Business Rules and How they are applied in Databases

Tharindu Weerasinghe
www.tharinduweerasinghe.com

Business Rules

Business rules are set of approved guideliness or framework within an organization. They simplify daily operations of any organization. From an engineering perspective, a business rule is a set of of reusable business logic.

Example Business Rules:

- *Hierarchy* of decision making and approving company invoices.
- *Formula* or *scenarios* in deciding Key Performance Indicators.
- *Company policies* in taking medical leaves

Business Rules - Types

A formula based rules:

- Define and preserve some formulas (such as average, sum, mean, median etc)
- Can use any data processing work sheet application in order to operate
- e.g. OT calculation formulas, Annual Leave Allocations, Bonus calculations

A decision table based rules:

- Non software developers can easily present their ideas via this
- If-then logic is used
- Use columns as the *conditions* and rows specify the appropriate *outcomes*. e.g. Invoice Approvals, Application Acceptance Criteria, Personal Loan Eligibility checks.

Business Rules – Examples

In a cooperate organization:

- Every employee should be present by 9am and work 9 hours per day.
- Every employee must under do a CPD course in-order to get an increment.
- The company will offer a bonus of half a salary in April.

In Academia: (Say in a University):

- Every student must have 80% attendance in-order to sit for an exam.
- A student has to obtain 50 out of 100 in-order to pass a subject.
- The maximum no. of lower grade subjects that a student can have is 3.

Business Rules – How they are written or presented

NOUN –VERB – NOUN is a common structure for business rule

TERM – FACT – TERM is the formal semantic for this type of business rule template

e.g.

Invoice ID should contain 10 characters only. It should clearly show the the branch ID and invoice number.

Price must be included in all product labels.

Implementation of Business Rules in DBs

Business rules will become constraints at the **Database Level**

e.g. Each *customer invoice* should have unique identifying number:

INV_0001

INV_CMB_0001

Implementation of Business Rules in DBs

So what are ***contraints***?

The word gives you the meaning – Limitations!

What do we limit?

The behavior/process/mechanism/pattern of an organization

If that organization´s process or system is automated then the mentioned business rules become contraints in the DB level!

Implementation of Business Rules in DBs

Constraints let you define the way the Database Engine automatically enforces the integrity of a Database.

Integrity of a DB is about maintaining a unique structure! - Will be discussed in a later slide.

Constraints define rules which are enforced on the values in the columns.

- **NOT NULL** specifies that the column does not accept NULL values
- A check constraint allows you to specify a condition
- A length of the value of a column describes the maximum limit of the value you can have there.

Implementation of Business Rules in DBs

The following MySQL statement illustrates certain constraints.

```
DROP TABLE IF EXISTS `employees`;
/*!40101 SET @saved_cs_client     =
@@character_set_client */;
/*!40101 SET character_set_client = utf8 */;
CREATE TABLE `employees` (
  `empid` int(10) unsigned NOT NULL,
  `name` varchar(300) NOT NULL,
  `homeaddress` text NOT NULL,
  `email` varchar(200) NOT NULL,
  `phone` varchar(20) NOT NULL,
  `salary` varchar(20) NOT NULL,
  `joineddate` varchar(25) NOT NULL,
  `lastincrementdate` varchar(25) NOT NULL,
  `dateofbirth` varchar(25) NOT NULL,
  `designation` varchar(30) NOT NULL,
  `leaves` int(11) DEFAULT NULL,
  `resigneddate` varchar(25) DEFAULT NULL,
  `expertise` varchar(75) DEFAULT NULL,
  `nic` varchar(10) NOT NULL,
  PRIMARY KEY (`empid`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
/*!40101 SET character_set_client = @saved_cs_client */;
```

Implementation of Business Rules in DBs

The following MySQL statement illustrates certain constraints.

```
DROP TABLE IF EXISTS `projects`;
/*!40101 SET @saved_cs_client     =
@@character_set_client */;
/*!40101 SET character_set_client = utf8 */;
CREATE TABLE `projects` (
  `projid` varchar(20) NOT NULL,
  `projname` varchar(30) NOT NULL,
  `starteddate` varchar(25) NOT NULL,
  `currentstatus` varchar(25) NOT NULL,
  `projinfo` varchar(300) DEFAULT NULL,
  PRIMARY KEY (`projid`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
/*!40101 SET character_set_client =
@saved_cs_client */;
```

Implementation of Business Rules in DBs

The following MySQL statement illustrates certain constraints.

```
DROP TABLE IF EXISTS `inventory`;
/*!40101 SET @saved_cs_client     =
@@character_set_client */;
/*!40101 SET character_set_client = utf8 */;
CREATE TABLE `inventory` (
  `seqid` int(20) NOT NULL AUTO_INCREMENT,
  `itemtype` varchar(300) NOT NULL,
  `itemname` text NOT NULL,
  `itemid` varchar(20) NOT NULL,
  `usedby` int(10) DEFAULT NULL,
  PRIMARY KEY (`seqid`),
  UNIQUE KEY `itemid` (`itemid`)
) ENGINE=InnoDB AUTO_INCREMENT=123 DEFAULT
CHARSET=latin1;
/*!40101 SET character_set_client =
@saved_cs_client */;
```

Database Integrity – 3 types

Integrity of a DB is about maintaining its own unique structure according to the business rules! The way it is, the way should be! - This is Tharindu's definition 

Entity Integrity: This brings up the concept of **primary keys**. The rule says that every table must have its own primary key and that each has to be unique and not null.

Referential Integrity: This brings up the concept of **foreign keys**. The rule says that the foreign key value can be in two states. The first state is that the foreign key value would refer to a primary key value of another table, or it can be null. Being null means that there are no relationships, or that the relationship is **unknown**.

Domain Integrity: This brings up the phenomena that all columns in a relational database are in a defined domain.

Gratitude

References:

- https://www.laserfiche.com/ecmblog/what-are-business-rules/
- https://www.techopedia.com/definition/811/data-integrity-databases
- Previous Year ICTST40704 (UVT – Sri Lanka) lecture notes of Mr. Sanjeeva Perera