**Exercise 5) University Database Design**

This report presents the design of a university database, modeling students and classes, their attributes, and relationships. The design includes descriptions of each table, their attributes and data types, an ER diagram, and SQL CREATE statements for all entities.

**Table Descriptions**

1. **Location**
   * **Attributes**:
     + **location\_id** (PK): INT
     + **street\_address**: VARCHAR(255)
     + **unit\_number**: VARCHAR(255)
     + **postal\_code**: VARCHAR(20)
     + **city\_id** (FK): INT
     + **province\_id** (FK): INT
   * **Associations**:
     + One-to-One with University (each university has one location)
     + Many-to-One with City and Province (many locations can belong to one city and one province)
2. **University**
   * **Attributes**:
     + **university\_id** (PK): INT
     + **university\_name**: VARCHAR(255)
     + **university\_head**: VARCHAR(255)
     + **university\_email**: VARCHAR(255)
     + **location** (FK): INT
   * **Associations**:
     + One-to-One with Location (each university has one location)
     + One-to-Many with Department (each university can have multiple departments)
3. **Department**
   * **Attributes**:
     + **department\_id** (PK): INT
     + **department\_name**: VARCHAR(255)
     + **department\_head**: VARCHAR(255)
     + **department\_email**: VARCHAR(255)
     + **university\_id** (FK): INT
   * **Associations**:
     + Many-to-One with University (each department belongs to one university)
     + One-to-Many with Faculty (each department can have multiple faculty members)
     + Many-to-Many with Student (each department can have multiple students, and each student can be enrolled in multiple departments)
4. **Faculty**
   * **Attributes**:
     + **faculty\_id** (PK): INT
     + **faculty\_first\_name**: VARCHAR(255)
     + **faculty\_last\_name**: VARCHAR(255)
     + **faculty\_email**: VARCHAR(255)
     + **university\_id** (FK): INT
     + **department\_id** (FK): INT
   * **Associations**:
     + Many-to-One with University (each faculty member belongs to one university)
     + Many-to-One with Department (each faculty member belongs to one department)
     + One-to-Many with FacultySemesterClass (each faculty member can teach multiple classes in multiple semesters)
5. **Student**
   * **Attributes**:
     + **student\_id** (PK): INT
     + **student\_first\_name**: VARCHAR(255)
     + **student\_last\_name**: VARCHAR(255)
     + **student\_email**: VARCHAR(255)
     + **university\_id** (FK): INT
   * **Associations**:
     + Many-to-One with University (each student belongs to one university)
     + Many-to-Many with Department (each student can be enrolled in multiple departments, and each department can have multiple students)
     + Many-to-Many with SemesterClass (each student can be enrolled in multiple classes in multiple semesters)
6. **Class**
   * **Attributes**:
     + **class\_id** (PK): INT
     + **class\_name**: VARCHAR(255)
   * **Associations**:
     + Many-to-Many with Semester (each class can be offered in multiple semesters, and each semester can have multiple classes)
     + One-to-Many with SemesterClass (each class can have multiple instances in different semesters)
7. **Semester**
   * **Attributes**:
     + **semester\_id** (PK): INT
     + **semester\_name**: VARCHAR(255)
   * **Associations**:
     + Many-to-Many with Class (each semester can have multiple classes, and each class can be offered in multiple semesters)
     + One-to-Many with SemesterClass (each semester can have multiple class instances)
8. **SemesterClass**
   * **Attributes**:
     + **semester\_class\_id** (PK): INT
     + **semester\_id** (FK): INT
     + **class\_id** (FK): INT
   * **Associations**:
     + Many-to-One with Semester (each semester class belongs to one semester)
     + Many-to-One with Class (each semester class belongs to one class)
     + One-to-Many with StudentSemesterClass and FacultySemesterClass (each semester class can have multiple enrolled students and faculty members)
9. **StudentSemesterClass**
   * **Attributes**:
     + **student\_semester\_class\_id** (PK): INT
     + **student\_id** (FK): INT
     + **semester\_class\_id** (FK): INT
   * **Associations**:
     + Many-to-One with Student (each record belongs to one student)
     + Many-to-One with SemesterClass (each record belongs to one semester class)
     + One-to-Many with ExamStudentGrade (each student semester class can have multiple exam grades)
10. **FacultySemesterClass**
    * **Attributes**:
      + **faculty\_id** (FK): INT
      + **semester\_class\_id** (FK): INT
    * **Associations**:
      + Many-to-One with Faculty (each record belongs to one faculty member)
      + Many-to-One with SemesterClass (each record belongs to one semester class)
11. **ExamStudentGrade**
    * **Attributes**:
      + **exam\_type\_id** (PK): INT
      + **exam\_type**: VARCHAR(255)
      + **grade**: VARCHAR(2)
      + **student\_semester\_class\_id** (FK): INT
    * **Associations**:
      + Many-to-One with StudentSemesterClass (each exam grade belongs to one student semester class)

**ERD**

