

Student ID: 33878897

Student Name: Muhammad Mubashir Shah

Assumptions for Ocean Odyssey Database Design

This document consolidates all assumptions, design decisions, and constraints discussed throughout the database design process for Ocean Odyssey. It covers conceptual modeling, normalization, logical modeling, and surrogate keys.

Conceptual Model Assumptions

Entities and Relationships

- Operator → Ship:
 - Cardinality: 1..1 Operator to 1..* Ship.
 - Assumption: An operator can exist without ships (e.g., newly registered), but ships must belong to one operator.
- Ship → Cabin:
 - Cardinality: 1..1 Ship to 1..* Cabin.
 - Assumption: Cabins are uniquely identified per ship (e.g., Cabin "D1" on Ship A vs. Ship B).
- Ship → Cruise:
 - Cardinality: 1..1 Ship to 1..* Cruise.
 - Assumption: A cruise cannot exist without a ship.
- Passenger → Manifest:
 - Cardinality: 0..* Passenger to 1..1 Manifest.
 - Assumption: Passengers can exist without a booking (e.g., registered but not booked).
- Guardianship (Self-Referential):
 - Cardinality: 0..* Guardian to 1..1 Minor.
 - Assumption: A minor must have one guardian; adults cannot have guardians.

Normalization Assumptions

Task 2 (Cruise Itinerary)

- UNF to 3NF:
 - Assumption: The sample itinerary's cost_per_person belongs to CRUISE, not port visits.
 - Dependencies:
 - cruise_id → cruise_name, cruise_cost_per_person (direct).
 - port_code → port_name, port_latitude, port_longitude, country_code (partial).
 - country_code → country_name (transitive).

Logical Model Surrogate Key Assumptions

CABIN Table: cabin_id

Primary Key: Composite of cabin_number and ship_code

Surrogate Key: cabin_id

Assumptions & Justifications

1. Business Need:
 - a. Cabins are reused across ships (e.g., "D1" on Ship A and Ship B)
 - b. A surrogate key avoids ambiguity in referencing cabins across different ships
2. Schema Impact:
 - a. Foreign Key Simplification: The MANIFEST table references cabin_id instead of (cabin_number, ship_code)
3. Unique Constraint: (cabin_number, ship_code) is retained to enforce natural key uniqueness

CRUISE_PORT_VISIT Table: visit_id

Primary Key: Composite of cruise_id, port_code, and datetime

Surrogate Key: visit_id

Assumptions & Justifications

1. Business Need:
 - a. A cruise may visit the same port multiple times (e.g., depart and arrive events)
 - b. A surrogate key ensures uniqueness without relying on timestamp precision.
2. Schema Impact:
 - a. Simplified Joins: Relationships with CRUISE and PORT use visit_id instead of composite keys
 - b. Avoiding Redundancy: Eliminates redundant storage of cruise_id, port_code, and datetime in related tables
3. Constraints:
 - a. Unique Constraint: (departure_arrival, cruise_id, datetime, port_code) ensures no duplicate port visits

MANIFEST Table: manifest_id

Primary Key: Composite of cruise_id, passenger_id , and cabin_id

Surrogate Key: manifest_id

Assumptions & Justifications

1. Business Need:
 - a. A passenger can book multiple cruises, and cabins are reused across cruises.
 - b. A surrogate key simplifies tracking individual bookings.
2. Schema Impact:
 - a. Streamlined Relationships: The MANIFEST table references passenger_id and cabin_id via single-column FKs.
 - b. Query Efficiency: Joins on manifest_id are faster than composite keys.
3. Constraints:

- a. Unique Constraint: (passenger_id, cruise_id) ensures a passenger cannot book the same cruise twice.