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**CUU 1102**

**Assignment 3**

Achieving security and privacy in computer networks faces several bottlenecks that can arise from technological, organizational, and human factors. Here are some of the key challenges:

1. Complexity of Network Infrastructure

Modern computer networks are highly complex, with multiple devices, layers, and protocols. This complexity makes it difficult to design, implement and maintain security measures. Ensuring consistent security across all layers—from hardware to software—introduces potential points of vulnerability.

2. Evolving Cyber Threats

Cyber threats are constantly evolving in terms of techniques and sophistication. Attackers continually develop new methods such as zero-day attacks, advanced persistent threats (APTs), and ransomware, making it difficult for traditional security measures to keep up.

3. Inadequate Encryption and Data Protection

Encryption is essential for maintaining data privacy and confidentiality, but it can be computationally expensive and challenging to implement correctly across different platforms and devices. Improper encryption practices, weak algorithms or lack of encryption for sensitive data expose networks to breaches.

4. User Behavior and Human Error

A significant bottleneck is the human factor, as users are often the weakest link in network security. Phishing attacks, weak passwords, failure to update software and mishandling of sensitive information create opportunities for attackers to exploit.

5. Insufficient Network Segmentation

Poorly segmented networks make it easier for attackers to move laterally once inside a system. Segmentation reduces the attack surface by isolating different parts of a network, but improper implementation of segmentation strategies leaves systems vulnerable.

6. Lack of Standardization and Interoperability

Networks often consist of a mix of technologies, devices and vendors, each with security protocols. Ensuring interoperability between security systems while maintaining consistency in the enforcement of policies can be challenging. Lack of standardization often leads to gaps in security.