# Chapter 5

# Data Model

In this chapter, we discuss the data model of our proposed system.

## 5.1 Data Modeling Concept:

A data model visually represents the nature of data, business rules governing the data, and how it will be organized in the database. A data model is comprised of two parts- logical design and physical design. Data Models are created in either Top-Down Approach or Bottom-Up Approach. In Top-Down Approach, data models are created by understanding and analyzing the business requirements. In Bottom-Up Approach, data models are created from existing databases. For our proposed system, we use Top-Down Approach.

## 5.2 Data Objects:

A database object in a relational database is a data structure used to either store or reference data. The most common object that people interact with is the table. Other objects are indexes, stored procedures, sequences, views and many more.

### 5.2.1 Grammatical Parsing (Noun Identify)

We have identified all nouns by parsing from our proposed user scenario and each noun may be in either problem space or solution space. A noun which is in solution space can be attribute or data object.

#### 5.2.1.1 Table: Noun identification

|  |  |  |  |
| --- | --- | --- | --- |
| NID | Noun | Problem/Solution Space | Attributes |
|  | Expenditure Management System | P | - |
|  | IIT | P | - |
| NID | Noun | Problem/Solution Space | Attributes |
|  | University of Dhaka | P | - |
|  | Transaction | P | - |
|  | Sectors | S | 8, 9, 10, 15, 19 |
|  | Director of IIT (Super Admin) | S | Director id, Username, Password |
|  | Teacher  (Sub Admin) | S | Teacher id, Username, Password |
|  | Field name | S | - |
|  | Field access key | S | - |
|  | Estimated amount | S | - |
|  | Annual budget report | P | - |
|  | Amount of expense | S | - |
|  | Approval | S | - |
|  | Proposal | P | - |
|  | Date of approval | S | - |
|  | Proposed Sector | S | Proposed sector id, 12, 13, 17, 18 |
|  | Assigned field name | S | - |
|  | Assigned sector name | S | - |
|  | Spent amount | S | - |
|  | Special report | P | - |
|  | Spent fields | P | - |

### 5.2.2 Identify Data Object:

Nouns having attributes are selected as data object. So, the data objects are:

1. **\*Sector:**
   1. field\_name
   2. field\_access\_key
   3. estimated\_amount
   4. date\_of\_approval
   5. spent\_amount

\* Format of creating dynamic data object

1. **Director:**
   1. director\_id
   2. user\_name
   3. password
2. **Teacher:**
   1. teacher\_id
   2. user\_name
   3. password
3. **Proposed Sector:**
   1. proposed\_sector\_id
   2. amount\_of\_expense
   3. approval
   4. assigned\_field\_name
   5. assigned\_sector\_name
4. **\*Sector List:**
   1. sector\_list\_id
   2. sector\_name

\*Infrastructural Data Object

### 5.2.3 Pair Relations:

add

Sector

Director

assign

Teacher

Director

propose

Proposed Sector

Teacher

get access

Sector

Teacher

has access

Sector List

Teacher

review

Proposed Sector

Director

update

Sector List

Director

### 5.2.4 ER-Diagram:



#### 5.2.1.1 Figure: ER Diagram

### 5.2.5 Database Table:

|  |  |
| --- | --- |
| Director | |
| Attribute | Type (Size) |
| director\_id | Integer (4) |
| user\_name | Varchar2 (20) |
| password | Varchar2 (20) |

|  |  |
| --- | --- |
| Teacher | |
| Attribute | Type (Size) |
| teacher\_id | Integer (4) |
| user\_name | Varchar2 (20) |
| password | Varchar2 (20) |
| director\_id | Integer (4) |
| sector\_list\_id | Integer (4) |

|  |  |
| --- | --- |
| Sector List | |
| Attribute | Type (Size) |
| sector\_list\_id | Integer (4) |
| sector\_name | Varchar2 (20) |
| director\_id | Integer (4) |

|  |  |
| --- | --- |
| Sector | |
| Attribute | Type (Size) |
| field\_access\_key | Integer (4) |
| field\_name | Varchar2 (20) |
| estimated\_amount | Integer (10) |
| spent\_amount | Integer (10) |
| date\_of\_approval | Date |
| teacher\_id | Integer (4) |
| director\_id | Integer (4) |

|  |  |
| --- | --- |
| Proposed Sector | |
| Attribute | Type (Size) |
| Proposed field | Integer (4) |
| assigned\_field\_name | Varchar2 (20) |
| assigned\_sector\_name | Varchar2 (20) |
| amount\_of\_expense | Integer (10) |
| approval | Integer(1) |
| teacher\_id | Integer (4) |
| director\_id | Integer (4) |