AIM: ANIMATE A SIMPLE NETWORK USING NETANIM IN NETWORK SIMULATOR.

THEORY:

SOURCE CODE:

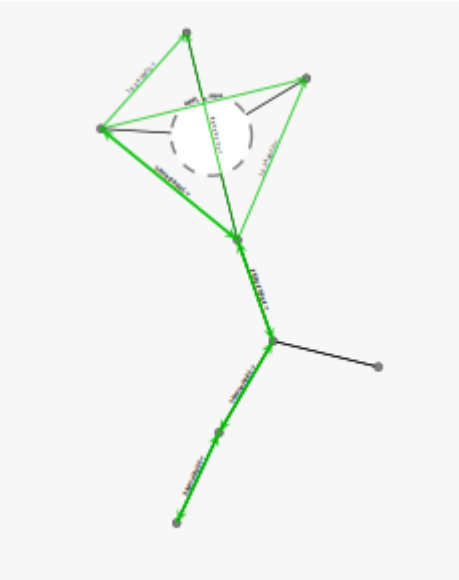
```
#include "ns3/core-module.h"
#include "ns3/network-module.h"
#include "ns3/csma-module.h"
#include "ns3/internet-module.h"
#include "ns3/point-to-point-module.h"
#include "ns3/applications-module.h"
#include "ns3/ipv4-global-routing-helper.h"
#include "ns3/netanim-module.h"
#include "ns3/mobility-module.h"

using namespace ns3;

NS_LOG_COMPONENT_DEFINE ("FirstScriptExample");

int main (int argc, char *argv[])
{
 CommandLine cmd (__FILE__);
 cmd.Parse (argc, argv);

 LogComponentEnable ("UdpEchoClientApplication", LOG_LEVEL_INFO);
 LogComponentEnable ("UdpEchoServerApplication", LOG_LEVEL_INFO);

 NodeContainer nodes;
 NodeContainer routers;
 nodes.Create (1);
 routers.Create(4);

 NodeContainer csmaNodes;
 csmaNodes.Create (3);

 InternetStackHelper stack;
 stack.Install (nodes);
 stack.Install (routers);
 stack.Install (csmaNodes);

 //subnet1
 PointToPointHelper pointToPoint;
 pointToPoint.SetDeviceAttribute ("DataRate", StringValue ("5Mbps"));
 pointToPoint.SetChannelAttribute ("Delay", StringValue ("2ms"));

 NodeContainer subnet1;
```

```
subnet1.Add(nodes.Get(0));
subnet1.Add(routers.Get(0));

NetDeviceContainer Subnet1devices;
Subnet1devices = pointToPoint.Install (subnet1);

Ipv4AddressHelper subnet1address;
subnet1address.SetBase ("10.1.1.0", "255.255.255.0");
Ipv4InterfaceContainer p2pInterfaces1;
p2pInterfaces1 = subnet1address.Assign (Subnet1devices);

//subnet2
NodeContainer subnet2;
subnet2.Add(routers.Get(0));
subnet2.Add(routers.Get(1));

NetDeviceContainer Subnet2devices;
Subnet2devices = pointToPoint.Install (subnet2);

Ipv4AddressHelper subnet2address;
subnet2address.SetBase ("10.1.2.0", "255.255.255.0");
Ipv4InterfaceContainer p2pInterfaces2;
p2pInterfaces2 = subnet2address.Assign (Subnet2devices);

//subnet3
NodeContainer subnet3;
subnet3.Add(routers.Get(1));
subnet3.Add(routers.Get(2));

NetDeviceContainer Subnet3devices;
Subnet3devices = pointToPoint.Install (subnet3);

Ipv4AddressHelper subnet3address;
subnet3address.SetBase ("10.1.3.0", "255.255.255.0");
Ipv4InterfaceContainer p2pInterfaces3;
p2pInterfaces3 = subnet3address.Assign (Subnet3devices);

//subnet4

NodeContainer subnet4;
subnet4.Add(routers.Get(1));
subnet4.Add(routers.Get(3));

NetDeviceContainer Subnet4devices;
Subnet4devices = pointToPoint.Install (subnet4);

Ipv4AddressHelper subnet4address;
```

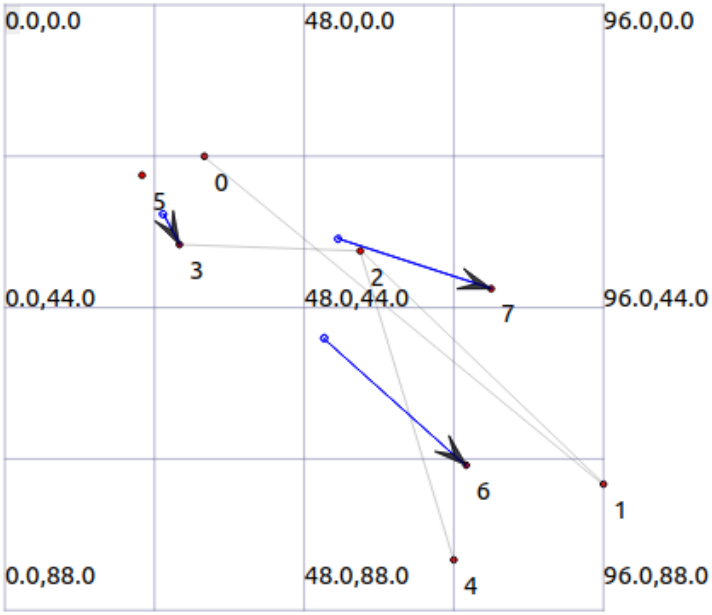
```
 subnet4address.SetBase ("10.1.4.0", "255.255.255.0");
 Ipv4InterfaceContainer p2pInterfaces4;
 p2pInterfaces4 = subnet4address.Assign (Subnet4devices);

 //subnet5
 CsmaHelper csma;
 csma.SetChannelAttribute ("DataRate", StringValue ("100Mbps"));
 csma.SetChannelAttribute ("Delay", TimeValue (NanoSeconds (6560)));

 NodeContainer subnet5;
 subnet5.Add(csmaNodes.Get(0));
 subnet5.Add(csmaNodes.Get(1));
 subnet5.Add(csmaNodes.Get(2));
 subnet5.Add(routers.Get(2));

 NetDeviceContainer csmaDevices;
 csmaDevices = csma.Install (subnet5);

 Ipv4AddressHelper subnet5address;
 subnet5address.SetBase ("10.1.5.0", "255.255.255.0");
 Ipv4InterfaceContainer p2pInterfaces5;
 p2pInterfaces5 = subnet5address.Assign (csmaDevices);

 UdpEchoServerHelper echoServer (9);

 ApplicationContainer serverApps = echoServer.Install (csmaNodes.Get (0));
 serverApps.Start (Seconds (1.0));
 serverApps.Stop (Seconds (10.0));

 UdpEchoClientHelper echoClient (p2pInterfaces5.GetAddress (0), 9);
 echoClient.SetAttribute ("MaxPackets", UintegerValue (1));
 echoClient.SetAttribute ("Interval", TimeValue (Seconds (1.0)));
 echoClient.SetAttribute ("PacketSize", UintegerValue (1024));

 ApplicationContainer clientApps = echoClient.Install (nodes.Get (0));
 clientApps.Start (Seconds (2.0));
 clientApps.Stop (Seconds (10.0));

 Ipv4GlobalRoutingHelper::PopulateRoutingTables();

 Simulator::Run ();
 Simulator::Destroy ();
 return 0;
}
```

OUTPUT:

```
vaish@vaish-VirtualBox:~/ns-allinone-3.32/ns-3.32$ ./waf --run scratch/pract8.cc --vis
Waf: Entering directory `/home/vaish/ns-allinone-3.32/ns-3.32/build'
Waf: Leaving directory `/home/vaish/ns-allinone-3.32/ns-3.32/build'
Build commands will be stored in build/compile_commands.json
'build' finished successfully (0.986s)
Could not load plugin 'show_last_packets.py': No module named 'kiwi'
Could not load icon applets-screenshooter due to missing gnomedesktop Python module
scanning topology: 8 nodes...
scanning topology: calling graphviz layout
scanning topology: all done.
At time +2s client sent 1024 bytes to 10.1.5.1 port 9
At time +2.01718s server received 1024 bytes from 10.1.1.1 port 49153
At time +2.01718s server sent 1024 bytes to 10.1.1.1 port 49153
At time +2.03435s client received 1024 bytes from 10.1.5.1 port 9
```

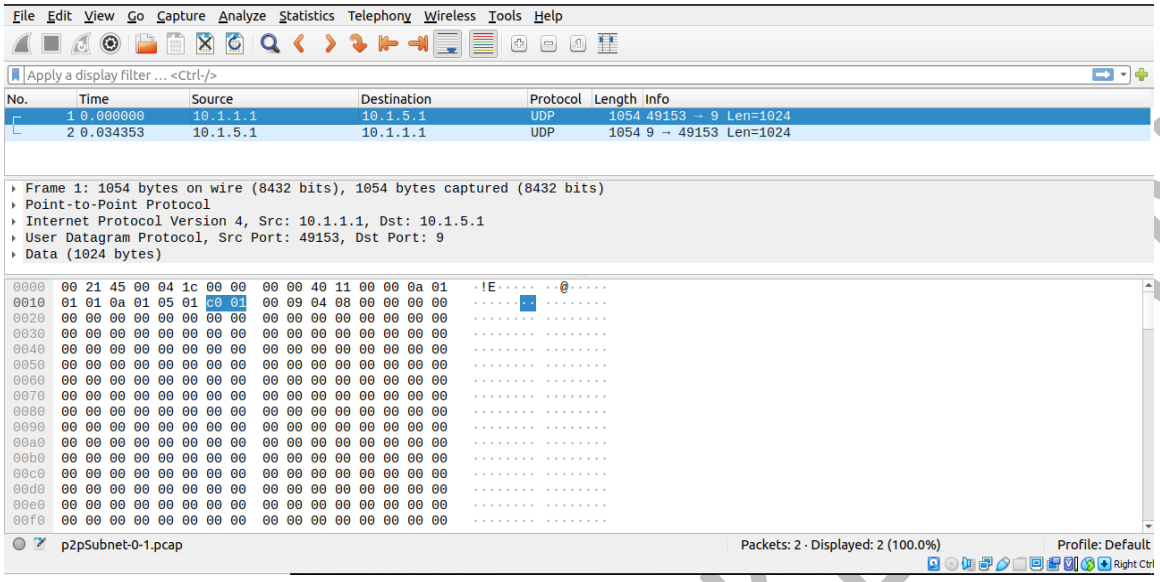


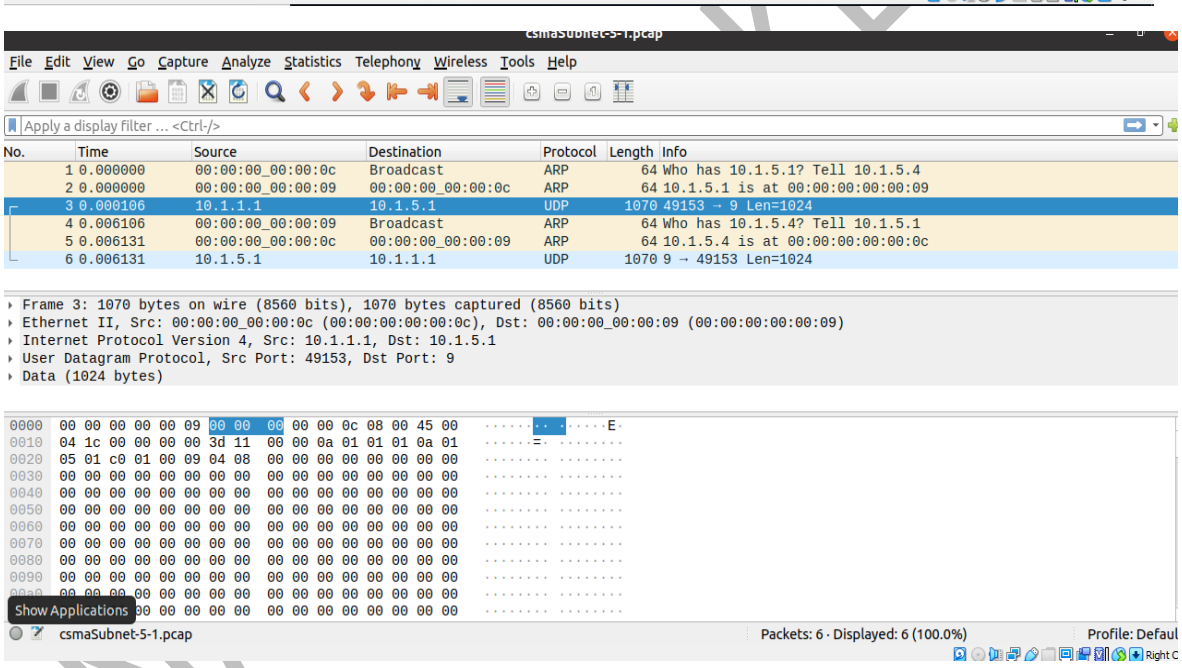
NetAnim:



WireShark :

```
vaish@vaish-VirtualBox:~/ns-allinone-3.32/ns-3.32$ wireshark p2pSubnet-0-1.pcap
vaish@vaish-VirtualBox:~/ns-allinone-3.32/ns-3.32$ wireshark csmaSubnet-5-1.pcap
```





CONCLUSION:

From this practical, I have learned how to implement a simple network using NetAnim in Network Simulator executed successfully.