Alternatives for Incorporating Business Rules

(Chapter 9)

What Is a Business Rule?

A business rule is a statement that defines or constrains some aspect of the business.

It is intended to assert business structure or to control or influence the behavior of a business.

Business Rule Categories

- **Term:** A word or phrase that has a single definition
- **Fact:** A statement that relates terms to each other, describes a thing or a role it plays, or provides some other description
- **Derivation:** An attribute that is derived from other attributes
- **Constraint** (AKA **Assertion**): A condition that prescribes the values a relationship or attribute must have

The Origin of Business Rules

- Business users and SMEs
- Process models
- Documents
- Business policies
- Laws and regulations
- Audit recommendations
- Established best practices
- Certification rules and guidelines

Implementing Terms in Data Models

- Terms appear in data models as:
  - Entity names
  - Attribute names
  - Common business or industry terms used in descriptions of entities, attributes, and process logic

Implementing Facts in Data Models

- Facts (not to be confused with Fact tables) appear in data models as:
  - Relationships and roles (but cannot enforce mandatory on the “many” side)
  - Attributes
  - Supertypes and Subtypes (particularly useful in conceptual and logical models)

Implementing Derivations in Data Models

- Derivations cannot be directly implemented
- The results of derivations can be represented as attributes, but there is no standard way to show which attributes are derived

Implementing Constraints in Data Models

- Constraints appear in data models as:
  - Optionality (NULL versus NOT NULL)
  - Cardinality
  - Unique identifiers
  - Subtypes (Exclusive versus not)
  - Domains

Limitations on Implementing Constraints

- Optionality cannot show an attribute or relationship that is only optional under certain circumstances
- Cardinality cannot show variable maximums depending on circumstances
- Domain support varies across modeling tools. Some DBMS products support user-defined types.
- Tradeoff between generalizing models and implementing specific constraints

Functional Classification of Business Rules

- An alternative (and common) way to classify business rules is by function:
  - Definitional rules
  - Data validation rules
  - Data derivation rules
  - Cardinality rules
  - Referential integrity rules
  - Process rules

  (see following slides)

Definitional Rules

- Determine the definition of entities and attributes
- Most commonly implemented as data type, precision and scale
- Rules that cannot be implemented may be reflected in entity and attribute descriptions

Data Validation Rules

- Determine the required characteristics of data that is stored
- Can be implemented using check constraints and foreign keys to reference tables
- Reference tables are generally viable only for discrete sets of values
- If subtypes are generalized (rolled up into the supertype), data validation rules probably require generalization as well
- Cannot be implemented for attributes dependent on the values of other attributes

Data Derivation Rules

- Methods by which derived data items are calculated
- Not directly supported in data models, but derived attributes may show the results of derivations

Cardinality Rules

- Determine how many of one entity or attribute can be associated with another entity or attribute
- For attributes, implemented:
  - By placement of attribute in an entity
  - By optionality (null versus not null)
- For entities, implemented as relationship cardinality.
  - Except rules requiring specific cardinality (e.g. manager must have between 2 and 6 subordinates)

Referential Integrity Rules

- Require that foreign key values have a matching key value in the parent entity
- Implicit in the relationships defined in the model
- Care must be taken if primary key values are subject to change
- May require tradeoffs when models are generalized

Process Rules

- Determine what processing the system must do in particular circumstances
- Except for the data that is supported by or created by the processes, process rules are generally out of scope for the data modeler

Rules in the Database Versus Application Code

- Unstable rules can be in data values, but should never be in data structures
- Data values can generally be changed more quickly than logic
- Complex rules may always require logic changes