

## MS218 – Database Technologies

### Assignment-1

October 12, 2021

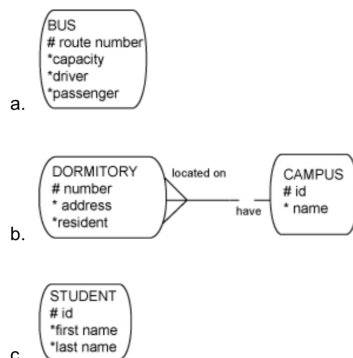
**Question.1** (40 points) Design an ERD of a database to keep track of information for an art museum. Assume that the following requirements were collected:

- The museum has a collection of ART\_OBJECTS. Each ART\_OBJECT has a unique Id\_no, an Artist (if known), a Year (when it was created, if known), a Title, and a Description. The art objects are categorized in several ways, as discussed below.
- ART\_OBJECTS are categorized based on their type. There are three main types: PAINTING, SCULPTURE, and STATUE, plus another type called OTHER to accommodate objects that do not fall into one of the three main types.
- A PAINTING has a Paint\_type (oil, watercolor, etc.), material on which it is Drawn\_on (paper, canvas, wood, etc.), and Style (modern, abstract, etc.).
- A SCULPTURE or a statue has a Material from which it was created (wood, stone, etc.), Height, Weight, and Style.
- An art object in the OTHER category has a Type (print, photo, etc.) and Style.
- ART\_OBJECTs are categorized as either PERMANENT\_COLLECTION (objects that are owned by the museum) and BORROWED. Information captured about objects in the PERMANENT\_COLLECTION includes Date\_acquired, Status (on display, on loan, or stored), and Cost. Information captured about BORROWED objects includes the Collection from which it was borrowed, Date\_borrowed, and Date\_returned.
- Information describing the country or culture of Origin (Italian, Egyptian, American, Indian, and so forth) and Epoch (Renaissance, Modern, Ancient, and so forth) is captured for each ART\_OBJECT.
- The museum keeps track of ARTIST information, if known: Name, DateBorn (if known), Date\_died (if not living), Country\_of\_origin, Epoch, Main\_style, and Description. The Name is assumed to be unique.
- Different EXHIBITIONS occur, each having a Name, Start\_date, and End\_date. EXHIBITIONS are related to all the art objects that were on display during the exhibition.
- Information is kept on other COLLECTIONS with which the museum interacts, including Name (unique), Type (museum, personal, etc.), Description, Address, Phone, and current Contact\_person.

**Question.2** (10 points) A train ticket is purchased from an agent, the railway booking office, or the Internet. A ticket has a description, train name, compartment number, seat number, a date and a price. An agent has a name and a phone number. The railway booking office has an address and a phone number. The Internet has a URL address. Draw the entities and represent the mutually exclusive relationship.

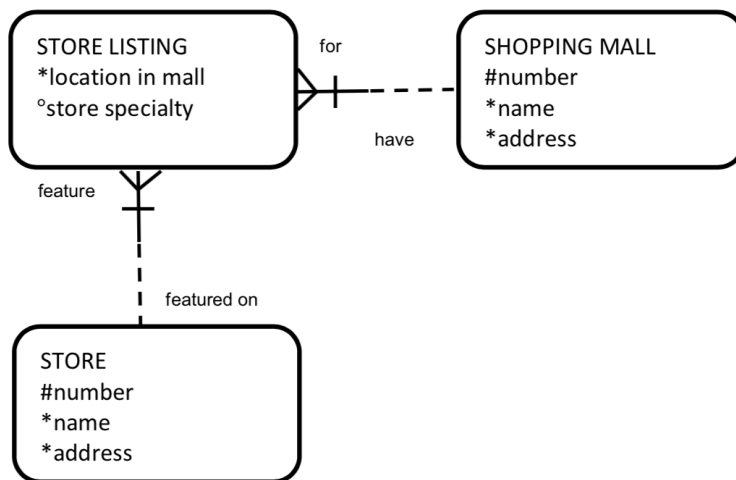
**Question.3** (10 points)

Check to see if each ERD is in 1NF. If not, make the necessary changes to correct it.



#### Question.4 (15 points)

A store can be located in several shopping malls, and a shopping mall may house several stores. To locate a particular store in a specific neighborhood, you will need to know the name and address of the nearby shopping mall, plus the name of the store. Does the ERD follow the rules of Second Normal Form? If you spot a violation, correct it.



#### Question.5 (25 points)

Assume the following business rules:

- An athlete employs one agent.
- An agent may work for one or more athletes.
- An athlete may play for one team.
- A team may have one or more players

Does the model below contain one or more transitive dependencies? Identify the attributes involved in the transitive dependencies.

