**Name & ID**: Syed Asghar Abbas Zaidi **Date:** 29th August 2023

| **EE-424L Data Communication & Networking**  **Fall 2023**  **Habib University**  **Dhanani School of Science & Engineering** |
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**LAB 2: Deploying Small Network in Packet tracer using HUB & Bridge**

| **Lab #2 Marks distribution:**   |  |  | **LR2=20** | **LR4=15** | **LR5=35** | **LR9=10** | **AR4=20** | | --- | --- | --- | --- | --- | --- | --- | | **In-Lab Tasks** | **Task 1** |  | 15 |  | 10 | 20 | | **Task 2** | 05 |  | 10 | | **Task 3** | 05 |  | 15 | | **Post-Lab** | **Task 1** | 10 |  | 10 | | **Total Marks** | **100** | | | | | |   **Lab #2 Marks Obtained:**   |  |  | **LR2=20** | **LR4=15** | **LR5=35** | **LR9=10** | **AR4=20** | | --- | --- | --- | --- | --- | --- | --- | | **In-Lab Tasks** | **Task 1** |  |  |  |  |  | | **Task 2** |  |  |  | | **Task 3** |  |  |  | | **Post-Lab** | **Task 1** |  |  |  | | **Marks Obt.** |  | | | | | | |
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| o**bjectives** | **The objective of this lab is to give basic understanding about connecting end-device to a Hub, learn Packet Tracer, create a simple Local Area Network (LAN) with PCs and Hub to verify the network connectivity using commands.** |
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| Task 1 |
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| **Familiarization With packet tracer Software** |
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| Packet Tracer make available a way of reliability, network capable, and simulation based knowledge surroundings for networking novices to design, configure, and troubleshoots computer networks |
| 1. Open you packet tracer, and observe the different type of options and menus that are available to you, Go through the description of each available option in Table 1.     *Figure 1 Packet Tracer Lay out* |
| | 1. | Menu Bar | This bar has following option. File, Edit, Option, View, Tools, Extensions and Basic Command Like Open, Save, Save as, Pkz and Preferences. | | --- | --- | --- | | 2. | Main Tool Bar | This bar provides following shortcut icons of the File and Edit Menu command and buttons for Copy, Paste, Undo, and Redo, Zoom the Drawing. | | 3. | Common Tools  Bar | This bar provides commonly used tools like Select, Move, Layout Place Note, Delete, Inspect, Resize Shape. | | 4. | Logical/Physical  Workspace and  Navigation Bar | We can toggle between both workspaces with the tabs on this bar. The logical workspace allow go back to a previous level in a cluster, create new cluster, Move Object, Set tiled Background.  Physical workspace allow to navigate through physical location , Create a new city , Create a new building , Create a new closet , Move object . | | 5. | Workspace | The workspace allows creating our network, watching simulation and view information and statistic. | | 6. | Real time /  Simulation Bar | This bar provide buttons to power cycle device and fast forward time and play control button and event list button in simulation mode. | | 7. | Network  Component Box | This box, we choose device and connection to put in to the workspace.  It has device type selection box and device specific selection box. | | 8. | Device-Type  Selection Box | It has types of devices and connection. | | 9. | Device-Specific  Selection Box | This box, we choose specifically device, We want to put in our network and connection make. |   *Table 1 : Settings for Packet Tracer* |
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| **Tasks** |
|  |
| 1. 1. Click on end devices and provide name of at least seven devices that are available in this option  |  | | --- | |
| 1. Click on end devices and then smart cities. What are different options available in the panel.  |  | | --- | |
| 1. \*Find a PC in the devices option and place it on working area (WorkPlace) Double Click on it. A new window will open, which will deal with PC properties. Find the price of PC as suggested by the packet racer. Also try to find that how can IPs be configured for this PC using same menu. |
| 1. Place two PCs in workspace and explore different options. And see how can they be connected with each other. What different options are available to connect PCs with each other.  |  | | --- | |
| 1. Try to save this project. What is the extension or format of the project , in which file will be saved ? \_\_\_\_\_\_\_\_ |
| \*Screen Shot required |

| Tasks 2 |
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| **Creating First Network** |
| 1. From the network component box, click on **End Devices** and drag-and-drop a **Generic** PC icon and a **Generic** laptop icon into the Workspace. |
| 1. \*Click on **Connections**, then click on **Copper Cross-Over**, then on **PC0**, and select **Fast Ethernet or Giga Ethernet**. After this, click on **Laptop0** and select **FastEthernet**. The link status LED should show up in green, indicating that the link is up.     *Figure 2* |
| 1. Click on the PC, go to the **Desktop** tab, click on **IP Configuration**, and enter an IP address and subnet mask. In this topology, the default gateway and DNS server information is not needed as there are only two end devices in the network.   Configure the following IPs    *Figure 3* |
| 1. \*Using Ping ,Tracert ip and arp-a to check the connectivity of computers together. Record your results. Also briefly explain them. |
| 1. From IP configuration settings, try to configure IPs automatically using DHCP option. Now try to check connectivity of computers. Discuss your result  |  | | --- | |
| 1. Assign same IPs to both devices 10.1.1.1. Now try to ping each device. Discuss the results.  |  | | --- | |

|  | \*Screen Shot required | |
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| Task 3 | |
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| **Adding a Hub to the network** | |
| A hub is probably the most common Physical layer device found on networks. A hub serves as a central connection point for several network devices. It repeats what it receives on one port to all other ports, excluding the port on which the signal was received, so that the transmitting device may monitor and recover from collisions because every device in the network connects directly to the hub through a single cable. The properties of HUB are    *Figure 4* | |
|  | |
| 1. Start Packet Tracer and Entering Real time mode 2. **Add PCs:** Add three PCs 3. **Add Hub**: Select a hub, by clicking once on Hubs and once on a PT-Hub 4. **Connections**: To create the network use Copper Straight-through cable | |
| 1. **\*Perform the following steps to connect PC0 to Hub0:** 2. Click once on PC0 3. Choose Fast Ethernet 4. Drag the cursor to Hub0 5. Click once on Hub0 and choose Port0 6. Notice the green link lights on both the PC0 Ethernet NIC and the Hub0 Port0 showing that the link is active | |
| *Figure 5* | |
| 1. Double click the hub and switch it off. What happens to green LEDs? What does the new state of LEDs mean?  |  | | --- | | |
| 1. Repeat the same process but this time use Copper cross over cable. How does this effect the network?  |  | | --- | | |
| 1. \*Create the following topology     *Figure 6* | |
| 1. \*Can you ping one computer to other computer with in the same network? 2. How Hub is broadcasting the information in a network? Explain with the help of making any network in Packet Tracer? Attach the model of your network with assigned and labelled IPs. 3. Find the bridge in Packet Tracer and replace Hub with Bridge in Figure 6. Are you able to do this? yes or not, support your answer with explanation.  |  | | --- | | |
| \*Screen Shot required | |

**POST LAB:**

1. Create a network of 5 PCs, assign IP addresses and ping them. Attach network topology and verify connectivity screenshots.
2. If you assign one PC an IP address of 192.168.7.15 and another PC with IP address of 192.168.8.15. Does the Subnet mask remain same for both devices? Can you ping each other? Yes or No. If No, why?

Perform networking diagnostic tool commands (Ping, Tracert, ARP, NETSTAT) on topology given in Question 1. Append your Screen-shots and explanations.

**Lab Evaluation Assessment Rubric**

**EE-424 Lab 2**

| **#** | **Assessment Elements** | **Level 1: Unsatisfactory**  **Points 0-1** | **Level 2: Developing**  **Points 2** | **Level 3: Good**  **Points 3** | **Level 4: Exemplary**  **Points 4** |
| --- | --- | --- | --- | --- | --- |
| **LR2** | **Program/Code/ Simulation Model/ Network Model** | Program/code/simulation model/network model does not implement the required functionality and has several errors. The student is not able to utilize even the basic tools of the software. | Program/code/simulation model/network model has some errors and does not produce completely accurate results. Student has limited command on the basic tools of the software. | Program/code/simulation model/network model gives correct output but not efficiently implemented or implemented by computationally complex routine. | Program/code/simulation /network model is efficiently implemented and gives correct output. Student has full command on the basic tools of the software. |
| **LR4** | **Data Collection** | Measurements are incomplete, inaccurate and imprecise. Observations are incomplete or not included. Symbols, units and significant figures are not included. | Measurements are somewhat inaccurate and imprecise. Observations are incomplete or vague. Major errors are there in using symbols, units and significant digits. | Measurements are mostly accurate. Observations are generally complete. Minor errors are present in using symbols, units and significant digits. | Measurements are both accurate and precise. Data collection is systematic. Observations are very thorough and include appropriate symbols, units and significant digits and task completed in due time. |
| **LR5** | **Results & Plots** | Figures/ graphs / tables are not developed or are poorly constructed with erroneous results. Titles, captions, units are not mentioned. Data is presented in an obscure manner. | Figures, graphs and tables are drawn but contain errors. Titles, captions, units are not accurate. Data presentation is not too clear. | All figures, graphs, tables are correctly drawn but contain minor errors or some of the details are missing. | Figures / graphs / tables are correctly drawn and appropriate titles/captions and proper units are mentioned. Data presentation is systematic. |
| **LR9** | **Report** | All the in-lab tasks are not included in report. | Most of the tasks are included in report but are not well explained. All the necessary figures / plots are not included. | Good summary of most of the in-lab tasks is included in report. The work is supported by figures and plots with explanations. | Detailed summary of the in-lab tasks is provided. All tasks are included and explained well. Data is presented clearly including all the necessary figures, plots and tables. |
| **AR4** | **\*Report Submission** | Late submission after 1 week and in between 2 weeks. | Late submission after 2 days and within a week. | Late submission after the lab timing and within 2 days of the due date. | Timely submission of the report and in the lab time. |

**\*Report:** Report will not be accepted after 1 week of due date