# Database Systems

Spring Semester 2023

# Assignment #1

**Due Date: 13th February 2023, before the start of the class.**

**Instructions:**

- *Use proper assignment papers for solving your assignment questions. Assignments done on diary pages, register pages, and rough pages will not be credited.*
- *Do not copy the work of your peers. If cheating is detected, your case will be referred to DC.*

**Question 1:** A cloud provider is facing challenging times balancing its users' evolving demands. It has developed the following DB schema to keep track of the different applications, companies that own those applications, and users who accessed the applications.

***Applications(applicationNo, name, CompanyNo, type)***
***User(userNo, user-name, email, city, country)***
***Company(companyNo, name, email, address, phone)***
***AccessedBy(userNo, applicationNo, date, time, duration)***

For each application, they record the number, name, company, and type. The type can be games, productivity, kids, and entertainment. The system maintains the application accessed by details that is it record which application is accessed by which particular user.

a) Identify the Domain of each attribute.
b) Identify the primary key of each relation.
c) Identify the foreign keys and referential integrity constraints. Show them pictorially
d) For each relation, do the following operations
    - Populate the relation with a few sample tuples that violate no schema-based or model-based constraints. Insert at least 3-4 tuples in each table.
    - Give an example of an insertion in the *AccessedBy* relation that *violates* the referential integrity constraint.
    - Give an example of an insertion in the Company relation that *violates* the Entity integrity constraint.
e) Give three semantic constraints for the above schema.

**Question 2: Event DB**

Science-X company organized scientific seminars, workshops, and conferences in different cities worldwide. We have developed an Event database to keep track of the different events organized by Science-X. The database stores details about the events, sponsors, and participants. For each event, we record the event ID, name, location (city name), type(seminar, workshop, conferences), start date\time, and end date\time. An event can be sponsored by different organizations. We also record basic information about each participant and the organization they belong to, if any. The attribute OID in person is a foreign key and can be null.

Consider the following relations for the above Event database:

**Event (EID, Ename, location, type, start_date, start_time, end_date, end_time)**
**Organization (OID, Oname, address)**
Participants **(PID, Pname, bdate, gender, OID)**
**Sponsors (EID, OID, amount)**
**Attended (PID, EID)**

Construct the following RA queries for this relational database.

1. List the ids and names of all the Events.
2. List the event id, name, and start_time of all the events that took place on January 3, 2023.
3. List the name of female participants younger than 25 who do not belong to any organization.
4. Find the names of the organizations that have sponsored one or more events.
5. Display the ids of the participants who attended the event organized by "Techlogix" on January 25, 2003.
6. List the names of organizations that have never sponsored a seminar; note seminar is a type of event.
7. List the ids of participants who attended exactly five events.
8. List the number of events attended by each participant.
9. Find the maximum, minimum, and average sponsorship amount.
10. List the name of the organization that has organized a seminar and a workshop in December 2022.
11. List the names of the participants who have attended a seminar but never attended a conference.
12. List the ids of participants who have attended an event on 5-Jan-2023 or who have never attended any event.
13. Add a new event to the database; assume any values for required attributes (write insert query).
14. Delete any organization (write a delete query).