Reading Assignment

Chapter #1

Access control: Limit information system access to authorized users, processes acting on behalf of authorized users, or devices (including other information systems) and to the types of transactions and functions that authorized users are permitted to exercise.

Awareness and training: (i) Ensure that managers and users of organizational information systems are made aware of the security risks associated with their activities and of the applicable laws, regulation, and policies related to the security of organizational information systems; and (ii) ensure that personnel are adequately trained to carry out their assigned information security-related duties and responsibilities.

Audit and accountability: (i) Create, protect, and retain information system audit records to the extent needed to enable the monitoring, analysis, investigation, and reporting of unlawful, unauthorized, or inappropriate information system activity; and (ii) ensure that the actions of individual information system users can be uniquely traced to those users so they can be held accountable for their actions.

Certification, accreditation, and security assessments: (i) Periodically assess the security controls in organizational information systems to determine if the controls are effective in their application; (ii) develop and implement plans of action designed to correct deficiencies and reduce or eliminate vulnerabilities in organizational information systems; (iii) authorize the operation of organizational information systems and any associated information system connections; and (iv) monitor information system security controls on an ongoing basis to ensure the continued effectiveness of the controls.

Configuration management: (i) Establish and maintain baseline configurations and inventories of organizational information systems (including hardware, software, firmware, and documentation) throughout the respective system development life cycles; and (ii) establish and enforce security configuration settings for information technology products employed in organizational information systems.

Contingency planning: Establish, maintain, and implement plans for emergency response, backup operations, and postdisaster recovery for organizational information systems to ensure the availability of critical information resources and continuity of operations in emergency situations.

Identification and authentication: Identify information system users, processes acting on behalf of users, or devices and authenticate (or verify) the identities of those users, processes, or devices, as a prerequisite to allowing access to organizational information systems.

Incident response: (i) Establish an operational incident handling capability for organizational information systems that includes adequate preparation, detection, analysis, containment, recovery, and user response activities; and (ii) track, document, and report incidents to appropriate organizational officials and/or authorities.

Maintenance: (i) Perform periodic and timely maintenance on organizational information systems; and (ii) provide effective controls on the tools, techniques, mechanisms, and personnel used to conduct information system maintenance.

Table 1.4

Security Requirements

(FIPS 200)

(page 1 of 2)

(Table can be found on pages 16-17 in the textbook.)

Media protection: (i) Protect information system media, both paper and digital; (ii) limit access to information on information system media to authorized users; and (iii) sanitize or destroy information system media before disposal or release for reuse.

Physical and environmental protection: (i) Limit physical access to information systems, equipment, and the respective operating environments to authorized individuals; (ii) protect the physical plant and support infrastructure for information systems; (iii) provide supporting utilities for information systems; (iv) protect information systems against environmental hazards; and (v) provide appropriate environmental controls in facilities containing information systems.

Planning: Develop, document, periodically update, and implement security plans for organizational information systems that describe the security controls in place or planned for the information systems and the rules of behavior for individuals accessing the information systems.

Personnel security: (i) Ensure that individuals occupying positions of responsibility within organizations (including third-party service providers) are trustworthy and meet established security criteria for those positions; (ii) ensure that organizational information and information systems are protected during and after personnel actions such as terminations and transfers; and (iii) employ formal sanctions for personnel failing to comply with organizational security policies and procedures.

Risk assessment: Periodically assess the risk to organizational operations (including mission, functions, image, or reputation), organizational assets, and individuals, resulting from the operation of organizational information systems and the associated processing, storage, or transmission of organizational information.

Systems and services acquisition: (i) Allocate sufficient resources to adequately protect organizational information systems; (ii) employ system development life cycle processes that incorporate information security considerations; (iii) employ software usage and installation restrictions; and (iv) ensure that third-party providers employ adequate security measures to protect information, applications, and/or services outsourced from the organization.

System and communications protection: (i) Monitor, control, and protect organizational communications (i.e., information transmitted or received by organizational information systems) at the external boundaries and key internal boundaries of the information systems; and (ii) employ architectural designs, software development techniques, and systems engineering principles that promote effective information security within organizational information systems.

System and information integrity: (i) Identify, report, and correct information and information system flaws in a timely manner; (ii) provide protection from malicious code at appropriate locations within organizational information systems; and (iii) monitor information system security alerts and advisories and take appropriate actions in response.

Table 1.4

Security Requirements

(FIPS 200)

(page 2 of 2)

(Table can be found on pages 16-17 in the textbook.)

Fundamental Security Design Principles

Economy of mechanism	Fail-safe defaults	Complete mediation	Open design
Separation of privilege	Least privilege	Least common mechanism	Psychological acceptability
Isolation	Encapsulation	Modularity	Layering
Least astonishment			

Attack Surfaces

Consist of the reachable and exploitable vulnerabilities in a system

Examples:

- Open ports on outward facing Web and other servers, and code listening on those ports
- Services available on the inside of a firewall
- Code that processes incoming data, email, XML, office documents, and industry-specific custom data exchange formats
- Interfaces, SQL, and Web forms
- An employee with access to sensitive information vulnerable to a social engineering attack

Attack Surface Categories

Network Attack Surface

Vulnerabilities over an enterprise network, wide-area network, or the Internet

Included in this category are network protocol vulnerabilities, such as those used for a denial-of-service attack, disruption of communications links, and various forms of intruder attacks

Software Attack Surface

Vulnerabilities in application, utility, or operating system code

Particular focus is Web server software

Human Attack Surface

Vulnerabilities created by personnel or outsiders, such as social engineering, human error, and trusted insiders

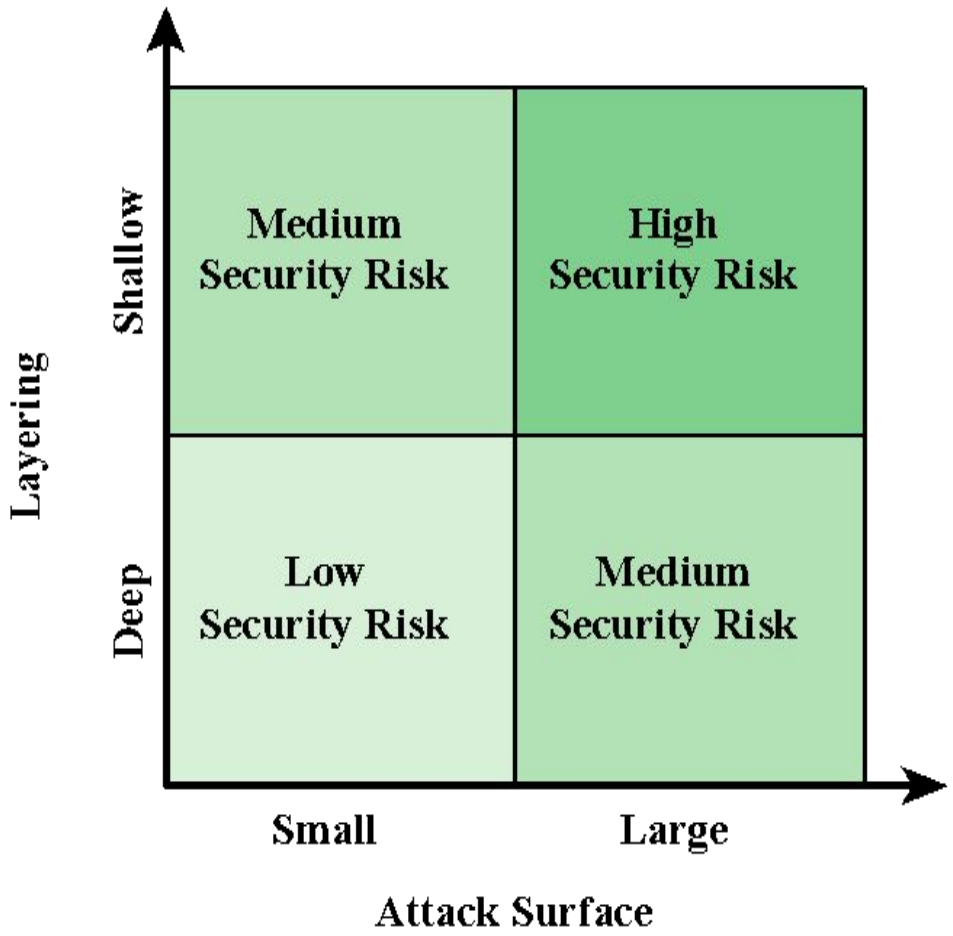

Figure 1.4 Defense in Depth and Attack Surface

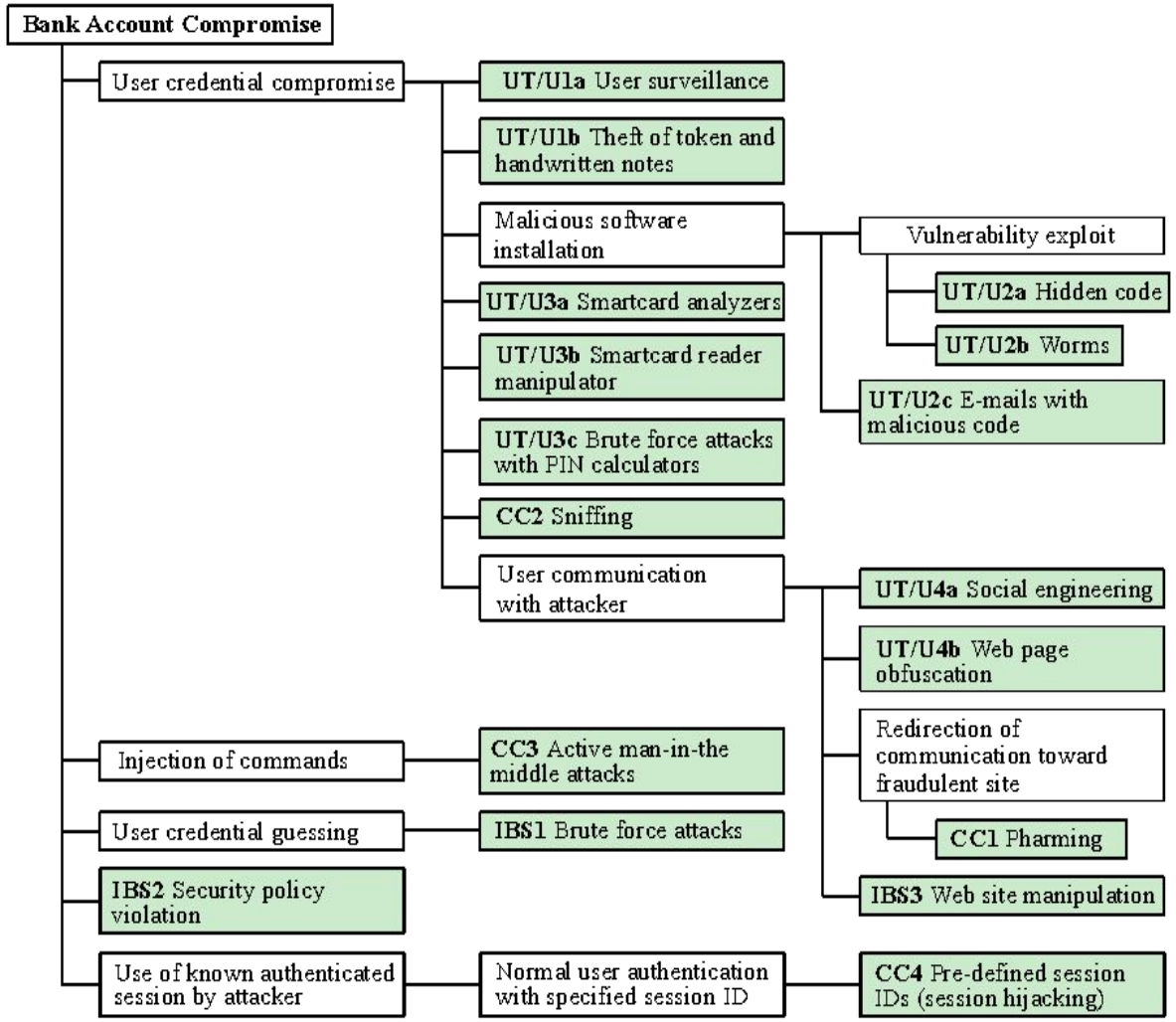

Figure 1.5 An Attack Tree for Internet Banking Authentication

Computer Security Strategy

Security Policy

- Formal statement of rules and practices that specify or regulate how a system or organization provides security services to protect sensitive and critical system resources

Security Implementation

- Involves four complementary courses of action:
  - Prevention
  - Detection
  - Response
  - Recovery

Assurance

- Encompassing both system design and system implementation, assurance is an attribute of an information system that provides grounds for having confidence that the system operates such that the system's security policy is enforced

Evaluation

- Process of examining a computer product or system with respect to certain criteria
- Involves testing and may also involve formal analytic or mathematical techniques