

SECOND TERM

WEEKLY LESSON NOTES – B8

WEEK 10

Week Ending: 09-06-2023	DAY:	Subject: Computing
Duration: 60mins		Strand: Communication Networks
Class: B8	Class Size:	Sub Strand: Computer Networks
Content Standard: B8.3.1.1. Identify the concept of computer networking for global communication	Indicator: B8.3.1.1.2 Describe the Internet, world wide web (www) and Internet Protocol (IP) addresses	Lesson: 1 of 2
Performance Indicator: Learners can describe the Internet, world wide web (www) and Internet Protocol (IP) addresses		Core Competencies: CC8.2: CP6.1
Reference: Computing Curriculum Pg. 32		
Activities For Learning & Assessment		
Resources		
Progression		
<p>Starter (5mins)</p> <p>Revise with learners to review their understanding in the previous lesson.</p> <p>Share performance indicators and introduce the lesson.</p> <p>Main (35mins)</p> <p>Brainstorm learners to explain internet addresses. <i>Internet addresses, also known as IP addresses, are unique numeric identifiers assigned to devices connected to the Internet. They serve as the "address" for each device, allowing them to send and receive data over the Internet.</i></p> <p>Describe the Internet and the classes of internet addresses.</p> <p><i>The Internet is a global network of interconnected computers and devices that enables communication and the sharing of information worldwide. It is a vast network that connects millions of computers, servers, and other devices through various communication protocols.</i></p> <p>Internet Addresses:</p> <p>1. IP version 4 (IPv4) Addresses:</p> <ul style="list-style-type: none"> • IPv4 addresses are 32-bit numeric addresses expressed in four sets of decimal numbers separated by periods (e.g., 192.168.0.1). • IPv4 addresses are divided into classes: • Class A: Used for large networks, with the first octet indicating the network portion and the remaining three octets for hosts. • Class B: Used for medium-sized networks, with the first two octets indicating the network portion and the remaining two octets for hosts. • Class C: Used for small networks, with the first three octets indicating the network portion and the last octet for hosts. 		
<p>Pictures and videos</p>		
<p>Describing the Internet, world wide web (www) and Internet Protocol (IP) addresses</p>		

- Class D: Reserved for multicasting.
 - Class E: Reserved for experimental purposes.
2. IP version 6 (IPv6) Addresses:
- IPv6 addresses are 128-bit hexadecimal addresses expressed in eight groups of four hexadecimal digits separated by colons (e.g., 2001:0db8:85a3:0000:0000:8a2e:0370:7334).
 - IPv6 addresses provide a much larger address space compared to IPv4, allowing for the growth of internet-connected devices.
3. Domain Names:
- Domain names are user-friendly, alphanumeric names used to identify websites and other internet resources.
 - They provide a more human-readable format for accessing websites instead of using IP addresses directly.
 - Domain names are mapped to IP addresses through the Domain Name System (DNS) to enable browsing the internet using familiar names.
4. Subnetting:
- Subnetting is a technique used to divide a large network into smaller subnetworks, allowing for more efficient allocation of IP addresses.
 - Subnetting helps manage network resources, improve security, and optimize network performance.

Explain the internet Domain Name Server (DNS), which is equivalent to the function of a phonebook.

The Internet Domain Name Server (DNS) is a critical component of the Internet infrastructure. It functions as a decentralized directory or "phonebook" that translates human-readable domain names into their corresponding IP addresses. Just as a phonebook helps us find the phone numbers of individuals or businesses, the DNS enables the translation of domain names (e.g., www.example.com) into IP addresses (e.g., 192.0.2.1) that computers and servers can understand.

When a user enters a domain name in a web browser, such as requesting to visit a website, the browser initiates a DNS lookup. The DNS system then goes through a process to locate and retrieve the IP address associated with that domain name. This process involves querying multiple DNS servers until it finds the authoritative DNS server for the requested domain.

The DNS system is hierarchical, with multiple levels of DNS servers. At the top level are the root DNS servers that maintain information about the top-level domains (.com, .org, .net, etc.). Below the root servers are the top-level domain (TLD) servers, which store information about specific domain extensions (e.g., .com, .org). Further down are the authoritative DNS servers for individual domains, which hold the specific IP address records for corresponding domain names.

Assessment

Fill in the blanks with the appropriate words to complete the sentences.

1. IPv4 addresses are expressed in _____ sets of decimal numbers separated by periods.
2. Class A addresses are used for _____ networks.

<p>3. Class B addresses are used for _____ networks.</p> <p>4. Class C addresses are used for _____ networks.</p> <p>5. The DNS system is _____ and consists of multiple levels of DNS servers.</p> <p>6. The _____ servers maintain information about the top-level domains.</p> <p>7. The authoritative DNS servers hold the _____ records for specific domain names.</p> <p>8. The DNS system ensures seamless and transparent translation between _____ names and IP addresses.</p> <p>9. The DNS allows users to access websites, send emails, and perform other online activities without needing to remember _____.</p> <p>10. The DNS plays a crucial role in the functioning of the _____ by providing a mapping between domain names and IP addresses.</p> <p>Reflection (10mins) Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson.</p> <p>Take feedback from learners and summarize the lesson.</p>		
<p>Homework/Project Work/Community Engagement Suggestions</p>		
<ul style="list-style-type: none"> • The DNS stands for _____. • The DNS acts as a _____, translating domain names into IP addresses. • The DNS helps computers and servers understand the _____ associated with a domain name. • A DNS lookup is initiated when a user enters a _____ in a web browser. • IPv6 addresses are expressed in _____ groups of four hexadecimal digits separated by colons. • Domain names provide a _____ format for accessing websites. • Domain names are mapped to IP addresses through the _____. • Subnetting is a technique used to divide a large network into _____ subnetworks. 		
<p>Cross-Curriculum Links/Cross-Cutting Issues</p>		
<p>None</p>		
<p>Potential Misconceptions/Student Learning Difficulties</p>		
<p>None</p>		

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Duration: 60mins		Strand: Communication Networks
Class: B8	Class Size:	Sub Strand: Computer Networks
Content Standard: B8.3.1.1. Identify the concept of computer networking for global communication	Indicator: B8.3.1.1.2 Describe the Internet, world wide web (www) and Internet Protocol (IP) addresses	Lesson: 2 of 2
Performance Indicator: Learners can describe the Internet, world wide web (www) and Internet Protocol (IP) addresses		Core Competencies: CC8.2: CP6.1
Reference: Computing Curriculum Pg. 32		
Activities For Learning & Assessment		
Resources		
Progression		
<p>Starter (5mins)</p> <p>Revise with learners to review their understanding in the previous lesson.</p> <p>Share performance indicators and introduce the lesson.</p> <p>Main (35mins)</p> <p>Distinguish between IPv4 and IPv6 addresses.</p> <p>1. Address Length:</p> <ul style="list-style-type: none"> • <i>IPv4: IPv4 addresses are 32 bits long and expressed in four sets of decimal numbers (ranging from 0 to 255) separated by periods. For example, 192.168.0.1.</i> • <i>IPv6: IPv6 addresses are 128 bits long and expressed in eight groups of four hexadecimal digits separated by colons. For example, 2001:0db8:85a3:0000:0000:8a2e:0370:7334.</i> <p>2. Address Space:</p> <ul style="list-style-type: none"> • <i>IPv4: IPv4 addresses provide a limited address space, allowing approximately 4.3 billion unique addresses.</i> • <i>IPv6: IPv6 addresses offer an extensively larger address space, allowing for approximately 340 undecillion unique addresses. This vast address space was designed to accommodate the growing number of internet-connected devices.</i> <p>3. Address Notation:</p> <ul style="list-style-type: none"> • <i>IPv4: IPv4 addresses are typically represented in decimal notation, such as 192.168.0.1, making them easier for humans to read and remember.</i> • <i>IPv6: IPv6 addresses are represented in hexadecimal notation, such as 2001:0db8:85a3:0000:0000:8a2e:0370:7334, which is more complex but necessary due to the larger address space.</i> <p>4. Address Configuration:</p>		
<p>Pictures and videos</p>		
<p>Describing the Internet, world wide web (www) and Internet Protocol (IP) addresses</p>		

- *IPv4: IPv4 addresses can be configured statically (manually assigned) or dynamically assigned through protocols like Dynamic Host Configuration Protocol (DHCP).*
- *IPv6: IPv6 addresses can also be configured statically or dynamically assigned, but they can also be automatically assigned through the stateless address auto configuration (SLAAC) process.*

5. Address Transition:

- *IPv4: Due to the limited address space, IPv4 addresses are gradually being exhausted. To cope with this, techniques like Network Address Translation (NAT) are used to share a single public IP address among multiple devices.*
- *IPv6: IPv6 was developed to address the address exhaustion issue of IPv4 and provide ample address space for future growth. However, IPv6 adoption is still ongoing, and many networks operate with dual-stack configurations, supporting both IPv4 and IPv6.*

Explore the difference between internet and world wide web (www).

1. Definition:

- *Internet: The Internet is a global network of interconnected computers and networks. It is a vast infrastructure that enables the exchange of data and communication between devices across the globe.*
- *World Wide Web: The World Wide Web, often referred to as the Web, is an information system within the broader Internet. It consists of a collection of interconnected documents and resources that are accessible through the use of hyperlinks.*

2. Function:

- *Internet: The Internet serves as the underlying infrastructure that connects devices worldwide, allowing them to communicate and share information. It provides various services such as email, file transfer, remote access, and more.*
- *World Wide Web: The World Wide Web is a subset of the Internet that facilitates the retrieval and display of web pages and multimedia content. It is a way to access and navigate through interconnected websites and web-based applications using web browsers.*

3. Structure:

- *Internet: The Internet is a decentralized network comprised of interconnected networks and devices. It operates on a set of protocols, such as TCP/IP (Transmission Control Protocol/Internet Protocol), which enable the routing and transmission of data packets across different networks.*
- *World Wide Web: The World Wide Web is a system built on top of the Internet that uses protocols like HTTP (Hypertext Transfer Protocol) to facilitate the retrieval and display of web pages. It relies on the infrastructure provided by the Internet to deliver content to users.*

4. Scope:

- *Internet: The Internet encompasses a wide range of services beyond the World Wide Web. It includes technologies like email, instant messaging, online gaming, streaming media, cloud computing, and more.*
- *World Wide Web: The World Wide Web specifically refers to the collection of interconnected websites and web-based resources that can be accessed*

through web browsers. It primarily focuses on the delivery of hypertext documents, multimedia content, and interactive applications.

Assessment

1. The _____ is a global network of interconnected computers and networks.
2. The _____ is an information system within the broader Internet.
3. The Internet serves as the underlying infrastructure that connects devices worldwide, while the _____ facilitates the retrieval and display of web pages and multimedia content.
4. The Internet is a decentralized network comprised of interconnected networks and devices, while the World Wide Web is a system built on top of the _____.
5. IPv4 addresses are typically represented in _____ notation, such as 192.168.0.1.
6. IPv6 addresses are represented in _____ notation, such as 2001:0db8:85a3:0000:0000:8a2e:0370:7334.
7. IPv4 addresses can be configured statically or dynamically assigned through protocols like _____.
8. IPv6 addresses can be configured statically or dynamically assigned, and they can also be automatically assigned through the _____ process.
9. IPv4 addresses are gradually being exhausted, and techniques like _____ are used to share a single public IP address among multiple devices.
10. IPv6 was developed to address the address exhaustion issue of IPv4 and provide ample address space for future growth, but many networks operate with _____ configurations, supporting both IPv4 and IPv6.

Reflection (10mins)

Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson.

Take feedback from learners and summarize the lesson.

Homework/Project Work/Community Engagement Suggestions

- IPv4 addresses are expressed in _____ sets of decimal numbers separated by periods.
- IPv6 addresses are expressed in _____ groups of four hexadecimal digits separated by colons.
- IPv4 addresses provide a _____ address space, allowing approximately 4.3 billion unique addresses.
- IPv6 addresses offer an extensively larger address space, allowing for approximately _____ unique addresses.
- The Internet provides various services such as email, file transfer, remote access, and more, while the World Wide Web primarily focuses on the delivery of _____.
- The Internet operates on protocols like _____, which enable the routing and transmission of data packets, while the World Wide Web uses protocols like _____ for the retrieval and display of web pages.
- The Internet is the broader infrastructure, while the World Wide Web is a _____ within it.

Cross-Curriculum Links/Cross-Cutting Issues

None

Potential Misconceptions/Student Learning Difficulties

None