Analysis Model

- Data model
    - description of the data - similar to database specifications

- Data flow model
    - description of process flow operating on the data

- Control flow
    - how system states interact with the data
    - how system states and events (internal and external) interact

Analysis Model Structure

Data Modeling

Objects, Attributes and Relationships - like databases

- Object - table
  - Have attributes - Person had name, address, age, etc.
  - Identifier - Key element(s) which make the object unique
  - Referential attributes - Ties a data object to other data tables
  - Relationships - How data objects are connected

Example: books and bookstore
- Bookstore orders books
- Bookstore displays books
- Bookstore stocks books
- Bookstore sells books
- Bookstore returns books
Data Modeling (cont’d)

Further relationships

- **Cardinality** - Number of occurrences in a relationship
  - one-to-one; one-to-many; many-to-many
- **Modality**
  - 0 - relationship is not explicit but can be optional
  - 1 - relationship is mandatory

Modality

<table>
<thead>
<tr>
<th>Bookstore</th>
<th>stocks</th>
<th>Books</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

An entity-relationship diagram

Entity-Relationship Diagram

Refer to Figure 12.7

Information Flow Models

Flow charts (PSpec)

External Event → Data Store → Trans #1 → External Event

External Event → Data Store → Trans #4 → External Event

External Event → Trans #2 → External Event

External Event → Trans #3 → External Event

This should not be new to any of you
State Transition Diagram

Data - State Coupling

Creating Data Flow Models

Pressman uses natural language techniques

- Verbs
  - Relate to processes
- Nouns
  - Relate to external entities, data or control object links or data stores

The control panel programs the system. This information is stored in the configuration database.