import java.util.Scanner;

import java.net.InetAddress;

import java.net.UnknownHostException;

public class SimpleSubnetDemo {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

// Input IP Address and Subnet Mask

System.out.print("Enter IP address (e.g., 192.168.1.1): ");

String ipAddress = scanner.nextLine();

System.out.print("Enter subnet mask (e.g., 255.255.255.0): ");

String subnetMask = scanner.nextLine();

try {

// Calculate Network and Broadcast Addresses

calculateSubnetInfo(ipAddress, subnetMask);

} catch (UnknownHostException e) {

System.out.println("Invalid IP address or subnet mask.");

}

}

private static void calculateSubnetInfo(String ip, String mask) throws UnknownHostException {

byte[] ipBytes = InetAddress.getByName(ip).getAddress();

byte[] maskBytes = InetAddress.getByName(mask).getAddress();

byte[] networkBytes = new byte[4];

byte[] broadcastBytes = new byte[4];

for (int i = 0; i < 4; i++) {

networkBytes[i] = (byte) (ipBytes[i] & maskBytes[i]);

broadcastBytes[i] = (byte) (networkBytes[i] | ~maskBytes[i]);

}

InetAddress networkAddress = InetAddress.getByAddress(networkBytes);

InetAddress broadcastAddress = InetAddress.getByAddress(broadcastBytes);

// Calculate the number of hosts

int prefixLength = getPrefixLength(maskBytes);

int numHosts = (int) Math.pow(2, 32 - prefixLength) - 2;

// Display Results

System.out.println("\nSubnet Information:");

System.out.println("Network Address: " + networkAddress.getHostAddress());

System.out.println("Broadcast Address: " + broadcastAddress.getHostAddress());

System.out.println("Subnet Mask: " + mask);

System.out.println("Number of Hosts: " + numHosts);

}

private static int getPrefixLength(byte[] maskBytes) {

int prefixLength = 0;

for (byte b : maskBytes) {

prefixLength += Integer.bitCount(b & 0xFF);

}

return prefixLength;

}

}