



NYU – TANDON SCHOOL OF ENGINEERING

CS-GY 6083 - B, Fall 2024

Principles of Database Systems

Project Part 1: 100 points with 15% weight

In this first part of the project, you will focus on designing a suitable relational schema that can be used to store the data in the system. In the second part of the project, you will then build a web-accessible frontend that will allow users to use the service via their browsers. Both parts of the project need to be done in teams of three students. Note that the second part of the project is built on top of this first part so you cannot skip this project part 1. You will not be allowed to change your team partner in project part 2.

Project Guidelines: In this first part of the project, you will design the relational database (using Oracle Data Modeler) that stores all the data about business cases detailed below. You should use your own database system (preferably MySQL) on your laptop or an internet-accessible server. Following is the business case and a list of steps for this part of the project. Note that in this first part, you will only deal with the database side of this project - a suitable web interface will be designed in the second project.

Business Case:

NICE (Nature International Cruise Excellence) is a well-known cruise line that provides excellent cruising experience from 35 ports across USA, Canada, Mexico, and Caribbean islands. The following are some details of NICE cruise lines.

The four sides of a cruise ship are:

Bow (Forward) - the front of the ship.

Stern (Aft) - the back of the ship.

Port Side (Left) - the left side of the ship when facing the bow.

Starboard Side (Right) - the right side of the ship when facing the bow

Type of the restaurants

Common Buffett (serves Breakfast, Dinner, Lunch) : 7 AM to 9 PM, 6th Floor

Italian Specialty (serves Dinner only): 6 PM to 10 PM, 8th Floor

Mexican Specialty (Serves Dinners only): 6PM to 10 PM, 7th Floor

La-carte continental (serves Lunch and Dinner): 12 PM to 8 PM 6th Floor

Tokyo Ramen Japanese (serves Lunch and Dinner): 12PM to 8 PM, 5th Floor

Ming Wok Chinese (serves Lunch and Dinner): 12 PM to 8 PM, 5th Floor

Round Clock Café: (serves beverages and light food): 24 hours: 10th Floor

Pool Bar: (serves alcoholic beverages): 10 AM to 10 PM: 10th Floor

Stout Bar: (serves alcoholic beverage): 10 AM to 10PM: 7th Floor

| Stateroom Type | Size in SQFT. | Number of Bed | Number of Bathroom | Balcony |
|----------------------|---------------|---------------|--------------------|---------|
| The Haven Suite | 1000 | 6 | 3 | 2 |
| Club Balcony Suite | 800 | 4 | 2 | 2 |
| Family Large Balcony | 600 | 4 | 2 | 1 |
| Family Balcony | 400 | 4 | 1.5 | 1 |
| Oceanview window | 300 | 2 | 1 | 0 |
| Inside stateroom | 200 | 2 | 1 | 0 |
| Studio stateroom | 150 | 1 | 1 | 0 |

*Number of beds includes guests aged 5 and up. Children less than 5 years old stay free.

*Per night price of the stateroom varies with its location, i.e. Forward, After, Left, and Right in their ascending order

| Entertainment and Activities | Number of Units | Floor |
|------------------------------|-----------------|----------|
| Theaters | 2 | 8 and 10 |
| Casino | 1 | 7 |
| Library | 2 | 3 and 4 |
| Children play | 1 | 3 |
| Gym | 1 | 5 |
| Outdoor pool | 1 | 11 |
| Indoor pool | 1 | 9 |
| Whirlpool | 2 | 11 and 9 |
| Steam room | 1 | 9 |
| Sona room | 1 | 9 |
| Yoga room | 1 | 5 |
| Night Club | 2 | 8 and 11 |
| Tennis court | 1 | 11 |

All entrainment and activities are free for all guests (age limits apply as necessary)

Packages

Water and Non-Alcoholic -- \$40/person/night

Unlimited Bar (for adult age over 21) -- \$80/person/night

Internet 200 minutes, 100 GB -- \$150/person for entire trip

Unlimited internet -- \$250/person for entire trip

Specialty dining (Italian, La-carte, Mexican, Japanese, Chinese) -- \$60/person/night

Packages are sold per night per guest age over 5 years. A package can be purchased for the entire trip and not partially.

Business rules:

1. NICE stores details of each port, such as name of the port, state, country, address, nearest airport name, number of parking spots
2. NICE stores details of each passenger such as Name, age, address, gender, nationality, email, phone
3. NICE stores details of each trip such as total number of nights, start port, end port, port stops on itinerary, start and end date and time of each port
4. Prices are charged per night per passenger over the age of 5 years. Children under 5 years of age stay free
5. NICE will store each cruise trip with relevant details
6. The stateroom sale price may vary from trip to trip.
7. Each trip will have group numbers assigned to customer or customers (if there are several customers in the group, e.g., Family, Friends etc.
8. A group can have many customers and customer belongs to one group only.
9. Payment details should include trip number, group number, payment date, payment amount in USD, payment method
10. There may be multiple payment transaction for each group on each trip.

Submission:

Submit the following deliverables towards project part 1 assignment.

- a) Create a logical E-R model for database schema with appropriate entities, attributes and relationship amongst entities. **Submit screenshot of the logical model.**
- b) Create a relational model, depicting all entities, attributes (name, type, size, and mandatory/optional, primary key), relationships (foreign keys). **Submit screenshot of the relational model.**
- c) State assumptions (if any) you have made other than stated in business case. **State assumptions.**
- d) DDL code, as generated from the relational model. **Submit DDL code.**
- e) Apply at least 5 CHECK constraints to define business rules to enforce data consistency. **Submit CHECK constraints DDL code.**
- f) Populate meaningful sample data for all entities (10 to 15 records for parent tables [as per details of staterooms, location side, restaurants, entertainment & activities, packages etc.], at least 30 records for guest data, trip data, invoice data and payment data). **Submit DML code.**

- g) List total number of records populated for each entity (just record counts, not full data set). **Submit COUNT (*) query and result for each table.**
- h) Write data dictionary queries that detail all tables, columns-datatype-size-mandatory/optional, constraints, and attribute comments of schema objects. **Submit data dictionary queries and screenshots of their corresponding results.**

Your submission should be a single PDF document (Times New Roman fonts, 12pts, single spacing) with all screenshots inserted within in. The naming convention of PDF should be first character of each team members as prefix, e.g. APC_FA24_Midterm.pdf. On the cover page clearly state course, section, submission date, student names and Ids on title page. **All team members need to submit. There should be a table of content page after the cover page. This project document must be submitted to Brightspace course site only. Any email submission will be rejected.**

===== END OF THE PROJECT PART 1 DOCUMENT =====