3. Student Activity

Student Activity: Network Troubleshooting and Basic Security

Welcome to the hands-on activity session! In this activity, you will practice using network troubleshooting tools and basic security measures. Follow the steps below to gain practical experience with the concepts discussed in the guide.

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1. Common Troubleshooting Tools

Ping

Objective: Use Ping to test connectivity between your computer and various network devices.

Examples:

1. **Ping a Local Device**: Open the command prompt (Windows) or terminal (Linux/Mac) and type `ping 192.168.1.1` to check connectivity with your router.
2. **Ping a Website**: Type `ping google.com` to see if you can reach Google's servers.
3. **Ping a Non-Existent IP**: Type `ping 192.0.2.1` to observe what happens when you try to ping an unreachable IP address.

Traceroute

Objective: Use Traceroute to identify the path data takes to reach a destination.

Examples:

1. **Traceroute to a Website**: Type `tracert google.com` (Windows) or `traceroute google.com` (Linux/Mac) to see the path to Google's servers.
2. **Traceroute to a Local Device**: Use `tracert 192.168.1.1` to trace the route to your router.
3. **Traceroute to a Slow Website**: Identify the path to a website that loads slowly and note any delays.

nslookup

Objective: Use nslookup to find the IP address of a domain name.

Examples:

1. **Find IP of a Website**: Type `nslookup google.com` to get Google's IP address.
2. **Check DNS Server**: Type `nslookup` and then `server` to see which DNS server your computer is using.
3. **Reverse Lookup**: Type `nslookup 8.8.8.8` to find the domain name associated with Google's public DNS server.

ipconfig/ifconfig

Objective: Use ipconfig/ifconfig to view your computer's network configuration.

Examples:

1. **View IP Configuration**: Type `ipconfig` (Windows) or `ifconfig` (Linux/Mac) to see your IP address and subnet mask.
2. **Release and Renew IP**: On Windows, type `ipconfig /release` followed by `ipconfig /renew` to refresh your IP address.
3. **Check Network Interfaces**: Use `ifconfig` on Linux/Mac to view all network interfaces and their statuses.

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2. Basic Troubleshooting Techniques

Objective: Practice basic troubleshooting steps to resolve network issues.

Examples:

1. **Check Physical Connections**: Ensure all cables are securely connected and the Wi-Fi is enabled.
2. **Test Connectivity with Ping**: Use Ping to verify connectivity with your router and a website.
3. **Identify Network Issues with Traceroute**: Use Traceroute to diagnose where delays occur in the network path.

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3. Diagnosing Connectivity Issues

Objective: Diagnose and resolve connectivity issues using the tools and techniques learned.

Examples:

1. **Website Not Loading**: Check if other websites are accessible, then use Ping and Traceroute to diagnose the issue.
2. **DNS Resolution Failure**: Use nslookup to verify if the DNS server is resolving domain names correctly.
3. **IP Configuration Issue**: Use ipconfig/ifconfig to check if your computer has a valid IP address and troubleshoot accordingly.

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4. Introduction to Network Security

Objective: Understand and apply basic network security practices.

Examples:

1. **Configure a Firewall**: Access your router's settings and ensure the firewall is enabled to block unauthorized access.
2. **Set Up a VPN**: Use a VPN service to encrypt your internet traffic and protect your privacy.
3. **Enable Encryption**: Ensure your Wi-Fi network uses WPA2 or WPA3 encryption to secure wireless communications.

Conclusion

By completing these activities, you should have a practical understanding of network troubleshooting tools and basic security measures. Practice these steps regularly to enhance your skills and confidence in managing network issues and securing your network.