


National University of Computer and Emerging Sciences, Lahore Campus

	Course Name:	Intro to Internet of Things	Course Code:	IO4041
	Program:	BS-CS, BS-SE	Semester:	Spring 2024
	Section	8A	Total Marks:	15
	Due Date:	24-4-2024	Weight	~3.3%
	Exam Type:	Assignment 2	Page(s):	3

Analyzing RPL DODAG construction

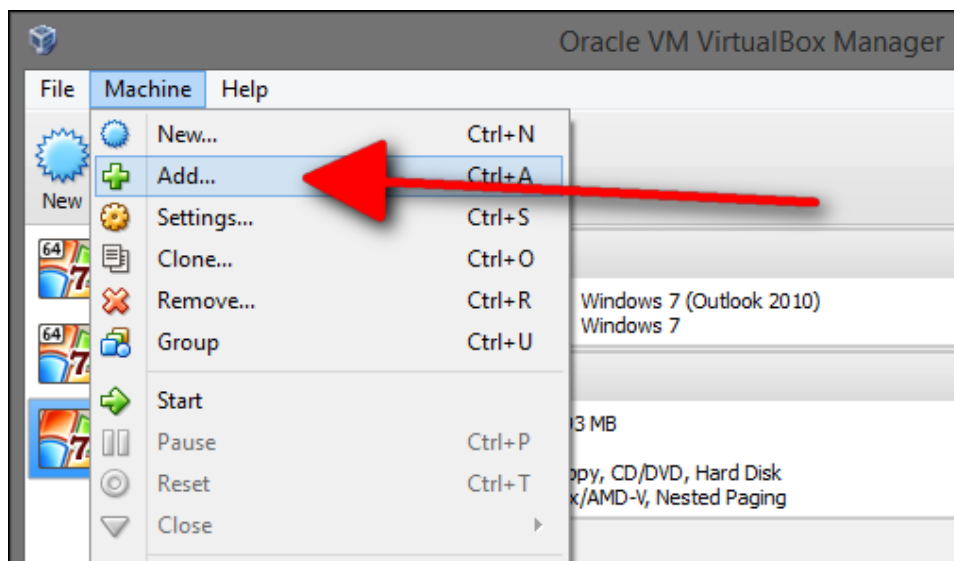
In this assignment you will use 'Cooja' — a simulator for wireless sensors networks — to analyze process of DODAG formation according to RPL protocol.

- 1) Download and install [Virtualbox](#).
- 2) Download the pre-made linux virtual machine image containing the Cooja simulator. It consists of two files. Download both and place them in the same folder.

[Virtual machine configuration file \(vbox\)](#)

[Virtual disk image \(vdi\)](#) - 15 GB

- 3) Register this machine in VirtualBox.



- 4) Start the VM and then follow the instructions in the following video. It demonstrates starting Cooja simulator, setting up a simple sensor network, capturing the radio traffic pcap file and opening that in Wireshark.

[Cooja Instructions & Demo](#)

Your task is to simulate a sensor network with

- one server
- four clients out of which two should be out of server's range (but reachable by other clients).

Then in Wireshark go through the list of captured RPL messages in sequence and explain specifically according to your network topology how DODAG construction takes place. Also identify the root of the DODAG tree.

Hints:

- All nodes get a link-local IP address in the form of fe80::201:1:1:1 (node #1), fe80::202:2:2:2 (node #2), and so on.
- ff02::1a is a special IPv6 multicast address.
- In DIO messages, keep an eye on Rank and DODAGID fields.

Deliverables

- Your simulation file *.csc (In Cooja File > Save simulation as)
- Your packet capture *.pcap
- A document containing your analysis and explanation.