```
Ass7
from flask import Flask, request, jsonify
@app.route('/add', methods=['POST'])
def add():
    data = request.get_json()
    num1 = data['num1']
    num2 = data['num2']
    num3 = num1 + num2
    return jsonify({"result": num3})

@app.route('/multiply', methods=["POST"])
def multiply():
    data = request.get_json()
    num1 = data['num1']
    num2 = data['num2']
    num3 = num1*num2
    return jsonify({"result": num3})

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

1.app.py

1. pip install flask

Python app.py

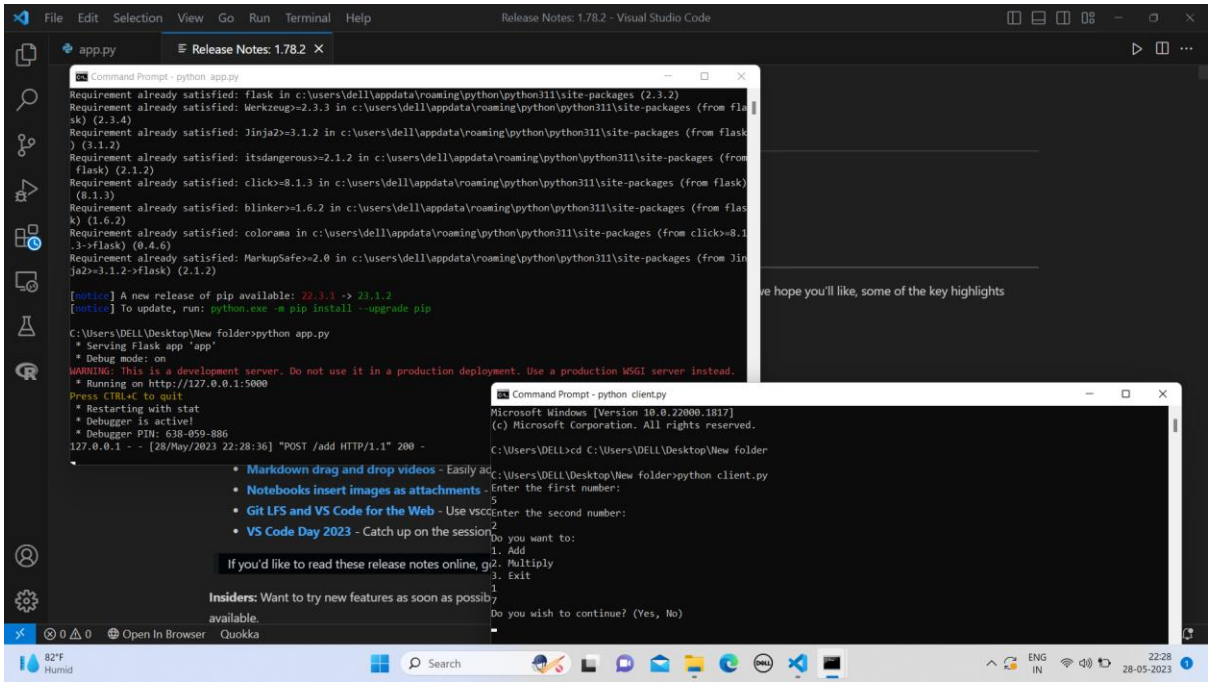
2.client.py

Pip install requests

Python client.py

```
import requests
url = 'http://127.0.0.1:5000/'

def add_num(num1, num2):
    endpoint = url + 'add'
    data = {"num1": num1, "num2": num2}
    response = requests.post(endpoint, json=data)
    result = response.json()['result']
    return result

def multiply_num(num1, num2):
    endpoint = url + 'multiply'
    data = {"num1": num1, "num2": num2}
    response = requests.post(endpoint, json=data)
    result = response.json()["result"]
    return result

state = True
while state:
    try:
        print("Enter the first number:")
        num1 = int(input())
        print("Enter the second number:")
        num2 = int(input())

        print("Do you want to:\n1. Add\n2. Multiply\n3. Exit")
```

```
        choice = int(input(""))

        if choice == 1:
            print(add_num(num1, num2))
            print("Do you wish to continue? (Yes, No)")
            if input().lower() == "no":
                state = False

        elif choice == 2:
            print(multiply_num(num1, num2))
            print("Do you wish to continue? (Yes, No)")
            if input().lower() == "no":
                state = False

        elif choice == 3:
            print("Thank you for using the service")
            state = False

        else:
            print("Invalid Input")

        if state:
            print("New Calculation")
            print("_" * 10, end="\n")

    except Exception as e:
        print("Encountered Error:", str(e))
        print("Restarting interface", end="\n")
```



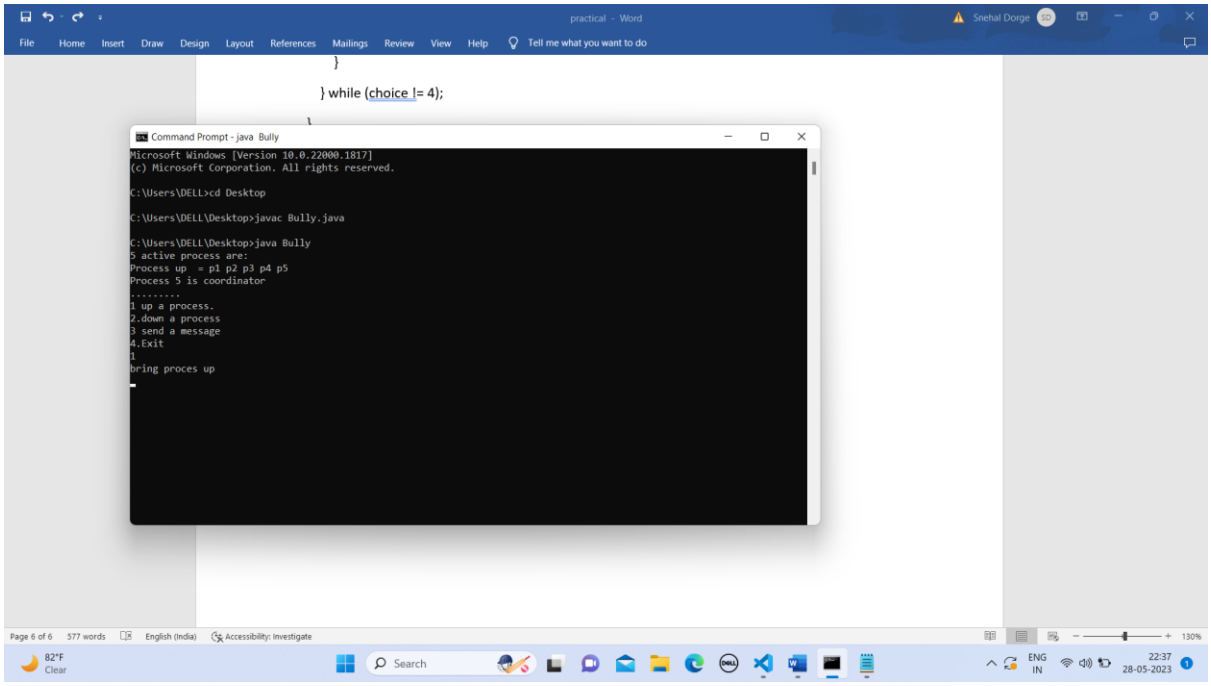
Ass 6:1)Bully.java

```
import java.io.InputStream;
import java.io.PrintStream;
import java.util.Scanner;

public class Bully {
   static boolean[] state = new boolean[5];
   int coordinator;

   public static void up(int up) {
      if (state[up - 1]) {
         System.out.println("process" + up + "is already up");
      } else {
         int i;
         Bully.state[up - 1] = true;
         System.out.println("process " + up + "held election");
         for (i = up; i < 5; ++i) {
            System.out.println("election message sent from process" + up + "to process" + (i + 1));
         }
         for (i = up + 1; i <= 5; ++i) {
            if (!state[i - 1]) continue;
            System.out.println("alive message send from process" + i + "to process" + up);
            break;
         }
      }
   }

   public static void down(int down) {
      if (!state[down - 1]) {
         System.out.println("process " + down + "is already dowm.");
      } else {
```

```
        Bully.state[down - 1] = false;
    }
}

public static void mess(int mess) {
    if (state[mess - 1]) {
        if (state[4]) {
            System.out.println("0K");
        } else if (!state[4]) {
            int i;
            System.out.println("process" + mess + "election");
            for (i = mess; i < 5; ++i) {
                System.out.println("election send from process" + mess + "to process " + (i + 1));
            }
            for (i = 5; i >= mess; --i) {
                if (!state[i - 1]) continue;
                System.out.println("Coordinator message send from process" + i + "to all");
                break;
            }
        }
    } else {
        System.out.println("Prccess" + mess + "is down");
    }
}

public static void main(String[] args) {
    int choice;
    Scanner sc = new Scanner(System.in);
    for (int i = 0; i < 5; ++i) {
        Bully.state[i] = true;
    }
```

```
System.out.println("5 active process are:");
System.out.println("Process up  = p1 p2 p3 p4 p5");
System.out.println("Process 5 is coordinator");
do {
   System.out.println(".....");
   System.out.println("1 up a process.");
   System.out.println("2.down a process");
   System.out.println("3 send a message");
   System.out.println("4.Exit");
   choice = sc.nextInt();
   switch (choice) {
      case 1: {
         System.out.println("bring proces up");
         int up = sc.nextInt();
         if (up == 5) {
            System.out.println("process 5 is co-ordinator");
            Bully.state[4] = true;
            break;
         }
         Bully.up(up);
         break;
      }
      case 2: {
         System.out.println("bring down any process.");
         int down = sc.nextInt();
         Bully.down(down);
         break;
      }
      case 3: {
         System.out.println("which process will send message");
         int mess = sc.nextInt();
```

```
                Bully.mess(mess);
            }
        }
    } while (choice != 4);
  }
}
```



2)Ring.java

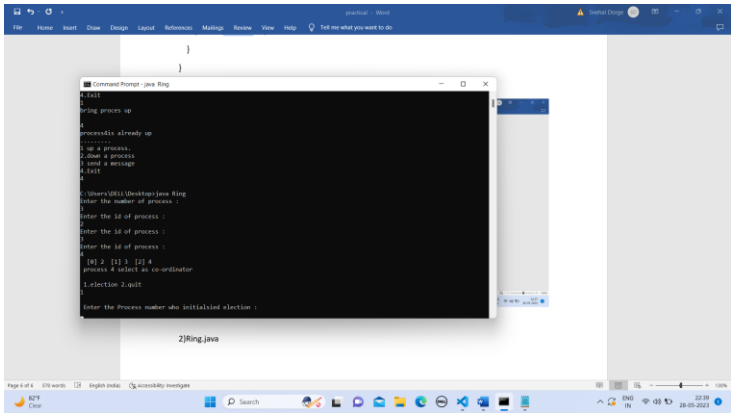
```
import java.util.Scanner;

public class Ring {

   public static void main(String[] args) {

      // TODO Auto-generated method stub

      int temp, i, j;
      char str[] = new char[10];
```

```
        Rr proc[] = new Rr[10];


// object initialisation
        for (i = 0; i < proc.length; i++)
            proc[i] = new Rr();


// scanner used for getting input from console
        Scanner in = new Scanner(System.in);
        System.out.println("Enter the number of process : ");
        int num = in.nextInt();


// getting input from users
        for (i = 0; i < num; i++) {
            proc[i].index = i;
            System.out.println("Enter the id of process : ");
            proc[i].id = in.nextInt();
            proc[i].state = "active";
            proc[i].f = 0;
        }


// sorting the processes from on the basis of id
        for (i = 0; i < num - 1; i++) {
            for (j = 0; j < num - 1; j++) {
                if (proc[j].id > proc[j + 1].id) {
                    temp = proc[j].id;
                    proc[j].id = proc[j + 1].id;
                    proc[j + 1].id = temp;
                }
            }
        }
```

```
for (i = 0; i < num; i++) {
   System.out.print("  [" + i + "]" + " " + proc[i].id);
}

int init;
int ch;
int temp1;
int temp2;
int ch1;
int arr[] = new int[10];
proc[num - 1].state = "inactive";
System.out.println("\n process " + proc[num - 1].id + " select as co-ordinator");

while (true) {
   System.out.println("\n 1.election 2.quit ");
   ch = in.nextInt();
   for (i = 0; i < num; i++) {
      proc[i].f = 0;
   }

   switch (ch) {
   case 1:
      System.out.println("\n Enter the Process number who initialsied election : ");
      init = in.nextInt();
      temp2 = init;
      temp1 = init + 1;
      i = 0;

      while (temp2 != temp1) {
         if ("active".equals(proc[temp1].state) && proc[temp1].f == 0) {
            System.out.println("\nProcess " + proc[init].id + " send message to " + proc[temp1].id);
```

```
                proc[temp1].f = 1;
                init = temp1;
                arr[i] = proc[temp1].id;
                i++;
            }
            if (temp1 == num) {
                temp1 = 0;
            } else {
                temp1++;
            }
        }
        System.out.println("\nProcess " + proc[init].id + " send message to " + proc[temp1].id);
        arr[i] = proc[temp1].id;
        i++;
        int max = -1;
// finding maximum for co-ordinator selection
        for (j = 0; j < i; j++) {
            if (max < arr[j]) {
                max = arr[j];
            }
        }

// co-ordinator is found then printing on console
        System.out.println("\n process " + max + "select as co-ordinator");

        for (i = 0; i < num; i++) {

            if (proc[i].id == max) {
                proc[i].state = "inactive";
            }
        }
```

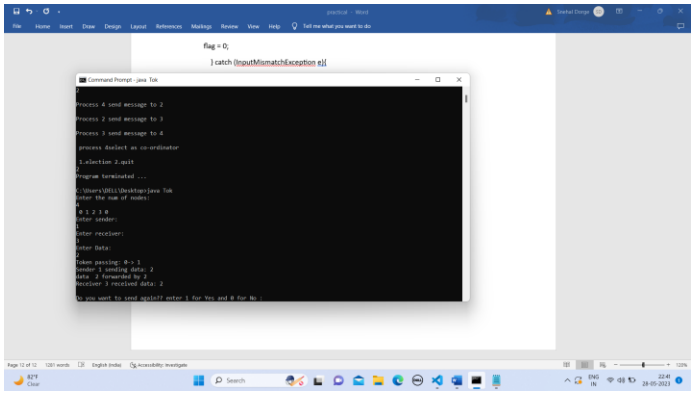
```
            break;
        case 2:
        System.out.println("Program terminated ...");
        return ;
        default:
            System.out.println("\n invalid response \n");
            break;
        }
      }
   }
}

class Rr {
   public int index;   // to store the index of process
   public int id;      // to store id/name of process
   public int f;
   String state;       // indiactes whether active or inactive state of node
}
```



Ass 5

```
import java.io.*;
import java.util.*;

class Tok {

    public static void main(String args[]) throws Throwable {
        Scanner scan = new Scanner(System.in);
        System.out.println("Enter the num of nodes:");
        int n = scan.nextInt();
        int m = n - 1;
        // Decides the number of nodes forming the ring
        int token = 0;
        int ch = 0, flag = 0;
        for (int i = 0; i < n; i++) {
            System.out.print(" " + i);
        }
        System.out.println(" " + 0);
        do{
            System.out.println("Enter sender:");
            int s = scan.nextInt();
            System.out.println("Enter receiver:");
            int r = scan.nextInt();
            System.out.println("Enter Data:");
            int a;
            a = scan.nextInt();
            System.out.print("Token passing:");
            for (int i = token, j = token; (i % n) != s; i++, j = (j + 1) % n) {
                System.out.print(" " + j + "->");
            }
            System.out.println(" " + s);
```

```
        System.out.println("Sender " + s + " sending data: " + a);
        for (int i = s + 1; i != r; i = (i + 1) % n) {
            System.out.println("data  " + a + " forwarded by " + i);
        }
        System.out.println("Receiver " + r + " received data: " + a +"\n");
        token = s;
        do{
            try {
                if( flag == 1)
        System.out.print("Invalid Input!!...");
                System.out.print("Do you want to send again?? enter 1 for Yes and 0 for No : ");
                ch = scan.nextInt();
                if( ch != 1 && ch != 0 )
        flag = 1;
                else
        flag = 0;
            } catch (InputMismatchException e){
                System.out.println("Invalid Input");
            }
        }while( ch != 1 && ch != 0 );
    }while( ch == 1 );
  }
}
```



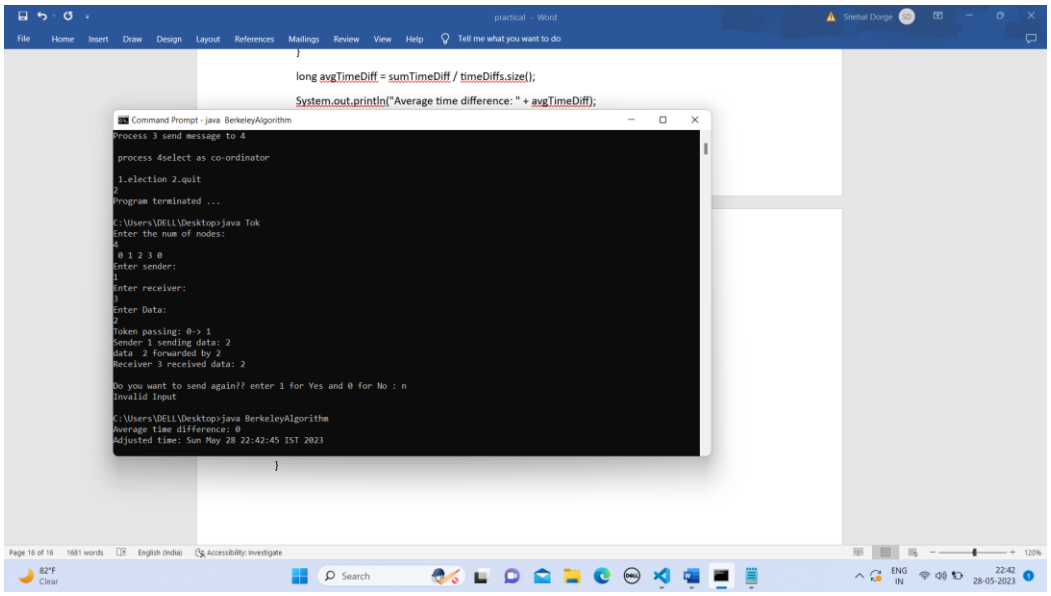
Asss 4

```
import java.io.*;
import java.net.*;
import java.util.*;

public class BerkeleyAlgorithm {

   // Define the port number that will be used for communication
   private static final int PORT = 1024;

   public static void main(String[] args) throws Exception {

      // Create a server socket to listen for incoming messages
      ServerSocket serverSocket = new ServerSocket(PORT);

      // Create a list to store the time differences for each node
      List<Long> timeDiffs = new ArrayList<Long>();

      // Create a new thread to handle the time requests from nodes
      Thread timeServerThread = new Thread(new Runnable() {
         public void run() {
            while (true) {
               try {
                  // Wait for a node to connect and request the current time
                  Socket clientSocket = serverSocket.accept();
                  ObjectInputStream in = new ObjectInputStream(clientSocket.getInputStream());

                  // Read the current time from the node's request
                  Date clientTime = (Date) in.readObject();

                  // Send the current time to the node as a response
```

```
            ObjectOutputStream out = new ObjectOutputStream(clientSocket.getOutputStream());
            out.writeObject(new Date());

            // Calculate the time difference between the server and the node
            long timeDiff = (new Date().getTime() - clientTime.getTime()) / 2;
            timeDiffs.add(timeDiff);

            // Close the input/output streams and the socket
            in.close();
            out.close();
            clientSocket.close();
          } catch (Exception e) {
            e.printStackTrace();
          }
        }
      }
});
timeServerThread.start();

// Create a new thread to periodically send time requests to the server
Thread timeClientThread = new Thread(new Runnable() {
    public void run() {
        while (true) {
            try {
                // Connect to the server and send a time request
                Socket socket = new Socket("localhost", PORT);
                ObjectOutputStream out = new ObjectOutputStream(socket.getOutputStream());
                out.writeObject(new Date());

                // Read the current time from the server's response
                ObjectInputStream in = new ObjectInputStream(socket.getInputStream());
```

```
            Date serverTime = (Date) in.readObject();

            // Calculate the time difference between the node and the server
            long timeDiff = (serverTime.getTime() - new Date().getTime()) / 2;
            timeDiffs.add(timeDiff);

            // Close the input/output streams and the socket
            in.close();
            out.close();
            socket.close();

            // Wait for a short period of time before sending the next time request
            Thread.sleep(1000);
          } catch (Exception e) {
            e.printStackTrace();
          }
        }
    }
});
timeClientThread.start();

// Wait for a sufficient number of time differences to be recorded
Thread.sleep(10000);

// Compute the average time difference and adjust the node's clock
long sumTimeDiff = 0;
for (Long timeDiff : timeDiffs) {
    sumTimeDiff += timeDiff;
}
long avgTimeDiff = sumTimeDiff / timeDiffs.size();
System.out.println("Average time difference: " + avgTimeDiff);
```

```
        // Adjust the node's clock by adding the average time difference
        Calendar calendar = Calendar.getInstance();
        calendar.setTime(new Date());
        calendar.add(Calendar.MILLISECOND, (int) avgTimeDiff);
        System.out.println("Adjusted time: " + calendar.getTime());
    }
}
```



Asss 3

```
from mpi4py import MPI
import numpy as np

comm = MPI.COMM_WORLD
rank = comm.rank

send_buf = []

if rank == 0:
    arr =np.array([12,21241,5131,1612251,161,6,161,1613,161363,12616,367,8363])
    arr.shape = (3, 4)
    send_buf = arr
v = comm.scatter(send_buf, root=0)
print("Local sum at rank{0}: {1}".format(comm.rank, np.sum(v)))
recvbuf = comm.reduce(v, root=0)
if comm.rank == 0:
```

```
    global_sum = np.sum(recvbuf)
    print("Global sum: "+ str(global_sum))
```

install mpi4py

set environment

check istall in successful using mpiexec -help

1)pip install mpi4py

2)mpiexec -np 3 python sum.py

Ass 2

Calc.idl

```
module CalcApp {
  interface Calc {
    exception DivisionByZero {};
    float sum(in float a, in float b);
    float div(in float a, in float b)raises (DivisionByZero);
    float mul(in float a, in float b);
    float sub(in float a, in float b);
  };
};
```

CalcImpl.java

```
import CalcApp.*;
 import CalcApp.CalcPackage.DivisionByZero;

  import org.omg.CosNaming.*;
  import org.omg.CosNaming.NamingContextPackage.*;
  import org.omg.CORBA.*;
  import org.omg.PortableServer.*;

  import java.util.Properties;

 class CalcImpl extends CalcPOA {

 @Override
 public float sum(float a, float b) {
 return a + b;
 }
 @Override
 public float div(float a, float b) throws DivisionByZero {
 if (b == 0) {
 throw new CalcApp.CalcPackage.DivisionByZero();
 } else {
 return a / b;
```

```
 }
 }
 @Override
 public float mul(float a, float b) {
 return a * b;
 }

 @Override
 public float sub(float a, float b) {
 return a - b;
 }
 private ORB orb;

 public void setORB(ORB orb_val) {
 orb = orb_val;
 }
 }

 public class CalcServer {

 public static void main(String args[]) {
 try {
 // create and initialize the ORB
ORB orb = ORB.init(args, null);

 // get reference to rootpoa & activate the POAManager
 POA rootpoa = POAHelper.narrow(orb.resolve_initial_references("RootPOA"));
 rootpoa.the_POAManager().activate();
 // create servant and register it with the ORB
 CalcImpl helloImpl = new CalcImpl();
 helloImpl.setORB(orb);

 // get object reference from the servant
 org.omg.CORBA.Object ref = rootpoa.servant_to_reference(helloImpl);
 Calc href = CalcHelper.narrow(ref);
 // get the root naming context
 // NameService invokes the name service
 org.omg.CORBA.Object objRef = orb.resolve_initial_references("NameService");
 // Use NamingContextExt which is part of the Interoperable
 // Naming Service (INS) specification.
 NamingContextExt ncRef = NamingContextExtHelper.narrow(objRef);

 // bind the Object Reference in Naming
 String name = "Calc";
 NameComponent path[] = ncRef.to_name(name);
 ncRef.rebind(path, href);

 System.out.println("Ready..");
```

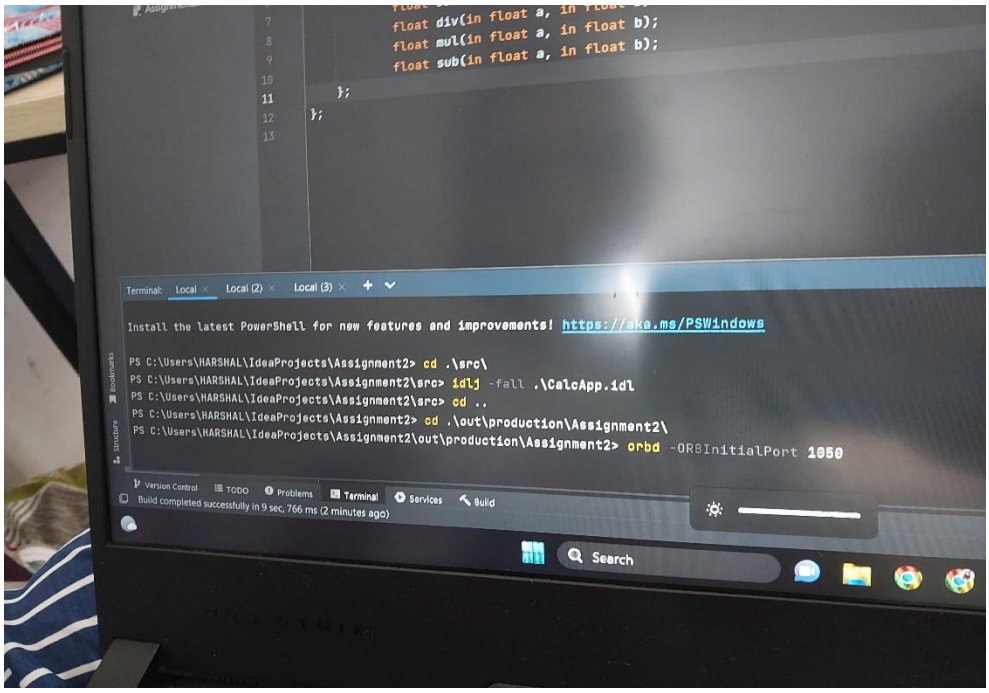
```
// wait for invocations from clients
orb.run();
} catch (Exception e) {
System.err.println("ERROR: " + e);
e.printStackTrace(System.out);
}

System.out.println("Exiting ...");

}
}
```

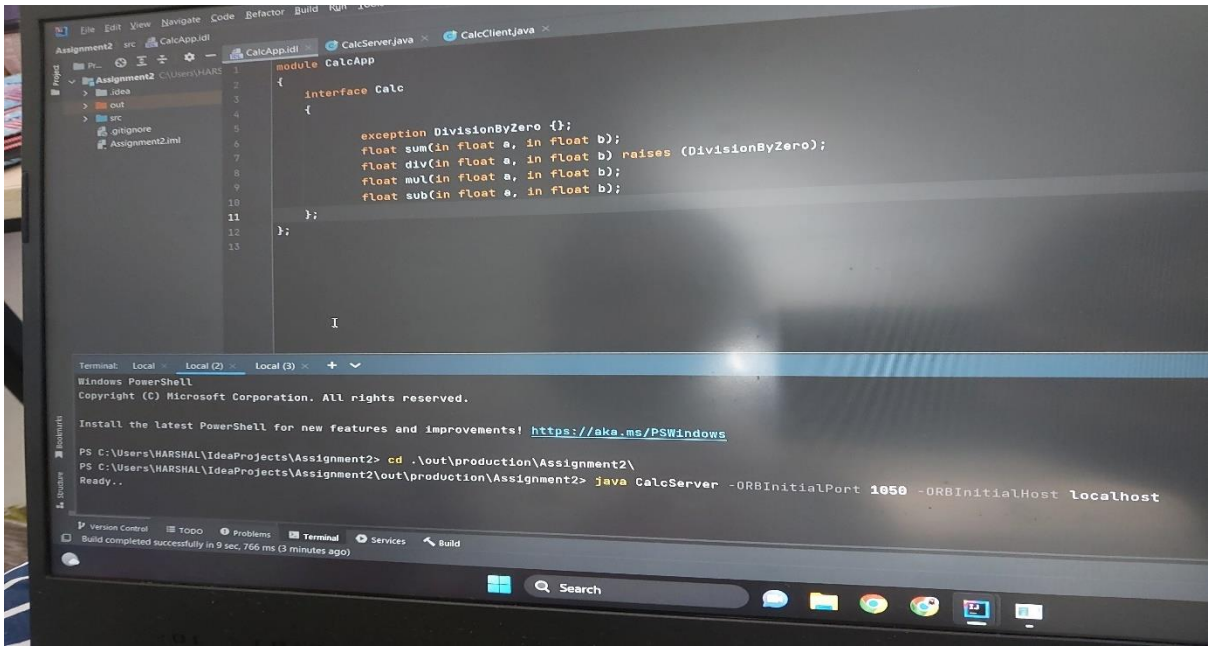
CalcClient.java

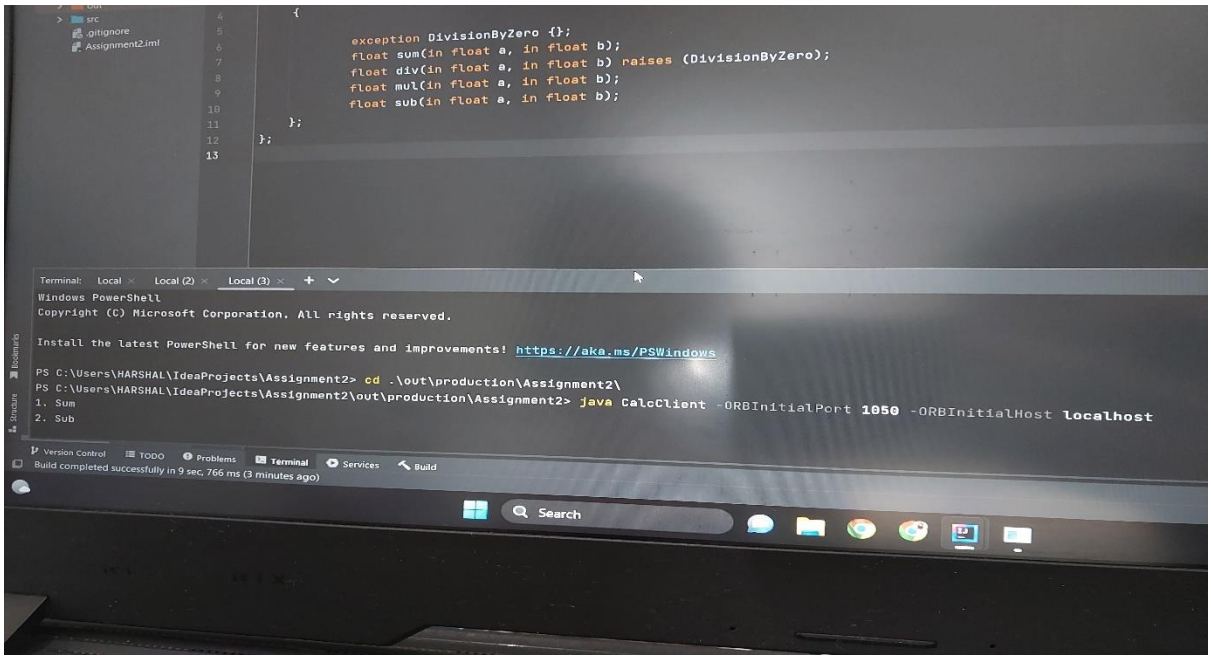
```
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;

import CalcApp.*;
import CalcApp.CalcPackage.DivisionByZero;

import org.omg.CosNaming.*;
import org.omg.CosNaming.NamingContextPackage.*;
import org.omg.CORBA.*;
import static java.lang.System.out;

public class CalcClient {

    static Calc calcImpl;
    static BufferedReader br = new BufferedReader(new
InputStreamReader(System.in));

    public static void main(String args[]) {

        try {
            // create and initialize the ORB
            ORB orb = ORB.init(args, null);

            // get the root naming context
            org.omg.CORBA.Object objRef =
orb.resolve_initial_references("NameService");
            // Use NamingContextExt instead of NamingContext. This is
            // part of the Interoperable naming Service.
            NamingContextExt ncRef = NamingContextExtHelper.narrow(objRef);

            // resolve the Object Reference in Naming
```

```
            String name = "Calc";
            calcImpl = CalcHelper.narrow(ncRef.resolve_str(name));

            // System.out.println(calcImpl);


            while (true) {
                out.println("1. Sum");
                out.println("2. Sub");
                out.println("3. Mul");
                out.println("4. Div");
                out.println("5. exit");
                out.println("--");
                out.println("choice: ");

                try {
                    String opt = br.readLine();
                    if (opt.equals("5")) {
                        break;
                        } else if (opt.equals("1")) {
                        out.println("a+b= " + calcImpl.sum(getFloat("a"),
getFloat("b")));
                        } else if (opt.equals("2")) {
                        out.println("a-b= " + calcImpl.sub(getFloat("a"),
getFloat("b")));
                        } else if (opt.equals("3")) {
                        out.println("a*b= " + calcImpl.mul(getFloat("a"),
getFloat("b")));
                        } else if (opt.equals("4")) {
                        try {
                            out.println("a/b= " + calcImpl.div(getFloat("a"),
                                    getFloat("b")));
                            } catch (DivisionByZero de) {
                            out.println("Division by zero!!!");
                            }
                        }
                    } catch (Exception e) {
                    out.println("===");
                    out.println("Error with numbers");
                    out.println("===");
                    }
                out.println("");

                }
            //calcImpl.shutdown();
            } catch (Exception e) {
            System.out.println("ERROR : " + e);
            e.printStackTrace(System.out);
            }
```

```
        }

        static float getFloat(String number) throws Exception {
        out.print(number + ": ");
        return Float.parseFloat(br.readLine());
        }
}
```







Ass1

RemoteInterface.java

```
import java.rmi.Remote;
 import java.rmi.RemoteException;
 public interface RemoteInterface extends Remote{
void sendMessage(String message) throws RemoteException;
 String receiveMessage() throws RemoteException;
 }
```

ServerImpl.java

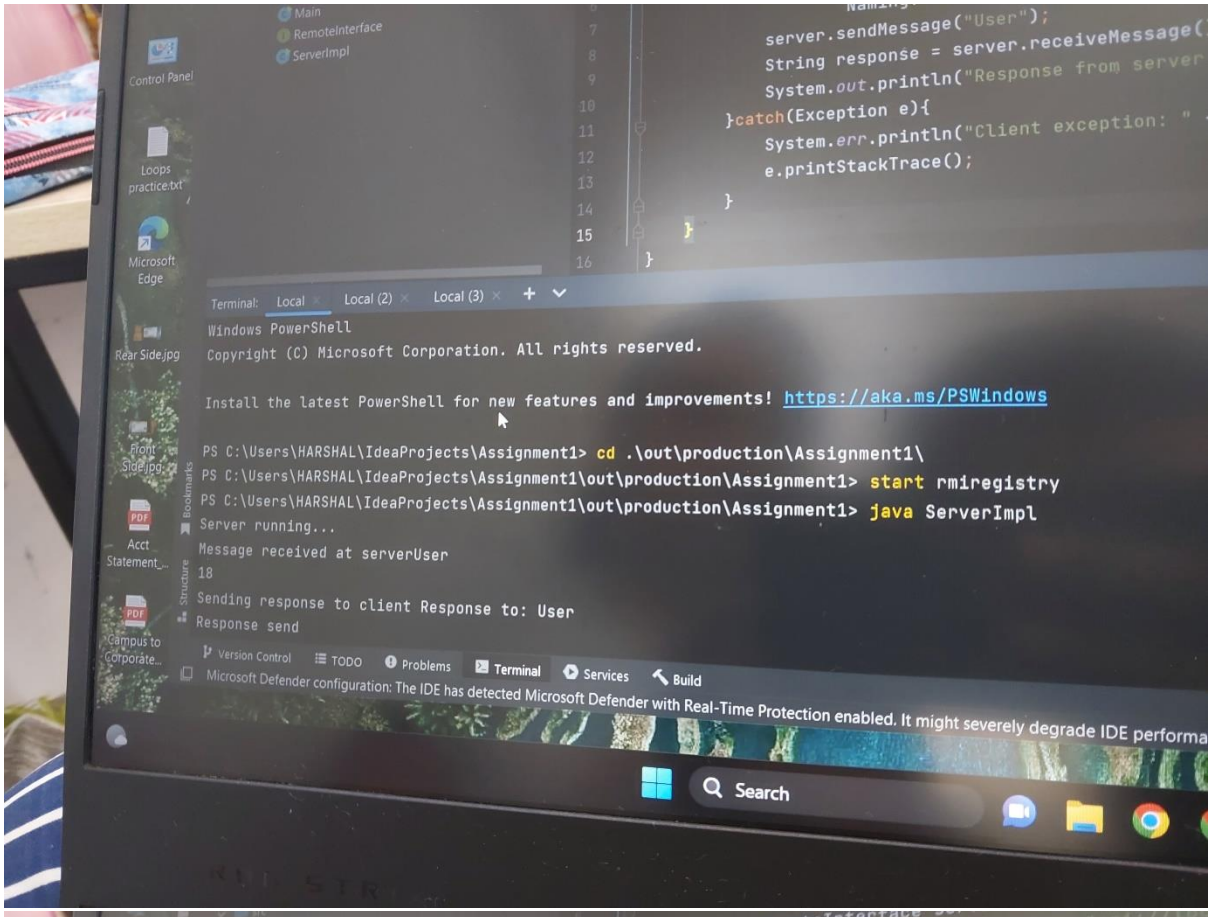
```
import java.rmi.Naming;
  import java.rmi.RemoteException;
  import java.rmi.server.UnicastRemoteObject;
  public class ServerImpl extends UnicastRemoteObject implements
RemoteInterface{
  String Msg = "Good day, ";
  public ServerImpl() throws RemoteException{
  super();
  }

 @Override
 public void sendMessage(String message) throws RemoteException{
 System.out.println("Message received at server"+message);

 Thread thread = new Thread(() -> {
```

```
try{
String response = "Response to: " + message;
Msg+= message;
System.out.println("Sending response to client "+ response);
sendResponseToClient(response);
} catch (RemoteException e){
System.err.println("Error sending response to client: "+e.getMessage());
}
});
thread.start();
}
@Override
public String receiveMessage() throws RemoteException{
return this.Msg;
}

private void sendResponseToClient(String response) throws RemoteException{
System.out.println("Response send");
}

public static void main(String[] args) {
try {
ServerImpl server = new ServerImpl();

// Bind the server object to the RMI registry
Naming.rebind("rmi://localhost/Server", server);

System.out.println("Server running...");
} catch (Exception e) {
System.err.println("Server exception: " + e.toString());
e.printStackTrace();
}
}
}
```

Client.java

```
import java.rmi.Naming;
  import java.rmi.RemoteException;
  public class Client {
  public static void main(String[] args){
  try{
  RemoteInterface server = (RemoteInterface)
Naming.lookup("rmi://localhost/Server");
  server.sendMessage("User");
  String response = server.receiveMessage();
  System.out.println("Response from server:" + response);
```

```
 }catch(Exception e){
 System.err.println("Client exception: " + e.toString());
 e.printStackTrace();
}
}
}
```


server.sendMessage("User");
String response = server.receiveMessage(
System.out.println("Response from server
}catch(Exception e){
System.err.println("Client exception: "
e.printStackTrace();
Terminal: Local Local (2) Local (3)
Windows PowerShell
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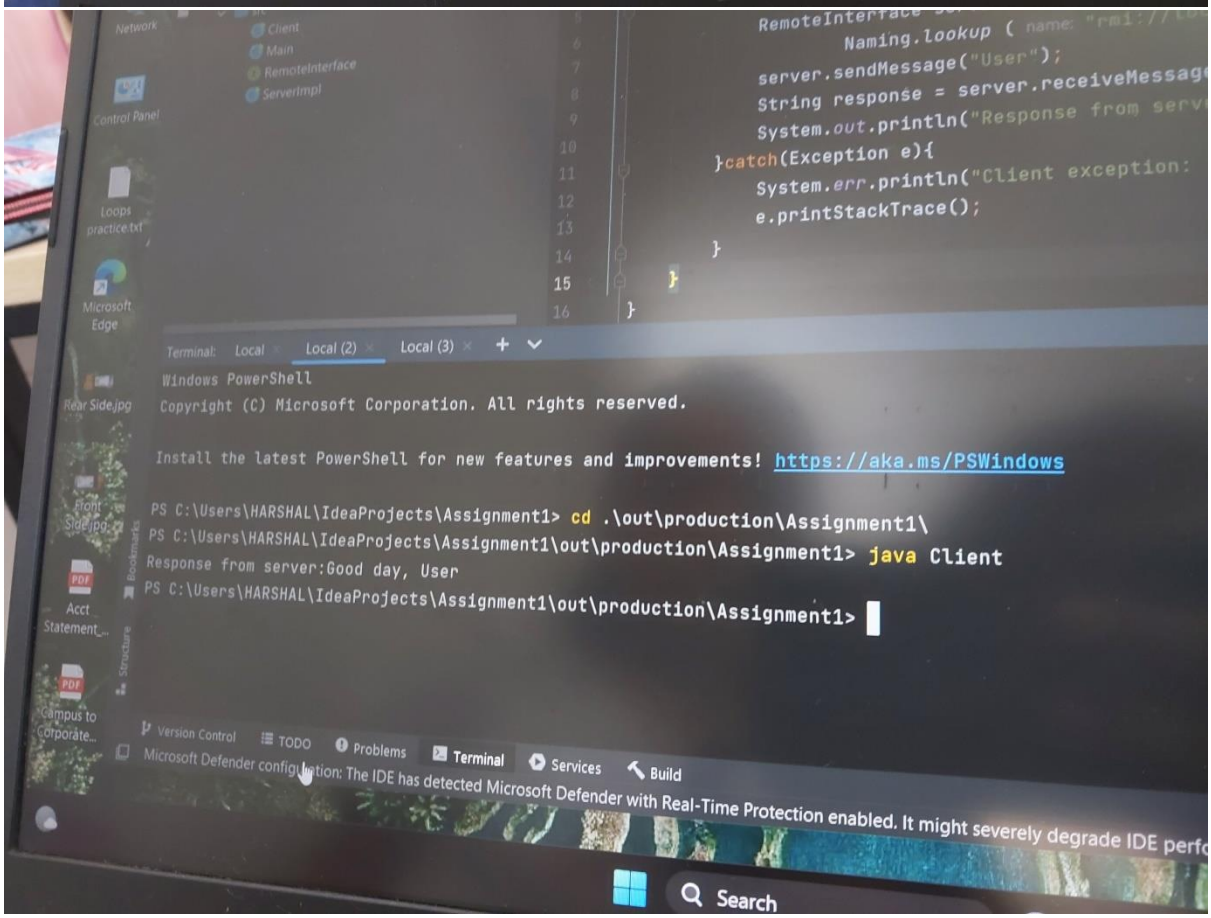
PS C:\Users\HARSHAL\IdeaProjects\Assignment1> cd .\out\production\Assignment1\
PS C:\Users\HARSHAL\IdeaProjects\Assignment1\out\production\Assignment1> start rmiregistry
PS C:\Users\HARSHAL\IdeaProjects\Assignment1\out\production\Assignment1> java ServerImpl
Server running...
Message received at serverUser
18
Sending response to client Response to: User
Response send
Version Control TODO Problems Terminal Services Build
Microsoft Defender configuration: The IDE has detected Microsoft Defender with Real-Time Protection enabled. It might severely degrade IDE performa
Search


server.sendMessage("User");
String response = server.receiveMessage
System.out.println("Response from serv
}catch(Exception e){
System.err.println("Client exception:
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Terminal: Local Local (2) Local (3)
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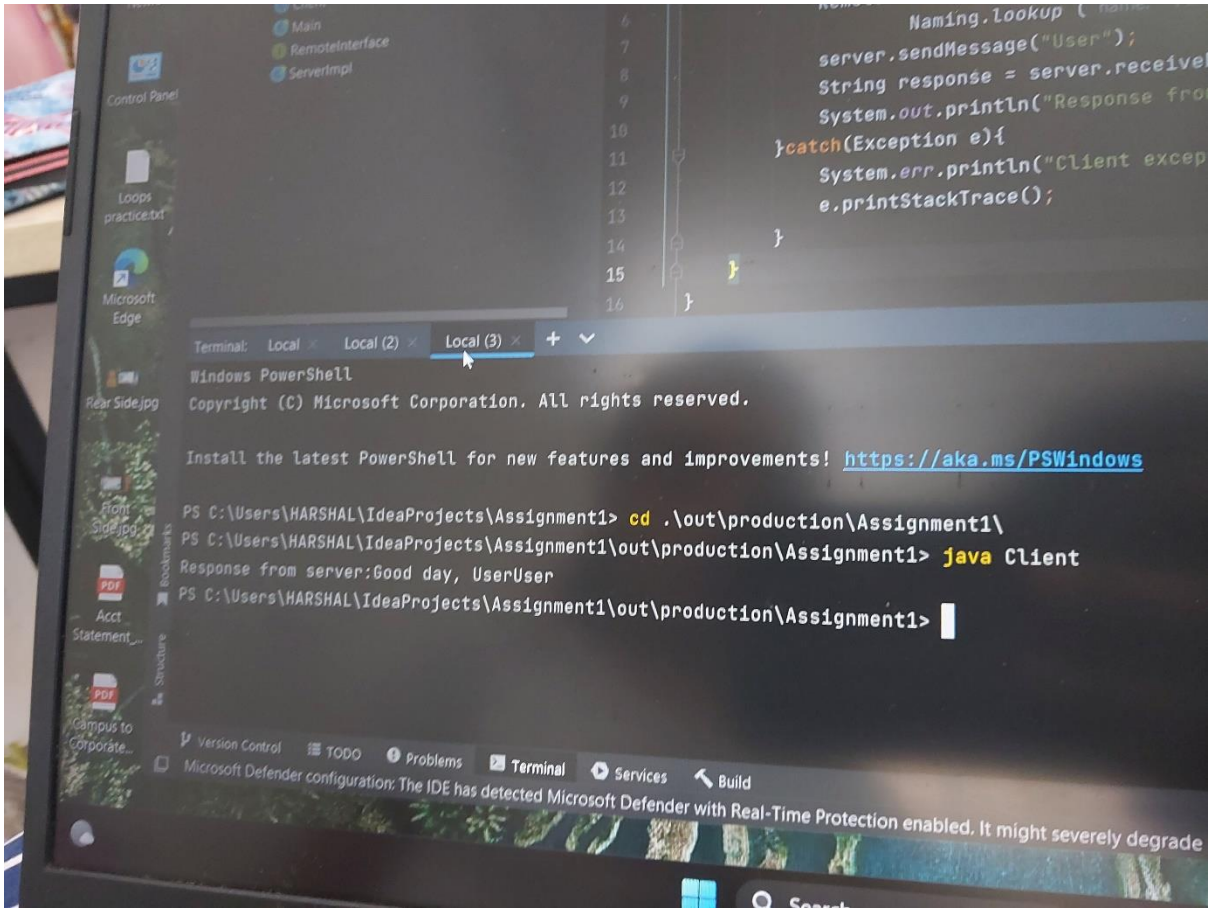
PS C:\Users\HARSHAL\IdeaProjects\Assignment1> cd .\out\production\Assignment1\
PS C:\Users\HARSHAL\IdeaProjects\Assignment1\out\production\Assignment1> java Client
Response from server:Good day, User
PS C:\Users\HARSHAL\IdeaProjects\Assignment1\out\production\Assignment1>
Version Control TODO Problems Terminal Services Build
Microsoft Defender configuration: The IDE has detected Microsoft Defender with Real-Time Protection enabled. It might severely degrade IDE perfo
Search


Main
RemoteInterface
ServerImpl
Naming.lookup (
server.sendMessage("User");
String response = server.receive
System.out.println("Response fro
}catch(Exception e){
System.err.println("Client excep
e.printStackTrace();
}
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}
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Windows PowerShell
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Version Control TODO Problems Terminal Services Build
Microsoft Defender configuration: The IDE has detected Microsoft Defender with Real-Time Protection enabled. It might severely degrade
Control Panel
Loops practice.txt
Microsoft Edge
Rear Side.jpg
Front Side.jpg
Acct Statement_...
Campus to Corporate...
Bookmarks
Structure