# Requirements Document (Project Phase 1)

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# Introduction

We have selected a restaurant named *Ustad Hotel* as our miniworld. Ustad Hotel is a 5 star, reservation-only restaurant that caters to high-end customers. Walk-in customers are allowed to make on the spot reservations and wait for an available table.

# Purpose

To store safely and reliably all information needed for the day-to-day running of the restaurant, and to update it as operations are carried out.
To organise all the data in a clear and logical way, in order to facilitate its access.
To constrain access to the data to users who require and are permitted to view and edit it.

# Users

The owner, *maître d'*, administrative staff, waiters, and chefs have access to various views of the database.

# Applications

This database can be used:

- By the *maître d'* to check and make reservations and ensure that they do not clash
- By the waiters to identify the tables they need to serve and the dishes they need to take
- By the chefs to ensure that all ingredients necessary are available
- By the administrative staff to keep track of transactions with suppliers and customers

# Database Requirements

## Entity Types

1. Table

    a. TableNumber (primary key)
        i. Integer
        ii. Not Null
        iii. Unique
    b. Capacity
        i. Integer
        ii. Not Null
2. Reservation
    a. PhoneNumber (primary key)
        i. 10-digit Integer
        ii. Not Null
        iii. Unique
    b. Name (primary key)
        i. Max 50 characters varchar
        ii. Not Null
    c. DateTime (composite attribute)
        i. StartTime
            1. Date&Time type
            2. Not Null
        ii. EndTime (derived attribute)
            1. Date&Time type
            2. Not Null
            3. StartTime + 2h
3. Employee
    a. EmpName
        i. Max 50 characters varchar
        ii. Not Null
    b. EmpID (primary key)
        i. 10 characters varchar
        ii. Not Null
        iii. Unique
4. Waiter (subclass of Employee)
    a. PartTime
        i. Boolean
        ii. Not Null
5. Cook (subclass of Employee)
    a. Specialties (multivalued attribute)
        i. List of strings (max 20 characters)
6. Order
    a. OrderNumber (primary key)
        i. Float
        ii. Not Null
        iii. Unique
    b. TotalPrice

        i. Integer
        ii. Not Null
    c. TakenTime
        i. Time
        ii. Not Null
    d. ETA (derived attribute)
        i. Time
        ii. Not Null
        iii. TakenTime + 25m
7. MenuItem
    a. ItemName (primary key)
        i. Max 50 characters varchar
        ii. Not Null
        iii. Unique
    b. Price
        i. Float
        ii. Not Null
8. Ingredient
    a. IngName (primary key)
        i. Max 20 characters varchar
        ii. Not Null
        iii. Unique
    b. Qty
        i. Float
        ii. Not Null
    c. IngPrice
        i. Float
        ii. Not Null
    d. Supplier (composite attribute)
        i. SupName
            1. Max 20 characters varchar
            2. Not Null
        ii. SupPhno
            1. 10-digit Integer
            2. Not Null

# Weak Entities

1. Customer
    a. CustNumber (partial key)
        i. Integer
        ii. Not Null
    b. Arrived
        i. Boolean

        ii. Default: False
        iii. Not Null
2. Dish
    a. DishNumber (partial key)
        i. Integer
        ii. Not Null
    b. Preferences (multivalued attribute)
        i. List of strings (max 100 characters)
    c. Status
        i. “Preparing”, “Prepared”, “Delivered”
        ii. Not Null

# Relationships

1. Reserved
    a. Degree: 3
    b. Entity types: Reservation, Table, Customer
    c. Cardinality ratio: 1:1:M
    d. Identifying relationship for Customer
    e. Total participation by Reservation, Customer; Partial Participation by Table
2. Making
    a. Degree: 2
    b. Entity types: Cook, Dish
    c. Cardinality Ratio: M:N
    d. Total participation by Dish; Partial Participation by Cook
3. InstanceOf
    a. Degree: 2
    b. Entity Types: Dish, MenuItem
    c. Cardinality Ratio: M:1
    d. Total participation by Dish; Partial Participation by MenuItem
4. ConsistsOf
    a. Degree: 2
    b. Entity types: MenuItem, Ingredient
    c. Cardinality Ratio: M:N
    d. Total participation by MenuItem, Ingredient

# n>3 Relationships

1. Ordered
    a. Degree: 4
    b. Entity Types: Table, Waiter, Order, Dish
    c. Cardinality Ratio: 1:1:1:P
    d. Identifying relationship for Dish
    e. Total Participation by Order, Dish; partial participation by Table, Waiter

# Functional Requirements

## Modifications

### Insert

1. Reservation (On new reservation)
2. When an order is taken, Create an Order and relate it to a Waiter, a Table and the initially ordered Dishes.
3. Dish (As dishes are added to *Ordered*)
4. MenuItem (As the menu is modified)
5. Ingredient (When new Ingredients are required)

### Delete

1. Reservation (When a reservation is fulfilled or a party doesn't arrive)
2. Order (At the end of the day, to clear the database)
3. Dish (As the orders related to each dish are deleted)

### Update

1. Reservation (If the DateTime is postponed or preponed)
2. Dish (As Status is changed to "Preparing", "Prepared" or "Delivered")
3. Order (When TotalPrice is calculated)
4. Customer (As customers arrive)
5. Ingredient (Qty is updated as ingredients are used)
6. Cook (When they start cooking a Dish)

## Retrievals

### Selection

1. View all Reservations
2. View all Tables
3. View all MenuItems
4. View all part-time Waiters

### Projection

1. View Ingredient Qty
2. View Ingredient Supplier and SupPhno
3. View Orders with their associated Dishes

### Aggregate

1. Generate bill for a table
2. Number of times a dish was ordered
3. Size of each reservation

## Search

1. View all waiters who are free
2. View all tables which are not filled to capacity according to Customer→Arrived
3. View all cooks who are free
4. View all overdue dishes (Order ETA < current time)
5. View all cooks with a certain specialty

## Analysis:

1. Number of orders taken by each waiter
2. Number of dishes prepared by each cook
3. Total income over a day