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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");
                                        }

                                      }

}
```

```
<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 :-

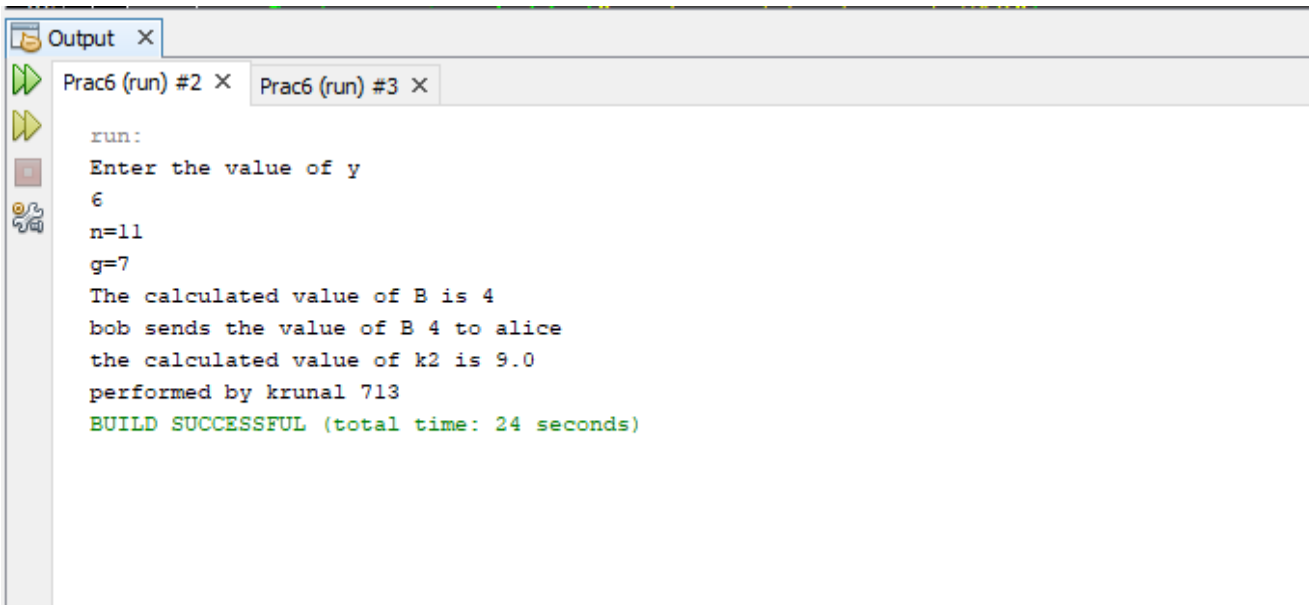
Bob.java

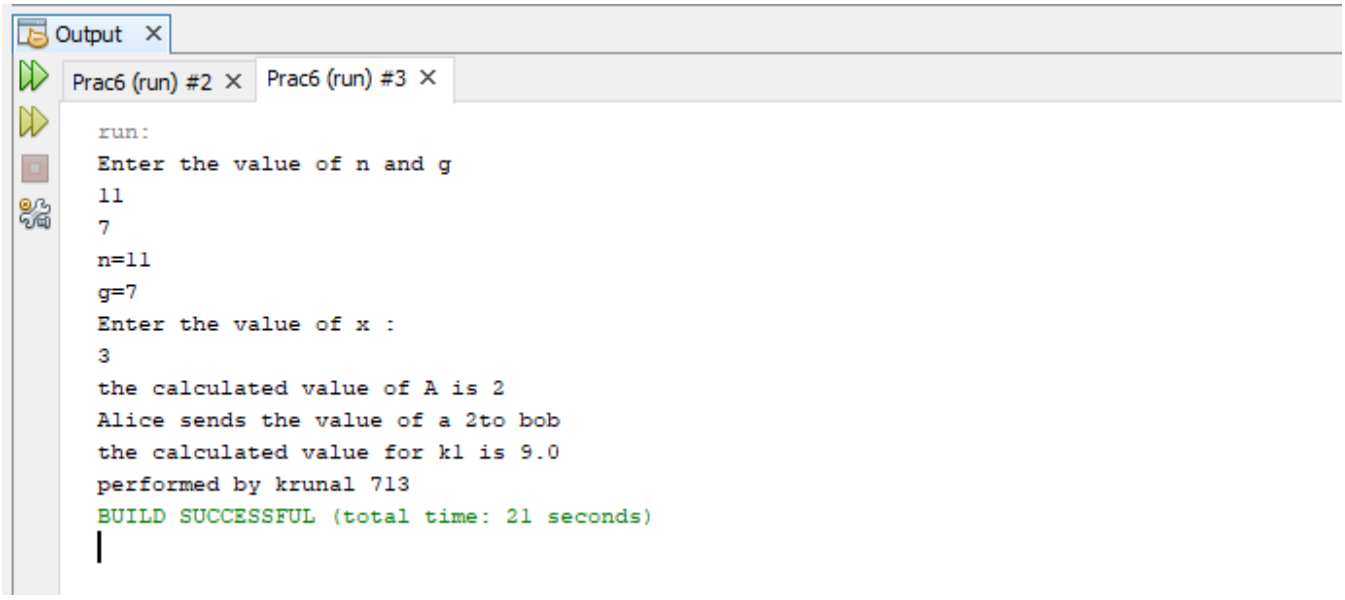
```
package prac6;
import java.io.*;
import java.net.ServerSocket;
import java.net.Socket;
import java.util.Scanner;
public class Bob {

    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
Prac6 (run) #2
Prac6 (run) #3
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)


Output
Prac6 (run) #2
Prac6 (run) #3
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 kl is 9.0
performed by krunal 713
BUILD SUCCESSFUL (total time: 21 seconds)