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EXP NO:12.A **Packet Sniffing Using Socket**
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AIM:
To study packet sniffing concept and implement it using sockets.

Algorithm:

Import Libraries: Import necessary modules from scapy for packet capturing and IP layers.

Define Packet Callback:

- Check if the packet contains an IP layer.
- Extract protocol number, source IP, and destination IP from the IP layer.
- Identify the protocol type (ICMP, TCP, UDP) based on the protocol number.
- Print the protocol name, source IP, and destination IP.

Main Function:

- Use sniff to capture packets on the default network interface.
- For each packet, call packet_callback to process and display packet information.

Run Program:

- Execute the main function to start packet sniffing when the script runs.

Program:

```
from scapy.all import sniff

from scapy.layers.inet import IP, TCP, UDP, ICMP

def packet_callback(packet):
    if IP in packet:
        ip_layer = packet[IP]
        protocol = ip_layer.proto
        src_ip = ip_layer.src
        dst_ip = ip_layer.dst

        # Determine the protocol
        protocol_name = ""
        if protocol == 1:
        protocol_name = "ICMP"
        elif protocol == 6:
        protocol_name = "TCP"
        elif protocol == 17:
            protocol_name = "UDP"
        else:
            protocol_name = "Unknown Protocol"

        # Print packet details
        print(f"Protocol: {protocol_name}")
        print(f"Source IP: {src_ip}")
        print(f"Destination IP: {dst_ip}")
        print("-" * 50)

def main():
    # Capture packets on the default network interface
    sniff(prn=packet_callback, filter="ip", store=0)

if __name__ == "__main__":
    main()
```

Output:

```
C:\Users\Windows\PycharmProjects\pythonProject1\.venv\Scripts\python
Protocol: TCP
Source IP: 3.231.72.45
Destination IP: 192.168.1.38
------------------------------------------------
Protocol: TCP
Source IP: 192.168.1.38
Destination IP: 3.231.72.45
------------------------------------------------
Protocol: Unknown Protocol
Source IP: 192.168.1.38
Destination IP: 224.0.0.22
------------------------------------------------
Protocol: UDP
Source IP: 192.168.1.38
Destination IP: 224.0.0.251
------------------------------------------------
Protocol: UDP
Source IP: 192.168.1.38
Destination IP: 224.0.0.251
------------------------------------------------
Protocol: Unknown Protocol
Source IP: 192.168.1.38
Destination IP: 224.0.0.22
------------------------------------------------
Protocol: UDP
Source IP: 192.168.1.37
Destination IP: 224.0.0.251
------------------------------------------------
Protocol: Unknown Protocol
Source IP: 192.168.1.1
Destination IP: 224.0.0.1
```

Result:

Packet sniffing concept and implement it using sockets is studied and successfully executed.