Information Systems and Databases 2022/2023

Project Assignment - Part 1

In this Part 1 of the project assignment, you will design a database model to answer the information requirements of an application whose domain is presented below. Your job is to deliver a concise and clean data model using the Entity-Association model graphic notation taught in class and, along with it, identify and specify the appropriate Integrity Constraints.

Domain Description

You have been asked to design an information system to support a Boating Management System.

The system keeps information about boats. Every boat has a name and a length. Boat names are sometimes long and are not always unique. Each boat is registered with a unique national boat identifier in a certain country. The year of registration must also be recorded. Every boat has a class (e.g.: "Class 1", "Class 2", etc.); classes are associated with a maximum length.

Each sailor has a first name, a surname, and an email. The system must allow changing all of these attributes. Sailors are either "Senior" or "Junior".

Sailors often come together to jointly reserve a boat to navigate for a certain scheduled date interval, who are then the authorized sailors of that reservation. Every reservation has, at least, one authorized sailor. Reserved boats are ready to sail on multiple trips for the same reservation.

Only authorized sailors can navigate the reserved boat within the reservation's time frame. Non-authorized sailors can be liable before port and national authorities. One of the authorized sailors, who must be senior, will be responsible for the reservation.

Each trip has one skipper (one of the authorized sailors), a start location, an end location, a take-off date, an arrival date, and an insurance reference (that may be reused among trips). Boats must display the flags of countries whose water jurisdiction will be navigated.

Every location has a name, a latitude and a longitude. Any two locations must be at least one nautical mile apart. Every location exists in the maritime authority of a given country. A country

has a unique name, a unique flag, and a unique standard ISO code. Every country where boats can be registered must have at least one location.

Sailors have personal sailing certifications. Each certification has issue date and expiry date, and allows the sailor to be the skipper of one specific boat class, in one or more specific country jurisdictions.

Work to be developed

1. Design an **Entity-Association model diagram** for the problem domain presented in the previous section.
2. Identify those situations that are inconsistent in the problem domain, but that are allowed in the presented Entity-Association model, and **define a set of Integrity Constraints** that complete the proposed model in order to prohibit situations that are invalid.

Aspects to keep in mind

Please keep in mind the following aspects while developing your work:

- The Entity-Association model must be **expressed** in **the notation taught in class**;
- The Integrity Constraints to the Entity-Association model must be written as **assertions expressed in terms of the concepts in the Entity-Association model**, that is, in terms of attributes, entities, and relationships between them;
- The **cleanliness** and **conciseness** of the model will be **evaluated.**

NOTE: The diagram should be drawn electronically on a diagraming tool. Refer to the lecture slides suggestions about the diagraming tools to be used.

Report format and submission

The project assignment will be evaluated based on a report submitted by the students. The report must contain responses to the items requested above.

The following table shows the value of each part of the work to be carried out.

Item	**Relative Maximum Grading**
Entity Association Model	16/20
Integrity Constraints	4/20

The report should start with a cover page with the title “**SIBD Project - Part 1**", with the **name and number of students**, the **relative percent of each student's contribution**, together with the **total effort (in hours) that each element of the group dedicated to the project**, the **number of the group**, the **shift to which the group belongs**.

Length: In addition to the cover sheet, the report shall have a **maximum** of **2 pages** including the cover page.

The report will have to be submitted digitally, in PDF format, with the name **`part-01-GG.pdf`** (where `GG` is the group number), submitted via Fénix System until the delivery date.

NOTE: Penalties apply to reports that do not comply with the submission format.