Information and Network Security

krunal dhavle

TYCS-713

Name : Krunal Dhavle

Class : TYCS

Roll No : 713

Subject : Information and Network Security

Teacher : Rasika Sawant Maam

INDEX

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Practial No 1

AIM: WAP in Java to implement the following Substitution Cipher Techniques.

CODE

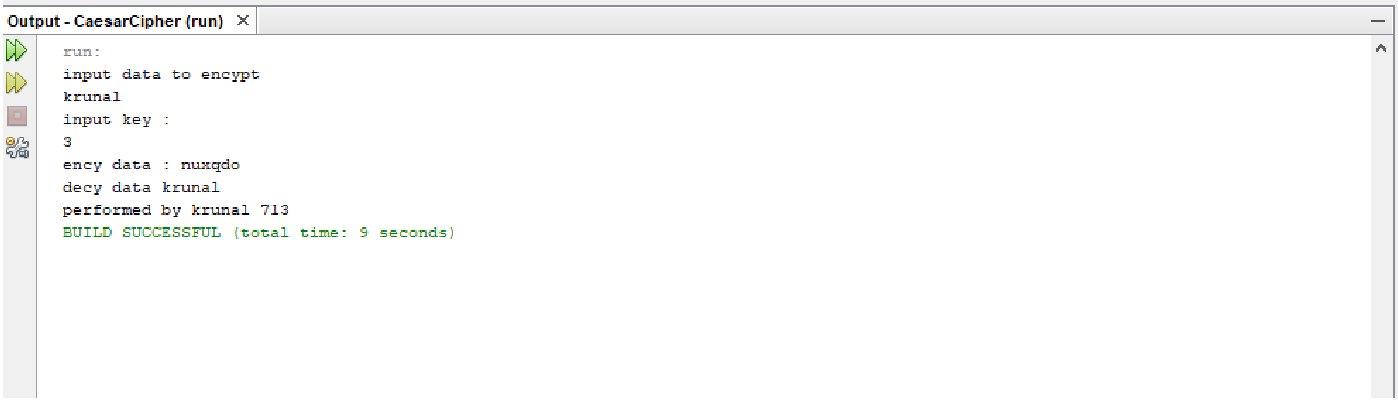
1) Caesar cipher :-

```
package
javaapplicationins;
import java.io.*;
import
java.util.Scanner;
public class
CaesarCipher
{
   public static void main(String[] args)
   {
      CaesarCipher c=new CaesarCipher();
      Scanner s= new Scanner(System.in);
      System.out.println("Performed by krunal
      713"); System.out.println("Input Data to
      encrypt"); String str=s.nextLine();
      System.out.println("Input the key");
      int key=s.nextInt();
      String encrypted=c.encrypt(str,key);
      System.out.println("Encrypted
      Data:"+encrypted); String
      decrypted=c.decrypt(encrypted,key);
      System.out.println("Decrypted
      Data:"+decrypted);
   }
   String encrypt(String str,int key)
   {
      String encrypted="";
      for(int i=0;i<str.length();i++)
      {
         int c=str.charAt(i);
         if(Character.isUpperCase(
         c))
         {
           c=c+ke
                y;
          if(c>'Z')
```

```
                {
          c=c-26;
           }
        }
        if(Character.isLowerCase(c))
        {

           c=c+
           key;
           if(c>'
           z'){
           c=c-
           26;
           }
        }
        encrypted +=(char) c;
      }
      return encrypted;
    }
    String decrypt(String str,int key)
    {
      String decrypted="";
      for(int i=0;i<str.length();i++)
      {
        int c=str.charAt(i);
        if(Character.isUpperCase(
        c))
        {
        c=c-key;
              if(c
           <'A'){
          c=c+26;
           }
        }
        if(Character.isLowerCase(c))
        {
          c=c-
          key;
          if(c
          <'a'){
            c = c + 26;
           }
        }
        decrypted += (char) c;
      }
```

```
        return decrypted;
    }
}
```

Output:



```
run:
input data to encypt
krunal
input key :
3
ency data : nuxqdo
decy data krunal
performed by krunal 713
BUILD SUCCESSFUL (total time: 9 seconds)
```

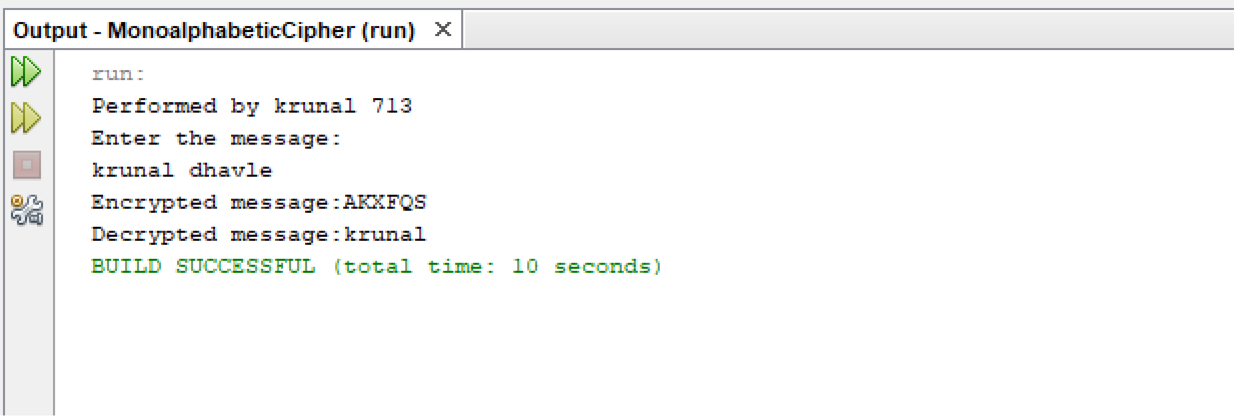
B)Monoalphabetic Cipher

Program code:

```
package

javaapplicationins;

import java.io.*;

import java.util.Scanner;

            public class
     MonoalphabeticCipher {

  public static char p[]={'a','b','c','d','e','f','g','h','i','j','k','l','m','n','o',

                         'p','q','r','s','t','u','v','w','x','y','z'};

  public static char ch[]={'Q','W','E','R','T','Y','U','I','O','P','A','S','D','F','G',

                          'H','J','K','L','Z','X','C','V','B','N','M'};

  public static String doEncryption(String s)

  {

    char c[]=new

    char[(s.length())]; for (int

    i=0;i<s.length();i++)

    {

      for(int j=0;j<26;j++)

      {

       if(p[j]==s.charAt(i))

        {

          c[i]=ch

          [j];

          break;

          }
```

```
            }
        }
        return(new String(c));
}
      public static String doDecryption(String s)
     {
        char pt[]=new
        char[(s.length())]; for (int
        i=0;i<s.length();i++)
        {
           for(int j=0;j<26;j++)
           {
              if(ch[j]==s.charAt(i))
              {
                 pt[i]=p[
                 j];
                 break;
                 }
           }
        }
        return(new String(pt));
     }
      public static void main(String args[])
      {
         Scanner sc=new Scanner(System.in);
         System.out.println("Performed by krunal
         713"); System.out.println("Enter the
         message:");
           String en=doEncryption(sc.next().toLowerCase());


           System.out.println("Encrypted message:"+en);
            System.out.println("Decrypted
            message:"+doDecryption(en));
         sc.close();
      }
  }
```

Output:



```
run:
Performed by krunal 713
Enter the message:
krunal dhavle
Encrypted message:AKXFQS
Decrypted message:krunal
BUILD SUCCESSFUL (total time: 10 seconds)
```

Date: 02/09/2020

Practical no 2

AIM: Write program to implement the following Substitution Cipher Techniques

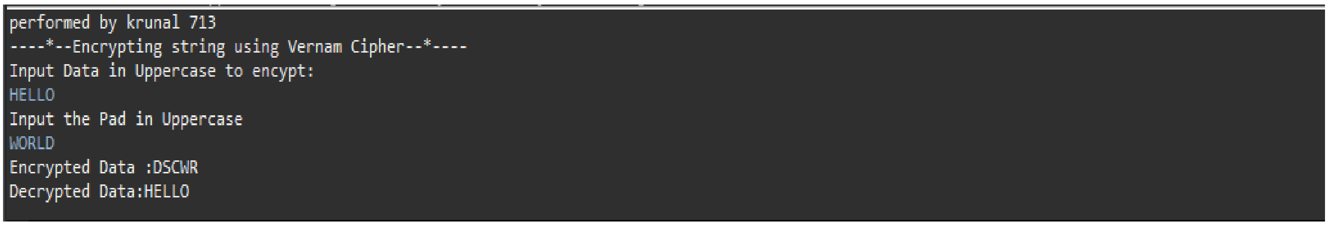
a)Vernam Cipher b)Playfair Cipher

Code:

a)Vernam Cipher

```
import java.util.Scanner;
public class Vernam {
 String encrypt(String str, String pad) {
        String encrypted = "";
        for (int i = 0; i < str.length(); i++) {
            int c = str.charAt(i);
            int p = pad.charAt(i);
            c = (c + p);
            if (c > 'Z') {
                c = c%26;
                c = c+65;
            }
            encrypted += (char) c;
        }
        return encrypted;
    }
    String decrypt(String str, String pad) {
        String decrypted = "";
        for (int i = 0; i < str.length(); i++) {
            int c = str.charAt(i);
            int p = pad.charAt(i);
            c = (c - p)+26;
            if (c < 'A') {
                c = (c%26);
                c = c+65;
            }
            decrypted += (char) c;
        }
        return decrypted;
    }
    public static void main(String[] args) {
            System.out.println("performed by krunal 713");
        System.out.println("----*--Encrypting string using Vernam Cipher--*----");
        Vernam v = new Vernam();
        Scanner s = new Scanner(System.in);
        System.out.println("Input Data in Uppercase to encypt:");
        String str = s.nextLine();
        System.out.println("Input the Pad in Uppercase");
        String pad = s.nextLine();
        String encrypted = v.encrypt(str, pad);
        System.out.println("Encrypted Data :" + encrypted);
        String decrypted = v.decrypt(encrypted, pad);
        System.out.println("Decrypted Data:" + decrypted);
    }
}
```

Output:



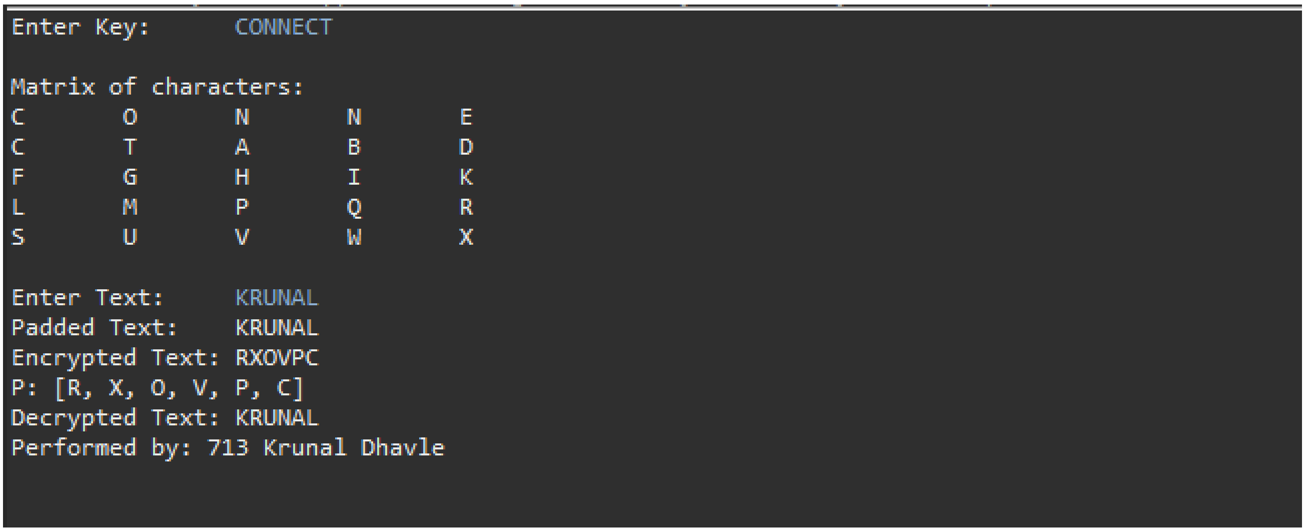
```
performed by krunal 713
----*--Encrypting string using Vernam Cipher--*----
Input Data in Uppercase to encypt:
HELLO
Input the Pad in Uppercase
WORLD
Encrypted Data :DSCWR
Decrypted Data:HELLO
```

b)Playfair Cipher

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

public class PlayFair {

    public static char keymat[][] = new char[5][5];
    public static String trans = "J";
    public static char subs = 'X';

    private static int decrem(int pos) {
        if (pos < 0) {
            return pos + 5;
        } else {
            return pos;
        }
    }

    private static int[] srch(char c) {
        int i, j;
        int[] pos = new int[2];
        for (i = 0; i < 5; i++) {
            for (j = 0; j < 5; j++) {
                if (keymat[i][j] == c) {
                    pos[0] = i;
                    pos[1] = j;
                    break;
                }
            }
        }
        return pos;
    }

    private static String encrypt(char c1, char c2) {
        int[] pos1 = new int[2];
        int[] pos2 = new int[2];
        String frag = "";
        pos1 = srch(c1);
        pos2 = srch(c2);
        if (pos1[0] == pos2[0]) { //condition for same row
            c1 = keymat[pos1[0]][(pos1[1] + 1) % 5];
            c2 = keymat[pos2[0]][(pos2[1] + 1) % 5];
            frag = ("" + c1 + c2 + "");
        } else if (pos1[1] == pos2[1]) { //condition for same column
            c1 = keymat[(pos1[0] + 1) % 5][pos1[1]];
            c2 = keymat[(pos2[0] + 1) % 5][pos2[1]];
            frag = ("" + c1 + c2 + "");
        } else { //condition for different row & column
            c1 = keymat[pos2[0]][pos1[1]];
            c2 = keymat[pos1[0]][pos2[1]];
            frag = ("" + c1 + c2 + "");
        }
        return frag;
    }

    private static String decrypt(char c1, char c2) {
        int[] pos1 = new int[2];
        int[] pos2 = new int[2];
        String frag = "";
        pos1 = srch(c1);
        pos2 = srch(c2);
        if (pos1[0] == pos2[0]) { //condition for same row
            c1 = keymat[pos1[0]][decrem(pos1[1] - 1) % 5];
            c2 = keymat[pos2[0]][decrem(pos2[1] - 1) % 5];
            frag = ("" + c1 + c2 + "");
        } else if (pos1[1] == pos2[1]) { //condition for same column
            c1 = keymat[decrem(pos1[0] - 1) % 5][pos1[1]];
            c2 = keymat[decrem(pos2[0] - 1) % 5][pos2[1]];
            frag = ("" + c1 + c2 + "");
        } else { //condition for different row & column
```

```
            c1 = keymat[pos2[0]][pos1[1]];
            c2 = keymat[pos1[0]][pos2[1]];
            frag = ("" + c1 + c2 + "");
        }
        return frag;
    }

    public static void main(String[] args) throws IOException {
        BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
        String key;
        int p = 0, k = 0, c = 65;
        System.out.print("Enter Key:\t");
        key = br.readLine();
        for (int i = 0; i < 5; i++) {
            for (int j = 0; j < 5; j++) {
                if (p < key.length()) {
                    keymat[i][j] = key.charAt(p);
                    p++;
                } else {
                    if ((char) c == 'J') {
                        c++;
                    }
                    for (; k < key.length();) {
                        if ((char) c == key.charAt(k)) {
                            k = 0;
                            c++;
                        }
                        k++;
                    }
                    keymat[i][j] = (char) c;
                    c++;
                    k = 0;
                }
            }
        }
        System.out.println("\nMatrix of characters:");
        for (int i = 0; i < 5; i++) {
            for (int j = 0; j < 5; j++) {
                System.out.print(keymat[i][j] + "\t");
            }
            System.out.println();
        }
        String etext = "", dtext = "";
        System.out.print("\nEnter Text: \t");
        String text = br.readLine();
        text = text.toUpperCase();
        text = text.replaceAll("\\s", ""); //removes whitespaces
        text = text.replace(trans, "I"); //replaces J with I
        text = text.replaceAll("([A-Z])\\1+", "$1" + subs + "$1");
        if (text.length() % 2 != 0) {
            text += subs;
        }
        char[] PTC = text.toCharArray();
        System.out.println("Padded Text:\t" + text);
        for (int i = 0; i < text.length(); i += 2) {
            etext += encrypt(PTC[i], PTC[i + 1]);
        }
        System.out.println("Encrypted Text:\t" + etext);
        char[] OTC = etext.toCharArray();
        System.out.println("P: " + Arrays.toString(OTC));
        for (int i = 0; i < etext.length(); i += 2) {
            dtext += decrypt(OTC[i], OTC[i + 1]);
        }
        System.out.println("Decrypted Text:\t" + dtext);
        System.out.println("Performed by: 713 Krunal Dhavle");
    }}
```

Output



```
Enter Key:      CONNECT

Matrix of characters:
C       O       N       N       E
C       T       A       B       D
F       G       H       I       K
L       M       P       Q       R
S       U       V       W       X

Enter Text:     KRUNAL
Padded Text:    KRUNAL
Encrypted Text: RXOVPC
P: [R, X, O, V, P, C]
Decrypted Text: KRUNAL
Performed by: 713 Krunal Dhavle
```

Date: 28/08/2020

Practical no 3

AIM: Write program to implement the following Transposition Cipher Techniques

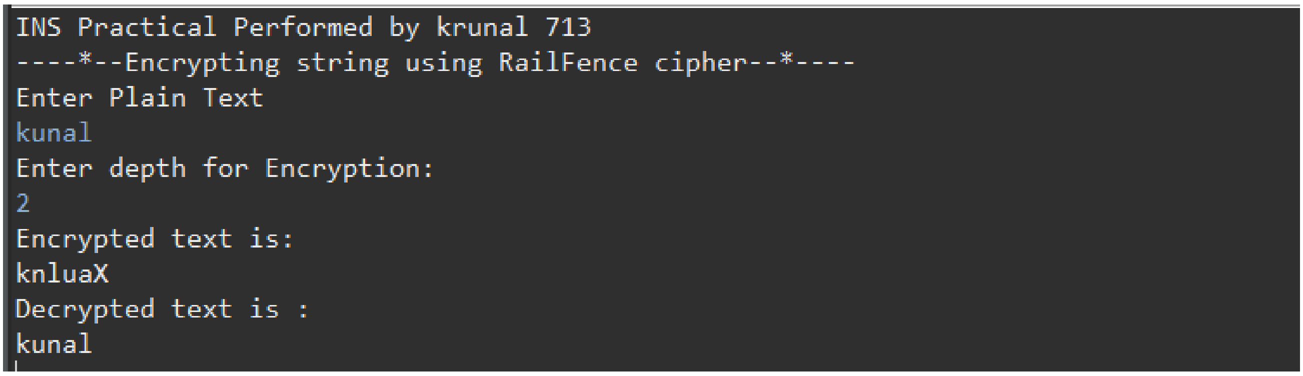
a)Rail Fence Cipher b)Simple Columnar Technique

Code:

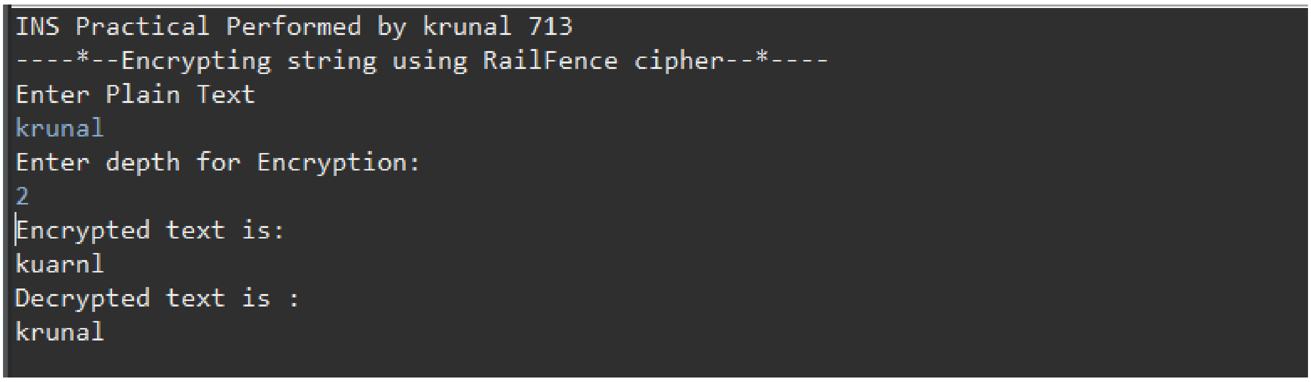
a)Rail Fence Cipher

```
import java.util.Scanner;
import java.util.logging.Level;
import java.util.logging.Logger;
public class Rails {
  String Encrypytion(String plainText,int depth) throws Exception{
        int r=depth, len = plainText.length();
        int c= len/depth;
        char mat[][] = new char[r][c];
        int k=0;

        String cipherText="";

        for(int i=0 ; i < c ; i++) {
            for (int j=0; j<r; j++) {
                if(k!=len) {
                    mat[j][i] = plainText.charAt(k++);
            }
        }
        }
        for(int i=0 ;i<r ;i++) {
            for (int j=0; j<c; j++){
                cipherText += mat[i][j];

                }
            }
        return cipherText ;
        }
    String Decryption(String cipherText,int depth)throws Exception{
        int r=depth,len=cipherText.length();
        int c=len/depth;
        char mat[][]=new char[r][c];
        int k=0;
        String plainText="";
        for(int i=0;i<r;i++) {
            for(int j=0;j<c;j++){
                mat[i][j] =cipherText.charAt(k++);
            }
        }
        for (int i=0; i<c ;i++){
            for(int j=0;j<r;j++){
                plainText += mat[j][i];

            }
        }
        return plainText ;
    }
    public static void main(String[] args) {
     try {
        System.out.println("INS Practical Performed by krunal 713");
        System.out.println("----*--Encrypting string using RailFence cipher--*----");
        Rails rf = new Rails();
        Scanner scn = new Scanner(System.in);
        int depth;
        String plainText,cipherText,decryptedText;
        System.out.println("Enter Plain Text");
        plainText=scn.nextLine();
        System.out.println("Enter depth for Encryption:");
        depth=scn.nextInt();
        while(plainText.length()%depth!=0){
            plainText+='X';
        }
        cipherText=rf.Encrypytion(plainText, depth);
        System.out.println("Encrypted text is:\n" + cipherText);
        decryptedText=rf.Decryption(cipherText, depth);
        decryptedText=decryptedText.replace("X","");
        System.out.println("Decrypted text is :\n"+decryptedText);
     }catch (Exception ex){
        Logger.getLogger(Rails.class.getName()).log(Level.SEVERE,null,ex);
     }
    }
    }
```

Output:



```
INS Practical Performed by krunal 713
----*--Encrypting string using RailFence cipher--*----
Enter Plain Text
kunal
Enter depth for Encryption:
2
Encrypted text is:
knluaX
Decrypted text is :
kunal
```

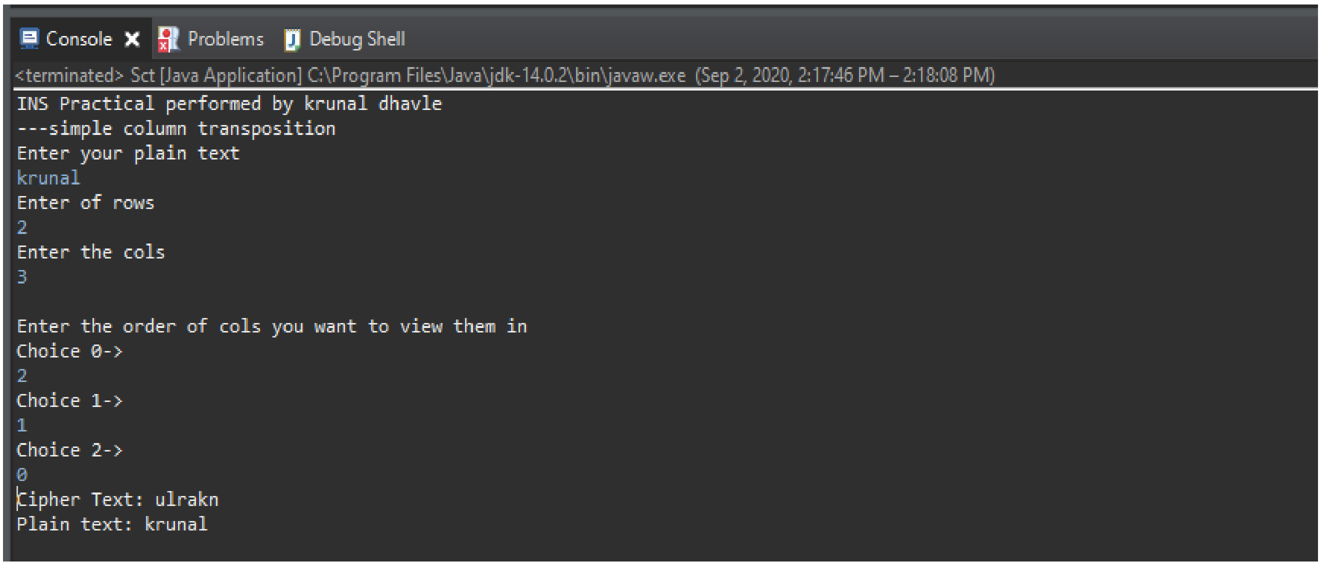


```
INS Practical Performed by krunal 713
----*--Encrypting string using RailFence cipher--*----
Enter Plain Text
krunal
Enter depth for Encryption:
2
Encrypted text is:
kuarnl
Decrypted text is :
krunal
```

b) Simple Columnar Technique

```
package prac3b;
import java.io.BufferedReader;
import java.io.*;
import java.io.InputStreamReader;
import java.util.logging.Level;
import java.util.logging.Logger;

public class Sct {
public static void main(String[] args) {

try {
        System.out.println("INS Practical performed by krunal dhavle ");
        System.out.println("---simple column transposition ");
        BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
        System.out.println("Enter your plain text");
        String accept = br.readLine();
        System.out.println("Enter of rows ");
        int r = Integer.parseInt(br.readLine());
        System.out.println("Enter the cols");
        int c = Integer.parseInt(br.readLine());
        int count = 0;
        char table[][] = new char[r][c];
        for (int i = 0; i < r; i++)
        {
                for (int j = 0; j < c; j++)
                {
                        table[i][j] = accept.charAt(count);
                     count++;
                }
        }
System.out.println("\nEnter the order of cols you want to view them in");
int choice[] = new int[c];
for (int k = 0; k < c; k++)
{
        System.out.println("Choice " + k + "-> ");
        choice[k] = Integer.parseInt(br.readLine());
}
String cipher = "", plain = "";
for (int j = 0; j < c; j++)
{
        int k = choice[j];
        for (int i = 0; i < r; i++)
        {
                cipher += table[i][k];
        }
}
cipher = cipher.trim();
System.out.println("Cipher Text: "+cipher);
char mat[][] = new char[r][c];
int t = 0;
for (int j = 0; j < c; j++)
{
        int k = choice[j];
        for (int i = 0; i < r; i++)
        {
                mat[i][k] = cipher.charAt(t++);
        }
}
for (int i = 0; i < r; i++)
{
        for (int j = 0; j < c; j++)
        {
                plain += mat[i][j];
        }
}
plain = plain.trim();
System.out.println("Plain text: "+plain);
}
catch (IOException ex)
{
        Logger.getLogger(Sct.class.getName()).log(Level.SEVERE, null, ex); }}}
```

Output:



```
<terminated> Sct [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe (Sep 2, 2020, 2:17:46 PM – 2:18:08 PM)
INS Practical performed by krunal dhavle
---simple column transposition
Enter your plain text
krunal
Enter of rows
2
Enter the cols
3

Enter the order of cols you want to view them in
Choice 0->
2
Choice 1->
1
Choice 2->
0
Cipher Text: ulrakn
Plain text: krunal
```

Date:11/09/2020

Practical no 4

AIM: Write program to encrypt and decrypt strings using

1) DES Algorithm 2) AES Algorithm

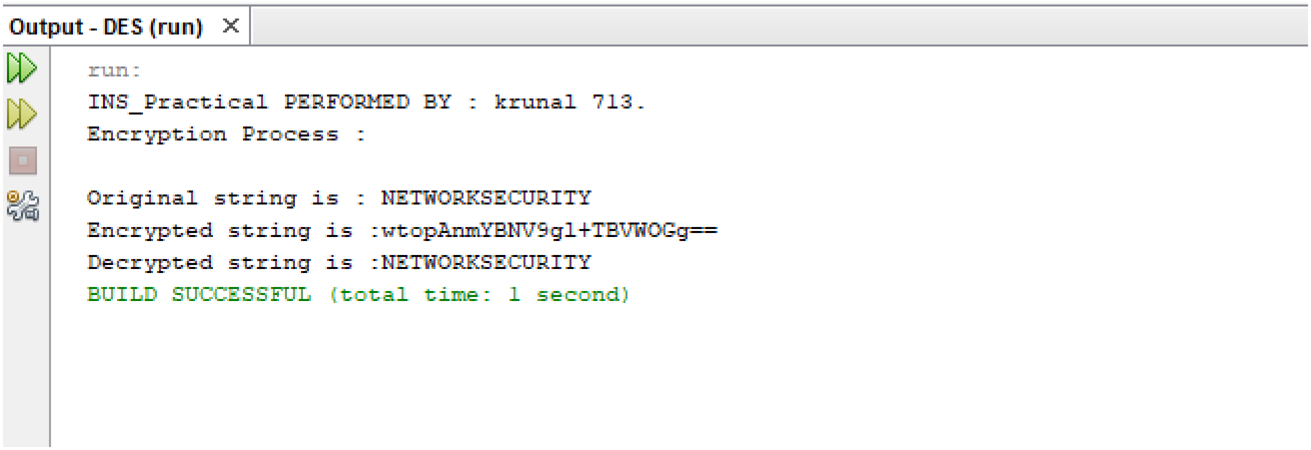
CODE

1) DES Algorithm

```
import java.util.logging.Level;
import java.util.logging.Logger;
import java.util.Base64;
import javax.crypto.Cipher;
import javax.crypto.KeyGenerator;
import javax.crypto.SecretKey;
public class DES {
   public static SecretKey getSecretEncryptionKey() throws Exception{
      KeyGenerator generator=KeyGenerator.getInstance("DES");
      SecretKey secKey=generator.generateKey();
      return secKey;
   }
   public String encrypt(SecretKey key,String Plaintext) throws Exception{
      byte[] utf8=Plaintext.getBytes();
      Cipher ecipher=Cipher.getInstance("DES");
      ecipher.init(Cipher.ENCRYPT_MODE, key);
      byte[] enc=ecipher.doFinal(utf8);
      Base64.Encoder encoder=Base64.getEncoder();
      String et=encoder.encodeToString(enc);
      return et;
   }
   public String decrypt(SecretKey key,String Ciphertext) throws Exception{
      Base64.Decoder decoder = Base64.getDecoder();
      byte[] dec=decoder.decode(Ciphertext);
      Cipher dcipher=Cipher.getInstance("DES");
      dcipher.init(Cipher.DECRYPT_MODE, key);
      byte[] utf8=dcipher.doFinal(dec);
      return new String(utf8,"UTF8");
```

```
    }
    public static void main(String[] args){
      try{
          System.out.println("INS_Practical PERFORMED BY : krunal 713.");
          System.out.println("----'--Encrypting string using DES--'----");
          System.out.println();
          String message ="NETWORKSECURITY";
          DES d=new DES();
          SecretKey key=getSecretEncryptionKey();
          String Encrypted=d.encrypt(key, message);
          String Decrypted=d.decrypt(key, Encrypted);
          System.out.println("Original String is : "+ message);
          System.out.println("Encrypted String is : "+ Encrypted);
          System.out.println("Decrypted String is : "+ Decrypted);
      }catch (Exception ex){
          Logger.getLogger(DES.class.getName()).log(Level.SEVERE,null,ex);
      }
    }
 }
```

Output:

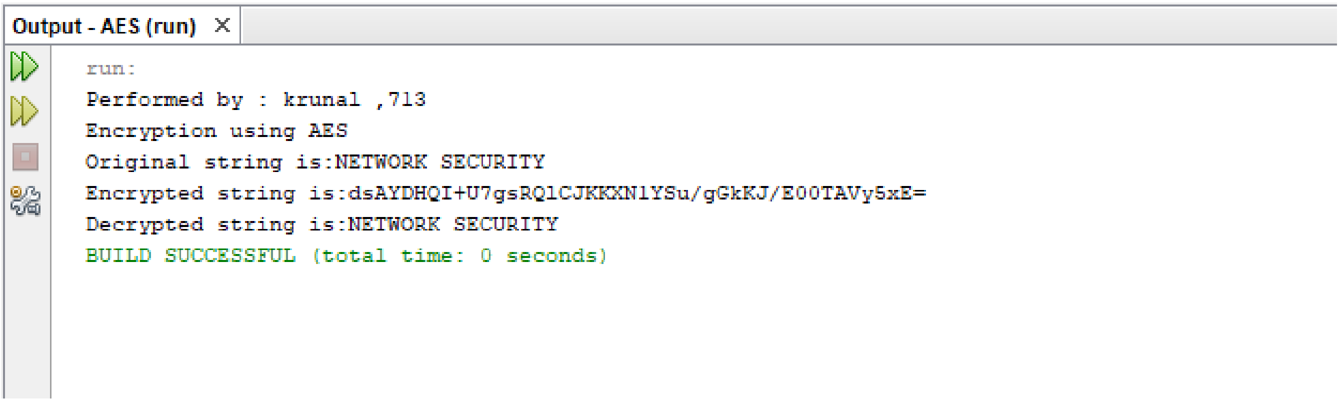


```
run:
INS_Practical PERFORMED BY : krunal 713.
Encryption Process :

Original string is : NETWORKSECURITY
Encrypted string is :wtopAnmYBNV9gl+TBVWOGg==
Decrypted string is :NETWORKSECURITY
BUILD SUCCESSFUL (total time: 1 second)
```

b) AES CODE

```
package aes;
import java.util.logging.Logger;
import  java.util.logging.Level;
import javax.crypto.Cipher;
import javax.crypto.KeyGenerator;
import javax.crypto.SecretKey;

public class AES {
    public static SecretKey getSecretEncryptionKey() throws Exception{
        KeyGenerator generator = KeyGenerator.getInstance("AES");
        generator.init(128);
        SecretKey secKey= generator.generateKey();
        return secKey;
    }

    public String encrypt(SecretKey key,String Plaintext)throws Exception{
        byte[] utf8= Plaintext.getBytes("UTF8");
        Cipher ecipher= Cipher.getInstance("AES");
        ecipher.init(Cipher.ENCRYPT_MODE,key);
        byte[] enc= ecipher.doFinal(utf8);
        return new sun.misc.BASE64Encoder().encode(enc);
    }

    public String decrypt(SecretKey key,String Ciphertext) throws Exception{
        byte[] dec= new sun.misc.BASE64Decoder().decodeBuffer(Ciphertext);
        Cipher dcipher= Cipher.getInstance("AES");
        dcipher.init(Cipher.DECRYPT_MODE,key);
        byte[] utf8= dcipher.doFinal(dec);
        return new String(utf8, "UTF8");
    }

    public static void main (String[]args) throws Exception
    {
        try{
            System.out.println("Performed by : krunal ,713");
            System.out.println("Encryption using AES");
            String message="NETWORK SECURITY";
            AES d= new AES();
            SecretKey key= getSecretEncryptionKey();
            String Encrypted= d.encrypt(key, message);
            String decrypted = d.decrypt(key,Encrypted);
            System.out.println("Original string is:" +message);
            System.out.println("Encrypted string is:" + Encrypted);
            System.out.println("Decrypted string is:" +decrypted);
        }
         catch(Exception ex){
            Logger.getLogger(AES.class.getName()).log(Level.SEVERE,null,ex) ;
        }
    }
}
```

Output:



```
run:
Performed by : krunal ,713
Encryption using AES
Original string is:NETWORK SECURITY
Encrypted string is:dsAYDHQI+U7gsRQ1CJKKXN1YSu/gGkKJ/E00TAVy5xE=
Decrypted string is:NETWORK SECURITY
BUILD SUCCESSFUL (total time: 0 seconds)
```

Date:29/09/2020

Practical no 5

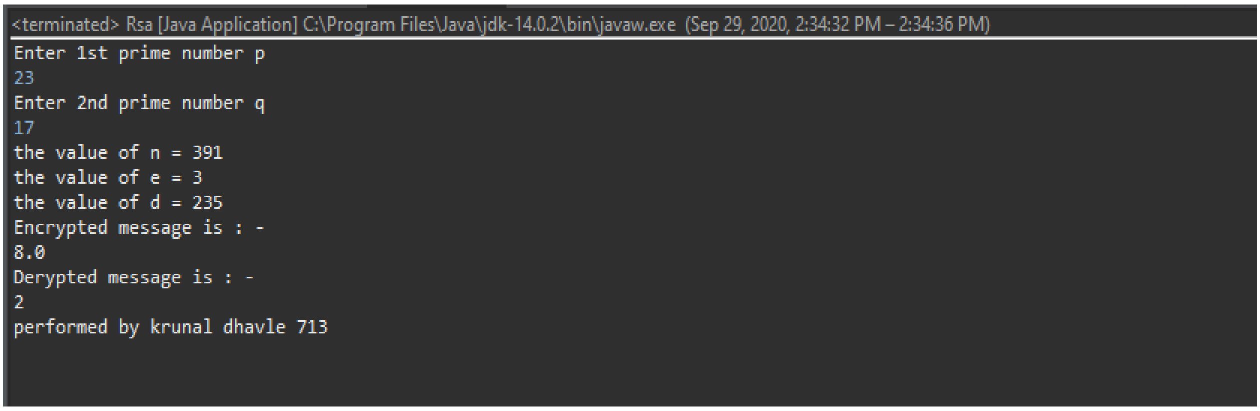
AIM: Write a program to implement RSA algorithm to perform encryption / decryption of a given string.

CODE

```
package prac5;
import java.util.*;
import java.math.*;
 public class Rsa {

	public static void main(String[] args) {
		// TODO Auto-generated method stub
		Scanner sc=new Scanner(System.in);
		 int p,q,n,z,d=0,e,i;
		 double c;
		 BigInteger msgback;
		 System.out.println("Enter 1st prime number p");
		 p=sc.nextInt();
		 System.out.println("Enter 2nd prime number q");
		 q=sc.nextInt();
		 sc.close();
		 n=p*q;
		 z=(p-1)*(q-1);
		 System.out.println("the value of n = "+n);
		 for(e=2;e<z;e++)
		 {
			 if(gcd(e,z)==1)		// e is for public key exponent
			 {
				 break;
			 }

		 }
		 System.out.println("the value of e = "+e);
		 for(i=0;i<=9;i++)
		 {
```

```
                        int x=1+(i*z);
                        if(x%e==0)     //d is for private key exponent
                        {
                            d=x/e;
                                break;
                        }
                }

                System.out.println("the value of d = "+d);
                c=(Math.pow(2,e))%n;

                System.out.println("Encrypted message is : -");
                System.out.println(c);

                BigInteger N = BigInteger.valueOf(n);

                BigInteger C = BigDecimal.valueOf(c).toBigInteger();
                msgback = (C.pow(d)).mod(N);

                System.out.println("Derypted message is : -");
                System.out.println(msgback);
                System.out.println("performed by krunal dhavle 713");
        }
        static int gcd(int e, int z)
         {
         if(e==0)
         return z;
         else
         return gcd(z%e,e);
         }
}
```

Output:



```
<terminated> Rsa [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe (Sep 29, 2020, 2:34:32 PM – 2:34:36 PM)
Enter 1st prime number p
23
Enter 2nd prime number q
17
the value of n = 391
the value of e = 3
the value of d = 235
Encrypted message is : -
8.0
Derypted message is : -
2
performed by krunal dhavle 713
```

Date:06/10/2020

Practical no 6

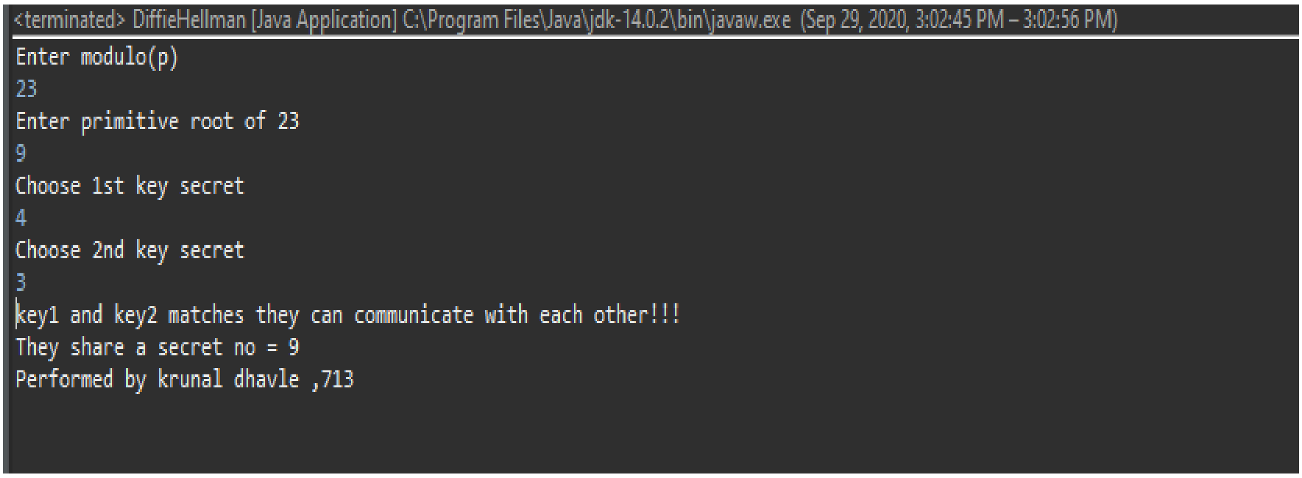
AIM: Write a program to implement the Diffie-Hellman Key Agreement algorithm to generate symmetric keys.

CODE:-

Method 1:-

```
package prac6;
import java.util.*;
public class DiffieHellman {

                                    public static void main(String[] args) {
                                     // TODO Auto-generated method stub
                                      Scanner sc=new Scanner(System.in);
                                      System.out.println("Enter modulo(p)");
                                      int p=sc.nextInt();
                                      System.out.println("Enter primitive root of "+p);
                                      int g=sc.nextInt();
                                      System.out.println("Choose 1st key secret");
                                      int a=sc.nextInt();
                                      System.out.println("Choose 2nd key secret");
                                      int b=sc.nextInt();
                                      sc.close();
                                      int A = (int)Math.pow(g,a)%p;
                                      int B = (int)Math.pow(g,b)%p;

                                      int S_A = (int)Math.pow(B,a)%p;
                                      int S_B =(int)Math.pow(A,b)%p;

                                      if(S_A==S_B)
                                      {
                                      System.out.println("key1 and key2 matches they can    communicate
with each other!!!");
                                      System.out.println("They share a secret no = "+S_A);
                                      System.out.println("Performed by krunal dhavle ,713");
                                      }

                                      else
                                      {
                                      System.out.println("key1 and key2 matches they cannot communicate
with each other!!!");
                                      System.out.println("Performed by krunal dhavle ,713");
                                      }
}}
```

Output:



```
<terminated> DiffieHellman [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe (Sep 29, 2020, 3:02:45 PM – 3:02:56 PM)
Enter modulo(p)
23
Enter primitive root of 23
9
Choose 1st key secret
4
Choose 2nd key secret
3
key1 and key2 matches they can communicate with each other!!!
They share a secret no = 9
Performed by krunal dhavle ,713
```

Method 2 :-

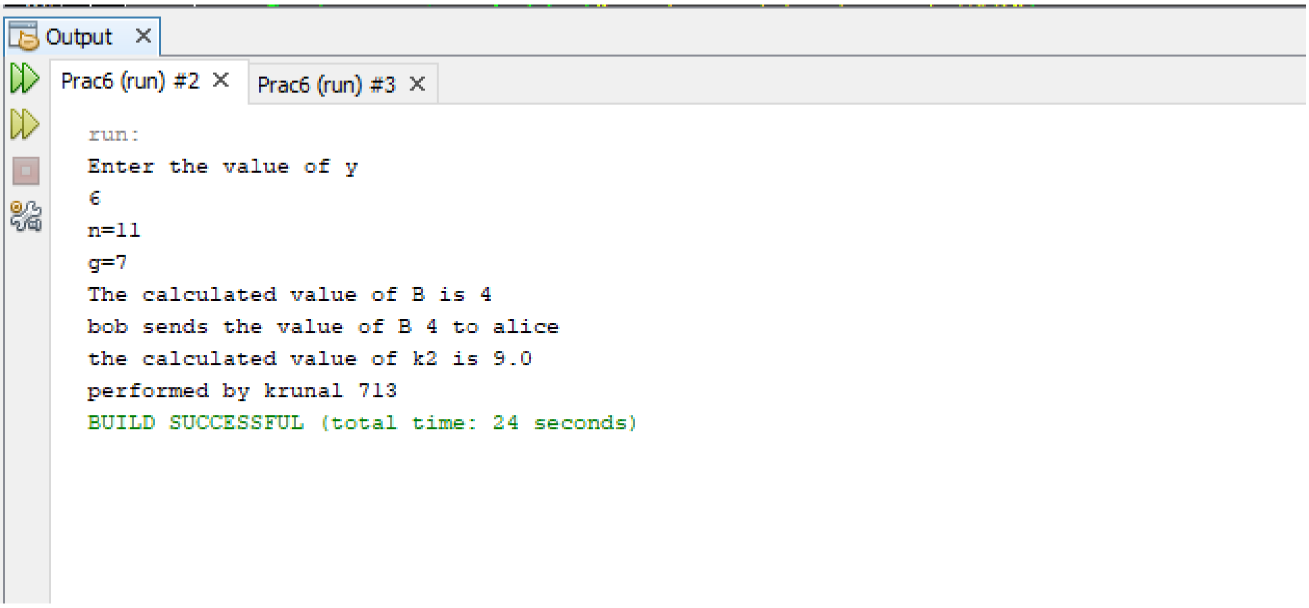
Bob.java

```
package prac6;
import java.io.*;
import java.net.ServerSocket;
import java.net.Socket;
import java.util.Scanner;
public class Bob {

    public static void main(String[] args) throws IOException {
        ServerSocket ss  = new ServerSocket(5000);
        Socket s = ss.accept();
        DataInputStream in = new DataInputStream(s.getInputStream());
        int n = in.readInt();
        int g = in.readInt();
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the value of y");
        int y = sc.nextInt();
        System.out.println("n=" +n);
        System.out.println("g=" +g);
        int d =(int)Math.pow(g, y);
        int B =d%n;
        System.out.println("The calculated value of B is " +B);
        System.out.println("bob sends the value of B " +B+ " to alice");
        int A = in.readInt();
        int b = (int)Math.pow(A,y);
        double K2 = b%n;
        System.out.println("the calculated value of k2 is " +K2);
        DataOutputStream out = new DataOutputStream(s.getOutputStream());
        out.writeInt(B);
        System.out.println("performed by krunal 713");
    }
}
```

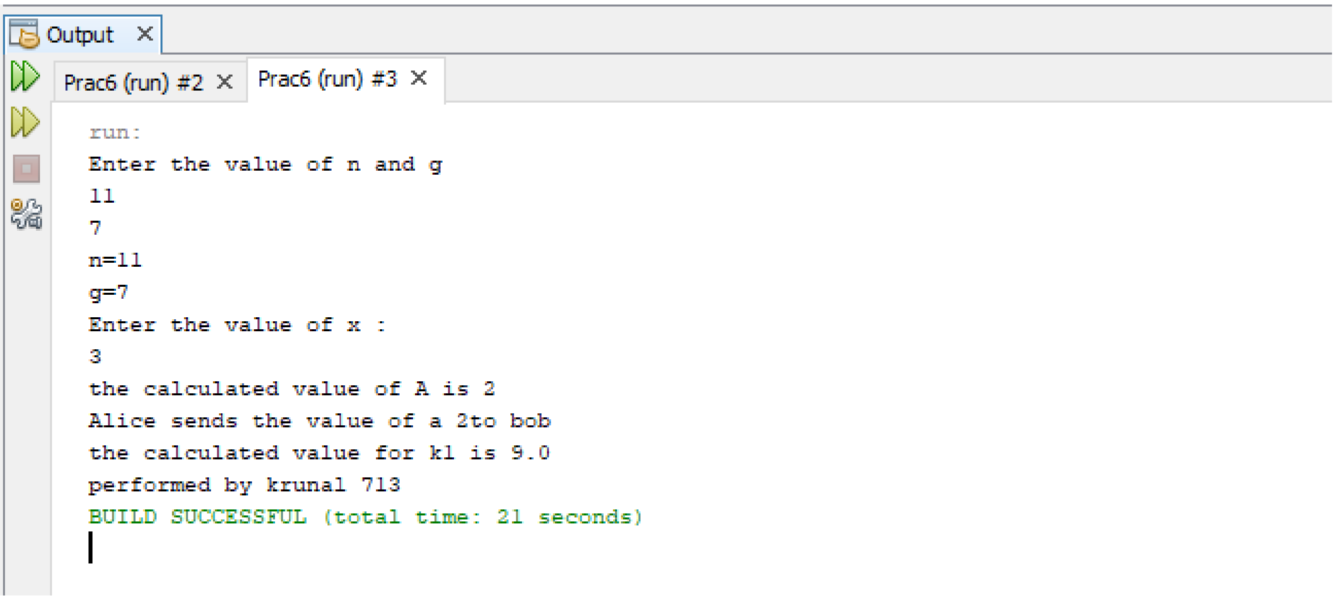
Alice.java

```
package prac6;
import java.io.*;
import java.net.Socket;
import java.util.Scanner;
public class Alice {
    public static void main(String[] args) throws IOException {
        Socket cs = new Socket("localhost" ,5000);
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the value of n and g ");
        int n = sc.nextInt();
        int g = sc.nextInt();
        System.out.println("n=" +n);
        System.out.println("g=" +g);
        DataOutputStream out = new DataOutputStream(cs.getOutputStream());
        out.writeInt(n);
        out.writeInt(g);
        System.out.println("Enter the value of x : ");
        int x = sc.nextInt();
        int c =(int)Math.pow(g,x);
        int A = c%n;
        System.out.println("the calculated value of A is " +A);
        out.writeInt(A);
        System.out.println("Alice sends the value of a " +A + "to bob");
        DataInputStream in = new DataInputStream(cs.getInputStream());
        int B = in.readInt();
        int a = (int)Math.pow(B, x);
        double K1 = a % n;
        System.out.println("the calculated value for k1 is " +K1);
        System.out.println("performed by krunal 713");
    }
}
```

Output:



```
run:
Enter the value of y
6
n=11
g=7
The calculated value of B is 4
bob sends the value of B 4 to alice
the calculated value of k2 is 9.0
performed by krunal 713
BUILD SUCCESSFUL (total time: 24 seconds)
```



```
run:
Enter the value of n and g
11
7
n=11
g=7
Enter the value of x :
3
the calculated value of A is 2
Alice sends the value of a 2to bob
the calculated value for k1 is 9.0
performed by krunal 713
BUILD SUCCESSFUL (total time: 21 seconds)
```

Date:23/10/2020

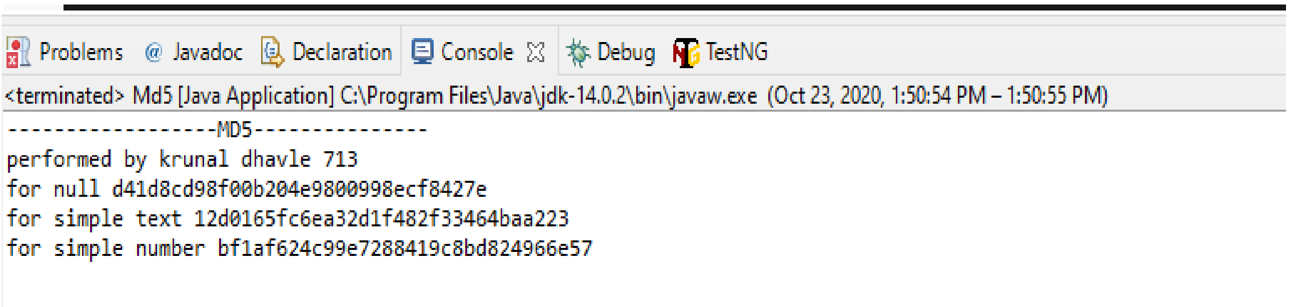
Practical no 7

AIM: Write a program to implement the MD5 algorithm compute the message digest.

Code:-

```
import java.math.BigInteger;
import java.security.MessageDigest;
import java.security.NoSuchAlgorithmException;

public class Md5 {
        public static String md5(String input) throws NoSuchAlgorithmException {
                String md5 = null;
                if(null == input)
                {
                        return null;
                }
         MessageDigest md = MessageDigest.getInstance("MD5");
         md.update(input.getBytes());
         md5 =new BigInteger(1 , md.digest()).toString(16);
         return md5;
        }
        public static void main(String[] args) throws NoSuchAlgorithmException {
                System.out.println("-----------------MD5---------------");
                System.out.println("performed by krunal dhavle 713");
                System.out.println("for null " +md5(""));
                System.out.println("for simple text " +md5(" krunal dhavle 713 "));
                System.out.println("for simple number " +md5("291999"));
        }
}
```

Output



```
<terminated> Md5 [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe (Oct 23, 2020, 1:50:54 PM – 1:50:55 PM)
------------------MD5---------------
performed by krunal dhavle 713
for null d41d8cd98f00b204e9800998ecf8427e
for simple text 12d0165fc6ea32d1f482f33464baa223
for simple number bf1af624c99e7288419c8bd824966e57
```

Date:16/10/2020

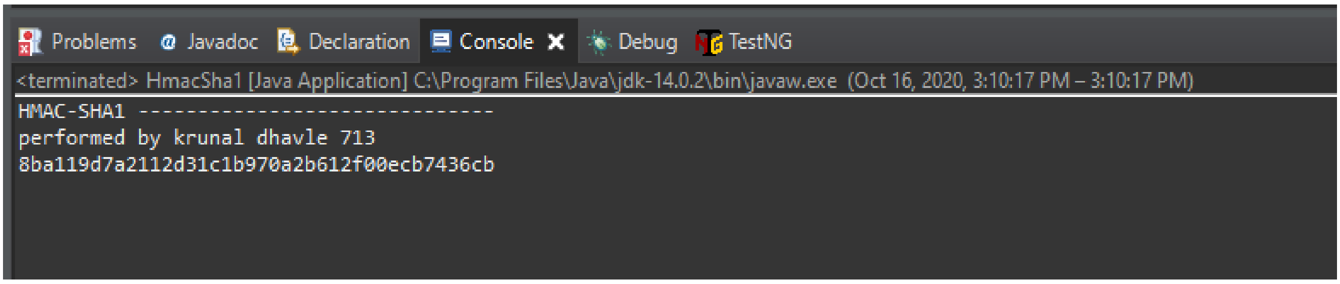
Practical no 8

AIM: Write a program to calculate HMAC-SHA1 Signature

Code:-

```
package prac8;
import java.util.Formatter;
import javax.crypto.*;
import javax.crypto.spec.SecretKeySpec;

public class HmacSha1 {
        private static String toHexString(byte[] bytes){
                Formatter formatter = new Formatter();
                for(byte b : bytes)
                {
                        formatter.format("%02x" , b);
                }
                return formatter.toString();
                }

        public static String calculateHMAC(String data , String key) throws Exception
        {
                SecretKeySpec signingKey = new SecretKeySpec(key.getBytes() , "HmacSHA1");
                Mac mac = Mac.getInstance("HmacSHA1");
                mac.init(signingKey);
                return toHexString(mac.doFinal(data.getBytes()));
        }

        public static void main(String[] args) throws Exception
        {
                String hmac = calculateHMAC("krunal", "dhavle");
                System.out.println("HMAC-SHA1 ------------------------------");
                System.out.println("performed by krunal dhavle 713");
                System.out.println(hmac);
        }
}
```

Output:-



```
<terminated> HmacSha1 [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe (Oct 16, 2020, 3:10:17 PM – 3:10:17 PM)
HMAC-SHA1 -----------------------------
performed by krunal dhavle 713
8ba119d7a2112d31c1b970a2b612f00ecb7436cb
```

Date:07/11/2020

Practical no 9

AIM: Configure windows firewall to block
1) A port 2) An Program 3) A Website

Different Types of Profiles available/ When does this rule applies

Domain: Applies when computer is connected to corporate domain

Private: Applies when computer is connected to a private network location, such as a home or workplace.

Public: Applies when computer is connected to public network connection.

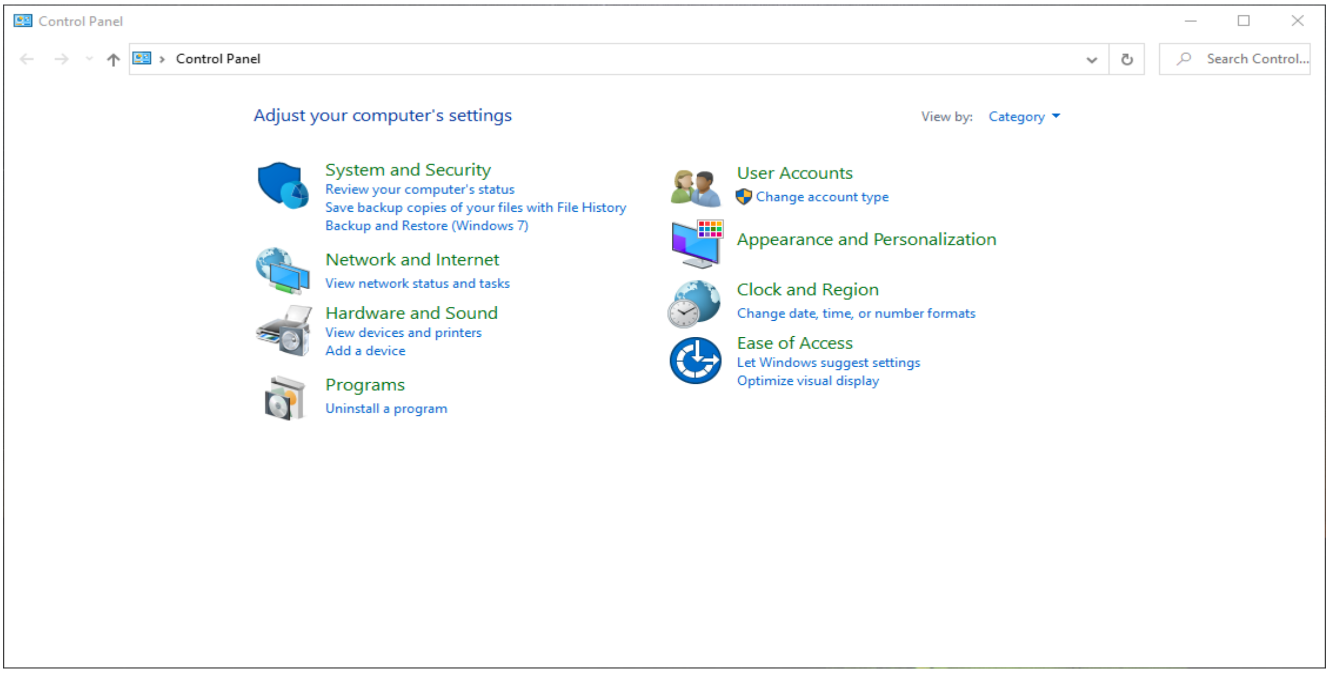
Different types of actions available/What action should be taken when a connection matches the specified the conditions

Allow the connection: This includes connections that are protected with IPsec as well as those are not

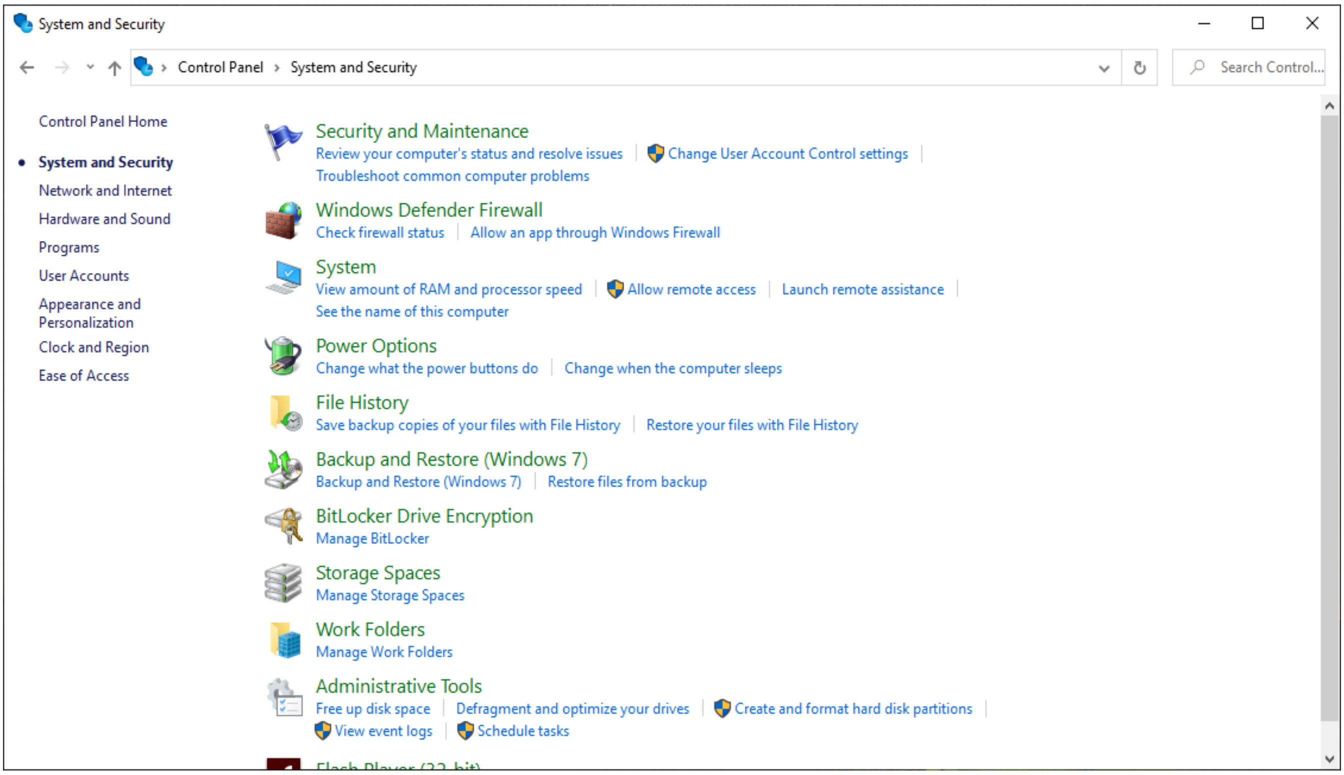
Allow the connection if it is secure: This includes only connections that have been authenticated by using IPsec. Connections will be secured using the settings in IPsec properties and rules in the Connection Security Rule node. Block the connection.

A) Blocking a port:

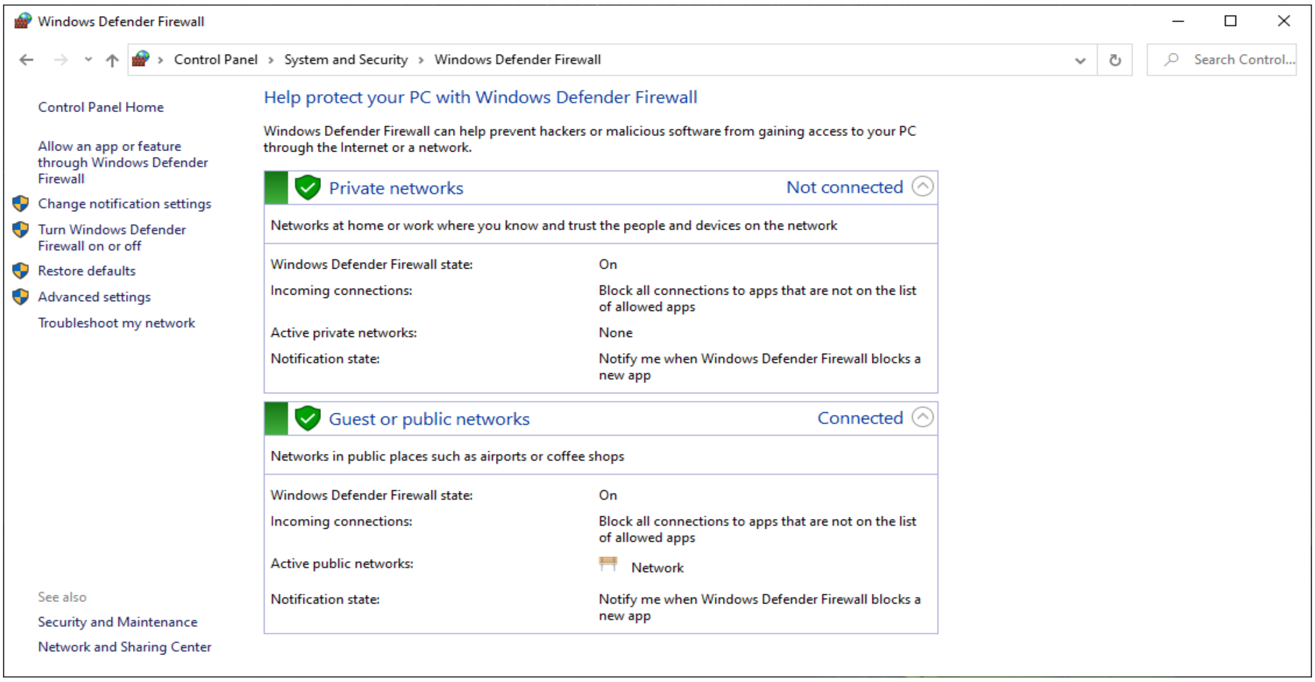
Step 1: Open control panel and go to System Security


Control Panel
Control Panel
Search Control...
Adjust your computer's settings
View by: Category
System and Security
Review your computer's status
Save backup copies of your files with File History
Backup and Restore (Windows 7)
Network and Internet
View network status and tasks
Hardware and Sound
View devices and printers
Add a device
Programs
Uninstall a program
User Accounts
Change account type
Appearance and Personalization
Clock and Region
Change date, time, or number formats
Ease of Access
Let Windows suggest settings
Optimize visual display

Step 2: Now Select Windows Defender Firewall.


System and Security
Control Panel > System and Security
Search Control...
Control Panel Home
System and Security
Network and Internet
Hardware and Sound
Programs
User Accounts
Appearance and Personalization
Clock and Region
Ease of Access
Security and Maintenance
Review your computer's status and resolve issues
Change User Account Control settings
Troubleshoot common computer problems
Windows Defender Firewall
Check firewall status
Allow an app through Windows Firewall
System
View amount of RAM and processor speed
Allow remote access
Launch remote assistance
See the name of this computer
Power Options
Change what the power buttons do
Change when the computer sleeps
File History
Save backup copies of your files with File History
Restore your files with File History
Backup and Restore (Windows 7)
Backup and Restore (Windows 7)
Restore files from backup
BitLocker Drive Encryption
Manage BitLocker
Storage Spaces
Manage Storage Spaces
Work Folders
Manage Work Folders
Administrative Tools
Free up disk space
Defragment and optimize your drives
Create and format hard disk partitions
View event logs
Schedule tasks
Flash Player (32-bit)

Step 3: Now you need to select Advanced setting.



Windows Defender Firewall

Control Panel > System and Security > Windows Defender Firewall

Search Control...

Control Panel Home

Allow an app or feature through Windows Defender Firewall

Change notification settings

Turn Windows Defender Firewall on or off

Restore defaults

Advanced settings

Troubleshoot my network

See also

Security and Maintenance

Network and Sharing Center

Help protect your PC with Windows Defender Firewall

Windows Defender Firewall can help prevent hackers or malicious software from gaining access to your PC through the Internet or a network.

Private networks — Not connected

Networks at home or work where you know and trust the people and devices on the network

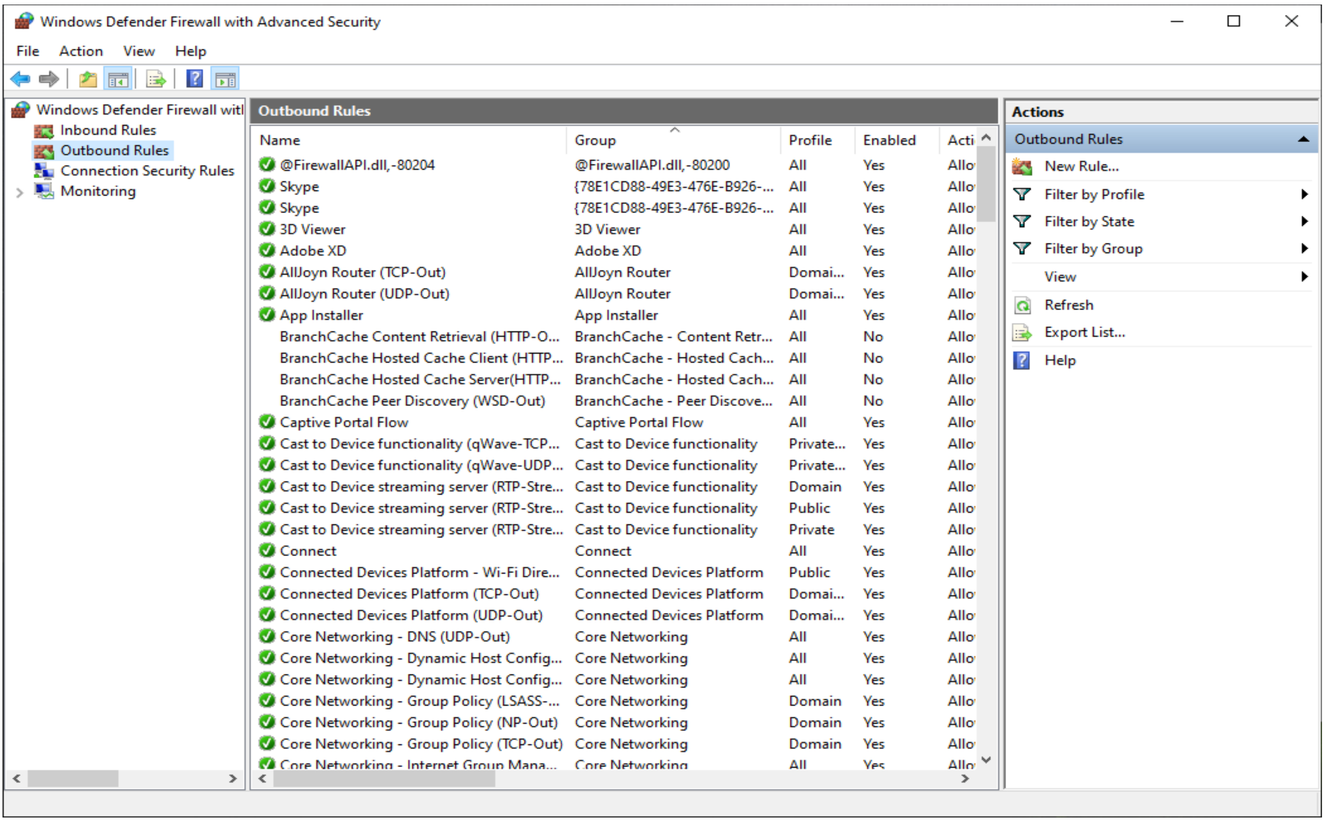
Windows Defender Firewall state:	On
Incoming connections:	Block all connections to apps that are not on the list of allowed apps
Active private networks:	None
Notification state:	Notify me when Windows Defender Firewall blocks a new app

Guest or public networks — Connected

Networks in public places such as airports or coffee shops

Windows Defender Firewall state:	On
Incoming connections:	Block all connections to apps that are not on the list of allowed apps
Active public networks:	Network
Notification state:	Notify me when Windows Defender Firewall blocks a new app

Step 4: Now Select Outbound Rules.

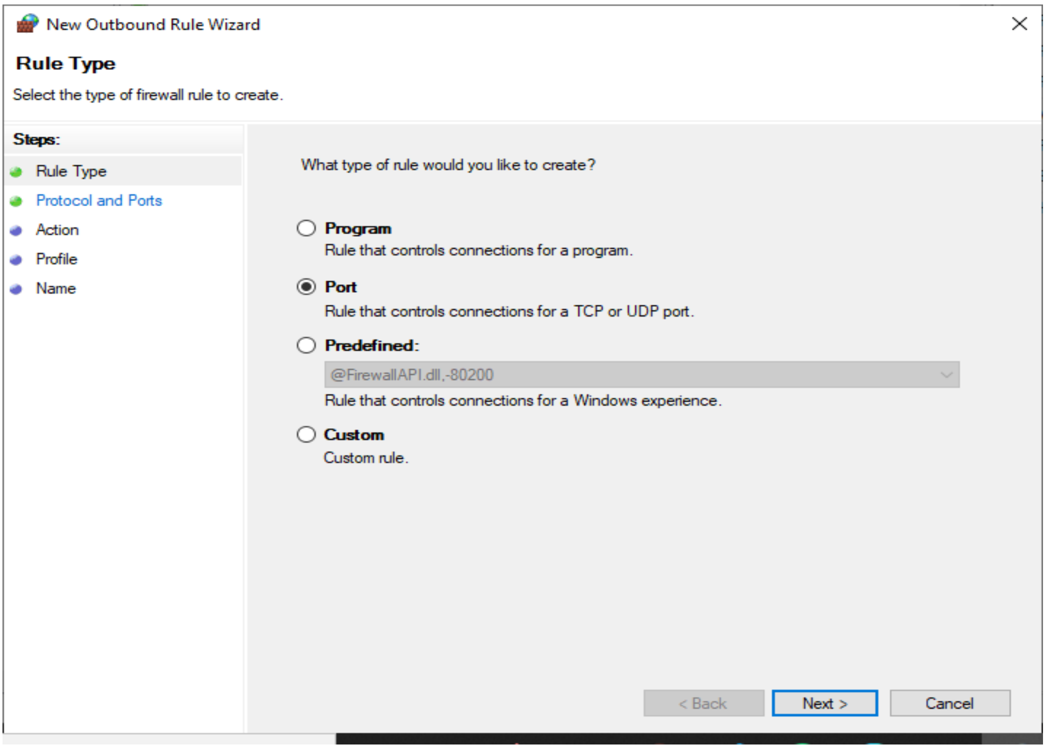


Windows Defender Firewall with Advanced Security

Outbound Rules

Name	Group	Profile	Enabled	Acti
@FirewallAPI.dll,-80204	@FirewallAPI.dll,-80200	All	Yes	Allo
Skype	{78E1CD88-49E3-476E-B926-...	All	Yes	Allo
Skype	{78E1CD88-49E3-476E-B926-...	All	Yes	Allo
3D Viewer	3D Viewer	All	Yes	Allo
Adobe XD	Adobe XD	All	Yes	Allo
AllJoyn Router (TCP-Out)	AllJoyn Router	Domai...	Yes	Allo
AllJoyn Router (UDP-Out)	AllJoyn Router	Domai...	Yes	Allo
App Installer	App Installer	All	Yes	Allo
BranchCache Content Retrieval (HTTP-O...	BranchCache - Content Retr...	All	No	Allo
BranchCache Hosted Cache Client (HTTP...	BranchCache - Hosted Cach...	All	No	Allo
BranchCache Hosted Cache Server(HTTP...	BranchCache - Hosted Cach...	All	No	Allo
BranchCache Peer Discovery (WSD-Out)	BranchCache - Peer Discove...	All	No	Allo
Captive Portal Flow	Captive Portal Flow	All	Yes	Allo
Cast to Device functionality (qWave-TCP...	Cast to Device functionality	Private...	Yes	Allo
Cast to Device functionality (qWave-UDP...	Cast to Device functionality	Private...	Yes	Allo
Cast to Device streaming server (RTP-Stre...	Cast to Device functionality	Domain	Yes	Allo
Cast to Device streaming server (RTP-Stre...	Cast to Device functionality	Public	Yes	Allo
Cast to Device streaming server (RTP-Stre...	Cast to Device functionality	Private	Yes	Allo
Connect	Connect	All	Yes	Allo
Connected Devices Platform - Wi-Fi Dire...	Connected Devices Platform	Public	Yes	Allo
Connected Devices Platform (TCP-Out)	Connected Devices Platform	Domai...	Yes	Allo
Connected Devices Platform (UDP-Out)	Connected Devices Platform	Domai...	Yes	Allo
Core Networking - DNS (UDP-Out)	Core Networking	All	Yes	Allo
Core Networking - Dynamic Host Config...	Core Networking	All	Yes	Allo
Core Networking - Dynamic Host Config...	Core Networking	All	Yes	Allo
Core Networking - Group Policy (LSASS-...	Core Networking	Domain	Yes	Allo
Core Networking - Group Policy (NP-Out)	Core Networking	Domain	Yes	Allo
Core Networking - Group Policy (TCP-Out)	Core Networking	Domain	Yes	Allo
Core Networking - Internet Group Mana...	Core Networking	All	Yes	Allo

Step 5: Inside Outbound rules -> Select New Rules -> select Port and then click on next.



New Outbound Rule Wizard

Rule Type

Select the type of firewall rule to create.

Steps:
- Rule Type
- Protocol and Ports
- Action
- Profile
- Name

What type of rule would you like to create?

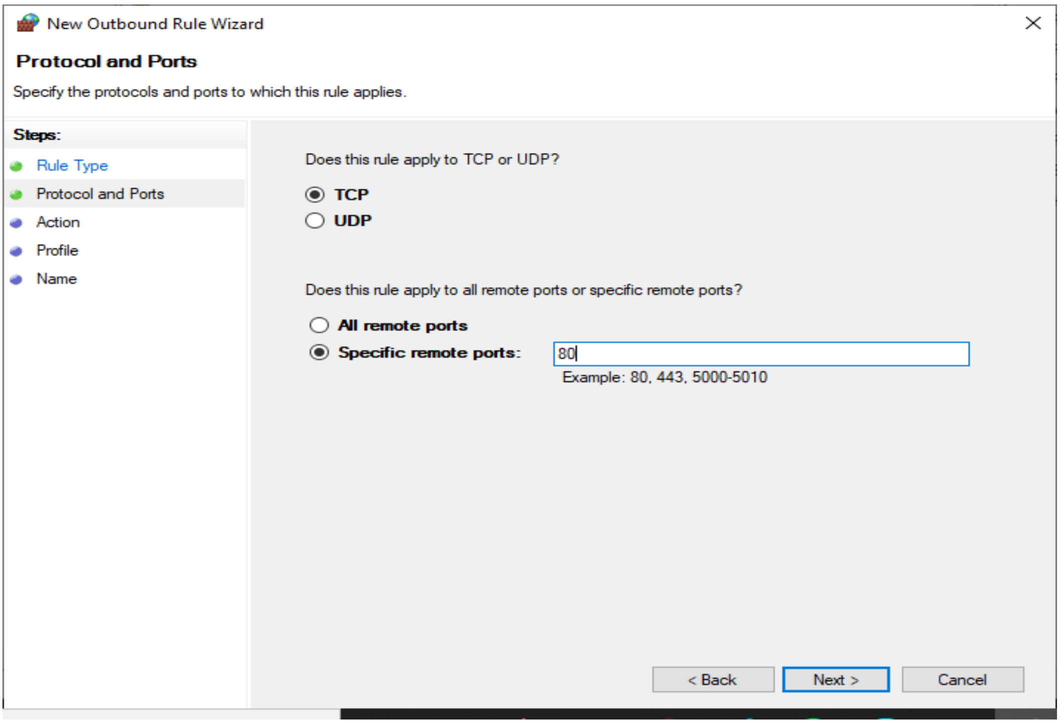
○ Program
Rule that controls connections for a program.

● Port
Rule that controls connections for a TCP or UDP port.

○ Predefined:
@FirewallAPI.dll,-80200
Rule that controls connections for a Windows experience.

○ Custom
Custom rule.

Step 6: Select the protocols and enter the port that you want to want to block



New Outbound Rule Wizard

Protocol and Ports

Specify the protocols and ports to which this rule applies.

Steps:
- Rule Type
- Protocol and Ports
- Action
- Profile
- Name

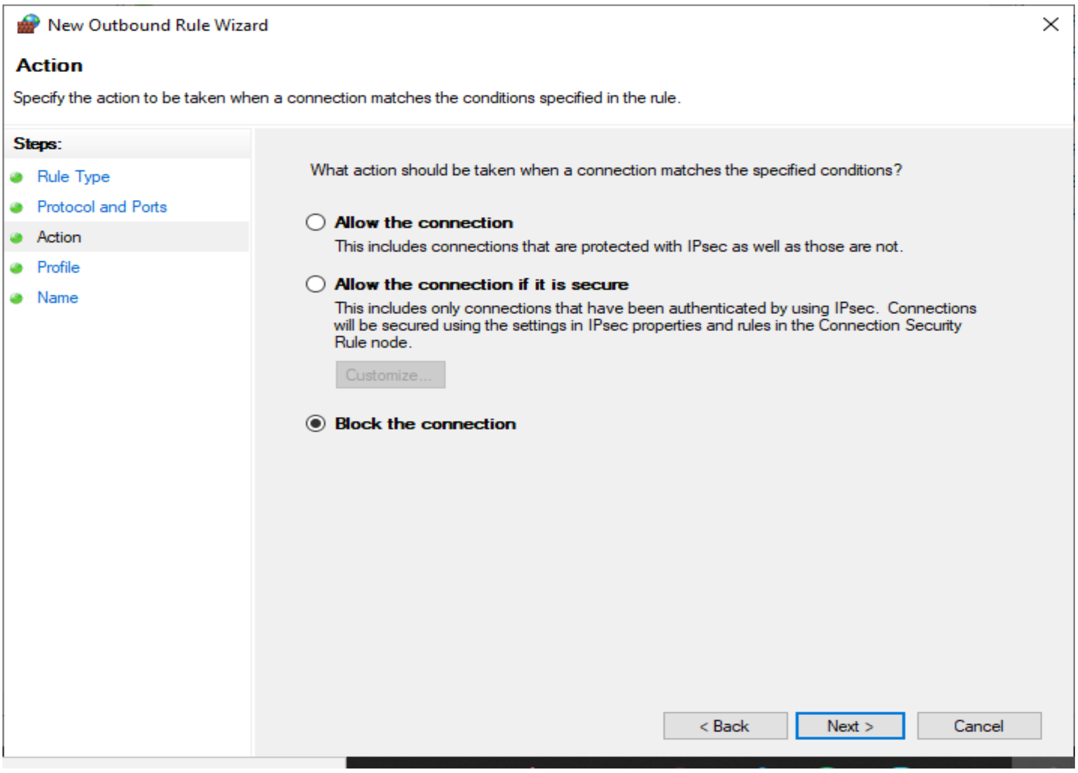
Does this rule apply to TCP or UDP?

● TCP
○ UDP

Does this rule apply to all remote ports or specific remote ports?

○ All remote ports
● Specific remote ports: 80
Example: 80, 443, 5000-5010

Step 7: Select the action block the connection for blocking a port



New Outbound Rule Wizard

Action

Specify the action to be taken when a connection matches the conditions specified in the rule.

Steps:
- Rule Type
- Protocol and Ports
- Action
- Profile
- Name

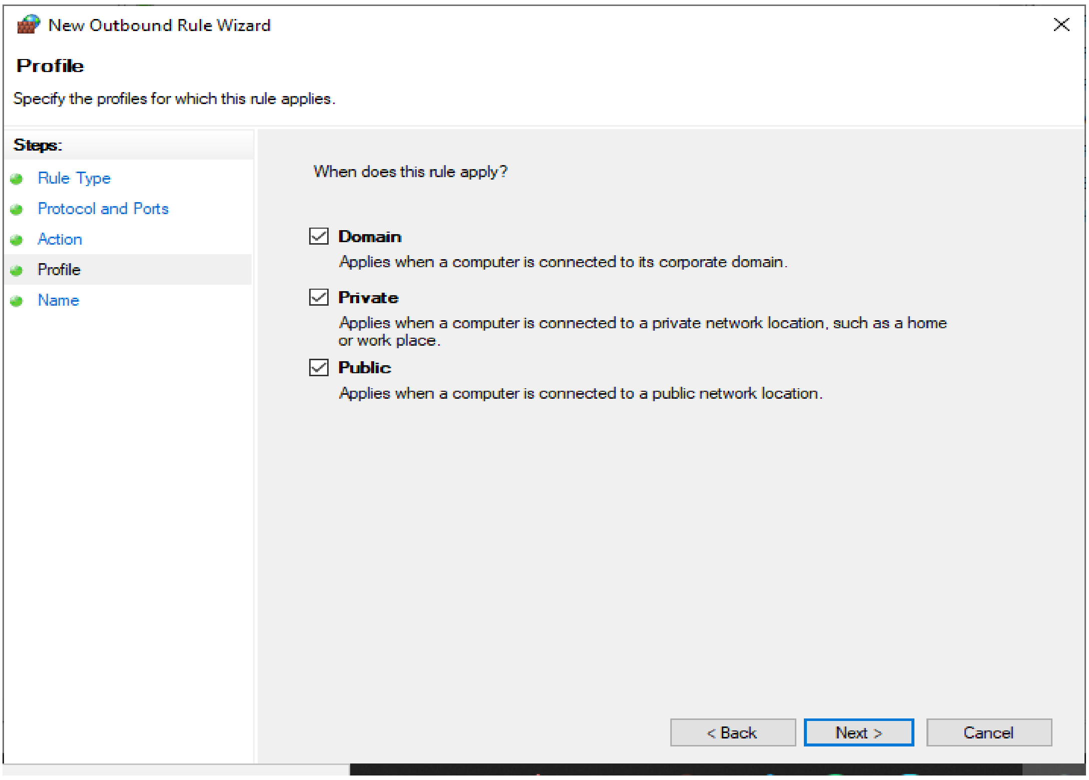
What action should be taken when a connection matches the specified conditions?

○ **Allow the connection**
This includes connections that are protected with IPsec as well as those are not.

○ **Allow the connection if it is secure**
This includes only connections that have been authenticated by using IPsec. Connections will be secured using the settings in IPsec properties and rules in the Connection Security Rule node.

● **Block the connection**

Step 8: Select the profiles domain private or public.



New Outbound Rule Wizard

Profile

Specify the profiles for which this rule applies.

Steps:
- Rule Type
- Protocol and Ports
- Action
- Profile
- Name

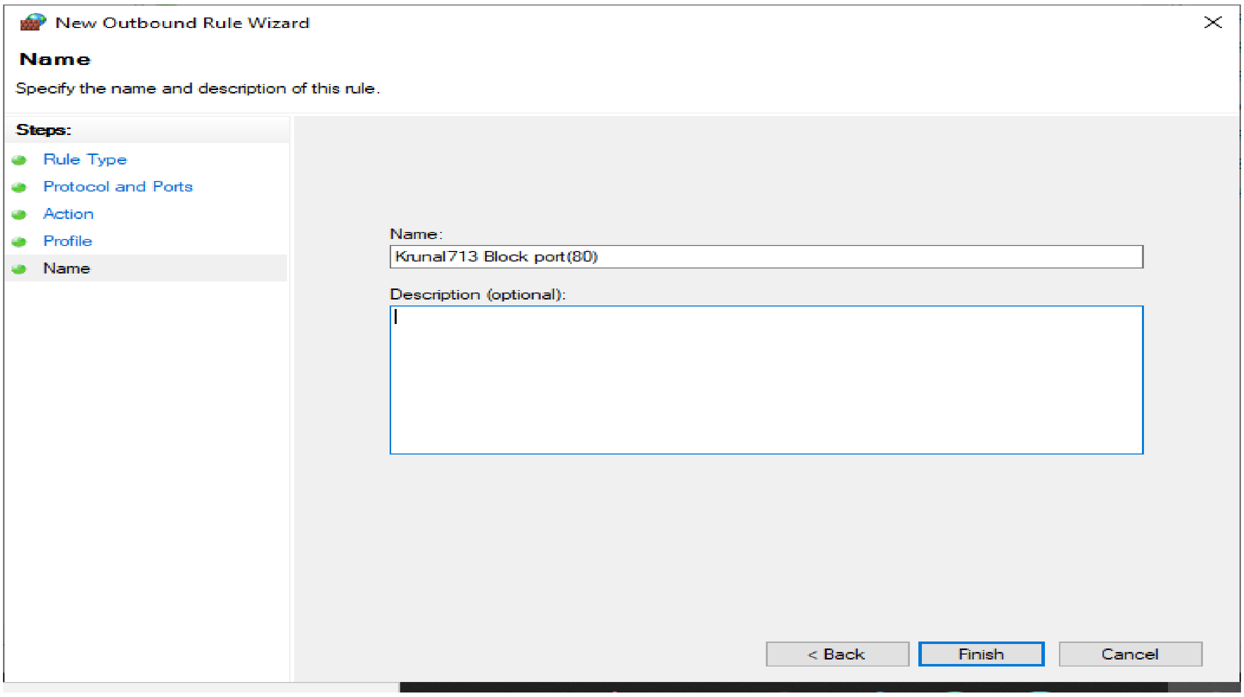
When does this rule apply?

☑ **Domain**
Applies when a computer is connected to its corporate domain.

☑ **Private**
Applies when a computer is connected to a private network location, such as a home or work place.

☑ **Public**
Applies when a computer is connected to a public network location.

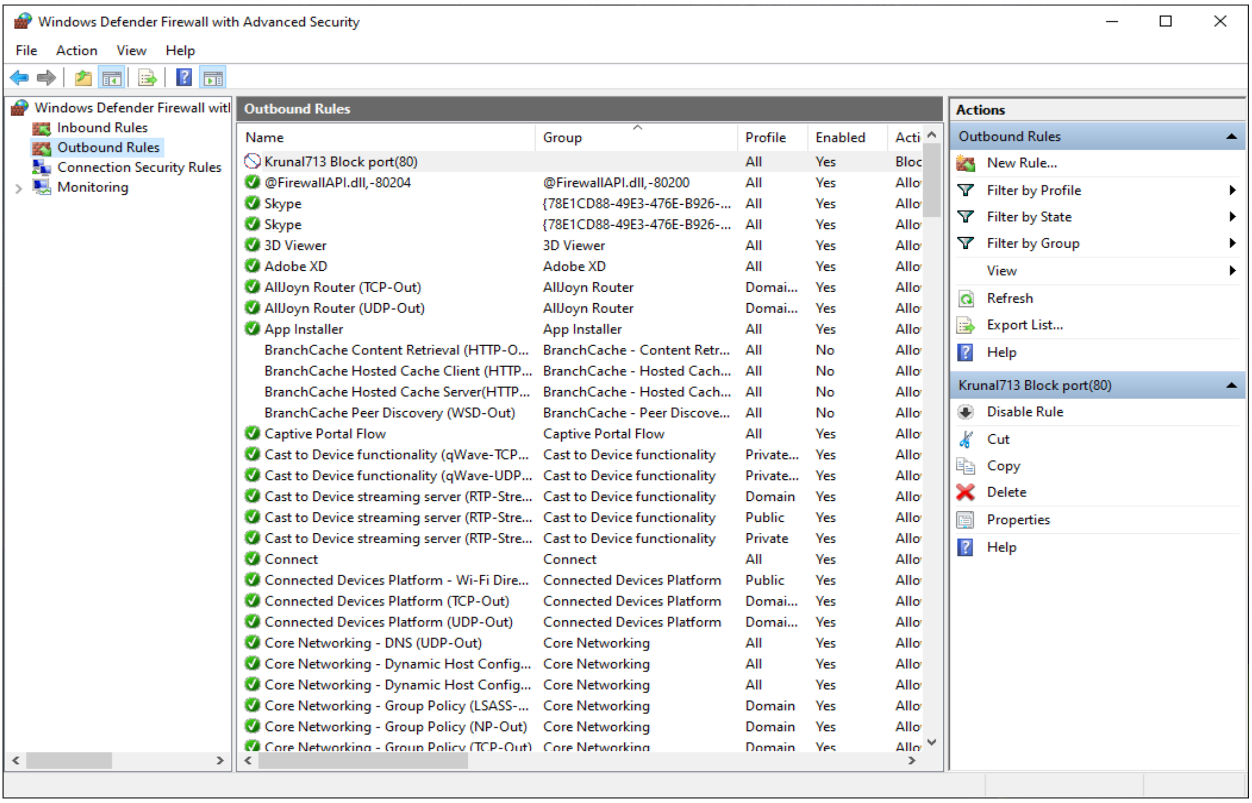
Step 9: Give a name to our new set rule and click on finish.



Name:
Krunal713 Block port(80)

Description (optional):

Output:



Outbound Rules

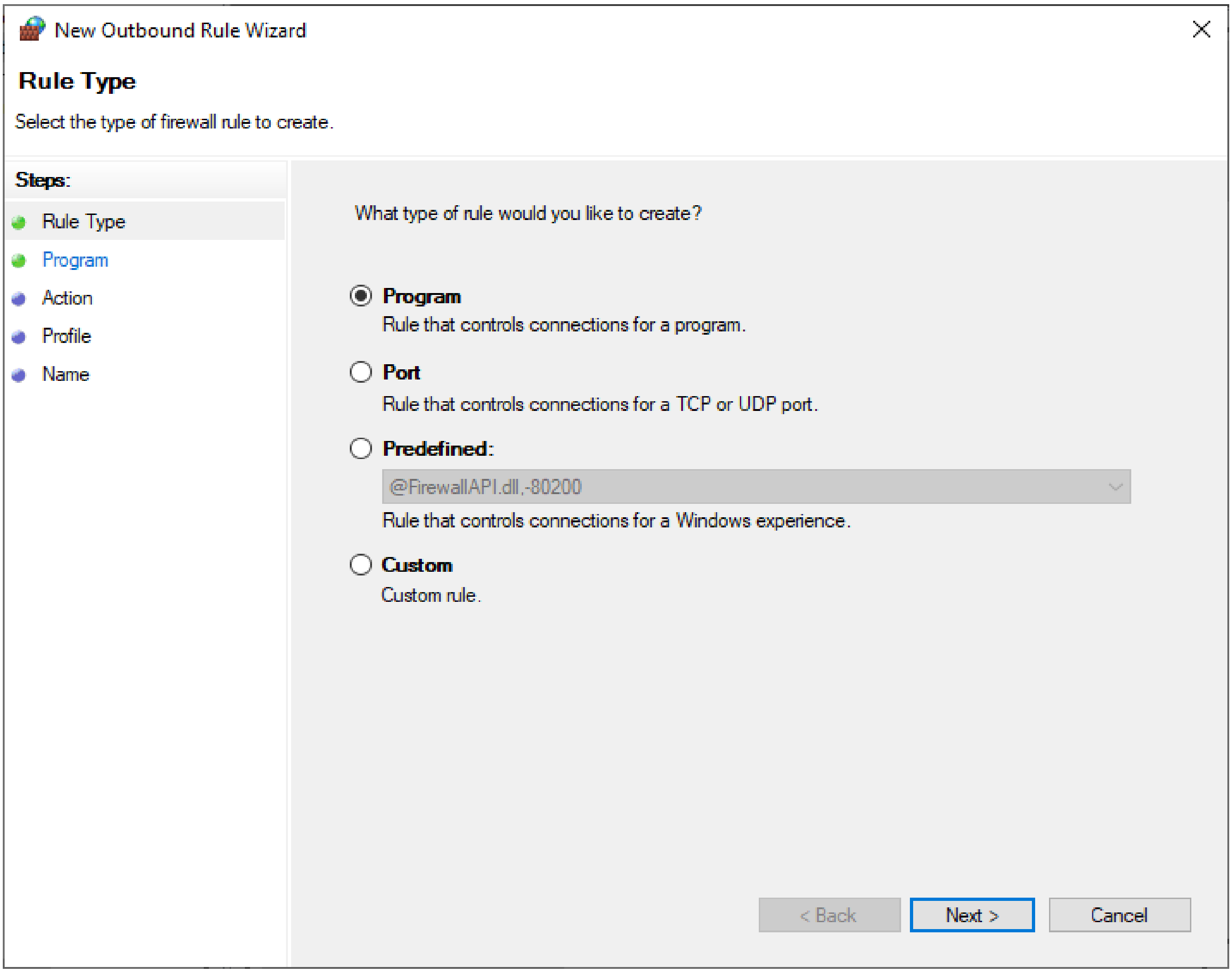
Name	Group	Profile	Enabled	Acti
Krunal713 Block port(80)		All	Yes	Bloc
@FirewallAPI.dll,-80204	@FirewallAPI.dll,-80200	All	Yes	Allo
Skype	{78E1CD88-49E3-476E-B926-...	All	Yes	Allo
Skype	{78E1CD88-49E3-476E-B926-...	All	Yes	Allo
3D Viewer	3D Viewer	All	Yes	Allo
Adobe XD	Adobe XD	All	Yes	Allo
AllJoyn Router (TCP-Out)	AllJoyn Router	Domai...	Yes	Allo
AllJoyn Router (UDP-Out)	AllJoyn Router	Domai...	Yes	Allo
App Installer	App Installer	All	Yes	Allo
BranchCache Content Retrieval (HTTP-O...	BranchCache - Content Retr...	All	No	Allo
BranchCache Hosted Cache Client (HTTP...	BranchCache - Hosted Cach...	All	No	Allo
BranchCache Hosted Cache Server(HTTP...	BranchCache - Hosted Cach...	All	No	Allo
BranchCache Peer Discovery (WSD-Out)	BranchCache - Peer Discove...	All	No	Allo
Captive Portal Flow	Captive Portal Flow	All	Yes	Allo
Cast to Device functionality (qWave-TCP...	Cast to Device functionality	Private...	Yes	Allo
Cast to Device functionality (qWave-UDP...	Cast to Device functionality	Private...	Yes	Allo
Cast to Device streaming server (RTP-Stre...	Cast to Device functionality	Domain	Yes	Allo
Cast to Device streaming server (RTP-Stre...	Cast to Device functionality	Public	Yes	Allo
Cast to Device streaming server (RTP-Stre...	Cast to Device functionality	Private	Yes	Allo
Connect	Connect	All	Yes	Allo
Connected Devices Platform - Wi-Fi Dire...	Connected Devices Platform	Public	Yes	Allo
Connected Devices Platform (TCP-Out)	Connected Devices Platform	Domai...	Yes	Allo
Connected Devices Platform (UDP-Out)	Connected Devices Platform	Domai...	Yes	Allo
Core Networking - DNS (UDP-Out)	Core Networking	All	Yes	Allo
Core Networking - Dynamic Host Config...	Core Networking	All	Yes	Allo
Core Networking - Dynamic Host Config...	Core Networking	All	Yes	Allo
Core Networking - Group Policy (LSASS-...	Core Networking	Domain	Yes	Allo
Core Networking - Group Policy (NP-Out)	Core Networking	Domain	Yes	Allo
Core Networking - Group Policy (TCP-Out)	Core Networking	Domain	Yes	Allo

B) Blocking a program:

Rule that controls the connection of a program

Step1: Repeat PartA Step1 to Step4.

Step 5: Inside Outbound rules -> Select New Rules -> select a program and then click on next.



New Outbound Rule Wizard

Rule Type

Select the type of firewall rule to create.

Steps:

- Rule Type
- Program
- Action
- Profile
- Name

What type of rule would you like to create?

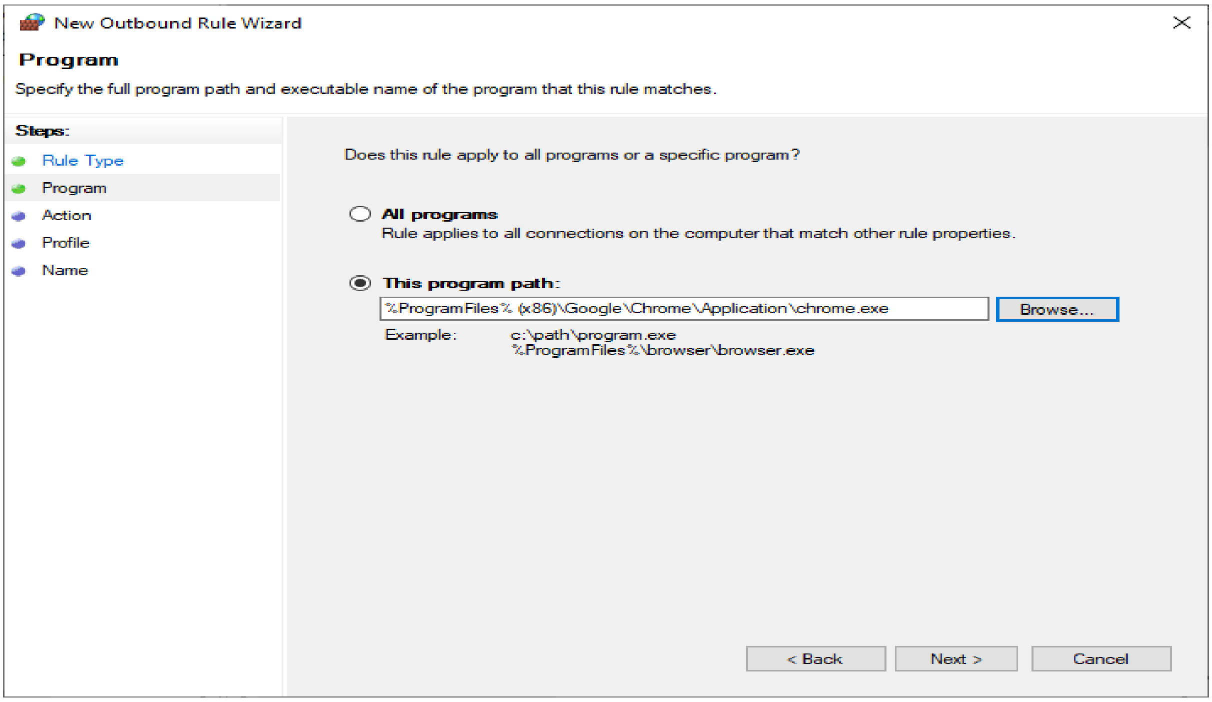
● **Program**
Rule that controls connections for a program.

○ **Port**
Rule that controls connections for a TCP or UDP port.

○ **Predefined:**
@FirewallAPI.dll,-80200
Rule that controls connections for a Windows experience.

○ **Custom**
Custom rule.

Step 6: Choose the path of the program from the directory.



New Outbound Rule Wizard

Program

Specify the full program path and executable name of the program that this rule matches.

Steps:

- Rule Type
- Program
- Action
- Profile
- Name

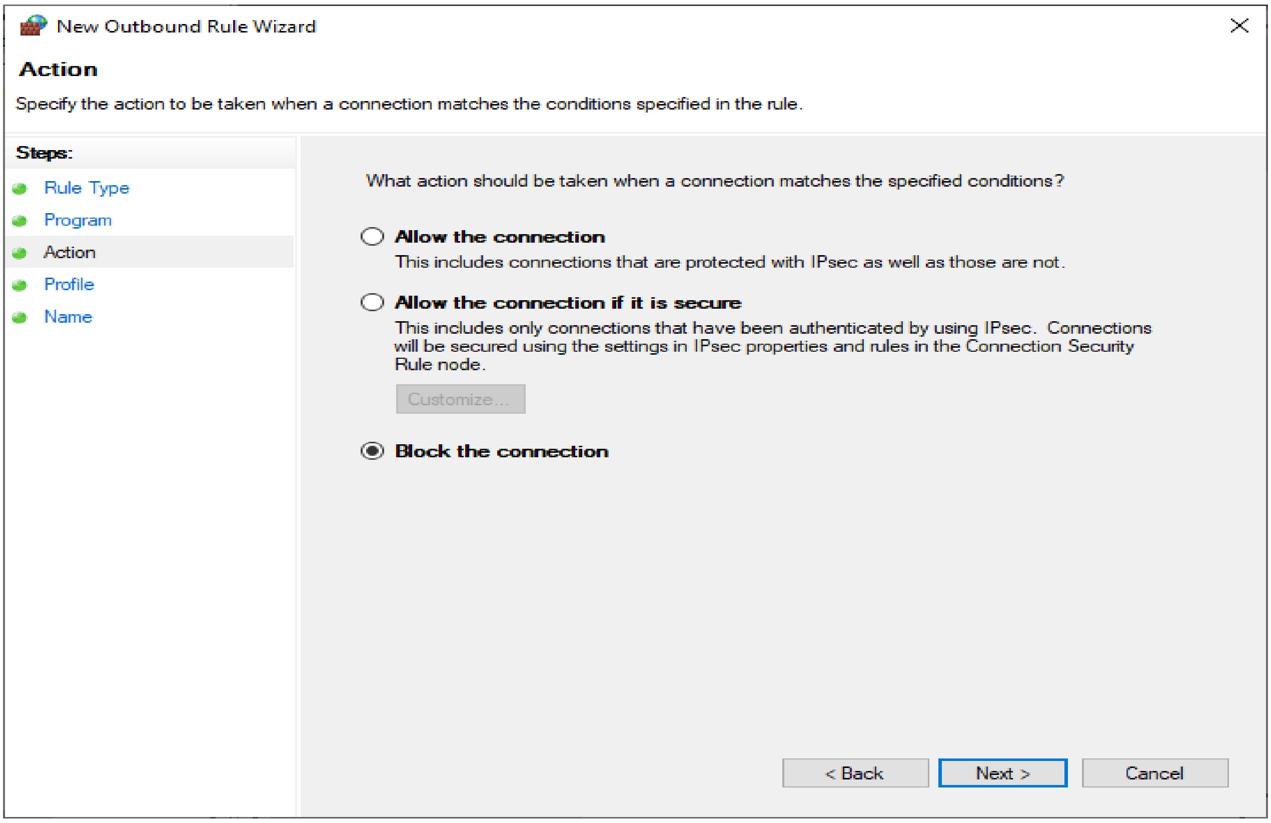
Does this rule apply to all programs or a specific program?

○ **All programs**
Rule applies to all connections on the computer that match other rule properties.

● **This program path:**
%ProgramFiles% (x86)\Google\Chrome\Application\chrome.exe

Example: c:\path\program.exe
%ProgramFiles%\browser\browser.exe

Step 7: Click on Block the connection.



New Outbound Rule Wizard

Action

Specify the action to be taken when a connection matches the conditions specified in the rule.

Steps:

- Rule Type
- Program
- Action
- Profile
- Name

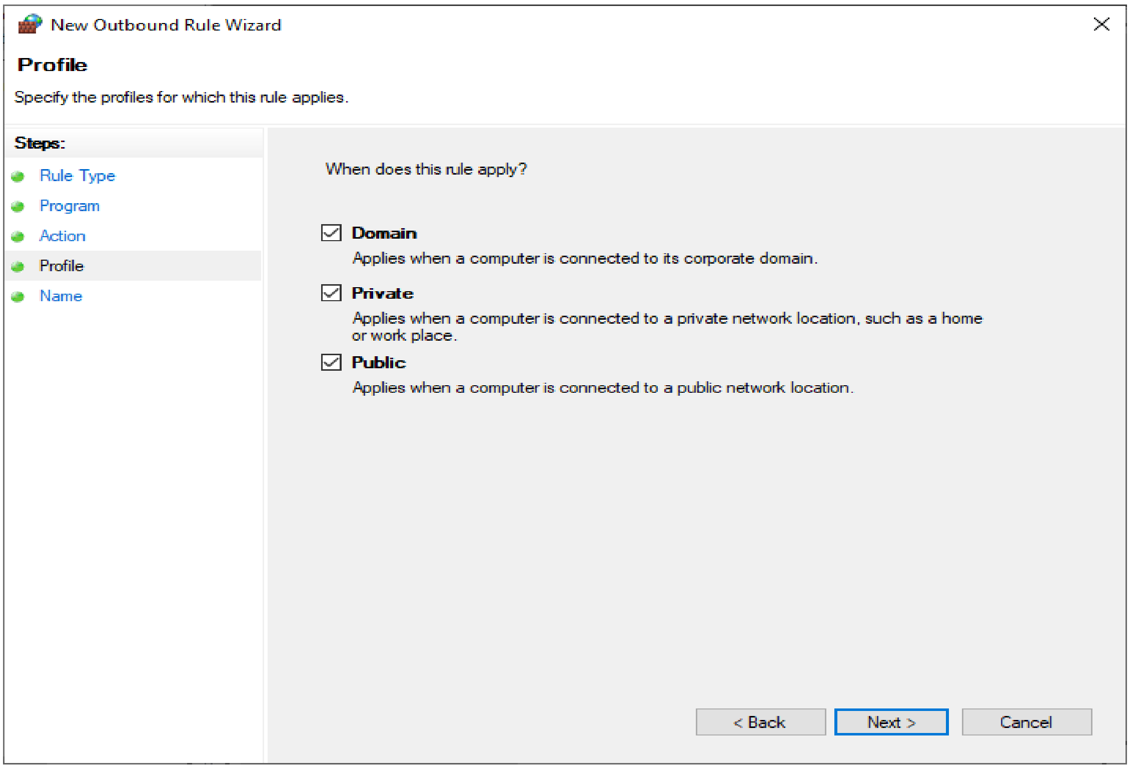
What action should be taken when a connection matches the specified conditions?

○ **Allow the connection**
This includes connections that are protected with IPsec as well as those are not.

○ **Allow the connection if it is secure**
This includes only connections that have been authenticated by using IPsec. Connections will be secured using the settings in IPsec properties and rules in the Connection Security Rule node.

● **Block the connection**

Step 8: Select the profiles domain private or public.



New Outbound Rule Wizard

Profile

Specify the profiles for which this rule applies.

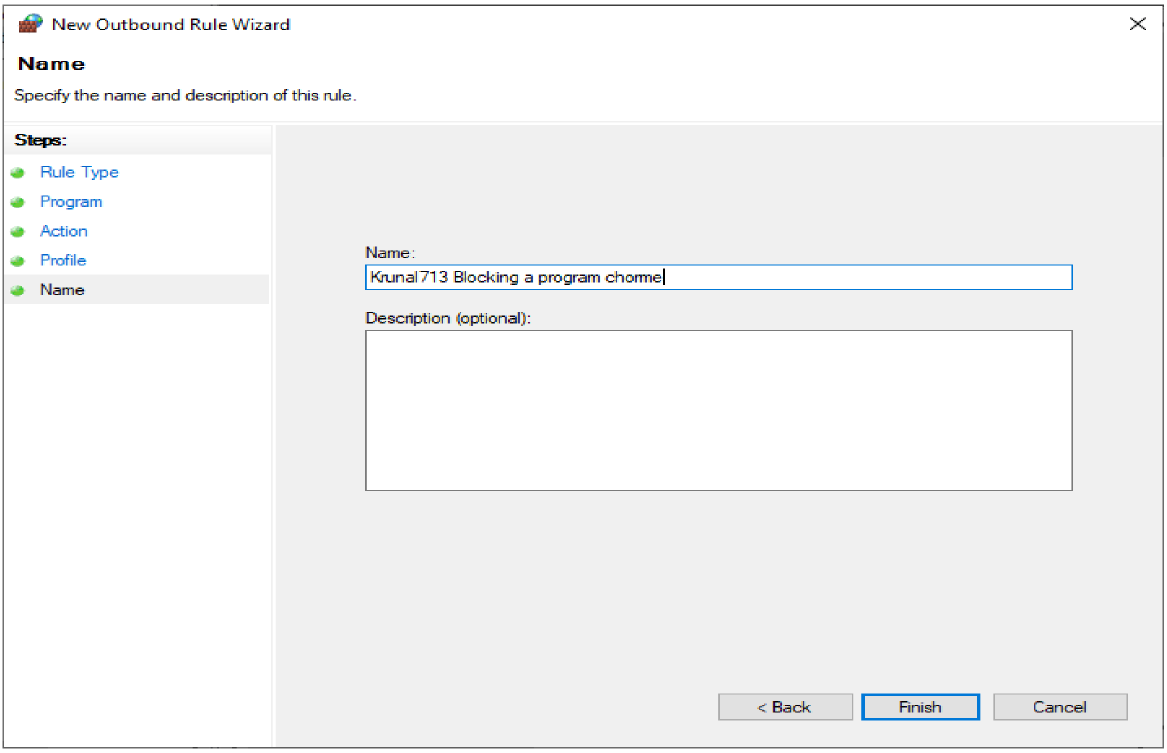
When does this rule apply?

☑ **Domain**
Applies when a computer is connected to its corporate domain.

☑ **Private**
Applies when a computer is connected to a private network location, such as a home or work place.

☑ **Public**
Applies when a computer is connected to a public network location.

Step 9: Give a name to your new set rule and click on finish.



New Outbound Rule Wizard

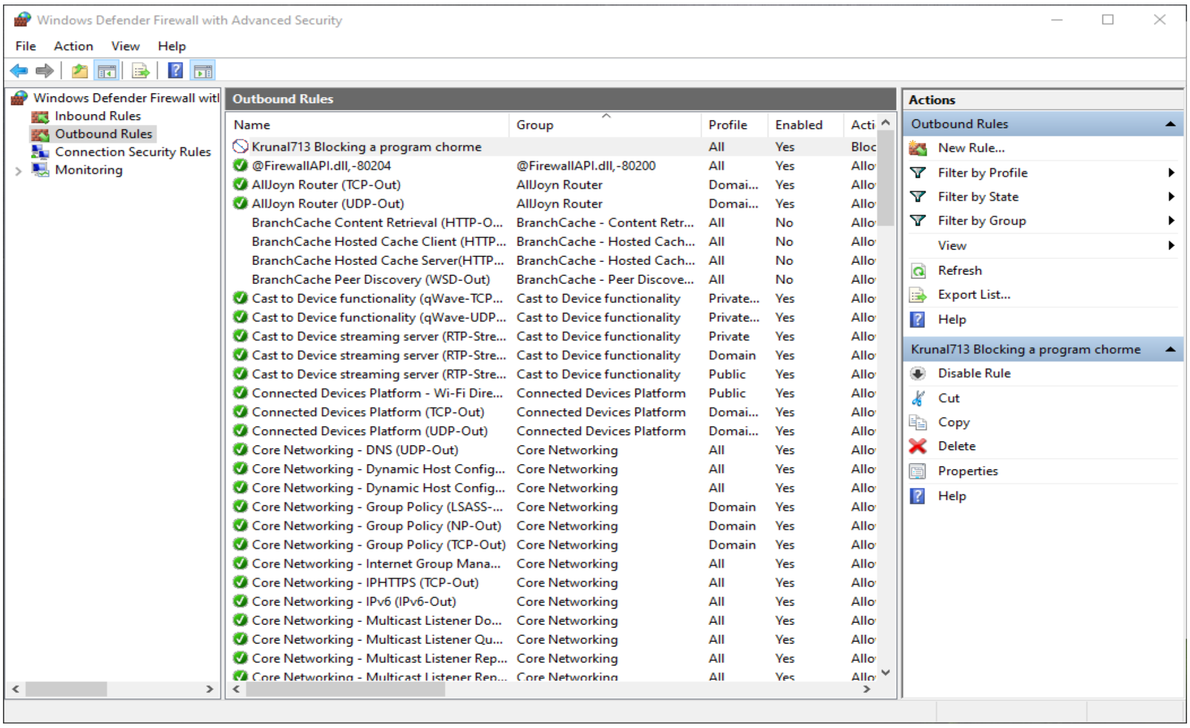
Name

Specify the name and description of this rule.

Name: Krunal713 Blocking a program chorme

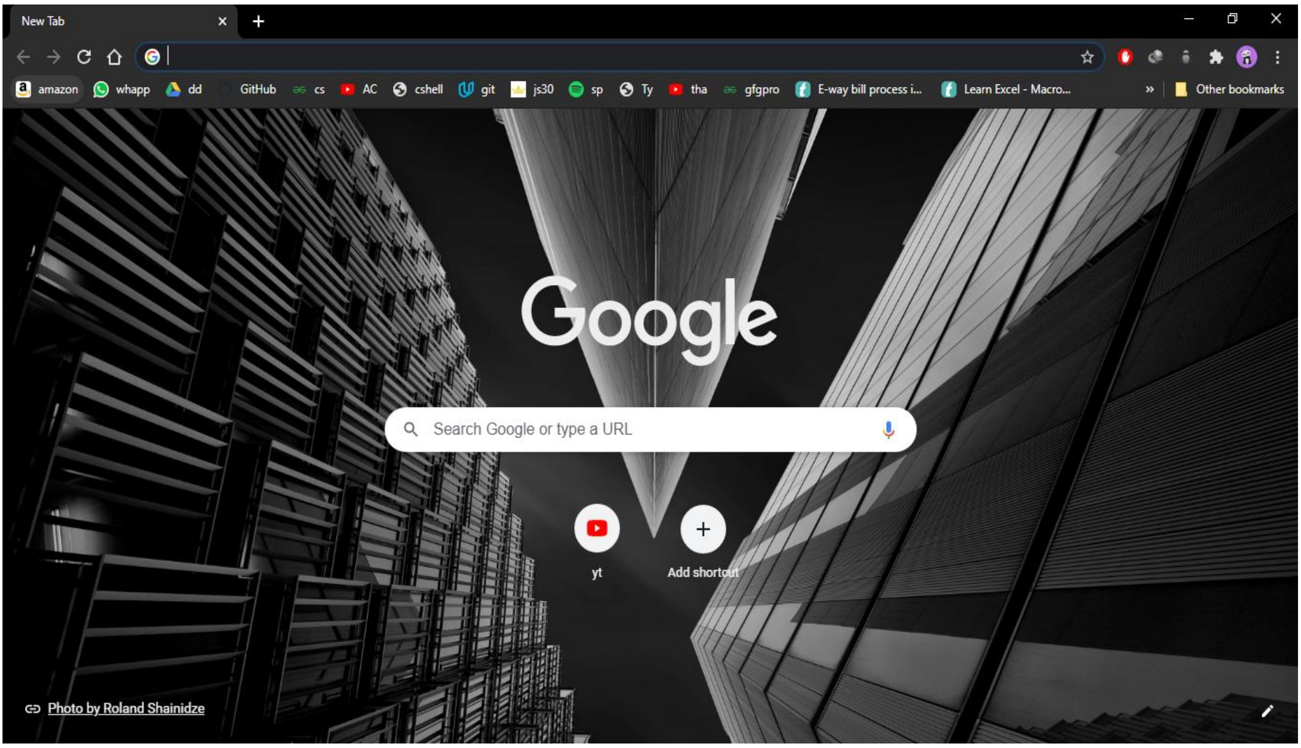
Description (optional):

Output:

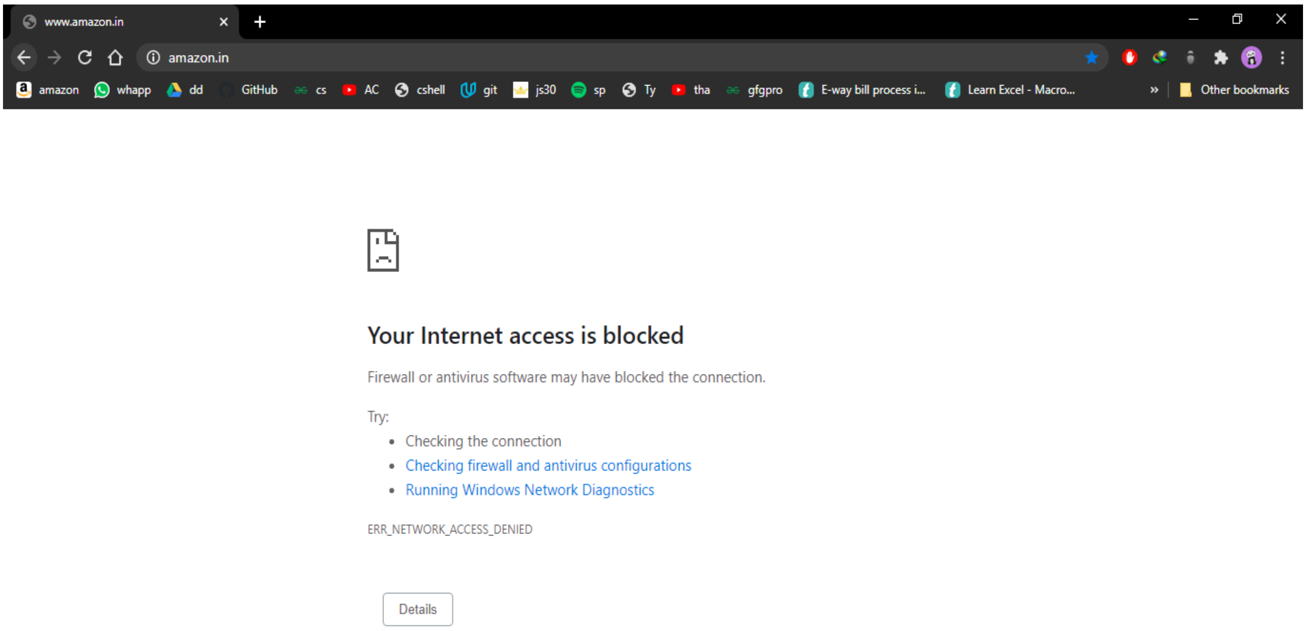


Name	Group	Profile	Enabled	Acti
Krunal713 Blocking a program chorme		All	Yes	Bloc
@FirewallAPI.dll,-80204	@FirewallAPI.dll,-80200	All	Yes	Allo
AllJoyn Router (TCP-Out)	AllJoyn Router	Domai...	Yes	Allo
AllJoyn Router (UDP-Out)	AllJoyn Router	Domai...	Yes	Allo
BranchCache Content Retrieval (HTTP-O...	BranchCache - Content Retr...	All	No	Allo
BranchCache Hosted Cache Client (HTTP...	BranchCache - Hosted Cach...	All	No	Allo
BranchCache Hosted Cache Server(HTTP...	BranchCache - Hosted Cach...	All	No	Allo
BranchCache Peer Discovery (WSD-Out)	BranchCache - Peer Discove...	All	No	Allo
Cast to Device functionality (qWave-TCP...	Cast to Device functionality	Private...	Yes	Allo
Cast to Device functionality (qWave-UDP...	Cast to Device functionality	Private...	Yes	Allo
Cast to Device streaming server (RTP-Stre...	Cast to Device functionality	Private	Yes	Allo
Cast to Device streaming server (RTP-Stre...	Cast to Device functionality	Domain	Yes	Allo
Cast to Device streaming server (RTP-Stre...	Cast to Device functionality	Public	Yes	Allo
Connected Devices Platform - Wi-Fi Dire...	Connected Devices Platform	Public	Yes	Allo
Connected Devices Platform (TCP-Out)	Connected Devices Platform	Domai...	Yes	Allo
Connected Devices Platform (UDP-Out)	Connected Devices Platform	Domai...	Yes	Allo
Core Networking - DNS (UDP-Out)	Core Networking	All	Yes	Allo
Core Networking - Dynamic Host Config...	Core Networking	All	Yes	Allo
Core Networking - Dynamic Host Config...	Core Networking	All	Yes	Allo
Core Networking - Group Policy (LSASS-...	Core Networking	Domain	Yes	Allo
Core Networking - Group Policy (NP-Out)	Core Networking	Domain	Yes	Allo
Core Networking - Group Policy (TCP-Out)	Core Networking	Domain	Yes	Allo
Core Networking - Internet Group Mana...	Core Networking	All	Yes	Allo
Core Networking - IPHTTPS (TCP-Out)	Core Networking	All	Yes	Allo
Core Networking - IPv6 (IPv6-Out)	Core Networking	All	Yes	Allo
Core Networking - Multicast Listener Do...	Core Networking	All	Yes	Allo
Core Networking - Multicast Listener Qu...	Core Networking	All	Yes	Allo
Core Networking - Multicast Listener Rep...	Core Networking	All	Yes	Allo
Core Networking - Multicast Listener Rep...	Core Networking	All	Yes	Allo

Before Applying the Rule:



After Applying the Rule:



Your Internet access is blocked

Firewall or antivirus software may have blocked the connection.

Try:

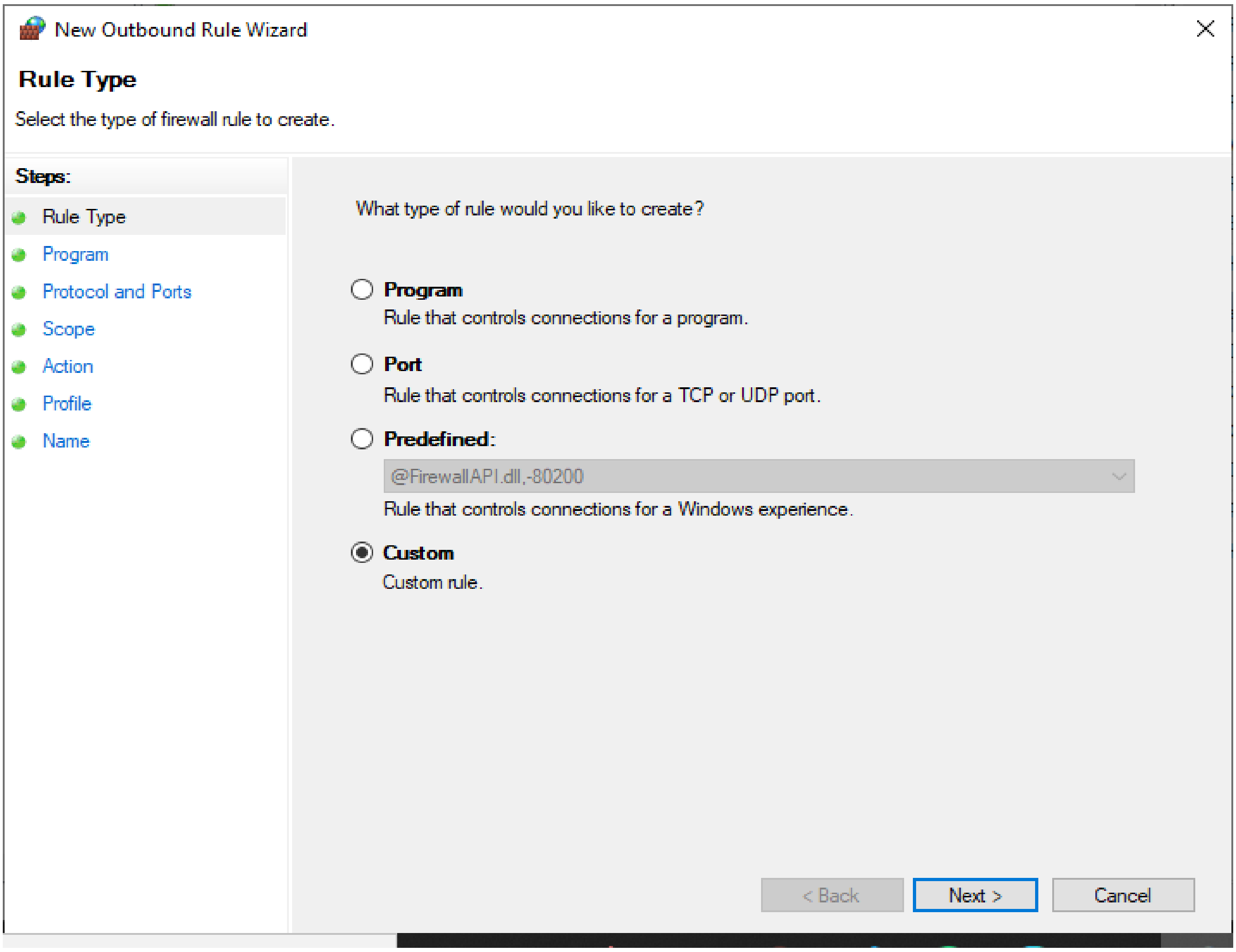
- Checking the connection
- Checking firewall and antivirus configurations
- Running Windows Network Diagnostics

ERR_NETWORK_ACCESS_DENIED

C) Blocking a website:

Step1: Repeat PartA Step1 to Step4.

Step 5: Inside Outbound rules -> Select New Rules -> select custom and then click on next.



New Outbound Rule Wizard

Rule Type

Select the type of firewall rule to create.

Steps:

- Rule Type
- Program
- Protocol and Ports
- Scope
- Action
- Profile
- Name

What type of rule would you like to create?

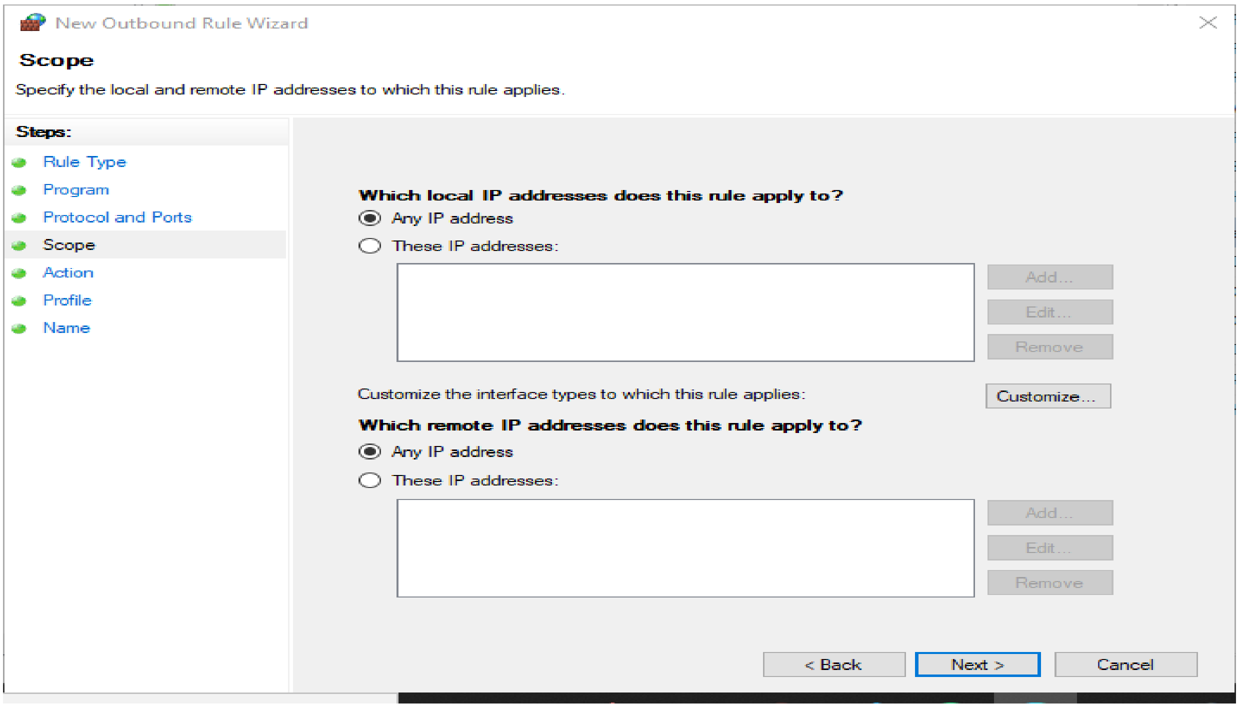
○ **Program**
Rule that controls connections for a program.

○ **Port**
Rule that controls connections for a TCP or UDP port.

○ **Predefined:**
@FirewallAPI.dll,-80200
Rule that controls connections for a Windows experience.

● **Custom**
Custom rule.

Step 6: When you click next you would see a window where you will see “Steps:” on left hand side of the screen. From that select “Scope”.



New Outbound Rule Wizard

Scope

Specify the local and remote IP addresses to which this rule applies.

Steps:
- Rule Type
- Program
- Protocol and Ports
- Scope
- Action
- Profile
- Name

Which local IP addresses does this rule apply to?

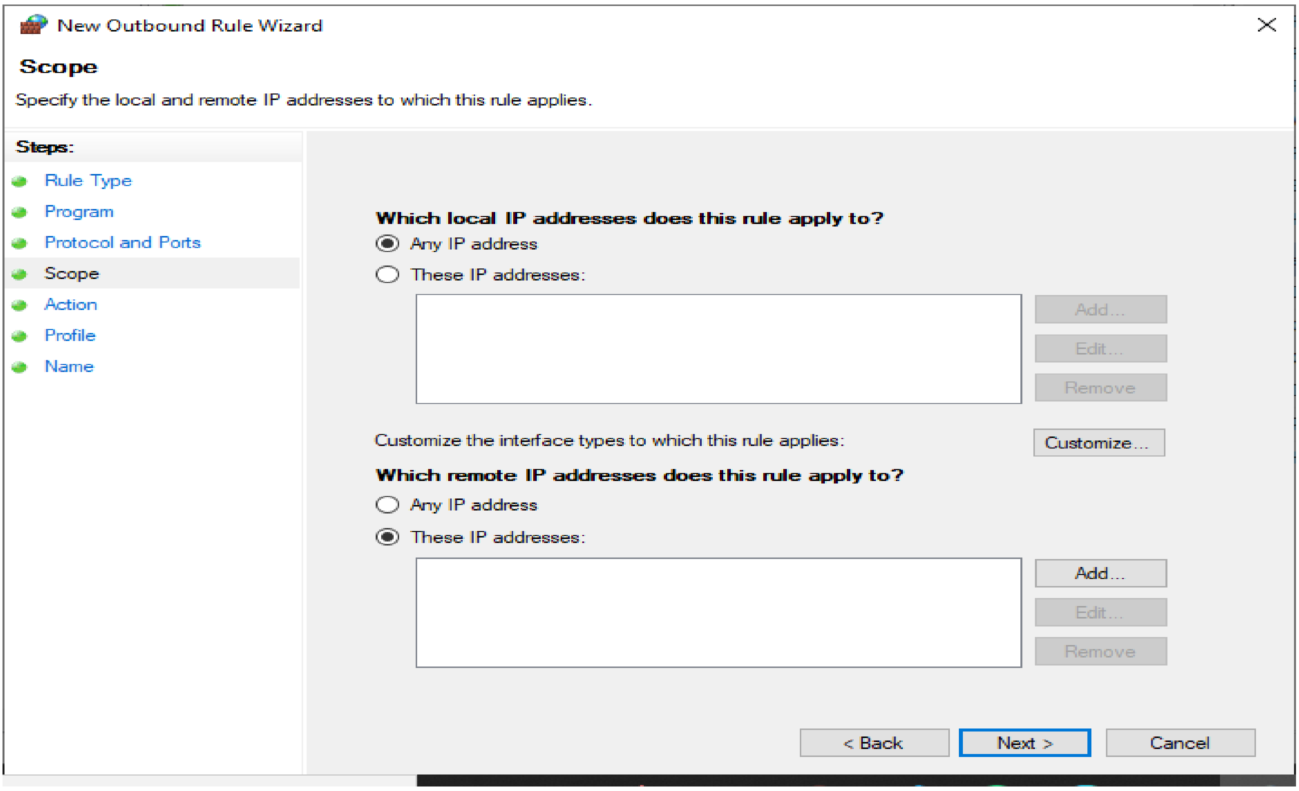
● Any IP address
○ These IP addresses:

Customize the interface types to which this rule applies:

Which remote IP addresses does this rule apply to?

● Any IP address
○ These IP addresses:

Step 7: In scope click on These IP addresses in remote IP



New Outbound Rule Wizard

Scope

Specify the local and remote IP addresses to which this rule applies.

Steps:
- Rule Type
- Program
- Protocol and Ports
- Scope
- Action
- Profile
- Name

Which local IP addresses does this rule apply to?

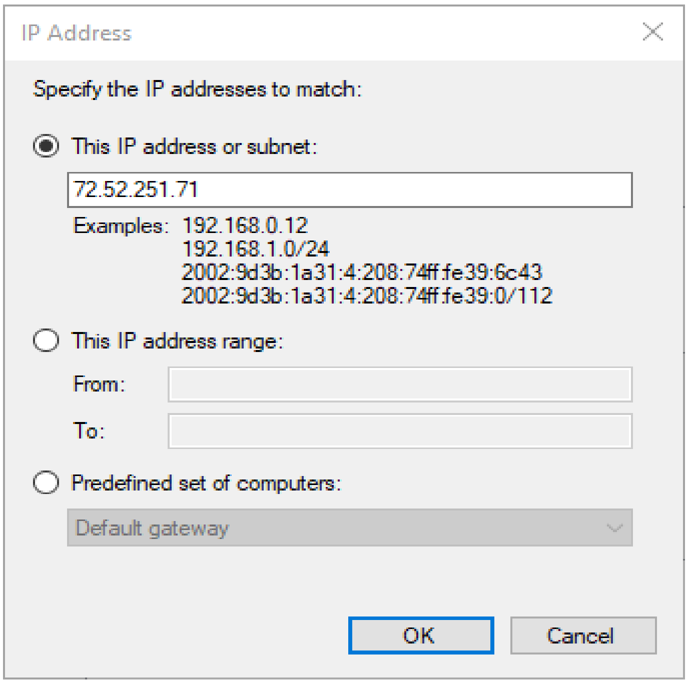
● Any IP address
○ These IP addresses:

Customize the interface types to which this rule applies:

Which remote IP addresses does this rule apply to?

○ Any IP address
● These IP addresses:

Step 8: Click on add and Add the IP address of the website that you want to block and click ok.



Specify the IP addresses to match:

● This IP address or subnet:

72.52.251.71

Examples: 192.168.0.12
192.168.1.0/24
2002:9d3b:1a31:4:208:74ff:fe39:6c43
2002:9d3b:1a31:4:208:74ff:fe39:0/112

○ This IP address range:

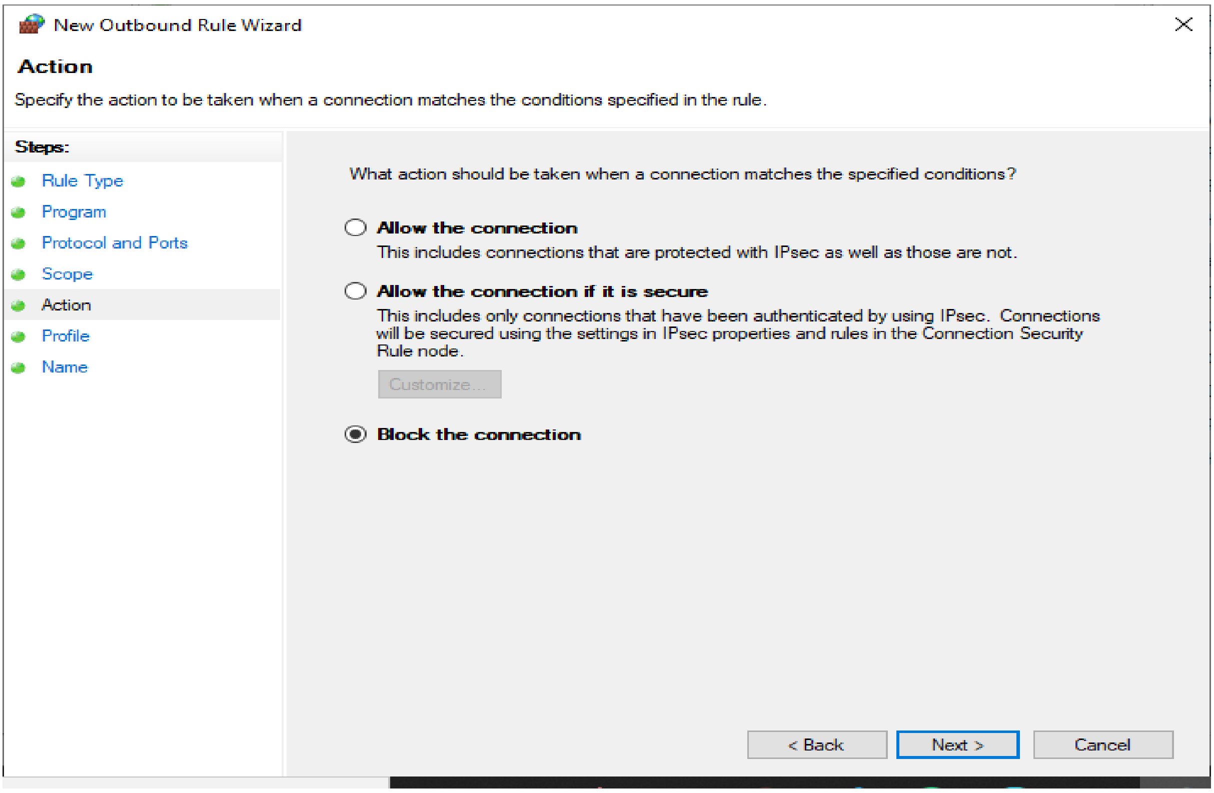
From:

To:

○ Predefined set of computers:

Default gateway

Step 9: Click on Block the connection in action



Specify the action to be taken when a connection matches the conditions specified in the rule.

What action should be taken when a connection matches the specified conditions?

○ **Allow the connection**
This includes connections that are protected with IPsec as well as those are not.

○ **Allow the connection if it is secure**
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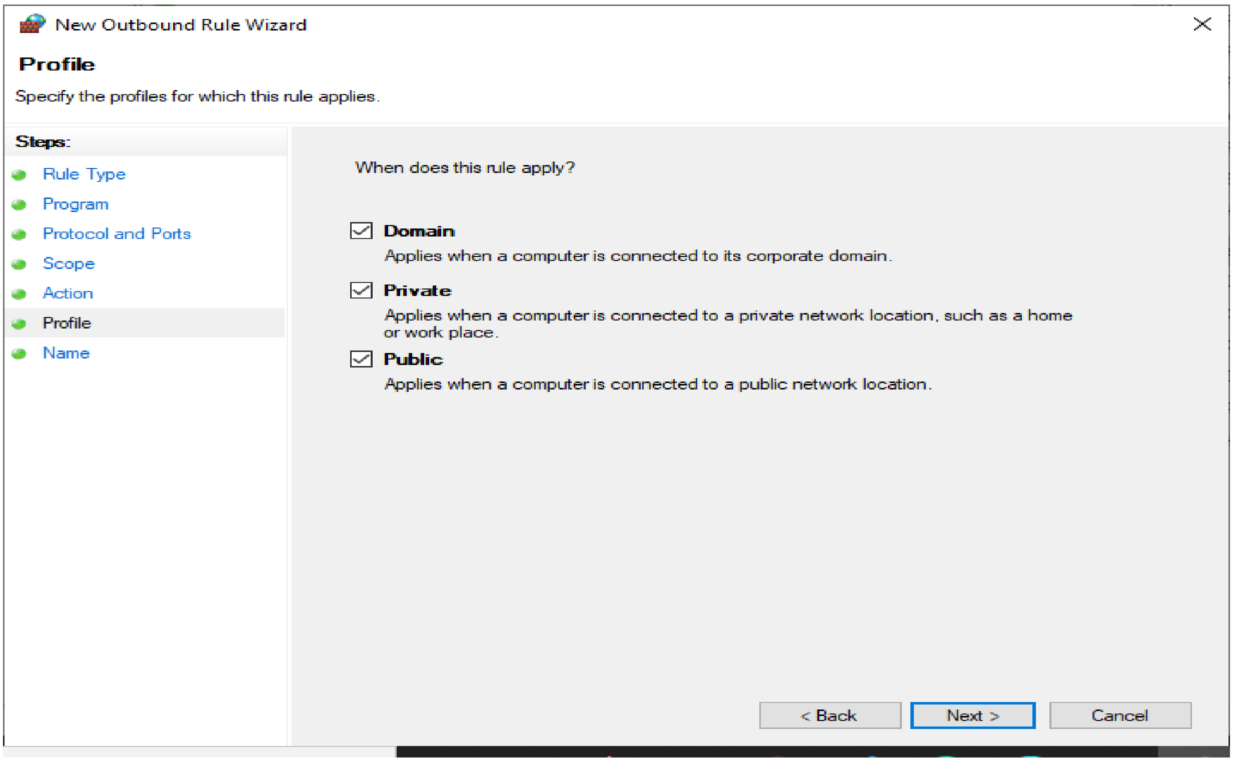
● **Block the connection**

Step 10: Select the profiles domain private or public.



New Outbound Rule Wizard

Profile

Specify the profiles for which this rule applies.

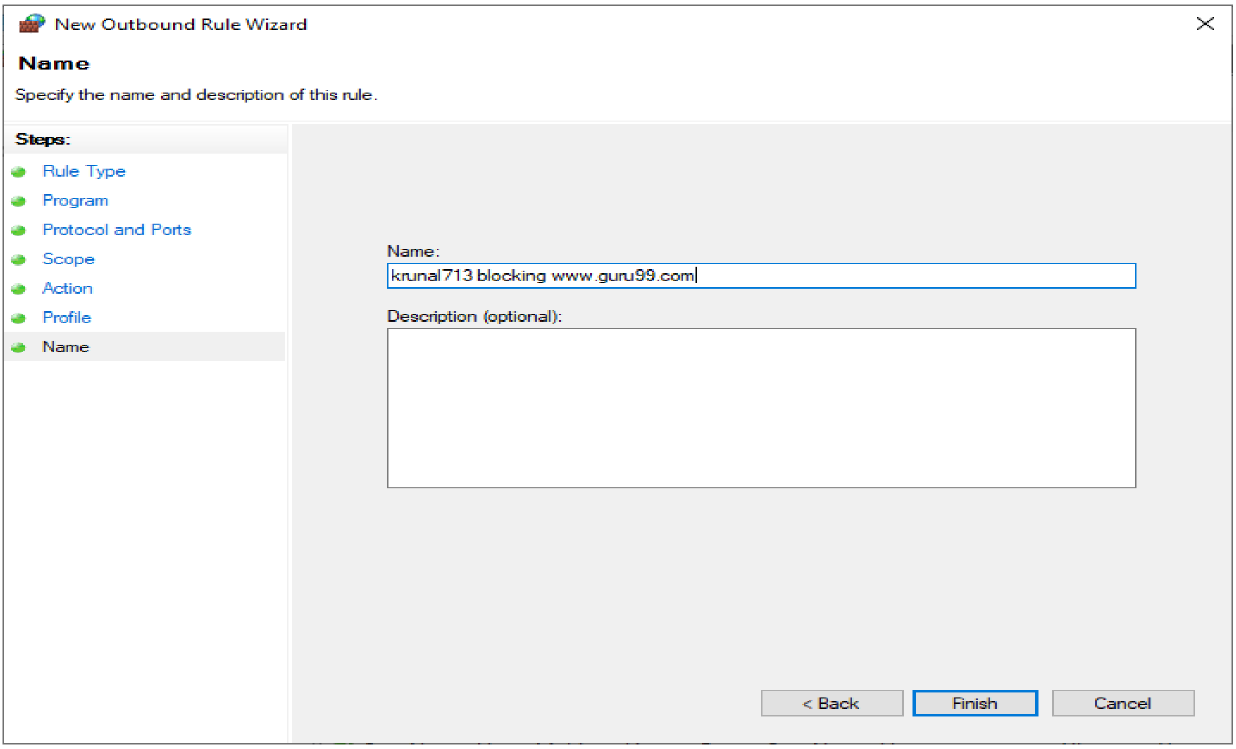
When does this rule apply?

☑ **Domain**
Applies when a computer is connected to its corporate domain.

☑ **Private**
Applies when a computer is connected to a private network location, such as a home or work place.

☑ **Public**
Applies when a computer is connected to a public network location.

Step 11: Give a name to your new set rule and click on finish.



New Outbound Rule Wizard

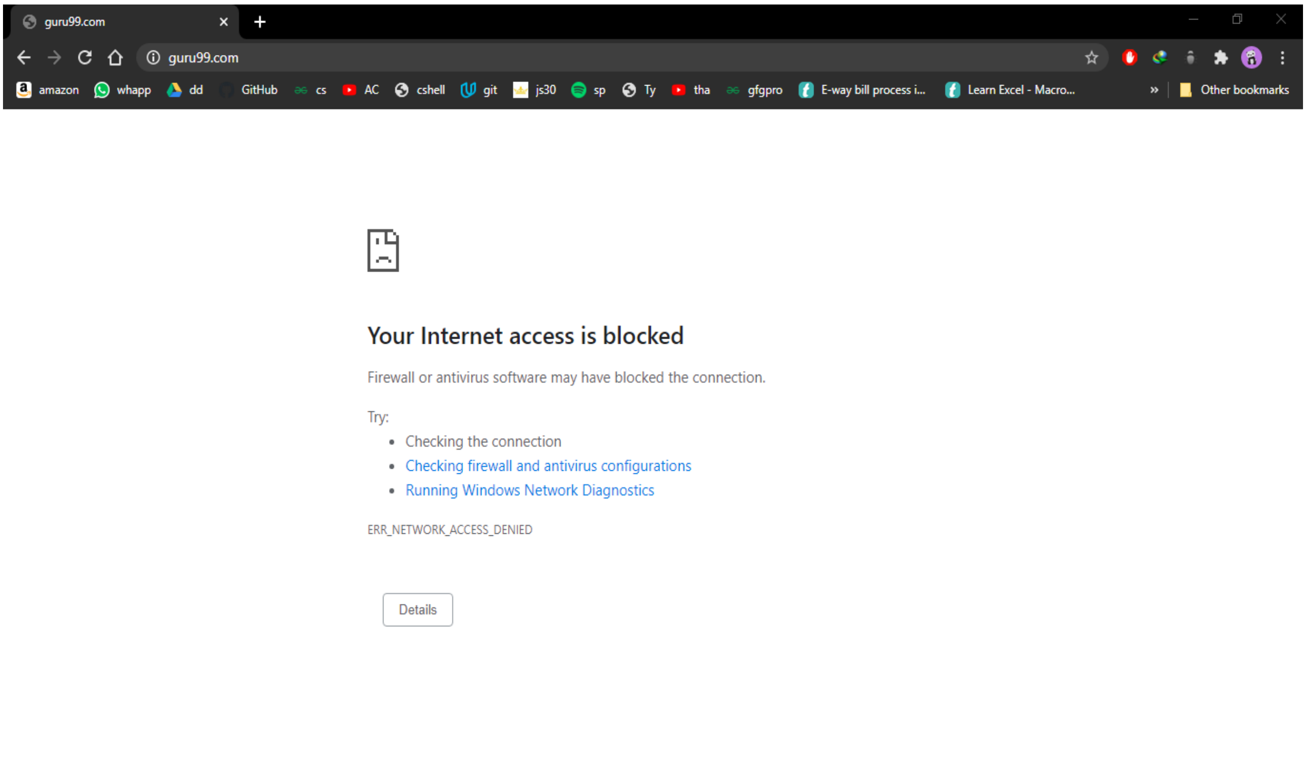
Name

Specify the name and description of this rule.

Name:
krunal713 blocking www.guru99.com

Description (optional):

Output:



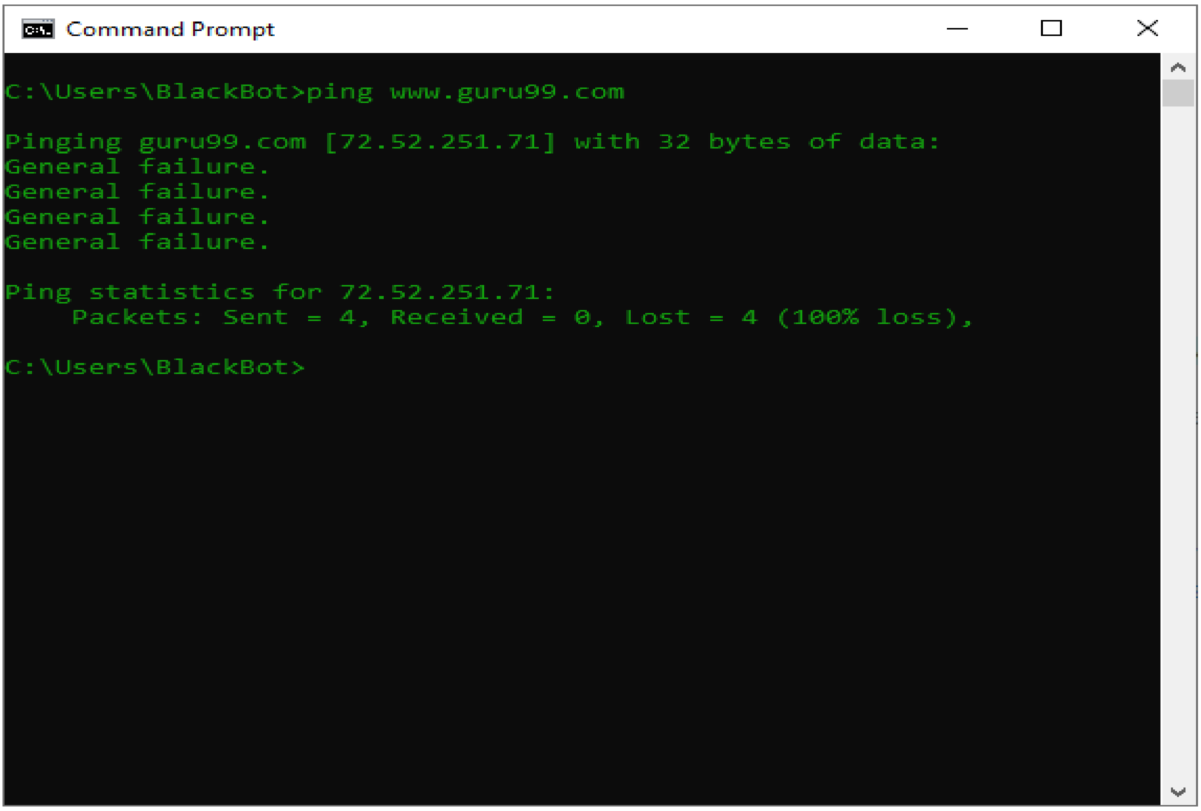
Your Internet access is blocked

Firewall or antivirus software may have blocked the connection.

Try:

- Checking the connection
- Checking firewall and antivirus configurations
- Running Windows Network Diagnostics

ERR_NETWORK_ACCESS_DENIED



```
C:\Users\BlackBot>ping www.guru99.com

Pinging guru99.com [72.52.251.71] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.

Ping statistics for 72.52.251.71:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\BlackBot>
```