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 object desc.
- Entity relation diag.
- Data flow diag.
- Data dict.
- State trans. diagram
- Control specs. (CSpec)
- Process Specs (PSpec)

Three related activities.
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
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

An entity-relationship diagram

- Bookstore
- Stocks
- Books

Cardinality: 0
Modality: 1
Entity-Relationship Diagram

Refer to Figure 12.7
Flow charts (PSpec)

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

State Transitions Flow Charts (CSpec)

Start Copying

Read Commands

Make Copies

Done

Empty tray

Diagnose Problems

Reloading Paper

Malfunction

This could be a malfunction

This loop could go to make copies

Malfunction Fixed
Data - State Coupling

Data Conditions

Process Model
- DFD
- PSpec

State Model
- STD
- CSpec

Data Input

Data Output

Events

External Actions

Control Activators
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.

Control Panel \( \rightarrow \) Configure Process \( \rightarrow \) Configuration DB

Ambiguities of natural language