Security

Database Security

- Data is a valuable resource, as with any corporate resource.
- May have strategic importance ⇒ needs to be kept secure and confidential.
- Protection against intentional or unintentional threats using computer-based or non-computer-based controls.

Involves measures to avoid:
- Theft and fraud
- Loss of confidentiality (secrecy)
- Loss of privacy
- Loss of integrity
- Loss of availability

Summary of Threats to Computer Systems

- Hardware
  - Faulty component
- Software
  - Data corruption due to power loss or surge
- Unauthorized access
- Physical damage to equipment
- Electronic interference and radiation
- Database
  - Unauthorised amendment or copying of data
- Theft or loss
- Data corruption due to power loss or surge

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Summary of Threats to Computer Systems

- Users
  - Using another person's means of access
- Program/Operators
  - Creating illegal programs
- Program Operators
  -Ghost
  - Substitution of data
- Introduction of viruses

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Database Security

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Typical Multi-user Computer Environment

Countermeasures – Computer-Based Controls
- Authorization
- Views
- Backup and recovery
- Integrity
- Encryption
- Associated procedures

Countermeasures – Non-Computer-Based Controls
- Using policies, agreements, and other administrative controls:
  - Security policy and contingency plan
  - Personnel controls
  - Secure positioning of equipment
  - Escrow agreements
  - Maintenance agreements
  - Physical access controls
Authorization - User and Group Identifiers

<table>
<thead>
<tr>
<th>User Identifier</th>
<th>Type</th>
<th>Group</th>
<th>Member Identifier</th>
</tr>
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<tbody>
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<td>SG37</td>
<td>User</td>
<td>Sales</td>
<td>SG37</td>
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<tr>
<td>SG14</td>
<td>User</td>
<td>Sales</td>
<td>SG14</td>
</tr>
<tr>
<td>SG5</td>
<td>User</td>
<td></td>
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</tr>
<tr>
<td>Sales</td>
<td>Group</td>
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</table>

Authorization - Access Control Matrix

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<th>Ono</th>
<th>Sno</th>
<th>Bno</th>
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<td>0001</td>
<td>0000</td>
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<td>15</td>
</tr>
</tbody>
</table>

Security Policy Coverage

- The area of the business it covers.
- Responsibilities and obligations of employees.
- The disciplinary action that will result from breaches of the policy.
- Procedures that must be followed.

Contingency Plan Coverage

- Key personnel and how to contact.
- Who decides contingency exists.
- Technical requirements of transferring operations to other site(s).
- Operational requirements of transferring operations to other site(s).
- Any important external contacts.
- Whether insurance exists to cover situation.
### Escrow Agreement
- Legal contract concerning software, made between developers and clients, whereby a third party holds the source code for the client’s applications.
- Client can acquire source code if developer goes out of business, and ensures that the client is not left with non-maintainable systems.
- Often overlooked and under-managed.

### PC Security
- Moved easily and normally located on employees’ desks - often no special access controls.
- Security includes
  - Use of keyboard lock.
  - Use of user identifier and/or password.
  - Procedures to control access to floppy discs.
  - Procedures to reduce risk of virus infection.

### Database and Web Security Measures
- Examples:
  - Proxy servers
  - Firewalls
  - Digital signatures
  - Digital certificates