
         <groupId>org.apache.cxf</groupId>
         <artifactId>cxf-rt-frontend-jaxws</artifactId>
         <version>3.4.5</version>
      </dependency>

      <!-- Apache CXF HTTP Transport -->
      <dependency>
         <groupId>org.apache.cxf</groupId>
         <artifactId>cxf-rt-transports-http</artifactId>
         <version>3.4.5</version>
      </dependency>

      <!-- Apache CXF HTTP Jetty Transport (for embedded HTTP server) -->
      <dependency>
         <groupId>org.apache.cxf</groupId>
         <artifactId>cxf-rt-transports-http-jetty</artifactId>
         <version>3.4.5</version>
      </dependency>

      <!-- Jakarta XML WS (JAX-WS API) -->
      <dependency>
         <groupId>jakarta.xml.ws</groupId>
         <artifactId>jakarta.xml.ws-api</artifactId>
         <version>2.3.3</version>
      </dependency>

      <!-- Java Annotations -->
      <dependency>
         <groupId>javax.annotation</groupId>
         <artifactId>javax.annotation-api</artifactId>
         <version>1.3.2</version>
      </dependency>
   </dependencies>
</project>
```

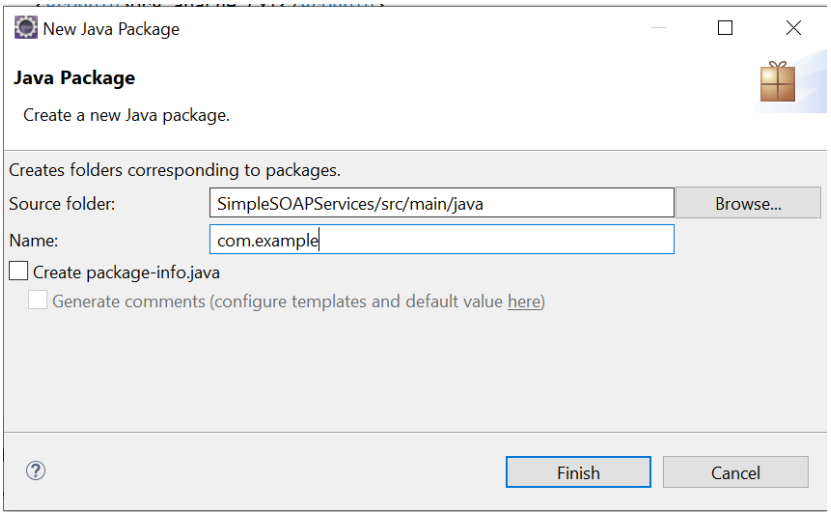
After adding dependencies Save it by Ctrl+S

Step 4: Create the Service Interface

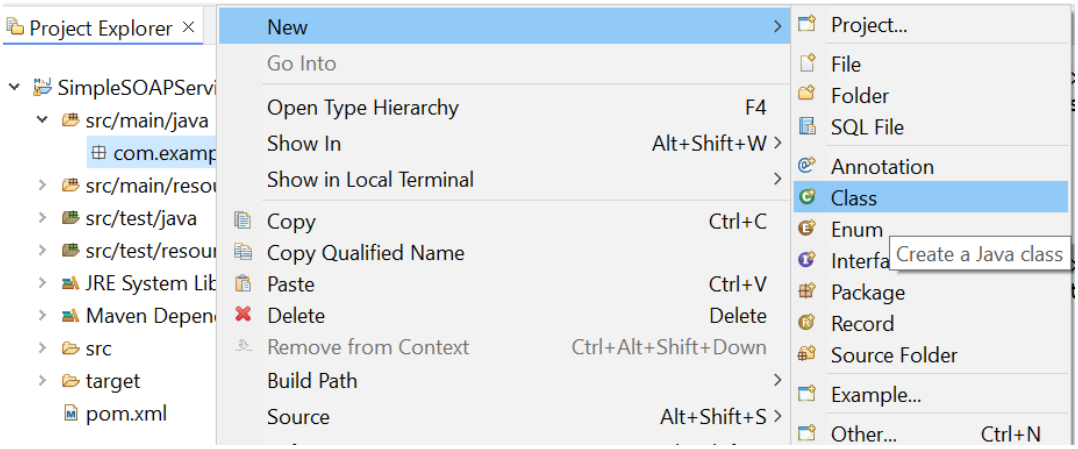
Now, create a simple SOAP service interface to define the operations.

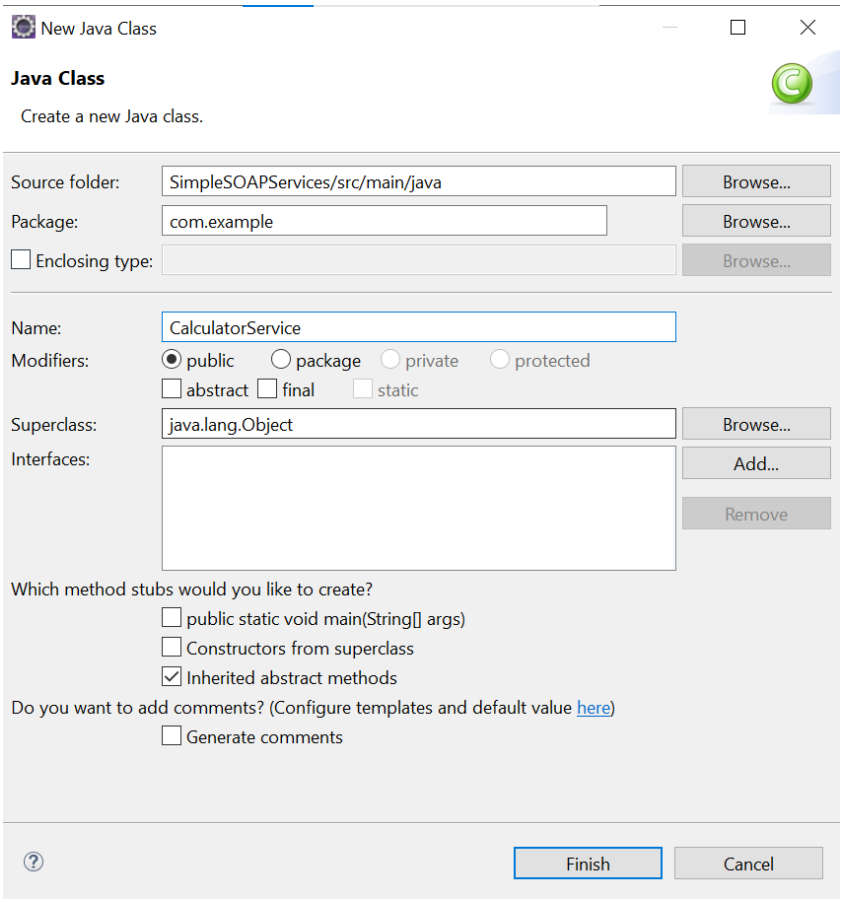
1. **Right-click** on src/main/java → **New** → **Package** and name it com.example





1. **Right-click** on the com.example package → **New** → **Class** and name it CalculatorService.java.





File Name: CalculatorService.java

Code:

```
package com.example;

import javax.jws.WebMethod;
import javax.jws.WebService;

@WebService
public interface CalculatorService {
	@WebMethod
	int add(int num1, int num2);

	@WebMethod
	int subtract(int num1, int num2);
}
```

Save it

Step 5: Implement the Service
Now, create a class that implements the CalculatorService interface.

1. **Right-click** on com.example → **New** → **Class** and name it CalculatorServiceImpl.java.
2. Add the following code to CalculatorServiceImpl.java:

File Name: CalculatorServiceImpl.java

Code:

```
package com.example;

import javax.jws.WebService;

@WebService(endpointInterface = "com.example.CalculatorService")
public class CalculatorServiceImpl implements CalculatorService {

    @Override
    public int add(int num1, int num2) {
        return num1 + num2;
    }
    @Override
    public int subtract(int num1, int num2) {
        return num1 - num2;
    }
}
```

Save It

Step 6: Create the SOAP Server
Next, create a class to publish the SOAP service.

1. **Right-click** on com.example → **New** → **Class** and name it SOAPServer.java.
2. Add the following code to SOAPServer.java:

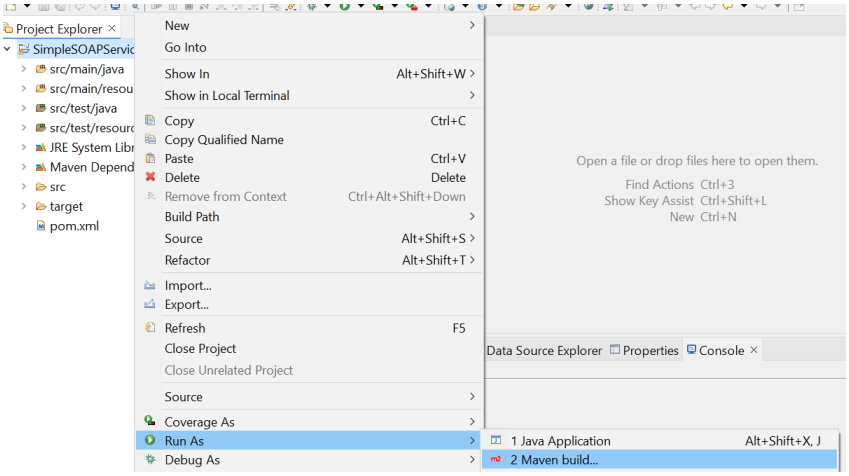
File Name: SOAPServer.java
Code:

```
package com.example;

import javax.xml.ws.Endpoint;

public class SOAPServer {
    public static void main(String[] args) {
        // Create an instance of the service implementation
        CalculatorServiceImpl implementor = new CalculatorServiceImpl();

        // Publish the service
        String address = "http://localhost:8080/CalculatorService";
        Endpoint.publish(address, implementor);

        System.out.println("SOAP Service started at " + address);
    }
}
```

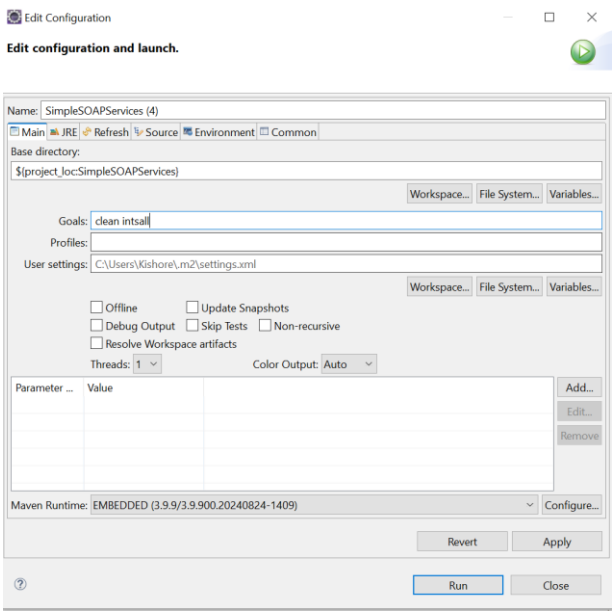
Save It

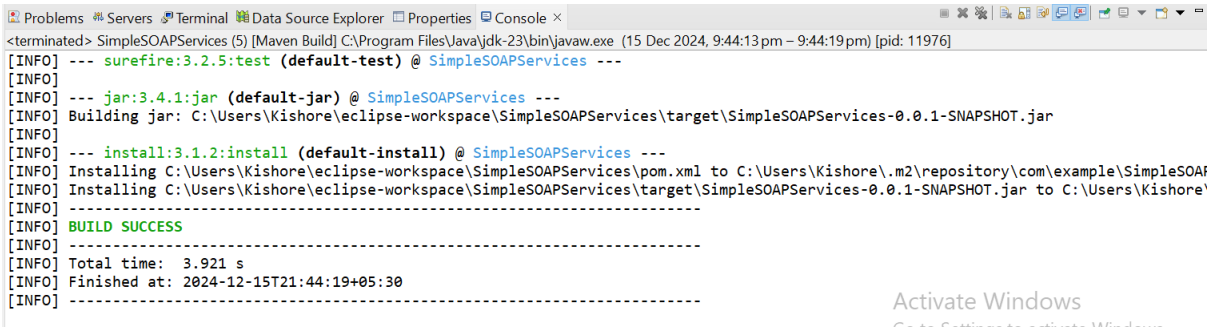
Output:

mvn clean install: The clean install command is commonly used in Maven to build and install a project. The purpose of running clean is to remove any previously compiled code or artifacts, ensuring that the next build starts fresh without using any old files that might cause conflicts or errors.



In Goal type clean install and run

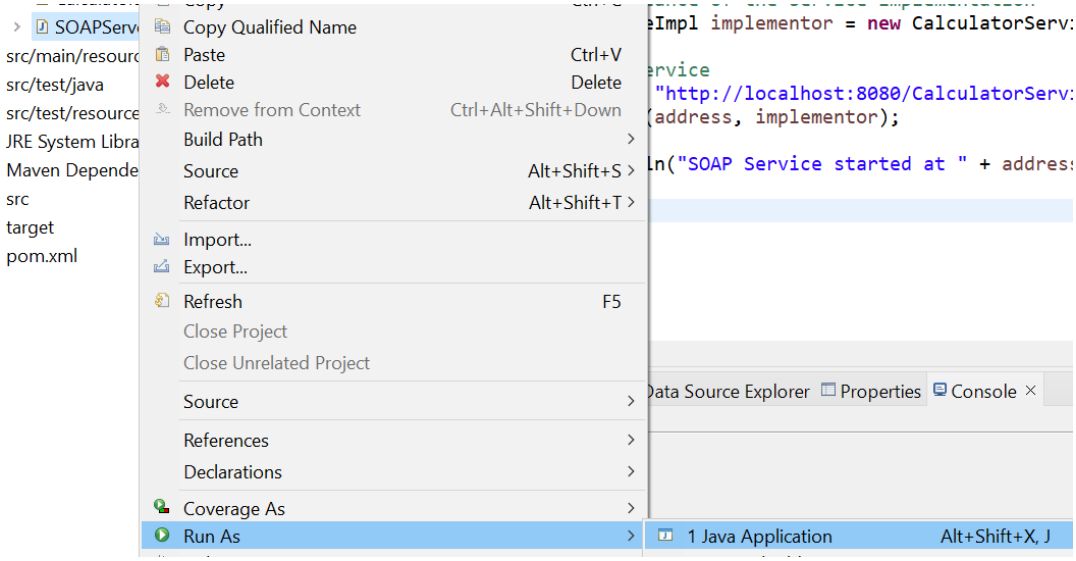


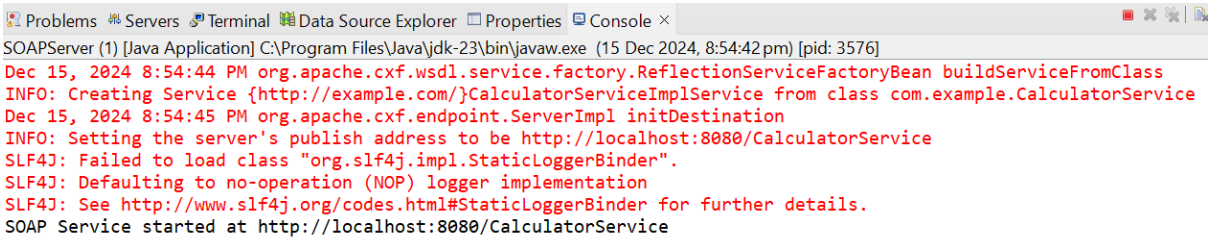


Run the Application

1. Right-click on SOAPServer.java → Run As → Java Application.
2. You should see the following output:

   SOAP Service started at http://localhost:8080/CalculatorService

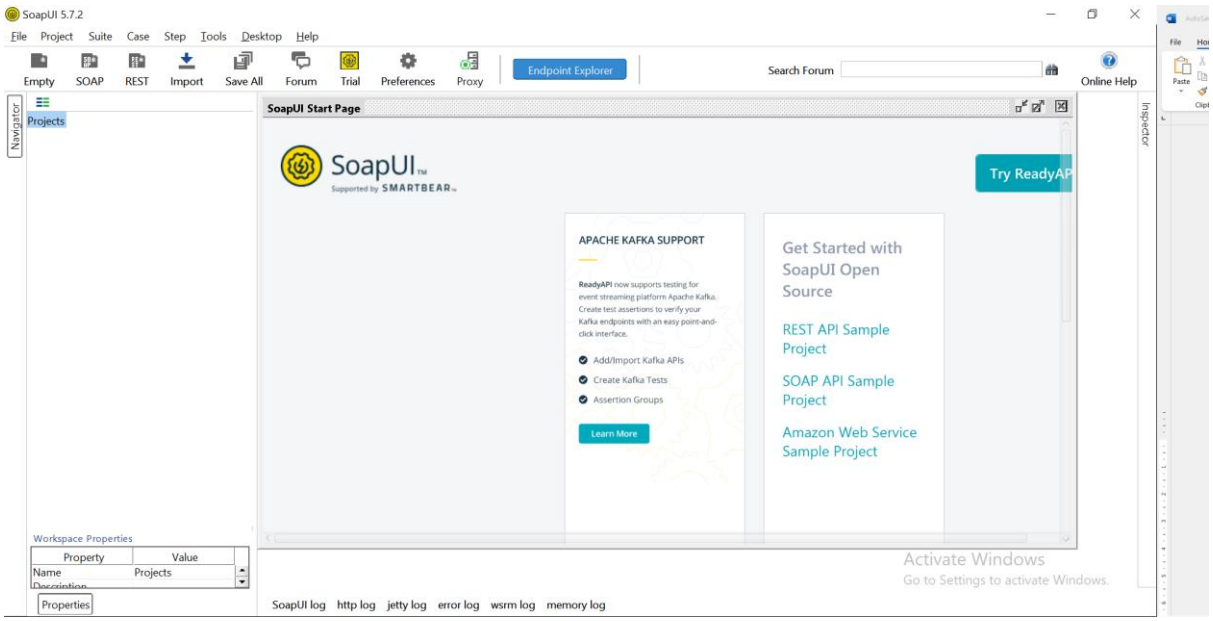


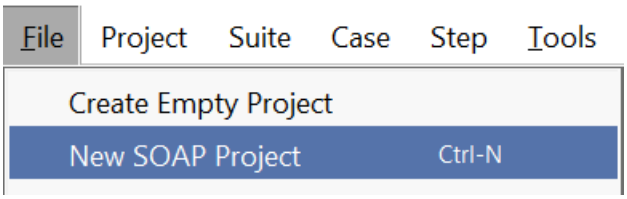


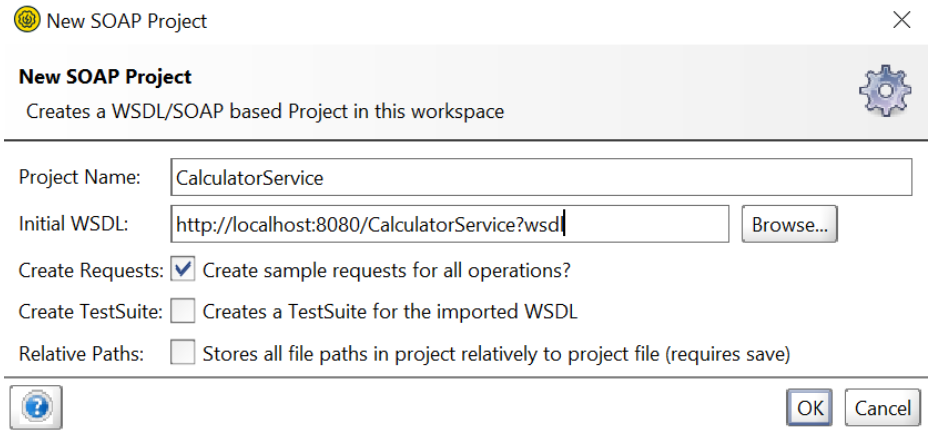
Step 7. Test the SOAP Service Using SOAPUI

1. Open SOAPUI and create a new project:
    1. Click File → New SOAP Project.
    2. In the Project Name field, enter CalculatorService.
    3. In the Initial WSDL field, enter:
       http://localhost:8080/CalculatorService?wsdl

SOAPUI:

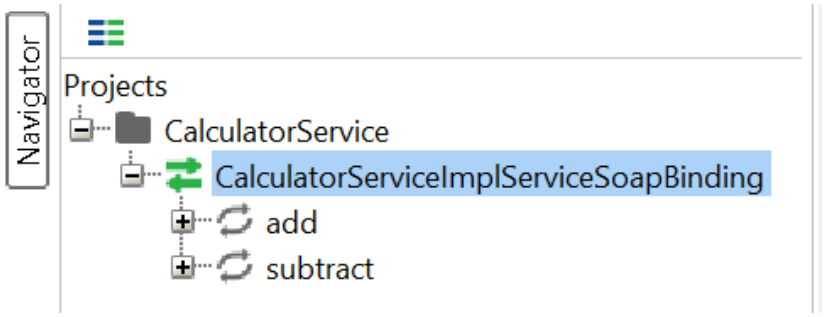


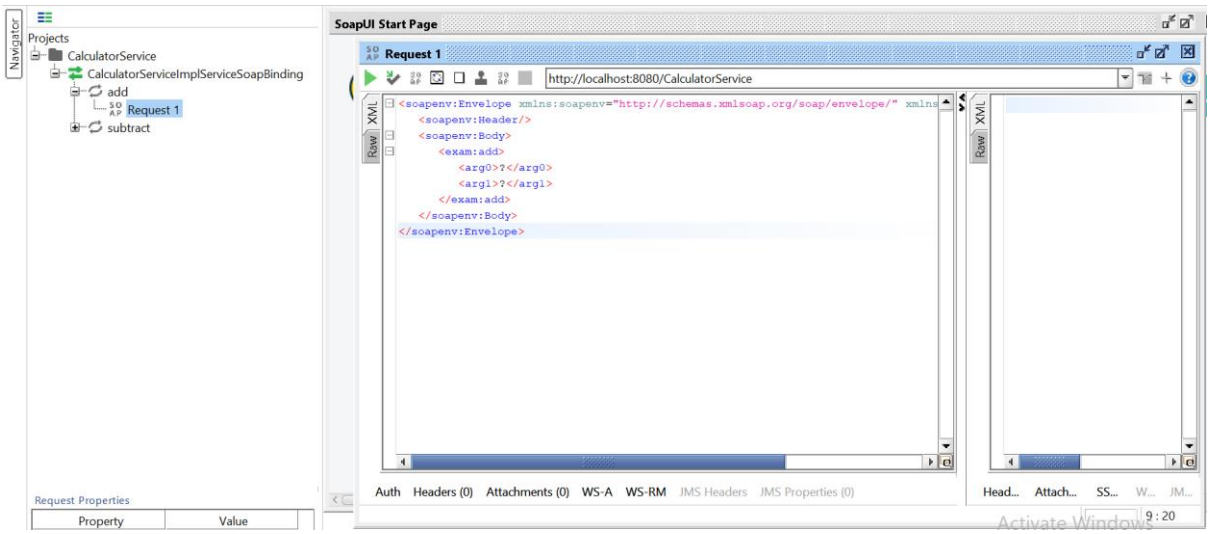




Click OK

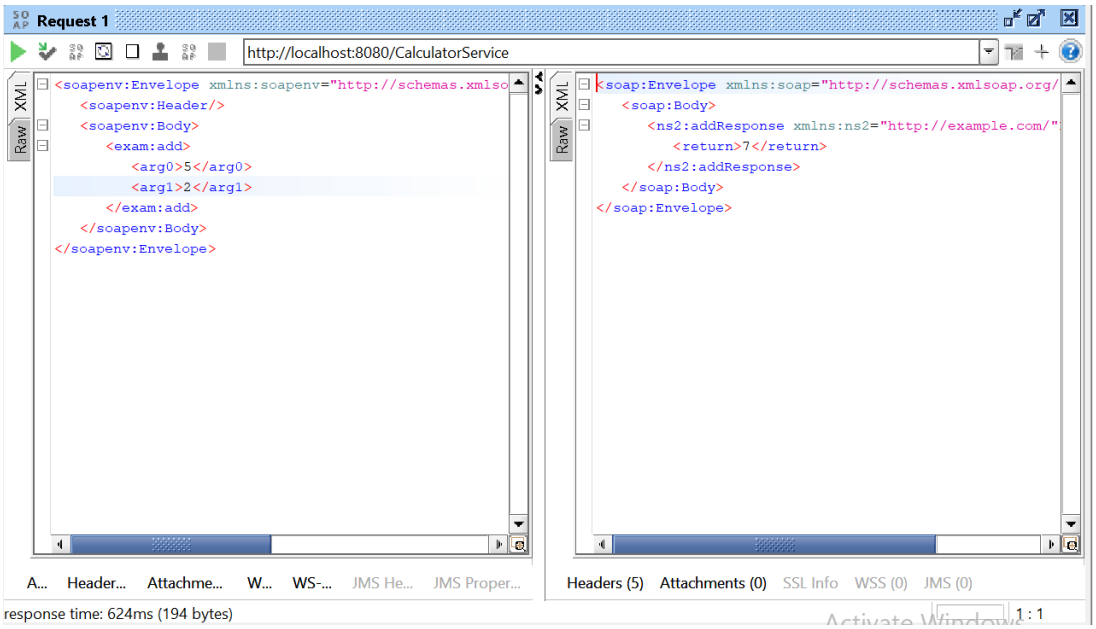
SOAPUI will import the WSDL and display the operations (add and subtract). You can now test the SOAP service by right-clicking on the operations and sending requests.



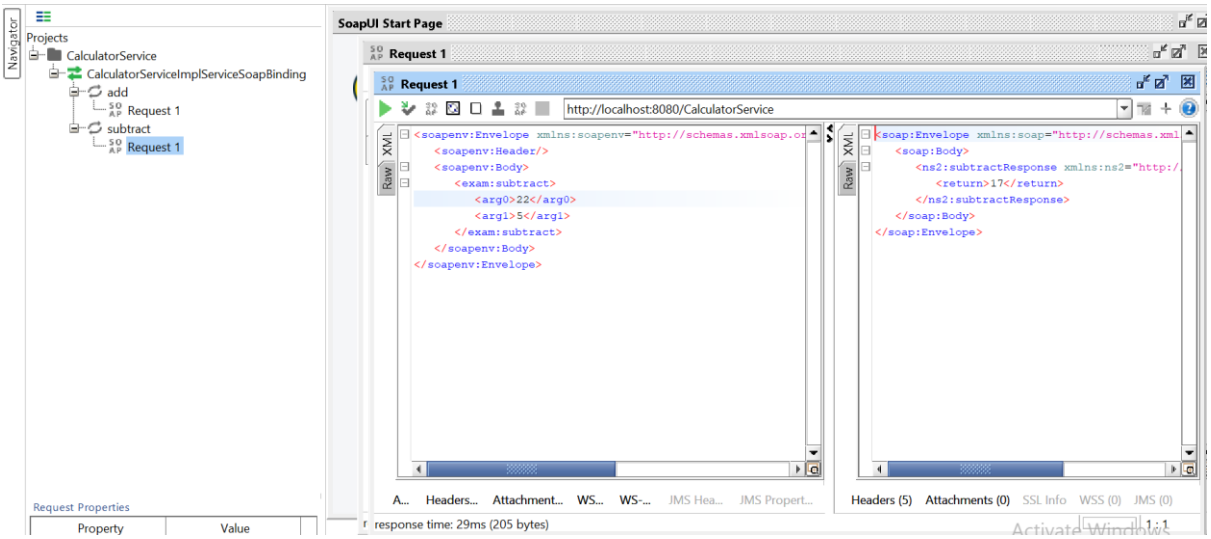


add > Request 1

Here, in add we got the request and edited 5 and 2 in argument tags and output displayed in xml.



subtract > Request 1
Here, in subtract we got the request and edited 22 and 5 in argument tags and output displayed in xml.



Conclusion: Why Use SoapUI to Create SOAP Services and Get Output in XML for Add and Subtract Operations

SoapUI is a popular tool for testing and interacting with SOAP (Simple Object Access Protocol) web services. It is used to create and test SOAP services, allowing developers and testers to ensure that their web services function correctly and handle various input scenarios. Logic to Work with SOAP Services in SoapUI:

Creating SOAP Service:

- WSDL (Web Services Description Language): SoapUI uses the WSDL file to generate the request and response structure for SOAP services. The WSDL defines the operations, input/output messages, and service endpoint.
- SOAP Request and Response: In SoapUI, you can create SOAP requests based on the operations defined in the WSDL. For operations like "Add" and "Subtract," the SOAP request will include the parameters (e.g., two numbers) to be processed by the web service.

Practical 3

Create a Simple REST Service

Software Tools Required:

- **Code Editor**: Visual Studio Code (VS Code)
- **API Testing Software Application**: Postman
- **Framework**: Flask (micro web framework)

Downloads Required:

- Python: Download Python | Python.org
- Postman: Download Postman | Get Started for Free
  (Create Account/ Log in with Google)

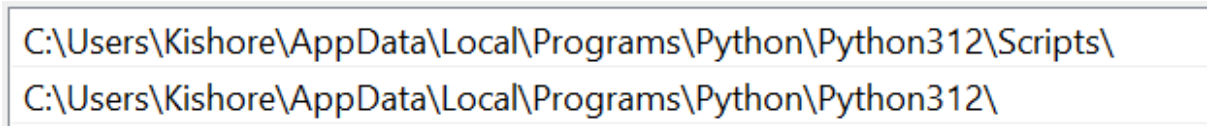
After Downloading Python, Set the Path in Environment Variable in User Variables > Path > Edit > New and Paste the Path for Python.

New version is 3.13, Here the version is 3.12 so following the same for new version.

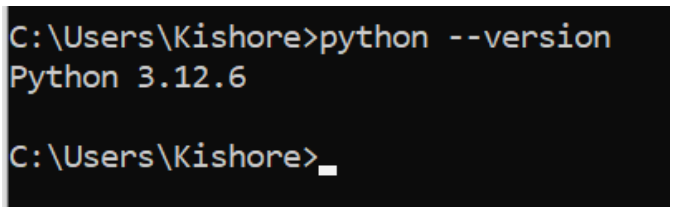
Till Python312: Copy Directory Path
Start > Python 3.13.1 (64 bit) > Open File Location > Python 3.13.1 (64 bit)

Till Python312\Scripts: Copy the Directory Path
Start > Python 3.13.1 (64 bit) > Open File Location > Python 3.13.1 (64 bit) > Open File Location > Scripts

Demonstration:



Check Version:



Step 1: Install Flask: Make sure you have Python installed on your system.
Open cmd and type the following command

pip install Flask

Demonstration:

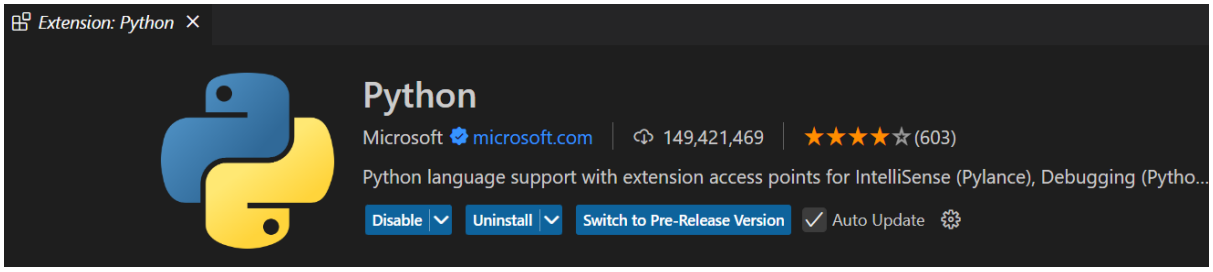
```
C:\Users\Kishore>pip install Flask
Requirement already satisfied: Flask in c:\users\kishore\appdata\local\programs\python\python312\lib\site-packages (3.0.3)
Requirement already satisfied: Werkzeug>=3.0.0 in c:\users\kishore\appdata\local\programs\python\python312\lib\site-packages (from Flask) (3.0.3)
Requirement already satisfied: Jinja2>=3.1.2 in c:\users\kishore\appdata\local\programs\python\python312\lib\site-packages (from Flask) (3.1.4)
Requirement already satisfied: itsdangerous>=2.1.2 in c:\users\kishore\appdata\local\programs\python\python312\lib\site-packages (from Flask) (2.2.0)
Requirement already satisfied: click>=8.1.3 in c:\users\kishore\appdata\local\programs\python\python312\lib\site-packages (from Flask) (8.1.7)
Requirement already satisfied: blinker>=1.6.2 in c:\users\kishore\appdata\local\programs\python\python312\lib\site-packages (from Flask) (1.8.2)
Requirement already satisfied: colorama in c:\users\kishore\appdata\local\programs\python\python312\lib\site-packages (from click>=8.1.3->Flask) (0.4.6)
Requirement already satisfied: MarkupSafe>=2.0 in c:\users\kishore\appdata\local\programs\python\python312\lib\site-packages (from Jinja2>=3.1.2->Flask) (2.1.5)

[notice] A new release of pip is available: 24.2 -> 24.3.1
[notice] To update, run: python.exe -m pip install --upgrade pip
```

Step 2: Create a folder name SimpleRESTService, Open with VS Code and create python file.

Check and Install Extensions for Python

Extensions:

Python



Python Debugger

Filename: app.py

Code:

```
from flask import Flask, jsonify, request
app = Flask(__name__)

# Sample data
data = [
    {'id': 1, 'name': 'Item 1'},
    {'id': 2, 'name': 'Item 2'},
]

# Endpoint to get all items
@app.route('/items', methods=['GET'])
def get_items():
    return jsonify({'items': data})

# Endpoint to get a specific item by ID
@app.route('/items/<int:item_id>', methods=['GET'])
def get_item(item_id):
    item = next((item for item in data if item['id'] == item_id), None)
    if item:
        return jsonify({'item': item})
    else:
        return jsonify({'message': 'Item not found'}), 404
```

```
# Endpoint to add a new item
@app.route('/items', methods=['POST'])
def add_item():
    new_item = {'id': len(data) + 1, 'name': request.json['name']}
    data.append(new_item)
    return jsonify({'message': 'Item added successfully', 'item': new_item}), 201


# Run the application
if __name__ == '__main__':
    app.run(debug=True)
```

Output:

View>Terminal

Type

Path> **python app.py**

Demonstration:

Postman

API Testing Software Application to Test the API

Open Postman

 # Endpoint to get all items

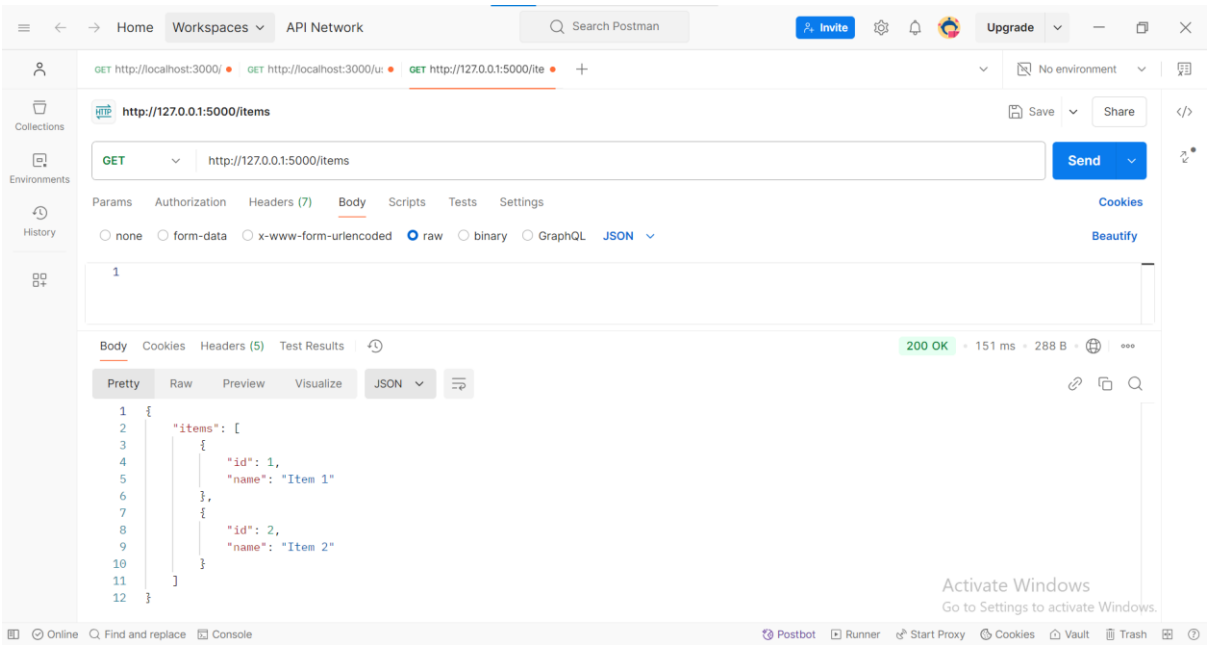
Send a GET Request:

URL: http://127.0.0.1:5000/items

Response:


```
{
  "items": [
    {
      "id": 1,
      "name": "Item 1"
    },
    {
      "id": 2,
      "name": "Item 2"
    }
  ]
}
```


Demonstration:



 # Endpoint to get a specific item by ID

Send a GET Request:

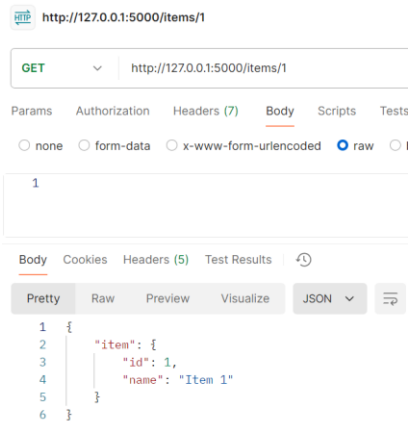
URL: http://127.0.0.1:5000/items/1

Response:


```
{
  "item": {
    "id": 1,
    "name": "Item 1"
  }
}
```


Provides specific id from Sample Data available i.e., URL: http://127.0.0.1:5000/items/1

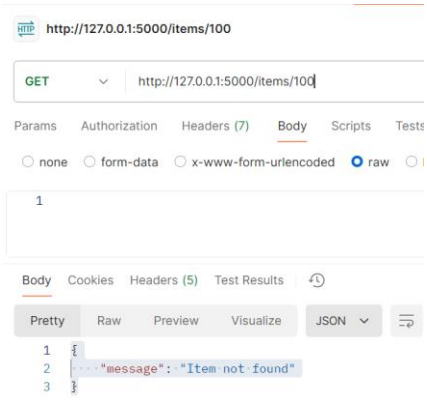
Demonstration:



Throws Error when not item not found from Sample Data. Example

URL: http://127.0.0.1:5000/items/100

Demonstration:



 # Endpoint to add a new item

Send a POST Request:

URL: http://127.0.0.1:5000/items

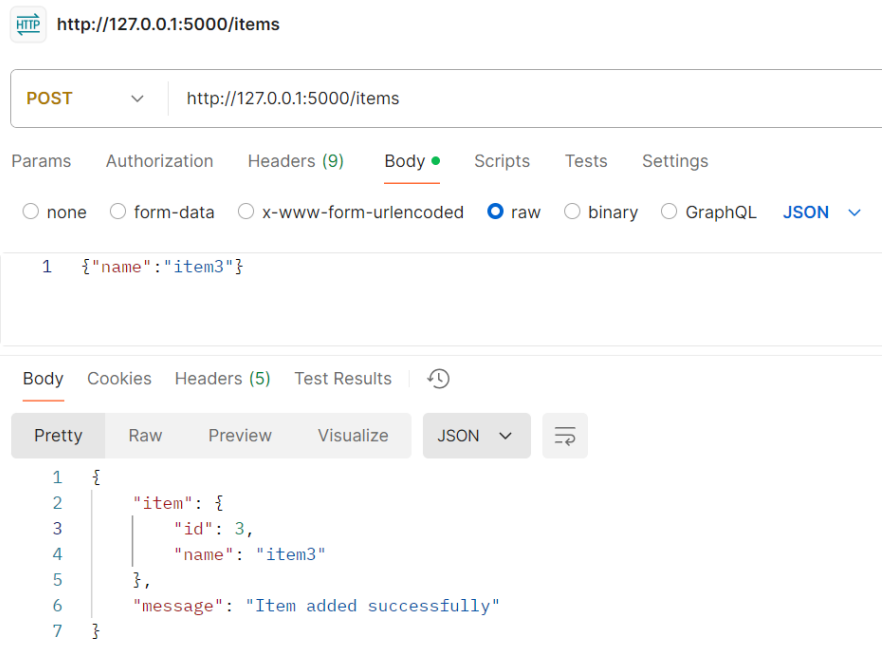
Body: Set the body to raw JSON and include:

{"name":"item3"}

Response:


```
{
   "item": {
      "id": 3,
      "name": "item3"
   },
   "message": "Item added successfully"
}
```


Demonstration:

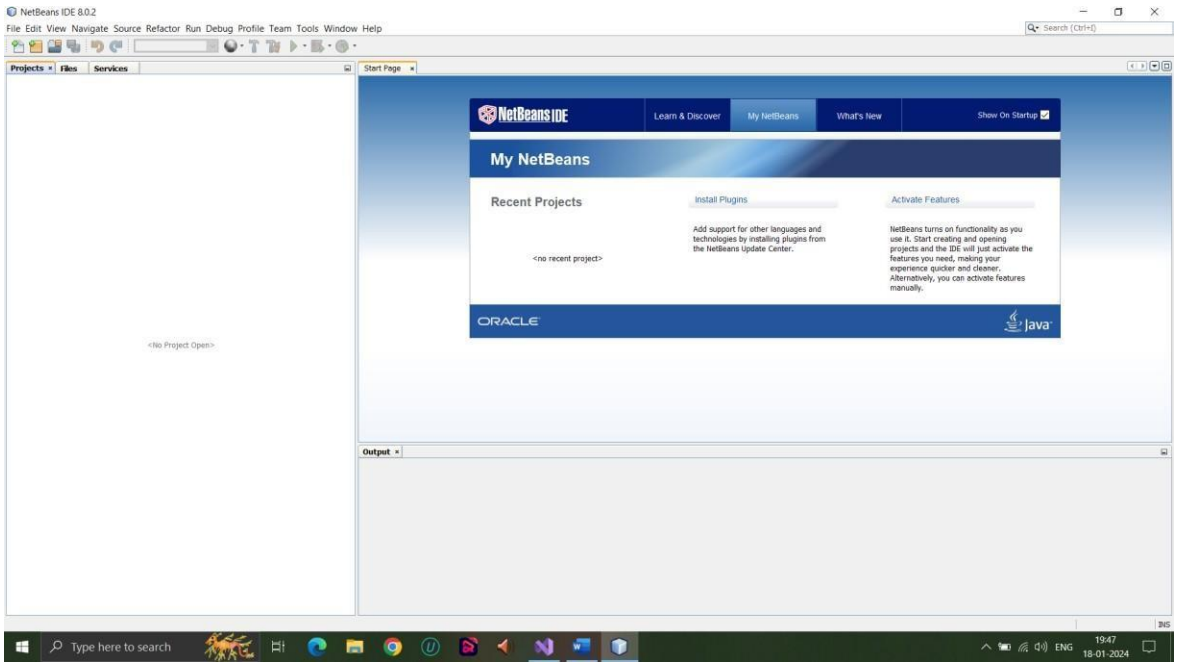


Practical-1

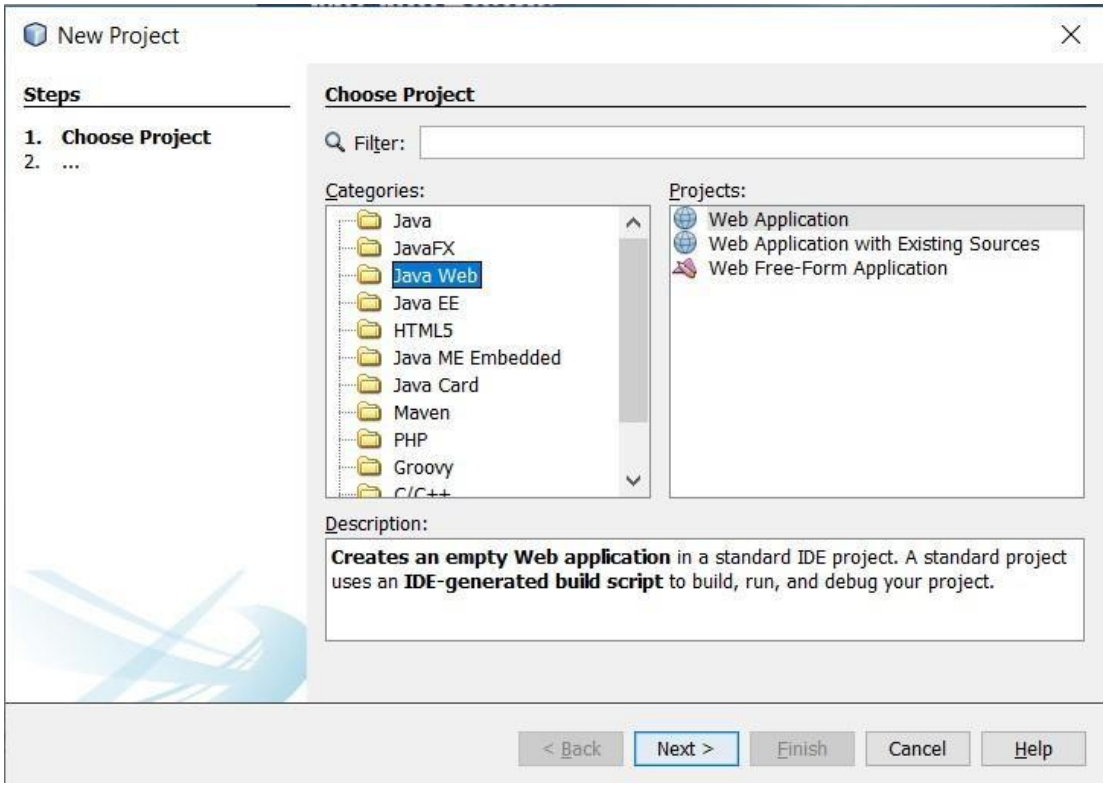
Create a Simple SOAP service.

Steps:

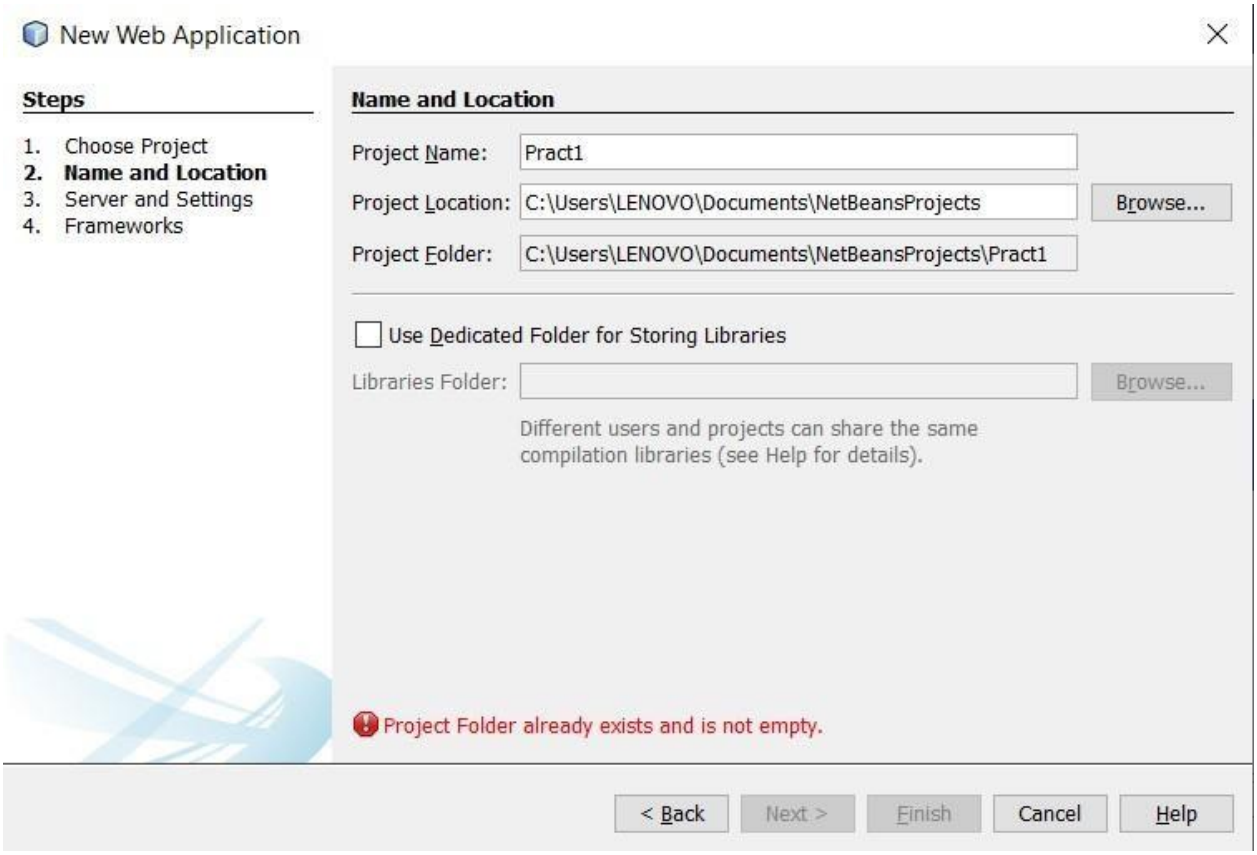
1] Open the NetBeans , and you will get the following screen. Close the start page.



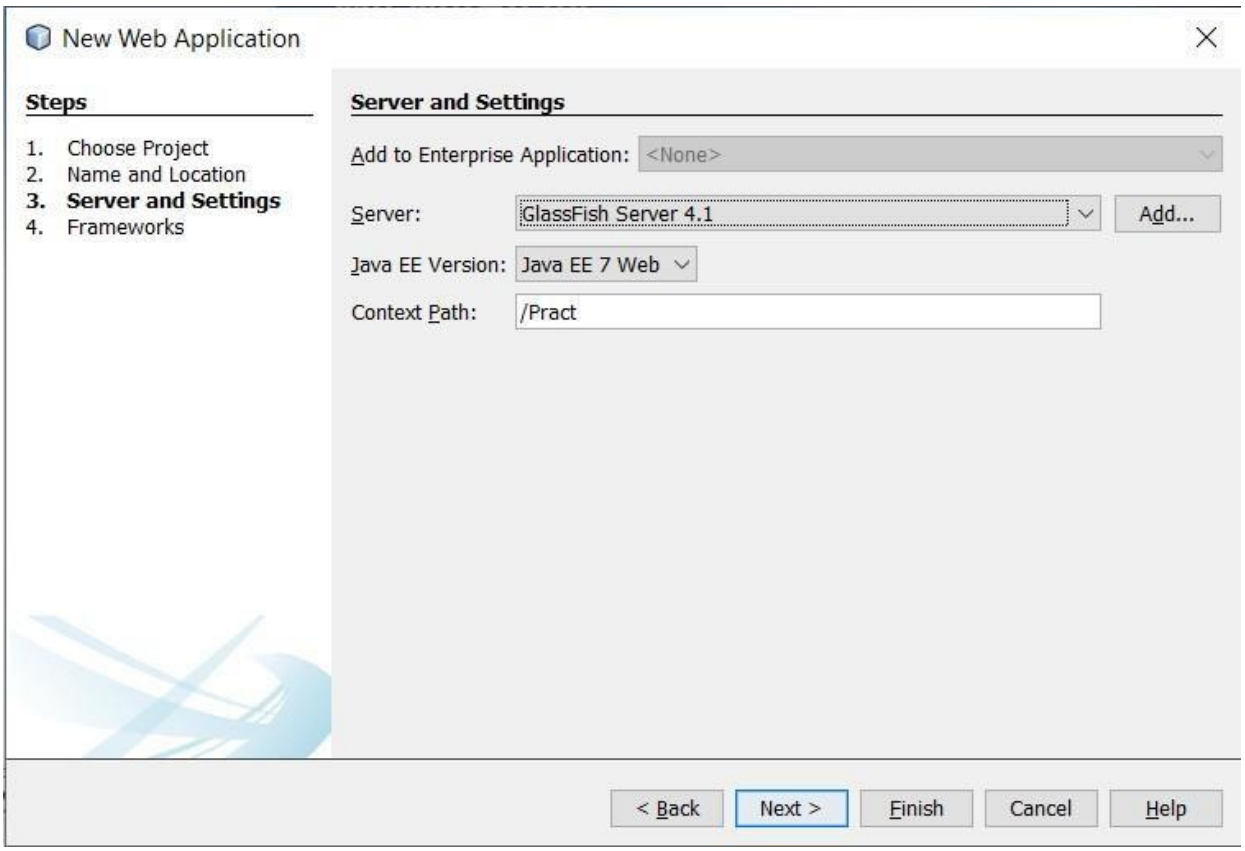
2] Now click on the file tab and click on new project you will get the following screen :



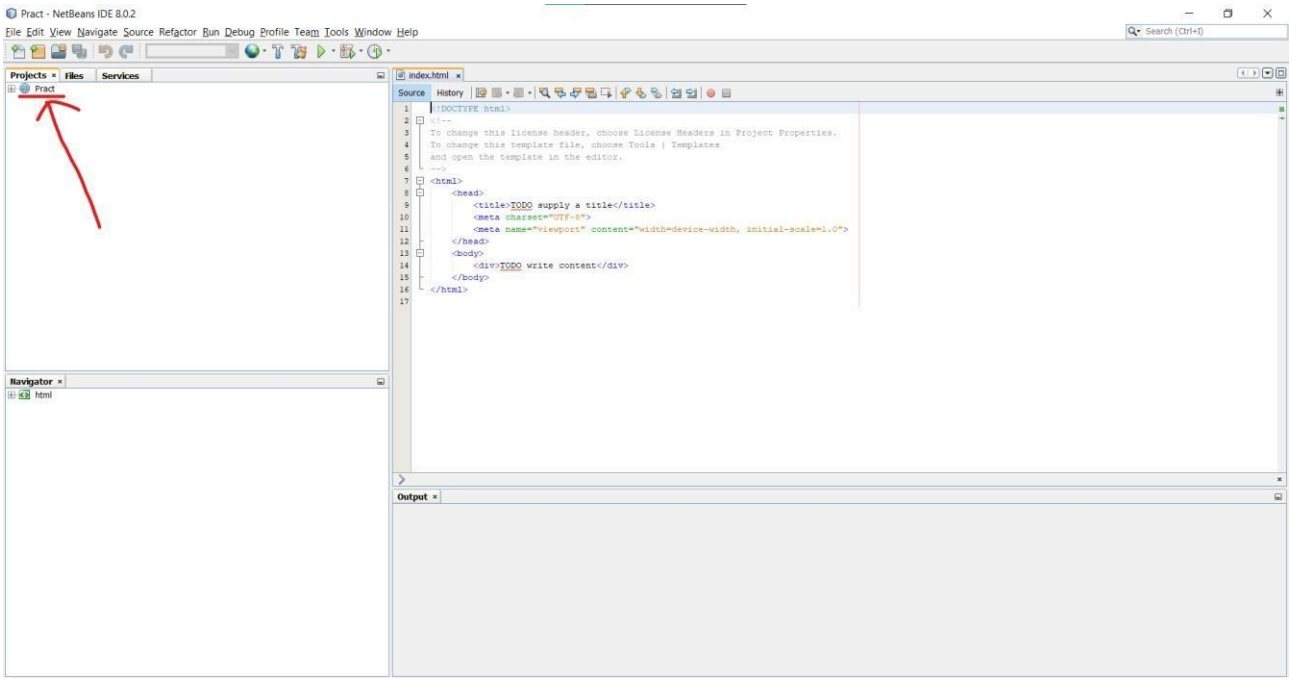
3] In Categories select Java Web and in Projects , Select Web Application .After selecting click onnext . You will get the following window:



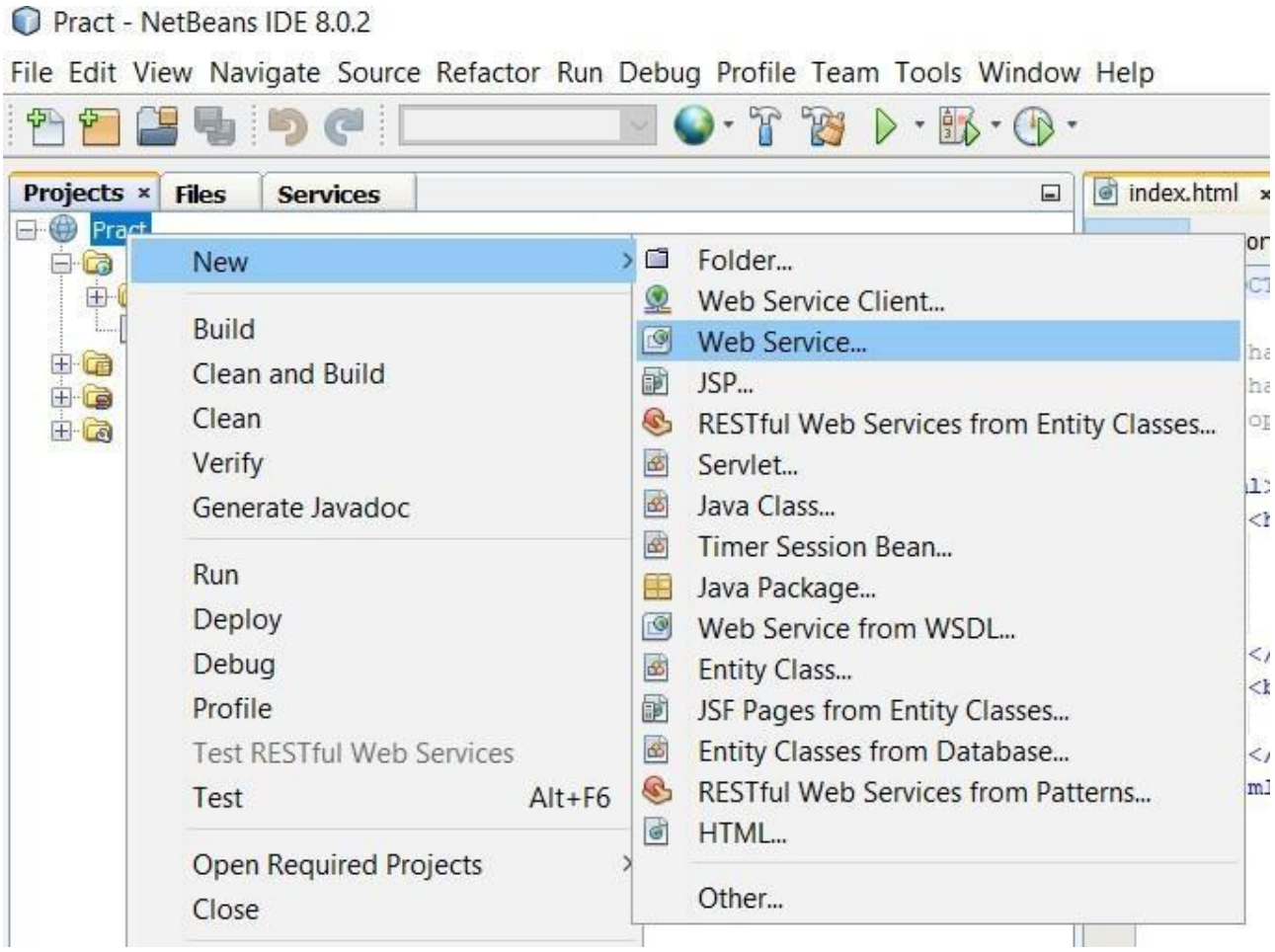
4] Now Give name to the Project Name: , and click on next . you will get the following windowthen . again click on finish:



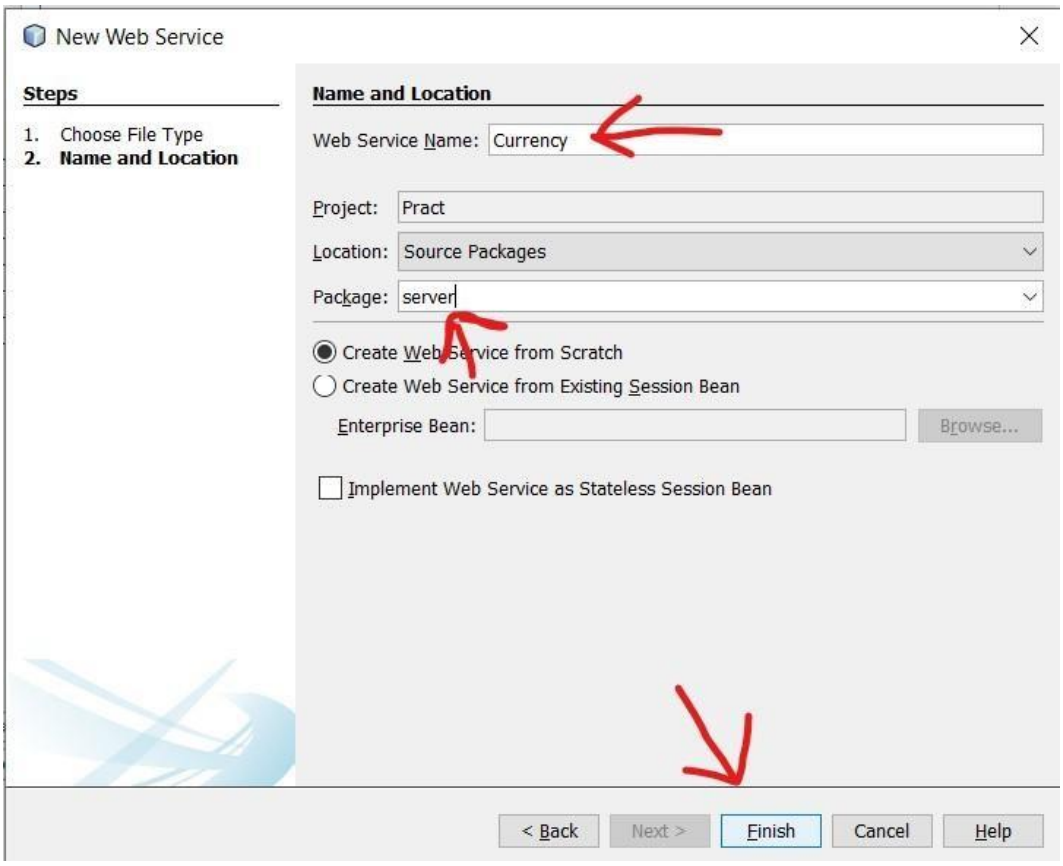
5] You will get the following screen now carefully see in projects section your recently created project appears double click to expand it:



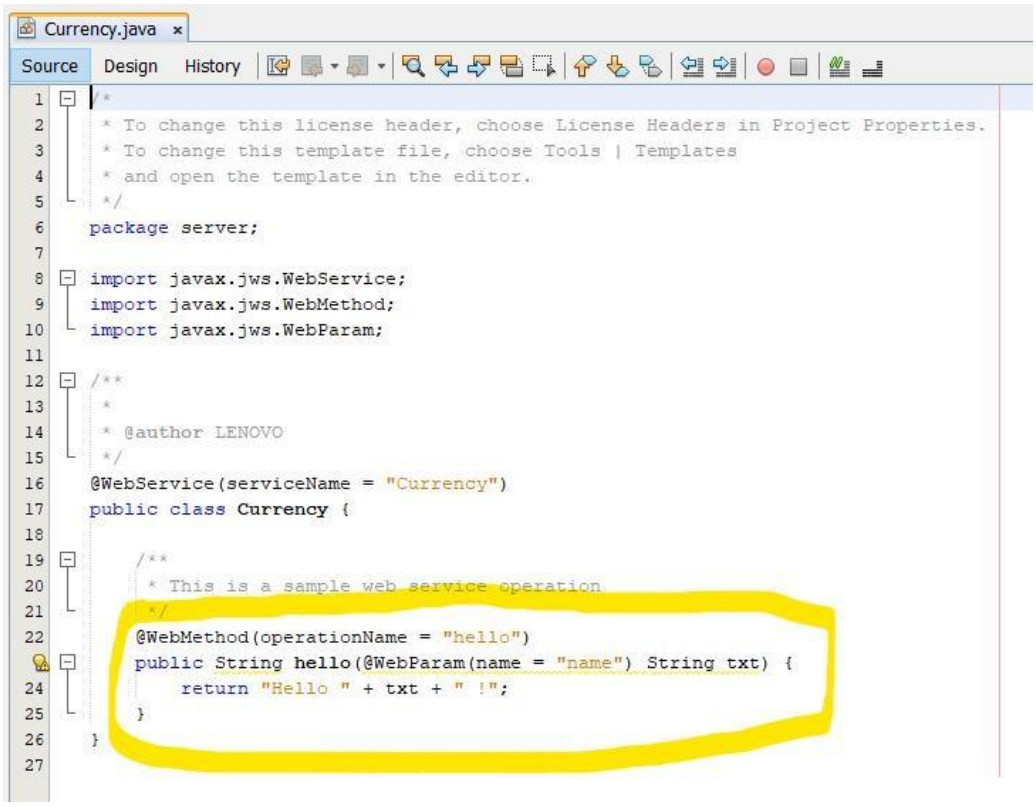
6] Now Right click on the project and select new and then select Web Service ,As shown Below:



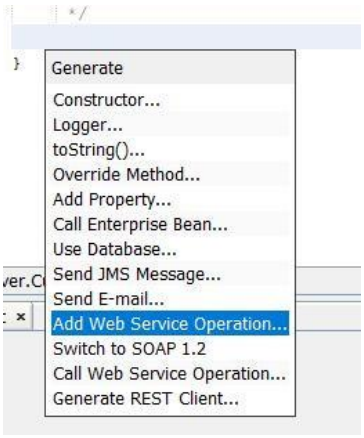
7] after clicking Web Service following window should appear , now give name to web serviceand give package as “server”. As shown in the image:



After clicking finish you should get the following window erase the mentioned code :

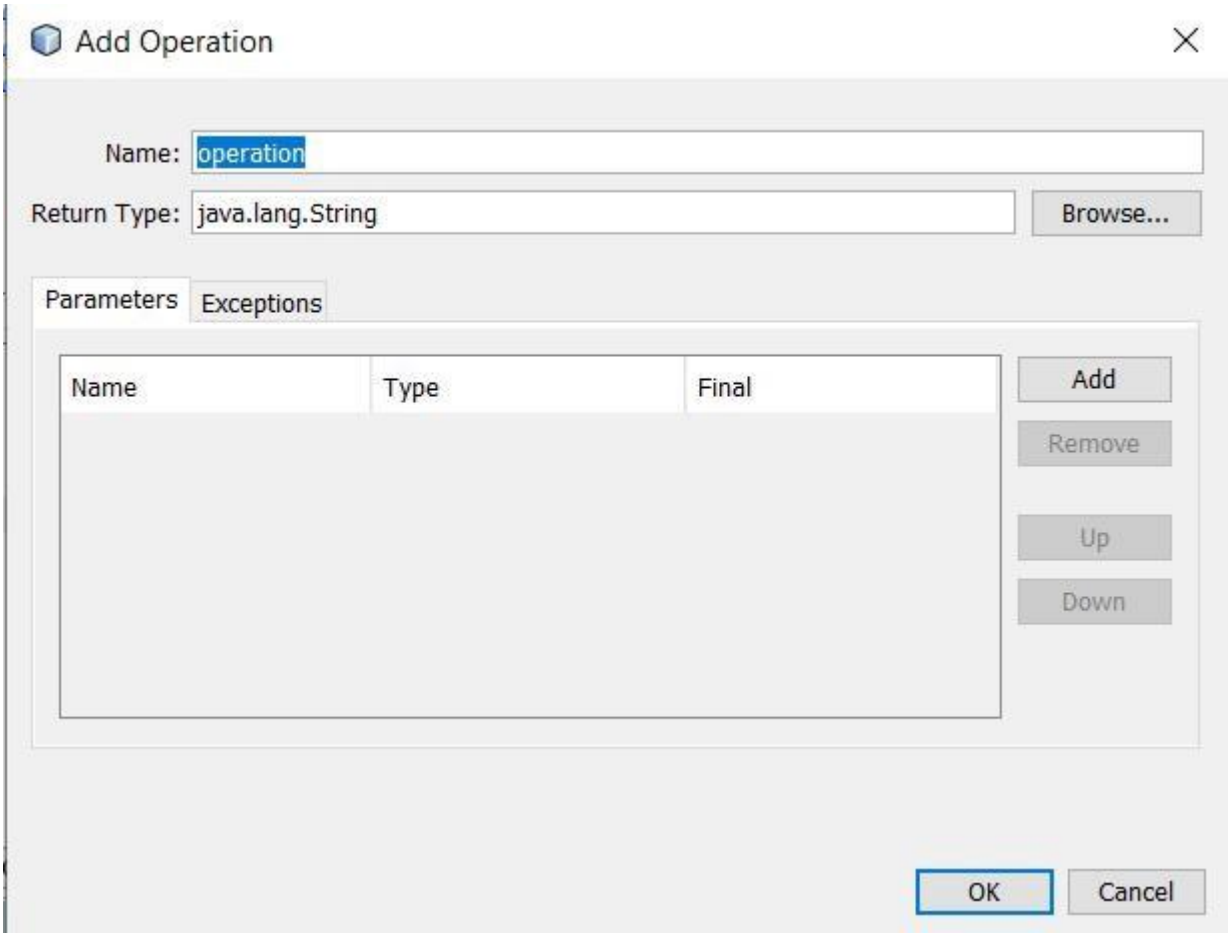


8] Now right click any where and click on insert code and select Add Web Service Operation :

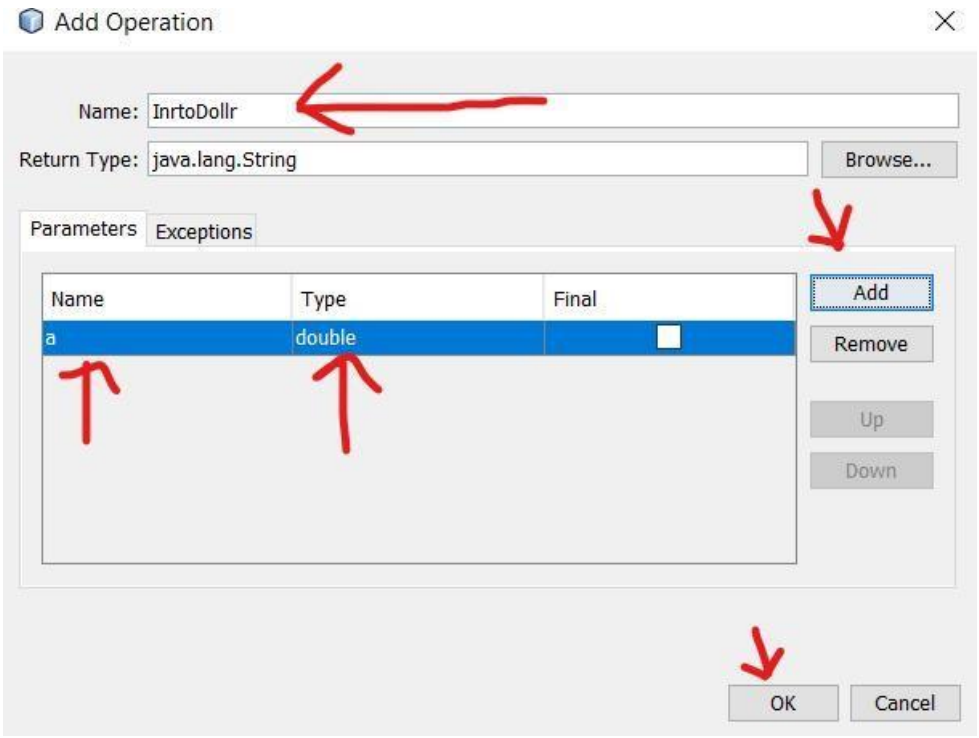


9] the following window would appear :

Just give name to the method or operation and click on add button to add parameters to the method as here we are converting dollar to rupees we should need only one parameter .



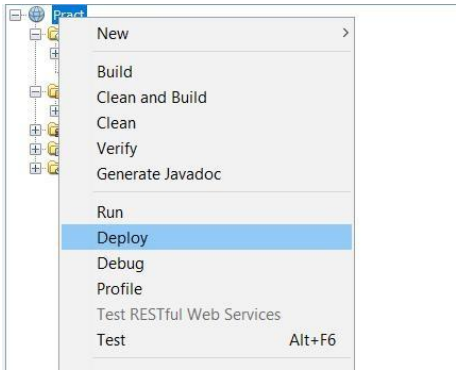
10] give the name to the variable select data type as double and click on ok as shown below:



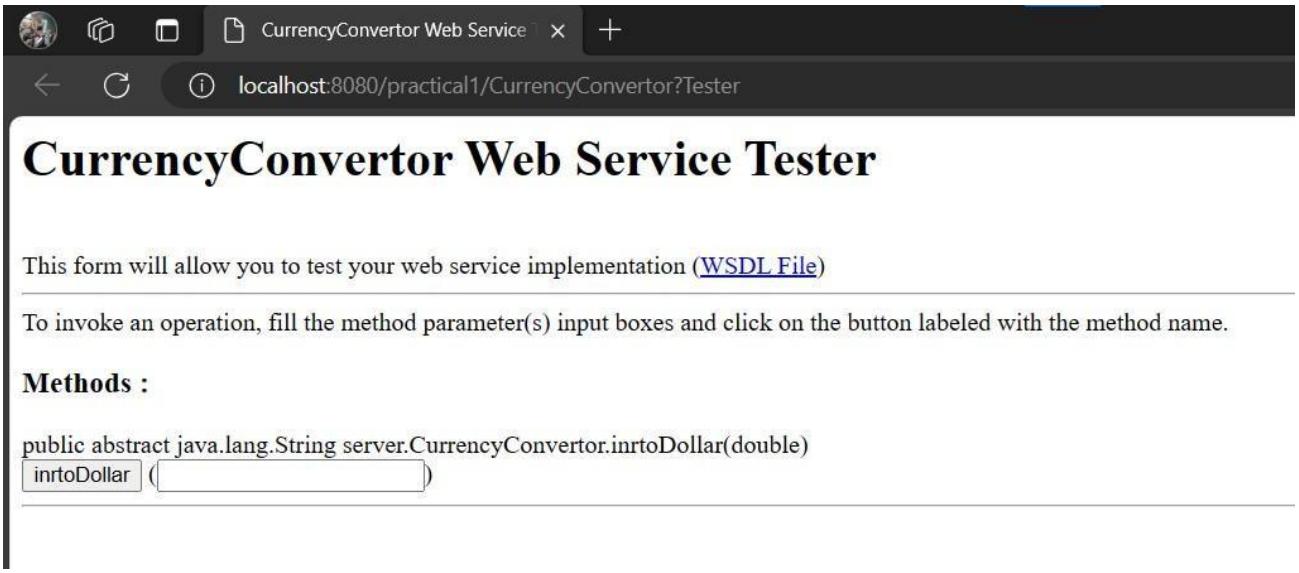
11] After clicking ok code will autogenerate , make changes In that code as mentioned below:

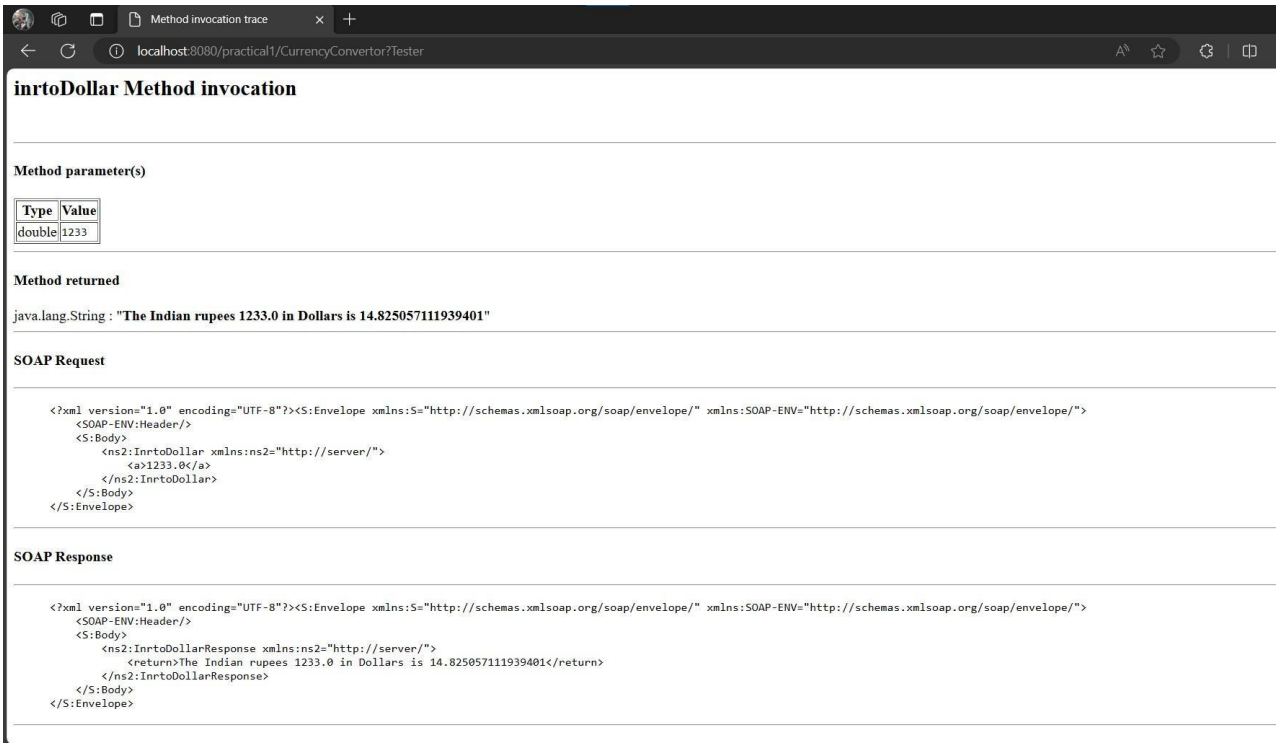
```
@WebMethod(operationName = "InrtoDollar")
public String InrtoDollar(@WebParam(name = "a") double a) {
    //TODO write your implementation code here:
    return "The Indian rupees "+a+" in Dollars is "+(a/83.17);
}
```

12] now our web service is ready now right click on project and click on deploy :



13] now right click on webservice and click on test web service you will get the following output:

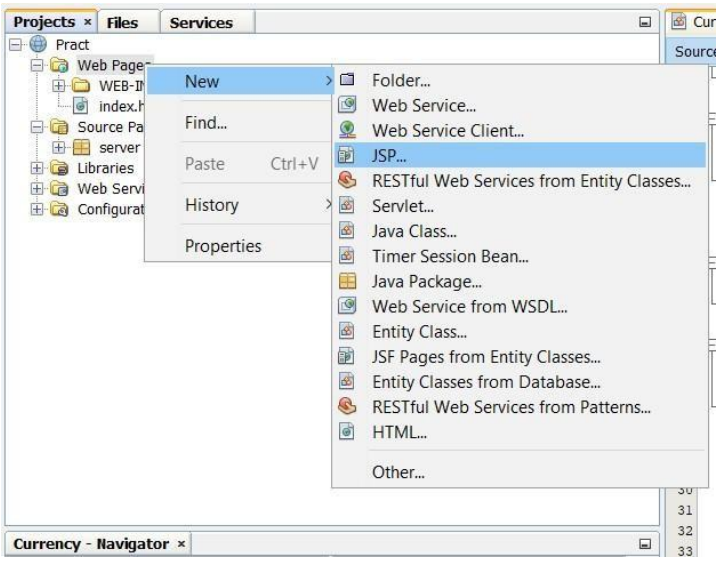




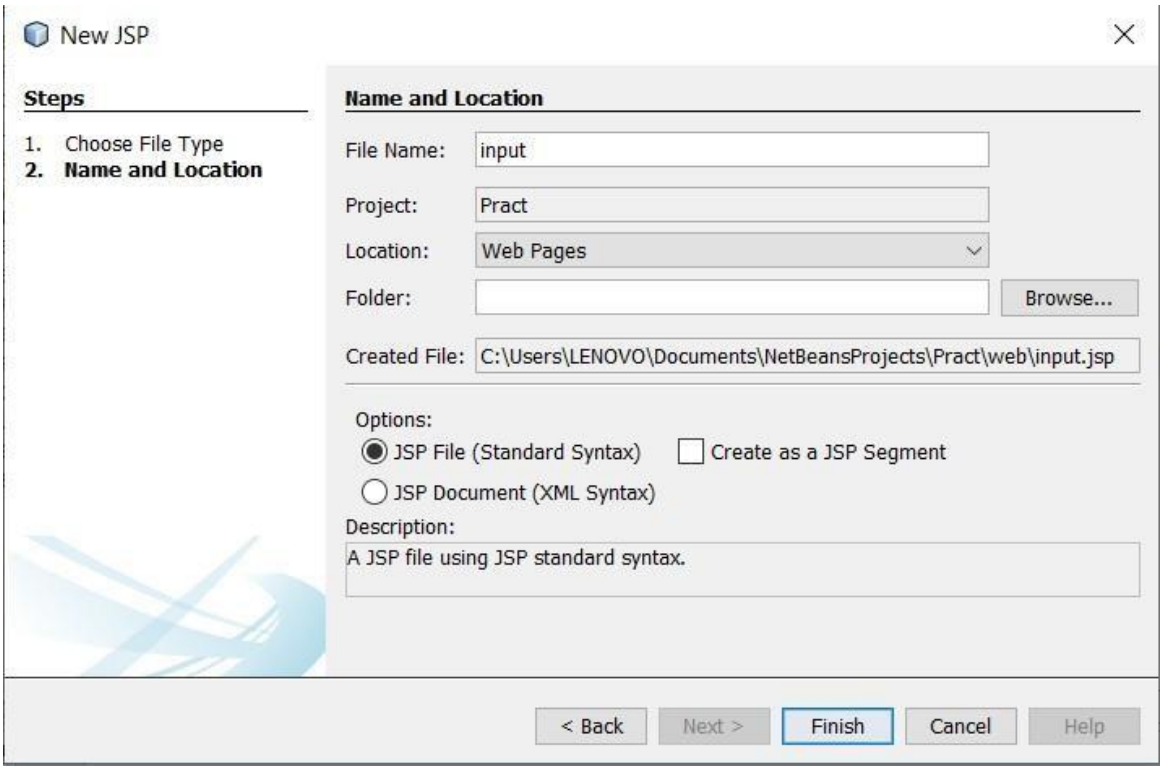
So this is how we created our web service and deployed it.

Creating a java Client using jsp

14] now our web service is successfully deployed. Right click on web pages and select new and select jsp as shown below:



15] give name and click on finish as shown below do it 2 times on for input and one foroutput:

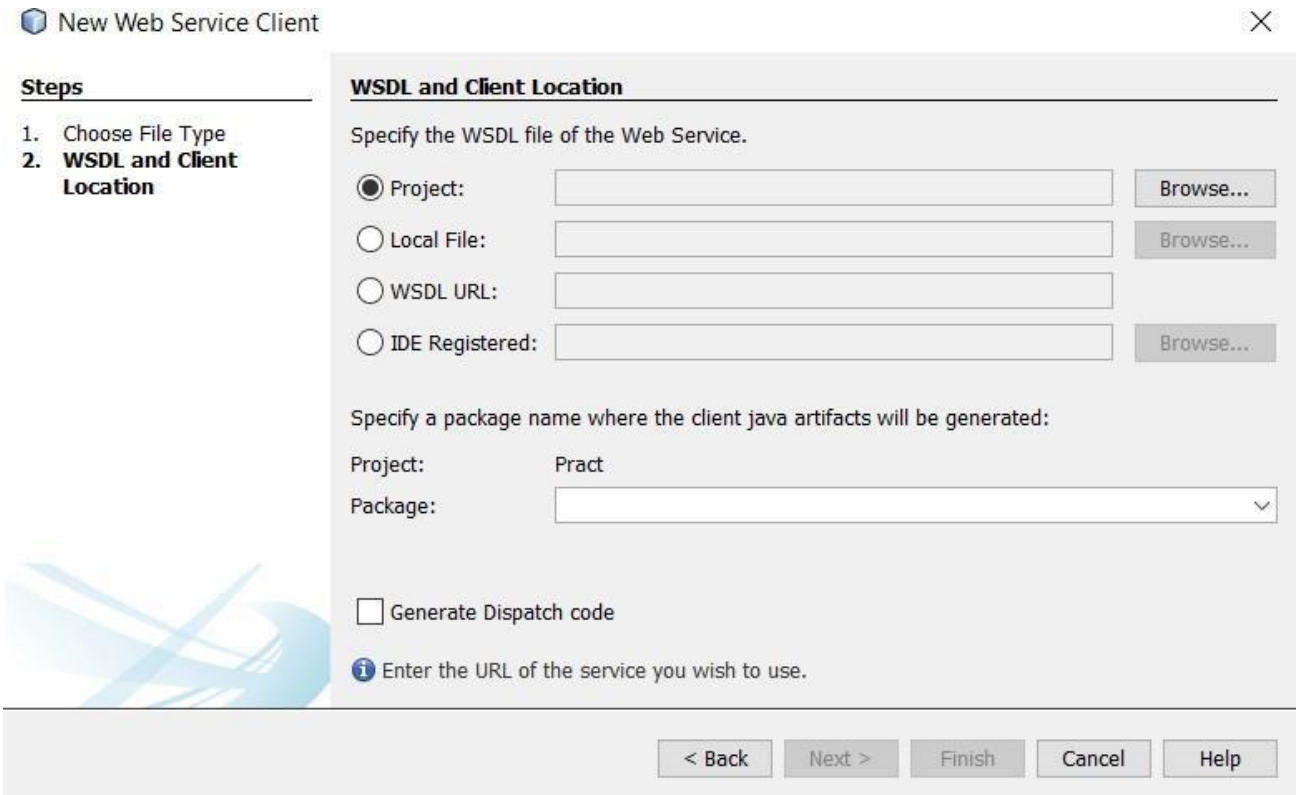


16] In input.jsp create a form for taking user input as shown below:

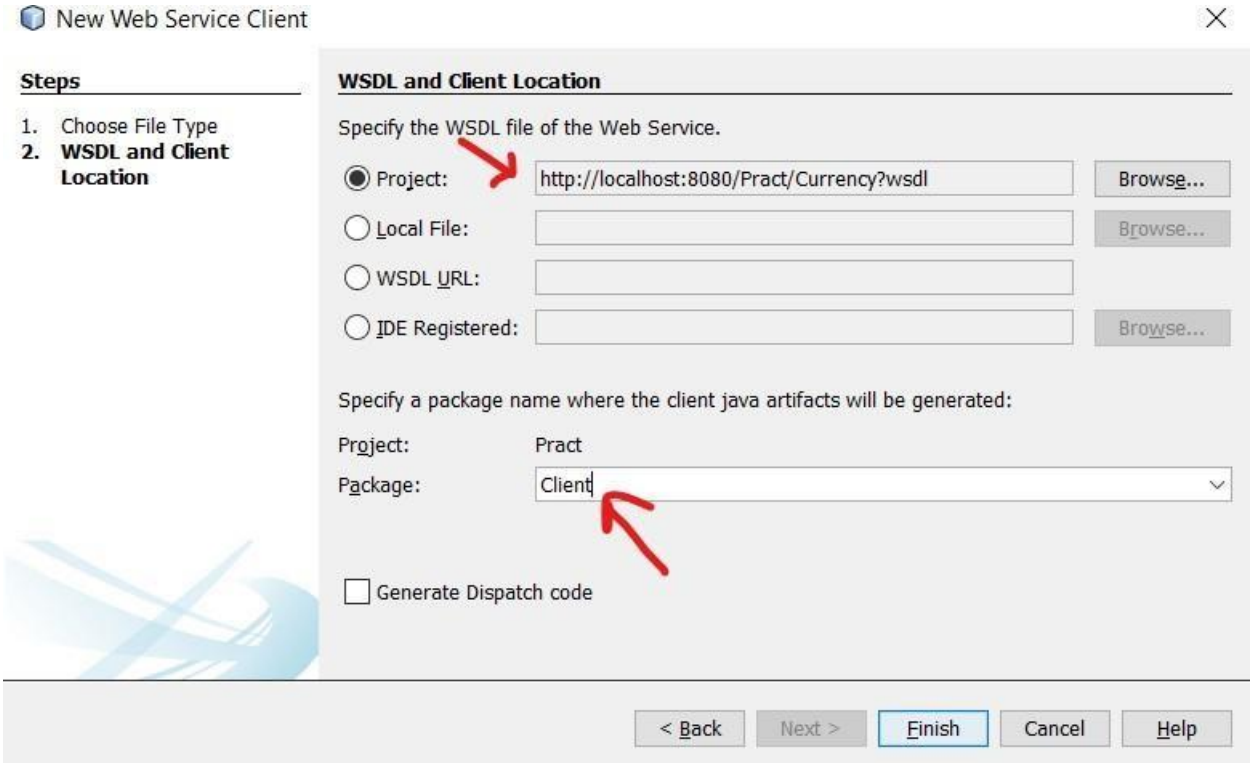
```
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>JSP Page</title>
    </head>
    <body>
        <form action="output.jsp">
            <pre>
                Enter the currency in rupees : <input type="text" name="t1">
                <input type="submit">       <input type="reset">
            </pre>
        </form>
    </body>
</html>
```

In this code set action = the jsp file where u want output and give name to textbox input.

17] now we have to create web service client, for same right click on project and select new then select web service client you will get the following screen:



At this step click on browse and select your project and click ok after clicking ok you will get wsdl url as shown below:



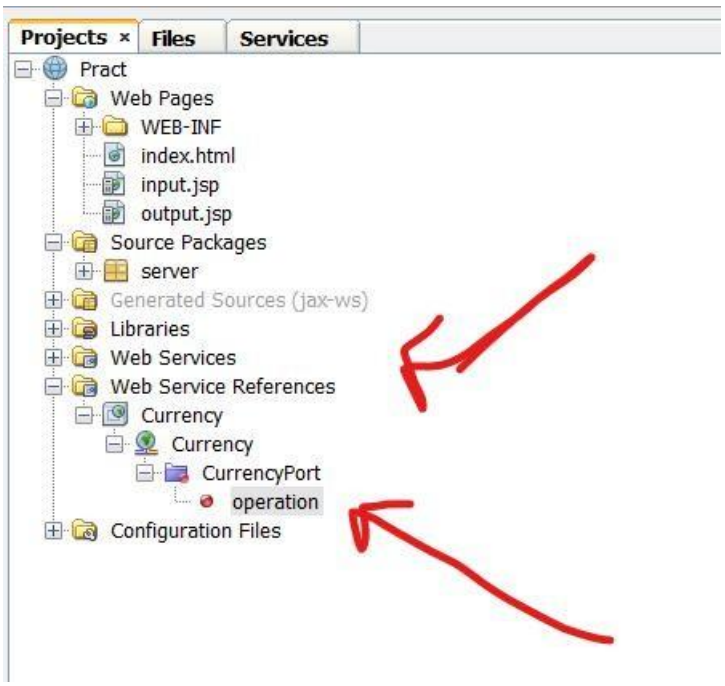
At this stage copy the url and paste it in notepad for future.

Give package name as "Client".

Now click on finish.

18] now in project section you can se a new folder is been created named "web servicerefrence".

double click to expand it you should get the following :



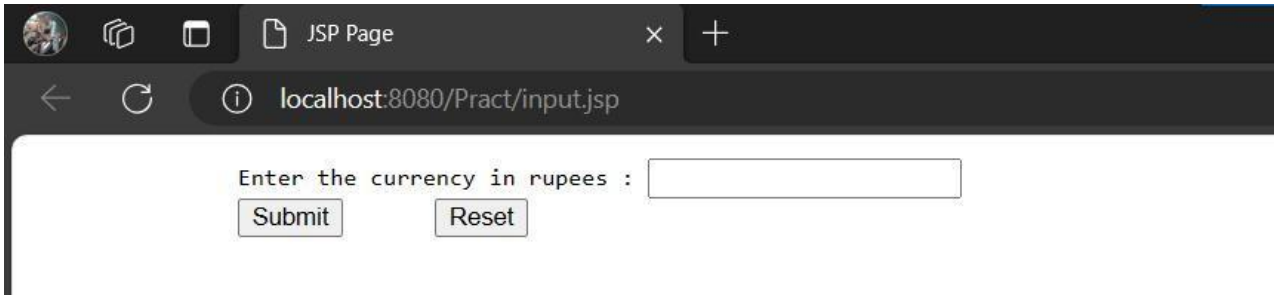
Hold the operation or your operation name and drag it into the output.jsp in body tag as shown : You will get the following auto generated code:

```
<body>
        <%-- start web service invocation --%><hr/>
<%
try {
    Client.Currency_Service service = new Client.Currency_Service();
    Client.Currency port = service.getCurrencyPort();
     // TODO initialize WS operation arguments here
    double a = 0.0d;
    // TODO process result here
    java.lang.String result = port.operation(a);
    out.println("Result = "+result);
} catch (Exception ex) {
    // TODO handle custom exceptions here
}
%>
<%-- end web service invocation --%><hr/>

</body>
```

19] now make changes as shown below in the code:

```
        <%-- start web service invocation --%><hr/>
<%
try {
    Client.Currency_Service service = new Client.Currency_Service();
    Client.Currency port = service.getCurrencyPort();
     // TODO initialize WS operation arguments here
    double a = Double.parseDouble(request.getParameter("t1"));
    // TODO process result here
    java.lang.String result = port.operation(a);
    out.println(result);
} catch (Exception ex) {
    // TODO handle custom exceptions here
}
%>
<%-- end web service invocation --%><hr/>
```

20] now Deploy our project again and right click on input.jsp and click run file you will redirect to a browser page as shown :



I

Enter any numerical value in text box and click on submit you will get the following output:

Python client:

1] for consuming java web services in python we should repeat the above steps till step np.19 .

Note: for getting output the project or web service should be deployed .

After doing all of the steps write the following code in python idle:

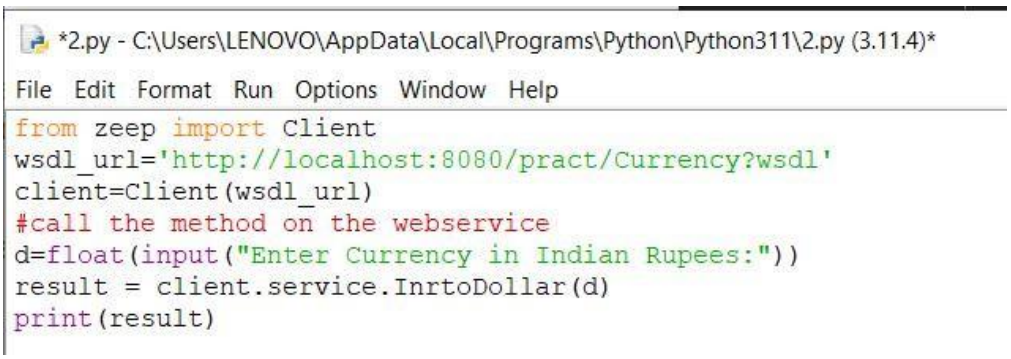
Code :

```
from zeep import Client
wsdl_url='http://localhost:8080/pract/Currency?wsdl'
client=Client(wsdl_url)
#call the method on the webservice
d=float(input("Enter Currency in Indian Rupees:"))
result = client.service.InrtoDollar(d)
print(result)
```

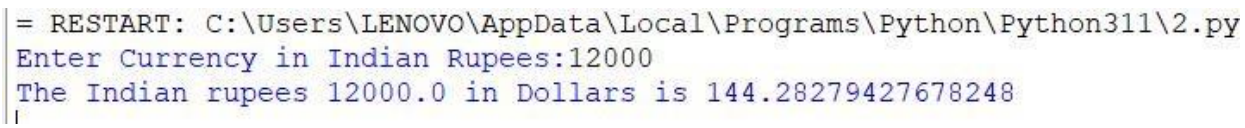
2] replace wsdl_url with the url which was copied at the time of web service client creation .

In step no.17 . and replace the InrtoDollarwith your method or operation name. and pass parameter to it

3] final code should look like following:

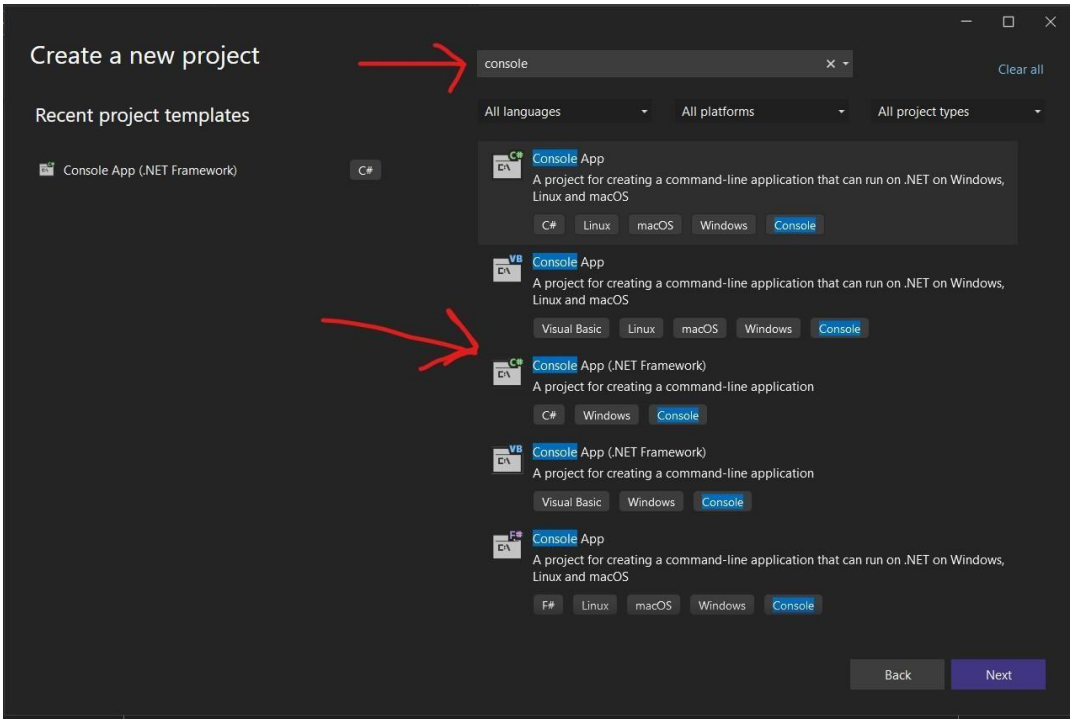


4] after running the above code you should get the following output:



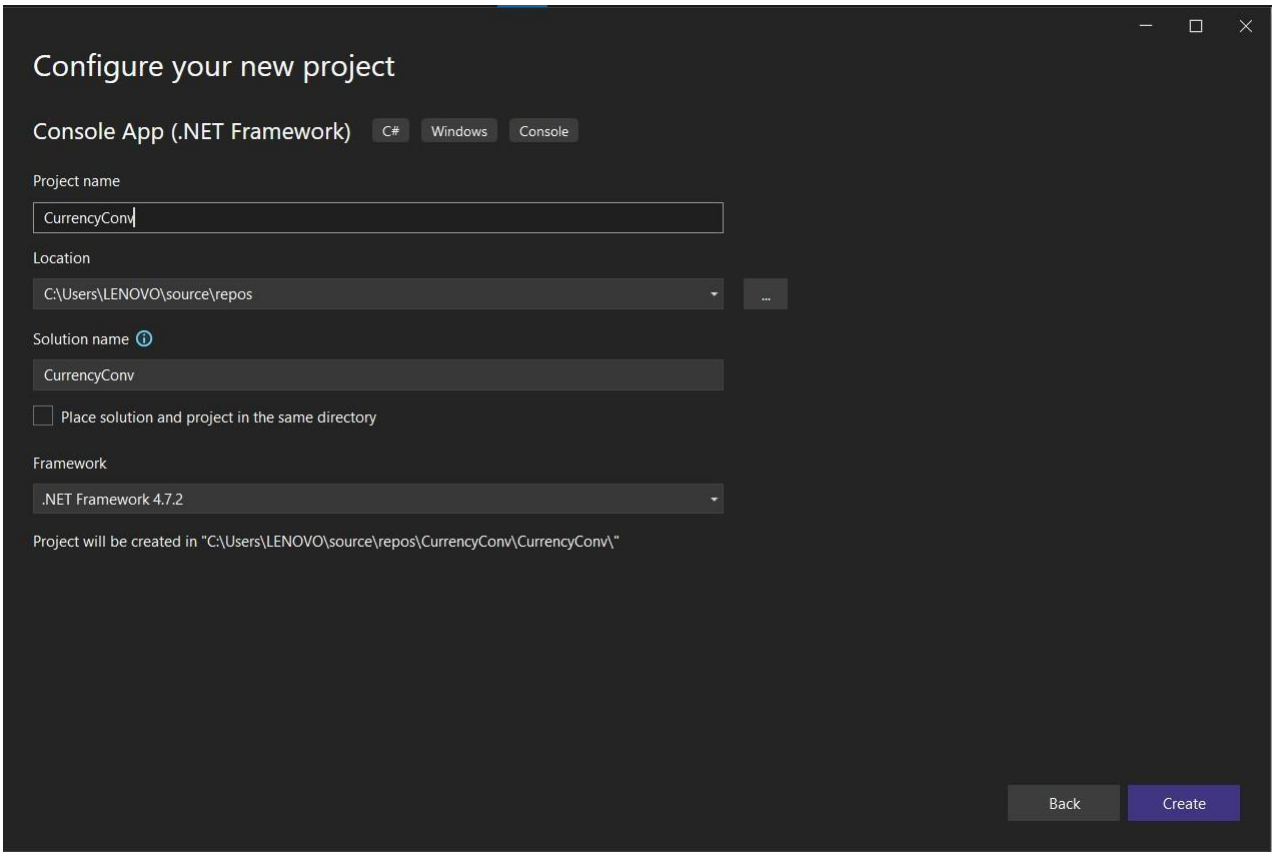
.Net Client

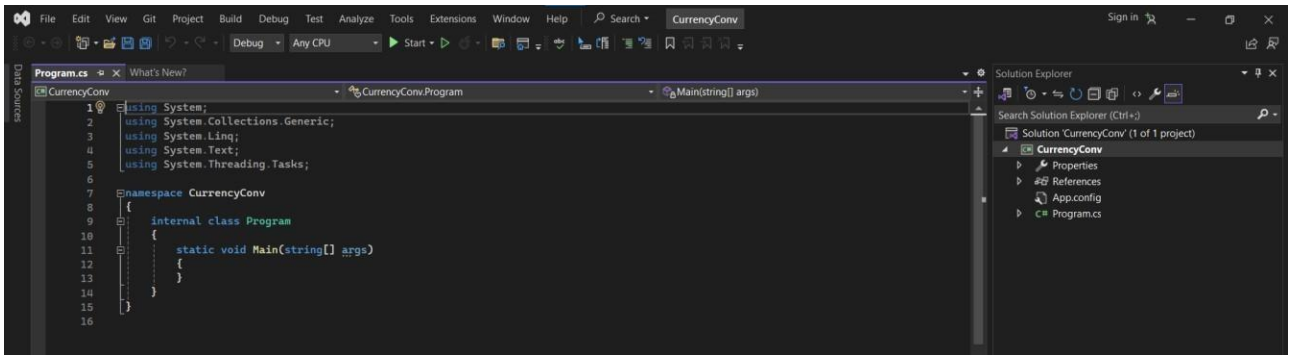
1] open visual studio and select create a new project the following window will appear:



Here in search bar type “console c#” and select console app for .Net frame work as shown in above image.

2] Give name to the project and press create button as shown in the image:

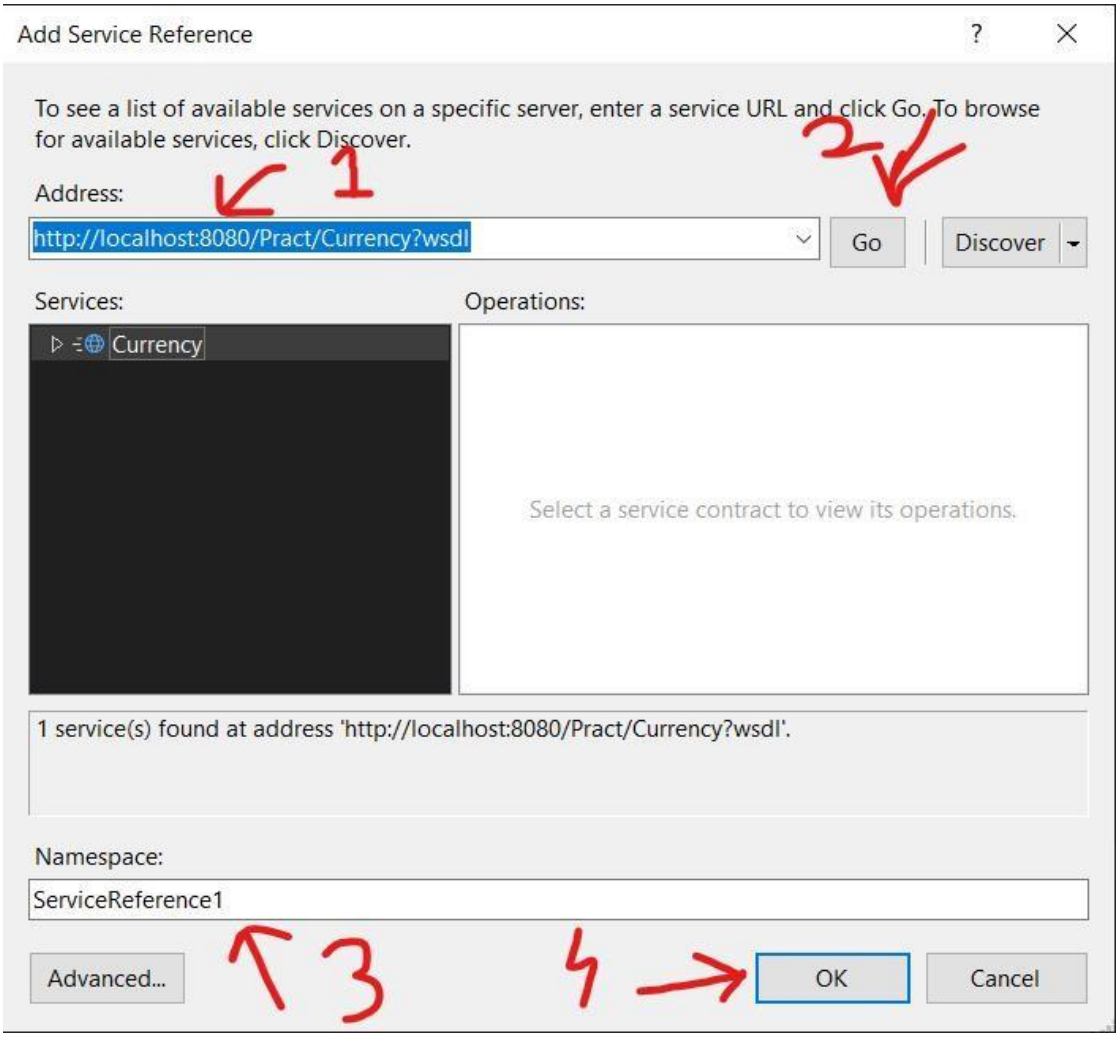




This window should appear after clicking create button now In right side there is solution Explorer.

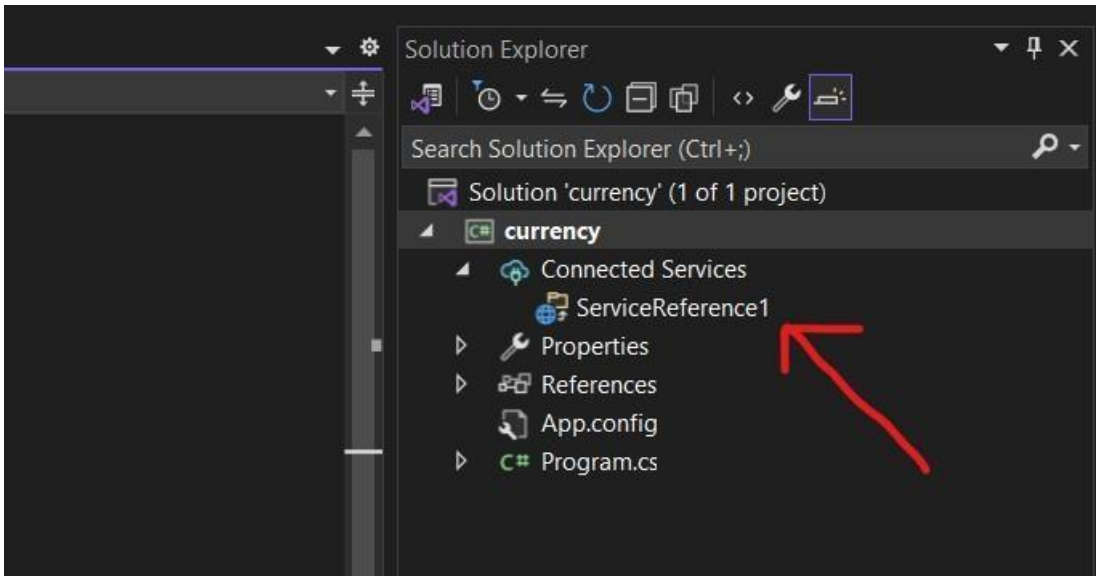
In that right click on your project name and click on add > Service Reference . You will get the following window :

Note: before executing the code make sure that the web service is deployed.

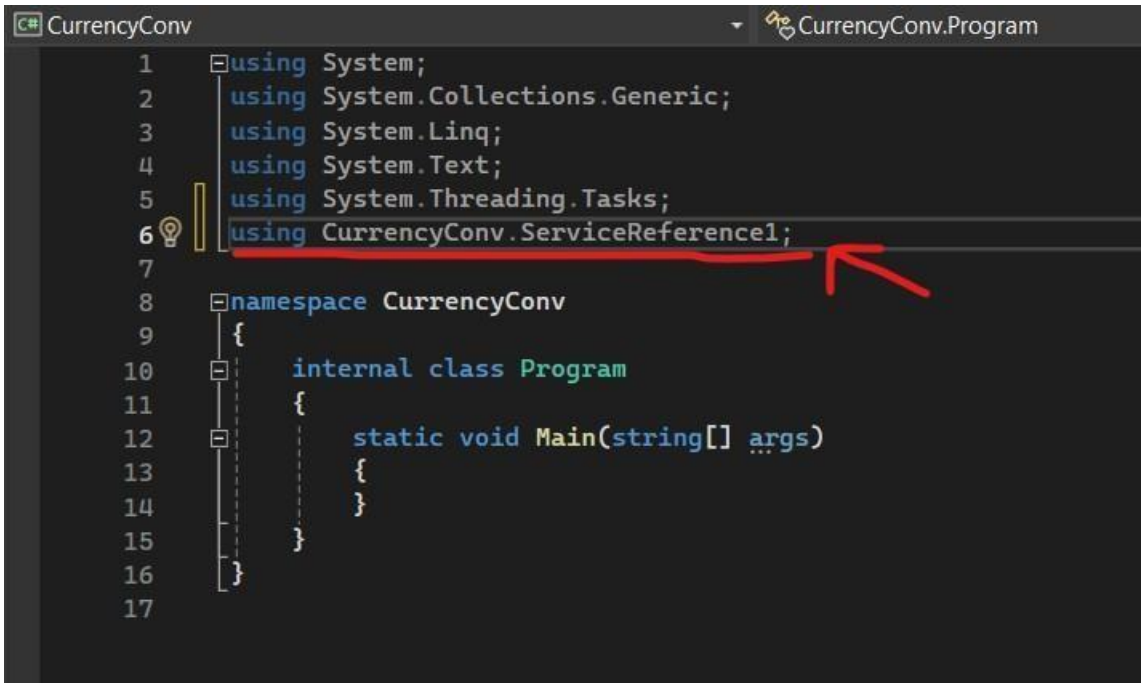


Here in address bar paste the wsdl url the same which is used I python code. And press go button . agter set the namespace In my case I am letting is as it is then press ok button.

In following image u can check in solution Explorer service refrence iscreated.:



3] now in code write the following line as shown in image:



Here type:

Using your_projectname . your_serviceReference_name ;

4] now write the code as shown in the following image:

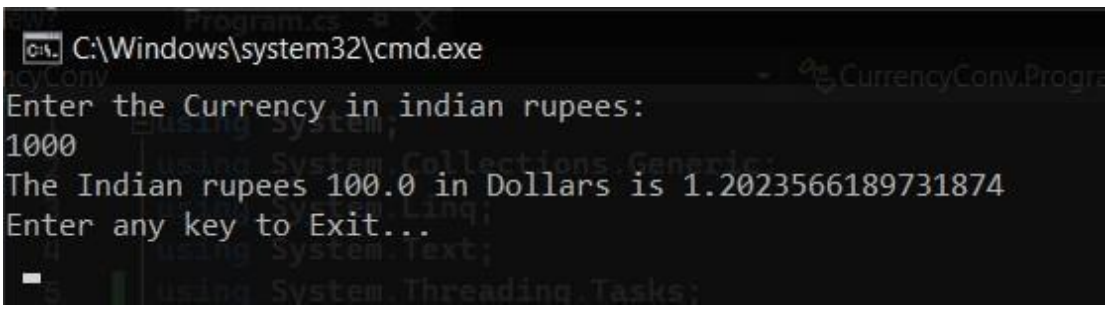
/

```
namespace CurrencyConv
{
    internal class Program
    {
        static void Main(string[] args)
        {
            CurrencyClient client = new CurrencyClient();
            Console.WriteLine("Enter the Currency in Indian Rupees : ");
            double d = double.Parse(Console.ReadLine());
            Console.WriteLine(client.InrtoDollar(d));
            Console.WriteLine("Enter any key to Exit...");
            Console.ReadKey();
            Console.ReadLine();
        }
    }
}
```

Note:

Here CurrencyClient is my webservice class name and **operation() is my method name** as show you can also check your own:

5] when you run the above code you get the following output:



/

Practical-2

Define a simple services like Converting Rs into Dollar and Call it from different platform like JAVA and .NET

Steps:

Note : for all these steps in brief refer practical no.1 document

1] create a new project and create a new webservice

2] now right click on the code and click on insert code > add new web service operation

3] after give name to operation **FtoC** and add one parameter **a** of double data type and click ok the code will auto generate .

4] now do the following changes in that auto generated code:

```
 */
@WebMethod(operationName = "FtoC")
public String FtoC(@WebParam(name = "a") double a) {
    //TODO write your implementation code here:
    return "The Fahrenheit Temperature "+a+" in Celsius is "+((a-32)*5/9);
}
```

Now deploy the model.

5] After deploying the model just right click on your web service and click on test web service . and you will get redirected to a browser page where you can check that your web service is working or not.

Creating java Client using jsp

5] now right click on web pages > new > jsp . and give name as input jsp.

Again right click on web pages > new > jsp . and give name as output jsp.

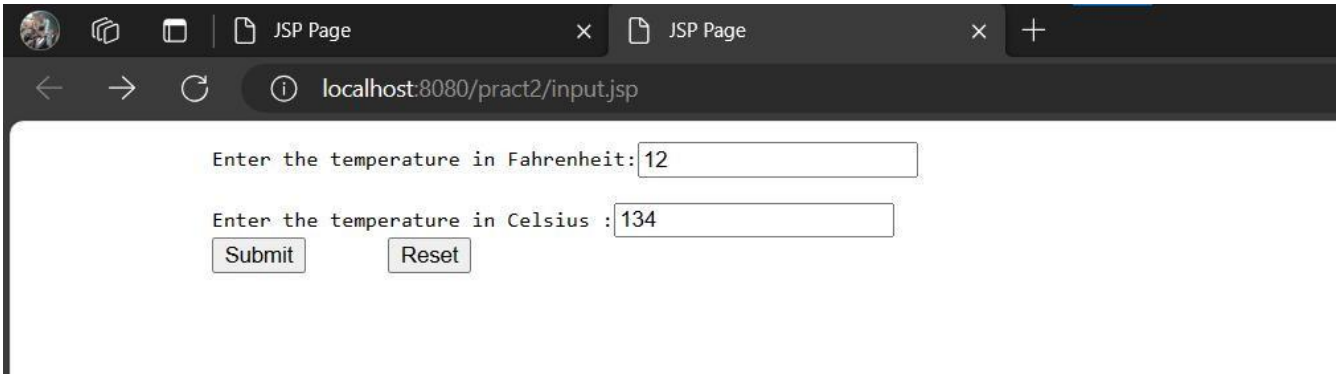
6] In input.jsp write the following code :

```
<body>
    <form action="output.jsp">
        <pre>
            Enter the temperature in Fahrenheit:<input type="text" name="t1" required>

            Enter the temperature in Celsius :<input type="text" name="t2" required>
            <input type="submit">       <input type="reset">
        </pre>
    </form>
</body>
```

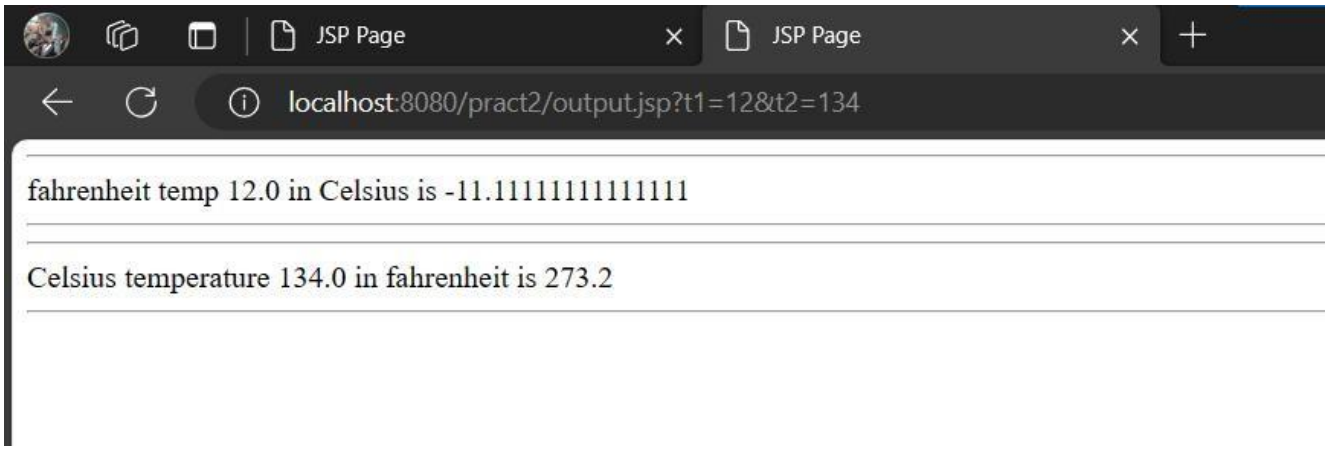
7] create a Web service client and give package name as “Client”. After creating web service client go to web service references and drag and drop the operations in output.jsp in body tag as shown below:

```
        <%-- start web service invocation --%><hr/>
<%
try {
    client.Conv_Service service = new client.Conv_Service();
    client.Conv port = service.getConvPort();
     // TODO initialize WS operation arguments here
    double a = Double.parseDouble(request.getParameter("t1"));
    // TODO process result here
    java.lang.String result = port.FtoC(a);
    out.println(result);
} catch (Exception ex) {
    // TODO handle custom exceptions here
}
%>
<%-- end web service invocation --%><hr/>
```

8] now deploy the model again and run the input.jsp file you will get redirected to the browser page as shown:



After submitting you will get the following output:



Python Client

1] Deploy the web service and write the following code :

Code :

```
from zeep import Client
wsdl_url='http://localhost:8080/Practical_2/TempConverter?wsdl'
client=Client(wsdl_url)
#call the method on the webservice
d=float(input("Enter temperaure in Fahrenheit :"))
result = client.service.FtoC(d)
print(result)
```

2] replace your_wsdl_url with the url which was copied at the time of web service client creation .

In step no.16 . and replace the operation_name with your method or operation name. and pass parameter to it

3] final code should look like following:

2.py - C:\Users\LENOVO\AppData\Local\Programs\Python\Python311\2.py (3.11.4)

File Edit Format Run Options Window Help

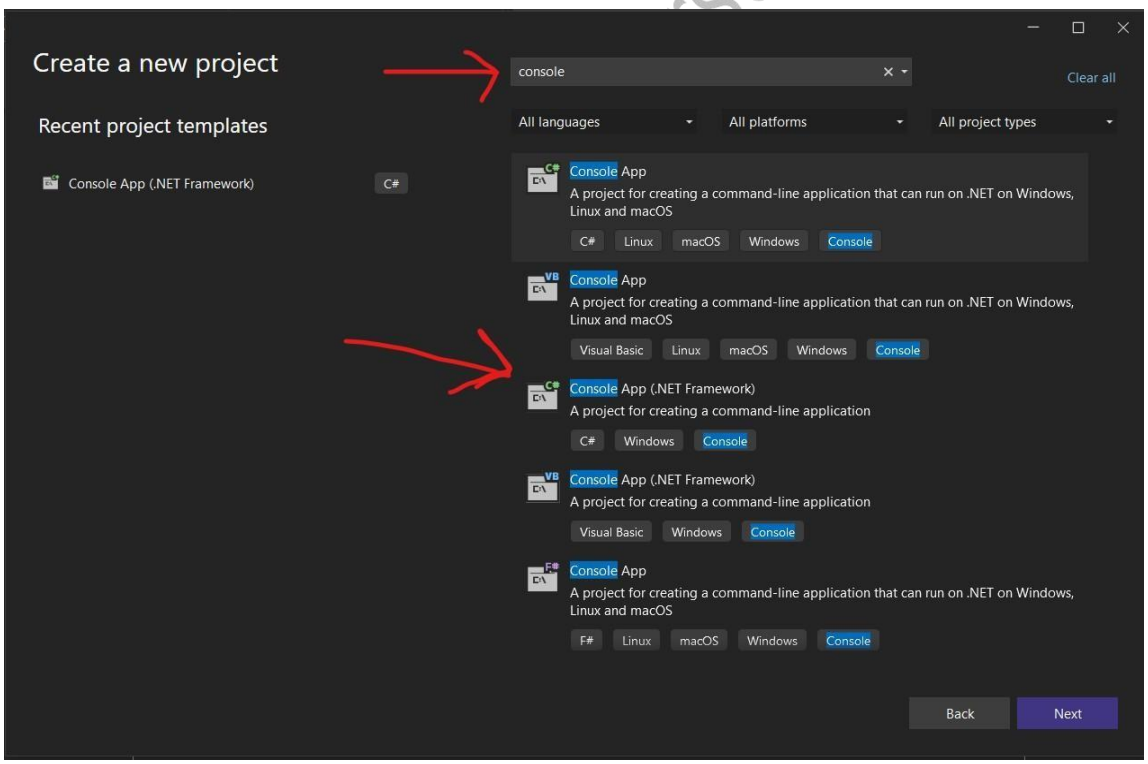
```
from zeep import Client
wsdl_url='http://localhost:8080/Practical_2/TempConverter?wsdl'
client=Client(wsdl_url)
#call the method on the webservice
d=float(input("Enter temperaure in Fahrenheit :"))
result = client.service.FtoC(d)
print(result)
```

4] after running the above code you should get the following output:

```
===== RESTART: C:\Users\LENOVO\AppData\Local\Programs\Python\Python311\2
Enter temperaure in Fahrenheit :1200
The Fahrenheit Temperature 1200.0 in Celsius is 648.8888888888889
```

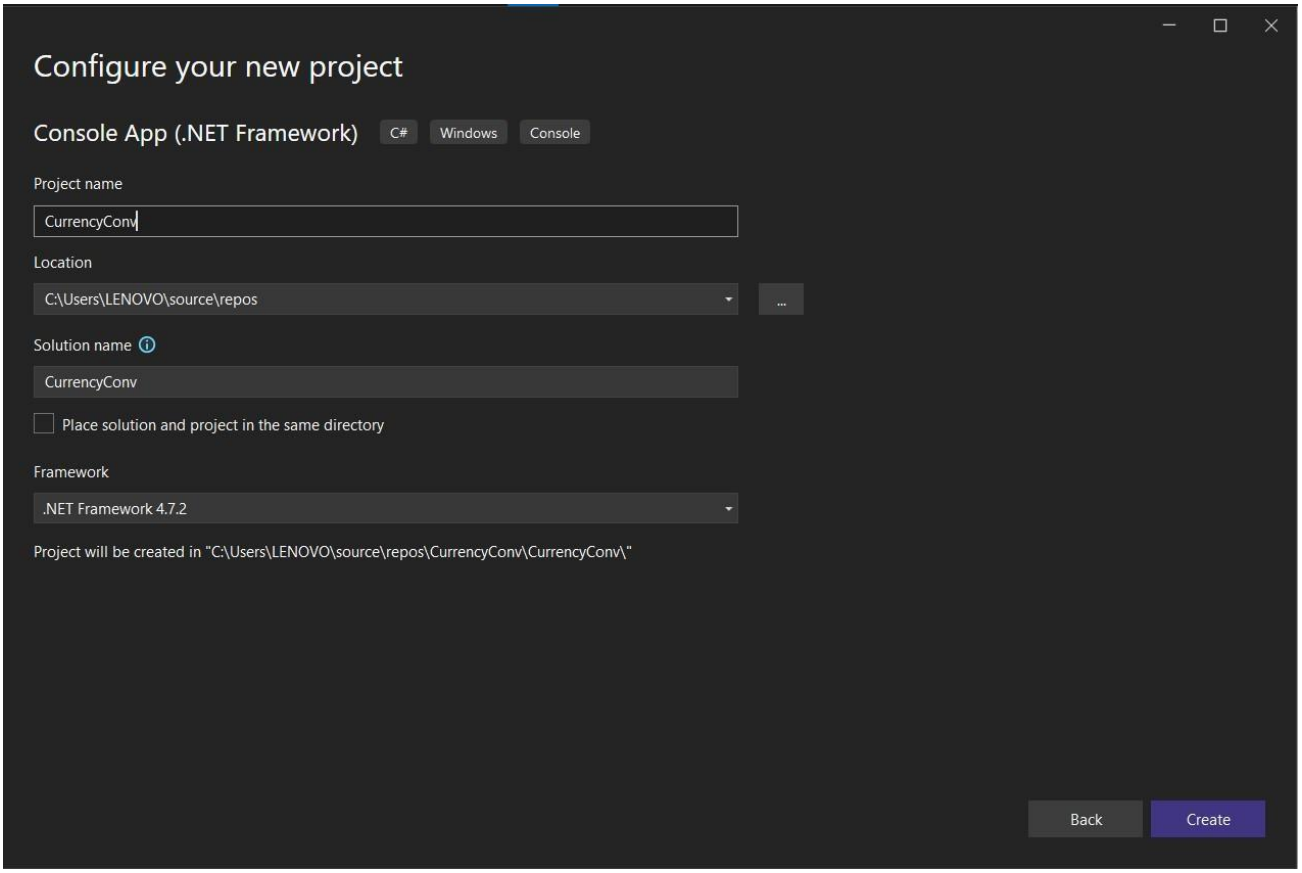
.Net Client

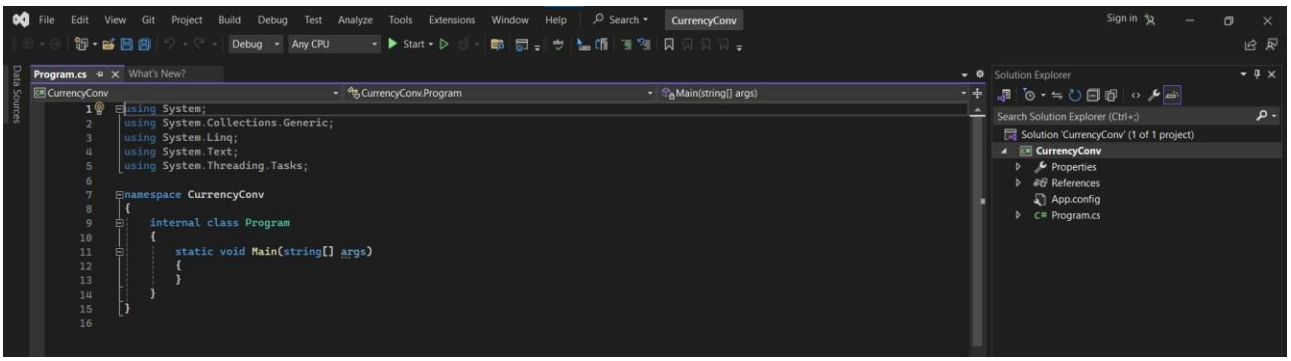
1] open visual studio and select create a new project the following window will appear:



Here in search bar type “console c#” and select console app for .Net frame work as shown in above image.

2] Give name to the project and press create button as shown in the image:

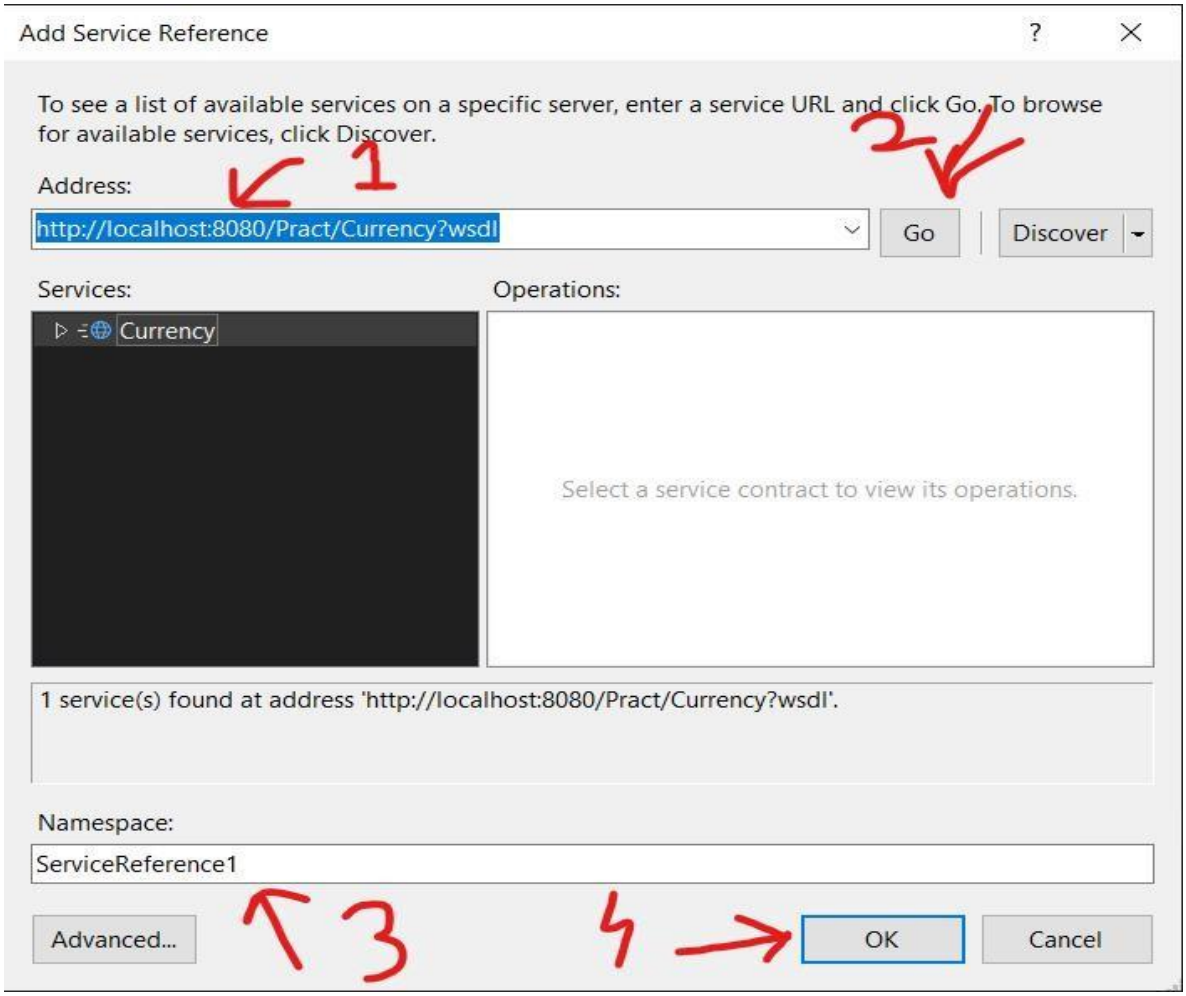




This window should appear after clicking create button now In right side there is solution Explorer.

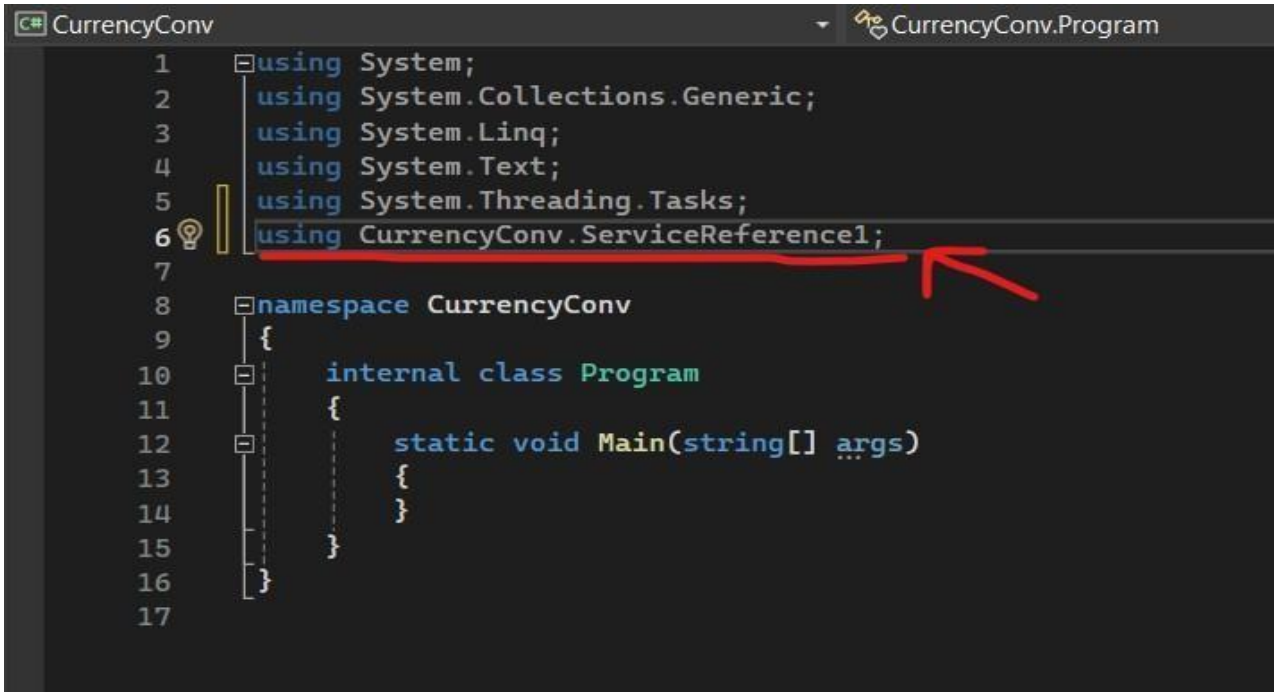
In that right click on your project name and click on add > Service Reference . You will get the following window :

Note: before executing the code make sure that the web service is deployed.



Here in address bar paste the wsdl url the same which is used I python code. And press go button . agter set the namespace In my case I am letting is as it is then press ok button

3] now in code write the following line as shown in image:



Here type:

Using your_projectname . your_serviceReference_name ;

4] now write the code as shown in the following image:

```
static void Main(string[] args)
{
    convClient client = new convClient();
    Console.WriteLine("Enter the Temperature: ");
    double d = double.Parse(Console.ReadLine());
    Console.WriteLine(client.FtoC(d));
    Console.WriteLine("Enter any key to Exit...");
    Console.ReadKey();
    Console.ReadLine();
}
```

Note:

Here my webservice class name is conv and convClient is my webservice client class name and **FtoC is method name** as shown you can also check your own:

5] when you run the above code you get the following output:

```
C:\Windows\system32\cmd.exe
Enter the Temperature in Fahrenheit :
1200
The Fahrenheit Temperature 1200.0 in Celsius is 648.8888888888889
```

Practical-03A

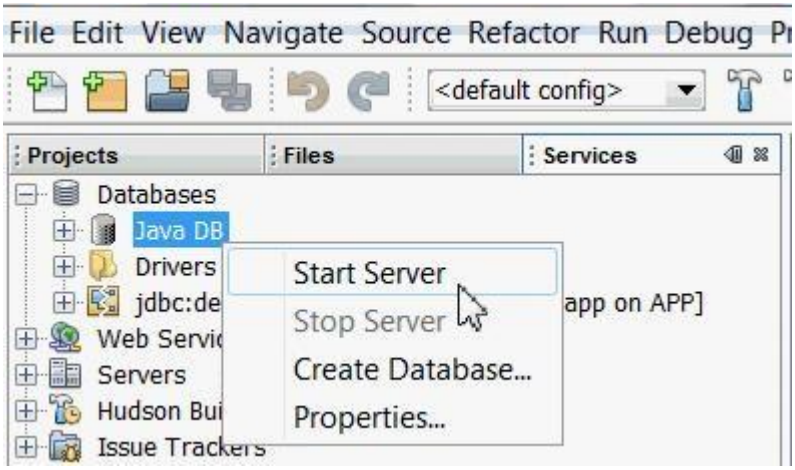
Create a Simple REST Service

- Demonstrate CRUD operations with suitable database using RESTful Web service.

1. To start the Java DB Database from NetBeans, perform the following steps.

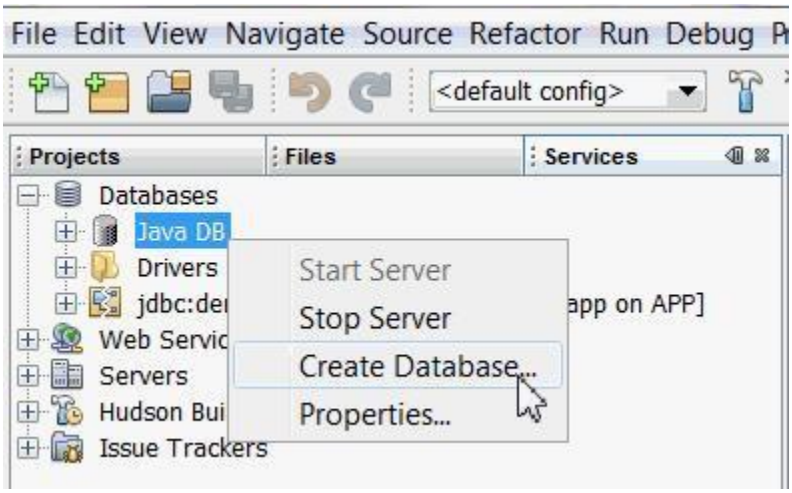
Click Services tab -> Expand Databases node. ->Right-click Java DB icon.

->Select Start Server



2. To create playerDB database, perform the following steps:

a. Right-click **Java DB** icon, select **Create Database**.



b. Enter the following information for the database:

Database Name: **playerDB**
User Name: **john**
Password: **john**
Confirm Password:**john**

c. Click OK.

3. To connect to the newly created database playerDB, perform the following steps

a. Right-click jdbc:derby://localhost:1527/playerDB connection.

b. Select Connect.

4. Create tables and populate them with data in **playerDB** database.

a. In NetBeans select File > Open File.

b. In the file select playersDB.sql.

c. Click Open. The script automatically opens in the SQL Editor.

5. Examine the contents of the database.

a. In the Services window, expand the jdbc:derby://localhost:1527/playerDB connection under the Databases node.
b. Right-click the connection and select Refresh.
c. Expand the john schema. You see the nodes for Tables, Views, and Procedures. d. Expand the Tables node to see the PLAYER and TEAM tables. e. Right-click the PLAYER table node and select View Data.

Player server

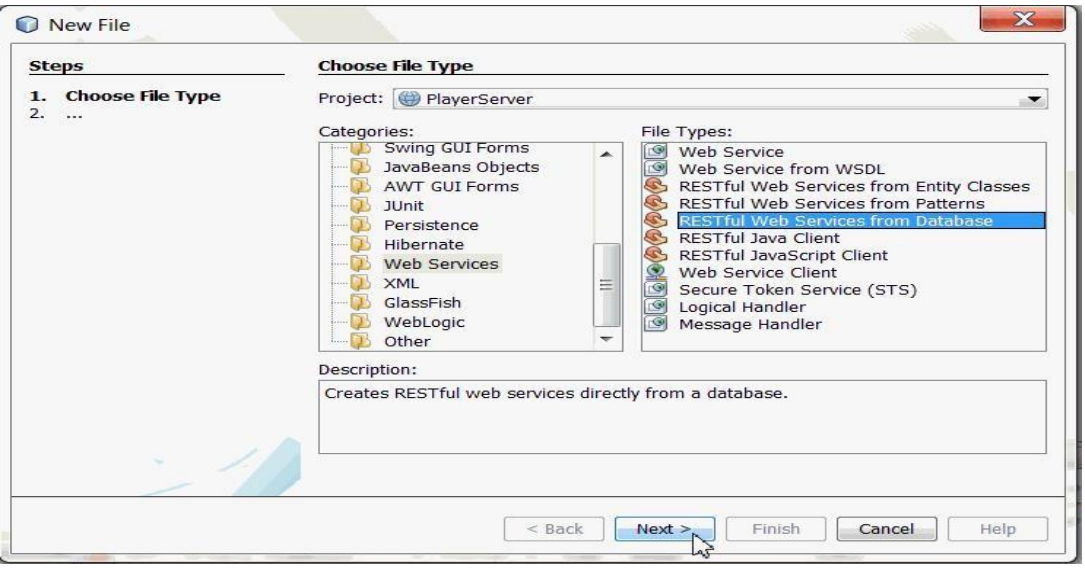
To create RESTful Web Services, you need a Java Web application project. In the below section you will create a demo Java web project, PlayerServer.

To create new Java Web Project, select File -> New Project -> Java web -> Web Application.

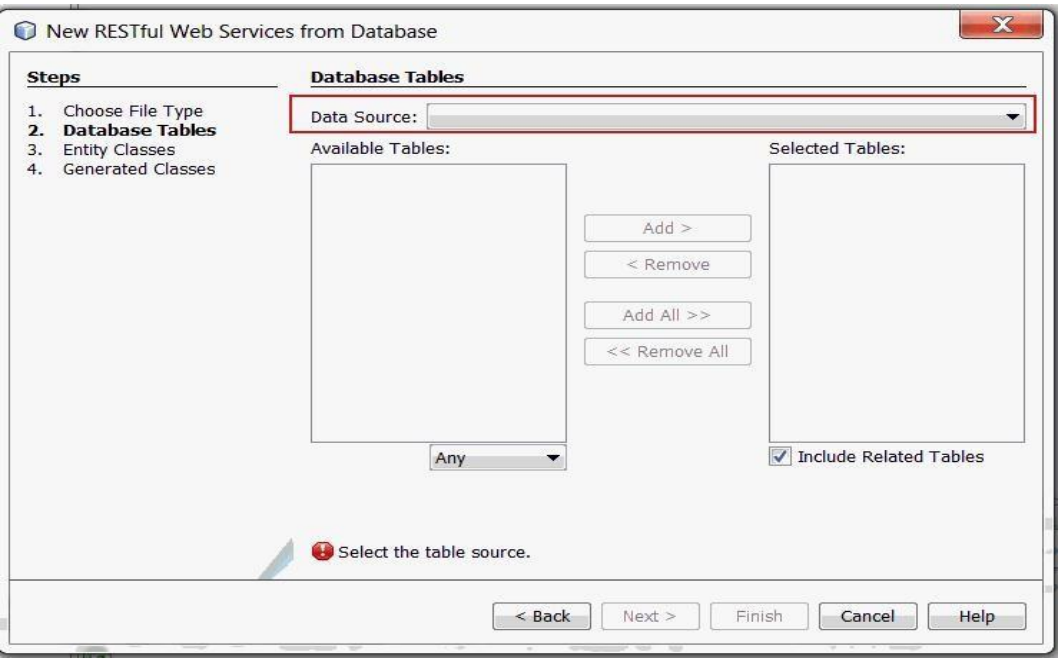
Generating web service

To generate RESTful Web Services do the following:

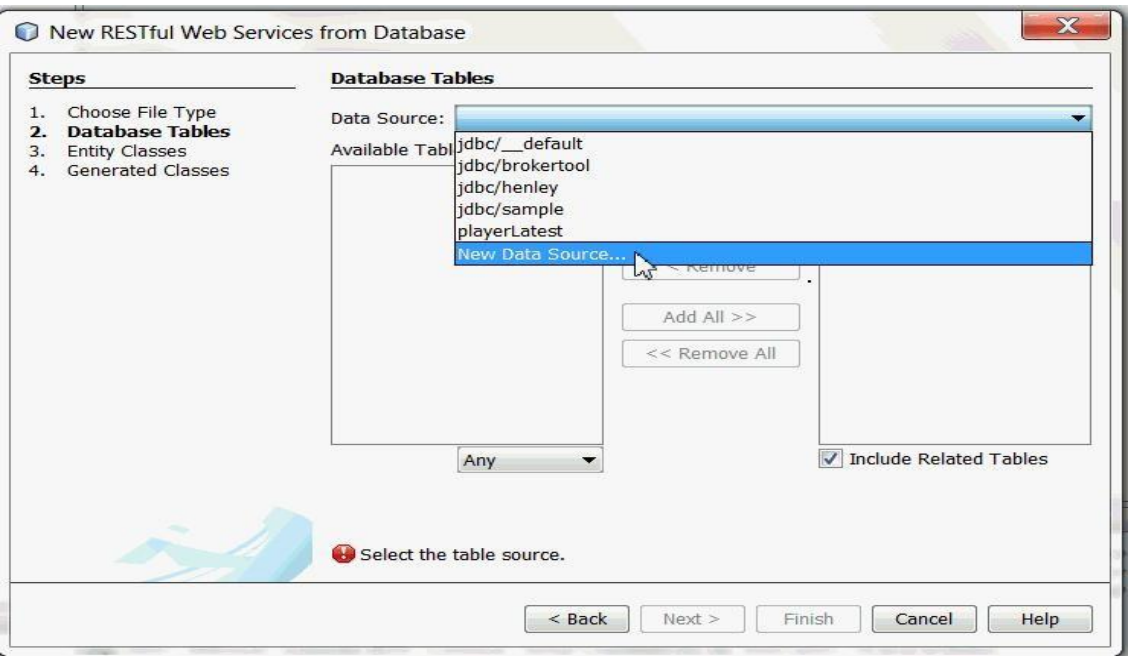
1.Right-click the PlayerServer and choose New > Other > Web Services > RESTful Web Services from Database. The New RESTful Web Service wizard opens on the Database Tables panel.



2. In the Database Tables window, select Data Source.



3. Next select "New Data Source" from the Drop-down list.



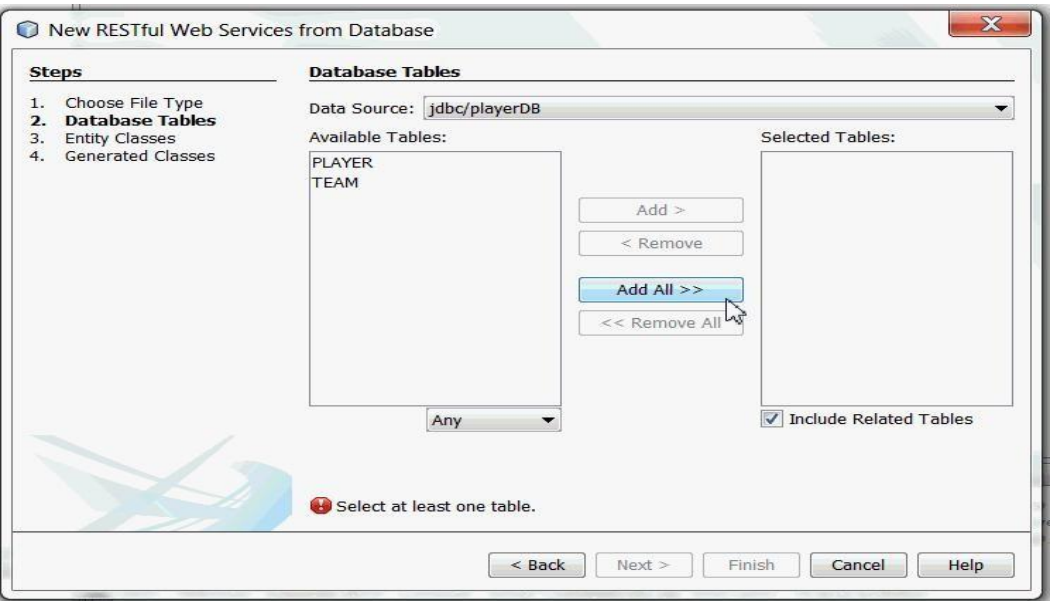
a. In the Create Data Source Window, enter the following information:

- **JNDI name**: jdbc/playerDB
- **Database connection :** select jdbc:derby://localhost:1527/playerDB[john on JOHN]

b. Click OK.

The PLAYER and TEAM tables are displayed under the Available Tables column.

c. Click **Add All**. The PLAYER and TEAM tables are displayed under the Selected Tables column.



d. Click Next.

4. In the **Entity Classes** window, complete the following steps:

a. Enter the package name as com.playerentity.

b. Click Next.

5. In the **Generated Classes** Window, click Finish with default values.

Test RESTful web Services

1. To Generate Web Services Test client, complete the following steps.

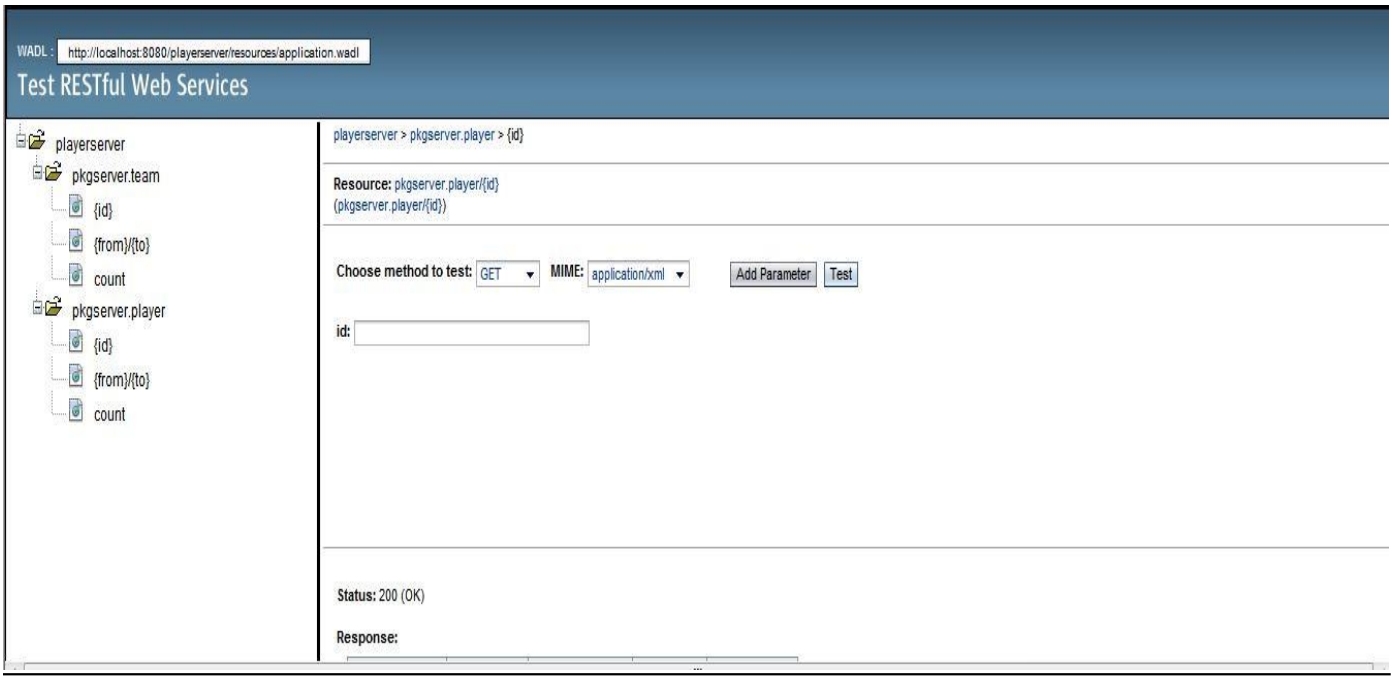
a. Select **PlayerServer** project.

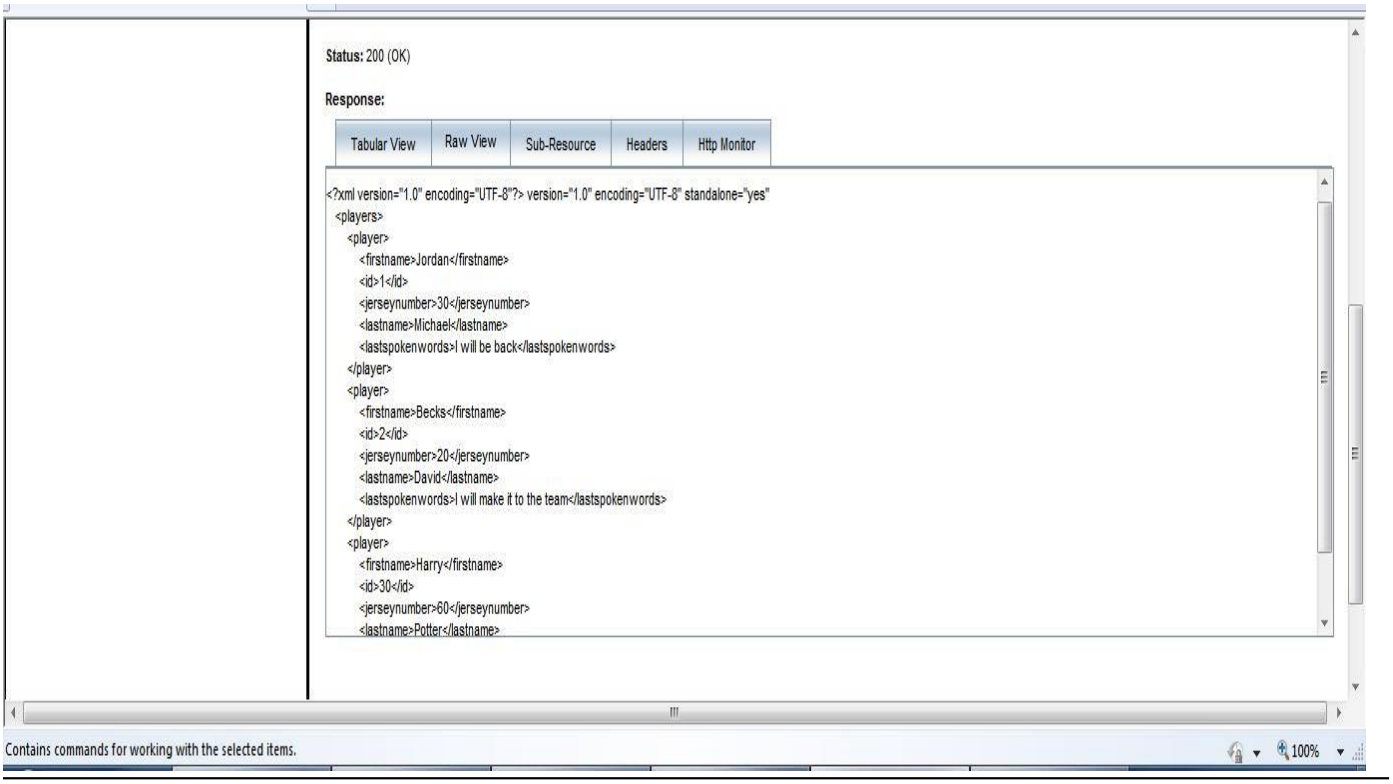
b. Right-click and select **Test RESTful Web Services.**

2. Select "Web Test Client in project" and click Browse.

3. a. In the Select Project dialog box, select **PlayerServer** and click OK.

b. **Configure Rest Test Client window** is displayed, click OK.





Player Client

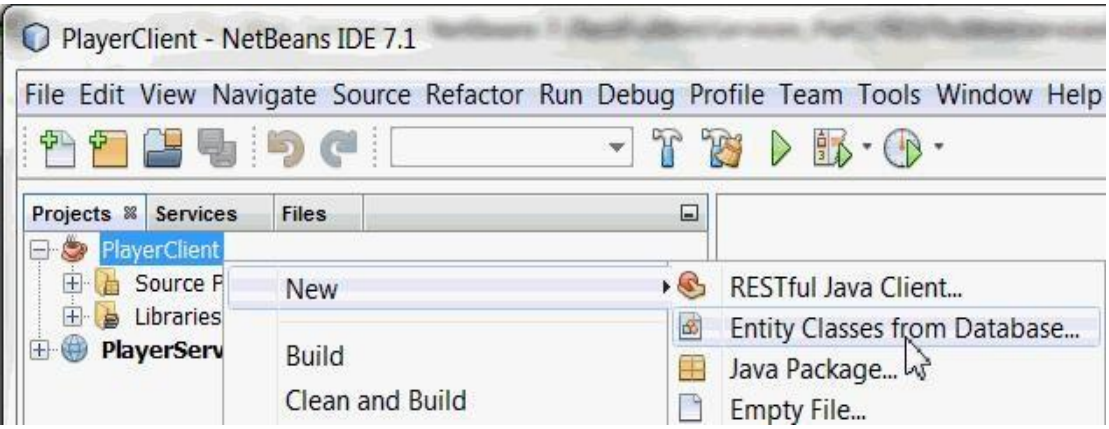
To create new Java Project, select File > New Project >Playerclient

Generating Entity Classes from Database

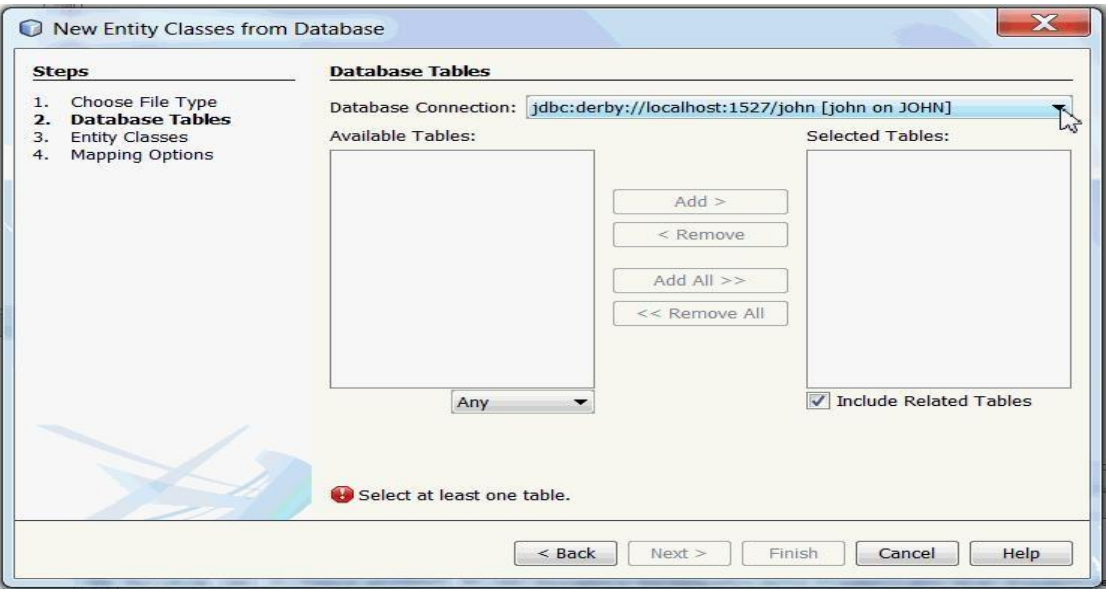
Implementing CRUD operations on the database, requires creation of Entity Classes to communicate with the database. The following section demonstrates how to create Entity

Classes from database.

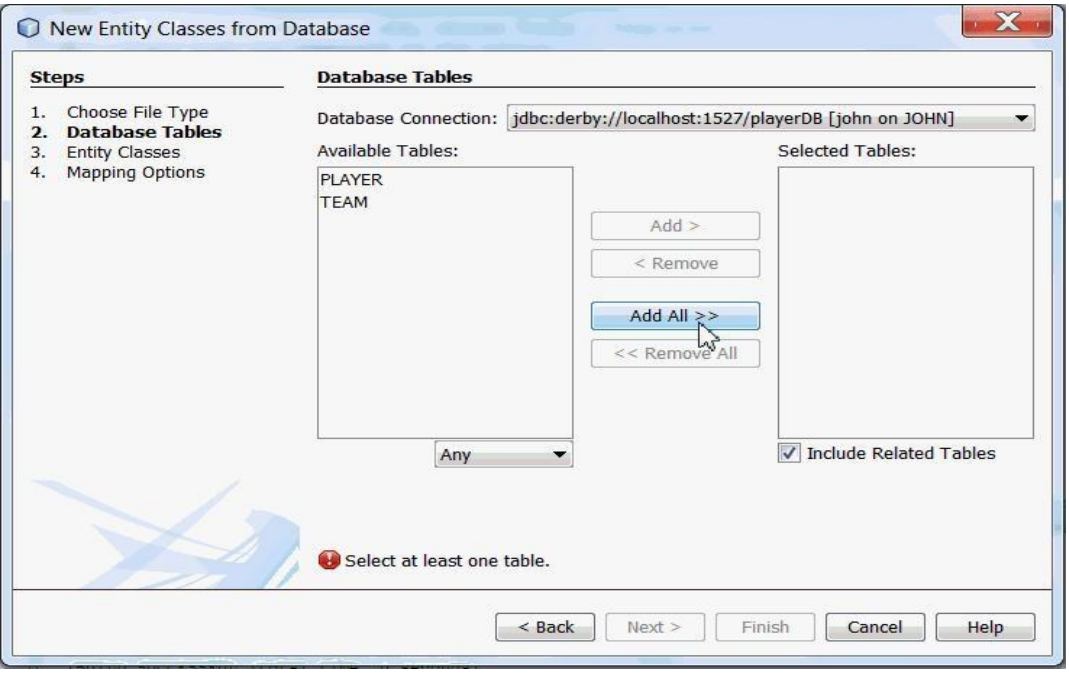
1. Right-click **PlayerClient** Project and select ***New > Entity Classes From Database***.



2. a. In the Database Tables window, **Database Connection** field
select jdbc:derby://localhost:1527/playerDB[john on JOHN] from the drop-down list.

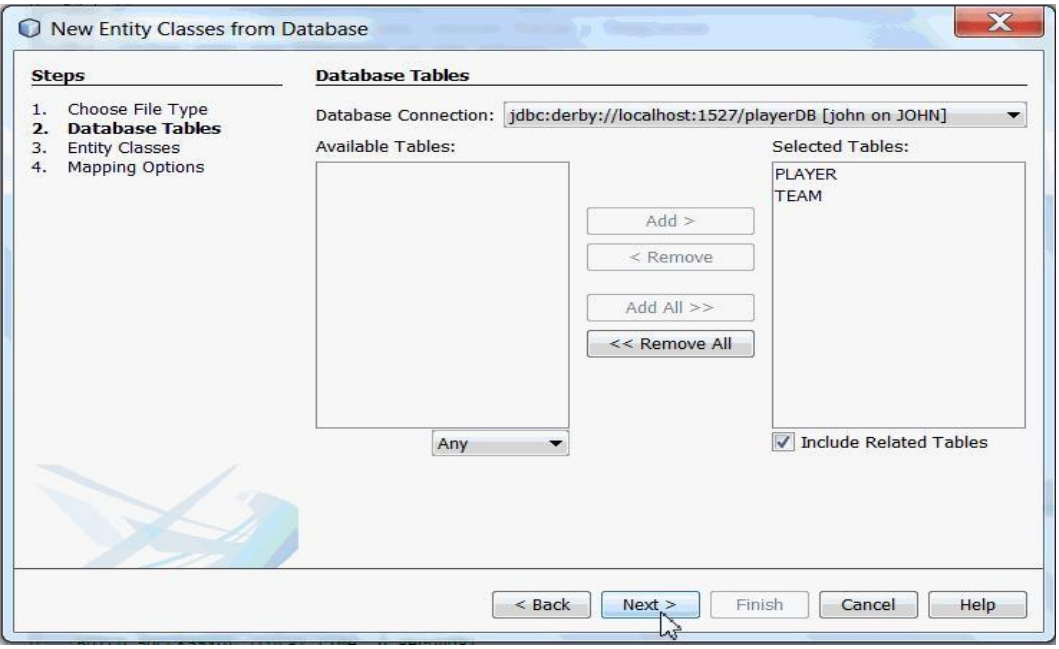


You see PLAYER and TEAM tables in Available Tables category
b. Click Add All

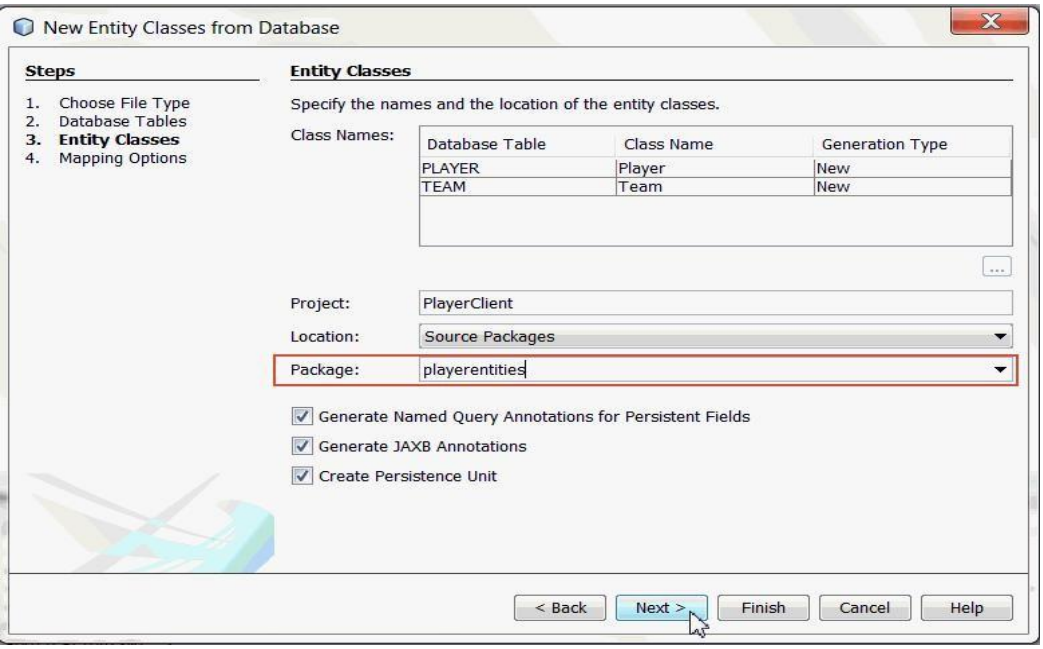


You see both the tables PLAYER and TEAM in Selected Tables Category.

c. Click Next



3. In the Entity classes Window, enter the Package Name as **playerentities** and click Next.

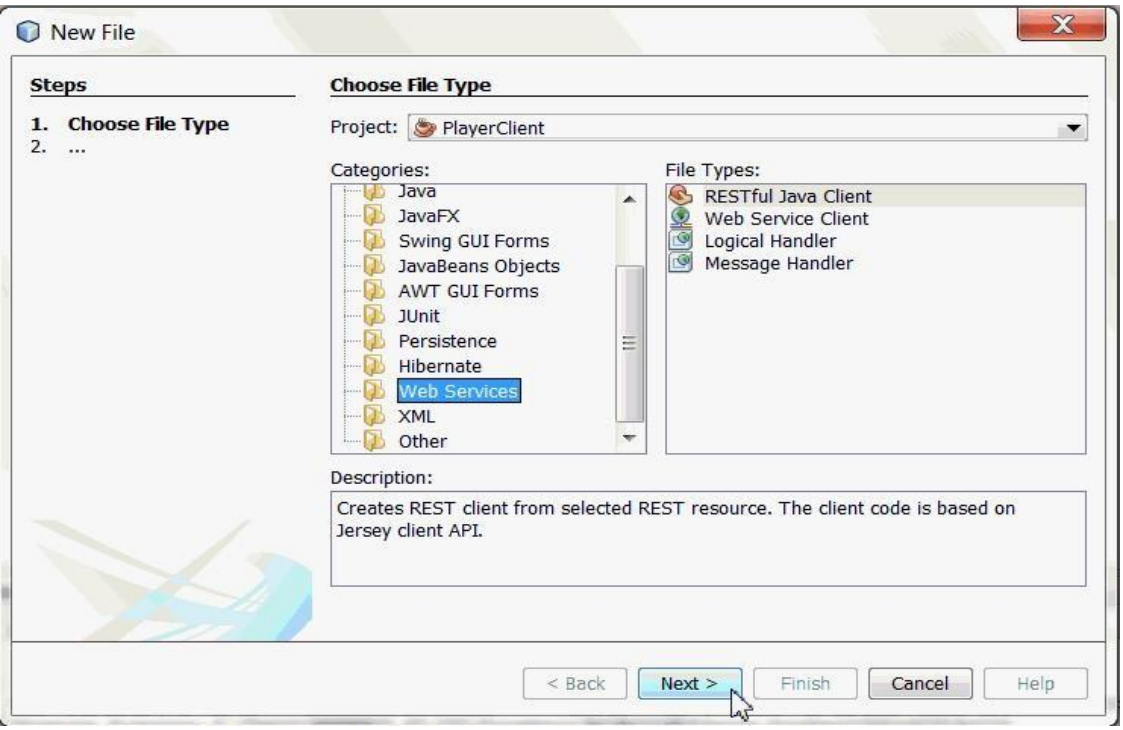


Create Client

Complete the following steps to create RESTful client in PlayerClient project.

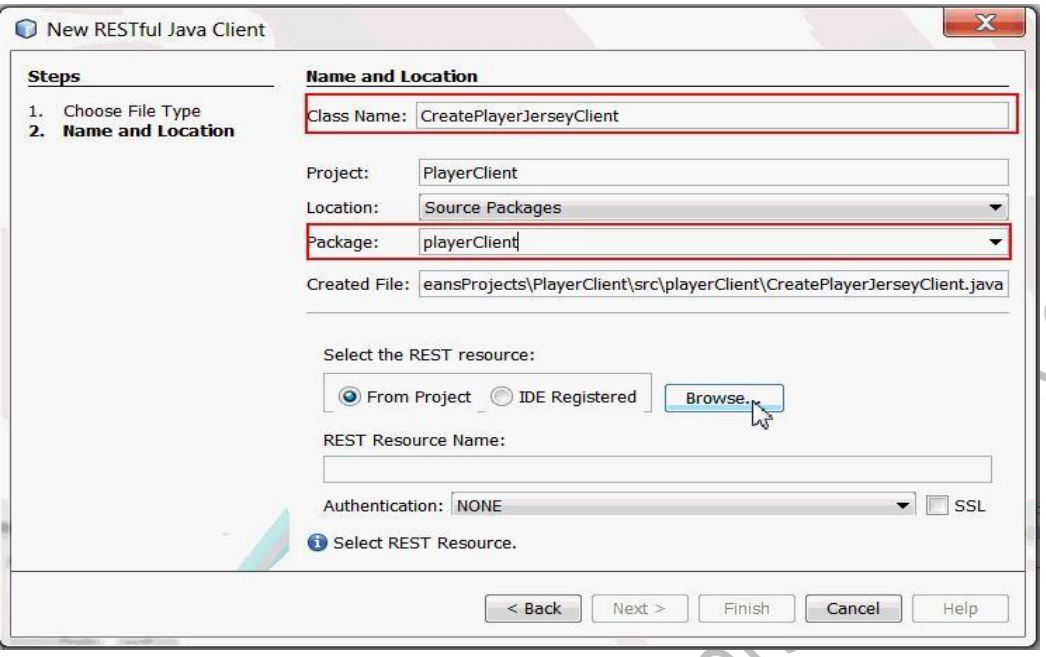
a. Right-click the PlayerClient and choose New > Other > Web Services > RESTful Java Client.

b. Click Next.

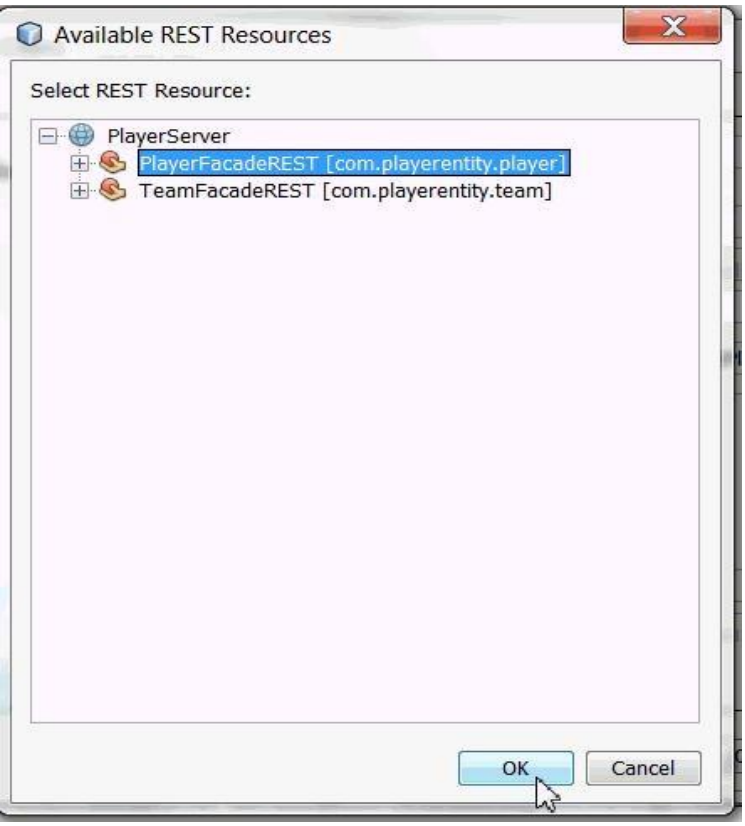


1. a.Enter the following details for the fields in the New Restful Java Client window :

- Class Name: CreatePlayerJerseyClient
- Package: playerClient
- Select the REST resource: From Project and Click Browse.



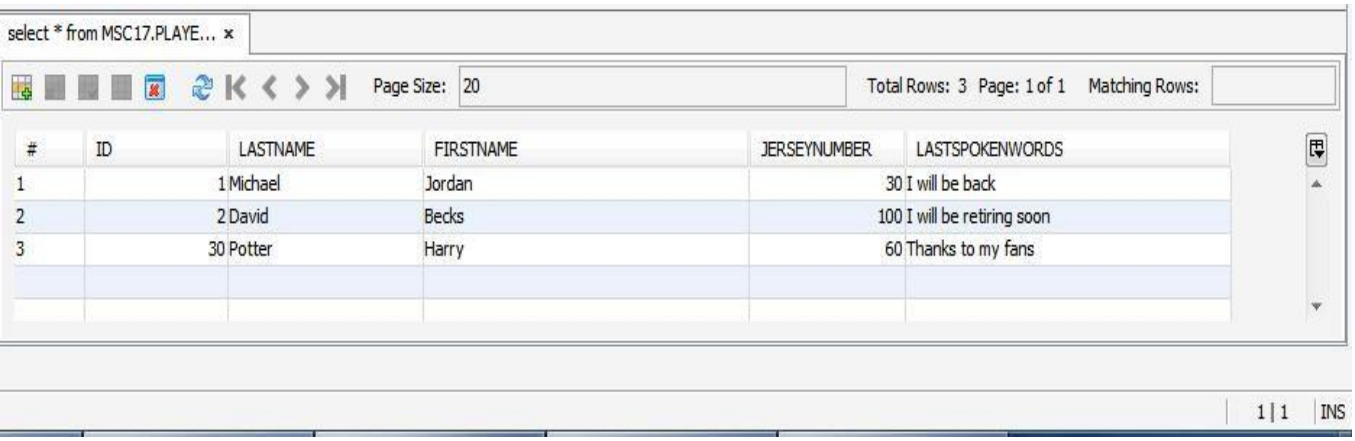
b. Select PlayerServer.
c. Expand the PlayerServer application.
d. Select PlayerFacadeREST[com.playerentity.player].



2. Add the main method.

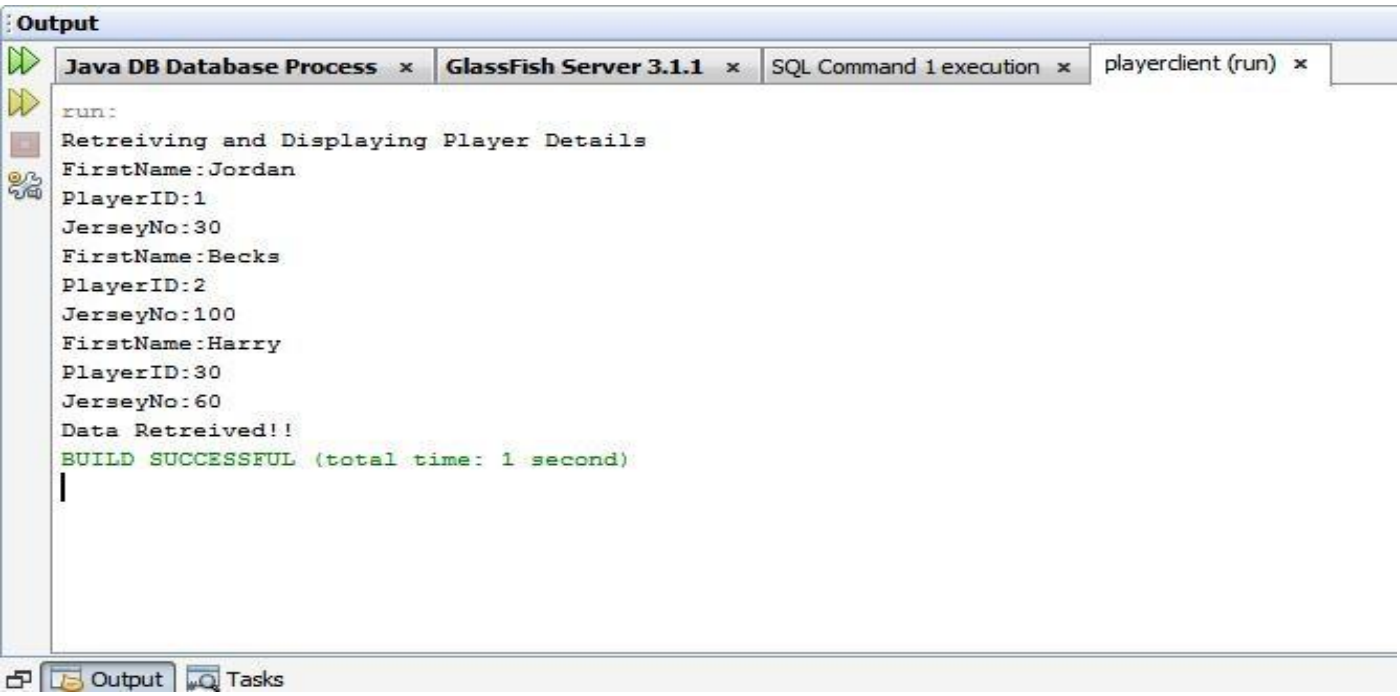
```
public static void main(String[]args){
    CreateClient client1 = new CreateClient();
    ClientResponse response = client1.findAll_XML(ClientResponse.class);

    GenericType<List<Player>> genericType = new GenericType<List<Player>>(){};
    List<Player> data = new ArrayList<Player>();
    data = (response.getEntity(genericType));

    Player p = new Player();
    p.setFirstname("Harry");
    p.setId(30);
    p.setJerseynumber(60);
    p.setLastname("Potter");
    p.setLastspokenwords("Thanks to my fans");
```

```
    client1.create_XML(p);
  }
```



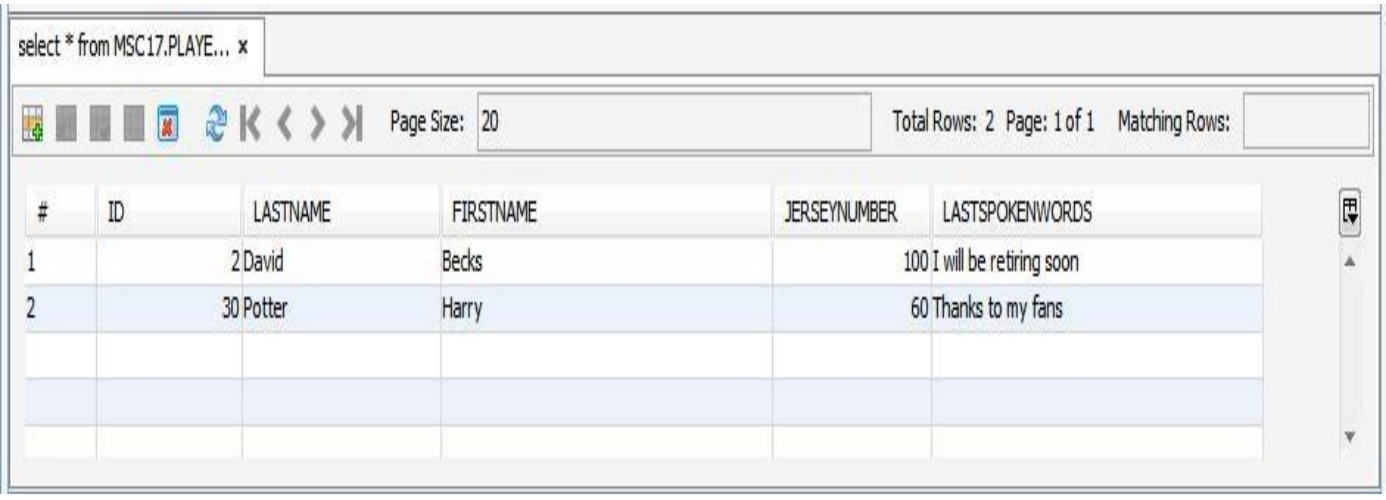
Read Client

```
public static void main(String[]args){
    ReadClient client1 = new ReadClient();
    ClientResponse response = client1.findAll_XML(ClientResponse.class);
    GenericType<List<Player>> genericType = new GenericType<List<Player>>(){};
    List<Player> data = new ArrayList<Player>();
    data = (response.getEntity(genericType));
    System.out.println("Retreiving and Displaying Player Details");
    for(Player players:data){
       System.out.println("FirstName:"+players.getFirstname());
       System.out.println("PlayerID:"+players.getId());
       System.out.println("JerseyNo:"+players.getJerseynumber());
    }
    System.out.println("Data Retreived!!");
  }
```



Delete Client

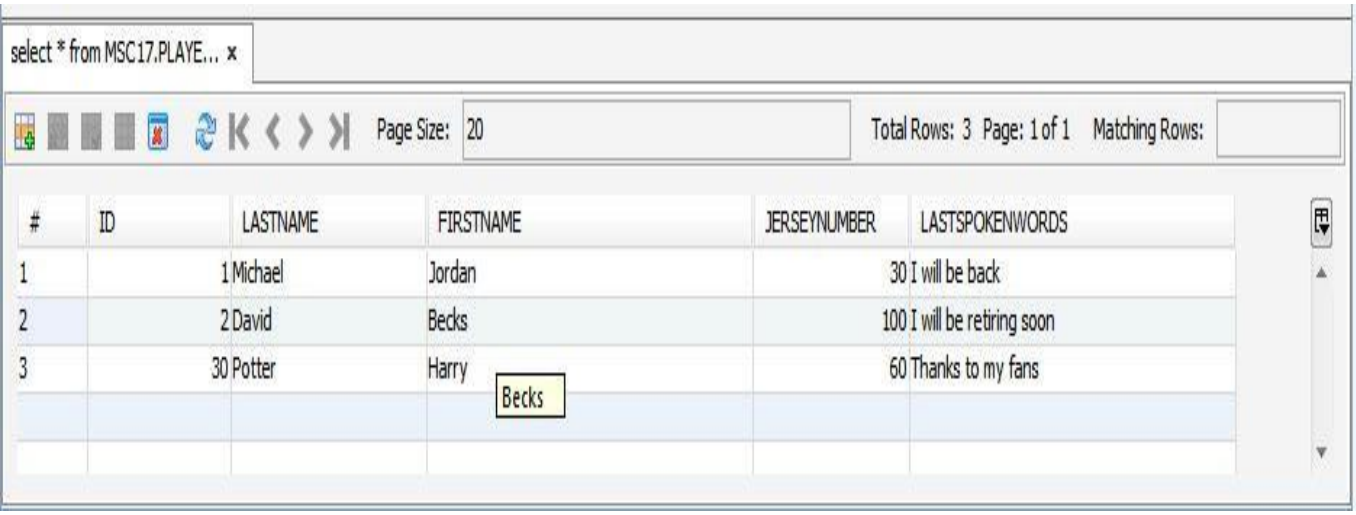
```
public static void main(String[]args){
      DeleteClient client1 = new DeleteClient();
      client1.remove("1");
   }
```



Update Client

```
public static void main(String[]args){
      UpdateClient client1 = new UpdateClient();
```

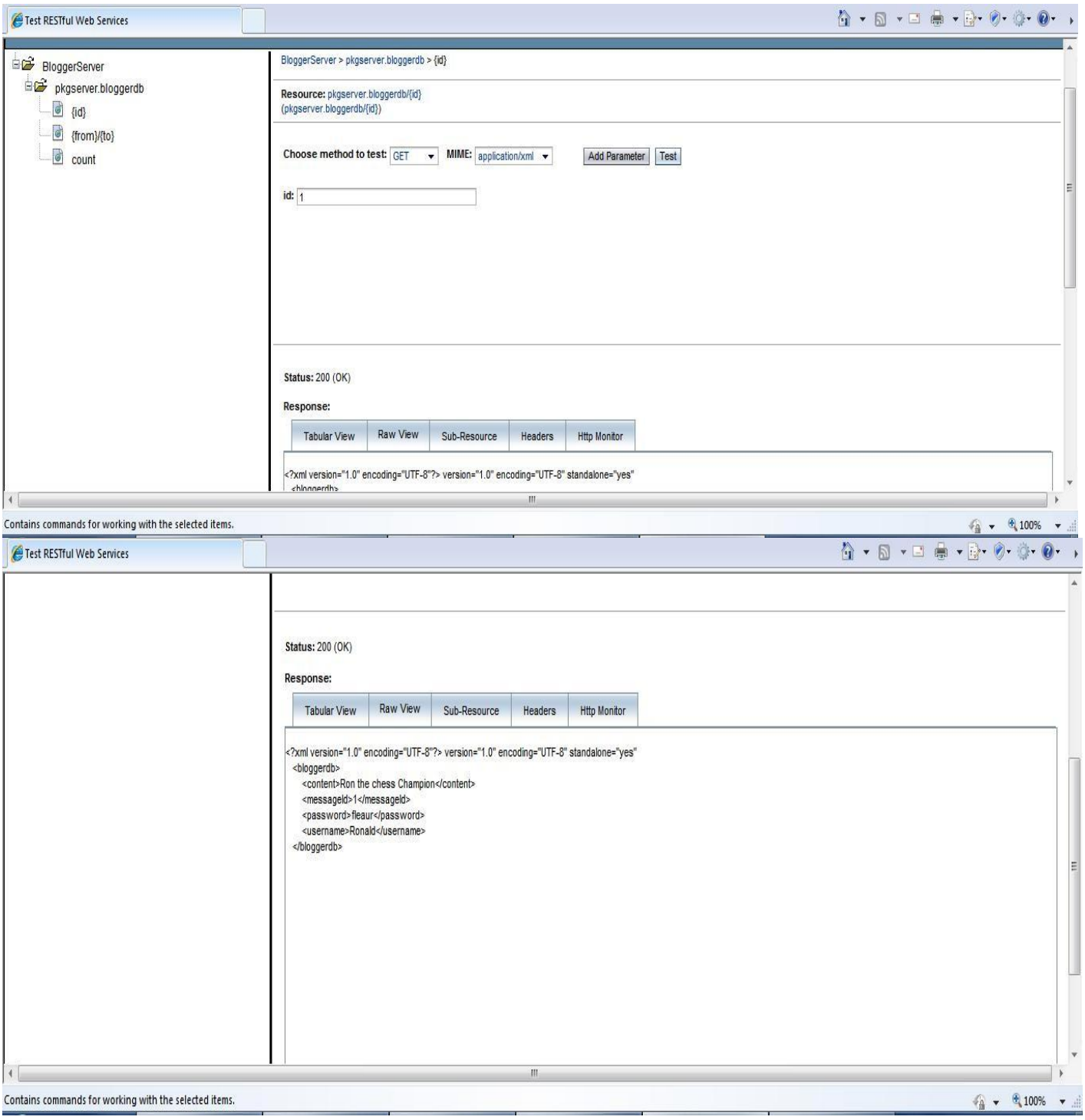
```
    ClientResponse response = client1.find_XML(ClientResponse.class, "2");
    GenericType<Player>genericType = new GenericType<Player>(){};
    Player player = response.getEntity(genericType);
    System.out.println("First Name: "+player.getFirstname());
    System.out.println("PlayerId: "+player.getId());
    System.out.println("JerseyNo: "+player.getJerseynumber());
    System.out.println("Last Name: "+player.getLastname());
    System.out.println("Last Spoken Words: "+player.getLastspokenwords());
    player.setJerseynumber(100);
    player.setLastspokenwords("I will be retiring soon");
    client1.edit_XML(player);
}
```



Practical No. 3B

- Develop Micro-blogger application (like Twitter) using RESTful Web services.

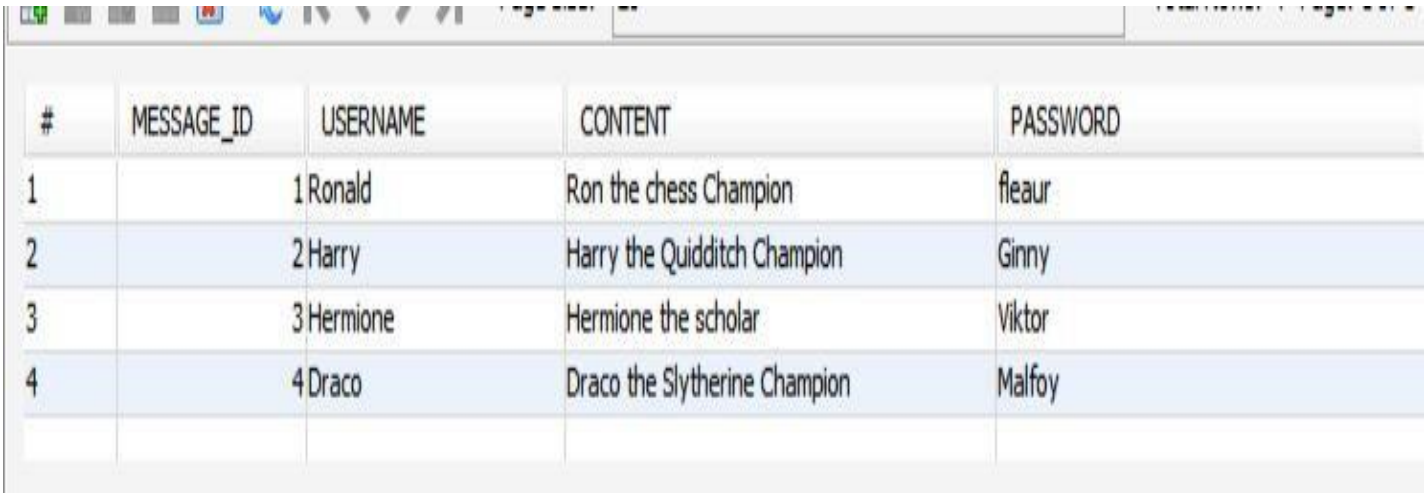
Blogger Server



Blogger Client

Create Client

```
public static void main(String[]args){
      CreateClient client1 = new CreateClient();
      ClientResponse response = client1.findAll_XML(ClientResponse.class);
     GenericType<List<Bloggerdb>> genericType = new  GenericType<List<Bloggerdb>>(){};
     List<Bloggerdb> data = new ArrayList<Bloggerdb>();
      data = (response.getEntity(genericType));
      Bloggerdb b = new Bloggerdb();
      b.setMessageId(4);
      b.setContent("Draco the Slytherine Champion");
      b.setUsername("Draco");
      b.setPassword("Malfoy");
      client1.create_XML(b);
}
```



#	MESSAGE_ID	USERNAME	CONTENT	PASSWORD
1	1	Ronald	Ron the chess Champion	fleaur
2	2	Harry	Harry the Quidditch Champion	Ginny
3	3	Hermione	Hermione the scholar	Viktor
4	4	Draco	Draco the Slytherine Champion	Malfoy

Update Client

```
public static void main(String[]args){
      UpdateClient client1 = new UpdateClient();
      ClientResponse response = client1.find_XML(ClientResponse.class, "1");
      GenericType<Bloggerdb>genericType = new GenericType<Bloggerdb>(){};
      Bloggerdb b = response.getEntity(genericType);
      System.out.println("Message id:"+b.getMessageId());
      System.out.println("Content:"+b.getContent());
      System.out.println("Username:"+b.getUsername());
      System.out.println("Password:"+b.getPassword());
      b.setContent("I love food");
      client1.edit_XML(b);
   }
```

#	MESSAGE_ID	USERNAME	CONTENT	PASSWORD
1	1	Ronald	I love food	fleaur
2	2	Harry	Harry the Quidditch Champion	Ginny
3	3	Hermione	Hermione the scholar	Viktor
4	4	Draco	Draco the Slytherine Champion	Malfoy

Delete Client

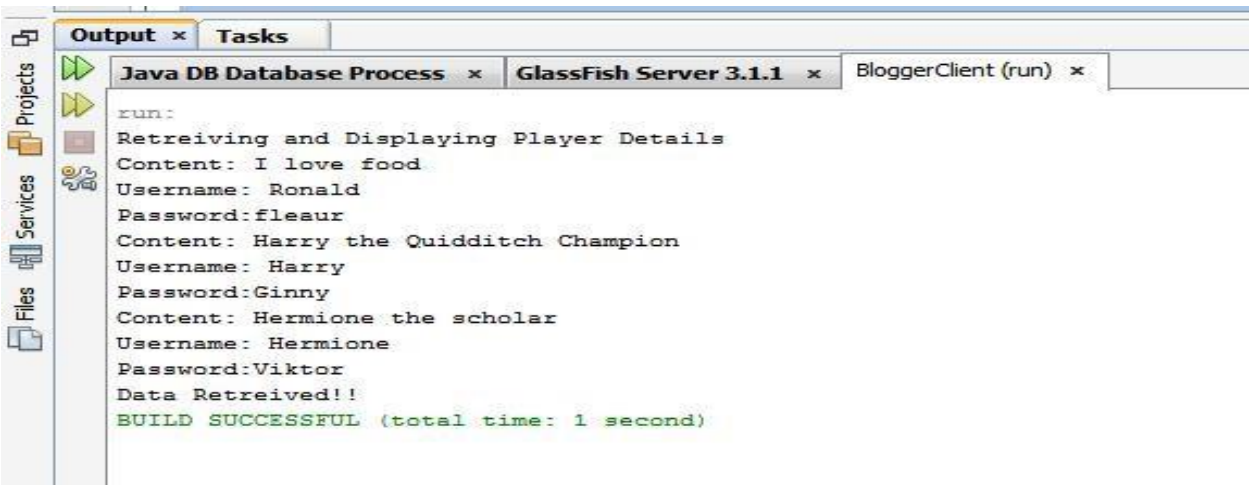
```
public static void main(String[]args){
      DeleteClient client1 = new DeleteClient();
      client1.remove("4");
      System.out.println("Successfully  Deleted!!");
   }
```

#	MESSAGE_ID	USERNAME	CONTENT	PASSWORD
1	1	Ronald	I love food	fleaur
2	2	Harry	Harry the Quidditch Champion	Ginny
3	3	Hermione	Hermione the scholar	Viktor

Read Client

```
public static void main(String[]args){
      ReadClient client1 = new ReadClient();
      ClientResponse response = client1.findAll_XML(ClientResponse.class);
      GenericType<List<Bloggerdb>> genericType = new GenericType<List<Bloggerdb>>(){};
      List<Bloggerdb> data = new ArrayList<Bloggerdb>();
      data = (response.getEntity(genericType));
      System.out.println("Retreiving and Displaying Player Details");
      for(Bloggerdb b:data){
         System.out.println("Content: "+b.getContent());
         System.out.println("Username: "+b.getUsername());
         System.out.println("Password:"+b.getPassword());
      }
      System.out.println("Data  Retreived!!");
```

}


Output
Tasks
Java DB Database Process
GlassFish Server 3.1.1
BloggerClient (run)
Projects
Services
Files
run:
Retreiving and Displaying Player Details
Content: I love food
Username: Ronald
Password:fleaur
Content: Harry the Quidditch Champion
Username: Harry
Password:Ginny
Content: Hermione the scholar
Username: Hermione
Password:Viktor
Data Retreived!!
BUILD SUCCESSFUL (total time: 1 second)

Practical-4

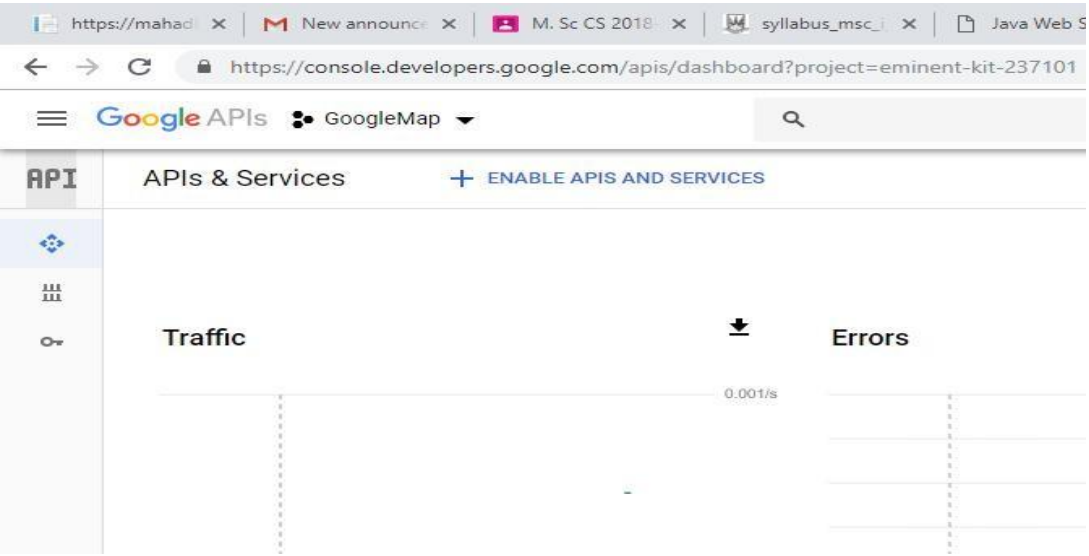
Develop application to consume Google's search / Google's Map RESTful Web service.

- Develop application to consume Google's search / Google's Map RESTful Web service.

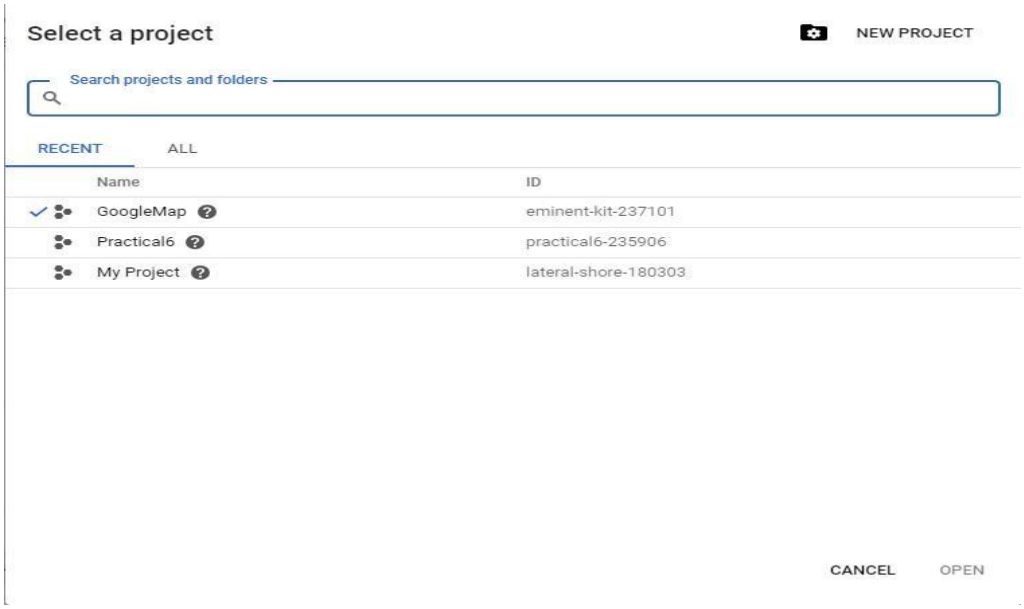
1. First of all we need to create an Java Web Application with any name, let it be GoogleMap here using Netbeans IDE.
2. The code inside the input.jsp will be similar to this input.jsp Input.jsp

```
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
  <head>
    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
    <title>JSP Page</title>
  </head>
  <body>
    <form action="index.jsp">
      <pre>
        Enter latitude:<input type="text" name="t1" />
        Enter longitude:<input type="text" name="t2" />
        <input type="submit" value="Show" />
      </pre>
    </form>
  </body>
</html>
```

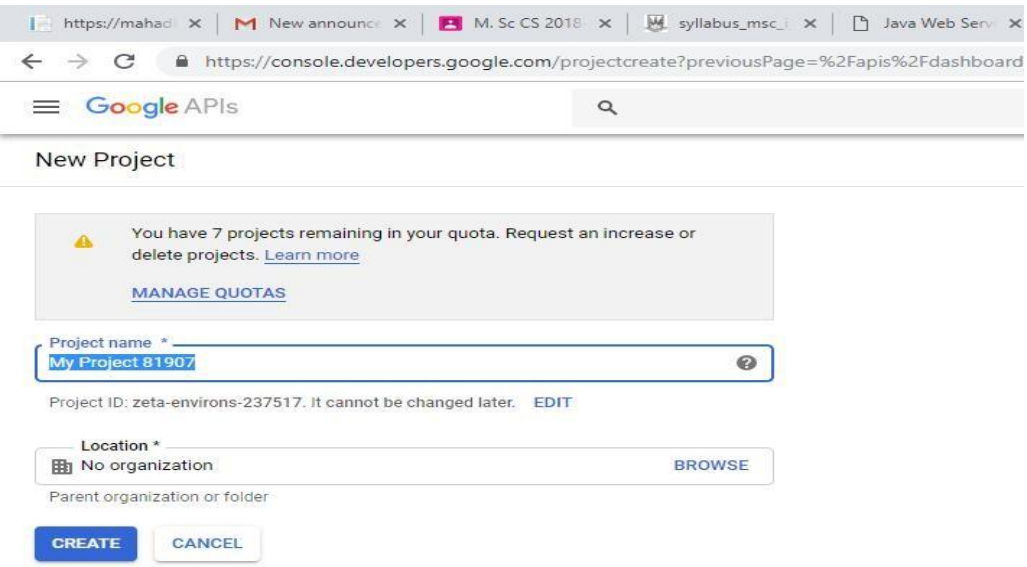
3. Before running the application we need the Google API key. The steps are shown here: - Visit Google APIs Console (https://console.developers.google.com, you have to login with your Google account).



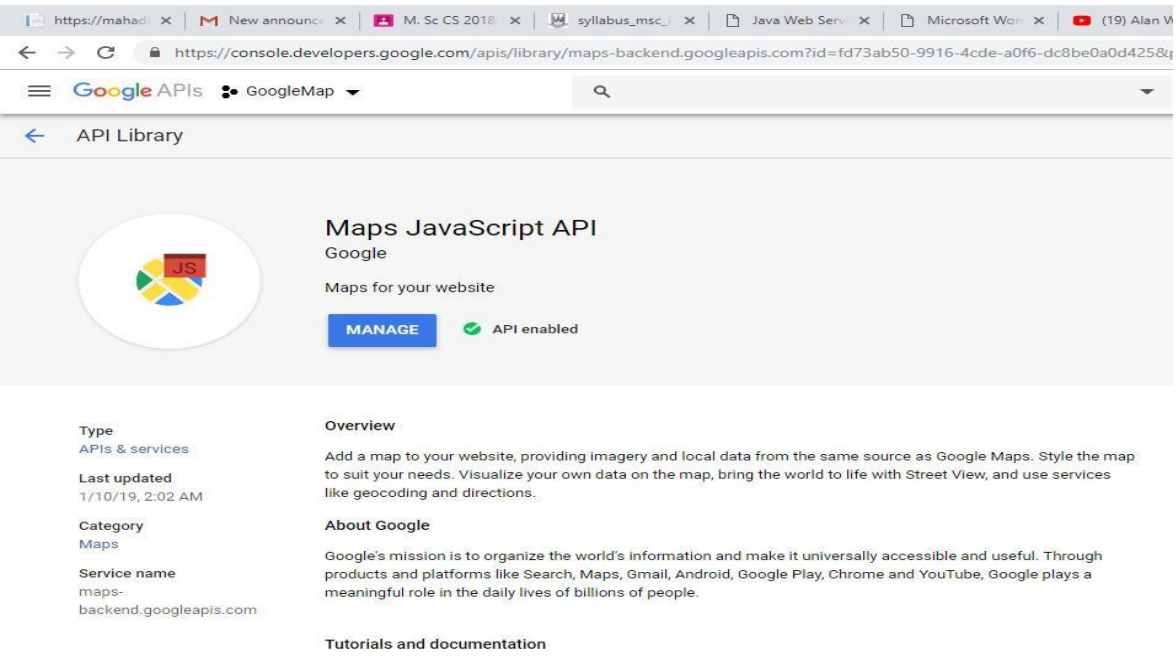
- Create a new API Project.



- Enter the name to your project.



- Enable the Google Maps API V3.



4. Create another file index.jsp

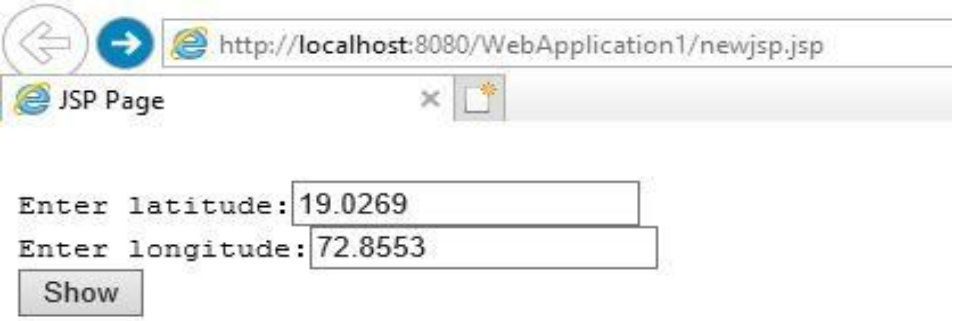
Index.jsp

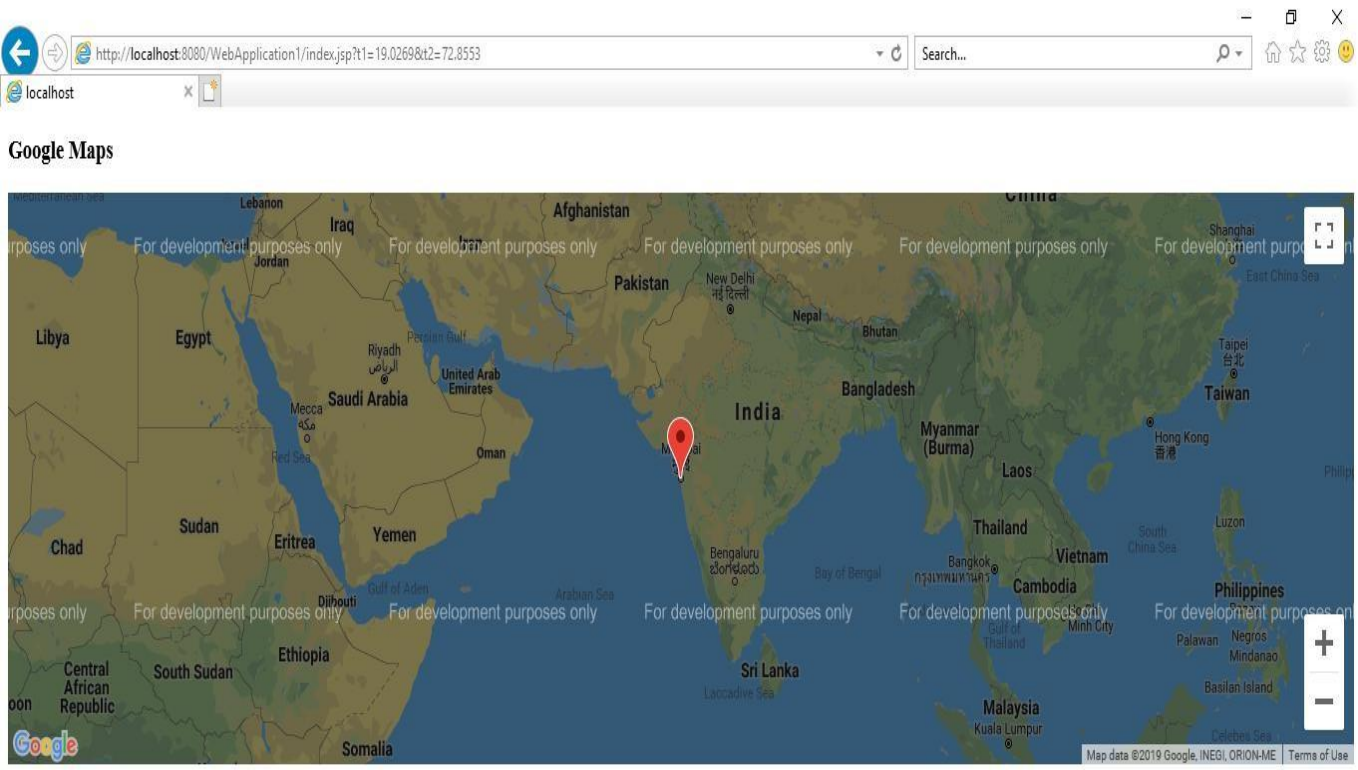
```
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
  <head>
    <style>
```

```
        #map {
            height: 400px;
            width: 100%;
           }
</style>
  </head>
  <body>

    <%
       double lati=Double.parseDouble(request.getParameter("t1"));
       double longi=Double.parseDouble(request.getParameter("t2"));
    %>
    <h3> Google Maps </h3>
    <div id="map"></div>
    <script lang="javascript">
       function initMap() {
       var info={lat: <%=lati%>, lng: <%=longi%>};
       var map = new google.maps.Map(document.getElementById('map'),
              {
                 zoom: 4, center: info
              });
       var marker = new google.maps.Marker({ position:
                  info,
                  map: map
                 });
       }
    </script>
    <script async defer
         src="put your key here">
```

```
    </script>
  </body>
</html>
```

Output :-





Practical-5

Installation and Configuration of virtualization using KVM

Practical-6

Develop application to download image/video from server or upload image/video to server using MTOM techniques

MTOMClient

Index.jsp

```
<%@page import="java.io.BufferedOutputStream">
<%@page import="java.io.FileOutputStream">
<%@page import="java.io.FileInputStream">
<%@page import="java.io.BufferedInputStream">
<%@page import="javax.imageio.stream.FileImageInputStream">
<%@page import="java.io.File">
<%@page import="javax.xml.ws.soap.MTOMFeature">
<%@page contentType="text/html" pageEncoding="UTF-8">
<!DOCTYPE html>
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
<title>JSP Page</title>
</head>
<body>
```

```
<%-- start web service invocation --><hr/>
<%
try {
pkg.ImageWS_Service service = new pkg.ImageWS_Service();
pkg.ImageWS port = service.getImageWSPort(new MTOMFeature(60000));
// TODO initialize WS operation arguments here
String filePath="c:/msc/ABC.jpg";
File file=new File(filePath);
FileInputStream fis=new FileInputStream(file);
BufferedInputStream bis=new BufferedInputStream(fis);
java.lang.String filename = file.getName();
byte[]imageBytes=new byte[(int)file.length()];
bis.read(imageBytes);
port.upload(filename, imageBytes);
bis.close();
out.println("File uploaded :"+filePath);
} catch (Exception ex) {
// TODO handle custom exceptions here
}
>
<%-- end web service invocation --><hr/>

<%-- start web service invocation --><hr/>
<%
try {

pkg.ImageWS_Service service = new pkg.ImageWS_Service();
pkg.ImageWS port = service.getImageWSPort();
// TODO initialize WS operation arguments here
java.lang.String filename = "ABC.jpg";
String filePath="c:/msc/download/"+filename;
// TODO process result here
byte[] fileBytes = port.download(filename);
FileOutputStream fos=new FileOutputStream(filePath);
BufferedOutputStream bos=new BufferedOutputStream(fos);
bos.write(fileBytes);
bos.close();
out.println("File downloaded"+filePath);
} catch (Exception ex) {
// TODO handle custom exceptions here
}
>
<%-- end web service invocation --><hr/>
</body>
</html>
MTOMServer
ImageWS.java
package mypkg;
import java.io.*;
import javax.jws.Oneway;
```

```
import javax.jws.WebService;
import javax.jws.WebMethod;
import javax.jws.WebParam;
import javax.xml.ws.soap.MTOM;
@MTOM(enabled=true,threshold=60000)
@WebService(serviceName = "ImageWS")
public class ImageWS {
@WebMethod(operationName = "upload")
@Oneway
public void upload(@WebParam(name = "Filename") String Filename, @WebParam(name =
"ImageBytes") byte[] ImageBytes){
String filePath="C:/MSC/upload/"+Filename;
try
{
FileOutputStream fos=new FileOutputStream(filePath);
BufferedOutputStream bos=new BufferedOutputStream(fos);
bos.write(ImageBytes);
bos.close();
System.out.println("Recieved file :"+filePath);
}
catch(Exception ex)

{
System.out.println(ex);
}
}
@WebMethod(operationName = "download")
public byte[] download(@WebParam(name = "Filename") String Filename) {
String filePath="C:/MSC/upload/"+Filename;
System.out.println("Sending file :"+filePath);
try
{
File file=new File(filePath);
FileInputStream fis=new FileInputStream(file);
BufferedInputStream bis=new BufferedInputStream(fis);
byte[] fileBytes=new byte[(int)file.length()];
bis.read(fileBytes);
bis.close();
return fileBytes;
}
catch(Exception ex)
{
System.out.println(ex);
}
return null;
}
}
```

Output:

Practical-07

Implement FOSS-Cloud Functionality VSI (Virtual Server Infrastructure)
Infrastructure as a Service (IaaS), Creating Virtual Machine or Storage

FOSS Cloud Installation

Steps:

1. Choose your keymap. 2. Confirm that you want to start: yes

3. Choose Demo-System: 1

4. Choose a Block-Device: sda

5. Confirm that you want to continue: yes

6. Confirm that you want to continue: yes

7. Choose the network interface: eth0

8. Choose if you want to use automatic network configuration: Yes

9. Reboot your system: yes

10. Login as root and run "fc-node-configuration -n demo-system --password admin"

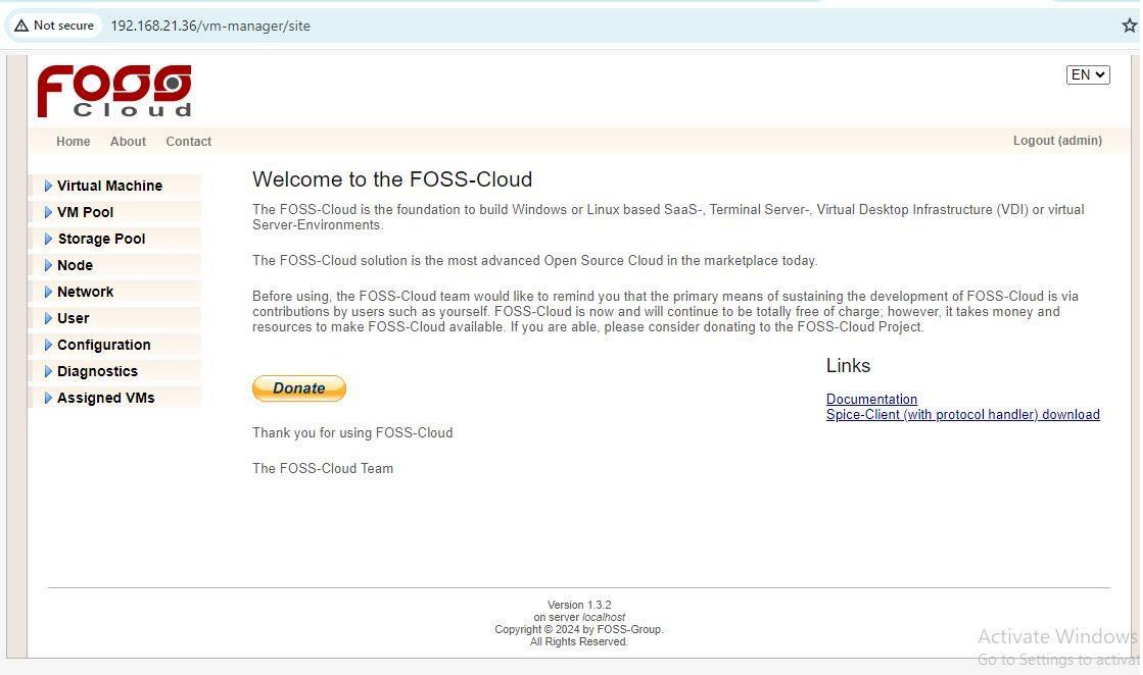
Note :- Above mentioned steps aren't mandatory you can start with the installation process of virt-viewer as shown below.

1. Install virt-viewer.

2. Install spice-client.0.6.3.

3. Open Browser.

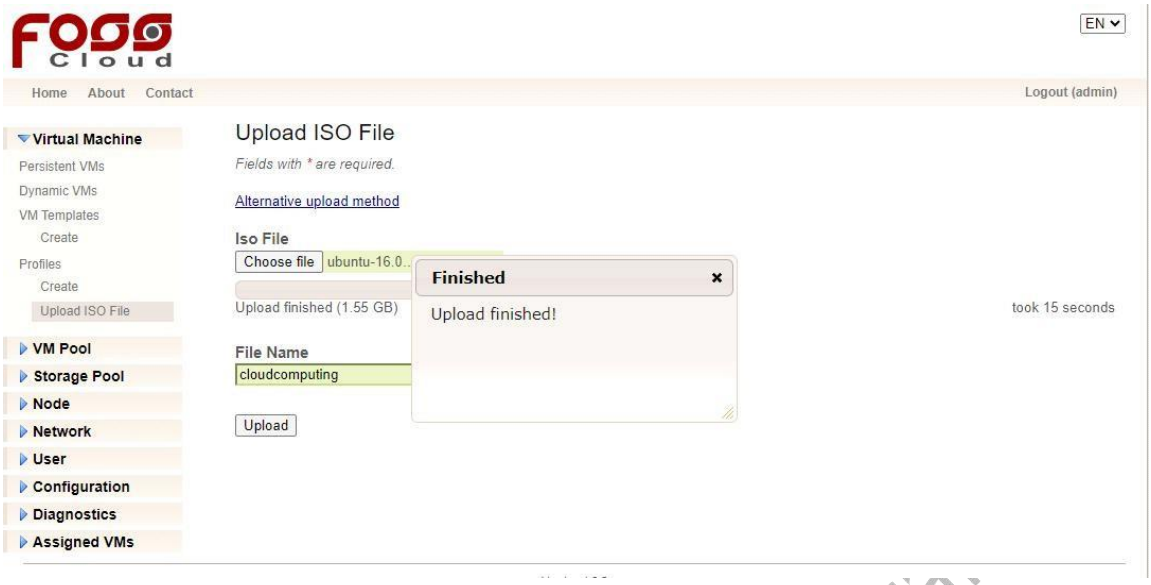
- Once you open browser then on the search type**, 192.168.21.36**



- **Uploading ISO files to Foss cloud**

  Go to **virtual machine→Profile→ Upload ISO file→file name**

Now choose the **ubuntu-16.04.5-desktop-i386 iso-file** from the FOSS cloud folder. Then, give your desired file name to it and click on the upload button**.**

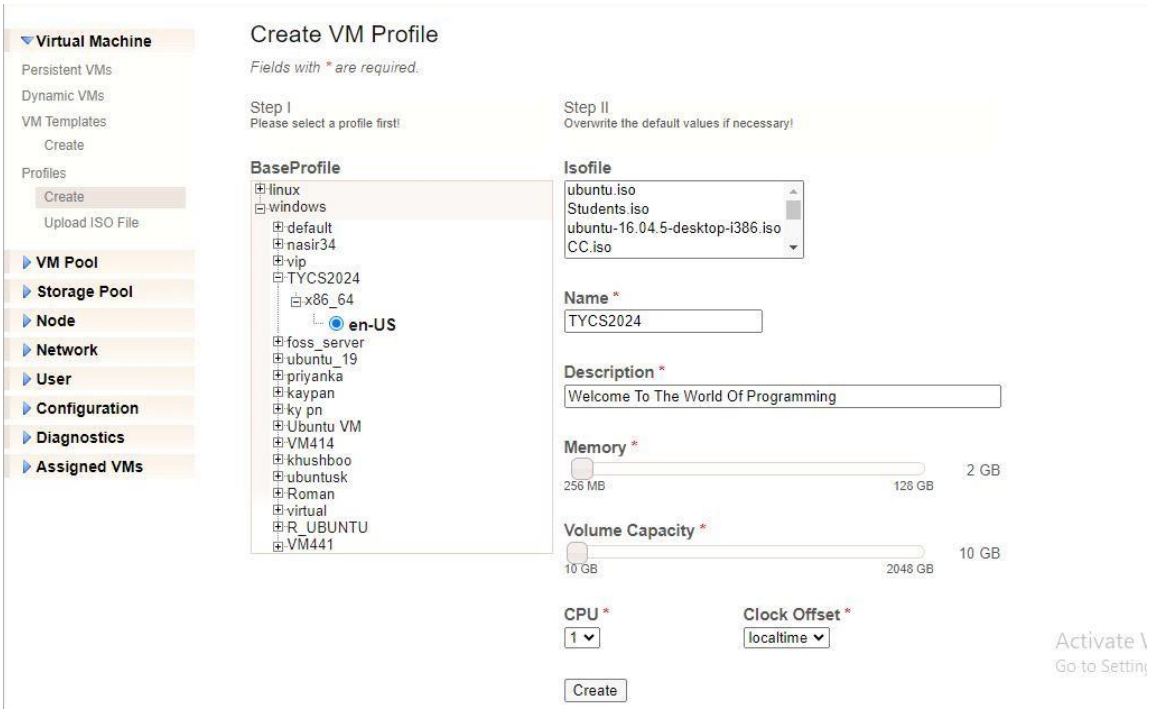


Once done with the upload process go to the create section in profiles.

Creating a Profile

The profile creates the relationship between the ISO file and the FOSS-Cloud.

1. Open Virtual Machines
2. Choose VM-Profiles
3. Choose the right Base Profile
4. Choose the right architecture (Windows only x86_64)
5. Chose the language (it is a information - not keyboard relevant)
6. Choose the ISO file (which you gave in file name tab)
7. Fill out name and description
8. Choose the amount of memory and volume capacity
9. Choose amount of CPU
10. Choose clock offset (normally Windows is "localtime" and Linux is "utc")



Now, we will create a VM template.

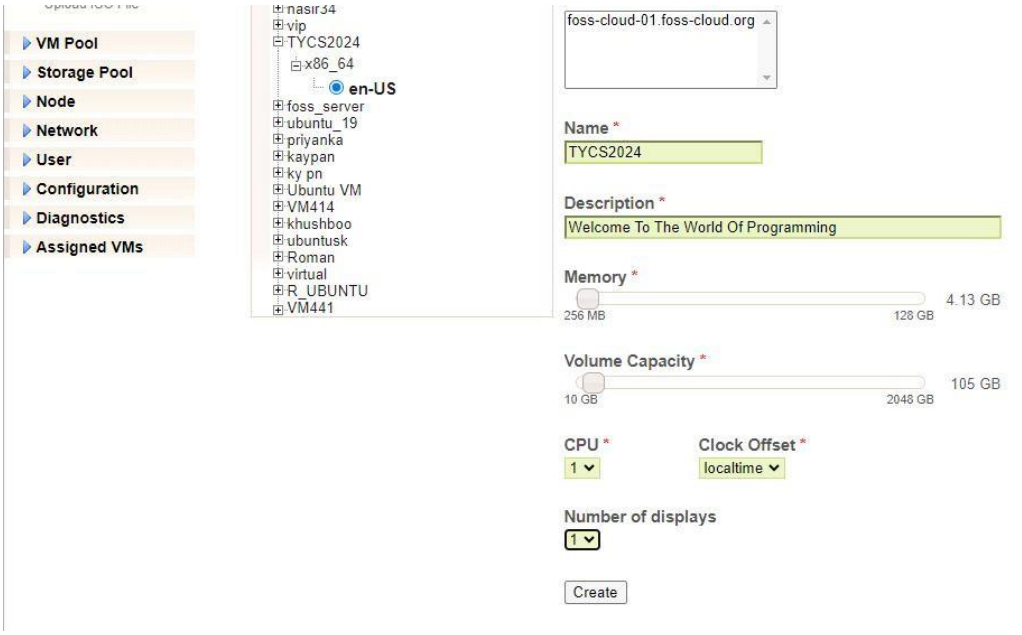
Creating Template

1. Choose the profile you have prepared before.

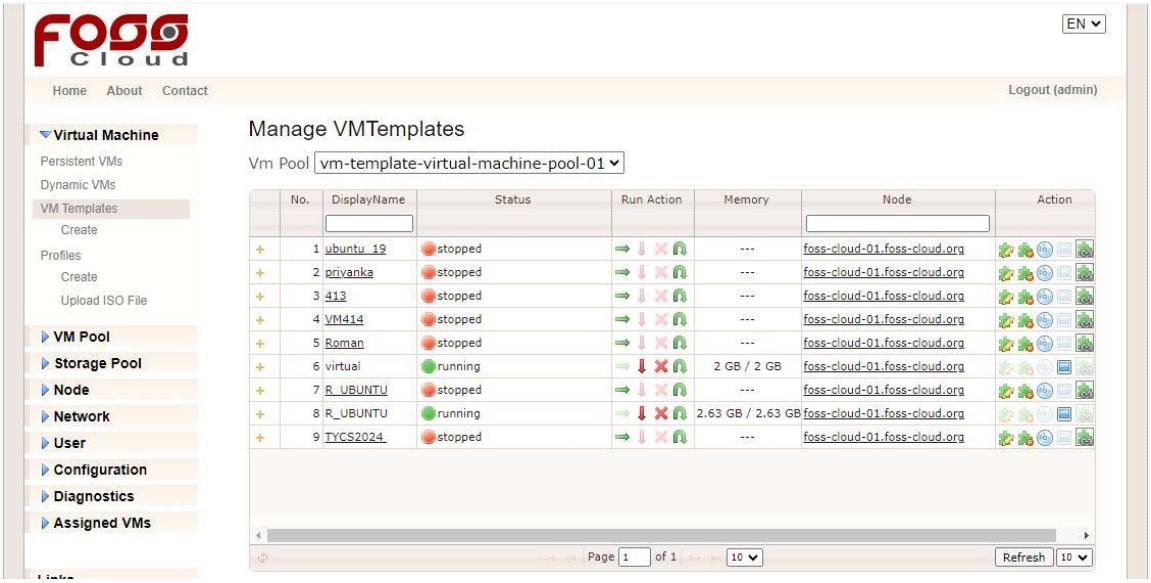
2. Add the VM-pool and one or more nodes, where you will run this VM (when the chosen VM-pool has only one node assigned, you don't have a choice)

3. You can change all the other information you have entered before

Click on "create" and the template is ready for installing the guest operating system.

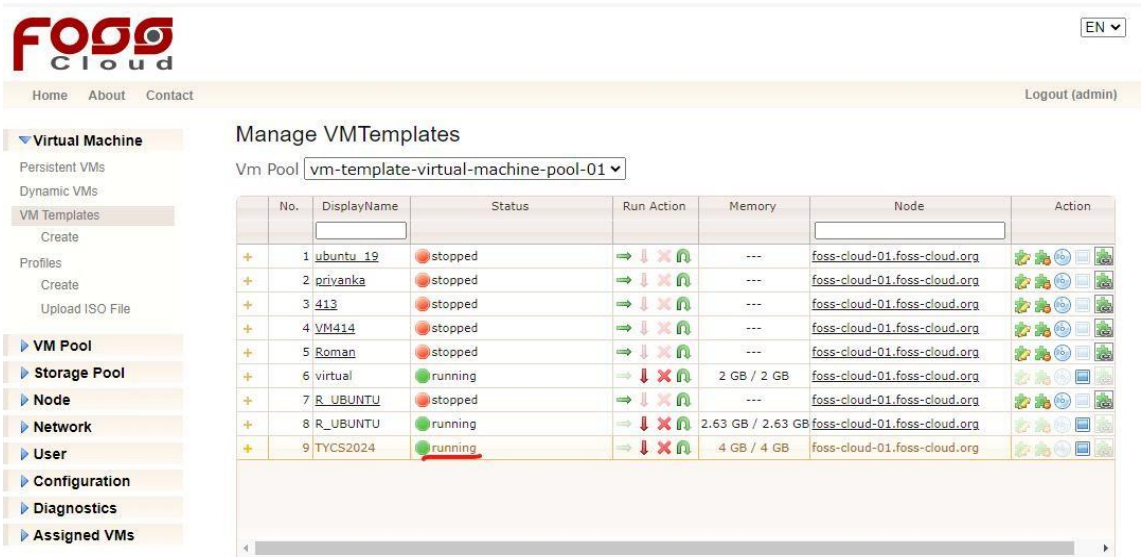


Once you create your virtual machine template you will be able to see your **VM template.**

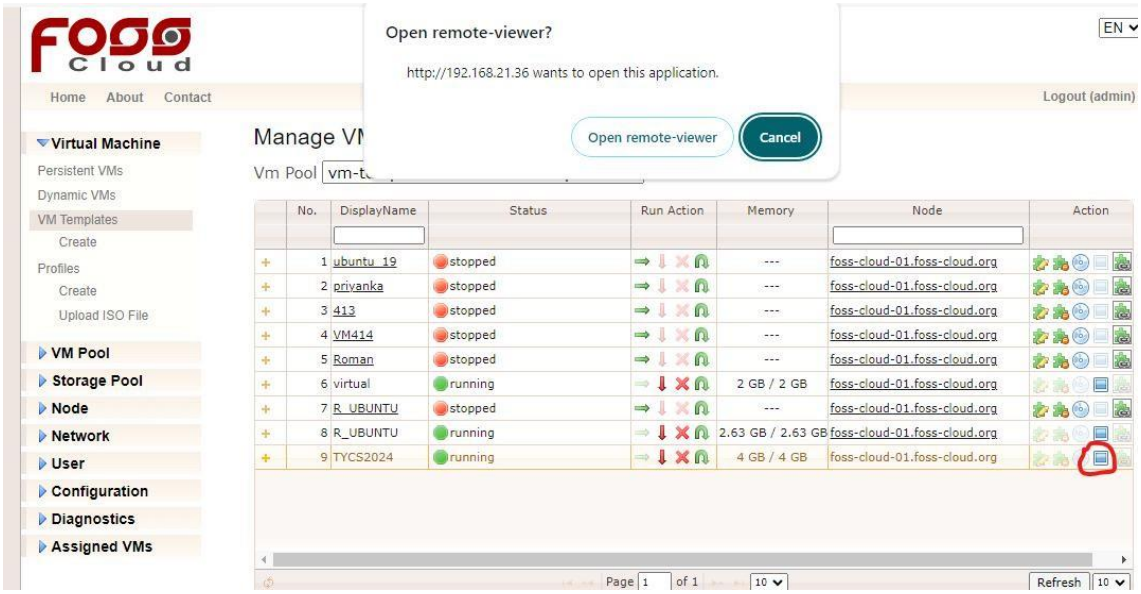


As you can see the last row of Display column our template is created.

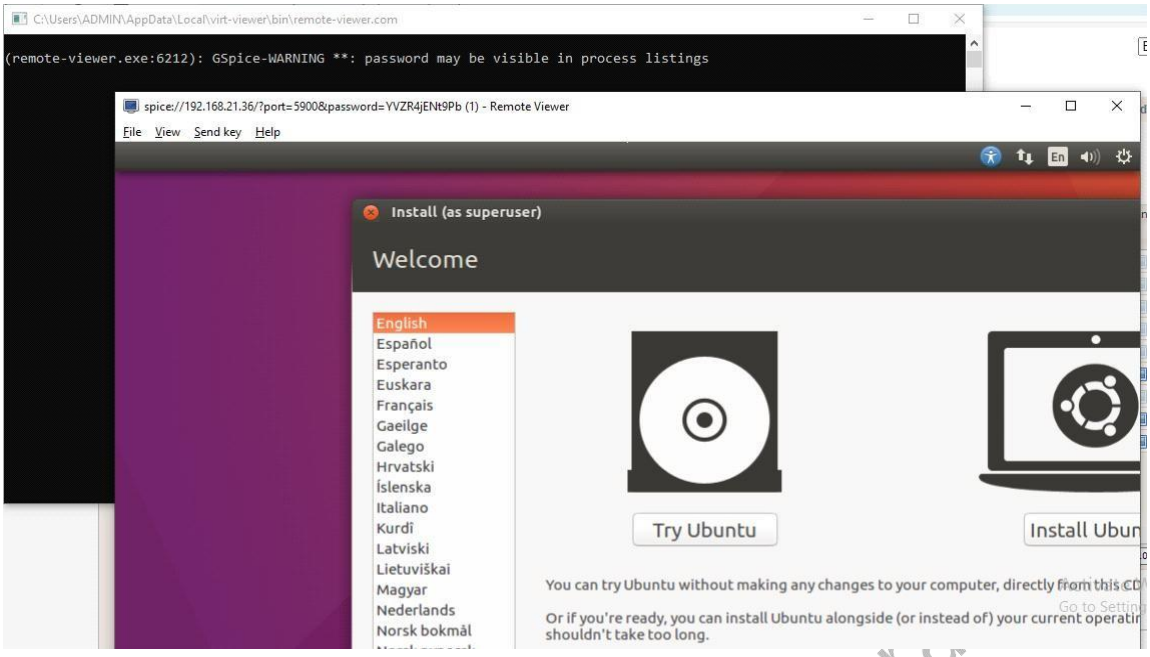
To update your template status, click on the green arrow.



Now click on Use Template in Action column of your corresponding template.

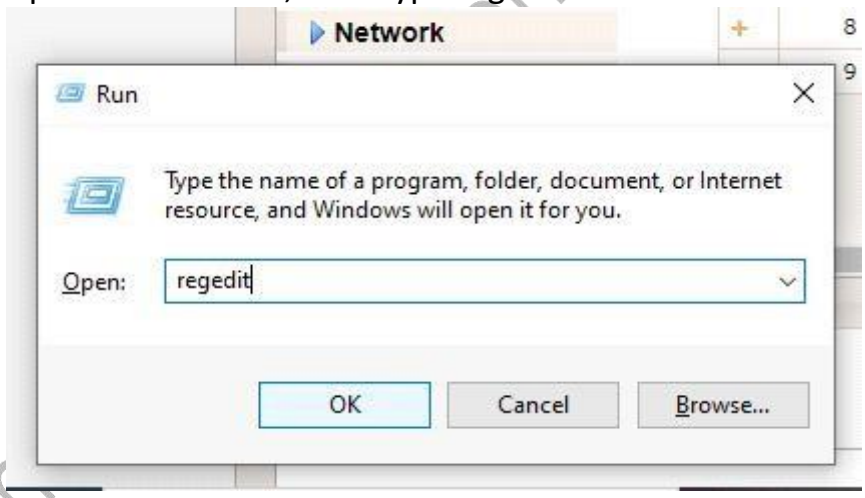


Just after clicking on, it a pop up would appear to Open remote-viewer? click on Open-remote-viewer button, you will see the following screen.

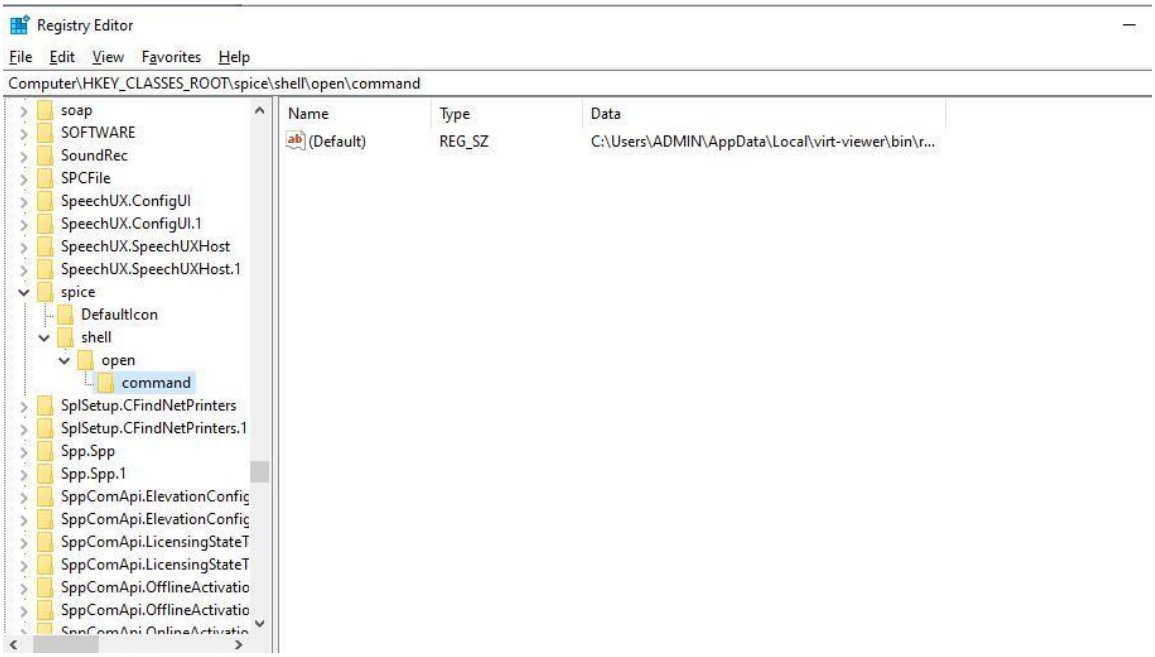


Note :- If you don't see the above screen follow the below given steps.

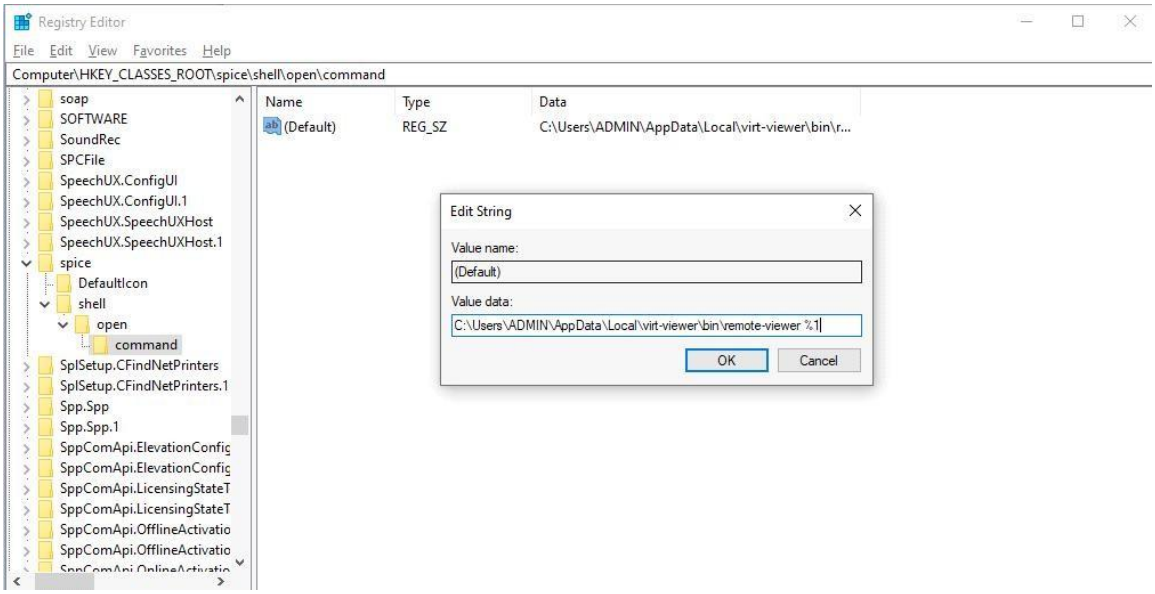
1. First press window + r, then type regedit and click ok.



2. Further permissions tab will open then click yes, and a regedit editor will get open.
3. In the Registry Editor a list of directories would appear, in those lists of directories search for the spice directory.
4. Keep on expanding the spice directory until you reach the command section.

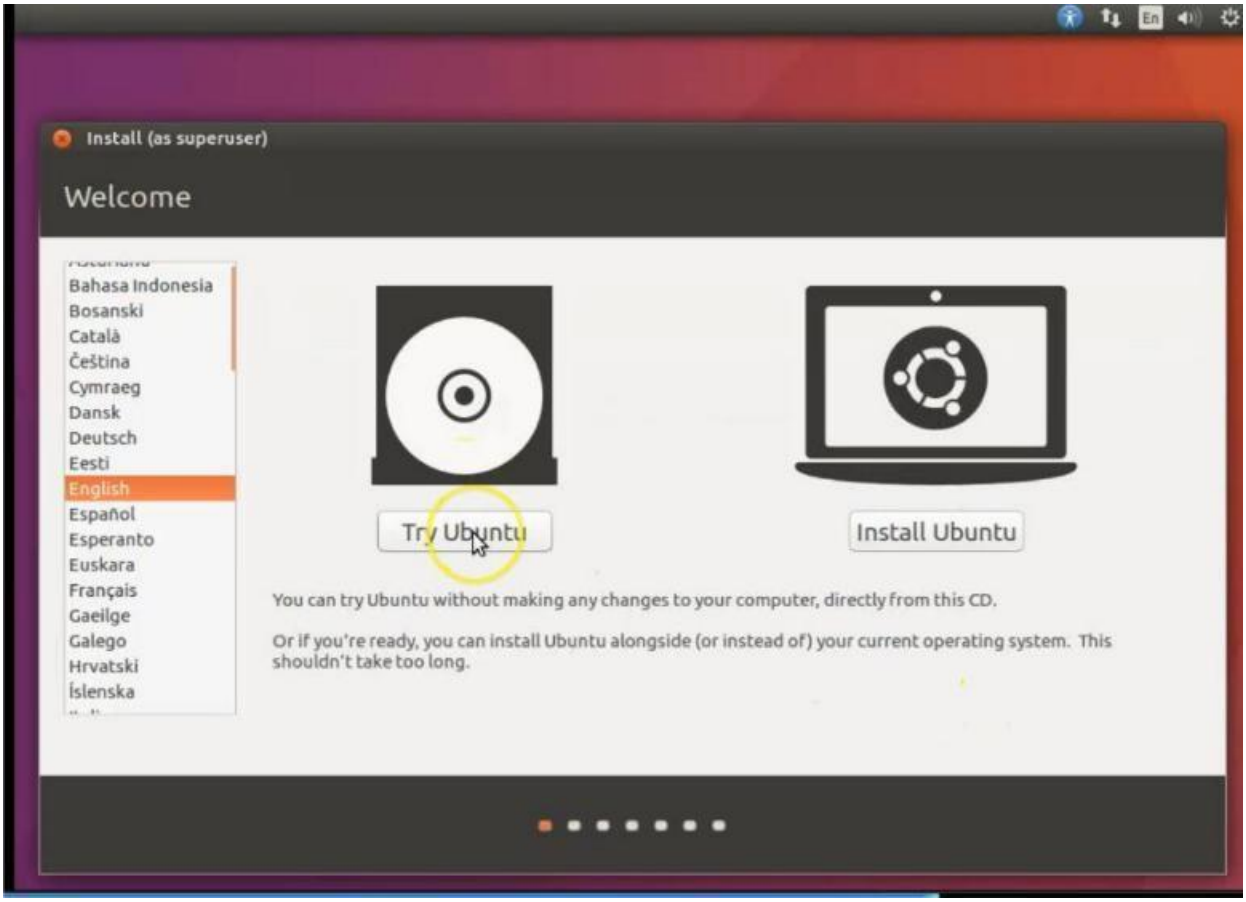


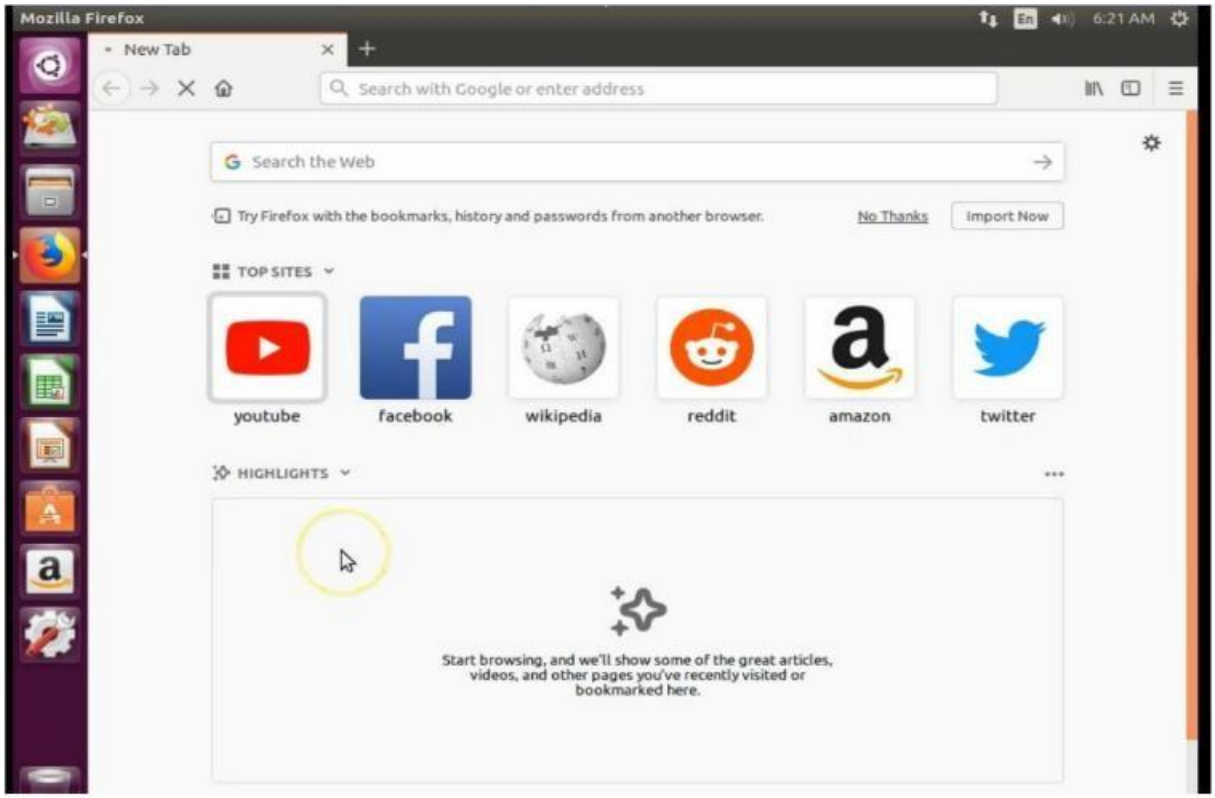
5. Then click on the default file and a pop up will appear, then you have to paste the path **C:\Users\ADMIN\AppData\Local\virt-viewer\bin** in the value data and **also type %1 in last**. Once done the above screen will appear.



Finally, after clicking on remote viewer button a command line come where a graphical control loading and getting connected will be displayed and then finally the ubuntu will get open.

On opening of ubuntu click on try ubuntu. Now, you can use ubuntu on your virtual machine.


Install (as superuser)
Welcome
Bahasa Indonesia
Bosanski
Català
Čeština
Cymraeg
Dansk
Deutsch
Eesti
English
Español
Esperanto
Euskara
Français
Gaeilge
Galego
Hrvatski
Íslenska
Try Ubuntu
Install Ubuntu
You can try Ubuntu without making any changes to your computer, directly from this CD.
Or if you're ready, you can install Ubuntu alongside (or instead of) your current operating system. This shouldn't take too long.

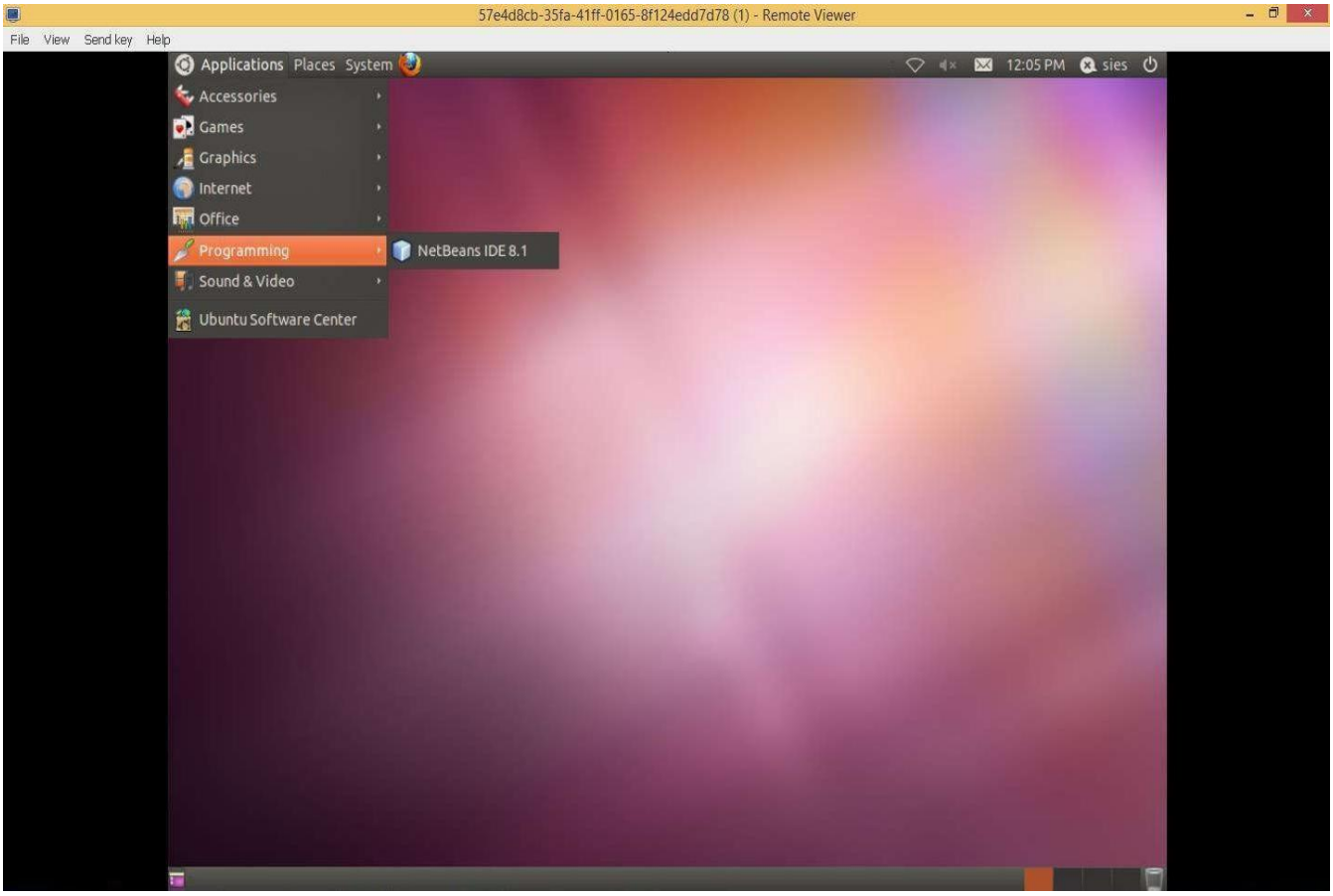

Mozilla Firefox
6:21 AM
New Tab
Search with Google or enter address
Search the Web
Try Firefox with the bookmarks, history and passwords from another browser.
No Thanks
Import Now
TOP SITES
youtube
facebook
wikipedia
reddit
amazon
twitter
HIGHLIGHTS
Start browsing, and we'll show some of the great articles, videos, and other pages you've recently visited or bookmarked here.

Practical-08

Implement FOSS-Cloud Functionality - VSI Platform as a Service (PaaS)

Software development Kits can be made available in the Virtual Machines that can be implemented as Platform as a Service.

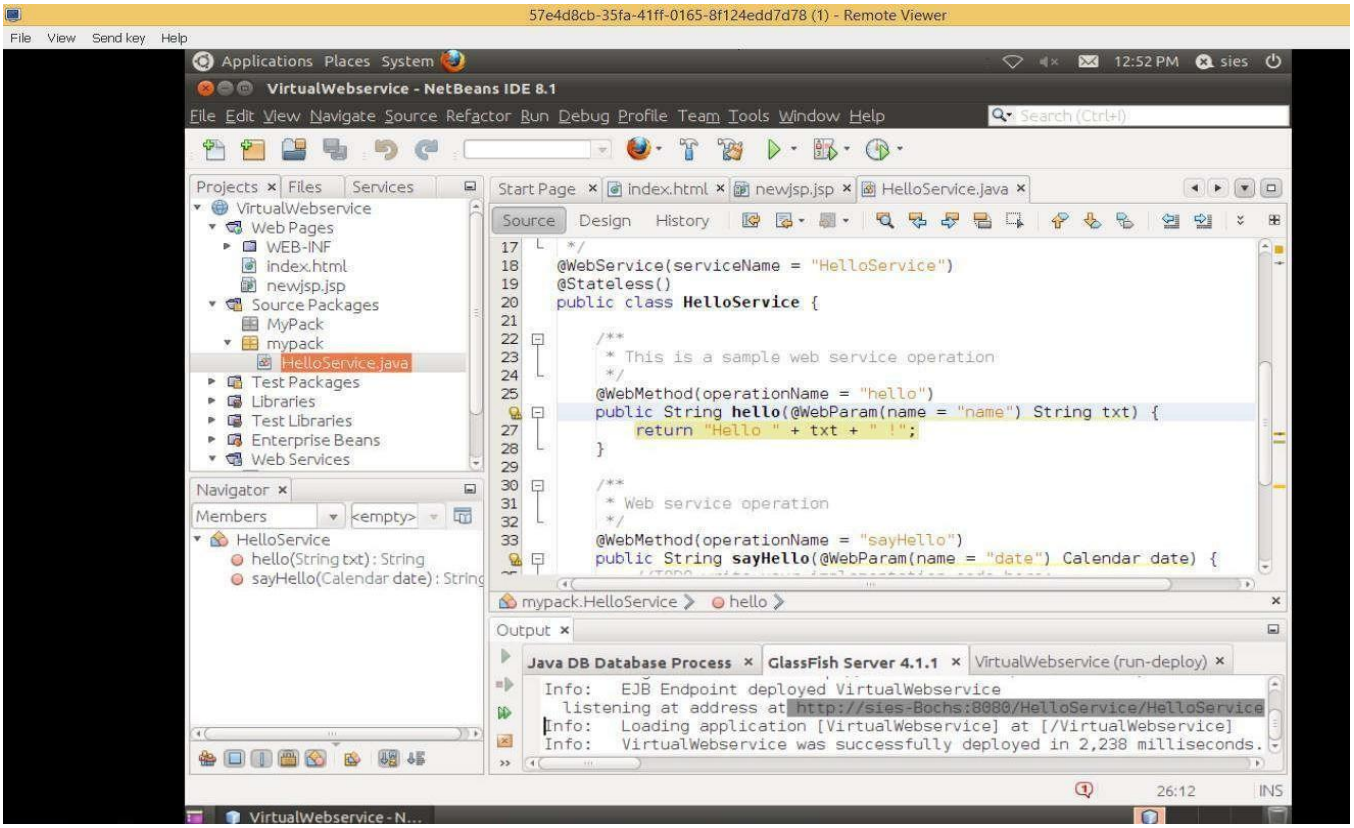
Installationof Netbeans, Eclipse, Visual Studio and DBMS can be done in the appropriate Virtual Machines.

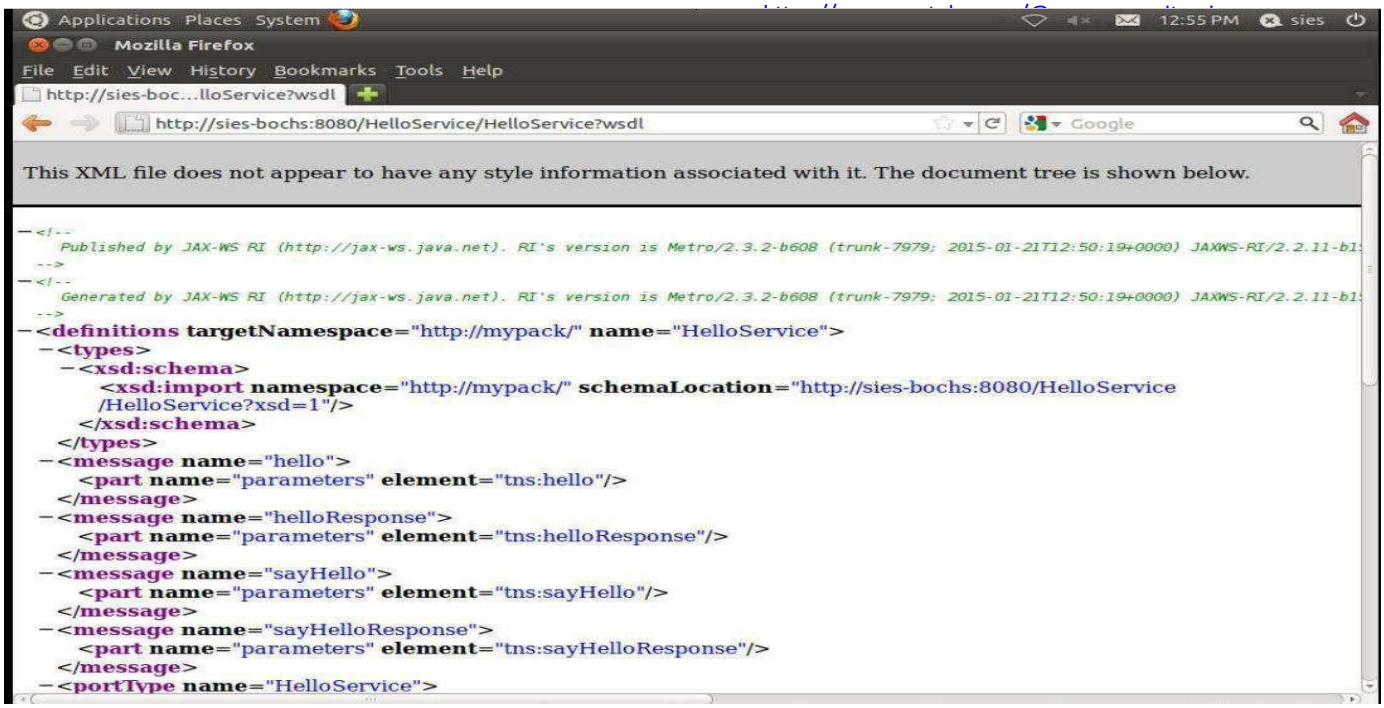


Aim: Implement FOSS-Cloud Functionality VSI Software as a Service (SaaS)

Applications created and deployed in the virtual machines can be accessed by outside world.

This can be implemented as Software as Service.




Applications Places System
12:55 PM
sies
Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://sies-boc...lloService?wsdl
http://sies-bochs:8080/HelloService/HelloService?wsdl
Google
This XML file does not appear to have any style information associated with it. The document tree is shown below.
<!-- Published by JAX-WS RI (http://jax-ws.java.net). RI's version is Metro/2.3.2-b608 (trunk-7979; 2015-01-21T12:50:19+0000) JAXWS-RI/2.2.11-b1
<!-- Generated by JAX-WS RI (http://jax-ws.java.net). RI's version is Metro/2.3.2-b608 (trunk-7979; 2015-01-21T12:50:19+0000) JAXWS-RI/2.2.11-b1
<definitions targetNamespace="http://mypack/" name="HelloService">
<types>
<xsd:schema>
<xsd:import namespace="http://mypack/" schemaLocation="http://sies-bochs:8080/HelloService
/HelloService?xsd=1"/>
</xsd:schema>
</types>
<message name="hello">
<part name="parameters" element="tns:hello"/>
</message>
<message name="helloResponse">
<part name="parameters" element="tns:helloResponse"/>
</message>
<message name="sayHello">
<part name="parameters" element="tns:sayHello"/>
</message>
<message name="sayHelloResponse">
<part name="parameters" element="tns:sayHelloResponse"/>
</message>
<portType name="HelloService">

INDEX

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3	Create a Simple REST Service.		Mugdha
4	Develop application to consume Google's search / Google's Map RESTful Web service.		Mugdha
5	Installation and Configuration of virtualization using KVM.		Mugdha
6	Develop application to download image/video from server or upload image/video to server using MTOM techniques		Mugdha
7	Implement FOSS-Cloud Functionality VSI (Virtual Server Infrastructure) Infrastructure as a Service (IaaS), Storage		Mugdha
8	Implement FOSS-Cloud Functionality - VSI Platform as a Service (PaaS),		Mugdha
9	Using AWS Flow Framework develop application that includes a simple workflow. Workflow calls an activity to print hello world to the console. It must define the basic usage of AWS Flow Framework, including defining contracts, implementation of activities and workflow coordination logic and worker programs to host them		Mugdha
10	Implementation of Openstack with user and private network creation.		Mugdha

Practical No 1

By Chandan

Aim: Define a simple services like Converting Rs into Dollar and Call it from different platform like JAVA and .NET

Solution:

currency_converter.py

```
from flask import Flask, request, jsonify
app = Flask(__name__)
# Conversion rate: 1 INR = 0.012 USD (example rate) conversion_rate =
0.012
@app.route('/convert', methods=['GET']) def
convert_currency():
    inr = request.args.get('inr') if
    inr:
        try:
            inr_value = float(inr)
            usd_value = inr_value * conversion_rate return
            jsonify({"INR": inr_value, "USD": usd_value})
        except ValueError:
            return jsonify({"error": "Invalid INR amount"}), 400
    return jsonify({"error": "INR amount missing"}), 400
if __name__== '__main__': app.run(debug=True)
```

CurrencyConverterClient.java

```
import java.io.BufferedReader; import
java.io.InputStreamReader; import
java.net.HttpURLConnection; import
java.net.URL;
import java.util.Scanner;
public class CurrencyConverterClient {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter amount in INR: "); String
        inrAmount = scanner.nextLine(); // User input
        try {
            String urlString = "http://127.0.0.1:5000/convert?inr=" + inrAmount;
```

```
        URL url = new URL(urlString);
        HttpURLConnection conn = (HttpURLConnection) url.openConnection();
        conn.setRequestMethod("GET");
        conn.setRequestProperty("Accept", "application/json");
        if (conn.getResponseCode() != 200) { throw new
           RuntimeException("Failed : HTTP error code : "
                 + conn.getResponseCode());
        }
        BufferedReader br = new BufferedReader(new InputStreamReader(
           (conn.getInputStream())));
        String output;
        System.out.println("Currency Conversion:"); while
        ((output = br.readLine()) != null) {
        System.out.println(output);
        }
        conn.disconnect();
      } catch (Exception e) {
        e.printStackTrace();
      }
   }
}
```

Output:

```
PS D:\TYCS\CC\cc testing-20241212T025333Z-001\cc testing> & "C:/Program Files/Py
thon313/python.exe" "d:/TYCS/CC/cc testing-20241212T025333Z-001/cc testing/curre
ncy_converter.py"
 * Serving Flask app 'currency_converter'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment.
 Use a production WSGI server instead.
 * Running on http://127.0.0.1:5000
Press CTRL+C to quit
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 379-447-875
```

Now take new terminal

```
Enter amount in INR: 2000
Currency Conversion:
{
  "INR": 2000.0,
  "USD": 24.0
}
```

Practical No 2

By Chandan (java 8v)

Aim: Create a Simple SOAP service

Solution:
Step 1: Download JDK 8

Step 2: Create New Project in Intellij Idea & Select Java 8 & Maven Structure

CalculatorServiceImpl.java

```
package com.example.soap;

import javax.jws.WebService;

@WebService(endpointInterface =
"com.example.soap.CalculatorService") public class
CalculatorServiceImpl implements CalculatorService {

  @Override    public int
add(int num1, int num2) {
return num1 + num2;
  }
}
```

CalculatorService.java

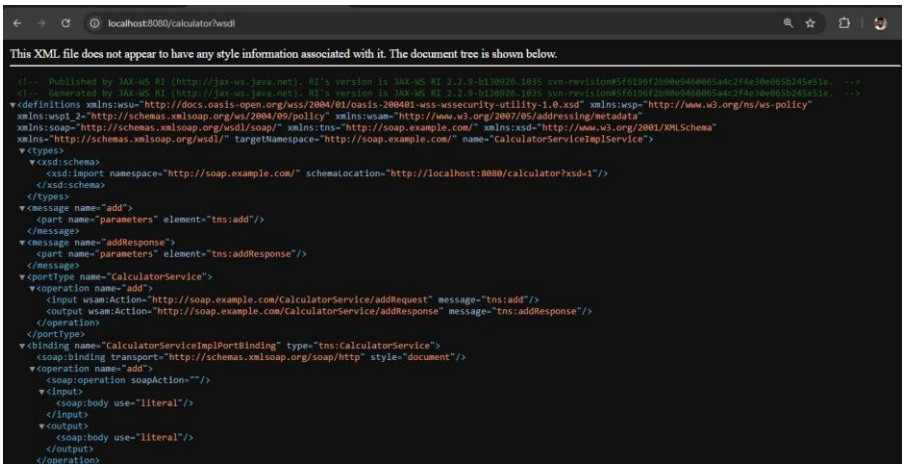
```
package com.example.soap;

import javax.jws.WebService;

@WebService
```

```
public interface CalculatorService
{    public int add(int num1, int
num2);
}
```

CalculatorPublisher.java

```
package com.example.soap;

import javax.xml.ws.Endpoint;

public class CalculatorPublisher {

  public static void main(String[] args) {
     // Publishing the service at a specific URL
     Endpoint.publish("http://localhost:8080/calculator", new CalculatorServiceImpl());
     System.out.println("Service is running at http://localhost:8080/calculator");
  }
}
```

```
"C:\Program Files\Java\jdk1.8.0_202\bin\java.exe" ...
Service is running at http://localhost:8080/calculator
```



CalculatorClient.java

```
package com.example.soap;

import
javax.xml.namespace.QName;
```

```
import javax.xml.ws.Service;
import java.net.URL;

public class CalculatorClient {

  public static void main(String[] args) throws Exception {
    // URL to the WSDL
    URL url = new URL("http://localhost:8080/calculator?wsdl");

    // Correct QName based on the WSDL (Check the actual service name)
    QName qname = new QName("http://soap.example.com/",
"CalculatorServiceImplService");

    // Creating service instance
    Service service = Service.create(url, qname);

    // Getting the port and invoking the method
    CalculatorService calculator =
service.getPort(CalculatorService.class);

    int result = calculator.add(10, 20);
    System.out.println("Result: " + result);
  }
}
```

Output:

```
"C:\Program Files\Java\jdk1.8.0_202\bin\java.exe" ...
Result: 30

Process finished with exit code 0
```

Practical No 3

By Chandan

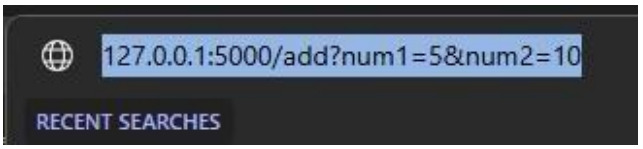
Aim: Create a Simple REST Service.

Solution:

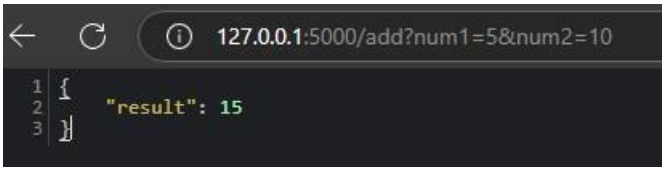
add_numbers.py

```
from flask import Flask, request, jsonify
app = Flask(__name__)
# Route to add two numbers

@app.route('/add', methods=['GET'])
def add_numbers():
    # Get numbers from query parameters
    num1 = float(request.args.get('num1'))
    num2 = float(request.args.get('num2'))
    # Calculate the sum
    result = num1 + num2
    # Return the result as JSON
    return jsonify({"result": result})

if __name__ == '__main__':
    app.run(debug=True)
```

```
 * Running on http://127.0.0.1:5000
Press CTRL+C to quit
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 379-447-875
```



Output:

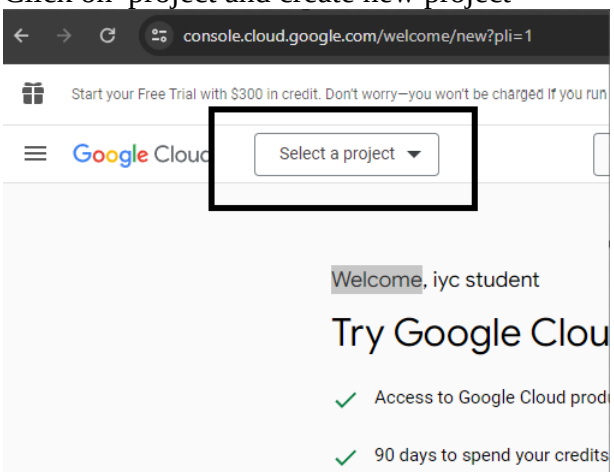


Practical No 4
By Chandan

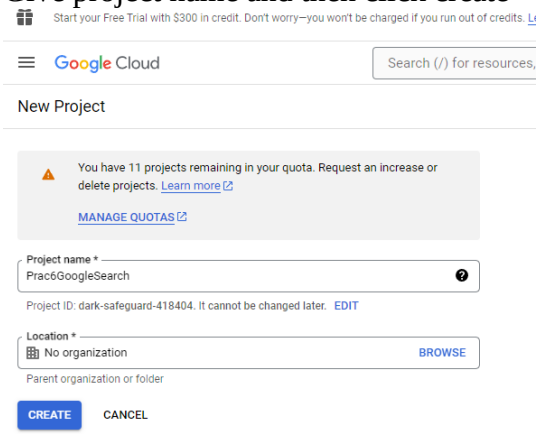
Aim:
Develop an application to consume Google's search / Google's Map RESTful Web service.

Solution:

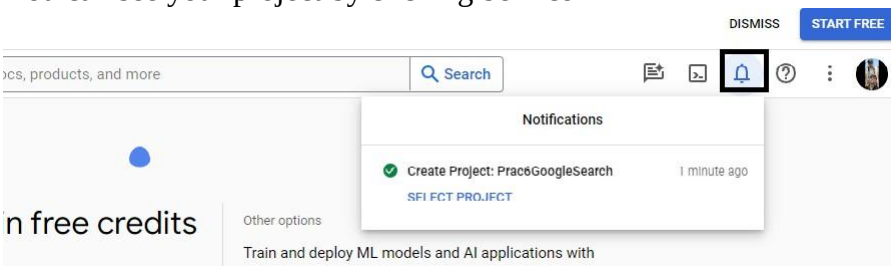
Step 1: Search "console cloud google" on chrome and sign up
https://console.cloud.google.com
Click on project and create new project



Give project name and then click create

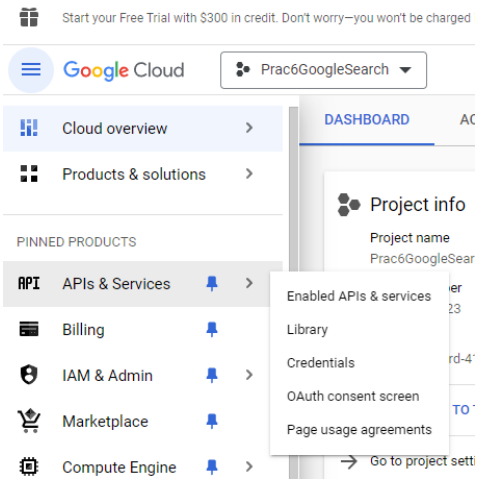


You can see your project by clicking bell icon

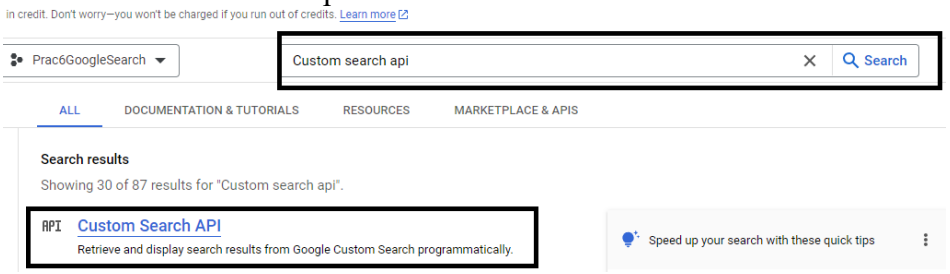


Step 2: Click on bell icon and click "select project"

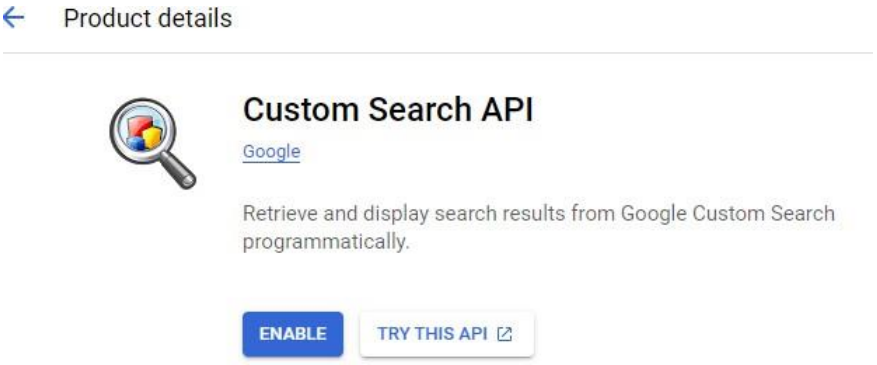
Once you select the project then click on top-left burger icon → Click “APIs and Services” → Enabled APIs and services



Search “Custom search api” on search bar and click on first link

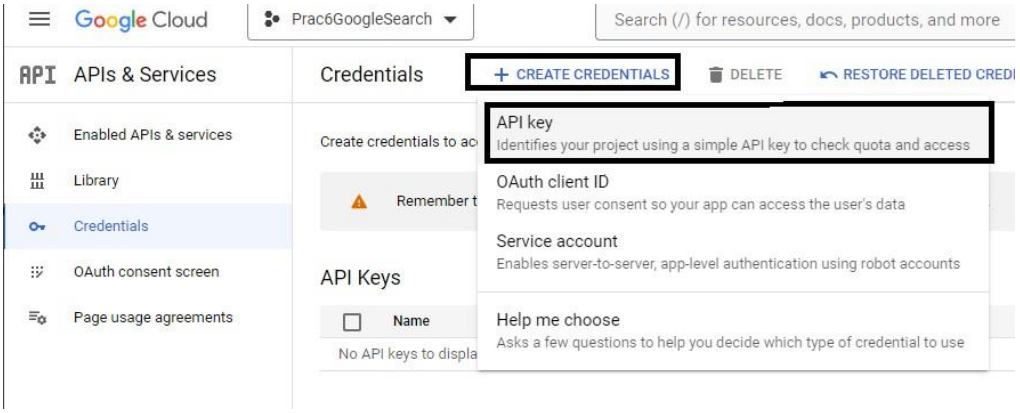


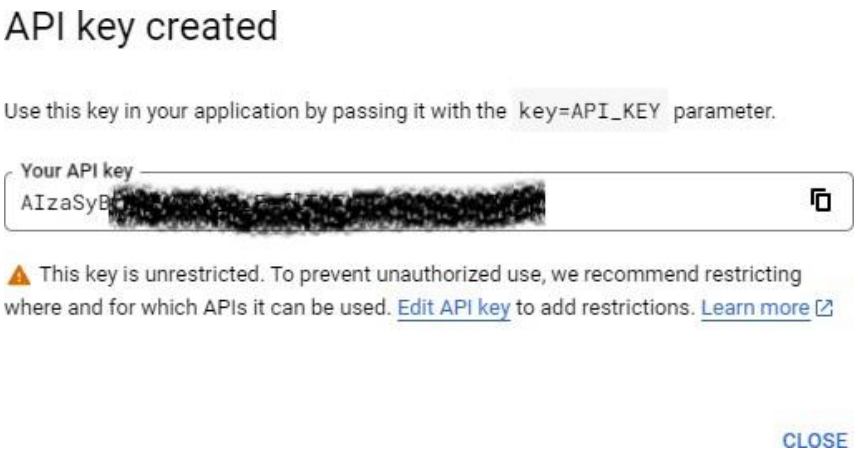
In google cloud project you always have to specify which functionality you want to enable.
Click on enable to enable custom search api
This enable the custom search api for this particular project



Step 3: Now you need to generate an api key to authenticate yourself from python.

In the Api & Services section click on credentials→ click create credentials→Click API key



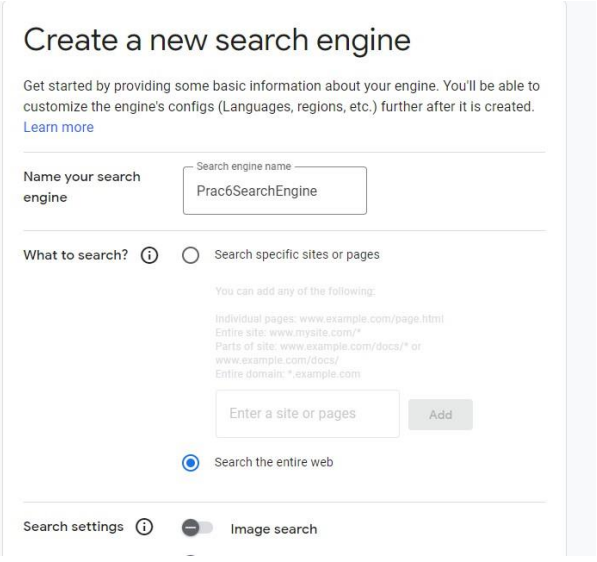


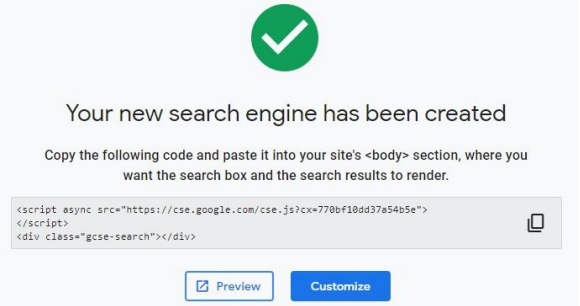
Create a file as API_KEY in your project and paste api_key value in it

Step 4: Create a search engine

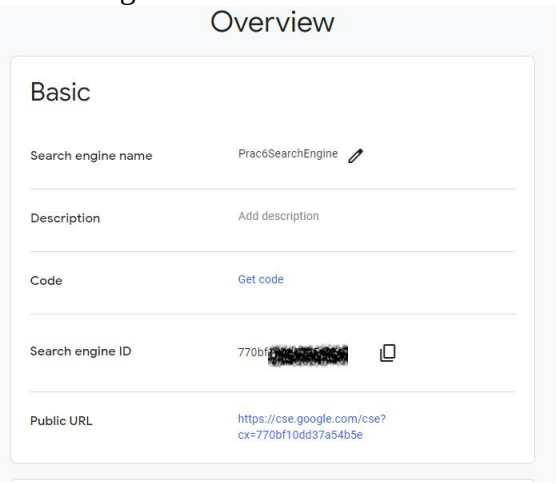
Go to google search programmable search engine → Open first website and click get started

Give name to your search engine and select the "search the entire website “ and click create





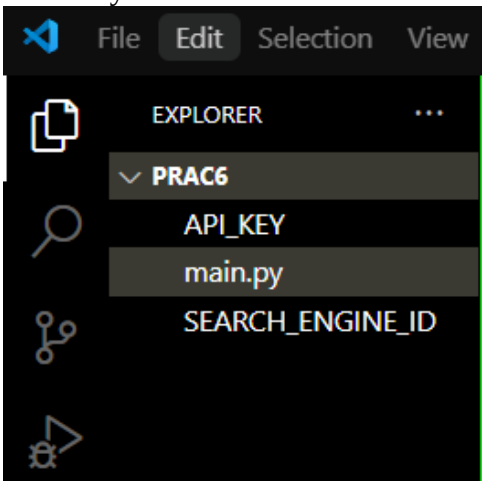
Step 5: Click “go back to all search engine” → click on your search engine → Copy the search engine ID



Create a new file on your project as SEARCH_ENGINE_ID and paste your search engine ID

Download requests using pip3 install requests in the command line .

Directory structure:



Step 6: Get text results using google search

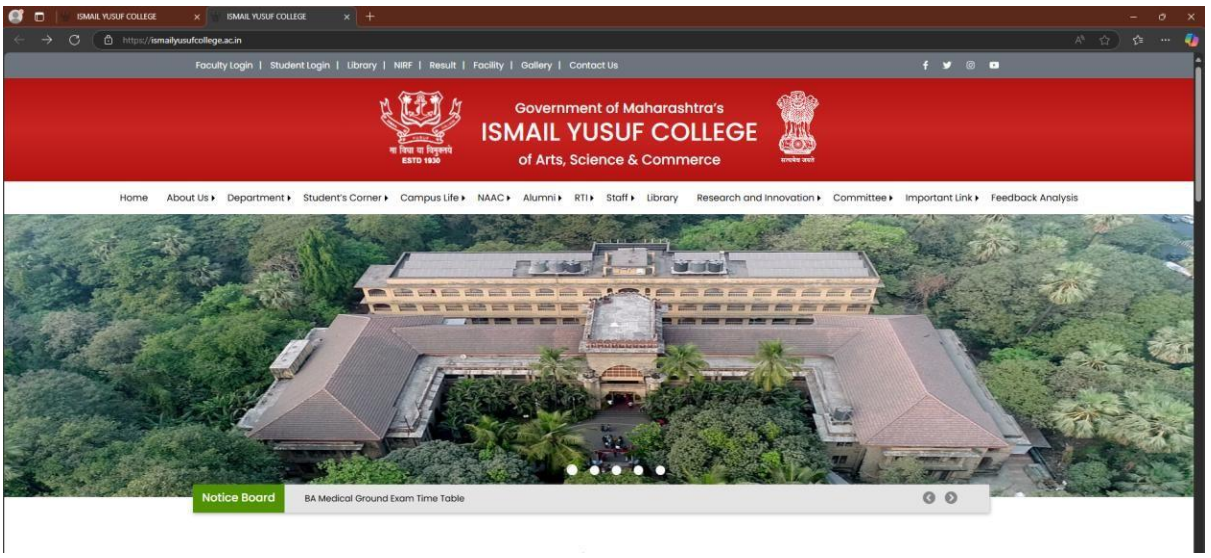
Create a file main.py and write a below code in it

Code:

```python
import requests

# Replace with your actual API key and Search Engine ID
API_KEY = 'Enter your Api Key'
SEARCH_ENGINE_ID = 'Enter your Engine ID'

search_query = 'ismail yusuf college'

url = 'https://www.googleapis.com/customsearch/v1'

params = {
    'q': search_query,
    'key': API_KEY,
    'cx': SEARCH_ENGINE_ID
}

# Send request to the API
response = requests.get(url, params=params)

# Get the response data in JSON format
results = response.json()

# Check if there are results and print the first result's link
if 'items' in results:
    print(results['items'][0]['link'])
else:
    print("No results found.")
```

Output:

```
PS D:\TYCS\CC\Prac4> & "C:/Program Files/Python313/python.exe" d:/TYCS/CC/Prac4/Current/main.py
https://ismailyusufcollege.ac.in/
PS D:\TYCS\CC\Prac4>
```



Practical No 5

By Chandan

Aim:
Installation and Configuration of virtualization using KVM.

Solution:

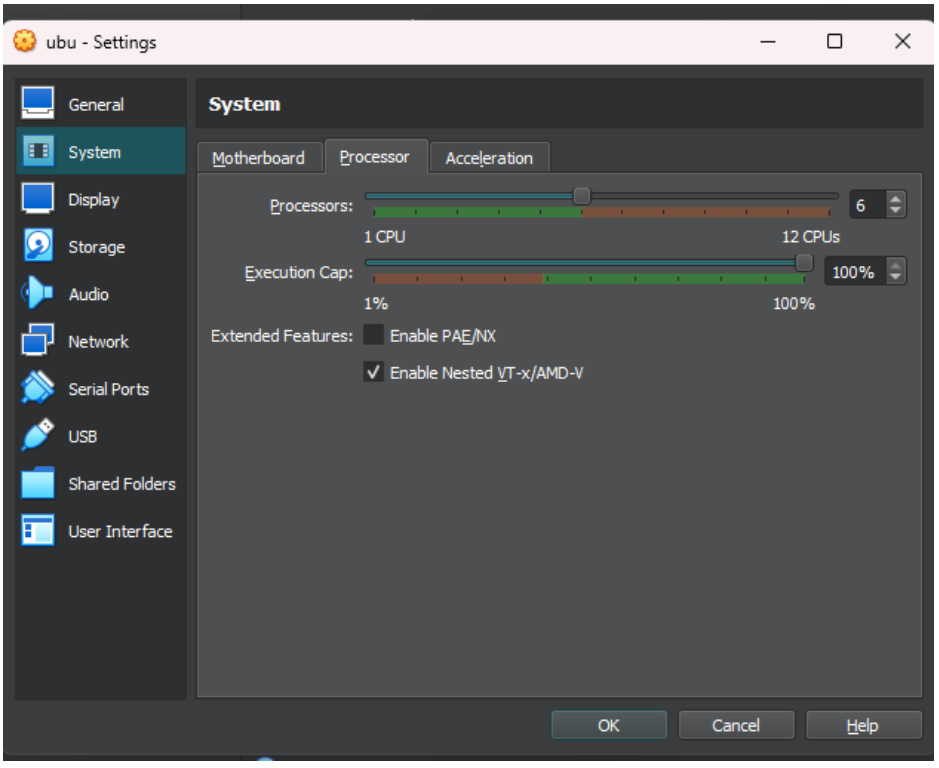
Step 1: Select Ubuntu platform Virtual Machine or Physical Ubuntu Machine recommended: go with Dual Boot

Step 2: In case of Virtual Machine use execute these command
"cd C:\Program Files\Oracle\VirtualBox"
"VBoxManage modifyvm "ubu" –nested—hw-virt on"

```
C:\Users\mehta>cd C:\Program Files\Oracle\VirtualBox

C:\Program Files\Oracle\VirtualBox>VBoxManage modifyvm "ubu" --nested-hw-virt on

C:\Program Files\Oracle\VirtualBox>
```

Step 3: open settings

Step 4: Give minimum 6 Processors & Nested VTX Should ON through above command



Step 5: open terminal & run this command to check processors
$ egrep -c '(vm|svm)' /proc/cpuinfo

```
ubu@ubu-mac:~$ egrep -c '(vm|svm)' /proc/cpuinfo
6
```

Step 6: $ kvm-ok

```
ubu@ubu-mac:~$ kvm-ok
INFO: Your CPU does not support KVM extensions
INFO: For more detailed results, you should run this as root
HINT:   sudo /usr/sbin/kvm-ok
```

Step 7: $ sudo apt-get install -y qemu-kvm virt-manager

```
ubu@ubu-mac:~$ sudo apt-get install -y qemu-kvm virt-manager
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'qemu-system-x86' instead of 'qemu-kvm'
The following additional packages will be installed:
  dmeventd dmsetup gir1.2-ayatanaappindicator3-0.1 gir1.2-gtk-vnc-2.0
  gir1.2-gtksource-4 gir1.2-libosinfo-1.0 gir1.2-libvirt-glib-1.0
```

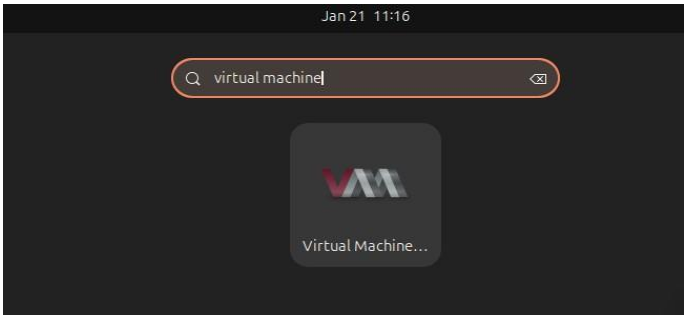
Step 8: $ sudo systemctl enable --now libvirtd
$ sudo systemctl start --now libvirtd
$ sudo systemctl status --now libvirtd

```
ubu@ubu-mac:~$ sudo systemctl enable --now libvirtd
ubu@ubu-mac:~$ sudo systemctl start --now libvirtd
ubu@ubu-mac:~$ sudo systemctl status --now libvirtd
● libvirtd.service - libvirt legacy monolithic daemon
     Loaded: loaded (/usr/lib/systemd/system/libvirtd.service; enabled; preset:>
     Active: active (running) since Tue 2025-01-21 11:10:01 IST; 1min 16s ago
TriggeredBy: ● libvirtd-admin.socket
             ● libvirtd-ro.socket
             ● libvirtd.socket
       Docs: man:libvirtd(8)
             https://libvirt.org/
   Main PID: 5460 (libvirtd)
      Tasks: 22 (limit: 32768)
     Memory: 10.9M (peak: 13.2M)
```

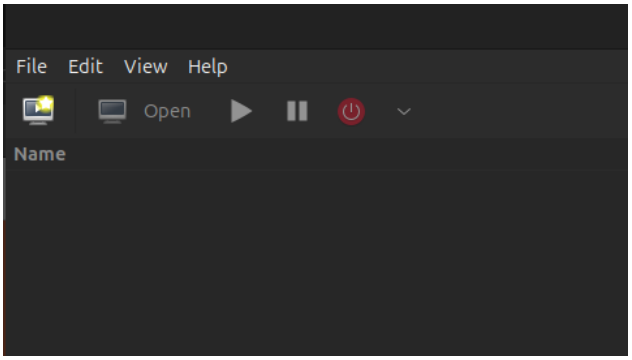
Step 9: $ sudo usermod -aG kvm $USER
$ sudo usermod -aG libvirt $USER

```
ubu@ubu-mac:~$ sudo usermod -aG kvm $USER
ubu@ubu-mac:~$ sudo usermode -aG libvirt $USER
sudo: usermode: command not found
ubu@ubu-mac:~$ sudo usermod -aG libvirt $USER
```

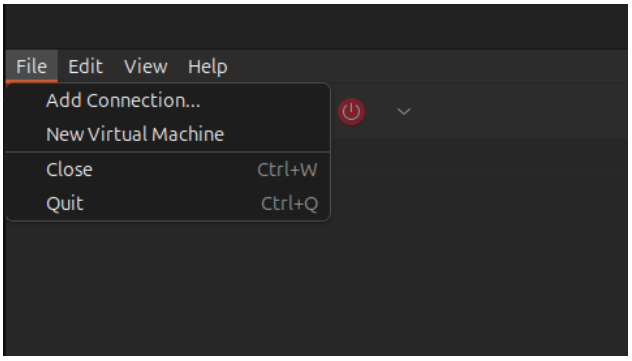
Step 10: Search Virtual Machine and open



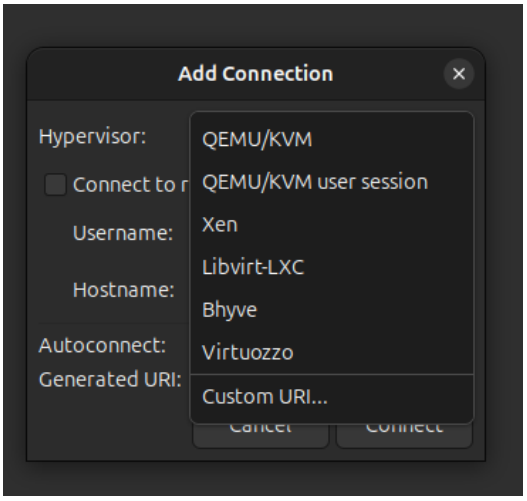
Step 11: Click on File



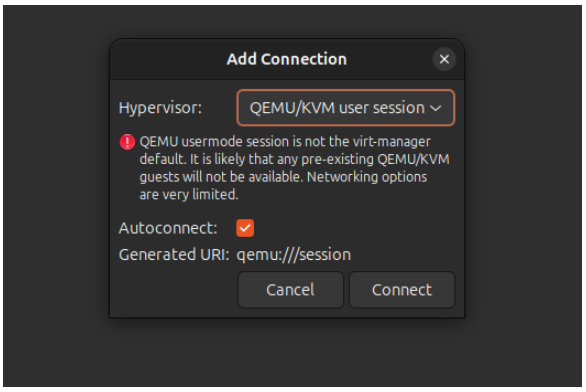
Step 12: Add Connection

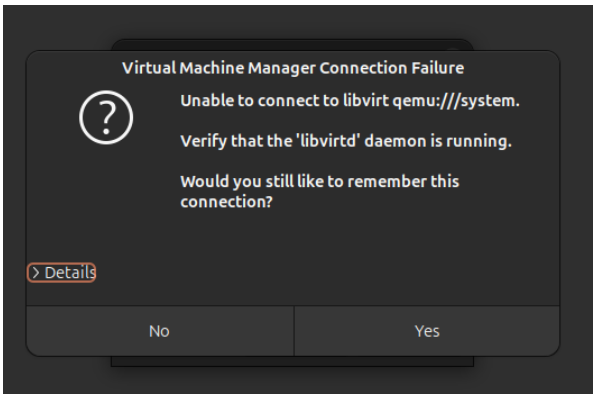


Step 13: QEMU/KVM user session

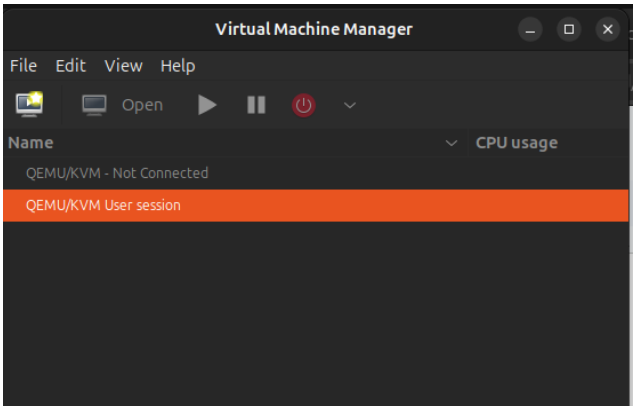


Step 14: click on “Connect” and then yes

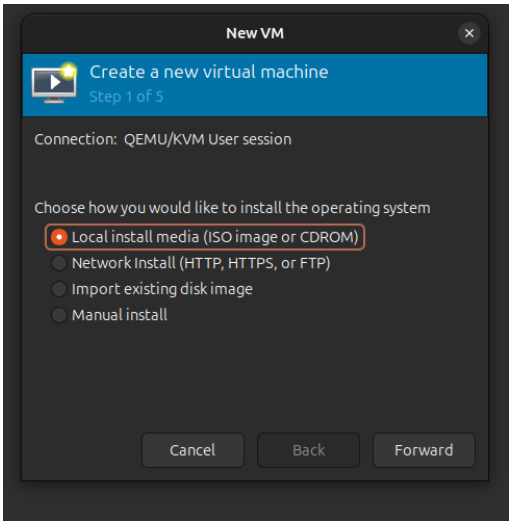




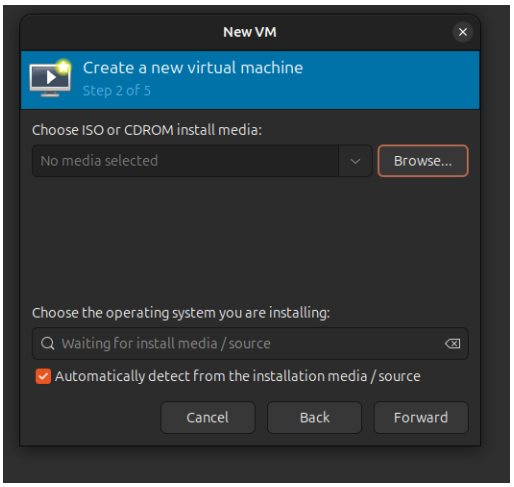
Step 15: now right click on “user session” and create new virtual machine



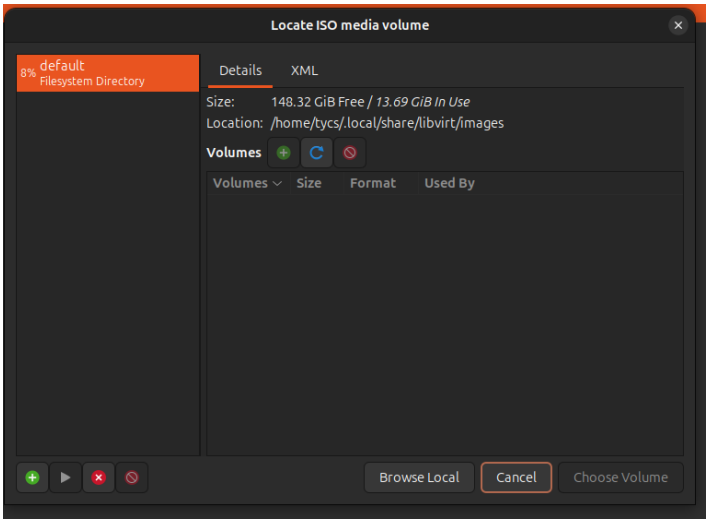
Step 16: Select 1st option and then forward



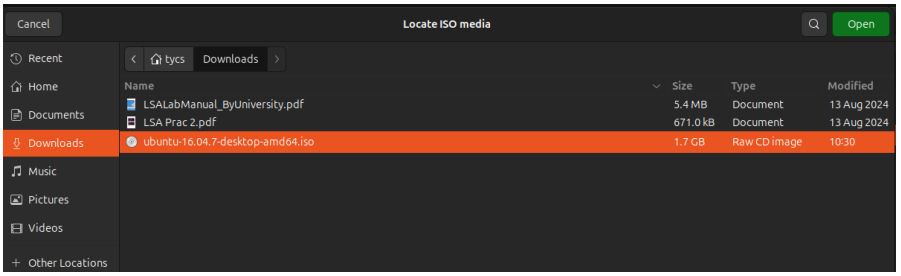
Step 17: Download ubuntu ISO File 16 & Click on Browse

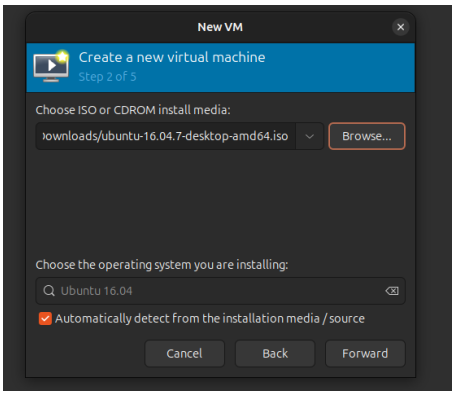


Step 18: Browse local

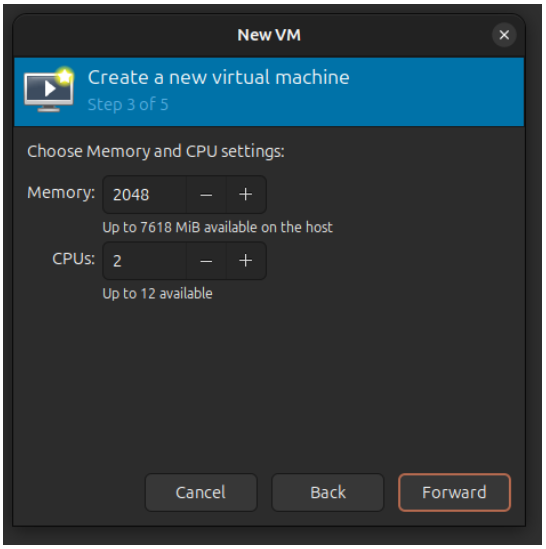


Select ISO file and then forward

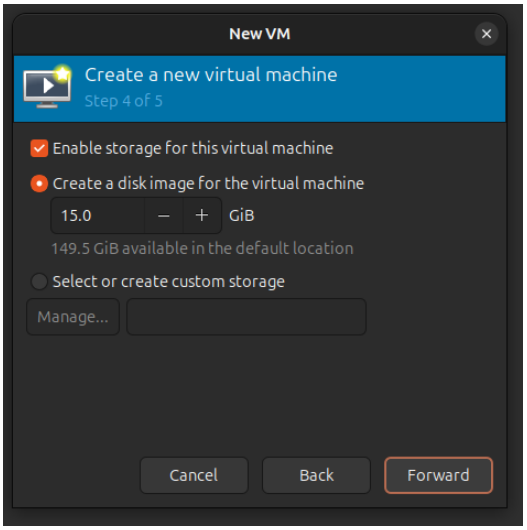


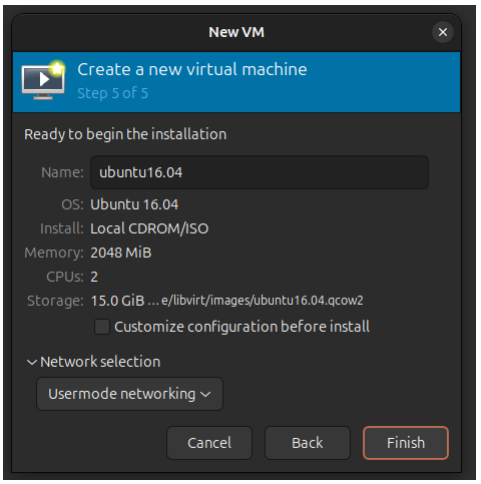


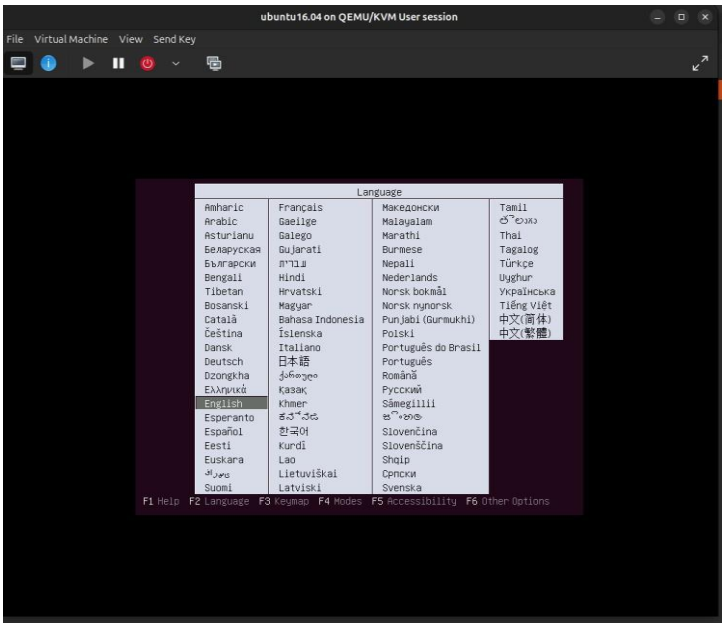
Step 18: Allocate Memory & CPUs and then forward

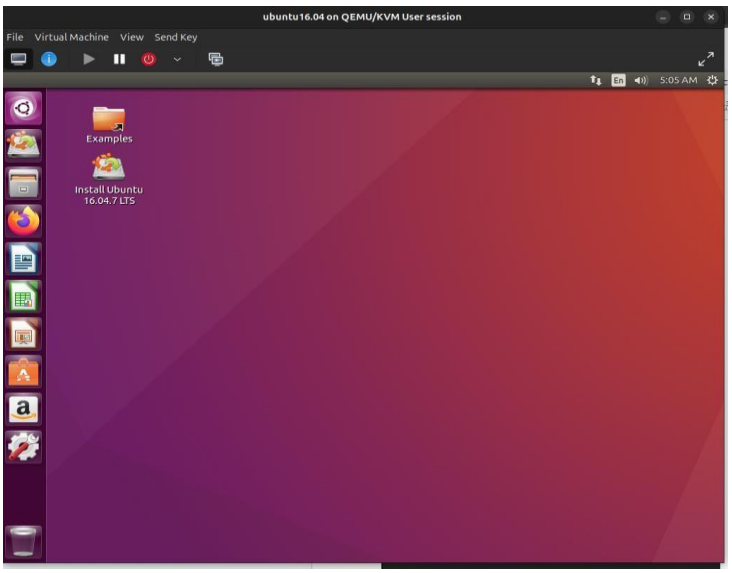


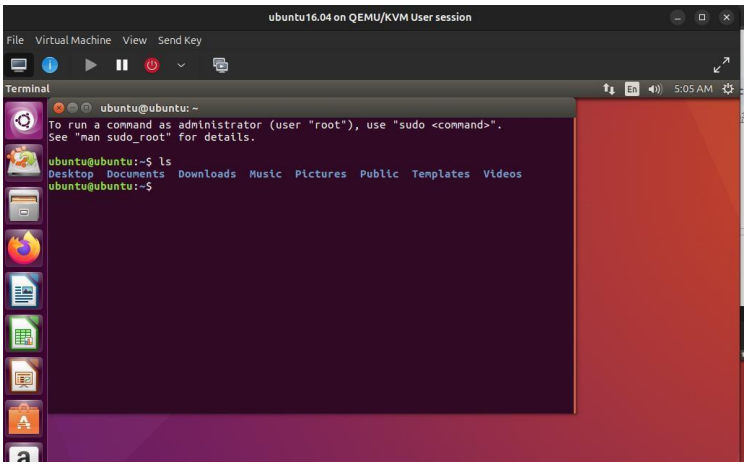
Step 19: Allocate Disk Space & then finish




New VM
Create a new virtual machine
Step 5 of 5
Ready to begin the installation
Name: ubuntu16.04
OS: Ubuntu 16.04
Install: Local CDROM/ISO
Memory: 2048 MiB
CPUs: 2
Storage: 15.0 GiB ... e/libvirt/images/ubuntu16.04.qcow2
Customize configuration before install
Network selection
Usermode networking
Cancel
Back
Finish


ubuntu16.04 on QEMU/KVM User session
File Virtual Machine View Send Key
Language
Amharic
Arabic
Asturianu
Беларуская
Български
Bengali
Tibetan
Bosanski
Català
Čeština
Dansk
Deutsch
Dzongkha
Ελληνικά
English
Esperanto
Español
Eesti
Euskara
Suomi
Français
Gaeilge
Galego
Gujarati
Hindi
Hrvatski
Magyar
Bahasa Indonesia
Íslenska
Italiano
日本語
Қазақ
Khmer
Kurdî
Lao
Lietuviškai
Latviski
Македонски
Malayalam
Marathi
Burmese
Nepali
Nederlands
Norsk bokmål
Norsk nynorsk
Punjabi (Gurmukhi)
Polski
Português do Brasil
Português
Română
Русский
Sámegillii
Slovenčina
Slovenščina
Shqip
Српски
Svenska
Tamil
Thai
Tagalog
Türkçe
Uyghur
Українська
Tiếng Việt
中文(简体)
中文(繁體)
F1 Help F2 Language F3 Keymap F4 Modes F5 Accessibility F6 Other Options


ubuntu16.04 on QEMU/KVM User session
File Virtual Machine View Send Key
5:05 AM
Examples
Install Ubuntu 16.04.7 LTS


ubuntu16.04 on QEMU/KVM User session
File Virtual Machine View Send Key
Terminal
5:05 AM
ubuntu@ubuntu: ~
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
ubuntu@ubuntu:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
ubuntu@ubuntu:~$

Practical No 6

By Chandan

Aim: Develop application to download image/video from server or upload image/video to server using MTOM techniques.

Solution:

Using Flask

Step 1: Create app.py file & Run

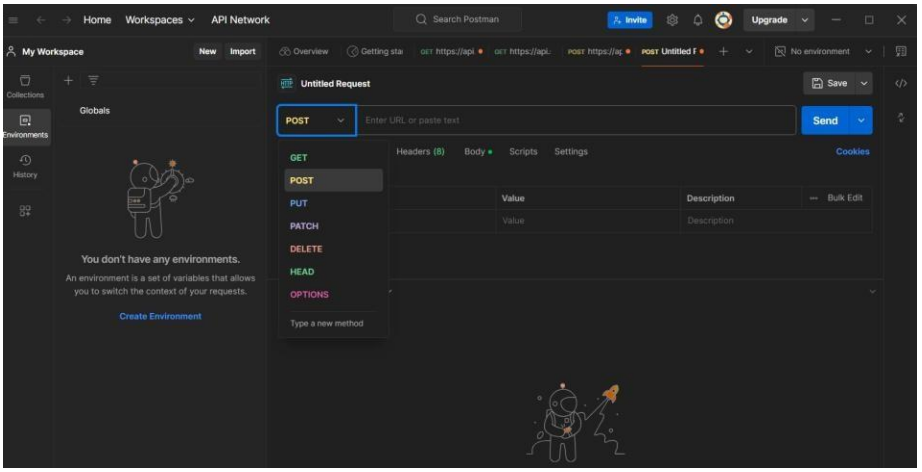
app.py

```
from flask import Flask, request,
send_from_directory import os
app = Flask(__name__)
# Namaste Bacho ! Uploads ke liye folder banane ka
UPLOAD_FOLDER = 'uploads'
os.makedirs(UPLOAD_FOLDER, exist_ok=True)
# 1. File upload endpoint
@app.route('/upload',
methods=['POST']) def upload_file():
    file =
    request.files.get('file') if
    file:
        file_path = os.path.join(UPLOAD_FOLDER, file.filename)
        file.save(file_path)
        return {"message": f"File '{file.filename}' uploaded successfully!"}, 200
    return {"error": "No file uploaded"}, 400
# 2. File download endpoint
@app.route('/download/<filename>',
methods=['GET']) def download_file(filename):
try:
        return send_from_directory(UPLOAD_FOLDER, filename, as_attachment=True)
    except FileNotFoundError: return
        {"error": "File not found"}, 404
if __name___==
    '__main__':
    app.run(debug=True)
```

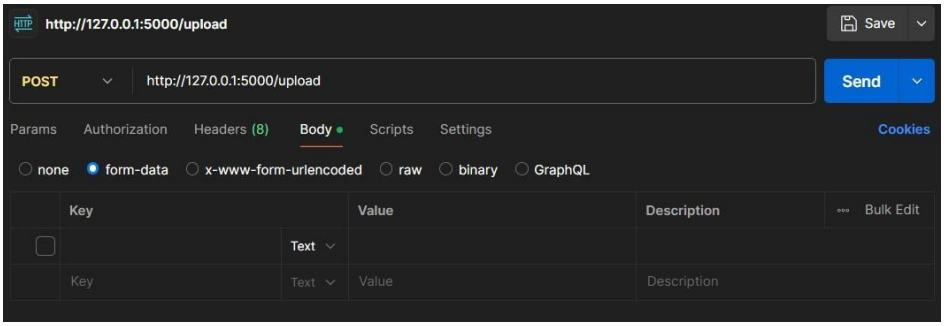
```
 * Running on http://127.0.0.1:5000
Press CTRL+C to quit
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 219-099-923
```

After running this code it will automictically create uploads folder

Step 2: Open postman and select method “POST”

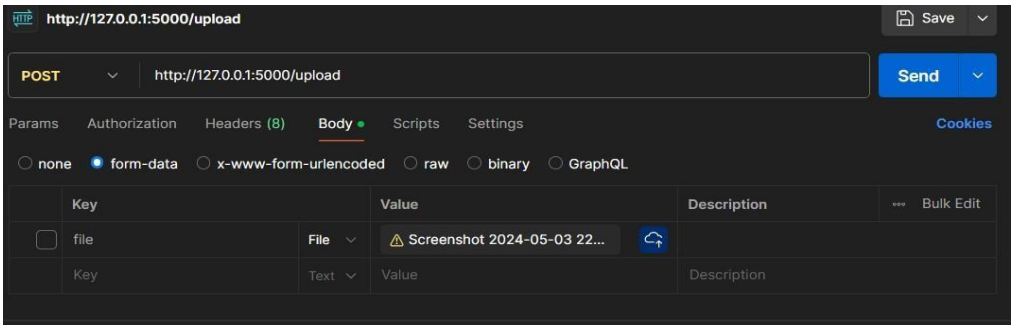


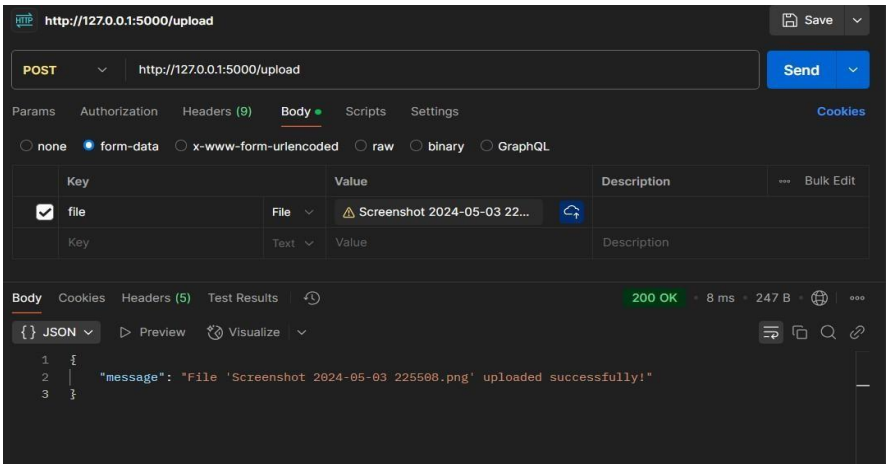
Step 3: Enter url http://127.0.0.1:5000/upload & select Body & then select form-data and replace text With File



Step 4: Click on Values and + New file from local machine

Step 5: After selecting file click on send button





Now u can see uploaded file in uploads folder

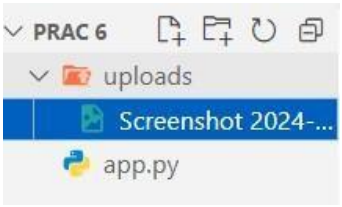
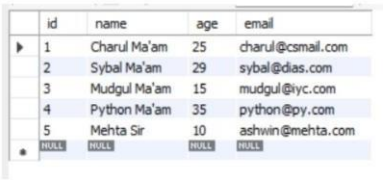


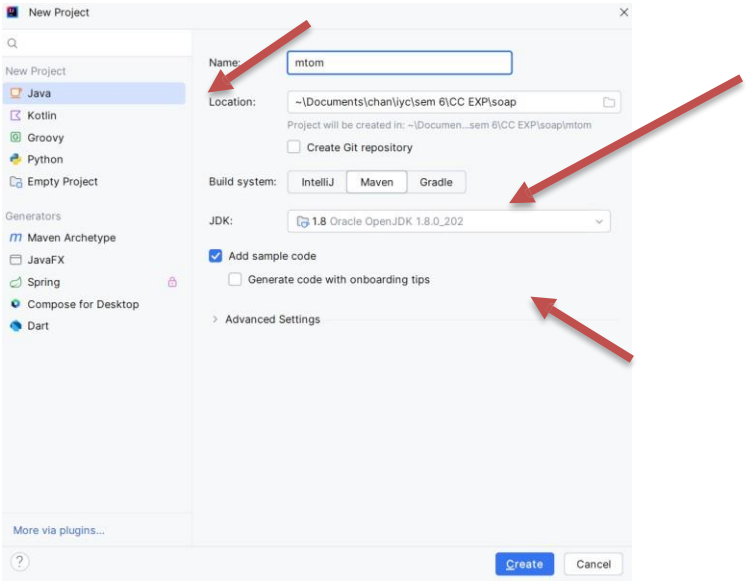
Image file



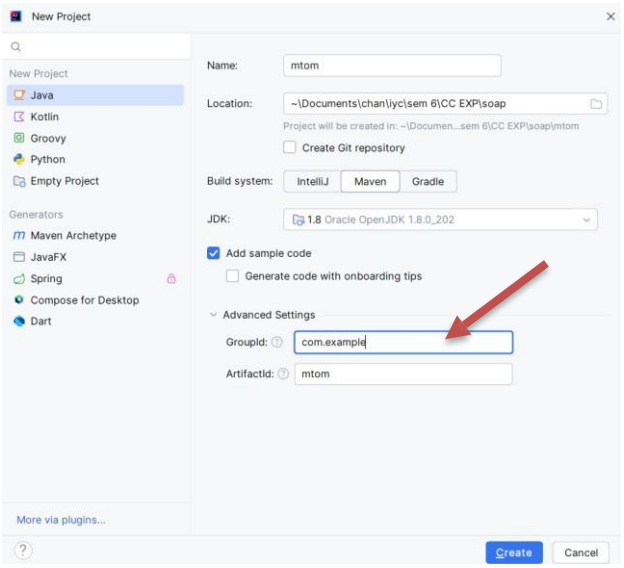
id	name	age	email
1	Charul Ma'am	25	charul@csmail.com
2	Sybal Ma'am	29	sybal@dias.com
3	Mudgul Ma'am	15	mudgul@iyc.com
4	Python Ma'am	35	python@py.com
5	Mehta Sir	10	ashwin@mehta.com
NULL	NULL	NULL	NULL

Using Real MTOM Technique

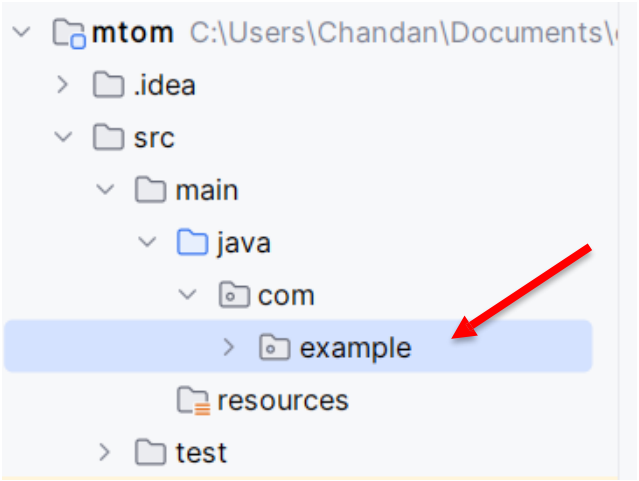
Step 1: Open Intelijee and do the basic work as shown in the screenshots.



Step 2: Give the example Group ID.

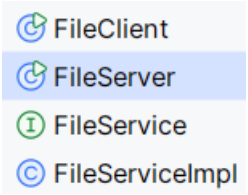


Step 3: After creating, the app will look like this.



Step 4: Now right-click on the example, and then left-click to create a new Java class. Name it as I'm telling you.

Step 5: You have to create all these classes one by one.



Step 6: Now look at the code and type it correctly from the files one by one.

FileService.java

```
package com.example;

import javax.jws.WebMethod;
import javax.jws.WebService;
import javax.xml.ws.soap.MTOM;

@MTOM // Enable MTOM
@WebService
public interface FileService {
    @WebMethod
    String uploadFile(byte[] data, String fileName);

    @WebMethod
    byte[] downloadFile(String fileName);
}
```

FileServiceImpl.java

```
package com.example;

import javax.jws.WebService;
import java.io.FileOutputStream;
import java.io.IOException;
import java.nio.file.Files;
import java.nio.file.Paths;

@WebService(endpointInterface = "com.example.FileService")
public class FileServiceImpl implements FileService {

    private static final String FILE_DIRECTORY =
"C:/Users/Chandan/Documents/chan/iyc/sem 6/CC
```

```
EXP/soap/mtom/src/main/java/com/example"; // Update path as required

    @Override
    public String uploadFile(byte[] data, String fileName) {
        try (FileOutputStream fos = new FileOutputStream(FILE_DIRECTORY +
fileName)) {
            fos.write(data);
            return "File uploaded successfully: " + fileName;
        } catch (IOException e) {
            e.printStackTrace();
            return "File upload failed: " + e.getMessage();
        }
    }

    @Override
    public byte[] downloadFile(String fileName) {
        try {
            return Files.readAllBytes(Paths.get(FILE_DIRECTORY + fileName));
        } catch (IOException e) {
            e.printStackTrace();
            return null;
        }
    }
}
```

FileServer.java

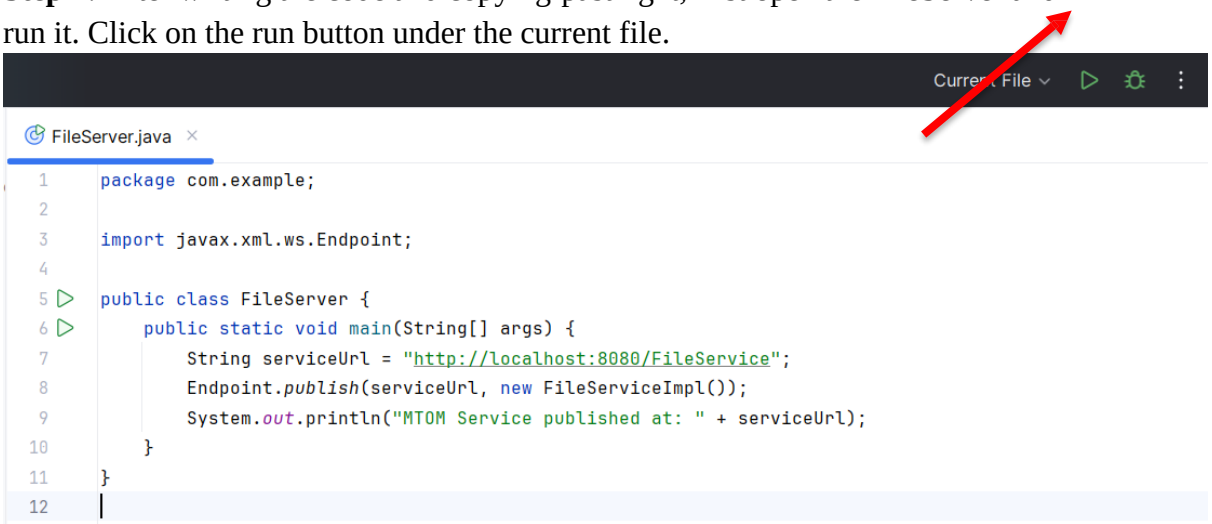
```
package com.example;

import javax.xml.ws.Endpoint;

public class FileServer {
    public static void main(String[] args) {
        String serviceUrl = "http://localhost:8080/FileService";
        Endpoint.publish(serviceUrl, new FileServiceImpl());
        System.out.println("MTOM Service published at: " + serviceUrl);
    }
}
```

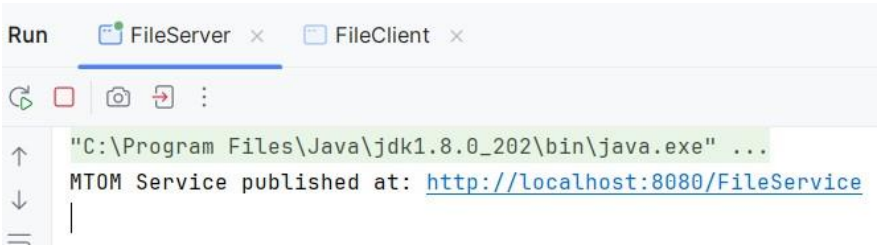
FileClient.java

```
package com.example;

import javax.xml.namespace.QName;
import javax.xml.ws.Service;
import java.io.File;
import java.io.FileOutputStream;
import java.net.URL;
import java.nio.file.Files;

public class FileClient {
```

```
    public static void main(String[] args) throws Exception {
        // Connect to the published service
        URL wsdlUrl = new URL("http://localhost:8080/FileService?wsdl");
        QName qname = new QName("http://example.com/",
"FileServiceImplService");
        Service service = Service.create(wsdlUrl, qname);
        FileService fileService = service.getPort(FileService.class);

        // Upload a file
        File fileToUpload = new
File("C:/Users/Chandan/Pictures/Screenshots/Screenshot 2025-01-18 203338.png"); //
Adjust file path
        byte[] fileData = Files.readAllBytes(fileToUpload.toPath());
        String uploadResponse = fileService.uploadFile(fileData, "uploaded.jpg");
        System.out.println(uploadResponse);

        // Download a file
        byte[] downloadedData = fileService.downloadFile("uploaded.jpg");
        String downloadPath = "C:/Users/Chandan/Documents/chan/iyc/sem 6/CC
EXP/downloaded.jpg"; // Specify a full file path
        try (FileOutputStream fos = new FileOutputStream(downloadPath)) {
            fos.write(downloadedData);
            System.out.println("File downloaded successfully to: " + downloadPath);
        }
    }
}
```

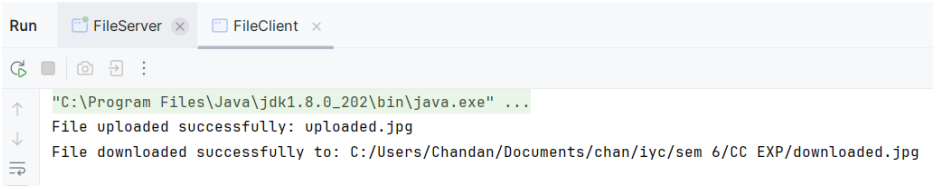
Step 7: After writing the code and copying-pasting it, first open the FileServer and run it. Click on the run button under the current file.

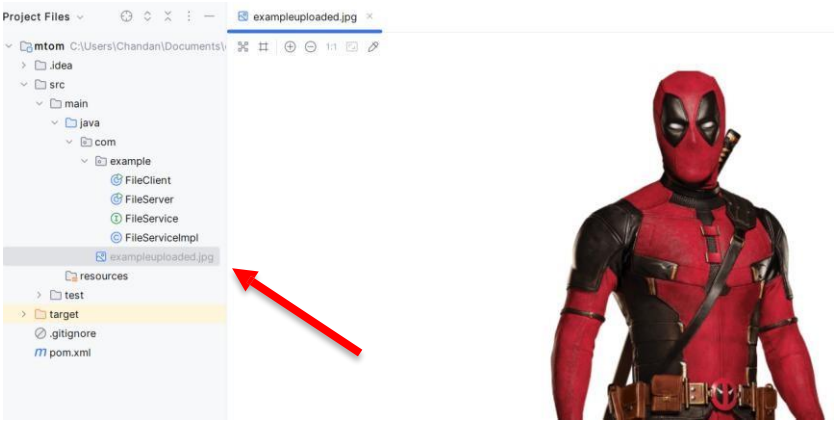




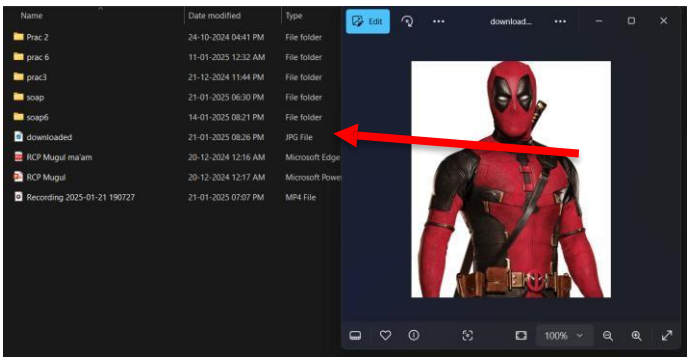
Step 8: Look kids, the run is successful. Open the server and client, then run them.

Step 9: See kids, the file will be uploaded and downloaded using the MTOM technique.





- Uploaded file will appear here.
- Now, let's see the downloaded file.



Practical No 7

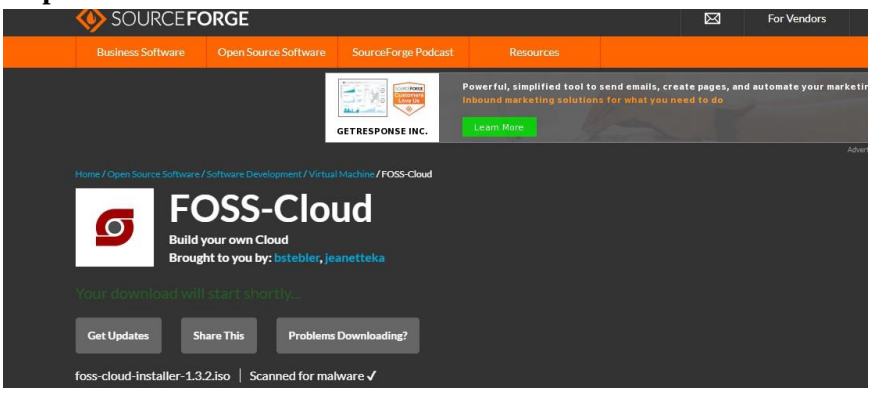
By Chandan

Aim: Implement FOSS-Cloud Functionality VSI (Virtual Server Infrastructure) Infrastructure as a Service (IaaS), Storage

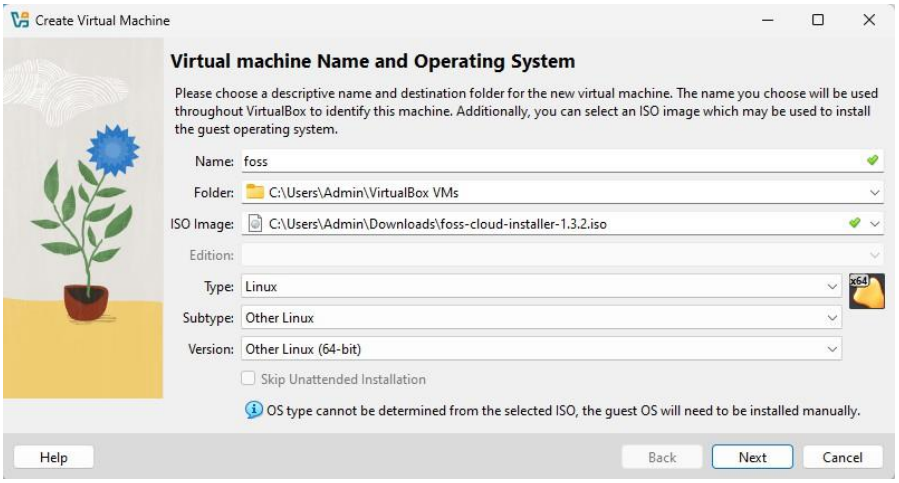
Solution:

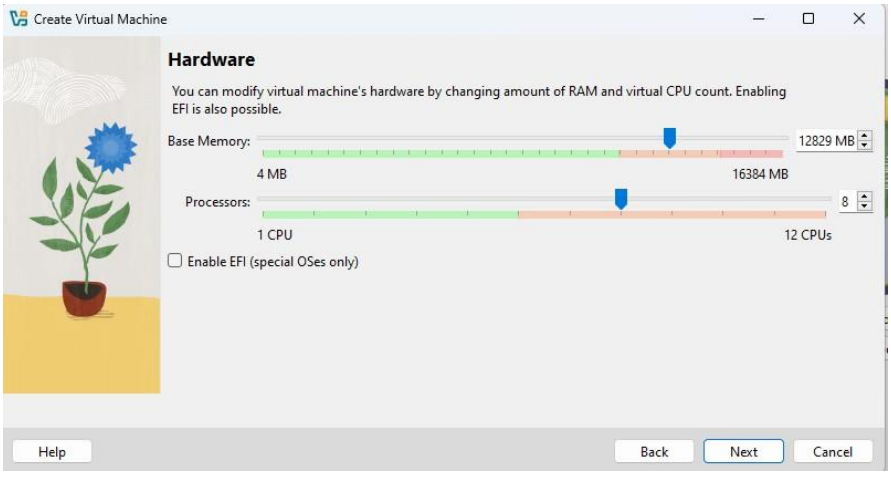
Note: If your windows machine support then You can do this practical in windows otherwise install virtual box in Physical Dual Booted Ubuntu Machine and follow same steps except one step

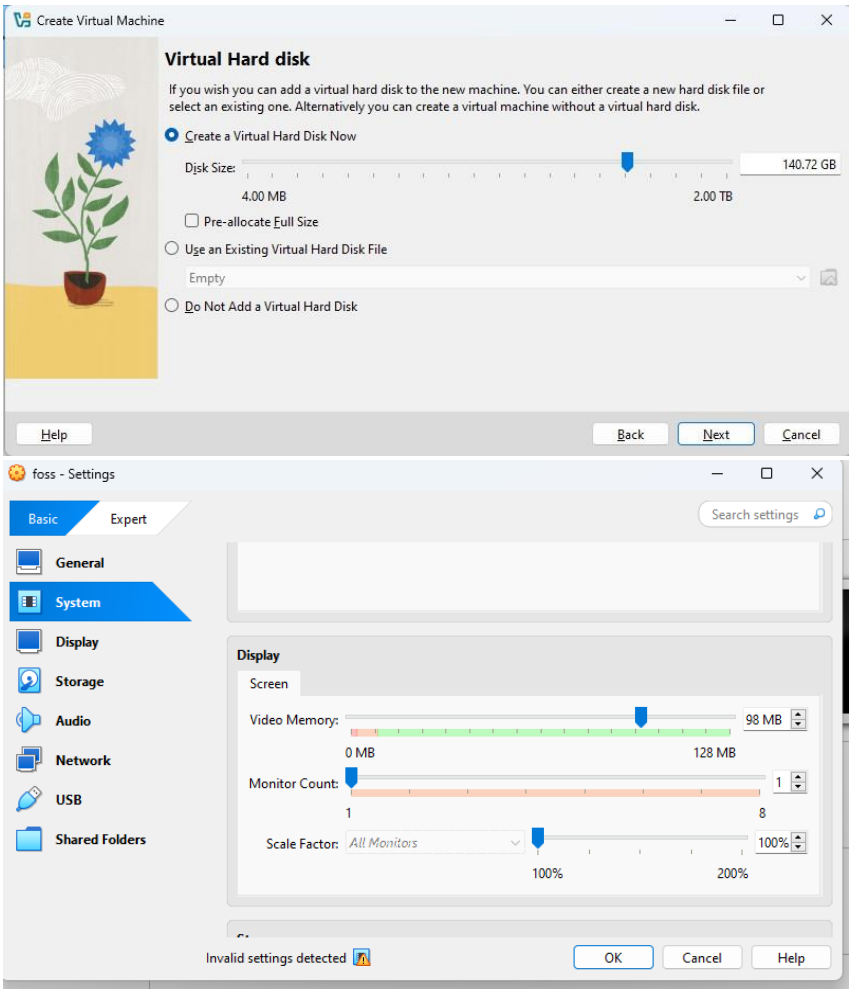
Step 1: Download Foss Cloud ISO



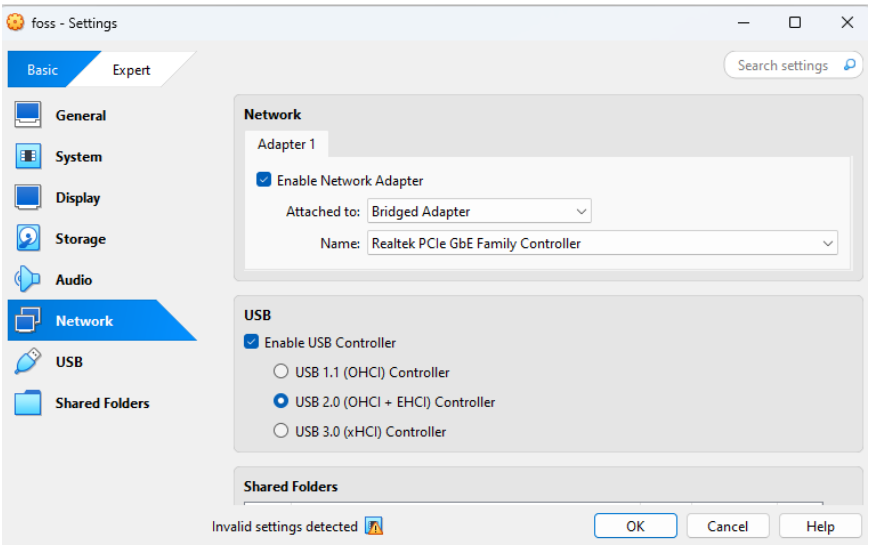
Step 2: Create Virtual with the below configurations



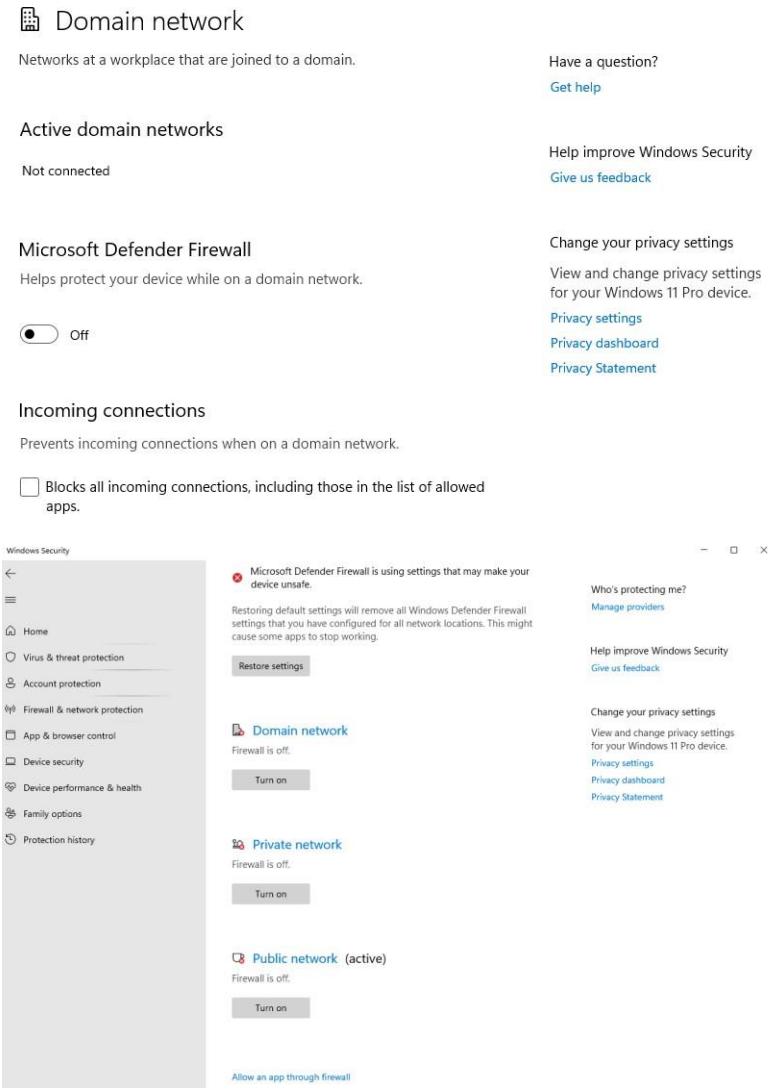




Step 3: Select Bridged Adapter



Step 4: Turn off firewall



For Linux: Execute “ufw disable” in root user mode

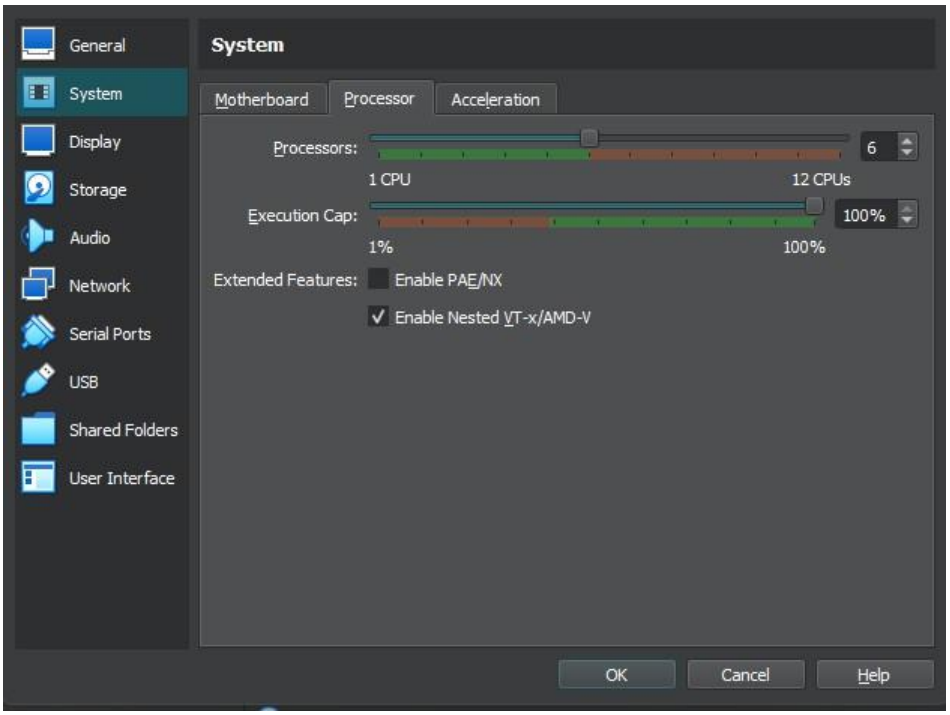
Step 5: Open Run cmd as administrative then execute the below commands

“cd C:\Program Files\Oracle\VirtualBox“

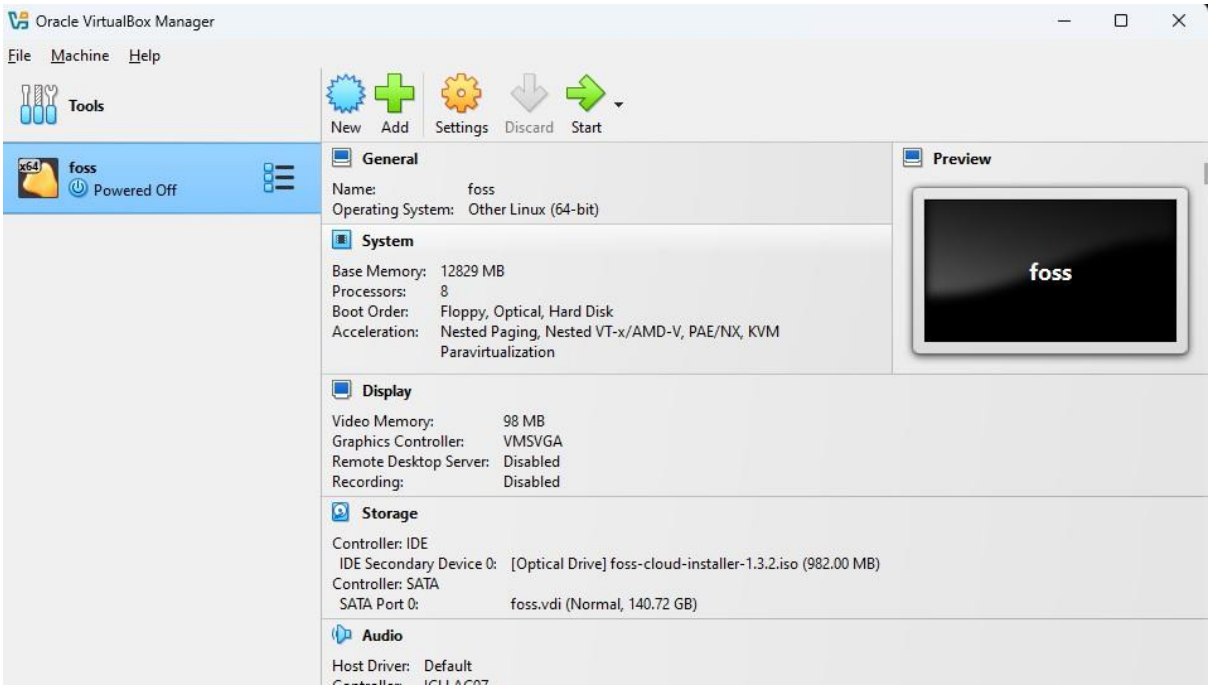
“VBoxManage modifyvm “foss” –nested—hw-virt on”

```
C:\Windows\System32>cd C:\Program Files\Oracle\VirtualBox

C:\Program Files\Oracle\VirtualBox>VBoxManage modifyvm "foss" --nested-hw-virt on
```

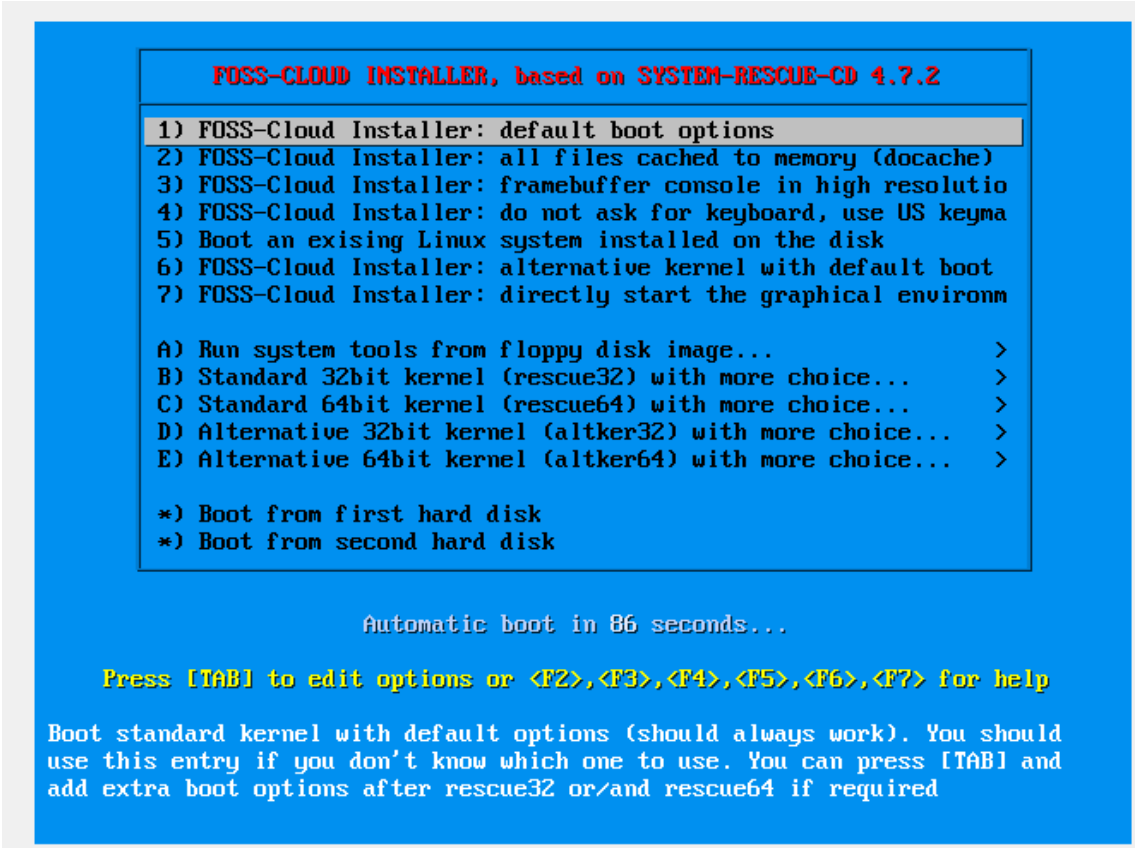
For Linux: You need to enable it manually by clicking on Enable Nested VT-x/AMD-V



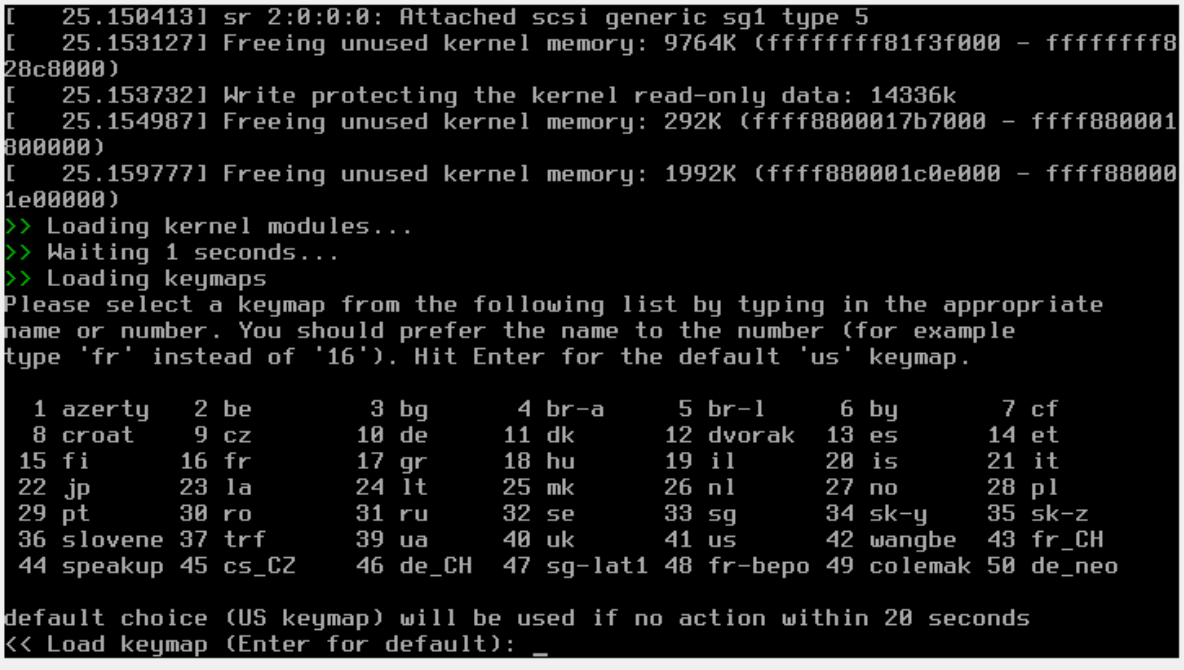
Step 6: Start the virtual Machine



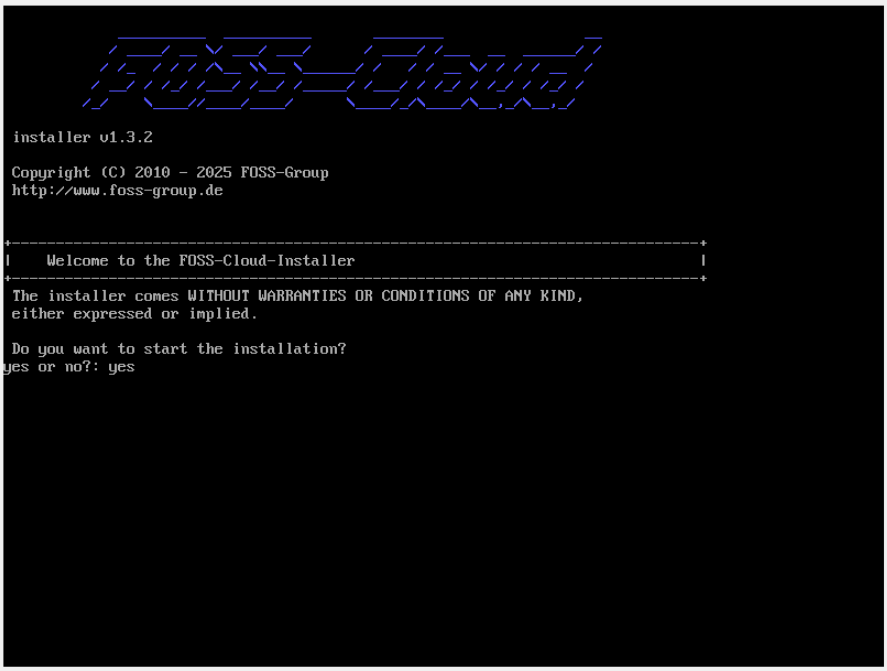
Step 7: Select 1st option



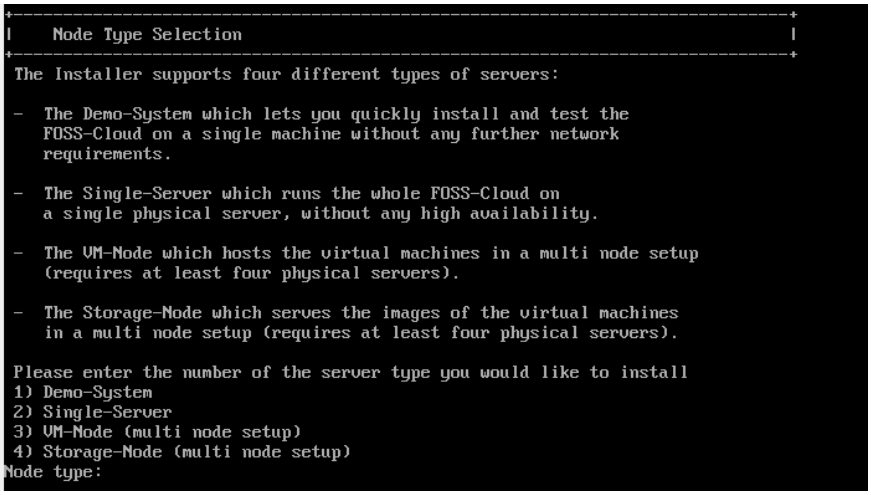
- Hit Enter



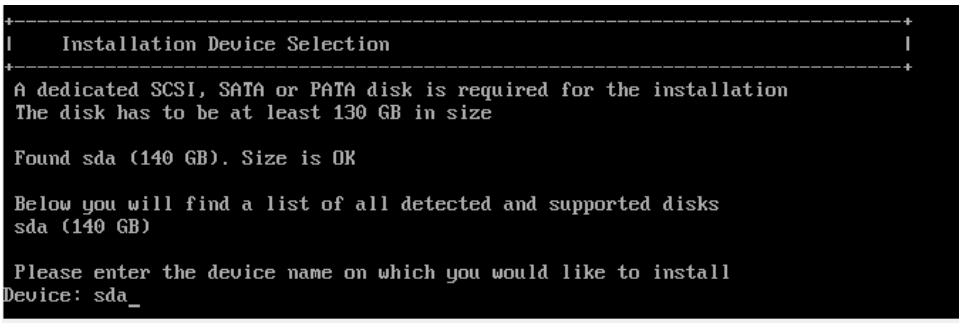
- Yes



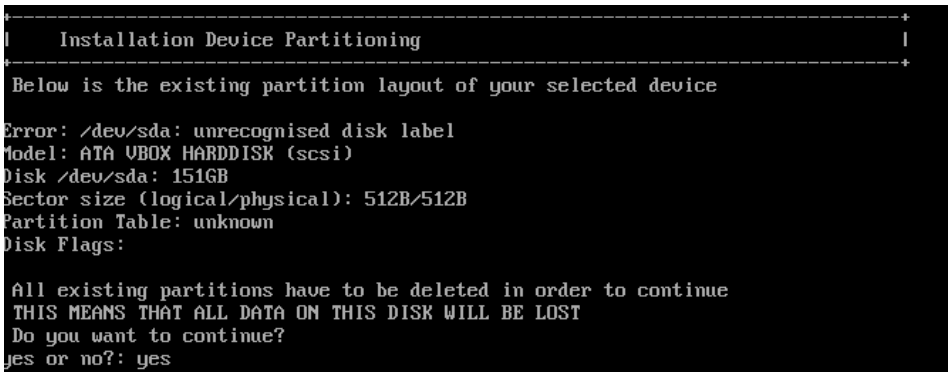
- Select 1) Demo-System



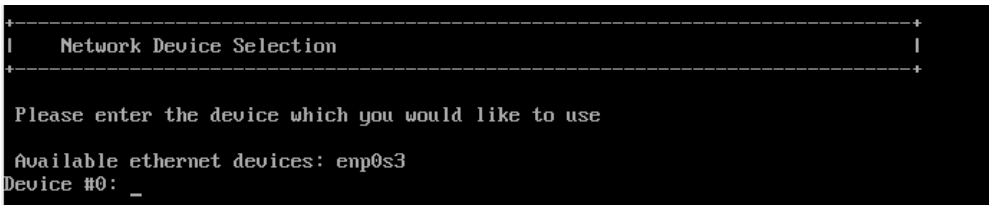
- Enter sda

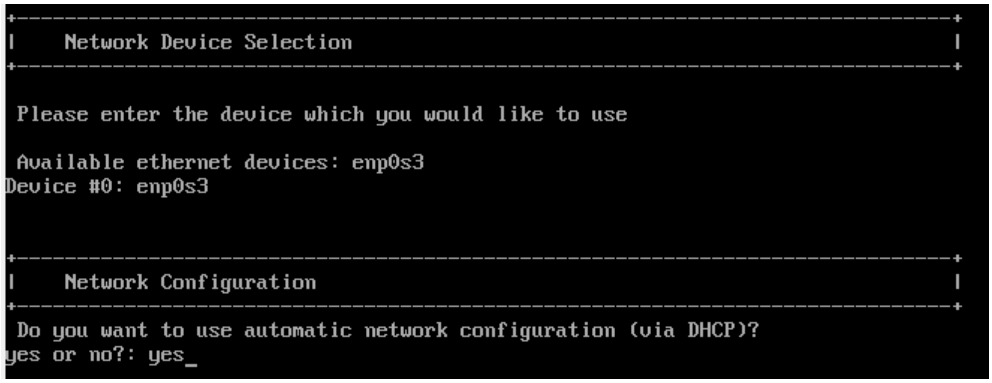


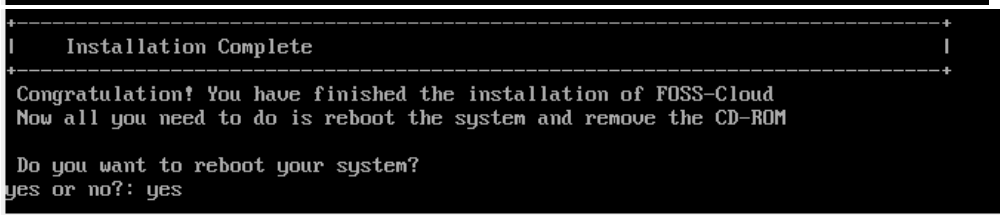
- Enter yes



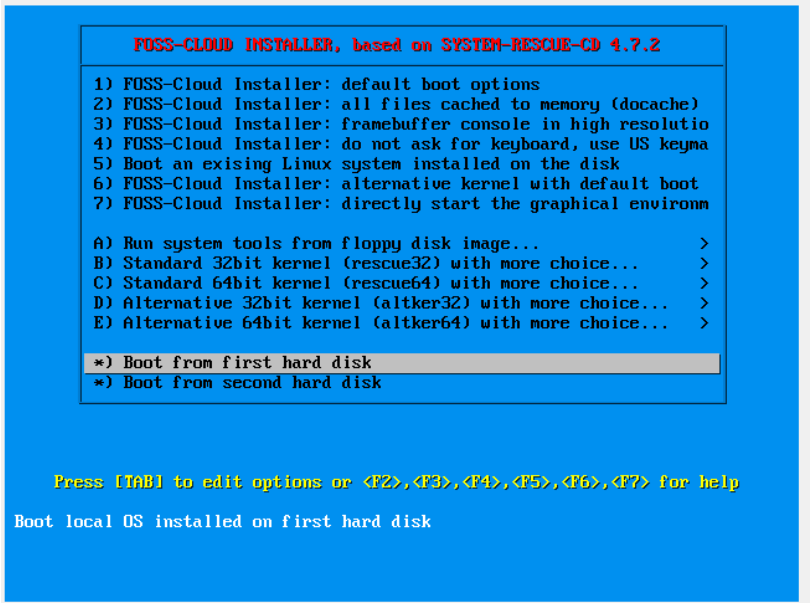
- Enter enp0s3 and then yes and then again yes for reboot



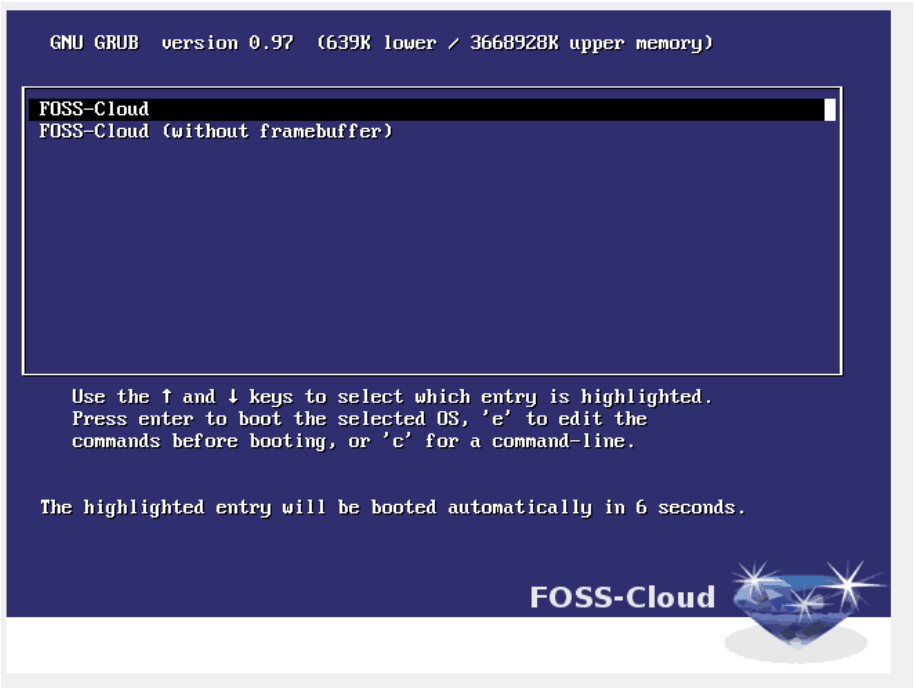


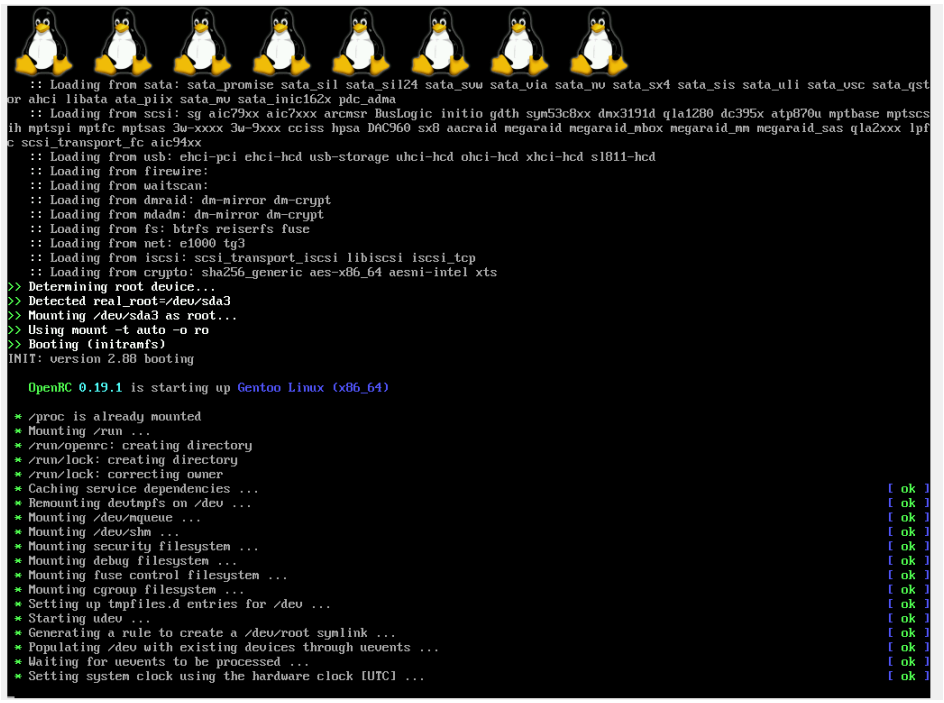


Step 8: Boot from first Hard disk



Step 9: Select FOSS-Cloud

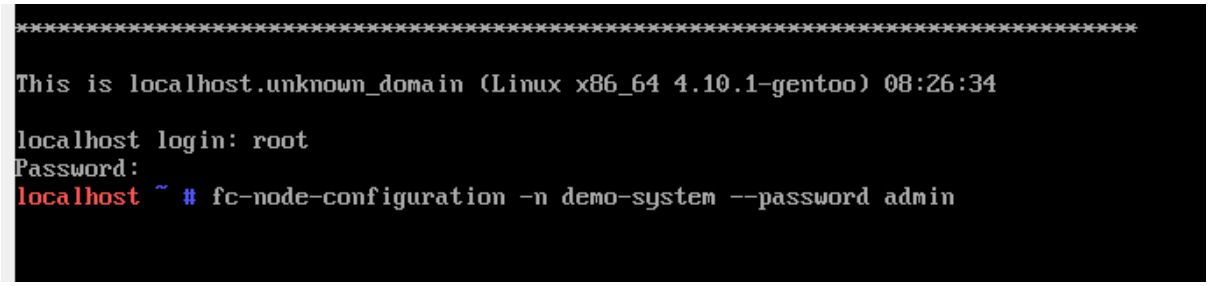




After this IP Address should come

Step 10: Now Login with root and password admin

Step 11: Execute fc-node-configuration -n demo-system -password admin



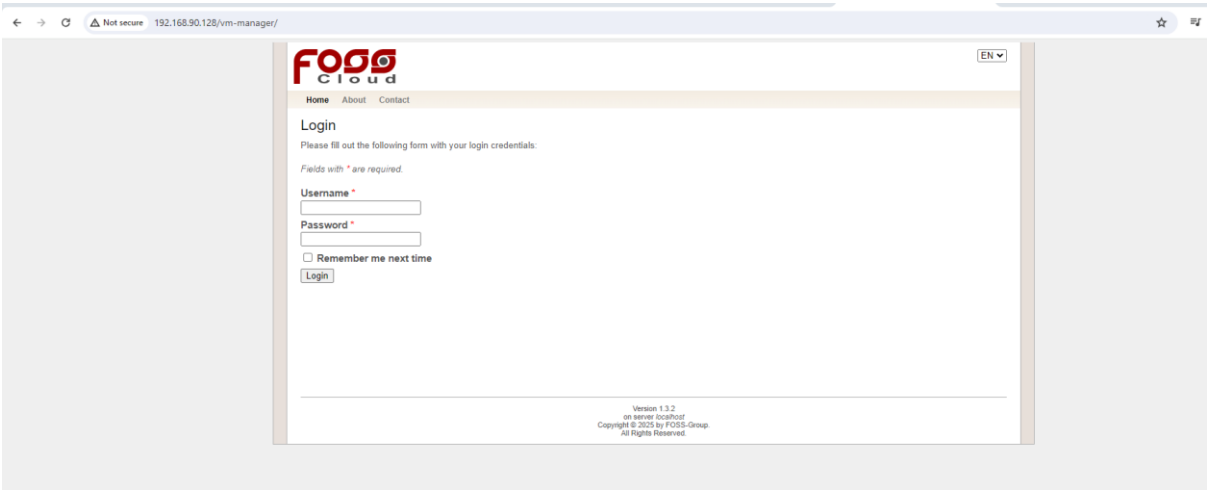
```
********************************************************************************

This is localhost.unknown_domain (Linux x86_64 4.10.1-gentoo) 08:26:34

localhost login: root
Password:
localhost ~ # fc-node-configuration -n demo-system --password admin
+------------------------------------------------------------------------------+
|   Demo-System Installation                                                   |
+------------------------------------------------------------------------------+
+------------------------------------------------------------------------------+
|   Retrieving local network configuration ...                                 |
+------------------------------------------------------------------------------+
Local network configuration retrieval ok!


Unpacking tarball /usr/share/foss-cloud/predefined-storage.tar.bz2, depending on it's size this action can take some minutes ...
```

```
Starting the daemon dhcpd ...
Executing: /etc/init.d/dhcpd start...
 * /var/run/dhcp: creating directory
 * /var/run/dhcp: correcting owner
 * /var/lib/dhcp: correcting owner
 * /var/lib/dhcp/dhcpd.leases: creating file
 * /var/lib/dhcp/dhcpd.leases: correcting mode
 * /var/lib/dhcp/dhcpd.leases: correcting owner
 * Starting dhcpd ...                                                    [ ok ]
Started dhcpd successfully!

Adding the daemon dhcpd to the runlevel default ...
Executing: rc-update add dhcpd default ...
Added dhcpd successfully to runlevel default!

Directory /var/virtualization/backup created


Created backup directory symlink: /var/backup --> /var/virtualization/backup, if you want to change the backup directory you may
 do so by modifing this symlink.
File /etc/local.d/50-foss-cloud-firstrun.start deleted


Congratulations, you have finished the installation and configuration of this Node!

localhost ~ #
```

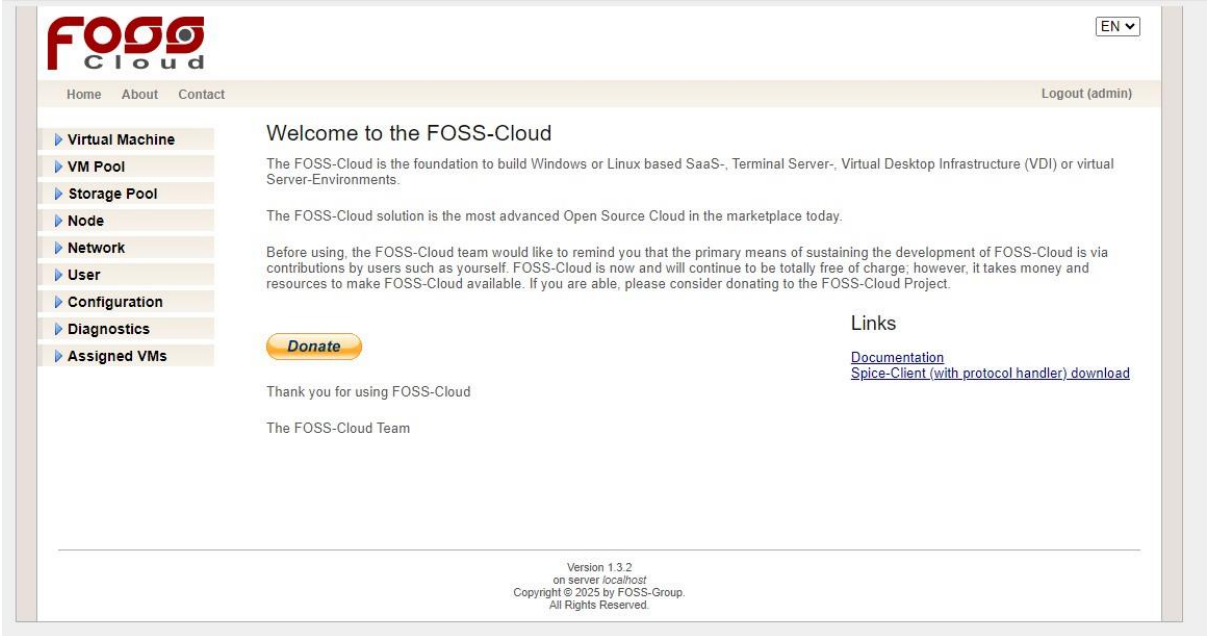
- Ifconfig and then note this ip address

```
localhost ~ # ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.90.128  netmask 255.255.255.0  broadcast 192.168.90.255
        ether 08:00:27:8b:a5:e6  txqueuelen 1000  (Ethernet)
        RX packets 567  bytes 45035 (43.9 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 126  bytes 11421 (11.1 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 1510  bytes 378169 (369.3 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 1510  bytes 378169 (369.3 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

vmbr0: flags=4419<UP,BROADCAST,RUNNING,PROMISC,MULTICAST>  mtu 1500
        inet 172.31.255.1  netmask 255.255.255.0  broadcast 172.31.255.255
        ether 52:bb:52:d5:2c:4b  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Step 12: Open Browser in your main machine and enter IP address of Foss Virtual Machine



Step 13: Login with username “admin” & password “admin”



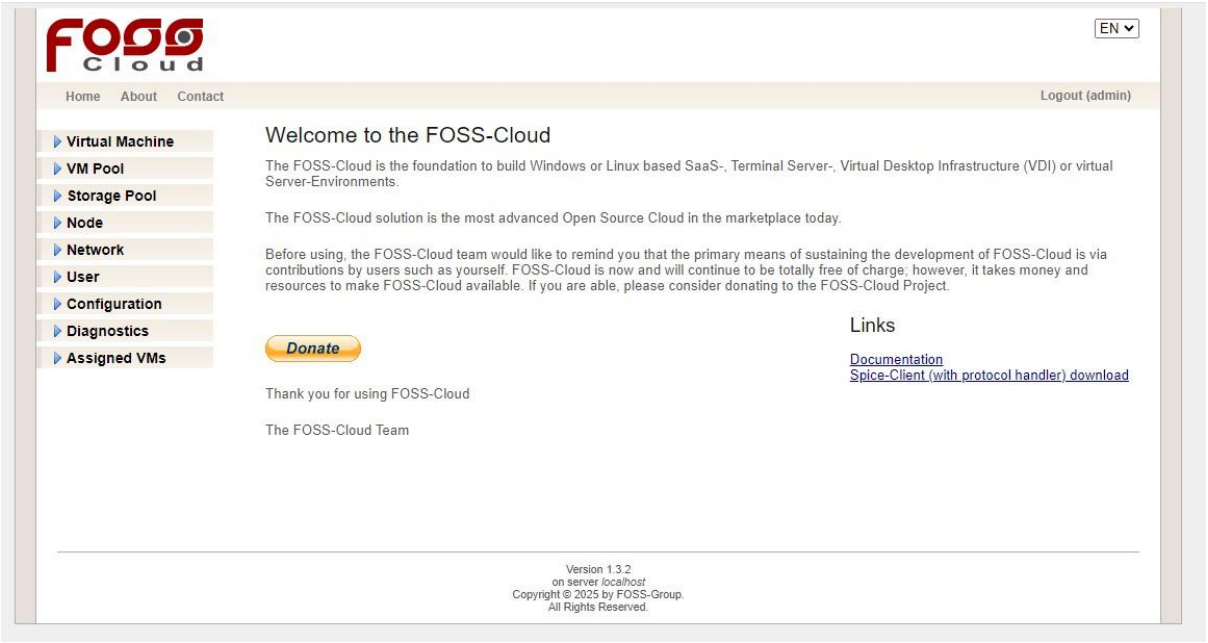
Practical No 8

By Chandan

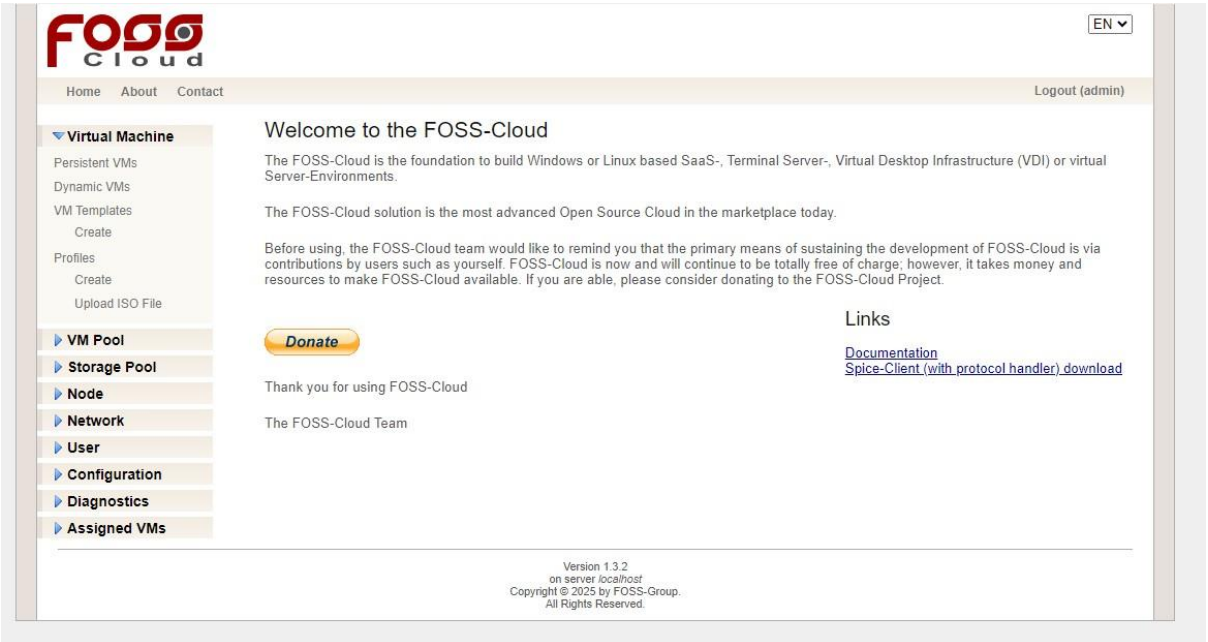
Aim: Implement FOSS-Cloud Functionality - VSI Platform as a Service (PaaS)

Solution:

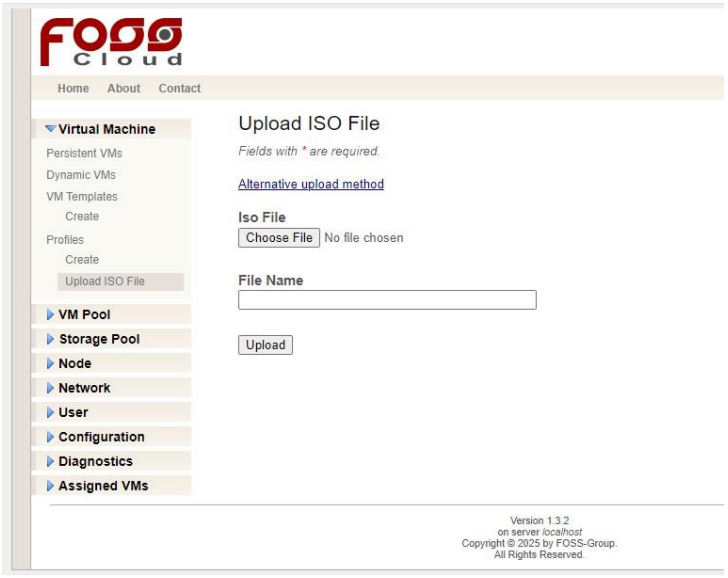
Step 1: Login Foss Cloud



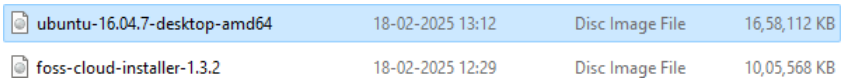
Step 2: Expand Virtual Machine Tab



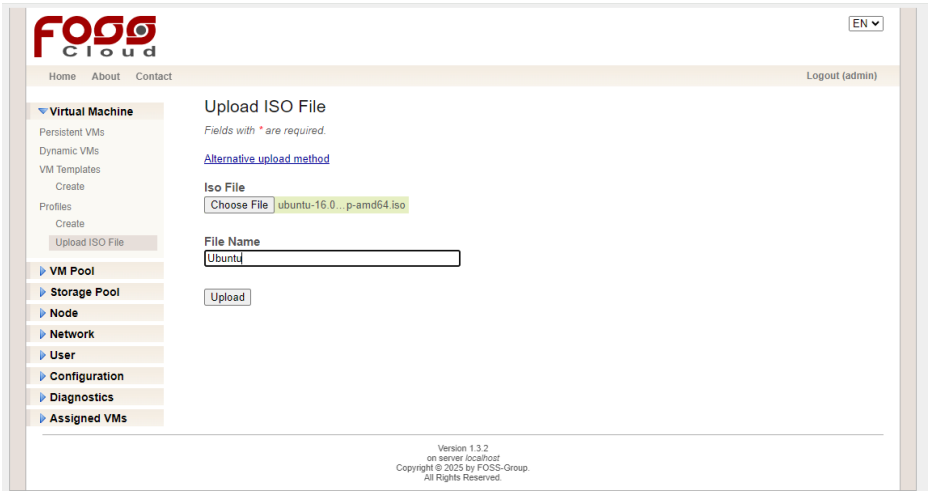
Step 3:Upload ISO File of Ubuntu 16

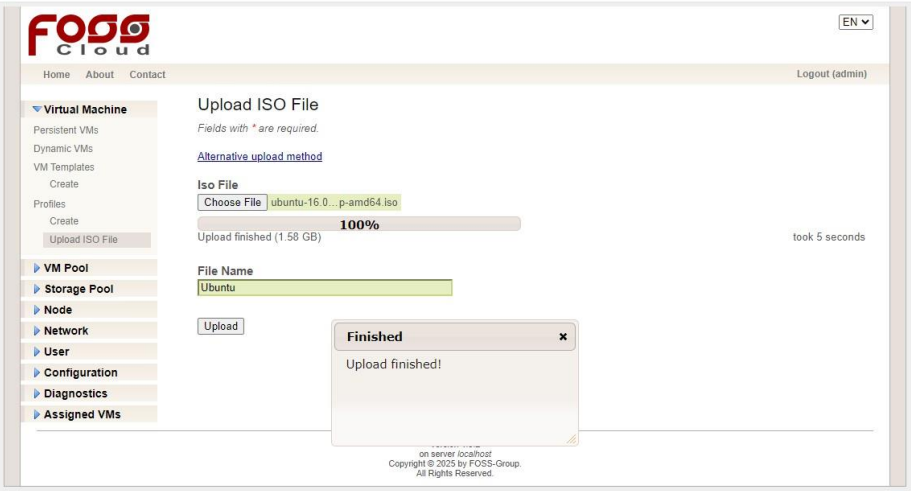


- Select & upload

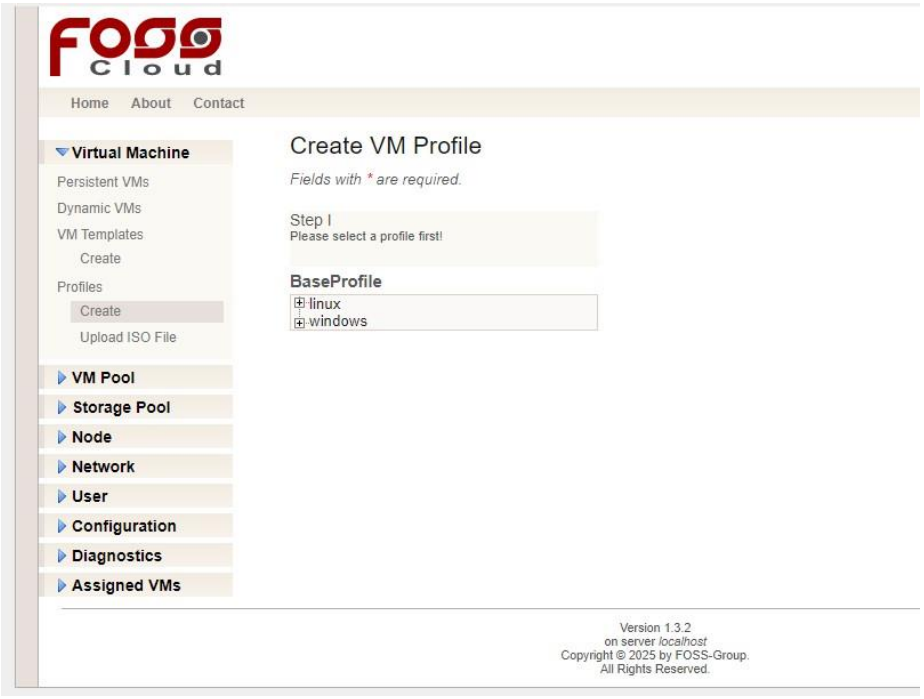


After uploading give File name

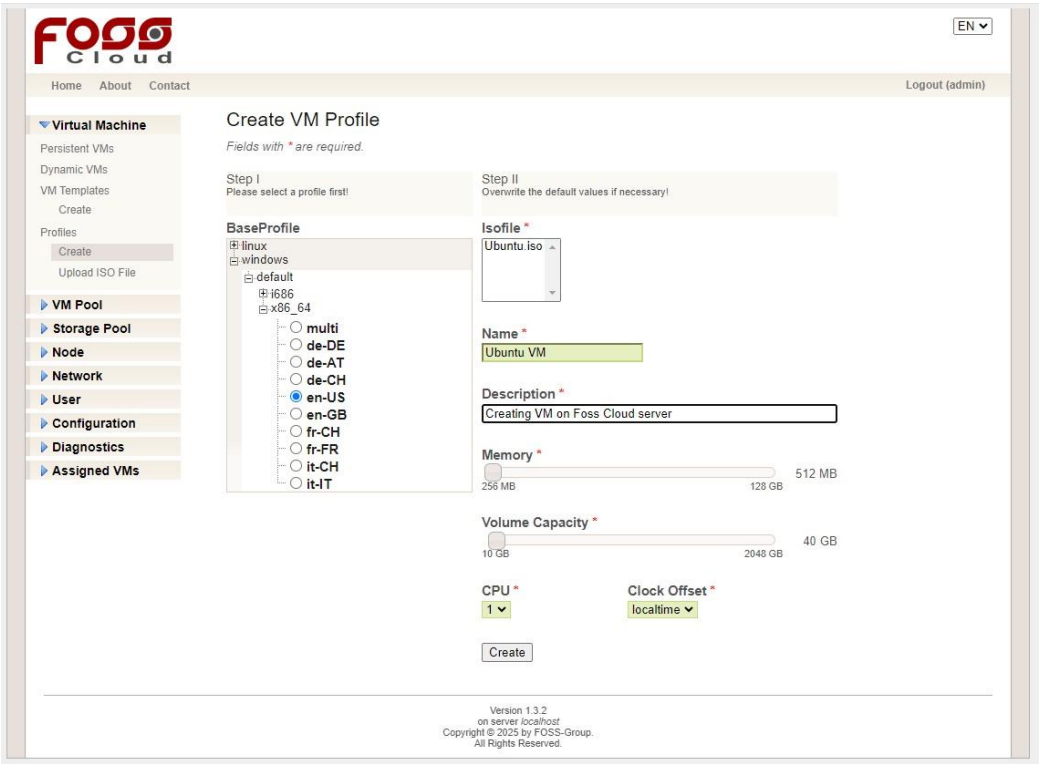


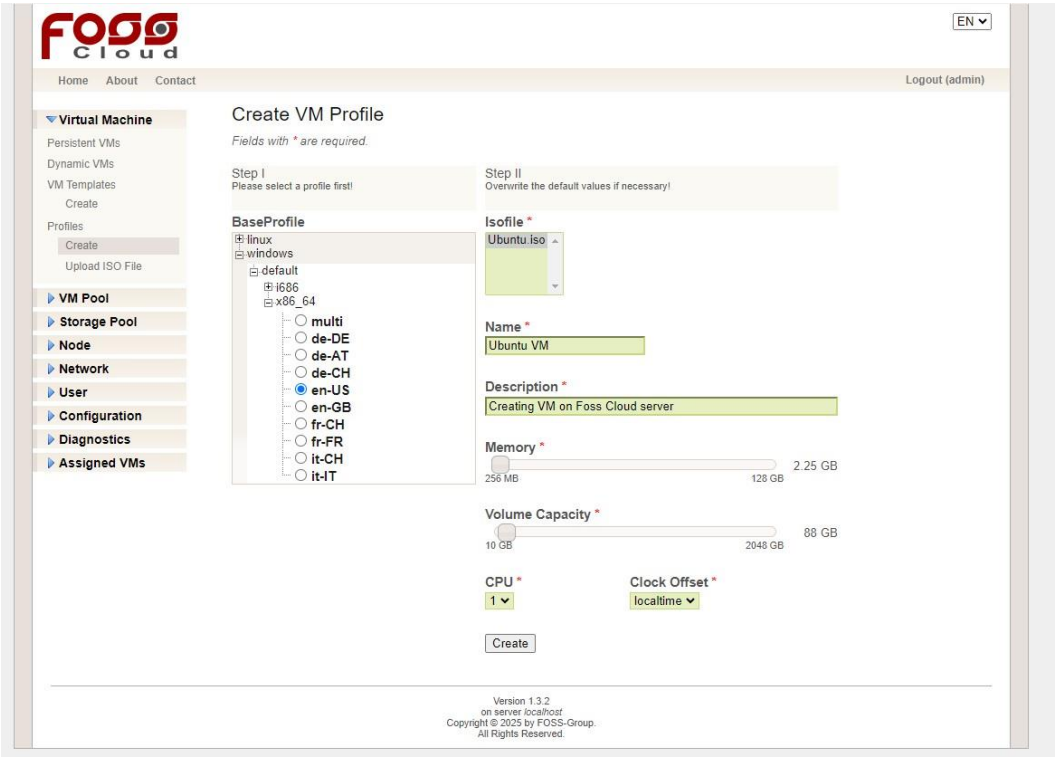


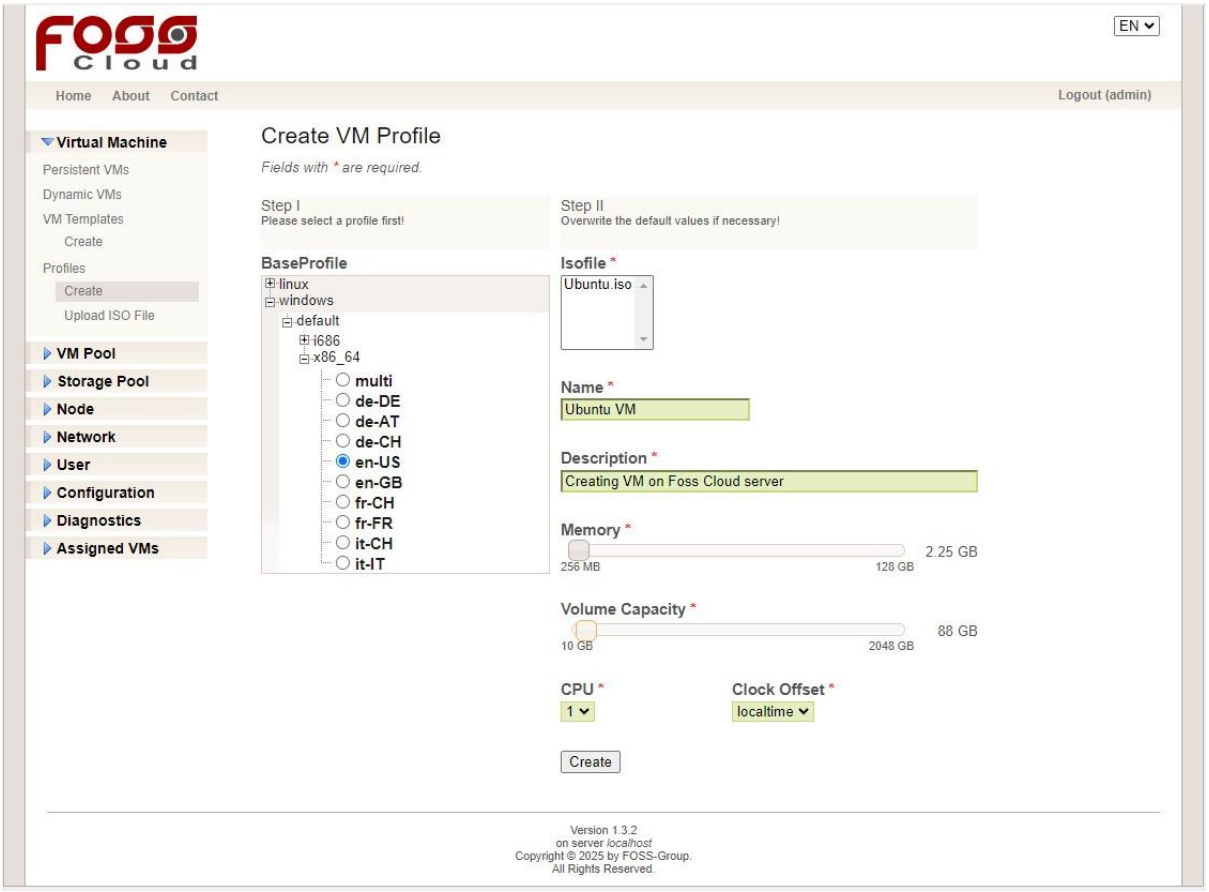
Step 4: Create VM Profile



- Now select BaseProfile [Your OS Windows or Linux] → x86_64 →en-US then give Name ,Description, memory, Vol capacity, CPU & localtime then create



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Logout (admin)
Virtual Machine
Persistent VMs
Dynamic VMs
VM Templates
Create
Profiles
Create
Upload ISO File
VM Pool
Storage Pool
Node
Network
User
Configuration
Diagnostics
Assigned VMs
Create VM Profile
Fields with * are required.
Step I
Please select a profile first!
BaseProfile
linux
windows
default
i686
x86_64
multi
de-DE
de-AT
de-CH
en-US
en-GB
fr-CH
fr-FR
it-CH
it-IT
Step II
Overwrite the default values if necessary!
Isofile *
Ubuntu.iso
Name *
Ubuntu VM
Description *
Creating VM on Foss Cloud server
Memory *
2.25 GB
256 MB
128 GB
Volume Capacity *
88 GB
10 GB
2048 GB
CPU *
1
Clock Offset *
localtime
Create
Version 1.3.2
on server localhost
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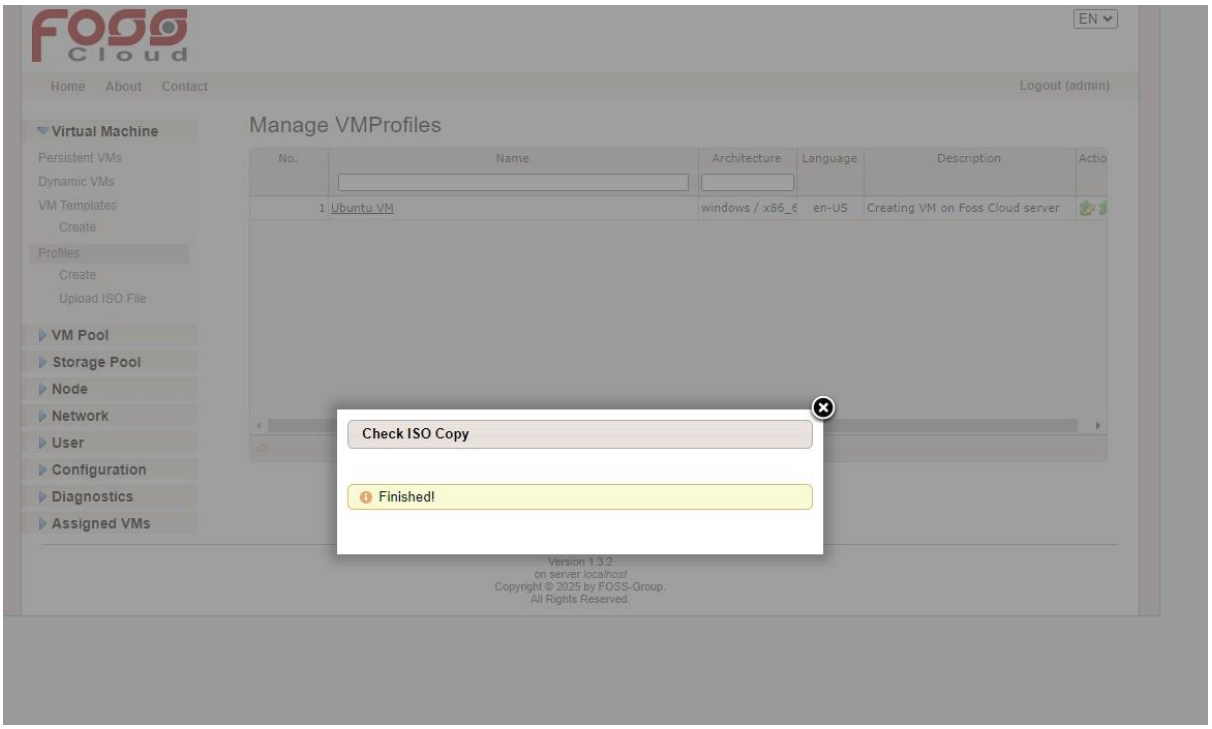
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VM Templates
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Profiles
Create
Upload ISO File
VM Pool
Storage Pool
Node
Network
User
Configuration
Diagnostics
Assigned VMs
Manage VMProfiles
No.
Name
Architecture
Language
Description
Actio
1 Ubuntu VM
windows / x86_6
en-US
Creating VM on Foss Cloud server
Check ISO Copy
Finished!
Version 1.3.2
on server localhost
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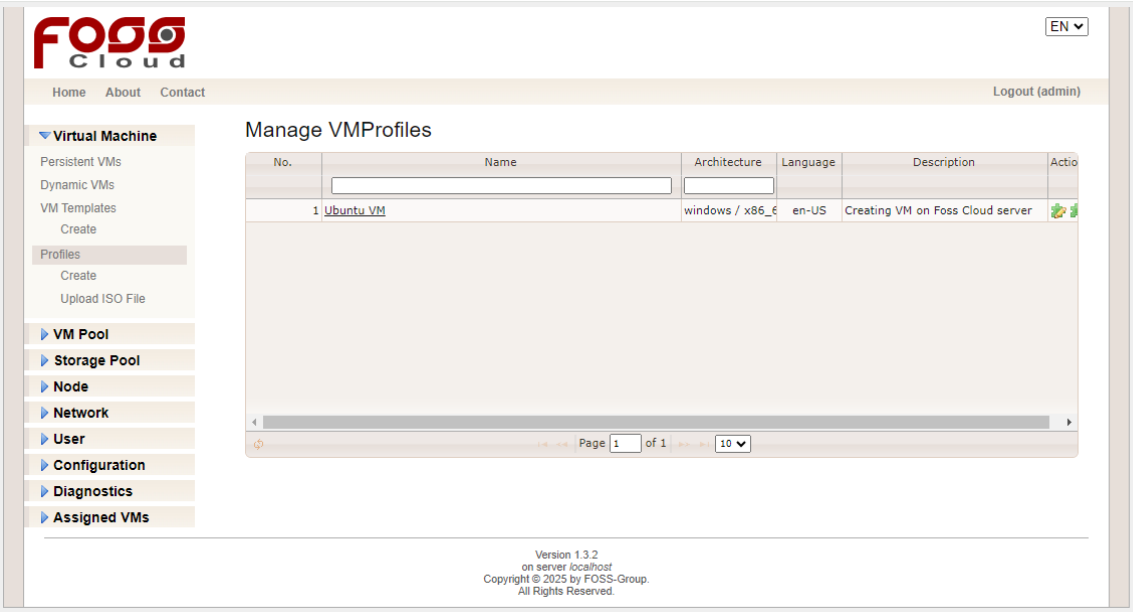
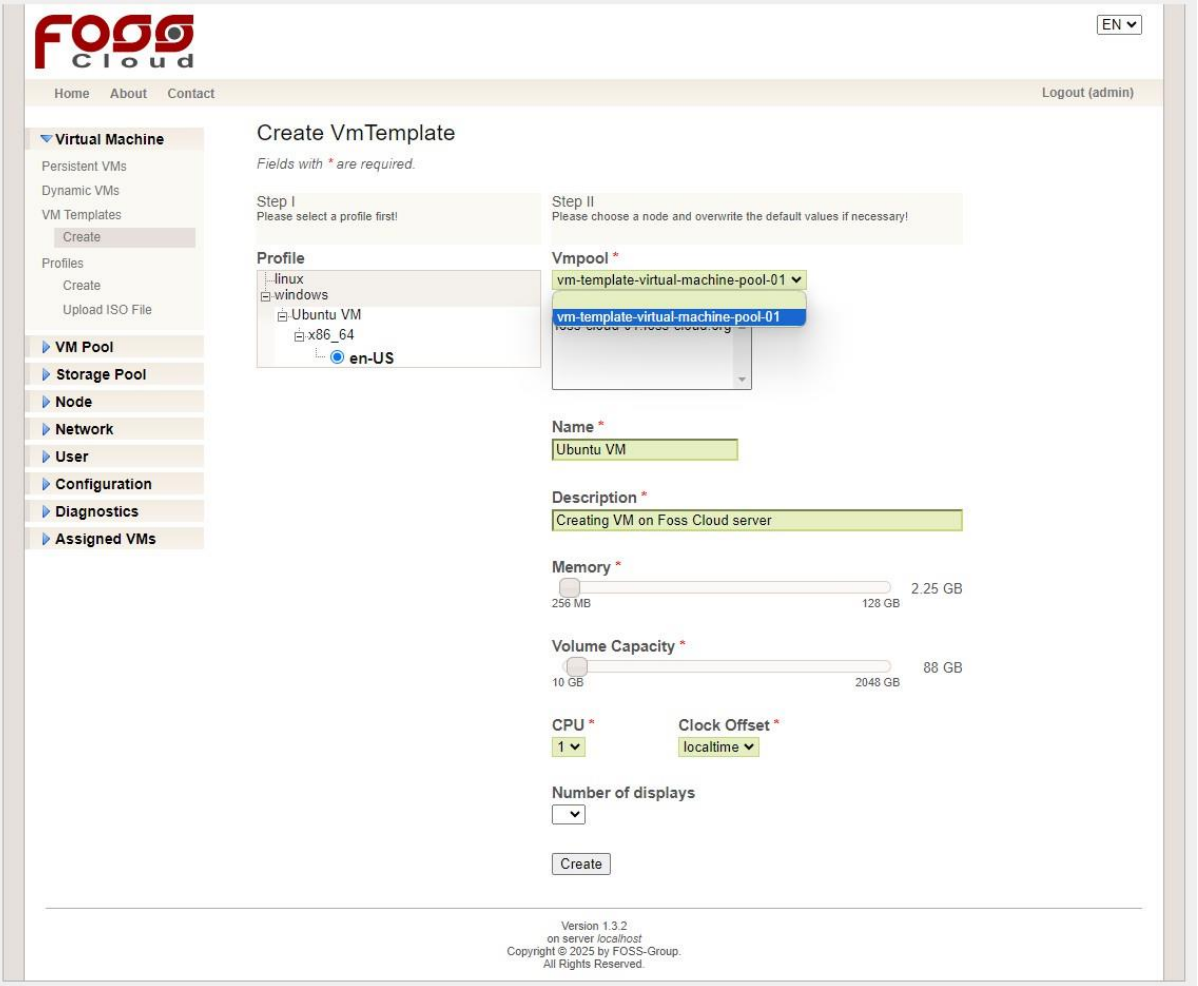
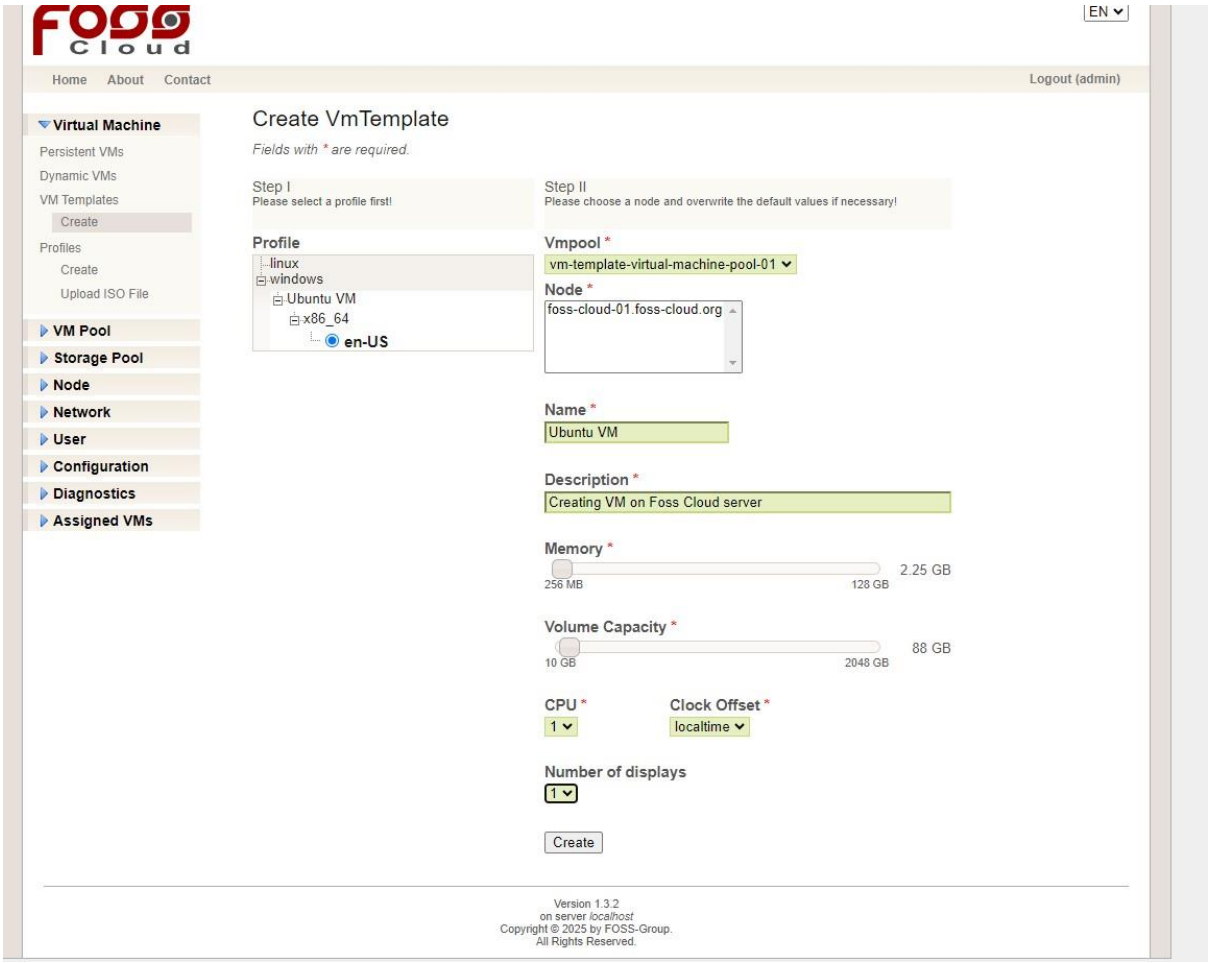
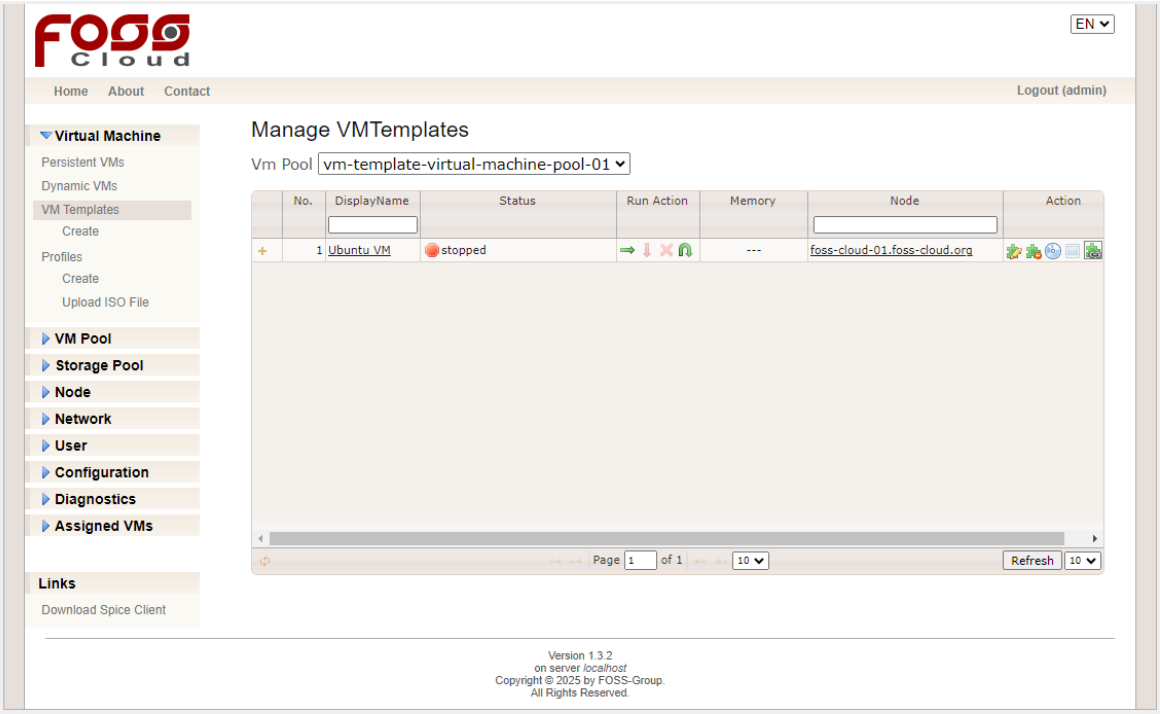


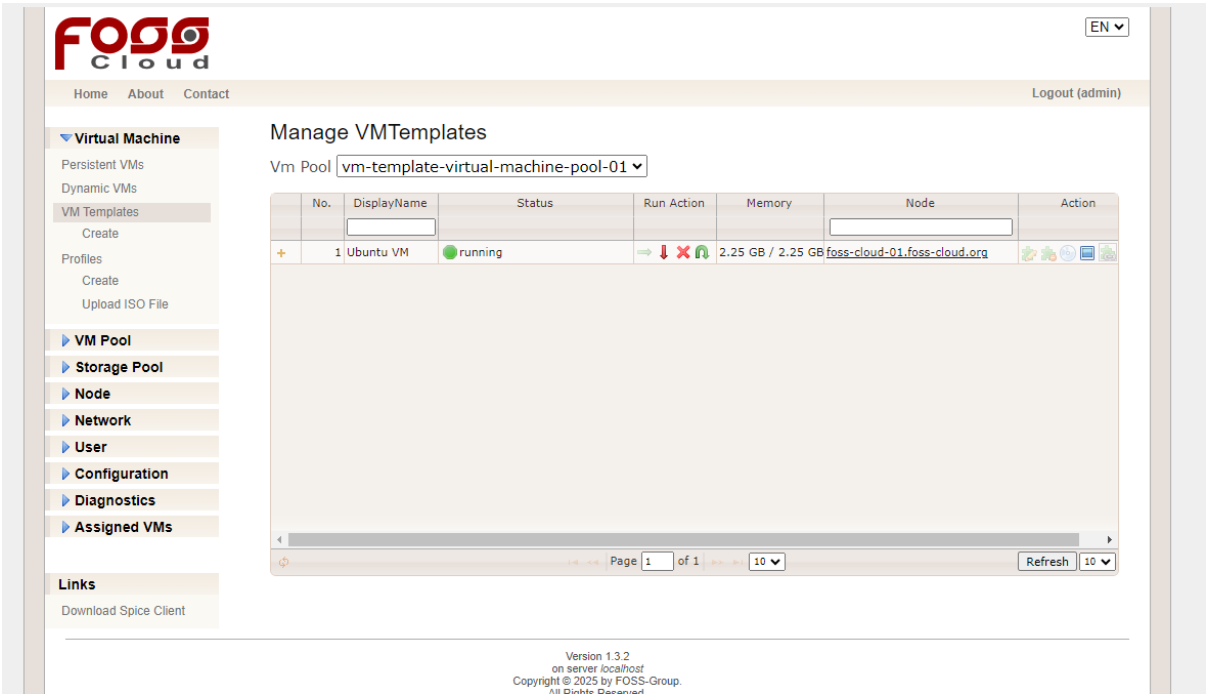
Step 5: Now Navigate to VM Template then click on create after that select Profile [os Windows or Linux] → [VM Name] → x86_64→en-US and then select Vmpool & number of display 1 and create





Step 6: Click on Green Arrow → to start VM

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Logout (admin)
Virtual Machine
Persistent VMs
Dynamic VMs
VM Templates
Create
Profiles
Create
Upload ISO File
VM Pool
Storage Pool
Node
Network
User
Configuration
Diagnostics
Assigned VMs
Links
Download Spice Client
Manage VMTemplates
Vm Pool
vm-template-virtual-machine-pool-01
No.
DisplayName
Status
Run Action
Memory
Node
Action
1
Ubuntu VM
running
2.25 GB / 2.25 GB
foss-cloud-01.foss-cloud.org
Page
1
of 1
10
Refresh
Version 1.3.2
on server localhost
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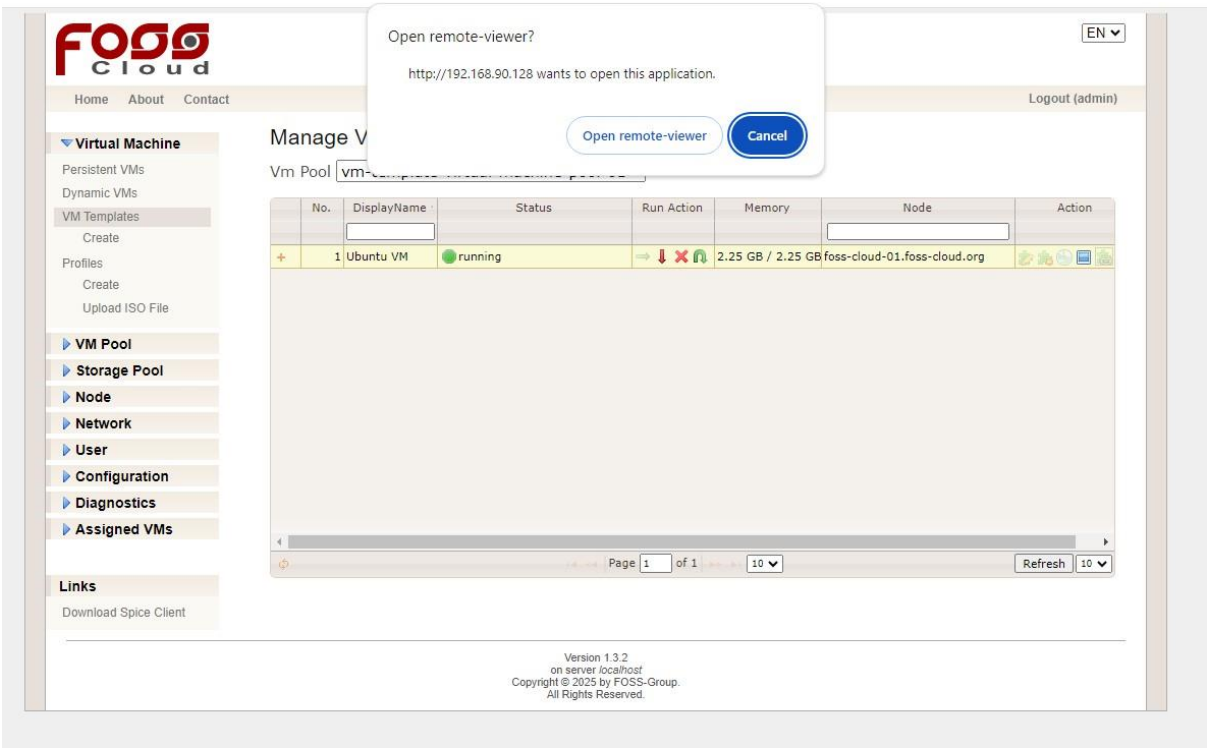
Open remote-viewer?
http://192.168.90.128 wants to open this application.
Open remote-viewer
Cancel
FOSS Cloud
EN
Home
About
Contact
Logout (admin)
Virtual Machine
Persistent VMs
Dynamic VMs
VM Templates
Create
Profiles
Create
Upload ISO File
VM Pool
Storage Pool
Node
Network
User
Configuration
Diagnostics
Assigned VMs
Links
Download Spice Client
Vm Pool
No.
DisplayName
Status
Run Action
Memory
Node
Action
1
Ubuntu VM
running
2.25 GB / 2.25 GB
foss-cloud-01.foss-cloud.org
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Refresh
Version 1.3.2
on server localhost
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Practical No 9

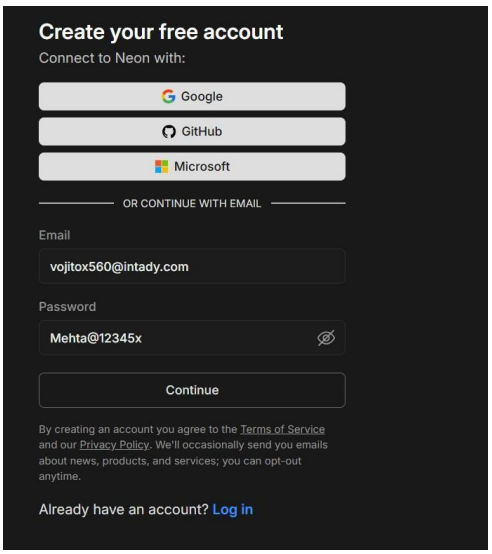
By Chandan

Aim: Using AWS Flow Framework develop application that includes a simple workflow. Workflow calls an activity to print hello world to the console. It must define the basic usage of AWS Flow Framework, including defining contracts, implementation of activities and workflow coordination logic and worker programs to host them

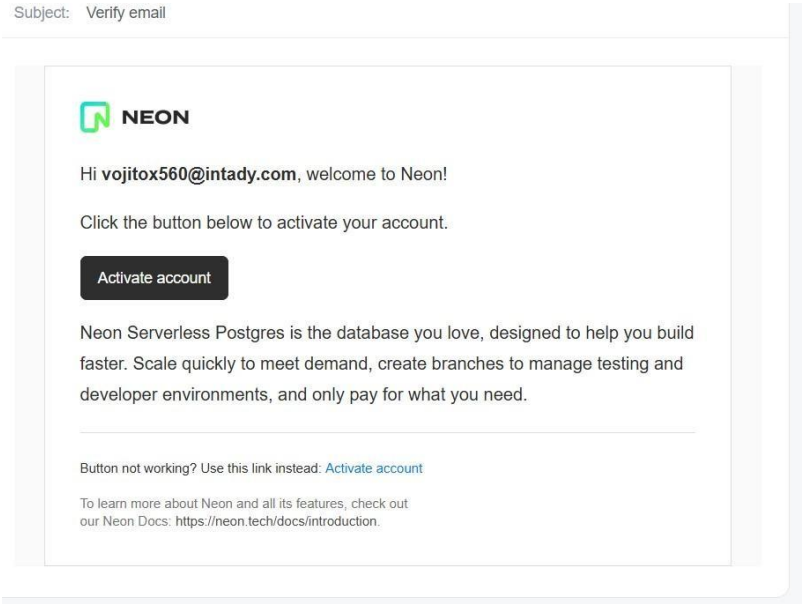
Solution:

Note: AWS is paid so there we using its kind of 1 type of alternative neon DB which uses AWS Cloud service and give us some free storage which built on AWS

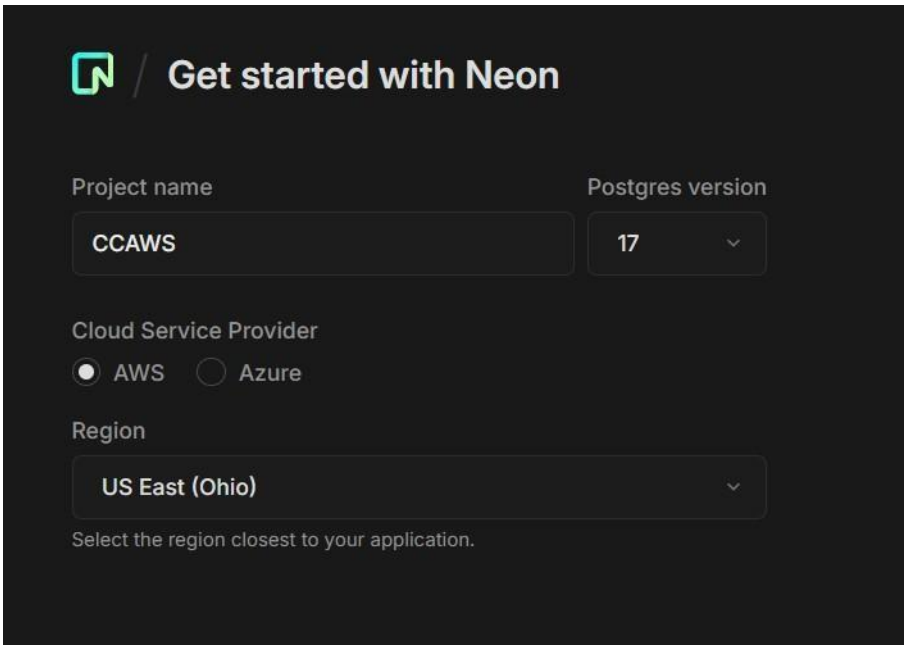
Step 1: Create a account neon db



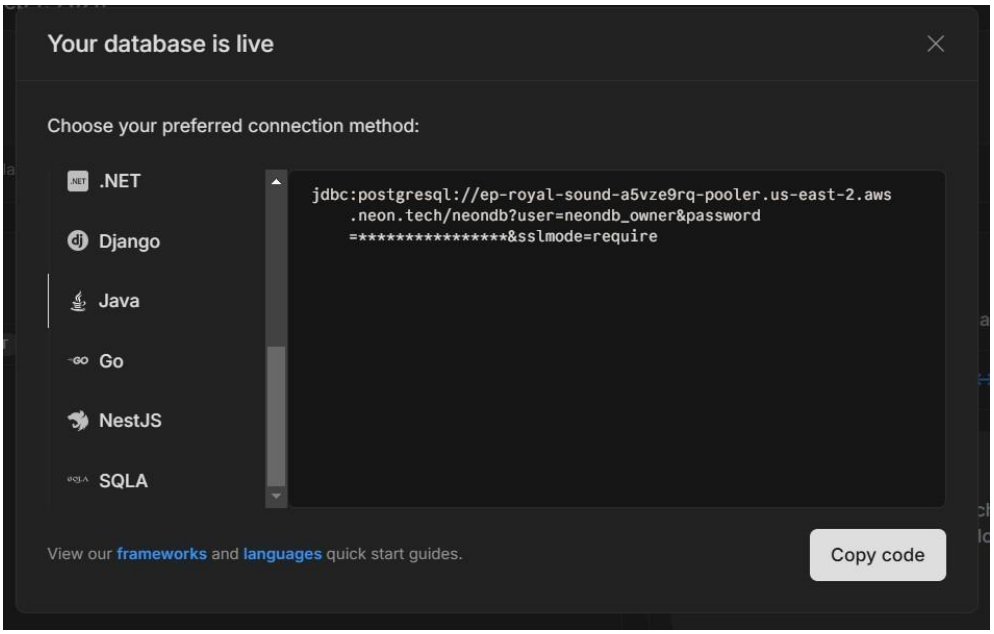
Step 2: Verify email



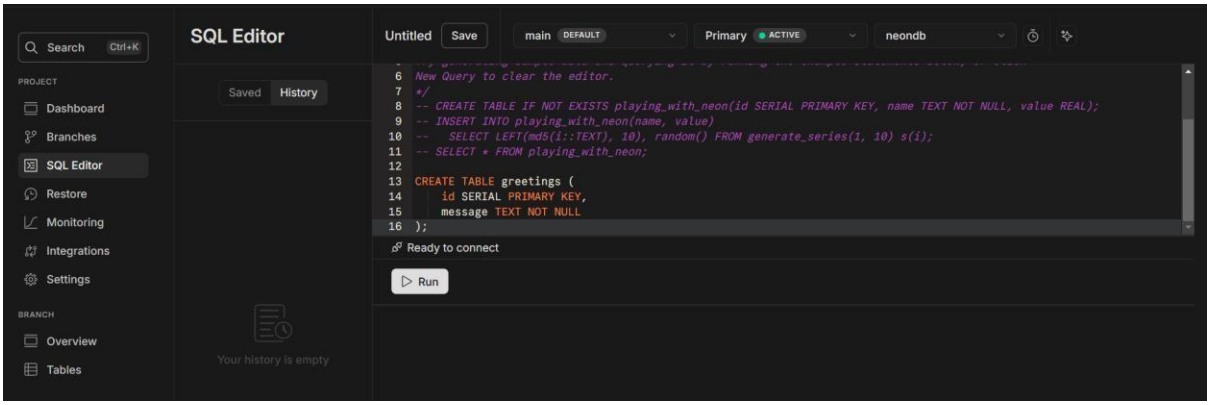
Step 3: Chose Cloud Service Provider “AWS”



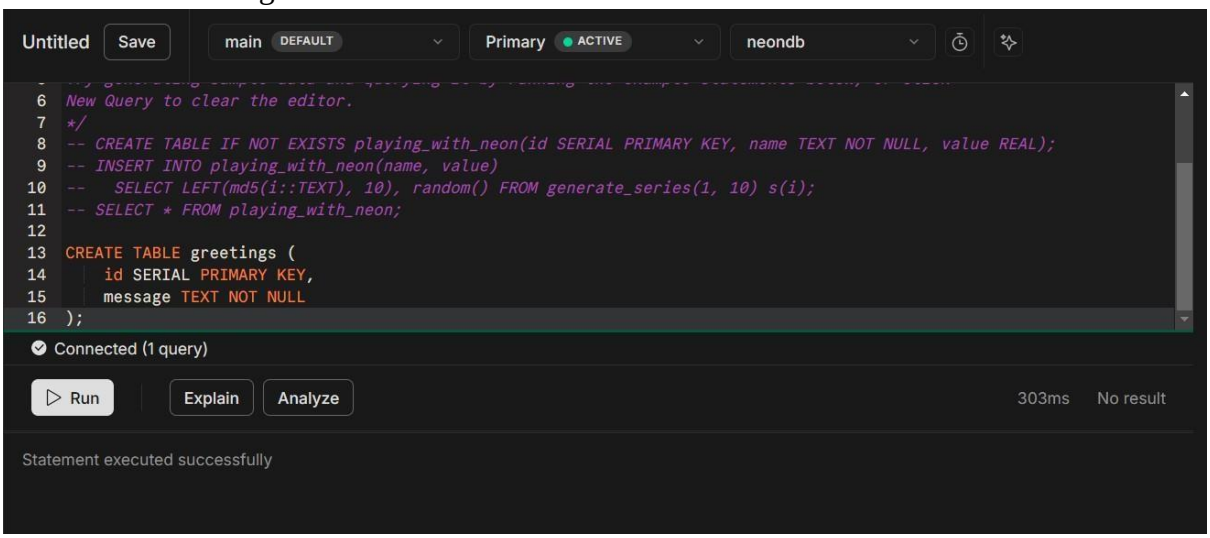
Now we got our connection url



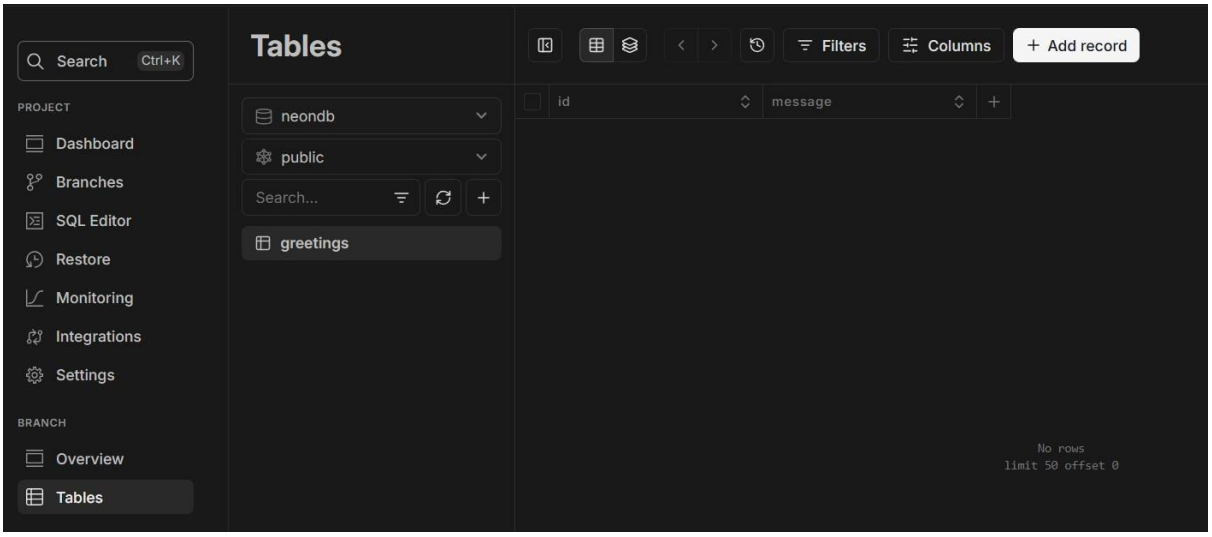
Step 4: Go to SQL Editor and create a Table by executing command which is mentioned in screenshot



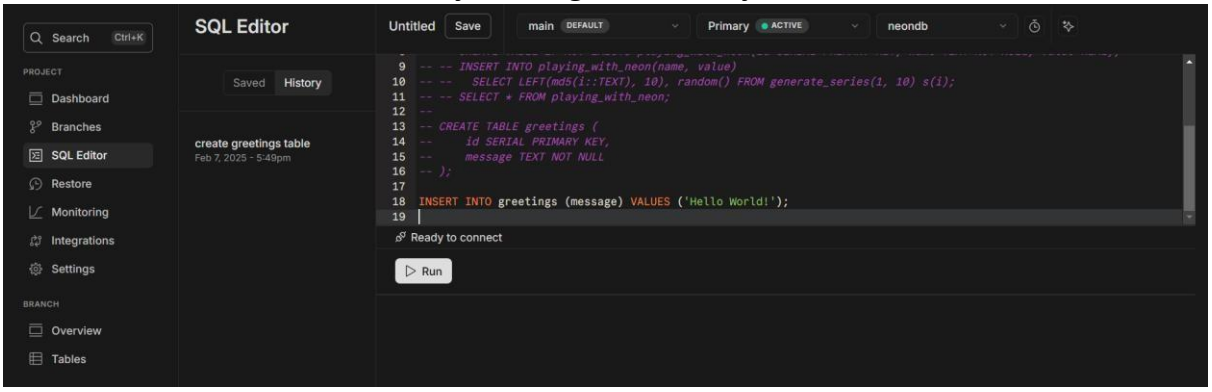
- After writing click on Run

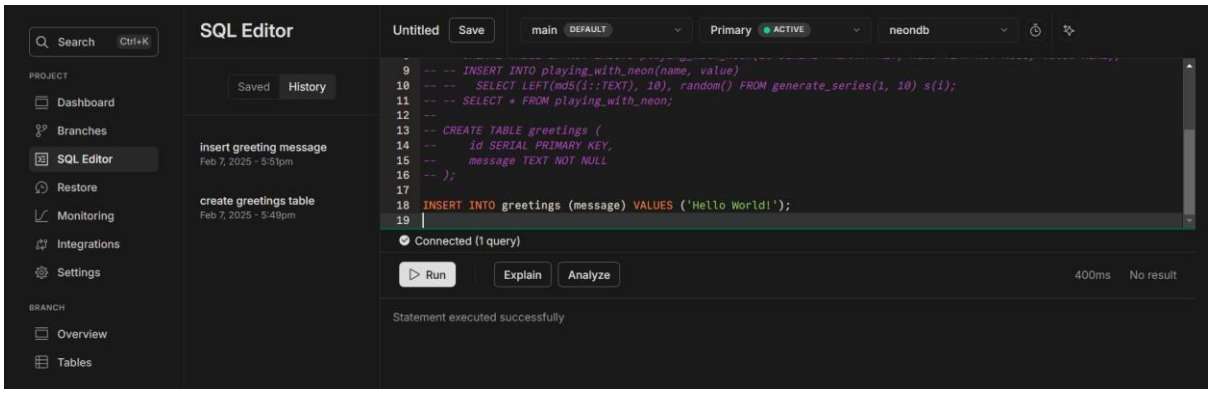


- Now table created

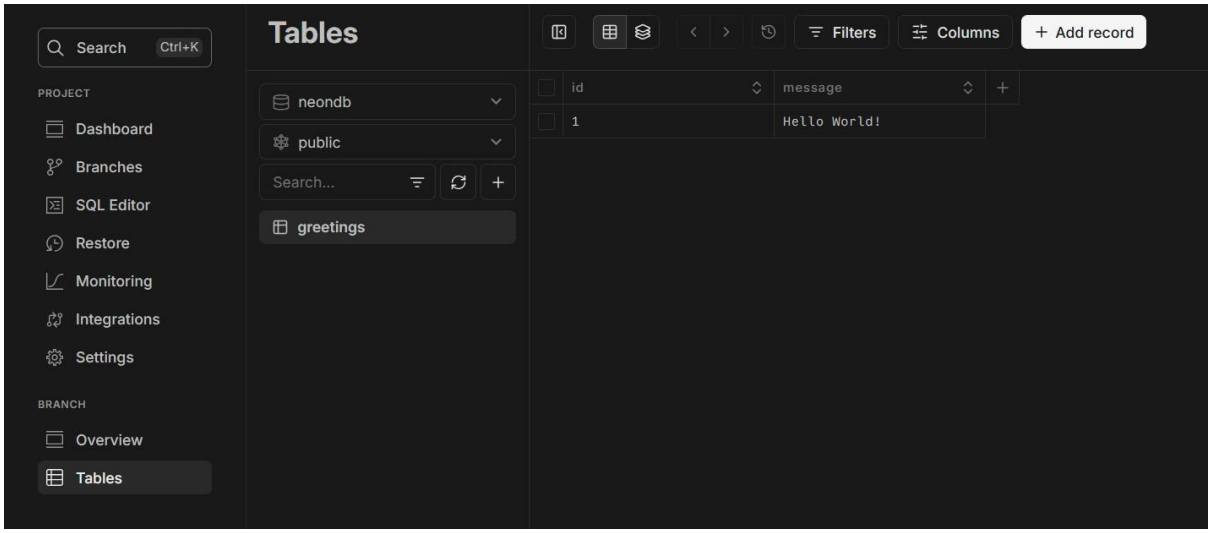


- Now inset a value in able by entering below Query in Screenshot and then run





- Now Value is inserted into table now we will fetch that value in console



Step 5: Create a python file and run

Neondb.py

```
import psycopg2

# Replace these with your Neon database credentials
DB_HOST = "ep-royal-sound-a5vze9rq-pooler.us-east-
2.aws.neon.tech"
DB_NAME = "neondb"
DB_USER = "neondb_owner"
DB_PASS = "npg_Ztv1oYdsI3Sq"

try:
    # Connect to the Neon database
connection = psycopg2.connect(
host=DB_HOST,
database=DB_NAME,
user=DB_USER,
        password=DB_PASS
    )

    # Create a cursor object
```

```
    cursor = connection.cursor()

    # Query to fetch "Hello World" from the database
    cursor.execute("SELECT message FROM greetings WHERE id =
1;")     result = cursor.fetchone()

    # Print the result
    print("Fetched from Neon DB:", result[0])

except Exception as e:     print("Error
connecting to the database:", e)
finally:     if connection:
cursor.close()
        connection.close()
```

Output:

```
Fetched from Neon DB: Hello World!
```

Practical No 10

Aim:
Implementation of Openstack with user and private network creation.

Solution:
Step 1: sudo snap install microstack --beta

```
cs@cs-iyc:~$ sudo snap install microstack --beta
[sudo] password for cs:
microstack (beta) ussuri from Canonical✓ installed
cs@cs-iyc:~$
```

Step 2: snap list microstack

```
cs@cs-iyc:~$ snap list microstack
Name        Version  Rev  Tracking     Publisher   Notes
microstack  ussuri   245  latest/beta  canonical✓  -
cs@cs-iyc:~$
```

Step 3: sudo microstack init --auto --control

```
cs@cs-iyc:~$ sudo microstack init --auto --control
[sudo] password for cs:
Sorry, try again.
[sudo] password for cs:
2025-02-15 08:46:46,852 - microstack_init - INFO - Configuring clustering ...
2025-02-15 08:46:47,297 - microstack_init - INFO - Setting up as a control node.
2025-02-15 08:46:50,064 - microstack_init - INFO - Generating TLS Certificate and Key
2025-02-15 08:46:51,540 - microstack_init - INFO - Configuring networking ...
2025-02-15 08:47:03,491 - microstack_init - INFO - Opening horizon dashboard up to *
2025-02-15 08:47:04,268 - microstack_init - INFO - Waiting for RabbitMQ to start ...
Waiting for 192.168.90.133:5672
2025-02-15 08:47:05,566 - microstack_init - INFO - RabbitMQ started!
2025-02-15 08:47:05,566 - microstack_init - INFO - Configuring RabbitMQ ...
2025-02-15 08:47:07,319 - microstack_init - INFO - RabbitMQ Configured!
2025-02-15 08:47:07,398 - microstack_init - INFO - Waiting for MySQL server to start ...
Waiting for 192.168.90.133:3306
2025-02-15 08:47:08,548 - microstack_init - INFO - Mysql server started! Creating databases ...
2025-02-15 08:47:13,574 - microstack_init - INFO - Configuring Keystone Fernet Keys ...
2025-02-15 08:47:21,693 - microstack_init - INFO - Bootstrapping Keystone ...
2025-02-15 08:47:24,827 - microstack_init - INFO - Creating service project ...
2025-02-15 08:47:26,403 - microstack_init - INFO - Keystone configured!
2025-02-15 08:47:26,474 - microstack_init - INFO - Configuring the Placement service...
2025-02-15 08:47:29,642 - microstack_init - INFO - Running Placement DB migrations...
2025-02-15 08:47:32,526 - microstack_init - INFO - Configuring nova control plane services ...
2025-02-15 08:47:34,159 - microstack_init - INFO - Running Nova API DB migrations (this may take a lot of time)...
2025-02-15 08:47:43,085 - microstack_init - INFO - Running Nova DB migrations (this may take a lot of time)...
Waiting for 192.168.90.133:8774
2025-02-15 08:48:01,500 - microstack_init - INFO - Creating default flavors...
2025-02-15 08:48:12,554 - microstack_init - INFO - Configuring nova compute hypervisor ...
2025-02-15 08:48:12,554 - microstack_init - INFO - Checking virtualization extensions presence on the host
2025-02-15 08:48:12,616 - microstack_init - INFO - Hardware virtualization is supported - KVM will be used for Nova instances
2025-02-15 08:48:17,119 - microstack_init - INFO - Configuring the Spice HTML5 console service...
2025-02-15 08:48:18,285 - microstack_init - INFO - Configuring Neutron
Waiting for 192.168.90.133:9696
2025-02-15 08:49:04,787 - microstack_init - INFO - Configuring Glance ...
Waiting for 192.168.90.133:9292
2025-02-15 08:50:44,126 - microstack_init - INFO - Adding cirros image ...
2025-02-15 08:50:47,791 - microstack_init - INFO - Creating security group rules ...
2025-02-15 08:50:55,580 - microstack_init - INFO - Configuring the Cinder services...
2025-02-15 08:51:34,126 - microstack_init - INFO - Running Cinder DB migrations...
2025-02-15 08:53:21,204 - microstack_init - INFO - restarting libvirt and virtlogd ...
2025-02-15 08:53:47,224 - microstack_init - INFO - Complete. Marked microstack as initialized!
```

Step 4: microstack.openstack --version

```
cs@cs-iyc:~$ microstack.openstack --version
openstack 5.2.0
```

Step 5: sudo snap get microstack config.credentials.keystone-password

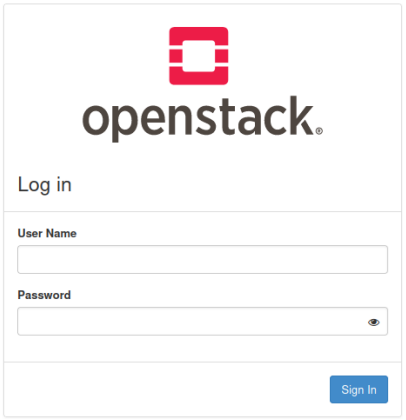
```
cs@cs-iyc:~$ sudo snap get microstack config.credentials.keystone-password
mU8blRngAvs6uJLb7BBMvN4bZVg5thHT
```

Step 6: ip a

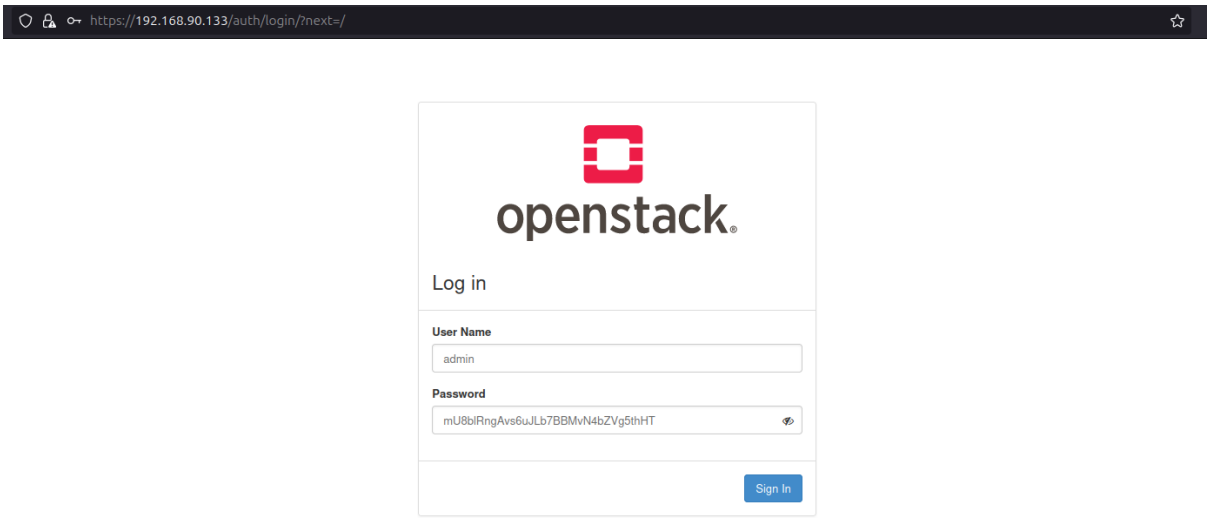
```
cs@cs-iyc:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
       valid_lft forever preferred_lft forever
2: enp1s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 1c:69:7a:ec:38:d8 brd ff:ff:ff:ff:ff:ff
    inet 192.168.90.133/24 brd 192.168.90.255 scope global dynamic noprefixroute enp1s0
       valid_lft 5523sec preferred_lft 5523sec
    inet6 fe80::1e69:7aff:feec:38d8/64 scope link
       valid_lft forever preferred_lft forever
3: wlo1: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether f4:c8:8a:b0:48:3e brd ff:ff:ff:ff:ff:ff
    altname wlp0s20f3
4: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 52:54:00:ed:5d:12 brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
       valid_lft forever preferred_lft forever
5: ovs-system: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether ca:38:26:2c:0c:74 brd ff:ff:ff:ff:ff:ff
6: br-ex: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UNKNOWN group default qlen 1000
    link/ether aa:3f:51:6c:16:44 brd ff:ff:ff:ff:ff:ff
    inet 10.20.20.1/24 scope global br-ex
       valid_lft forever preferred_lft forever
    inet6 fe80::a83f:51ff:fe6c:1644/64 scope link
       valid_lft forever preferred_lft forever
7: br-int: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 2e:9b:c8:ae:70:49 brd ff:ff:ff:ff:ff:ff
```

Step 7: now open Browser and enter https://yourip

https://192.168.90.133



Step 8: Login user name: admin & password from them terminal which got through previous command


https://192.168.90.133/auth/login/?next=/
openstack.
Log in
User Name
admin
Password
mU8blRngAvs6uJLb7BBMvN4bZVg5thHT
Sign In