Lab Report

Course Title: Computer Networks Laboratory Course
Code: CSE-3634

Autumn-2021

Lab No: 2

A network consists of 10 nodes where the message generation and forwarding by a node depend on its parameter's value.

Name of Labwork: 10 Nodes pass a message circularly

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Date of :
Performance :
Date of
Submission: 09/2/2022

Marks :

1.Introduction:

In this lab 2 I develop a simulation that 4 nodes will circulate a message”Showing lab2 network”……...

3.Description:

One of the nodes will generate message, here PC-1 will generate message. That message will be passed to PC-2,3,4 and one by one to node 10 thereafter Node-10 will pass down the message to node 10 and thus this loop will continues until their limit arrives.i have set my limit to 7 and they will circularly pass mesasage 6 times. I also created my Node module in C++, network in NED language and ini file for initialization of the simulation. Each of the file is described in the following sections.

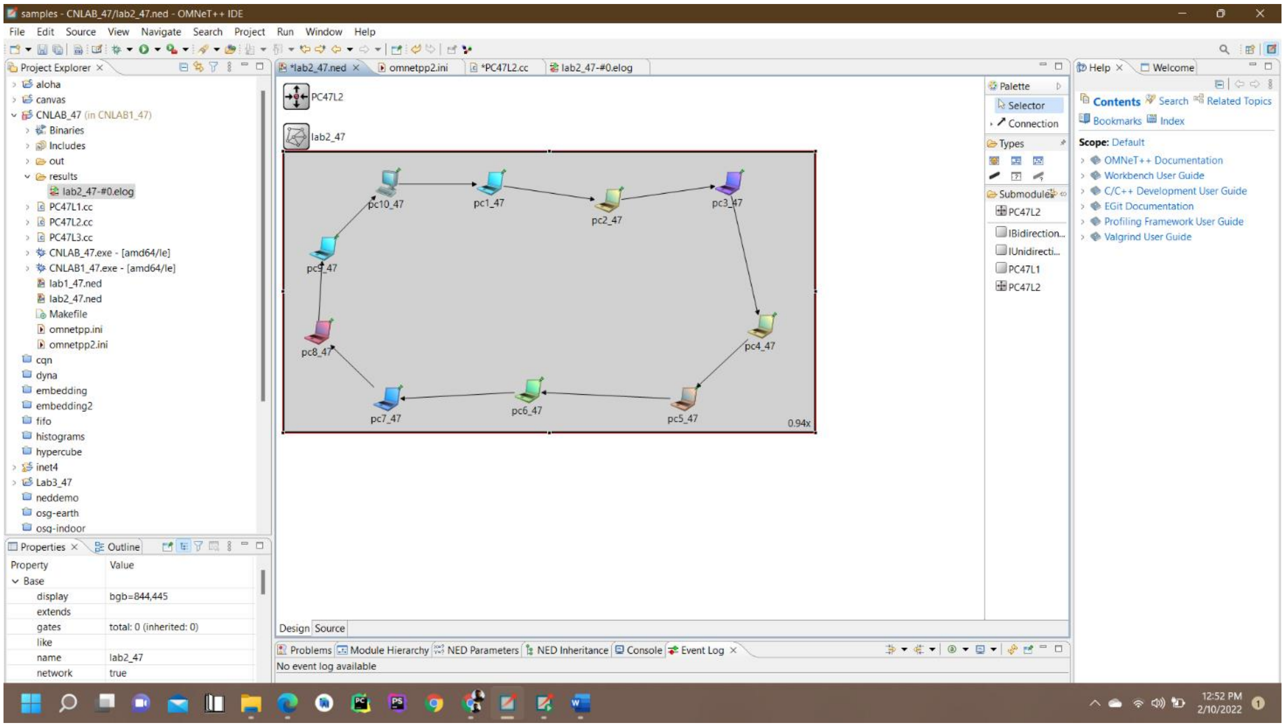
4.Module:

```
//Design Source Code
simple PC47L2
{
    parameters:
        bool sendMsgOnInit = default(false); // whether the module should send out a
message on initialization
        int limit = default(2);   // another parameter with a default value
        @display("i=block/routing");
    gates:
        input in;
        output out;
}


network lab2_47
{
    @display("bgb=844,445");
    submodules:
        pc1_47:PC47L2 {
            parameters:
                sendMsgOnInit = true;
                @display("i=device/laptop,cyan;p=328,50");
        }
        pc2_47:PC47L2 {
            parameters:
                sendMsgOnInit = false;
                @display("i=device/laptop,gold;p=516,78");
        }
        pc3_47:PC47L2 {
            parameters:
                sendMsgOnInit = false;
                @display("i=device/laptop,#8000FF;p=708,50");
        }
        pc4_47:PC47L2 {
            parameters:
                sendMsgOnInit = false;
                @display("i=device/laptop,gold;p=760,278");
        }
        pc5_47: PC47L2 {
            parameters:
                sendMsgOnInit = false;
                @display("i=device/laptop,#FF8000;p=637,394");
        }
        pc6_47: PC47L2 {
            parameters:
                sendMsgOnInit = false;
                @display("i=device/laptop,#80FF00;p=389,381");
        }
        pc7_47: PC47L2 {
            parameters:
                sendMsgOnInit = false;
                @display("i=device/laptop,#0080FF;p=164,394");
        }
        pc8_47: PC47L2 {
            parameters:
                sendMsgOnInit = false;
                @display("i=device/laptop,red;p=54,288");
        }
        pc9_47: PC47L2 {
            parameters:
                sendMsgOnInit = false;
                @display("i=device/laptop,cyan;p=62,154");
        }
        pc10_47: PC47L2 {
            parameters:
                sendMsgOnInit = false;
                @display("i=device/pc,#408080;p=164,50");
        }
    connections:
        pc1_47.out --> {  delay = 100ms; } --> pc2_47.in;

        pc2_47.out --> {  delay = 100ms; } --> pc3_47.in;

        pc3_47.out --> {  delay = 100ms; } --> pc4_47.in;
        pc4_47.out --> {  delay = 100ms; } --> pc5_47.in;

        pc5_47.out --> {  delay = 100ms; } --> pc6_47.in;

        pc6_47.out --> {  delay = 100ms; } --> pc7_47.in;

        pc7_47.out --> {  delay = 100ms; } --> pc8_47.in;

        pc8_47.out --> {  delay = 100ms; } --> pc9_47.in;

        pc9_47.out --> {  delay = 100ms; } --> pc10_47.in;

        pc10_47.out --> {  delay = 100ms; } --> pc1_47.in;


}

//C++ code
#include <stdio.h>
    #include <string.h>
    #include <omnetpp.h>

    using namespace omnetpp;


    class PC47L2 : public cSimpleModule
    {
      private:
        int counter;

      protected:
        virtual void initialize() override;
        virtual void handleMessage(cMessage *msg) override;
    };

    Define_Module(PC47L2);

    void PC47L2::initialize()
    {

        counter = par("limit");

        // we no longer depend on the name of the module to decide
        // whether to send an initial message
        if (par("sendMsgOnInit").boolValue() == true) {
            EV << "Sending initial message\n";
            cMessage *msg = new cMessage("Showing PC2 network");
            send(msg, "out");
        }
    }

    void PC47L2::handleMessage(cMessage *msg)
```

```
{
    counter--;
    if (counter == 0) {
        EV << getName() << "'s counter reached zero, deleting message\n";
        delete msg;
    }
    else {
        EV << getName() << "'s counter is " << counter << ", sending back message\n";
        send(msg, "out");
    }
}
```

5.NED file:

(Desktop screen)



Property	Value
Base	
display	bgb=844,445
extends	
gates	total: 0 (inherited: 0)
like	
name	lab2_47
network	true

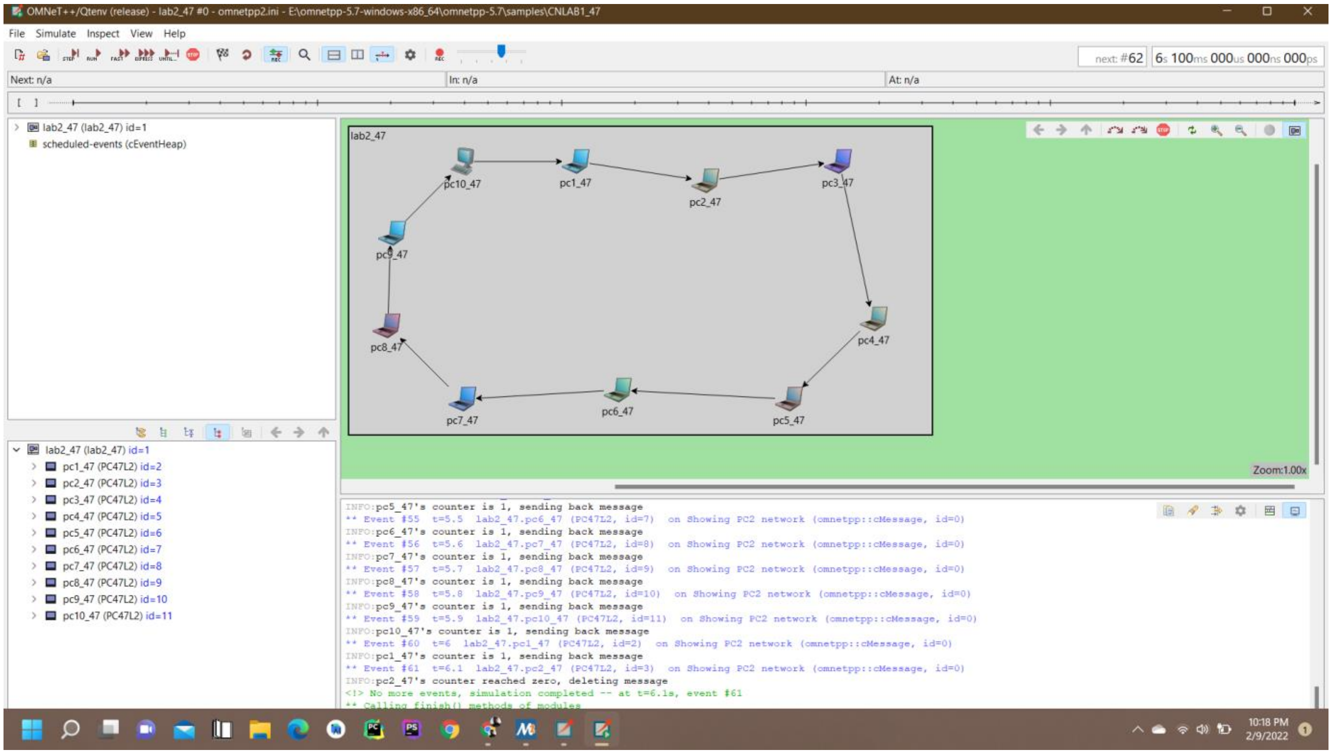
No event log available

6.INI File:

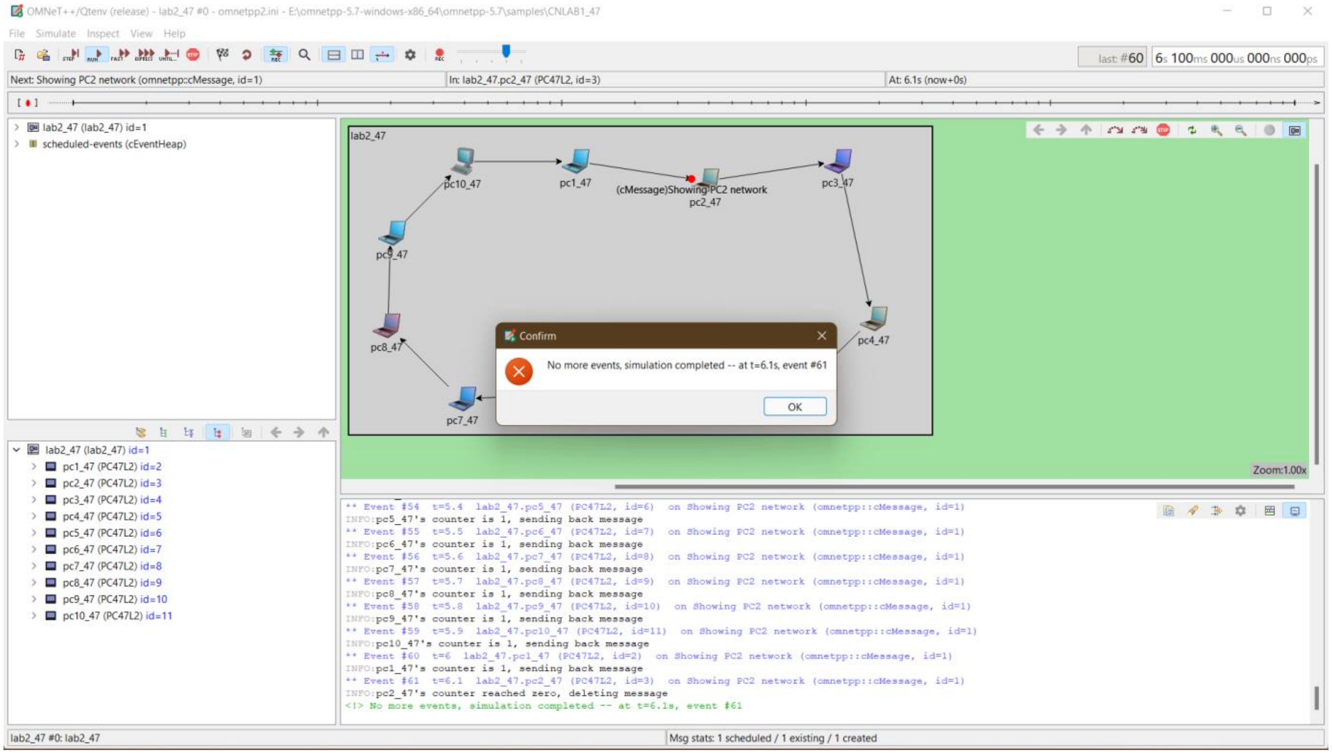
```
[Config lab2_47]
    network = lab2_47
record-eventlog=true
lab2_47.pc1_47.limit = 7
lab2_47.pc2_47.limit = 7
lab2_47.pc3_47.limit = 7
lab2_47.pc4_47.limit = 7
lab2_47.pc5_47.limit = 7
lab2_47.pc6_47.limit = 7
lab2_47.pc7_47.limit = 7
lab2_47.pc8_47.limit = 7
lab2_47.pc9_47.limit = 7
lab2_47.pc10_47.limit = 7
```

7.Simulation and result:

Simulation:



```
INFO:pc5_47's counter is 1, sending back message
** Event #55  t=5.5  lab2_47.pc6_47 (PC47L2, id=7)  on Showing PC2 network (omnetpp::cMessage, id=0)
INFO:pc6_47's counter is 1, sending back message
** Event #56  t=5.6  lab2_47.pc7_47 (PC47L2, id=8)  on Showing PC2 network (omnetpp::cMessage, id=0)
INFO:pc7_47's counter is 1, sending back message
** Event #57  t=5.7  lab2_47.pc8_47 (PC47L2, id=9)  on Showing PC2 network (omnetpp::cMessage, id=0)
INFO:pc8_47's counter is 1, sending back message
** Event #58  t=5.8  lab2_47.pc9_47 (PC47L2, id=10)  on Showing PC2 network (omnetpp::cMessage, id=0)
INFO:pc9_47's counter is 1, sending back message
** Event #59  t=5.9  lab2_47.pc10_47 (PC47L2, id=11)  on Showing PC2 network (omnetpp::cMessage, id=0)
INFO:pc10_47's counter is 1, sending back message
** Event #60  t=6  lab2_47.pc1_47 (PC47L2, id=2)  on Showing PC2 network (omnetpp::cMessage, id=0)
INFO:pc1_47's counter is 1, sending back message
** Event #61  t=6.1  lab2_47.pc2_47 (PC47L2, id=3)  on Showing PC2 network (omnetpp::cMessage, id=0)
INFO:pc2_47's counter reached zero, deleting message
<!> No more events, simulation completed -- at t=6.1s, event #61
** Calling finish() methods of modules
```



OMNeT++/Qtenv (release) - lab2_47 #0 - omnetpp2.ini - E:\omnetpp-5.7-windows-x86_64\omnetpp-5.7\samples\CNLAB1_47

last: #60 6s 100ms 000us 000ns 000ps

Next: Showing PC2 network (omnetpp::cMessage, id=1) | In: lab2_47.pc2_47 (PC47L2, id=3) | At: 6.1s (now+0s)

```
> lab2_47 (lab2_47) id=1
> scheduled-events (cEventHeap)
```

```
v lab2_47 (lab2_47) id=1
  > pc1_47 (PC47L2) id=2
  > pc2_47 (PC47L2) id=3
  > pc3_47 (PC47L2) id=4
  > pc4_47 (PC47L2) id=5
  > pc5_47 (PC47L2) id=6
  > pc6_47 (PC47L2) id=7
  > pc7_47 (PC47L2) id=8
  > pc8_47 (PC47L2) id=9
  > pc9_47 (PC47L2) id=10
  > pc10_47 (PC47L2) id=11
```

Confirm

No more events, simulation completed -- at t=6.1s, event #61

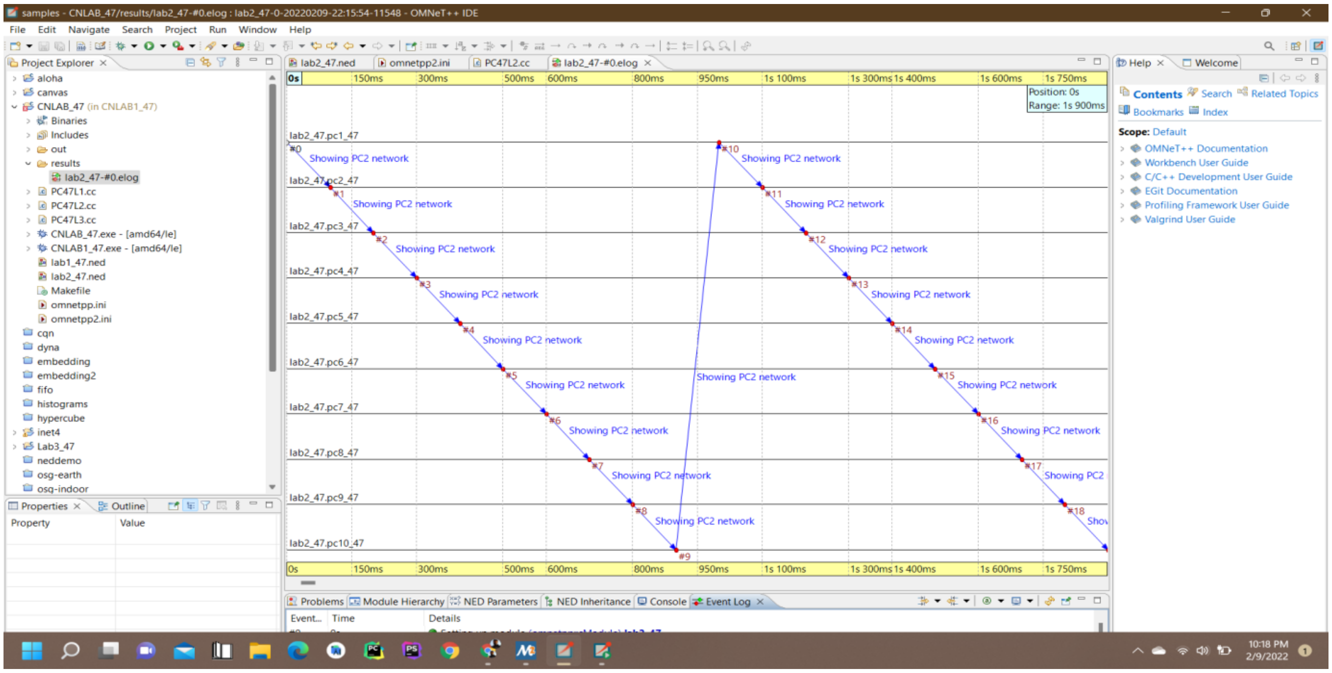
```
** Event #54  t=5.4  lab2_47.pc5_47 (PC47L2, id=6)  on Showing PC2 network (omnetpp::cMessage, id=1)
INFO:pc5_47's counter is 1, sending back message
** Event #55  t=5.5  lab2_47.pc6_47 (PC47L2, id=7)  on Showing PC2 network (omnetpp::cMessage, id=1)
INFO:pc6_47's counter is 1, sending back message
** Event #56  t=5.6  lab2_47.pc7_47 (PC47L2, id=8)  on Showing PC2 network (omnetpp::cMessage, id=1)
INFO:pc7_47's counter is 1, sending back message
** Event #57  t=5.7  lab2_47.pc8_47 (PC47L2, id=9)  on Showing PC2 network (omnetpp::cMessage, id=1)
INFO:pc8_47's counter is 1, sending back message
** Event #58  t=5.8  lab2_47.pc9_47 (PC47L2, id=10)  on Showing PC2 network (omnetpp::cMessage, id=1)
INFO:pc9_47's counter is 1, sending back message
** Event #59  t=5.9  lab2_47.pc10_47 (PC47L2, id=11)  on Showing PC2 network (omnetpp::cMessage, id=1)
INFO:pc10_47's counter is 1, sending back message
** Event #60  t=6  lab2_47.pc1_47 (PC47L2, id=2)  on Showing PC2 network (omnetpp::cMessage, id=1)
INFO:pc1_47's counter is 1, sending back message
** Event #61  t=6.1  lab2_47.pc2_47 (PC47L2, id=3)  on Showing PC2 network (omnetpp::cMessage, id=1)
INFO:pc2_47's counter reached zero, deleting message
<!> No more events, simulation completed -- at t=6.1s, event #61
```

lab2_47 #0: lab2_47 | Msg stats: 1 scheduled / 1 existing / 1 created

8.Result Analysis:

After successfully building and launching my simulation, a new GUI window appear, similar to the one in the screenshot below. The window belongs to *Qtenv*, the main OMNeT++ simulation runtime GUI. I am also seeing the network results containing *pc1 to pc10* and they are displayed graphically in the main area.

After start the simulation.lab2_47 exchanging messages among pc1 to pc10.



9.Conclusion:

During creating NED file and designing network i faced some problem i.e circling the message in 10 PC’s means I had to give 9 in and 9 out first and last one should be in to out but I couldn’t help it with first attempt,after changing my source code then finally it worked. Further I haven’t confront any issues during the lab1 project.at the end I succesfully recovered my problem and created it.Then build and simulated it with omnet.ppi in my system windows10.