



EECS3421 Final Project Report

1. Introduction and Preliminary Study

Background of the Organization Involved

Cruise Critic is a real organization that functions as the world's largest consumer cruise website, providing a trusted platform for planning, researching, and booking cruises. With over 700,000 cruise reviews, expert advice, insider tips, and cruise deals, Cruise Critic helps individuals to research and book cruises for their vacations. Cruise Critic was co-founded in 1995 by Anne Campbell and Kathleen Tucker as a feature of America Online in Pennington, New Jersey, United States. In 2003, Cruise Critic averaged 10.5 million page views per month and had 62,000 registered members. In 2007, Cruise Critic was acquired by TripAdvisor and now operates as a subsidiary under them. Over the years, Cruise Critic has evolved into a well-established authority in the travel and leisure sector, offering reviews, forums, and deals to cruise travellers worldwide. The platform focuses on connecting travellers with the right cruise experiences while providing valuable resources for planning and booking.

Business Objective and Scope of Application

The business objective of Cruise Critic is to provide cruise enthusiasts with a wealth of information about cruises, including detailed reviews and potential deals, to help vacationers find and choose a cruise that best suits their needs and preferences. Cruise Critic provides users with both professional reviews from experts and reviews and images submitted by other users of ships and destinations. Community forums are provided so that users can ask questions to clear any doubts or engage in cruise-related conversations. Forums for specific cruises are also available to provide more in-depth information about the voyage and vessel, as well as to facilitate discussions. To help their users make the best choice, not only does Cruise Critic provide comprehensive details about more than 120 cruise lines, over 1200 ships, almost 500 ports, and itineraries, but it also provides a platform to find deals and pricing like its parent company, TripAdvisor. Additionally, Cruise Critic annually recognizes the best cruises with an awards program in an array of categories with the help of professional critics and the opinions of travellers.

The Cruise Critic database will have different functions ranging from researching a cruise, reading reviews, comparing options for cruises and travel deals, and sharing tips with other users. The first function of the database will enable the client to set up their account using a valid email address and password. Next, the client will select a departure date, departure port, desired length of the cruise and price. All of this info will help produce the best possible cruise deals available for the client. The client will then be given a list of all of the best cruise deals with two options: they can either view the cruise details or they can view the deal. Clicking on the deal will take them to an external (partner/member) website where they can purchase the

ticket. Clicking on the cruise detail will provide the client with more information about the cruise, including its itinerary, ports, cabin deals, an overview of the ship, and reviews from past cruise travellers. The account aspect of the client information will store the first and last name of the client, the display name, and their year of birth. The cruise information will store reviews of cruise lines, ships, destination-specific deals, itineraries, ports of call, booking websites, and destinations. Using the available information, users will be able to select the cruise by comparing them according to amenities, price range, destination, and duration. Furthermore, the community information will contain details about the community, including discussion forums where users can exchange information, read cruise articles and guides, share their travel experiences with other members, and store posts, replies, and user activity. All of this information benefits travellers by providing them with access to all the cruise-related information they need, reliable reviews, and a knowledge-sharing community.

Functional Requirements of Application:

The Cruise Critic database application will consist of multiple modules designed to manage user accounts, cruise information, reviews, and community interactions. Each function will support key operations that ensure smooth functionality and user engagement across the platform. The main functional requirements are as follows:

1. User Account Management

- The system must allow clients to create an account using a valid email address and password.
- Account data will include first name, last name, display name, and year of birth.
- Users must be able to log in and authenticate securely to access personalized features.
- The system must require a login for users to participate in forums and receive cruise deals.
- Users should be able to update or delete their profile information as needed.

2. Cruise Search and Filtering Management

- The system must allow visitors to search for cruises using multiple fields, including:
 - Destination
 - Departure port
 - Departure time/date
 - Cruise line
 - Ship name
 - Desired cruise length
 - Price range

- Based on the selected parameters, the system will generate a list of matching cruise deals.
- Users should be able to compare cruises according to amenities, duration, price, and destination.

3. Cruise Deals and External Booking Management

- The system must list and link cruise deals relevant to the user's search criteria.
- Each cruise listing must include two options:
 - View Deal – Redirects users to an external partner site for booking tickets.
 - View Details – Displays in-depth information about the cruise (ship overview, itinerary, ports, and cabin options).
- The system must maintain active partnerships with external websites for booking integration.

4. Reviews, Ratings, and Information Management

- The system must store and display reviews of cruise lines, ships, ports, and destinations.
- Users must be able to:
 - Submit reviews and rate cruises based on amenities, value, and service.
 - View average ratings and past traveller feedback.
- The system must also publish cruise-related content, including:
 - News articles
 - Travel advice
 - Destination guides
- This feature helps visitors make informed travel decisions.

5. Community Discussion Forums Management

- The application must include forums where registered members can:
 - Create topics and discuss issues related to cruises, rooms, trips, itineraries, and travel costs.
 - Reply to discussions and share advice or experiences.
- The system must require a user login to post or interact in forums.
- Forum data will store posts, replies, timestamps, and user activity.

6. Cruise Catalogue Management

- The system must maintain a complete catalogue of cruise information, including:
 - Cruise lines
 - Ships
 - Ports and destinations

- Itineraries
- This catalogue will serve as the foundation for the search, review, deal, and guide functionalities.

2. Database Modelling

External views

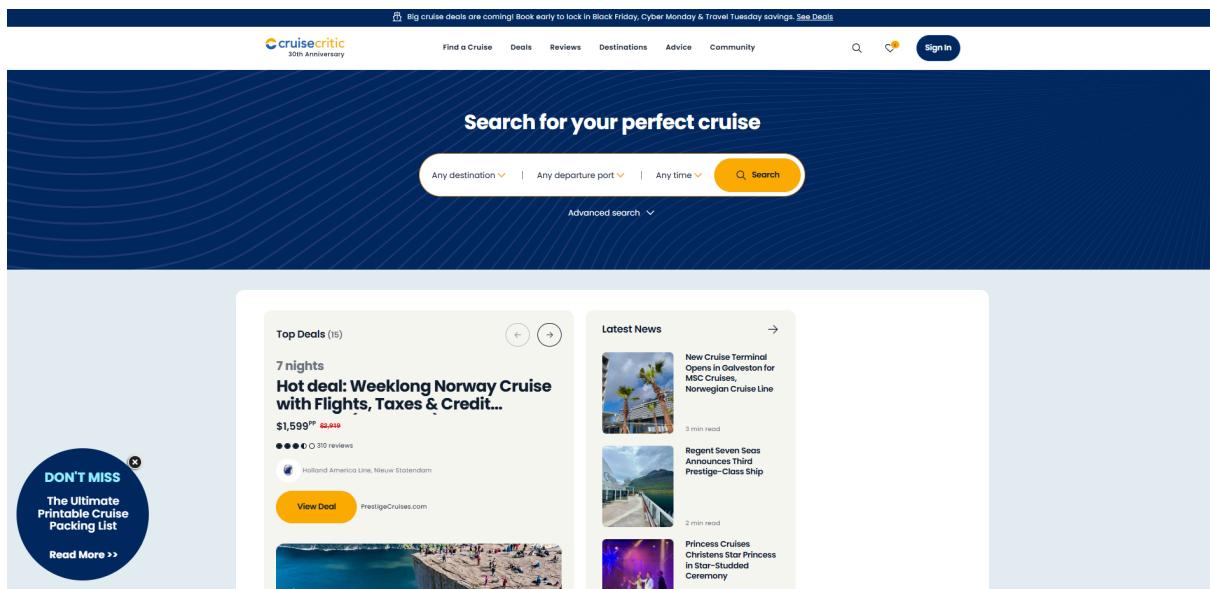


Figure 1: The Cruise Critic homepage presents the main entry point to the system, with top-level navigation links such as Find a Cruise, Deals, Reviews, Destinations, Advice, Community and sign-in options. This view shows that the application must support browsing cruise information, viewing aggregated deals, accessing editorial content, and interacting with a member community.

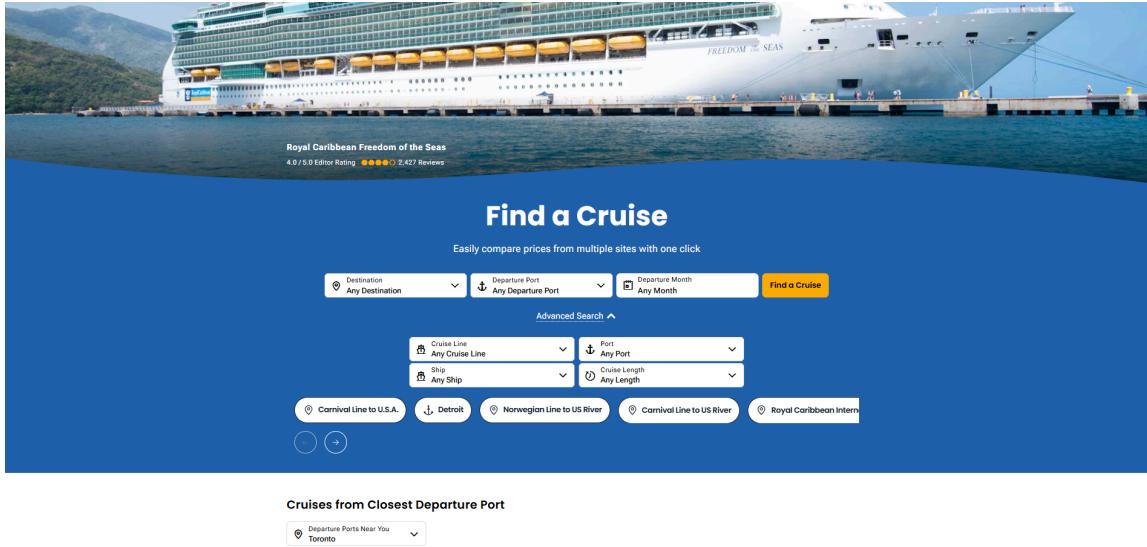


Figure 2: This view provides a structured search form where users can select criteria such as destination, departure port, departure month/date, cruise line, ship, length and port. It demonstrates that the system must store and filter trips using these attributes and return relevant options.

Figure 3: After submitting a search, users see a list of cruises/deals displayed as cards with information such as cruise line, ship name, travel dates, duration, headline price, price per night, ratings and *View Deal / More Details* buttons. This external view confirms that each result combines data from CruiseTrip, CruiseDeal, CruiseLine, CruiseShip, Destination and review aggregates. The *View Deal* button shows that each deal links to an external travel agency or partner website.



Itinerary

The itinerary section shows a map of the cruise route from Miami to various ports in South America, including St. Barts, Dominica, Barbados, Fortaleza, Belém, and Bahia de Salvador. To the right of the map, there is a box titled "Popular excursions on Viator" with a "Learn More" button.

Figure 4: The cruise detail view displays ship overview, photos, amenities, cabin types, ratings, review summaries, ports of call, day-by-day itinerary, and linked sailings/deals.

Celebrity Edge Cruise Reviews

The review page for the Celebrity Edge cruise includes a header with the ship's name, average rating (4.5/5.0 Editor Rating), and a "Find Your Cruise" button. Below the header are five thumbnail images showing various parts of the ship, such as a cabin interior and an outdoor deck area. The main content area features a "Cruiser Rating" section with a score of 3.8, average reviews, and categories for Cabins, Dining, and Entertainment. A "Featured Review" box displays a comment from a user named "Mixed Client Focus" with a 5-star rating. To the right, there is a search form for finding deals on the Celebrity Edge cruise.

Figure 5: Review pages list individual user reviews and expert reviews for ships, lines, and destinations, including reviewer name/handle, rating scores, review title, date, text comments, and optional photos.

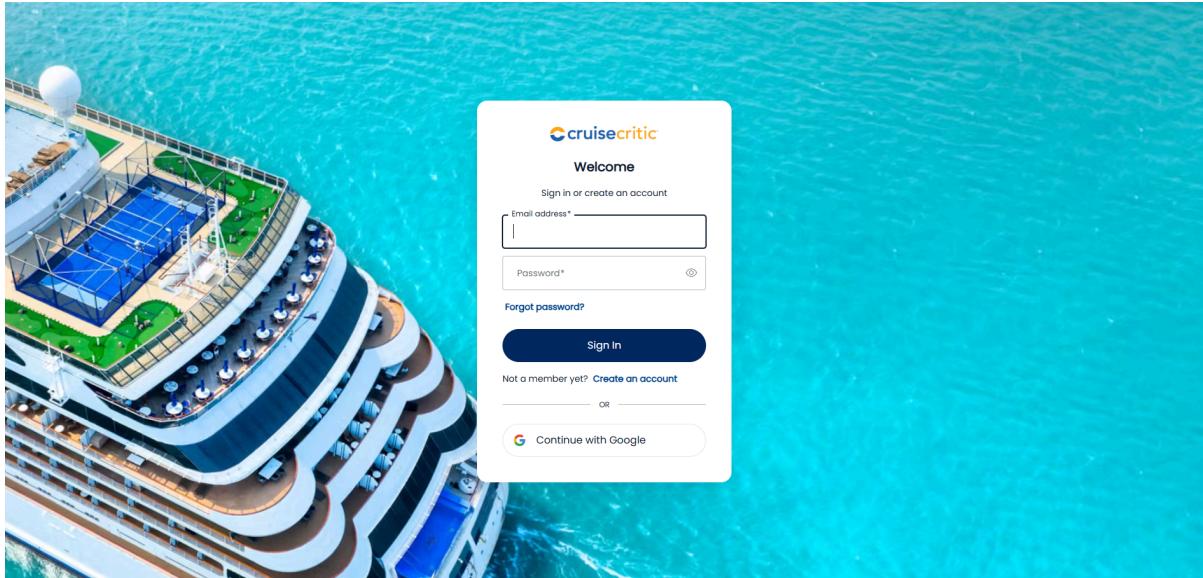


Figure 6: The sign-in page collects email/username, password, basic profile details, and agreement to terms. It indicates that registered members receive personalized access, can post in forums, write reviews, and manage settings.

This screenshot shows the 'Cruise Critic Community' forums view. The top navigation bar includes links for 'Forums', 'Activity', 'Gallery', 'Write a Review', 'Top 10 Topics', 'Live Cruise Reports', 'More', and a search bar. Below the navigation is a secondary navigation bar with links for 'Find Your Roll Call', 'Downloads', 'Meet & Mingle', 'Guidelines', and 'Community Help Center'. The main content area is titled 'Cruise Critic Community' and features a 'Categories' section. It lists several forum topics with their respective post counts: 'Welcome to Cruise Critic' (23.4k posts), '30th Anniversary - Come Celebrate With Us!' (391 posts), and 'New Cruisers'. Each category has a small thumbnail image and a brief description. The overall design is light-colored with a dark blue header and navigation bar.

Figure 7: This Community Forums View page lists forum categories (e.g., Welcome, New Cruisers, Roll Calls, Cruise lines) with post counts and links to discussion topics.



Cruise Articles and Guides

Set Sail with your Next Must-Reads (12)



Amazon River Cruises: How to Choose the Best One for You

7 min read



I Used to Hate 3 Day Cruises. Now, I Can't Get Enough of Them

6 min read



Best-Kept Secret Cruise Ships

3 min read



These Are the Strangest Cruise Ship Shore Excursions We've Ever Taken

8 min read



Floating and City What C Like in 2

6 min read

Latest Stories



Cruise Itinerary Changes: Why They Happen and What Your Cruise Line Could Owe You

Cruise itineraries change more often than some cruisers may realize. Here's our breakdown of why they happen and what your cruise line may owe you if they do.

Figure 8: This page showcases Cruise Critic's articles and guides. Under the heading "*Cruise Articles and Guides*," users see a grid of article cards, each displaying a large image, article title, and estimated reading time (e.g., "7 min read"). Below, the *Latest Stories* section highlights featured articles with a summary. There is also a section with trending stories.

Business rules and assumptions

Cruise Line

1. The CompanyName uniquely identifies each Cruise Line.
2. A cruise line *owns and operates* one or more Cruise Ships.
3. A cruise line *organizes* multiple Cruise Trips and may promote various Cruise Deals.
4. Each cruise line has specific attributes, including CompanyName, Logo, FleetSize, Rating, Entertainment, and Images.
5. A cruise line may receive multiple Reviews from registered users.

Cruise Ship

6. Each Cruise Ship belongs to exactly one Cruise Line, but a cruise line can operate many ships.
7. Every ship is uniquely identified by a ShipID and has attributes such as ShipName, YearLaunched, CrewCount, Capacity, PassengerToCrewRatio, ShipRating, Amenities, CabinTypes, and ShipImages.
8. Each ship *conducts* one or more Cruise Trips.
9. A ship may receive multiple Reviews written by users.

Cruise Trip

10. Each Cruise Trip is uniquely identified by a TripID.
11. A cruise trip is *organized by* exactly one Cruise Line and *conducted by* exactly one Cruise Ship.
12. Each cruise trip has one corresponding Cruise Itinerary (1 : 1 relationship).
13. Each trip *departs from* exactly one Port.
14. Each trip includes attributes such as TripName, DeparturePort, Duration, Price, Style, Orientation, Excursions, and TripImages.
15. A trip can be associated with one or more Cruise Deals that apply to its itinerary.

Cruise Itinerary

16. Each Cruise Itinerary is a *weak entity* identified by an Itinerary ID and is dependent on a Cruise Trip.
17. A cruise itinerary consists of one or more Destinations and one or more Ports that the cruise *visits* or *stops at*.
18. Attributes include Map, Days, and related Port or Destination details.
19. Each itinerary may be linked to multiple Cruise Deals through a many-to-many “Applies To” relationship.

Destination

20. Each Destination is uniquely identified by a DestinationID and includes DestinationName, DestinationSummary, DestinationType, and Images.
21. Each destination may have an associated Port of arrival or departure (optional 1 : 1 relationship).

Port

23. Each Port is uniquely identified by a PortID and includes PortName, DepartureLocation, and PortImages.
24. A Cruise Trip *departs from* exactly one port, but a port can serve as the departure location for many trips (1 : N).
25. A port can be linked to multiple itineraries as a stop or destination.

Cruise Deal

26. Each Cruise Deal is uniquely identified by a DealID and includes attributes such as Price, Duration, Image, and TravelAgencyLink.
27. A cruise deal is *provided by* one Cruise Line (1 : N)

28. A cruise deal can also be *linked to* one or more Cruise Trips.

User / Member

29. Each User is uniquely identified by a UserID and includes attributes Username, Password, DateJoined, PostCount, and Badges.

30. A user can write many Reviews (1 : N relationship).

31. A user can create many Forum Threads (1 : N relationship).

32. A user may also contribute Advice articles or tips.

Community Review

33. Each Review is uniquely identified by a ReviewID.

34. A review must be written by exactly one User

35. Each review includes a Title, Rating, Date, Picture, and optional comments.

36. A community can have many discussion forums (1:M).

Forum / Discussion Thread

37. Each Forum is a weak entity identified by a ForumID and dependent on a User (the creator).

38. Each forum thread includes ForumTitle, Category, Timestamp, and may discuss one or more Reviews.

39. A user can create multiple forum threads, but each thread has exactly one author.

40. A forum may also be associated with general Advice content or cruise topics.

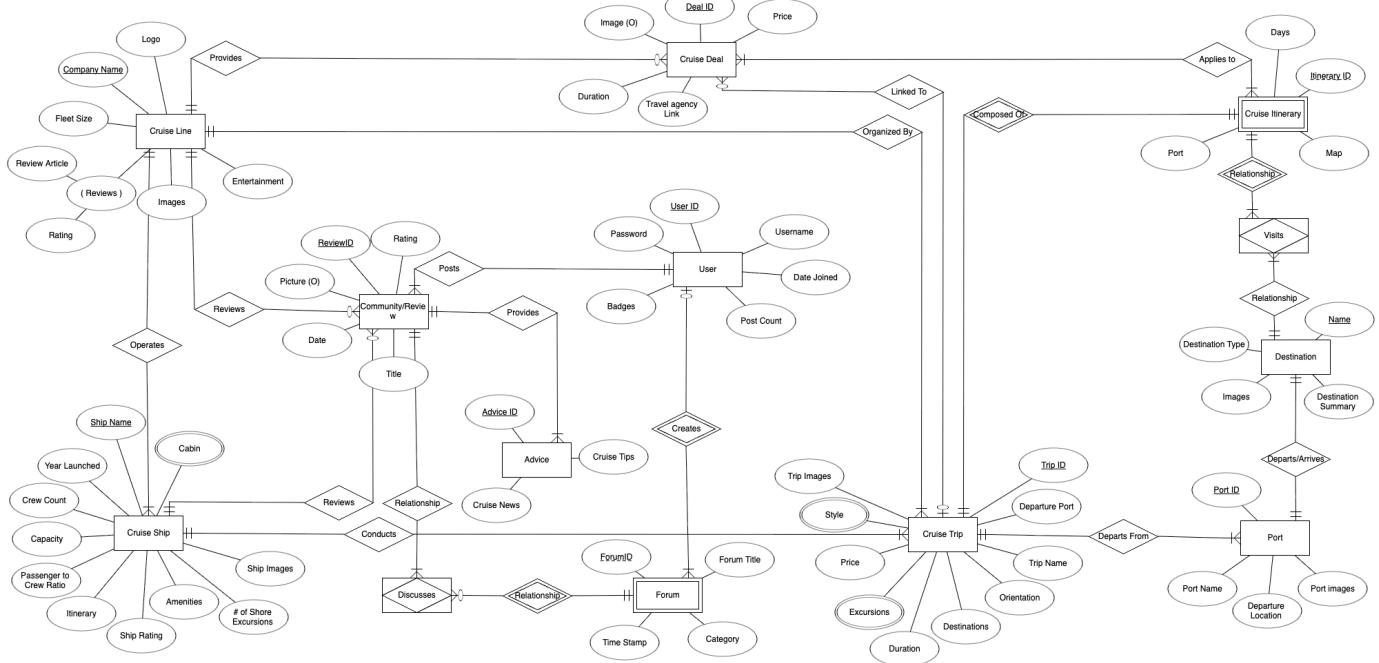
Advice

41. Each Advice record is uniquely identified by an AdviceID.

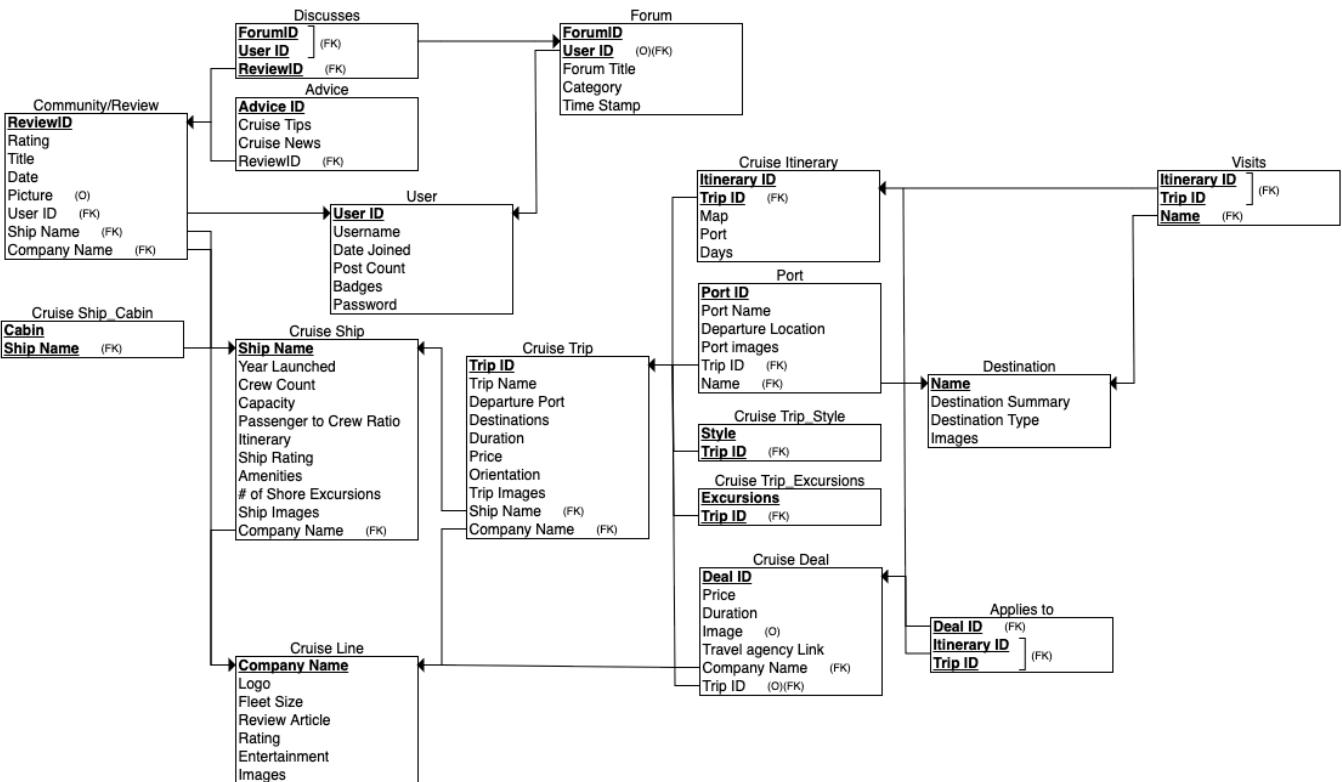
42. Advice articles contain CruiseTips and CruiseNews.

43. A cruise line may provide multiple advice articles for community engagement (1 : N relationship).

The E-R data model



Logical design of the relational database



3. Database Design and Implementation

Table design and data integrity control

```
USE EECS3421_DB_Abrar;
GO

-- CRUISE_LINE TABLE
CREATE TABLE CRUISE_LINE (
    COMPANY_NAME VARCHAR(50) NOT NULL,
    LOGO VARCHAR(100),
    FLEET_SIZE INT,
    REVIEW_ARTICLE VARCHAR(200),
    RATING NUMERIC(3,1),
    ENTERTAINMENT VARCHAR(200),
    IMAGES VARCHAR(200),
    PRIMARY KEY (COMPANY_NAME)
);
GO

-- CRUISE_SHIP TABLE
CREATE TABLE CRUISE_SHIP (
    SHIP_NAME VARCHAR(50) NOT NULL,
    YEAR_LAUNCHED INT,
    CREW_COUNT INT,
    CAPACITY INT,
    PASSENGER_CREW_RATIO NUMERIC(5,2),
    ITINERARY VARCHAR(200),
    SHIP_RATING NUMERIC(3,1),
    AMENITIES VARCHAR(200),
    SHORE_EXCURSIONS INT,
    SHIP_IMAGES VARCHAR(200),
    COMPANY_NAME VARCHAR(50) NOT NULL,
    PRIMARY KEY (SHIP_NAME),
    FOREIGN KEY (COMPANY_NAME) REFERENCES CRUISE_LINE(COMPANY_NAME)
        ON UPDATE CASCADE
        ON DELETE CASCADE
);
GO

-- CRUISE_TRIP TABLE
CREATE TABLE CRUISE_TRIP (
    TRIP_ID INT NOT NULL,
    TRIP_NAME VARCHAR(100),
    DEPARTURE_PORT VARCHAR(100),
    DESTINATIONS VARCHAR(200),
    DURATION INT,
    PRICE NUMERIC(8,2),
    ORIENTATION VARCHAR(50),
    TRIP_IMAGES VARCHAR(200),
    SHIP_NAME VARCHAR(50) NOT NULL,
    COMPANY_NAME VARCHAR(50) NOT NULL,
    PRIMARY KEY (TRIP_ID),
    FOREIGN KEY (SHIP_NAME) REFERENCES CRUISE_SHIP(SHIP_NAME),
    FOREIGN KEY (COMPANY_NAME) REFERENCES CRUISE_LINE(COMPANY_NAME)
        ON UPDATE NO ACTION
        ON DELETE CASCADE
);
GO
```

```

-- DESTINATION TABLE
CREATE TABLE DESTINATION (
    NAME VARCHAR(100) NOT NULL,
    DESTINATION_SUMMARY VARCHAR(300),
    DESTINATION_TYPE VARCHAR(50),
    IMAGES VARCHAR(200),
    PRIMARY KEY (NAME)
);
GO

-- PORT TABLE
CREATE TABLE PORT (
    PORT_ID INT NOT NULL,
    PORT_NAME VARCHAR(100),
    DEPARTURE_LOCATION VARCHAR(100),
    PORT_IMAGES VARCHAR(200),
    TRIP_ID INT NOT NULL,
    NAME VARCHAR(100) NOT NULL,
    PRIMARY KEY (PORT_ID),
    FOREIGN KEY (TRIP_ID) REFERENCES CRUISE_TRIP(TRIP_ID),
    FOREIGN KEY (NAME) REFERENCES DESTINATION(NAME)
    ON UPDATE CASCADE
    ON DELETE CASCADE
);
GO

-- CRUISE DEAL TABLE
CREATE TABLE CRUISE DEAL (
    DEAL_ID INT NOT NULL,
    PRICE NUMERIC(8,2),
    DURATION INT,
    IMAGE VARCHAR(200),
    TRAVEL_AGENCY_LINK VARCHAR(200),
    COMPANY_NAME VARCHAR(50) NOT NULL,
    TRIP_ID INT NOT NULL,
    PRIMARY KEY (DEAL_ID),
    FOREIGN KEY (COMPANY_NAME) REFERENCES CRUISE_LINE(COMPANY_NAME),
    FOREIGN KEY (TRIP_ID) REFERENCES CRUISE_TRIP(TRIP_ID)
    ON UPDATE CASCADE
    ON DELETE CASCADE
);
GO

-- USER ACCOUNT TABLE
CREATE TABLE USER_ACCOUNT (
    USER_ID INT NOT NULL,
    USERNAME VARCHAR(50) UNIQUE NOT NULL,
    DATE_JOINED DATE,
    POST_COUNT INT,
    BADGES VARCHAR(100),
    PASSWORD VARCHAR(100) NOT NULL,
    PRIMARY KEY (USER_ID)
);
GO

```

```

-- FORUM TABLE
CREATE TABLE FORUM (
    FORUM_ID INT NOT NULL,
    USER_ID INT NOT NULL,
    FORUM_TITLE VARCHAR(100),
    CATEGORY VARCHAR(50),
    TIME_STAMP DATETIME,
    PRIMARY KEY (FORUM_ID),
    FOREIGN KEY (USER_ID) REFERENCES USER_ACCOUNT(USER_ID)
    ON UPDATE CASCADE
    ON DELETE CASCADE
);
GO

-- COMMUNITY REVIEW TABLE
CREATE TABLE COMMUNITY REVIEW (
    REVIEW_ID INT NOT NULL,
    RATING NUMERIC(3,1),
    TITLE VARCHAR(100),
    DATE DATE,
    PICTURE VARCHAR(200),
    USER_ID INT NOT NULL,
    SHIP_NAME VARCHAR(50) NOT NULL,
    COMPANY_NAME VARCHAR(50) NOT NULL,
    PRIMARY KEY (REVIEW_ID),
    FOREIGN KEY (USER_ID) REFERENCES USER_ACCOUNT(USER_ID),
    FOREIGN KEY (SHIP_NAME) REFERENCES CRUISE_SHIP(SHIP_NAME),
    FOREIGN KEY (COMPANY_NAME) REFERENCES CRUISE_LINE(COMPANY_NAME)
    ON UPDATE NO ACTION
    ON DELETE CASCADE
);
GO

-- ADVICE TABLE
CREATE TABLE ADVICE (
    ADVICE_ID INT NOT NULL,
    CRUISE_TIPS VARCHAR(200),
    CRUISE_NEWS VARCHAR(200),
    REVIEW_ID INT NOT NULL,
    PRIMARY KEY (ADVICE_ID),
    FOREIGN KEY (REVIEW_ID) REFERENCES COMMUNITY REVIEW(REVIEW_ID)
    ON UPDATE NO ACTION
    ON DELETE CASCADE
);
GO

-- CRUISE TRIP STYLE TABLE
CREATE TABLE CRUISE_TRIP_STYLE (
    STYLE VARCHAR(50),
    TRIP_ID INT NOT NULL,
    PRIMARY KEY (STYLE, TRIP_ID),
    FOREIGN KEY (TRIP_ID) REFERENCES CRUISE_TRIP(TRIP_ID)
    ON UPDATE CASCADE
    ON DELETE CASCADE
);
GO

```

```

-- CRUISE_ITINERARY TABLE
CREATE TABLE CRUISE_ITINERARY (
    ITINERARY_ID INT NOT NULL,
    TRIP_ID INT NOT NULL,
    MAP VARCHAR(200),
    PORT VARCHAR(100),
    TOTALDAYS INT,
    PRIMARY KEY (ITINERARY_ID),
    FOREIGN KEY (TRIP_ID) REFERENCES CRUISE_TRIP(TRIP_ID)
    ON UPDATE CASCADE
    ON DELETE CASCADE
);
GO

-- VISITS TABLE
CREATE TABLE VISITS (
    ITINERARY_ID INT NOT NULL,
    TRIP_ID INT NOT NULL,
    NAME VARCHAR(100) NOT NULL,
    PRIMARY KEY (ITINERARY_ID, TRIP_ID, NAME),
    FOREIGN KEY (ITINERARY_ID) REFERENCES CRUISE_ITINERARY(ITINERARY_ID),
    FOREIGN KEY (TRIP_ID) REFERENCES CRUISE_TRIP(TRIP_ID),
    FOREIGN KEY (NAME) REFERENCES DESTINATION(NAME)
    ON UPDATE CASCADE
    ON DELETE CASCADE
);
GO

-- CRUISE_SHIP_CABIN TABLE
CREATE TABLE CRUISE_SHIP_CABIN (
    CABIN INT NOT NULL,
    SHIP_NAME VARCHAR(50) NOT NULL,
    PRIMARY KEY (CABIN),
    FOREIGN KEY (SHIP_NAME) REFERENCES CRUISE_SHIP(SHIP_NAME)
    ON UPDATE NO ACTION
    ON DELETE CASCADE
);
GO

-- CRUISE_TRIP_EXCURSIONS TABLE
CREATE TABLE CRUISE_TRIP_EXCURSIONS (
    EXCURSIONS VARCHAR(100),
    TRIP_ID INT NOT NULL,
    PRIMARY KEY (EXCURSIONS),
    FOREIGN KEY (TRIP_ID) REFERENCES CRUISE_TRIP(TRIP_ID)
    ON UPDATE NO ACTION
    ON DELETE CASCADE
);
GO

```

```

-- APPLIES_TO TABLE
CREATE TABLE APPLIES_TO (
    DEAL_ID INT NOT NULL,
    ITINERARY_ID INT NOT NULL,
    TRIP_ID INT NOT NULL,
    PRIMARY KEY (DEAL_ID, ITINERARY_ID, TRIP_ID),
    FOREIGN KEY (DEAL_ID) REFERENCES CRUISE DEAL(DEAL_ID),
    FOREIGN KEY (ITINERARY_ID) REFERENCES CRUISE_ITINERARY(ITINERARY_ID),
    FOREIGN KEY (TRIP_ID) REFERENCES CRUISE_TRIP(TRIP_ID)
    ON UPDATE CASCADE
    ON DELETE CASCADE
);
GO

-- DISCUSSES TABLE
CREATE TABLE DISCUSSES (
    FORUM_ID INT NOT NULL,
    USER_ID INT NOT NULL,
    REVIEW_ID INT NOT NULL,
    PRIMARY KEY (FORUM_ID, USER_ID, REVIEW_ID),
    FOREIGN KEY (FORUM_ID) REFERENCES FORUM(FORUM_ID),
    FOREIGN KEY (USER_ID) REFERENCES USER_ACCOUNT(USER_ID),
    FOREIGN KEY (REVIEW_ID) REFERENCES COMMUNITY REVIEW(REVIEW_ID)
    ON UPDATE NO ACTION
    ON DELETE CASCADE
);
GO

```

Explanation of the integrities

Entity Integrity

- Entity integrity ensures that every table in the database has a unique and non-null primary key that identifies each record.
- All tables in the Cruise Database include primary keys that uniquely identify each entity.
- Some tables use simple primary keys, for example: (**PRIMARY KEY (COMPANY_NAME)**, **PRIMARY KEY (TRIP_ID)**, **PRIMARY KEY (TRIP_ID)**), while others use composite primary keys, for example: (**PRIMARY KEY (STYLE, TRIP_ID)**) in **CRUISE_TRIP_STYLE**, **PRIMARY KEY (DEAL_ID, ITINERARY_ID, TRIP_ID)** in **APPLIES_TO**.
- Primary key columns are all defined as **NOT NULL** to prevent missing identifiers.
- This enforces uniqueness and guarantees that no duplicate or null records can exist within a table.

Referential Integrity

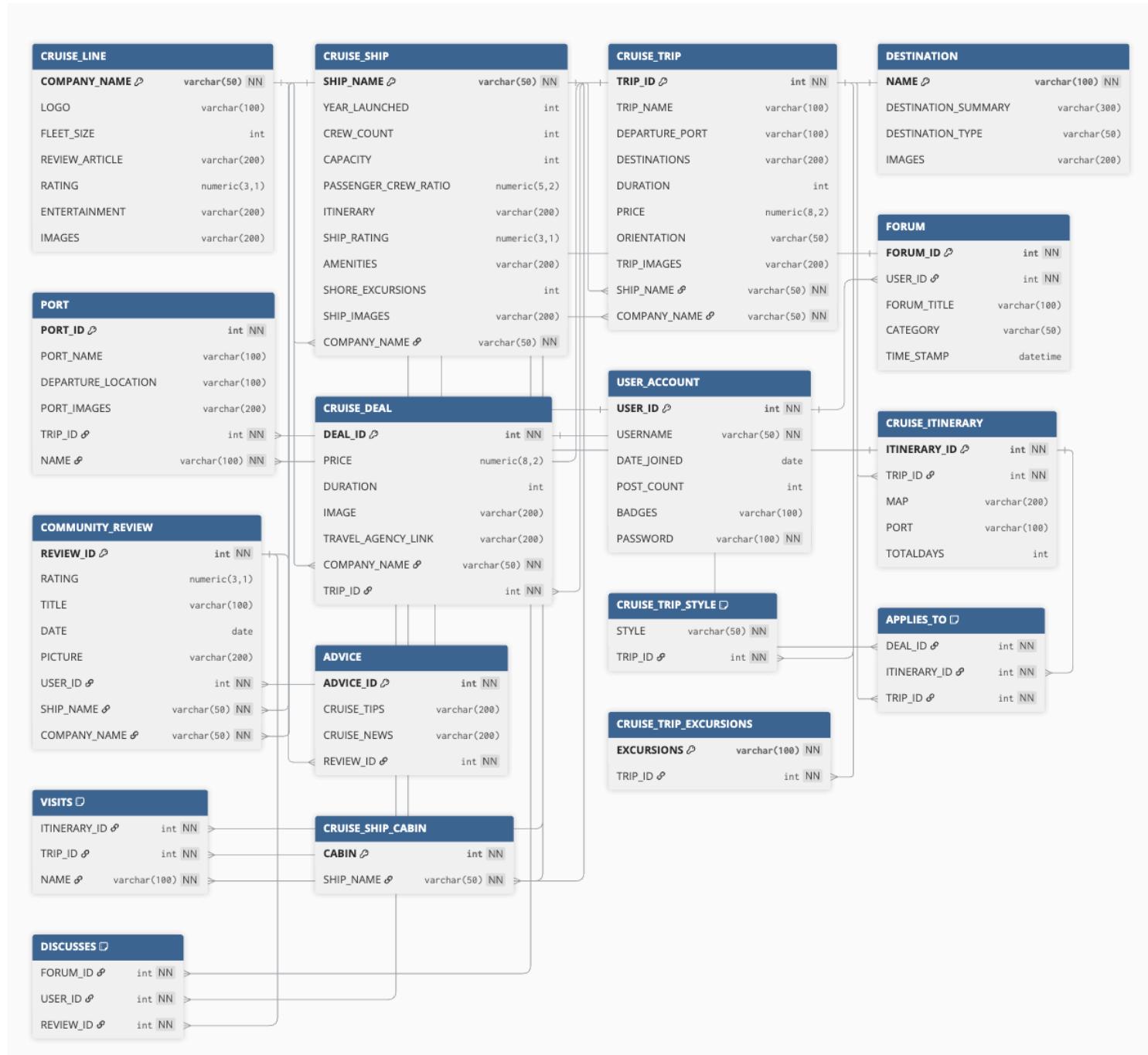
- Referential integrity ensures that relationships between parent and child tables remain valid by utilizing foreign key constraints.

- Every relationship in the database is implemented using **FOREIGN KEY** constraints that reference the corresponding **PRIMARY KEY** in the parent table.
- These constraints ensure that no child record can exist without a valid parent (for example, every cruise ship must belong to an existing cruise line, and every review must be linked to a valid user and ship).
- To maintain consistent data when key values are updated, most foreign keys include the action: **ON UPDATE CASCADE**.
 - This automatically updates foreign key values when a referenced primary key changes.
- To prevent accidental data loss, most relationships use: **ON DELETE NO ACTION**.
 - Ensuring that a parent record cannot be deleted while related child records exist.
 - **ON UPDATE NO ACTION** is also used to force the system to block any update that would break referential integrity, instead of automatically cascading the change.
- In some cases (e.g., when deletion of a parent should remove its dependents, such as a cruise line and its ships), **ON DELETE CASCADE** is applied so it is reflected accordingly.
- These Referential Integrity implementations prevent multiple cascade path errors and maintain logical consistency between related tables.

Domain Integrity

- Domain integrity ensures that all data entered into the database is valid, consistent, and within the correct domain.
- All tables use appropriate data types for their columns:
 - **INT** for identifiers and numeric counts.
 - **NUMERIC(p,s)** for precise values such as prices and ratings.
 - **VARCHAR(n)** for text fields with controlled lengths and descriptions
 - **DATE and DATETIME** for attributes such as trip dates and timestamps.
 - **NOT NULL** constraints are used for required fields, while optional descriptive attributes (like IMAGES, REVIEW_ARTICLE, or LOGO) are allowed to be NULL.
- All foreign key and primary key columns share matching data types, ensuring type consistency across relationships.
- By enforcing proper data types, constraints, and value domains, invalid entries (e.g., text in numeric fields or null IDs) are automatically prevented.

Design relational diagram



Sample data for all the tables

```
-- CRUISE_LINE INSERTS
INSERT INTO CRUISE_LINE VALUES
('Royal Caribbean', 'royal_logo.png', 27, 'Adventure focused big ships', 4.6, 'Broadway shows, surf
rider', 'royal_line.jpg'),
('Norwegian Cruise Line', 'norwegian_logo.png', 19, 'Freestyle modern cruising vibe', 4.4, 'Live music
theme nights', 'norwegian_line.jpg'),
('Carnival Cruise Line', 'carnival_logo.png', 24, 'Affordable fun family experience', 4.2, 'Comedy club
water parks', 'carnival_line.jpg'),
('MSC Cruises', 'msc_logo.png', 22, 'European style onboard service', 4.3, 'Opera shows fine dining',
'msc_line.jpg'),
('Celebrity Cruises', 'celebrity_logo.png', 15, 'Modern luxury relaxed elegance', 4.7, 'Art galleries
wine tastings', 'celebrity_line.jpg');
GO

-- CRUISE_SHIP INSERTS
INSERT INTO CRUISE_SHIP VALUES
('Wonder of the Seas', 2022, 2300, 6988, 3.04, 'Caribbean seven night loop', 4.8, 'Pools rink surf
rider', 12, 'wonder_ship.jpg', 'Royal Caribbean'),
('Norwegian Encore', 2019, 1700, 3998, 2.35, 'Alaska and Panama canal', 4.6, 'Kart track laser tag', 8,
'encore_ship.jpg', 'Norwegian Cruise Line'),
('Carnival Mardi Gras', 2021, 1800, 5282, 2.93, 'Bahamas and short getaways', 4.5, 'Roller coaster
comedy club', 10, 'mardigras_ship.jpg', 'Carnival Cruise Line'),
('MSC Seaside', 2017, 1500, 4134, 2.75, 'Mediterranean coastal explorer', 4.4, 'Aqua park zip line', 9,
'seaside_ship.jpg', 'MSC Cruises'),
('Celebrity Apex', 2020, 1400, 2910, 2.08, 'Greek isles iconic route', 4.9, 'Rooftop garden Eden
lounge', 7, 'apex_ship.jpg', 'Celebrity Cruises');
GO

-- CRUISE_TRIP INSERTS
INSERT INTO CRUISE_TRIP VALUES
(4101, 'Eastern Caribbean Adventure', 'Miami', 'Bahamas, St. Thomas, St. Maarten', 7, 1299.99,
'Caribbean focus itinerary', 'trip_4101.jpg', 'Wonder of the Seas', 'Royal Caribbean'),
(4102, 'Alaskan Glacier Voyage', 'Seattle', 'Ketchikan, Juneau, Skagway', 7, 1599.00, 'Alaska glacier
sightseeing', 'trip_4102.jpg', 'Norwegian Encore', 'Norwegian Cruise Line'),
(4103, 'Mediterranean Odyssey', 'Barcelona', 'Rome, Naples, Athens', 10, 1899.50, 'Mediterranean
culture highlights', 'trip_4103.jpg', 'MSC Seaside', 'MSC Cruises'),
(4104, 'Bahamas Getaway', 'Port Canaveral', 'Nassau, Half Moon Cay', 5, 899.99, 'Short tropical
escape', 'trip_4104.jpg', 'Carnival Mardi Gras', 'Carnival Cruise Line'),
(4105, 'Greek Isles Luxury', 'Athens', 'Santorini, Mykonos, Crete', 8, 2099.99, 'Europe island
hopping', 'trip_4105.jpg', 'Celebrity Apex', 'Celebrity Cruises');
GO

-- DESTINATION INSERTS
INSERT INTO DESTINATION VALUES
('Bahamas', 'Turquoise water beach time', 'Island', 'dest_bahamas.jpg'),
('St. Thomas', 'Harbor views duty free', 'Island', 'dest_stthomas.jpg'),
('Barcelona', 'Gaudi art vibrant streets', 'City', 'dest_barcelona.jpg'),
('Athens', 'Ancient sites classic ruins', 'City', 'dest_athens.jpg'),
('Santorini', 'Cliffside sunsets blue domes', 'Island', 'dest_santorini.jpg');
GO

-- PORT INSERTS
INSERT INTO PORT VALUES
(5101, 'Port of Nassau', 'Nassau', 'port_nassau.jpg', 4104, 'Bahamas'),
(5102, 'Havensight Pier', 'Charlotte Amalie', 'port_stthomas.jpg', 4101, 'St. Thomas'),
(5103, 'Port of Barcelona', 'Barcelona', 'port_barcelona.jpg', 4103, 'Barcelona'),
(5104, 'Port of Piraeus', 'Athens', 'port_athens.jpg', 4105, 'Athens'),
```

```

(5105, 'Athinios Port', 'Santorini', 'port_santorini.jpg', 4105, 'Santorini');

GO

-- CRUISE DEAL INSERTS
INSERT INTO CRUISE_DEAL VALUES
(6201, 999.99, 7, 'deal_6201.jpg', 'https://www.royalcaribbean.com/deal1', 'Royal Caribbean', 4101),
(6202, 1499.50, 7, 'deal_6202.jpg', 'https://www.ncl.com/deal2', 'Norwegian Cruise Line', 4102),
(6203, 1799.00, 10, 'deal_6203.jpg', 'https://www.msccruises.com/deal3', 'MSC Cruises', 4103),
(6204, 749.99, 5, 'deal_6204.jpg', 'https://www.carnival.com/deal4', 'Carnival Cruise Line', 4104),
(6205, 1999.00, 8, 'deal_6205.jpg', 'https://www.celebritycruises.com/deal5', 'Celebrity Cruises', 4105);
GO

-- USER_ACCOUNT INSERTS
INSERT INTO USER_ACCOUNT VALUES
(7001, 'AbrarJawadTarfder', '2023-06-15', 12, 'Top Reviewer', 'abrar123'),
(7002, 'ShoumikAhmed', '2023-07-05', 8, 'Travel Expert', 'shoumik123'),
(7003, 'EkambirMomi', '2023-05-20', 10, 'Cruise Enthusiast', 'ekam123'),
(7004, 'JasveenSahani', '2023-08-10', 5, 'New Contributor', 'jasveen123'),
(7005, 'VrindaKhanduja', '2023-09-02', 6, 'Photo Uploader', 'vrinda123');
GO

-- FORUM INSERTS
INSERT INTO FORUM VALUES
(8001, 7001, 'Tips for first cruise', 'Advice', '2024-01-10 10:30:00'),
(8002, 7002, 'Best Alaska shore tours', 'Excursions', '2024-02-15 14:45:00'),
(8003, 7003, 'Mediterranean dining picks', 'Dining', '2024-03-22 09:20:00'),
(8004, 7004, 'Bahamas with kids tips', 'Family', '2024-04-18 16:05:00'),
(8005, 7005, 'Greek isles photo spots', 'Photography', '2024-05-25 19:40:00');
GO

-- COMMUNITY REVIEW INSERTS
INSERT INTO COMMUNITY REVIEW VALUES
(9001, 4.8, 'Amazing Caribbean cruise', '2024-03-12', 'rev_9001.jpg', 7001, 'Wonder of the Seas', 'Royal Caribbean'),
(9002, 4.6, 'Loved the glacier views', '2024-05-10', 'rev_9002.jpg', 7002, 'Norwegian Encore', 'Norwegian Cruise Line'),
(9003, 4.4, 'Great Mediterranean flavors', '2024-06-20', 'rev_9003.jpg', 7003, 'MSC Seaside', 'MSC Cruises'),
(9004, 4.2, 'Fun short Bahamas trip', '2024-02-25', 'rev_9004.jpg', 7004, 'Carnival Mardi Gras', 'Carnival Cruise Line'),
(9005, 5.0, 'Unforgettable Greek luxury', '2024-07-01', 'rev_9005.jpg', 7005, 'Celebrity Apex', 'Celebrity Cruises');
GO

-- ADVICE INSERTS
INSERT INTO ADVICE VALUES
(10001, 'Pack light breathable layers', 'Check port weather updates', 9001),
(10002, 'Book glacier excursions early', 'Bring binoculars for wildlife', 9002),
(10003, 'Reserve specialty dining early', 'Wear comfy shoes for ruins', 9003),
(10004, 'Bring reef safe sunscreen', 'Plan kid friendly activities', 9004),
(10005, 'Sunset deck photo timing', 'Prebook tender priority spots', 9005);
GO

-- CRUISE TRIP STYLE INSERTS
INSERT INTO CRUISE_TRIP_STYLE VALUES
('Family Adventure', 4101),
('Scenic Wilderness', 4102),
('Culture Immersion', 4103),

```

```

('Quick Getaway', 4104),
('Modern Luxury', 4105);
GO

-- CRUISE_ITINERARY INSERTS
INSERT INTO CRUISE_ITINERARY VALUES
(11001, 4101, 'map_4101.png', 'Eastern loop ports', 7),
(11002, 4102, 'map_4102.png', 'Inside passage route', 7),
(11003, 4103, 'map_4103.png', 'Western med highlights', 10),
(11004, 4104, 'map_4104.png', 'Bahamas short circuit', 5),
(11005, 4105, 'map_4105.png', 'Cyclades scenic circle', 8);
GO

-- VISITS INSERTS
INSERT INTO VISITS VALUES
(11001, 4101, 'Bahamas'),
(11001, 4101, 'St. Thomas'),
(11003, 4103, 'Barcelona'),
(11005, 4105, 'Athens'),
(11005, 4105, 'Santorini');
GO

-- CRUISE_SHIP_CABIN INSERTS
INSERT INTO CRUISE_SHIP_CABIN VALUES
(12001, 'Wonder of the Seas'),
(12002, 'Norwegian Encore'),
(12003, 'Carnival Mardi Gras'),
(12004, 'MSC Seaside'),
(12005, 'Celebrity Apex');
GO

-- CRUISE_TRIP_EXCURSIONS INSERTS
INSERT INTO CRUISE_TRIP_EXCURSIONS VALUES
('Nassau snorkeling tour', 4104),
('Mendenhall glacier hike', 4102),
('Vatican museums skipline', 4103),
('St Thomas skyride view', 4101),
('Santorini catamaran sail', 4105);
GO

-- APPLIES_TO INSERTS
INSERT INTO APPLIES_TO VALUES
(6201, 11001, 4101),
(6202, 11002, 4102),
(6203, 11003, 4103),
(6204, 11004, 4104),
(6205, 11005, 4105);
GO

-- DISCUSSES INSERTS
INSERT INTO DISCUSSES VALUES
(8001, 7001, 9001),
(8002, 7002, 9002),
(8003, 7003, 9003),
(8004, 7004, 9004),
(8005, 7005, 9005);
GO

```

1. Cruise Line

	COMPANY_NAME	LOGO	FLEET_SIZE	REVIEW_ARTICLE	RATING	ENTERTAINMENT	IMAGES
1	Carnival Cruis...	carnival_logo.png	24	Affordable fun...	4.2	Comedy club water par...	carnival_line.jpg
2	Celebrity Crui...	celebrity_logo.png	15	Modern luxury...	4.7	Art galleries wine tasti...	celebrity_line.jpg
3	MSC Cruises	msc_logo.png	22	European styl...	4.3	Opera shows fine dining	msc_line.jpg
4	Norwegian Cr...	norwegian_logo.png	19	Freestyle mod...	4.4	Live music theme nights	norwegian_line.jpg
5	Royal Caribbe...	royal_logo.png	27	Adventure foc...	4.6	Broadway shows, surf ...	royal_line.jpg

2. Cruise Ship

	SHIP_NAME	YEAR_BUILT	CREW_COUNT	CAPACITY	PASSENGERS	ITINERARY	SHIP_TYPE	AMENITIES	SHORE_EXCURSIONS	SHIP_IMAGES	COMPANY_NAME
1	Carnival Sunshine	2021	1800	5282	2.93	Bahamas	4.5	Roller coaster	10	mardigras_ship.jpg	Carnival Cruises
2	Celebrity Edge	2020	1400	2910	2.08	Greek Isles	4.9	Rooftop bar	7	apex_ship.jpg	Celebrity Cruises
3	MSC Seaside	2017	1500	4134	2.75	Mediterranean	4.4	Aqua park	9	seaside_ship.jpg	MSC Cruises
4	Norwegian Joy	2019	1700	3998	2.35	Alaska	4.6	Kart track	8	encore_ship.jpg	Norwegian Cruises
5	Wonder of the Seas	2022	2300	6988	3.04	Caribbean	4.8	Pools and spas	12	wonder_ship.jpg	Royal Caribbean

3. Cruise Trip

	TRIP_ID	TRIP_NAME	DEPARTURE_DATE	DESTINATIONS	DAYS	PRICE	ORIENTATION	TRIP_IMAGES	SHIP_NAME	COMPANY_NAME
1	4101	Easter Egg Hunt	Miami	Bahamas, St. Maarten	7	1299.99	Caribbean focus	trip_4101.jpg	Wonder of the Seas	Royal Caribbean
2	4102	Alaska Adventure	Seattle	Ketchikan, Juneau	7	1599.00	Alaska glacier	trip_4102.jpg	Norwegian Joy	Norwegian Cruises
3	4103	Mediterranean Escape	Barcelona	Rome, Naples, Sicily	10	1899.50	Mediterranean	trip_4103.jpg	MSC Seaside	MSC Cruises
4	4104	Bahamas Getaway	Port Canaveral	Nassau, Half Moon Cay	5	899.99	Short tropical cruise	trip_4104.jpg	Carnival Magic	Carnival Cruises
5	4105	Greek Islands	Athens	Santorini, Mykonos, Crete	8	2099.99	Europe island hopper	trip_4105.jpg	Celebrity Edge	Celebrity Cruises

4. Destination

	NAME	DESCRIPTION	TYPE	IMAGES
1	Athens	Ancient sites and modern culture	City	dest_athens.jpg
2	Bahamas	Turquoise waters and white sand beaches	Island	dest_bahamas.jpg
3	Barcelona	Gaudi art and Mediterranean cuisine	City	dest_barcelona.jpg
4	Santorini	Cliffside sunsets and blue domes	Island	dest_santorini.jpg
5	St. Thomas	Harbor views and duty-free shopping	Island	dest_stthomas.jpg

5. Port

	PORT_ID	PORT_NAME	DEPARTURE_LOCATION	PORT_IMAGES	TRIP_ID	NAME
1	5101	Port of Nassau	Nassau	port_nassau.jpg	4104	Bahamas
2	5102	Havensight Pier	Charlotte Amalie	port_stthomas.jpg	4101	St. Thomas
3	5103	Port of Barcelona	Barcelona	port_barcelona.jpg	4103	Barcelona
4	5104	Port of Piraeus	Athens	port_athens.jpg	4105	Athens
5	5105	Athinios Port	Santorini	port_santorini.jpg	4105	Santorini

6. Cruise Deal

	DEAL_ID	PRICE	DURATION	IMAGE	TRAVEL_AGENCY_LINK	COMPANY_NAME	TRIP_ID
1	6201	999.99	7	deal_6201.jpg	https://www.royalcarib...	Royal Caribbean	4101
2	6202	1499.50	7	deal_6202.jpg	https://www.ncl.com/de...	Norwegian Cruise Li...	4102
3	6203	1799.00	10	deal_6203.jpg	https://www.msccruises....	MSC Cruises	4103
4	6204	749.99	5	deal_6204.jpg	https://www.carnival.co...	Carnival Cruise Line	4104
5	6205	1999.00	8	deal_6205.jpg	https://www.celebritycru...	Celebrity Cruises	4105

7. User Account

USER_ID	USERNAME	DATE_JOINED	POST_COUNT	BADGES	PASSWORD
1	7001	AbrarJawadTarfder	2023-06-15	12	Top Reviewer
2	7002	ShoumikAhmed	2023-07-05	8	Travel Expert
3	7003	EkambirMomi	2023-05-20	10	Cruise Enthusi...
4	7004	JasveenSahani	2023-08-10	5	New Contribut...
5	7005	VrindaKhanduja	2023-09-02	6	Photo Uploader

8. Forum

	FORUM_ID	USER_ID	FORUM_TITLE	CATEGORY	TIME_STAMP
1	8001	7001	Tips for first cruise	Advice	2024-01-10 10:30:00.000
2	8002	7002	Best Alaska shore tours	Excursions	2024-02-15 14:45:00.000
3	8003	7003	Mediterranean dining picks	Dining	2024-03-22 09:20:00.000
4	8004	7004	Bahamas with kids tips	Family	2024-04-18 16:05:00.000
5	8005	7005	Greek isles photo spots	Photography	2024-05-25 19:40:00.000

9. Community Review

	REVIEW_ID	RATING	TITLE	DATE	PICTURE	USER_ID	SHIP_NAME	COMPANY_NAME
1	9001	4.8	Amazing Caribbean cruise	2024-03-12	rev_9001.jpg	7001	Wonder of the...	Royal Caribbean
2	9002	4.6	Loved the glacier views	2024-05-10	rev_9002.jpg	7002	Norwegian En...	Norwegian Cruis...
3	9003	4.4	Great Mediterranean flavors	2024-06-20	rev_9003.jpg	7003	MSC Seaside	MSC Cruises
4	9004	4.2	Fun short Bahamas trip	2024-02-25	rev_9004.jpg	7004	Carnival Mardi...	Carnival Cruise L...
5	9005	5.0	Unforgettable Greek luxury	2024-07-01	rev_9005.jpg	7005	Celebrity Apex	Celebrity Cruises

10. Advice

	ADVICE_ID	CRUISE_TIPS	CRUISE_NEWS	REVIEW_ID
1	10001	Pack light breathable layers	Check port weather updates	9001
2	10002	Book glacier excursions early	Bring binoculars for wildlife	9002
3	10003	Reserve specialty dining early	Wear comfy shoes for ruins	9003
4	10004	Bring reef safe sunscreen	Plan kid friendly activities	9004
5	10005	Sunset deck photo timing	Prebook tender priority spots	9005

11. Cruise Trip Style

	STYLE	TRIP_ID
1	Culture Immersion	4103
2	Family Adventure	4101
3	Modern Luxury	4105
4	Quick Getaway	4104
5	Scenic Wilderness	4102

12. Cruise Itinerary

	ITINERARY_ID	TRIP_ID	MAP	PORT	TOTALDAYS
1	11001	4101	map_4101.png	Eastern loop ports	7
2	11002	4102	map_4102.png	Inside passage route	7
3	11003	4103	map_4103.png	Western med highlights	10
4	11004	4104	map_4104.png	Bahamas short circuit	5
5	11005	4105	map_4105.png	Cyclades scenic circle	8

13. Visits

	ITINERARY_ID	TRIP_ID	NAME
1	11001	4101	Bahamas
2	11001	4101	St. Thomas
3	11003	4103	Barcelona
4	11005	4105	Athens
5	11005	4105	Santorini

14. Cruise Ship Cabin

	CABIN	SHIP_NAME
1	12001	Wonder of the Seas
2	12002	Norwegian Encore
3	12003	Carnival Mardi Gras
4	12004	MSC Seaside
5	12005	Celebrity Apex

15. Cruise Trip Excursions

	EXCURSIONS	TRIP_ID
1	Mendenhall glacier hike	4102
2	Nassau snorkeling tour	4104
3	Santorini catamaran sail	4105
4	St Thomas skyride view	4101
5	Vatican museums skipline	4103

16. Applies To

	DEAL_ID	ITINERARY_ID	TRIP_ID
1	6201	11001	4101
2	6202	11002	4102
3	6203	11003	4103
4	6204	11004	4104
5	6205	11005	4105

17. Discusses

	FORUM_ID	USER_ID	REVIEW_ID
1	8001	7001	9001
2	8002	7002	9002
3	8003	7003	9003
4	8004	7004	9004
5	8005	7005	9005

Sample SQL queries to support applications and reports for management use

1) Average Cruise Rating by Cruise Line

Purpose: This report helps management identify which cruise lines have the highest average customer satisfaction scores based on user reviews. It can be used to determine which cruise lines are performing well and which cruise lines may need improvement. This is why the results in the table are sorted in descending order.

```
SELECT
    CRUISE_LINE.COMPANY_NAME,
    ROUND(AVG(COMMUNITY REVIEW.RATING), 2) AS AVERAGE_RATING
FROM CRUISE_LINE
JOIN COMMUNITY REVIEW ON CRUISE_LINE.COMPANY_NAME = COMMUNITY REVIEW.COMPANY_NAME
GROUP BY CRUISE_LINE.COMPANY_NAME
ORDER BY AVERAGE_RATING DESC;
```

RESULTS		
	COMPANY_NAME	AVERAGE_RATING
1	Celebrity Cruises	5.000000
2	Royal Caribbean	4.800000
3	Norwegian Cruise Line	4.600000
4	MSC Cruises	4.400000
5	Carnival Cruise Line	4.200000

2) Price Per Day Ratio by Cruise Line

Purpose: This report helps management identify which cruises have the highest price per day, calculated by the trip duration and total cost. It can be used to determine which cruises are the most and least expensive, as well as the average daily cost for the average person.

```

SELECT
    CRUISE_LINE.COMPANY_NAME,
    CRUISE_DEAL.DURATION,
    CRUISE_DEAL.PRICE,
    ROUND((CRUISE_DEAL.PRICE / CRUISE_DEAL.DURATION), 2) AS PRICE_PER_DAY
FROM CRUISE_LINE
JOIN CRUISE DEAL
ON CRUISE_LINE.COMPANY_NAME = CRUISE DEAL.COMPANY_NAME
ORDER BY PRICE_PER_DAY DESC;

```

	COMPANY_NA...	DURATION	PRICE	PRICE_PER_D...
1	Celebrity Crui...	8	1999.00	249.8800000...
2	Norwegian Cr...	7	1499.50	214.21000000...
3	MSC Cruises	10	1799.00	179.9000000...
4	Carnival Cruis...	5	749.99	150.0000000...
5	Royal Caribbe...	7	999.99	142.8600000...

3) Number of Posts Made by the User

Purpose: This report lists users who are most engaged in community discussions by counting the number of posts they have made. It helps management recognize active customers and plan engagement or loyalty programs. The forum_id is linked to each user_id, which helps identify which users posted what forum. For our purposes and simplification, we only had one forum per user.

```

SELECT
    USER_ACCOUNT.USERNAME,
    COUNT(DISCUSSES.FORUM_ID) AS POSTS_MADE
FROM USER_ACCOUNT
JOIN DISCUSSES ON USER_ACCOUNT.USER_ID = DISCUSSES.USER_ID
GROUP BY USER_ACCOUNT.USERNAME
ORDER BY POSTS_MADE DESC;

```

	USERNAME	POSTS_MADE
1	AbrarJawadTarfder	1
2	EkambirMomi	1
3	JasveenSahani	1
4	ShoumikAhmed	1
5	VrindaKhanduja	1

4) Excursions Offered By Cruise Line

Purpose: This report lists each cruise excursion and the cruise line offering it. Management can use this to identify which lines offer which excursion options, track popular offerings, and pinpoint potential gaps in trip experiences.

```
SELECT
    CRUISE_LINE.COMPANY_NAME,
    CRUISE_TRIP.ORIENTATION,
    CRUISE_TRIP_EXCURSIONS.EXCURSIONS
FROM CRUISE_LINE
JOIN CRUISE_TRIP ON CRUISE_LINE.COMPANY_NAME = CRUISE_TRIP.COMPANY_NAME
JOIN CRUISE_TRIP_EXCURSIONS ON CRUISE_TRIP.TRIP_ID = CRUISE_TRIP_EXCURSIONS.TRIP_ID;
```

	COMPANY_NAME	ORIENTATION	EXCURSIONS
1	Royal Caribbean	Caribbean focus itinerary	St Thomas skyride view
2	Norwegian Cruise Line	Alaska glacier sightseeing	Mendenhall glacier hike
3	MSC Cruises	Mediterranean culture hi...	Vatican museums skipline
4	Carnival Cruise Line	Short tropical escape	Nassau snorkeling tour
5	Celebrity Cruises	Europe island hopping	Santorini catamaran sail

5) Average Cruise Price by Port Departure

Purpose: This report helps management compare the average cruise price by port of departure. This is useful for identifying which cities have the most premium cruises.

```
SELECT
    CRUISE_TRIP.DEPARTURE_PORT,
    ROUND(AVG(CRUISE_TRIP.PRICE), 2) AS AVG_PRICE
FROM CRUISE_TRIP
GROUP BY CRUISE_TRIP.DEPARTURE_PORT
ORDER BY AVG_PRICE DESC;
```

	DEPARTURE_PORT	AVG_PRICE
1	Athens	2099.990000
2	Barcelona	1899.500000
3	Seattle	1599.000000
4	Miami	1299.990000
5	Port Canaveral	899.990000

6) Long-Term Trips

Purpose: This report helps management find the long-term cruise trips. For our purposes, a long-term trip is defined as any trip lasting longer than a week (> 7 days). This will be especially important as understanding these long-term trips is valuable because they often attract high-value customers who are more likely to purchase premium packages, excursions, and amenities.

```
SELECT
    TRIP_NAME,
    DURATION,
    PRICE
FROM CRUISE_TRIP
WHERE DURATION > 7
ORDER BY DURATION DESC;
```

	TRIP_NAME	DURATION	PRICE
1	Mediterranean Odyssey	10	1899.50
2	Greek Isles Luxury	8	2099.99

4. Evaluation and conclusion

1) The achievement of the project

We delivered a working relational database for a Cruise Critic-style platform that supports the end-to-end user journey (registration, cruise search/filter, deal click-through, detailed cruise pages, member reviews, and forums), directly addressing the project objective of designing a simplified real-world e-business database. We demonstrate implementation with the complete DDL(PK/FK/constraints), an ER diagram, and screenshots/query outputs showing populated sample tables (lines, ships, itineraries, ports, deals, users, reviews, posts) and sample SQL queries to support application and reports for management use such as Average Cruise Rating by Cruise Line, Price Per Day Ratio by Cruise, etc. This evidence verifies entity/referential integrity, as well as realistic data flows and business values. The result aligns with the final-report criteria, providing a clear objective and scope, sound data modelling, a demonstrated database implementation, and a well-structured write-up, which meets the requirement to demonstrate the sample database in the report, which is suitable for both technical and non-technical individuals.

2) Further development and improvement

In the future, this project could be improved in several ways. One goal would be to simplify the database structure and make it easier to maintain by refining relationships and eliminating unnecessary tables. This would make updates and debugging faster, especially when working with larger datasets. We could also experiment with a larger, more realistic dataset that includes thousands of users, ships and reviews to test performance and scalability. This would help us identify how well the database handles real-world traffic and complex queries. Another significant improvement would be creating our own version of the Cruise Critic website, with its own front-end and database connection. A web-based platform, similar to the actual Cruise Critic website, would allow users to register, browse cruises, post reviews, and view deals through an interactive interface. This would transform our database from a backend model into a functional, user-friendly application.

3) The advantages and limitations of the database package used.

Advantages:

- We used Microsoft SQL Server with Azure Data Studio, which provided a simple enough interface for us to work with and reliable schema and error validation.
- Microsoft SQL Server, combined with Azure Data Studio, helped us execute DDL and DML commands smoothly and identify any referential integrity checks and debugging.
- We also used ERD Plus to visualize the database and the schemas before actually working with the queries.
- Microsoft SQL Server, accessed through Azure Data Studio, was straightforward enough to use and connect to via Visual Studio Code, which made the development of queries a lot easier.

Limitations:

- We noticed some delays when running larger scripts.
 - It was a hassle to have to drop all the tables every time, whenever we needed to debug and look for errors, or if we wanted to restart.
 - The interface, while simple enough, sometimes lacked the necessary details that would make running queries much easier. The error messages were also sometimes more complex to understand and required careful thought.
- Overall, Microsoft SQL Server, combined with Azure Data Studio, provided a straightforward interface for us to work with for this project.

4) The experience learned from this project.

This project improved our understanding of database design principles, normalization, and SQL programming. We gained practical experience building a system from conceptual design (ERD) to physical design (CREATE TABLE, INSERT, SELECT scripts and queries). We learned the importance of technical skills relating to data integrity, relationships, and normalization, as well as soft skills such as teamwork, documentation, and project coordination. The process also strengthened our problem-solving, testing, and debugging skills, preparing us for real-world database development.