

练习一：生成身份证号

</h1>

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1800012963, 1800012945, 1800012912

```
In [1]: %load_ext sql
```

```
In [2]: import pymysql
pymysql.install_as_MySQLdb()
%sql mysql://stu1800012963:stu1800012963@162.105.146.37:43306
```

```
In [3]: %sql use stu1800012963;

* mysql://stu1800012963:***@162.105.146.37:43306
0 rows affected.
```

```
Out[3]: []
```

```
In [4]: %%sql
DROP FUNCTION IF EXISTS IdCheckSum;
DROP FUNCTION IF EXISTS AreaCode;
DROP PROCEDURE IF EXISTS GenerateIdNum;

* mysql://stu1800012963:***@162.105.146.37:43306
0 rows affected.
0 rows affected.
0 rows affected.
```

```
Out[4]: []
```

Subtask 1: A Stored Function for Calculating the Check Sum of the First 17 Digits

```
In [5]: %%sql

CREATE FUNCTION IdCheckSum(
    input CHAR(17)
)
RETURNS CHAR(1)
BEGIN
    CASE ((
        RIGHT(LEFT(input, 1), 1) * 7
        + RIGHT(LEFT(input, 2), 1) * 9
        + RIGHT(LEFT(input, 3), 1) * 10
        + RIGHT(LEFT(input, 4), 1) * 5
        + RIGHT(LEFT(input, 5), 1) * 8
        + RIGHT(LEFT(input, 6), 1) * 4
        + RIGHT(LEFT(input, 7), 1) * 2
        + RIGHT(LEFT(input, 8), 1) * 1
        + RIGHT(LEFT(input, 9), 1) * 6
```

```

+ RIGHT(LEFT(input, 10), 1) * 3
+ RIGHT(LEFT(input, 11), 1) * 7
+ RIGHT(LEFT(input, 12), 1) * 9
+ RIGHT(LEFT(input, 13), 1) * 10
+ RIGHT(LEFT(input, 14), 1) * 5
+ RIGHT(LEFT(input, 15), 1) * 8
+ RIGHT(LEFT(input, 16), 1) * 4
+ RIGHT(LEFT(input, 17), 1) * 2
) % 11)
WHEN 0 THEN
    RETURN '1';
WHEN 1 THEN
    RETURN '0';
WHEN 2 THEN
    RETURN 'X';
WHEN 3 THEN
    RETURN '9';
WHEN 4 THEN
    RETURN '8';
WHEN 5 THEN
    RETURN '7';
WHEN 6 THEN
    RETURN '6';
WHEN 7 THEN
    RETURN '5';
WHEN 8 THEN
    RETURN '4';
WHEN 9 THEN
    RETURN '3';
WHEN 10 THEN
    RETURN '2';
END CASE;
END;
```

```

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0 rows affected.
```

Out[5]: []

Subtask 2: A Stored Procedure for Generating ID Numbers

First, let's define a stored function for calculating the area code, i.e., the first 6 digits of an ID number

```

In [6]: %%sql

CREATE FUNCTION AreaCode(
    province VARCHAR(32),
    city VARCHAR(32),
    district VARCHAR(32)
)
RETURNS CHAR(6)
BEGIN
    DECLARE province_code CHAR(2) DEFAULT '--';
    DECLARE city_code CHAR(4) DEFAULT '----';
```

```

DECLARE district_code CHAR(6) DEFAULT '-----';

SET province_code = (SELECT LEFT(code, 2)
FROM xzqh
WHERE name = province);

IF city <> '' THEN
    SET city_code = (SELECT LEFT(code, 4)
FROM xzqh
WHERE name = city AND LEFT(code, 2) = province_code);
END IF;

IF city_code <> '-----' THEN
    SET district_code = (SELECT code
FROM xzqh
WHERE name = district AND LEFT(code, 4) = city_code);
ELSE
    SET district_code = (SELECT code
FROM xzqh
WHERE name = district AND LEFT(code, 2) = province_code);
END IF;

RETURN district_code;
END;

```

```

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0 rows affected.

```

Out[6]: []

Here are some examples for how to use *AreaCode* function

In [7]: %sql SELECT AreaCode('甘肃省', '武威市', '凉州区')

```

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1 rows affected.

```

Out[7]: AreaCode('甘肃省', '武威市', '凉州区')

620602

In [8]: %sql SELECT AreaCode('北京市', '', '海淀区')

```

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1 rows affected.

```

Out[8]: AreaCode('北京市', '', '海淀区')

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This is the final procedure we want

In [9]: %%sql

```

CREATE PROCEDURE GenerateIdNum(
    IN province VARCHAR(32),
    IN city VARCHAR(32),
    IN district VARCHAR(32),
    IN birth_date CHAR(8),

```

```

IN gender VARCHAR(6),
OUT id_num CHAR(18)
)
BEGIN
  DECLARE area_code CHAR(6) DEFAULT '-----';
  DECLARE random_code CHAR(2) DEFAULT '--';
  DECLARE gender_code CHAR(2) DEFAULT '-';
  DECLARE check_sum CHAR(1) DEFAULT '-';
  DECLARE first_17_digits CHAR(17);

  SET area_code = AreaCode(province, city, district);

  SET random_code = LPAD(CAST(FORMAT(FLOOR(RAND() * 100), 0) AS CHAR(2)), 2, 0);

  IF gender = 'male' THEN
    SET gender_code = CAST((FORMAT(FLOOR(RAND() * 5), 0) * 2 + 1) AS CHAR(2));
  ELSEIF gender = 'female' THEN
    SET gender_code = CAST((FORMAT(FLOOR(RAND() * 5), 0) * 2) AS CHAR(2));
  END IF;

  SET first_17_digits = CONCAT(area_code, birth_date, random_code, gender_code);

  SET check_sum = (SELECT IdCheckSum(first_17_digits));

  SELECT CONCAT(first_17_digits, check_sum) INTO id_num;

END;

```

```

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0 rows affected.

```

Out[9]: []

An example for the usage of the procedure

In [10]: %%sql

```

CALL GenerateIdNum('山西省', '大同市', '平城区', '19190504', 'female', @my_id_num);

select @my_id_num;

```

```

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1 rows affected.
1 rows affected.

```

Out[10]: @my_id_num

```
140213191905045704
```

In []: