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| **Operating System & Networking Fundamentals**  Diploma in CSF/IT  Year 1 (2021/22) Semester 2 | Week 15 |
| Practical |
| **Setting up Wireless LAN (WLAN)** | |

**OBJECTIVES**

* Identify the parameters to set for a Wireless LAN (WLAN)
* Configure a Wireless Router to setup a WLAN
* Set up Internet Connection
* Use Wireless Router as an Access Point

**Equipment & Resources:**

1 x Linksys MR8300 Tri-band Mesh WiFi Router, AC2200

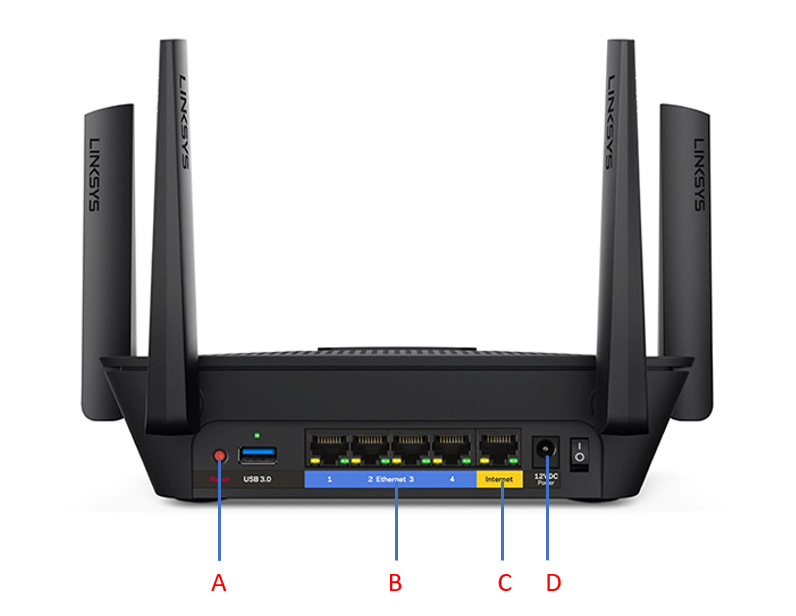
2 x RJ45 UTP cables

2 or more laptops for wireless connection to the WLAN

*Form 8 teams and each team will be given a wireless router.*

*Tutor will assign a name for your team: Team01 to Team08.*

**Activity 1: Understanding the Linksys MR8300 WiFi Router**



Refer to the diagram above, write appropriate alphabet in the blanks below:

- Power Inlet \_\_\_\_\_D\_\_\_\_\_\_

- Internet Port \_\_\_\_\_C\_\_\_\_\_\_

- Ethernet LAN Ports \_\_\_\_\_B\_\_\_\_\_\_

- Reset Button \_\_\_\_\_A\_\_\_\_\_\_

Configure router in menu (admin page, this one is 192.168.1.1)

Device list - blacklist devices

Guest access for visitors – has separate ssid and optional password for guests

so that visitors won’t have to use main ssid where they can carry out attacks

Parental control – prevent access to some sites

Device prioritisation – prioritise bandwidth for selected devices

1. The four “Ethernet” LAN ports (4-port Switch) allow you to connect to various devices such as desktop, laptop, print server or network printer using UTP cables. If a desktop is connected to Port 2, how do you check that the connection is properly made and that there is data transmission?

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| LED light on router is blinking |

1. The “Internet” port (labelled as “WAN” for other models of router) handles all outgoing/incoming data to/from the Internet. How do you know whether there is any data to/from the Internet?

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| LED light on “Internet” is blinking |

1. To connect the “Internet” port to a Fibre Broadband network, what network device would you need?

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| Optical Network Terminal |

1. How would you connect the “Internet” port to access Internet via the NP network in your lab?

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| Connect the RJ45 fibre-optic cable to the internet RJ45 port of the device |

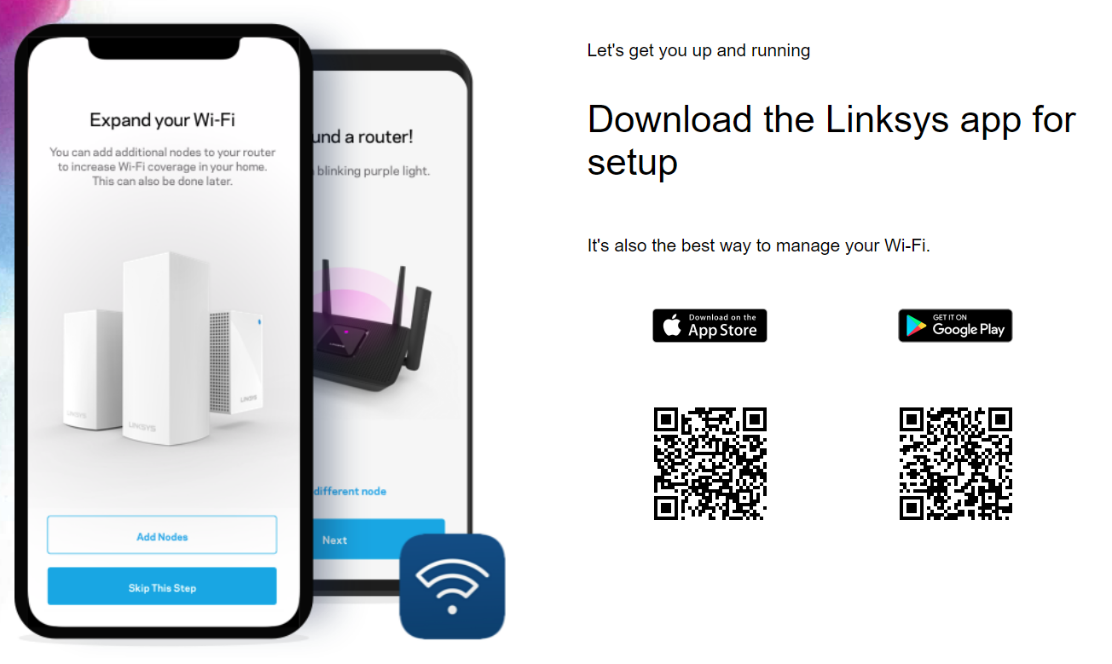
**Activity 2: Configure the Wireless Router**

1. Connect a UTP cable between the PC and one of the Ethernet LAN ports on the Wireless Router.
2. Set PC’s IP address to obtain an IP address automatically.
3. Power on the router.
4. **Reset the router setting:**

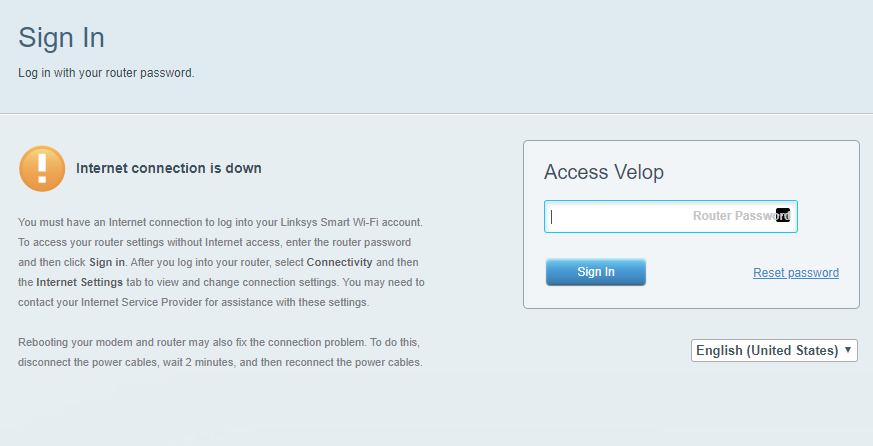
Use a ball-pen tip, press and hold the Reset button for about 10 seconds. Do not release the button until the light turns **from blinking red (or blue)** to **permanent red (or blue)**.

1. On the PC, at the search bar of the browser, enter 192.168.1.1.
2. The initial log-in page will appear. **Click on the picture of the smartphones**.

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1. Sign in to the router using “admin” as the password.



1. Click on “Connectivity” followed by “Local Network” tab. Use it to configure DHCP settings.

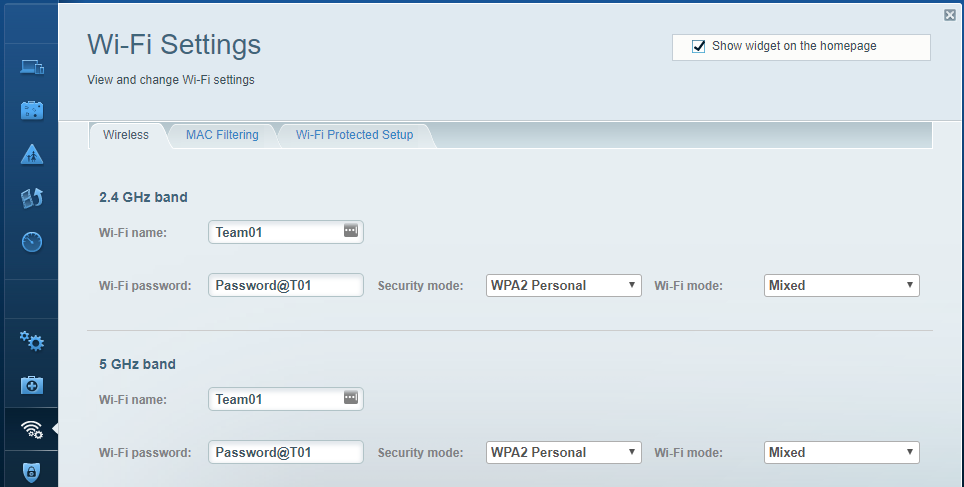


Fill in the following:

1. Router IP address is \_\_\_\_\_\_\_\_\_192.168.1.1\_\_\_\_\_\_\_\_
2. For DHCP Server Setting, the range of dynamic IP addresses to be issued by DHCP Server is from \_\_\_\_\_\_\_192.168.1.10\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_192.168.1.14\_\_\_\_\_\_.
3. Determine the range of static IP addresses that can be assigned to servers and network printers:

* from \_\_\_\_\_\_\_192.168.1.10\_\_\_\_\_\_ to \_\_\_\_\_\_192.168.1.14\_\_\_\_\_\_\_

1. Click on the “Wi-Fi Settings” tab. Use it to configure SSID, and WiFi password.



1. Type in the following WLAN configuration parameters:

WiFi name (SSID): Team01 (assigned by tutor)

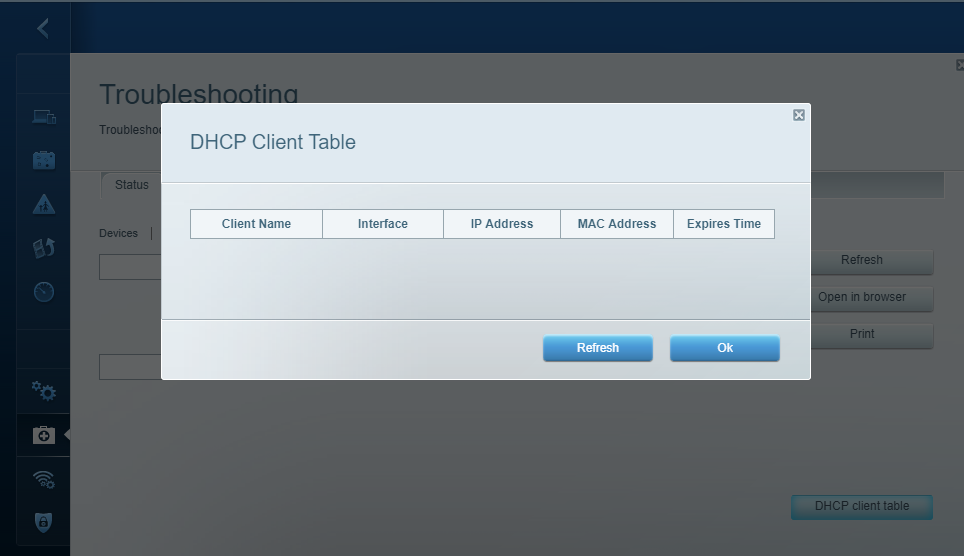
WiFi password: Password@T01

Click “Apply” then “OK” box.

**Activity 3: Testing the Wireless LAN**

1. Boot up your laptop. Click the “network connection” icon in the task bar to see a list of available WLANs. Search for the SSID of the wireless LAN that you have just configured (e.g. Team01).

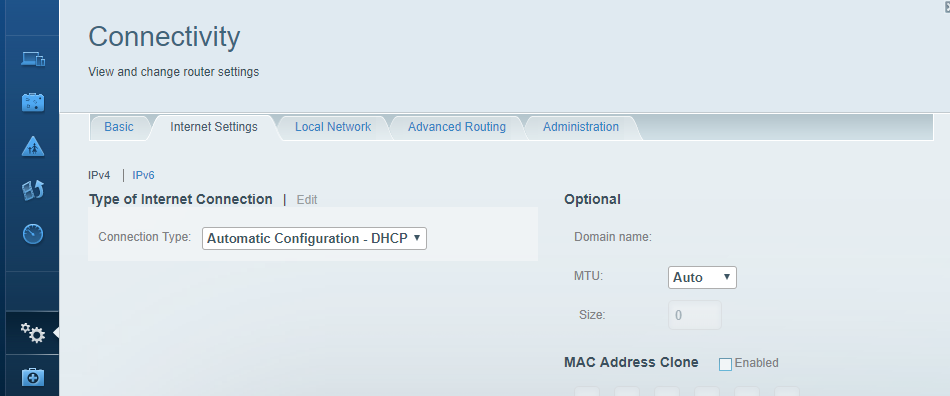
1. Connect to this WLAN (e.g. Team01) supplying the correct passphrase.
2. Once the connection is established, the laptop is now part of the WLAN. Do the followings:
3. Use “ipconfig” in command prompt to find out the private IP address assigned by the DHCP server to this laptop: \_\_\_\_\_\_\_192.168.1.14\_\_\_\_\_\_\_\_\_
4. Is this address within the range of the DHCP pool of addresses you have seen in step 8 of Activity 2 above? \_\_\_\_\_Yes\_\_\_\_\_\_\_
5. Ping to the router’s IP address, then to other laptops in the WLAN;
6. Click on “Troubleshooting” tab and view the status. Click on the DHCP Client Table button.



1. You should see details of the list of clients which include wired client connected to the LAN port(s) as well as wireless clients who have joined your WLAN – it should include your laptop!

**Activity 4: Set Up Internet Connection**

1. Click on “Connectivity” followed by “Internet Settings” tab and check that the Internet Connection Type is “Automatic Configuration - DHCP”.



1. Connect the UTP cable from the “Internet port” of the Wireless Router to the wall outlet. This would provide Internet connection via the NP-ICT network. Try surfing the Internet now.
2. What is the IP address assigned to the Wireless Router for the clients to access the Internet? (Hint: check under “Troubleshooting”)

\_\_\_\_\_\_\_\_\_\_192.168.1.1\_\_\_\_\_\_\_\_\_\_\_\_

Is it a public or private IP address? \_\_\_\_\_\_\_Public\_\_\_\_\_\_\_\_

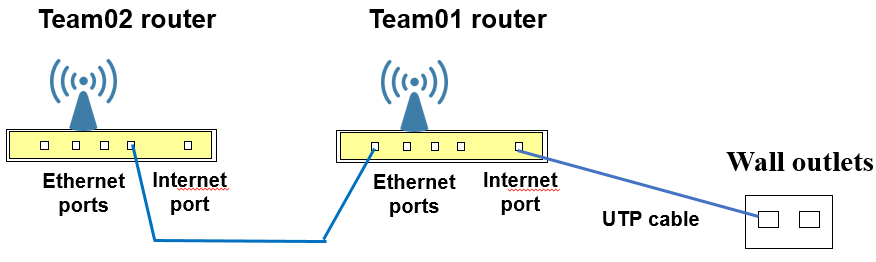
Which is the software component (network protocol) in the Wireless Router that allows your laptop which has a private IP address to access the Internet? \_\_\_\_NAT\_\_\_\_\_

**Activity 5: Use Wireless Router as an Access Point**

In this activity, you are required to set up a wireless router connected to an access point to form a wireless network with multiple access points. Two teams need to work together e.g. Team01 and Team02.

1. Leave Team01 router connected to the wall outlet.
2. Remove the UTP cable connecting “Internet” port of Team02 router from the wall outlet. Use this UTP cable to connect one of the LAN ports of Team01 router to one of the LAN ports of Team02 router.

[Note that you have just created an extended LAN with 2 switches]



1. To use Team02 router as an access point, you need to:

- configure it with a static IP address that is different from the Team01 router: 192.168.1.1 (a suitable IP address is 192.168.1.2),

- disable the DHCP server.

1. Explain what problems would arise if you did not perform the configuration in step 3.

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| When a device that wants to connect to the network requests for an IP address, both of the DHCP servers will respond, resulting in a conflict, where the DHCP response given to the device may or may not be accepted by the device. If the IP address is okay, the device may still not be able to connect to the network, as it may not connect to the correct router that has been connected to the network. |

1. Test whether your laptop connected to the WLAN with SSID: Team02 is able to surf the Internet.
2. You can configure both APs in the routers with the same SSID to allow seamless roaming. Note: they must also be configured with the same type of authentication and encryption e.g. WPA2 Personal and AES.

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