CCNY Fall 2024 CSC 38000 Computer Security

Assignment 2 Due on 10/15/2024 EOD

1. Define the following types of security threats and provide an example of each:

    - Eavesdropping
    - Denial-of-Service (DoS)
    - Masquerading
    - Alteration

2. Describe the difference between circuit switching and packet switching. Which one does the internet primarily use and why?

3. Explain how the TCP three-way handshake works. List the steps involved and describe the purpose of each step.

4. Discuss why a centralized security control system might be both beneficial and problematic for an organization. Include at least two points for each side of the argument.

5. You are given a network with the IP address `172.16.0.0/16.` You need to divide this network into 8 equal subnets.

    a. What will be the new subnet mask?
    b. List the first and last IP addresses of the first subnet

6. Describe ARP spoofing (also known as ARP poisoning). Why is it considered a security vulnerability, and what countermeasures can be taken to prevent it?

7. A device has a MAC address represented in hexadecimal as 00:1A:92: D4:BF:86. Convert this MAC address to binary format.

8. A library management system is implemented to manage access for different users. The following roles have been identified:

    - **Librarian**: Responsible for managing book inventory, issuing books, and updating records.
    - **Library Assistant**: Can view book records, check in books, and issue books to users.
    - **Member**: Can view book availability, check their own issued book records, and place holds on books.
    - **Guest**: Can only browse the library catalog without accessing any personal or member-specific data.

The system supports the following operations:

- Add Book
- Issue Book
- Return Book
- View Book Record
- Place Hold on Book

Task: Design an access control matrix that specifies which roles have permissions for each operation.

a) Create a matrix with the roles and operations, showing what each role can or cannot do.
b) Justify why each role is assigned (or denied) specific permissions