Create and simulate a simple ad hoc network

Aim:

To create a simple ad hoc network and perform its simulation with the required number of hosts

Software Used:

Omnetpp 5.7, INET 4.3.6 framework

Theory:

An ad hoc network is one that is spontaneously formed when devices connect and communicate with each other.
Ad hoc networks are mostly wireless local area networks (LANs).
The devices communicate with each other directly instead of relying on a base station or access points as in wireless LANs for data transfer co-ordination.
Each device participates in routing activity, by determining the route using the routing algorithm and forwarding data to other devices via this route.

Types of Wireless Ad Hoc Networks

Wireless ad hoc networks are categorized into classes. Here are a few examples:

1) Mobile ad hoc network (MANET): An ad hoc network of mobile devices.
2) Vehicular ad hoc network (VANET): Used for communication between vehicles. Intelligent VANETs use artificial intelligence and ad hoc technologies to communicate what should happen during accidents.
3) Smartphone ad hoc network (SPAN): Wireless ad hoc network created on smartphones via existing technologies like Wi-Fi and Bluetooth.
4) Wireless mesh network: A mesh network is an ad hoc network where the nodes communicate directly with each other to relay information throughout the network.
5) Army tactical MENT: Used in the army for "on-the-move" communication, a wireless tactical ad hoc network relies on range and instant operation to establish networks when needed.
6) Wireless sensor network: Wireless sensors that collect everything from temperature and pressure readings to noise and humidity levels can form an ad hoc network to deliver information to a home base without needing to connect directly to it.
7) Disaster rescue ad hoc network: Ad hoc networks are important when disaster strikes and established communication hardware isn't functioning properly.

Limitations of Ad Hoc Wireless Network

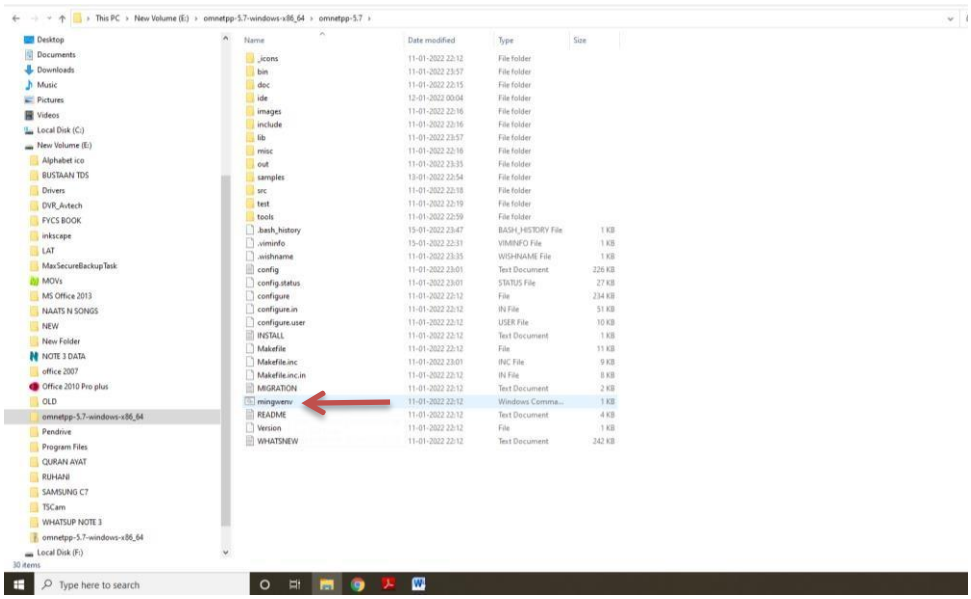
1) For file and printer sharing, all users need to be in the same workgroup, or if one computer is joined to a domain, the other users must have accounts on that computer to access shared items.
2) Other limitations of ad hoc wireless networking include the lack of security and a slow data rate. Ad hoc mode offers minimal security; if attackers come within range of your ad hoc network, they won't have any trouble connecting.

We create an Ad hoc network with 7 hosts using Omnetpp and INET through the following steps

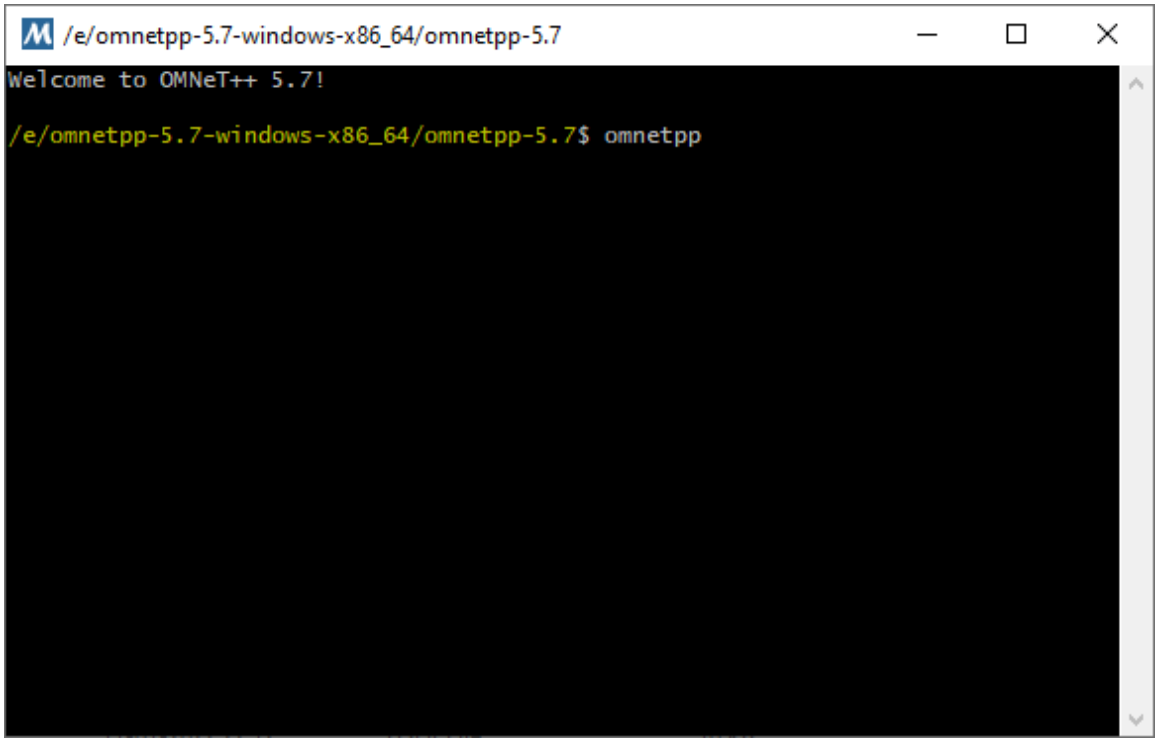
Note: we don't need to do the first step in prac exam as we can start it normally.

Step 1: Start the Omnetpp simulator through the following procedure

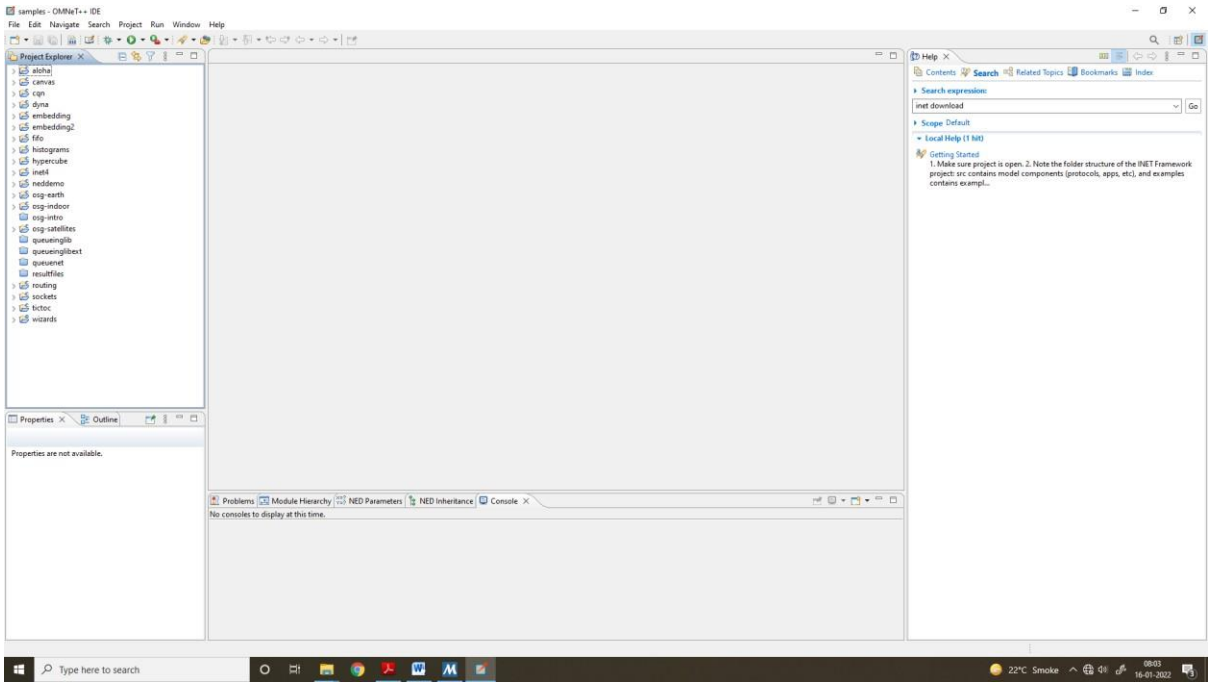
Click on the file mingwenv



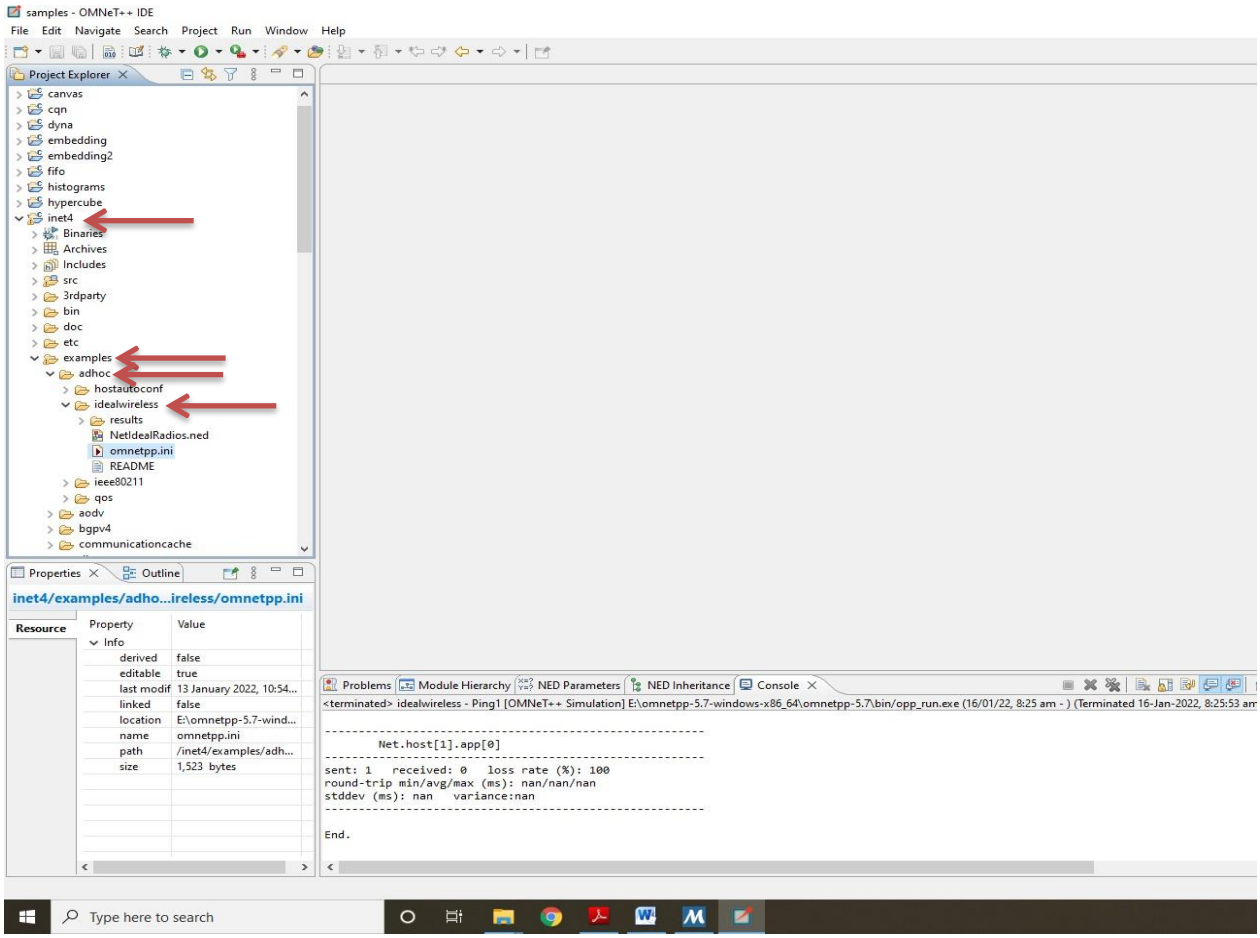
We will get the following $ prompt, type omnetpp and enter



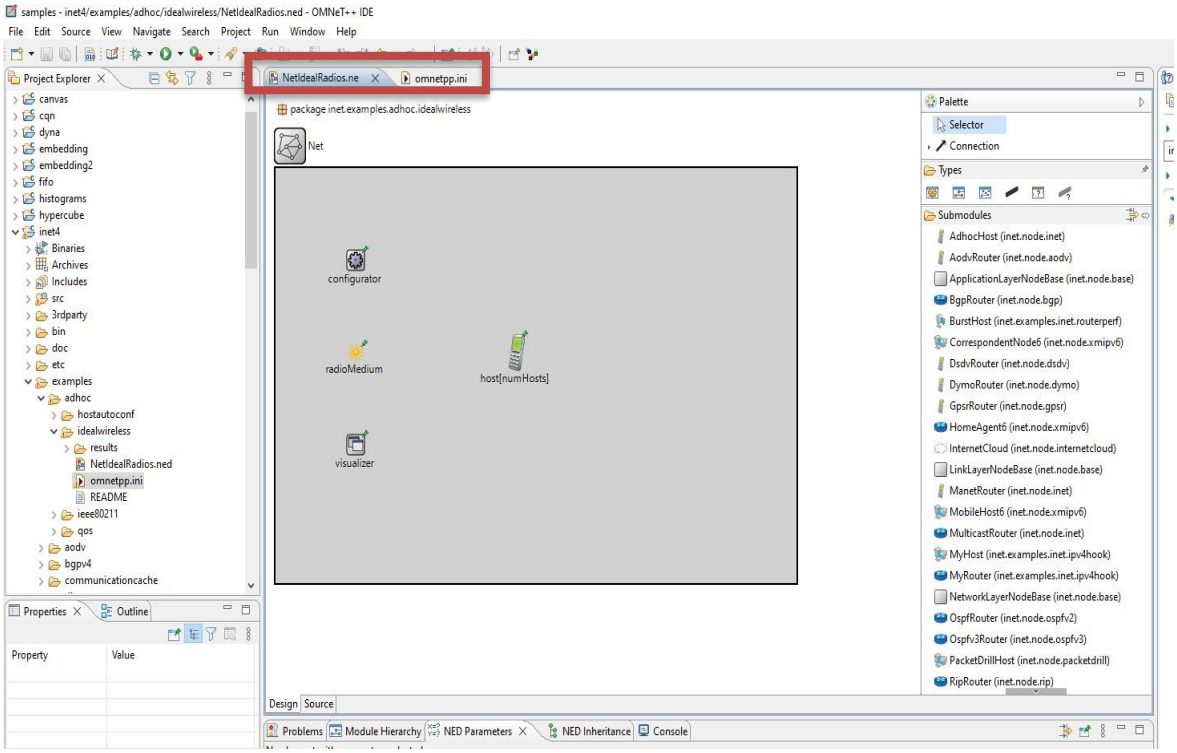
Step 2: The omnetpp simulator in now ready with the following user interface



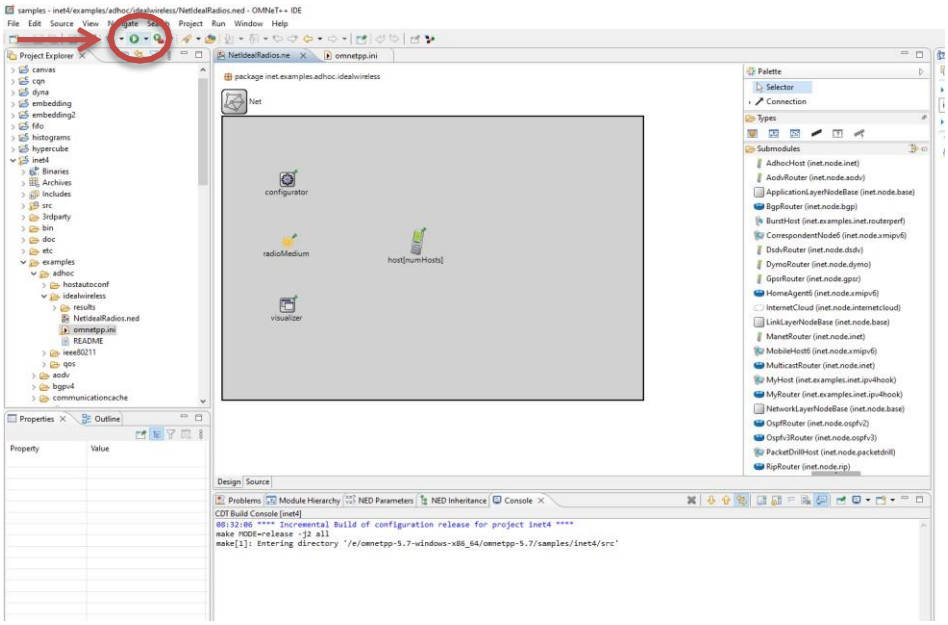
Click on inet folder, then in it click on examples, then on adhoc and then on idealwireless as given



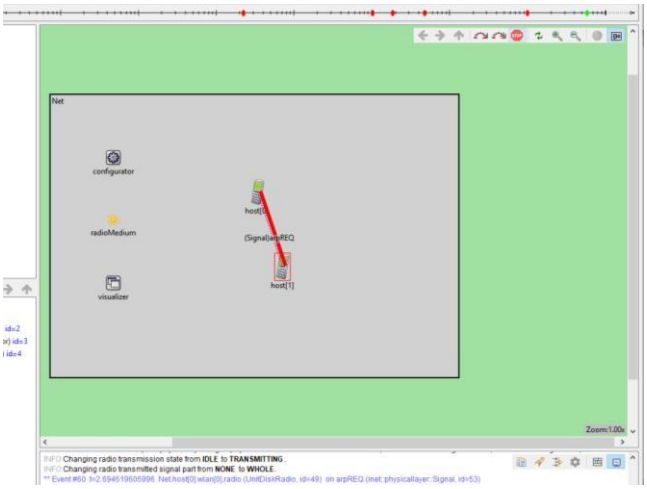
Step 3: In order to load the simulation, double click on two files NetIdealRadios.ned and omnetpp.ini



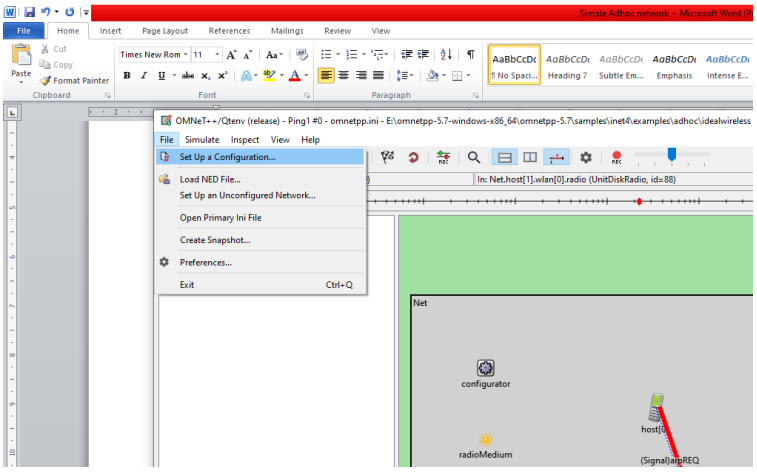
Step 4: Now we run the simulation



Step 5: After running the simulation we get the following



The number of hosts can be increased by the following



In this we get a dropdown menu, select n host option and enter the required hosts
The following simulation has 7 hosts