# **Chapter 3: Design**

# **3.1 Introduction**

Design is the one of the most crucial phase in SDLC. Based on the user requirements and the analysis of the system, the system must be designed. The logical design made during the analysis phase starts to taking shape into physical design during this phase. Problems are identified during the previous phase and a detailed description of what is needed to solve that problems are produced this phase. This is the phase where we take decision about how the system will meet the requirements identified during analysis phase.

# **3.2 Structural Modelling**

## **3.1.1 Final class diagram**

Class diagram is UML structural diagram that shows the relationship between class(entities) of the system. It is static diagram that represents the static view of the system. Class diagram describes the class’s attributes, operations, and the system’s constraints.

# **3.3 Behavioral Modelling**

## **3.2.1 Activity Diagram**

Activity diagram is flowchart to represent the flow from one activity to another activity. The activity can be represented as the operation of the system. It shows the workflow in the system. It shows the dynamic behavior of the system and also describe the sequence from one activity to the another.

## **3.2.2 Sequence Diagram**

Sequence diagram is UML behavioral diagram that describe the interactions among class and object in term of an exchange of messages over time. It is also known as “Event diagram”. It shows how the system will behave in different scenarios and helps to validate the logic of complex operations and functions.

# **3.4 Database Modelling**

## **3.3.1 Data Dictionary**

Data dictionary is file that contains the database’s metadata. It is also known as “Data definition matrix” or “Metadata repository”. It provides the names, definitions and attributes about the data elements.

**User:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column** | **Datatype** | **Length** | **Constraint** | **Nullable** | **Key** |
| user\_id | Int | 10 | pk\_user\_id | No | Primary |
| first\_name | varchar | 20 | **-** | No | - |
| last\_name | varchar | 20 | - | No | - |
| email | varchar | 20 | - | No | Unique |
| phone\_num | varchar | 20 | - | No | Unique |
| address | varchar | 20 | - | No | - |
| password | varchar | 20 | - | No | - |
| Type | varchar | 20 | - | No | - |

**Bus:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column** | **Datatype** | **Length** | **Constraint** | **Nullable** | **Key** |
| bus\_id | Int | 10 | pk\_bus\_id | No | Primary |
| name | Varchar | 20 | - | No | - |
| owner | varchar | 20 | - | Yes | - |

**Route:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column** | **Datatype** | **Length** | **Constraint** | **Nullable** | **Key** |
| route\_id | Int | 10 | pk\_route\_id | No | Primary |
| starting | Varchar | 20 | - | No | - |
| destination | Varchar | 20 | - | No | - |
| cost | Int | 10 | - | No | - |

**Seat:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column** | **Datatype** | **Length** | **Constraint** | **Nullable** | **Key** |
| seat\_id | Int | 10 | pk\_seat\_id | No | Primary |
| seat\_num | Int | 10 | - | No | - |
| status | Varchar | 10 | - | No | - |
| bus\_id | Int | 10 | fk\_bus\_id | No | Foreign |

**Schedule:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column** | **Datatype** | **Length** | **Constraint** | **Nullable** | **Key** |
| schedule\_id | Int | 10 | pk\_schedule\_id | No | Primary |
| dept\_date | Date | - | - | No | - |
| dept\_time | Time | - | - | No | - |
| arrival\_date | Date | - | - | No | - |
| arrival\_time | Time | - | - | No | - |
| bus\_id | Int | 10 | fk\_bus\_id1 | No | Foreign |
| route\_id | Int | 10 | fk\_route\_id | No | Foreign |

**Booking:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column** | **Datatype** | **Length** | **Constraint** | **Nullable** | **Key** |
| booking\_id | Int | 10 | pk\_booking\_id | No | Primary |
| date | Date | - | - | No | - |
| user\_id | Int | 10 | fk\_user\_id | No | Foreign |
| schedule\_id | Int | 10 | fk\_schedule\_id | No | Foreign |
| seat\_id | Int | 10 | fk\_seat\_id | No | Foreign |

**Payment:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column** | **Datatype** | **Length** | **Constraint** | **Nullable** | **Key** |
| payment\_id | Int | 10 | pk\_payemnt\_id | No | Primary |
| booking\_id | Int | 10 | fk\_booking\_id | No | Foreign |
| amount | Int | 10 | - | No | - |

## **3.3.2 ER diagram**

ER diagram is a type of structural diagram in which the relationships of entities stored in the database are shown. It can be used as the foundation for relational database. It illustrates the logical structure of the database.

# **3.5 Architectural Model**

# **3.6 Prototyping**

Prototyping refers to the creating the prototypes (model)of the system. It shows how the system will look like and how it will work. It facilitates in system implementation since feedback can be received from the users.