SQL -- DDL

重要程度：⭐⭐⭐⭐
难易程度：⭐⭐

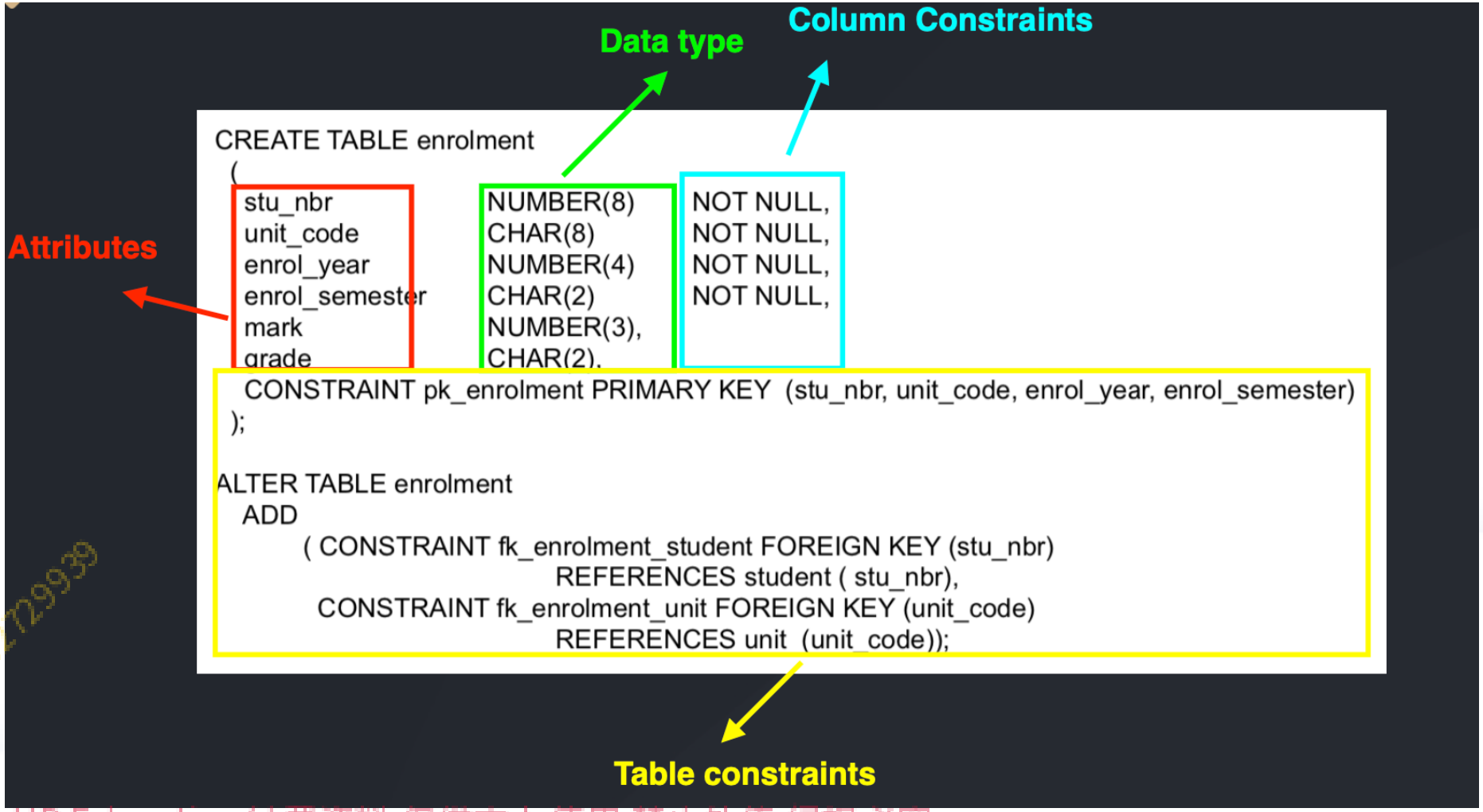
- **DDL (Data Definition Language)**
  - Creating database structure
    - Define 每个table的特性
    - e.g. CREATE TABLE, ALTER TABLE, DROP TABLE

- **DML (Data Manipulation Language)**
  - 对table里的内容进行操作
  - Adding and manipulating database contents(rows) - E.g. INSERT, UPDATE, DELETE
  - Retrieving data from database
  - E.g. SELECT (next week)

- **Data Control Language (DCL)**
  - Set permissions on objects - e.g. GRANT

SQL -- DDL

重要程度：⭐⭐⭐⭐
难易程度：⭐⭐



SQL -- DDL

重要程度：⭐⭐⭐⭐
难易程度：⭐⭐

- Text: CHAR(size), VARCHAR2(size)
  - CHAR(10): 只看char数量，截断尾部空格，只要设定了size为10，即使只有5个字母，也会占据10个位置
    - e.g. ‘apple’ = ‘apple ‘
  - VARCHAR2(10): 尾部空格也算入字节数，最大储存字节数为size，但是可以根据实际情况变化
    - e.g. ‘apple’ < ‘apple ‘

- Number: NUMBER(precision, scale)
  - precision: 总共有多少位数字
  - scale: 小数有多少位数字
  - e.g. salary NUMBER(7) — > 1234567
    - Salary NUMBER(7,1) —> 123456.7
    - Salary NUMBER(8,2) —> 123456.78

- Date : Date / timestamp - Date: 日期
- Timestamp: 日期+时间

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重要程度：⭐⭐⭐⭐
难易程度：⭐⭐

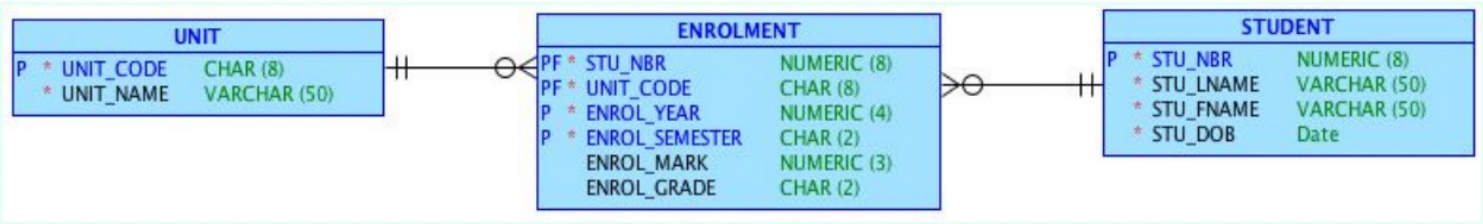
```
  CONSTRAINT pk_enrolment PRIMARY KEY  (stu_nbr, unit_code, enrol_year, enrol_semester)
);

ALTER TABLE enrolment
  ADD
       ( CONSTRAINT fk_enrolment_student FOREIGN KEY (stu_nbr)
                          REFERENCES student ( stu_nbr),
         CONSTRAINT fk_enrolment_unit FOREIGN KEY (unit_code)
                          REFERENCES unit  (unit_code));
```

CONSTRAINT pk_name PRIMARY KEY (attribute(s) which is/are used to be pk in this table);

```
ALTER TABLE table_name
          ADD
              (CONSTRAINT fk_name FOREIGN KEY(fk_attributes)
                        REFERENCES from_which_table(which attributes));
```

SQL -- DDL

重要程度：⭐⭐⭐⭐
难易程度：⭐⭐



Q3. What would be the order of the CREATE TABLE statements in the schema script to successfully create a database based on the above diagram? (assuming that we will define the FK as part of the create table statement)

A. UNIT, ENROLMENT, STUDENT
B. ENROLMENT, STUDENT, UNIT
C. STUDENT, UNIT, ENROLMENT
D. UNIT, STUDENT, ENROLMENT
E. More than one option is correct

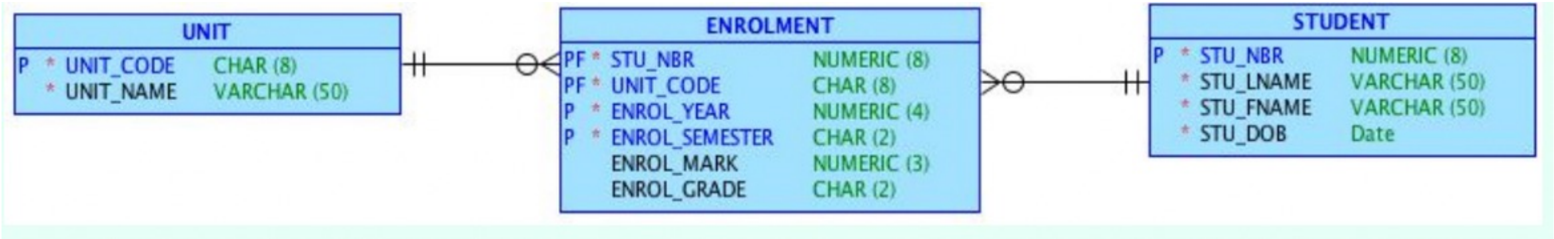
2. SQL -- DDL

重要程度：⭐⭐⭐⭐
难易程度：⭐⭐

```
CREATE TABLE student
 (
  stu_nbr       NUMBER(8)     NOT NULL,
  stu_lname     VARCHAR(50)   NOT NULL,
  stu_fname     VARCHAR(50)   NOT NULL,
  stu_dob       DATE          NOT NULL,
  CONSTRAINT pk_student PRIMARY KEY (stu_nbr)
 );

CREATE TABLE unit
 (
  unit_code     CHAR(7)       NOT NULL,
  unit_name     VARCHAR(50) CONSTRAINT uq_unit_name UNIQUE NOT NULL ,
  CONSTRAINT pk_unit PRIMARY KEY (unit_code)
 );

CREATE
 TABLE enrolment
 (
  stu_nbr           NUMBER(8)     NOT NULL,
  unit_code         CHAR(7)       NOT NULL,
  enrol_year        NUMBER(4)     NOT NULL,
  enrol_semester          CHAR(1)       NOT NULL,
  enrol_mark              NUMBER(3) ,
  enrol_grade             CHAR(3),
  CONSTRAINT pk_enrolment PRIMARY KEY (stu_nbr, unit_code, enrol_year, enrol_semester),
  CONSTRAINT fk_enrolment_student FOREIGN KEY (stu_no) REFERENCES student (stu_nbr),
  CONSTRAINT fk_enrolment_unit FOREIGN KEY (unit_code) REFERENCES unit (unit_code)
 );
```

SQL -- DDL

重要程度：★★★★
难易程度：★★



❖ Referential Integrity

- **RESTRICT**
  - Deletion of tuples is NOT ALLOWED for those tuples in the table referred by the FK if there is corresponding tuple in the table containing FK
  - 系统提示不允许删除
- **CASCADE**
  - deletion of tuples in the table referred by the FK will result in the deletion of the corresponding tuples in the table containing FK
  - 父表行删除时，子表受影响的行也会被删除
- **NULLIFY**
  - A deletion of a table in the table referred by the FK will result in the update of the corresponding tuples in the table containing FK to NULL
  - 子表对应的FK变成NULL

SQL -- DDL

重要程度：⭐⭐⭐⭐
难易程度：⭐⭐

```
ALTER TABLE enrolment
      DROP CONSTRAINT fk_enrolment_student;

ALTER TABLE enrolment
      DROP CONSTRAINT fk_enrolment_unit;

ALTER TABLE enrolment
   ADD
         ( CONSTRAINT fk_enrolment_student FOREIGN KEY (stu_nbr)
         REFERENCES student ( stu_nbr) ON DELETE CASCADE,

         CONSTRAINT fk_enrolment_unit FOREIGN KEY (unit_code) REFERENCES unit
                  (unit_code) ON DELETE CASCADE
          );
```

Alter Table

- Add columns
- Remove columns
- Add constraints
- Remove constraints

例题练习

重要程度：★★★★★
难易程度：★★★★

vi. The company has decided that they wish to record, for each department, the number of employees currently working in the department. Modify the database structure to allow this data to be recorded. Initially, following your modification, the number of employees in each department should be set to 0 - this will be updated at a later stage, you do not need to code this later update.

[6 marks]

例题练习

重要程度：
难易程度：

```
ALTER TABLE department ADD deptcount NUMBER(3, 0) DEFAULT 0 NOT NULL;
```

重难点总结

重难点总结

1、DDL

Creating database structure
- Define 每个table的特性
- e.g. CREATE TABLE, ALTER TABLE, DROP TABLE

先create strong entity，再create weak entity

Delete (Referential Integrity)

RESTRICT: not allowed to delete

CASCADE: delete at the same time

NULLIFY: change to null if not exist