

# Project Part 1

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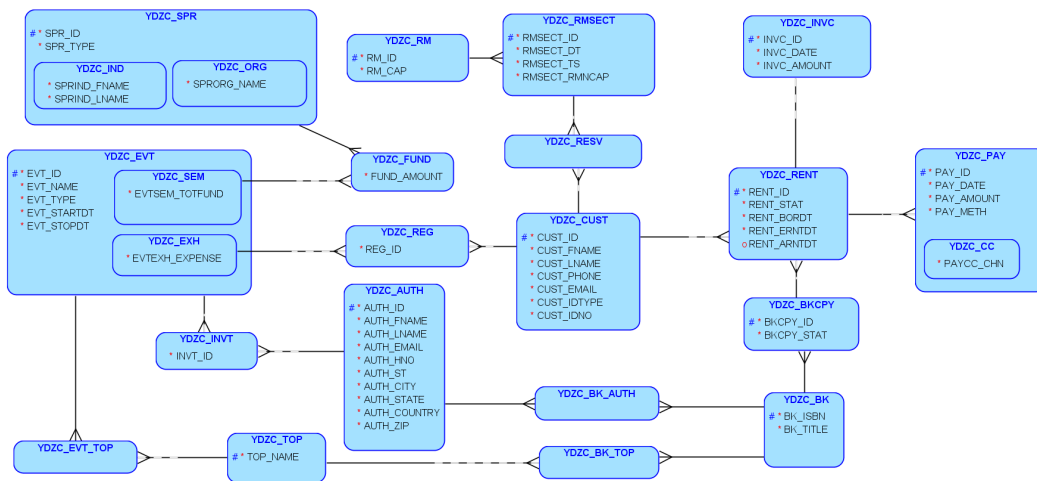
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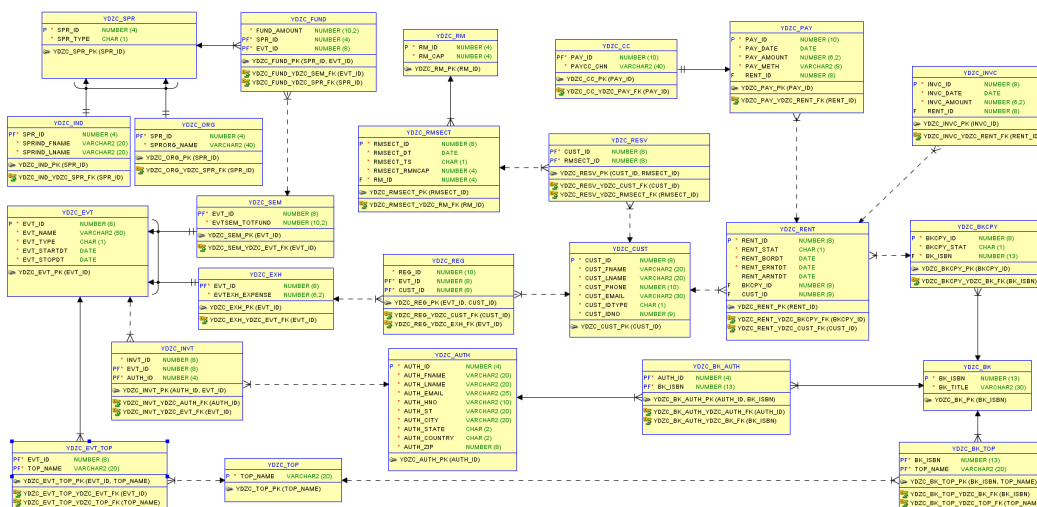
# Description and Justification of the Design

In this document, we will present our design with both logical and relational model for RTL public library database system. With carefully audit the logic among entities, we managed to meet all the required function and designed a model with 3NF standard. For the customer, we provide essentially three services: renting books, reserving sites in study rooms and registering the various exhibitions. Meanwhile, we offer to store different kinds of sponsors, authors, with efficient storage method. There are several optional relations in our model, because we believe it is necessary to meet those cases such as some seminars hasn't been funded yet, or some rental hasn't been paid yet. This design is also easy to update in the future, when we want to add some new attributes or conducting new services.

## Logical E-R Model



## Relational Model



## Assumptions

- For customer identification type, we use one single character to represent its type as followed: Passport(P), SSN(S), Driver License(D).
- For each copy of the book, we use one single character to represent its status as followed: available(Y), unavailable(N).
- For each rental we use one single character to represent its status as followed: borrowed(B), late(L), returned(R).
- We denote room section as a combination of room id, date and timeslot. In this way, we can easily get the information whether there is left space or not at certain time for each room, without counting the reservations. For timeslot, we use one single character to represent its time slot as followed: 8AM-10AM(A), 11AM-1PM(B), 1PM-3PM(C), 4PM-6PM(D).

## Relational Model DDL Code

```
CREATE TABLE ydzc_auth (  
    auth_id      NUMBER(4) NOT NULL,  
    auth_fname   VARCHAR2(20) NOT NULL,  
    auth_lname   VARCHAR2(20) NOT NULL,  
    auth_email   VARCHAR2(25) NOT NULL,  
    auth_hno     VARCHAR2(10) NOT NULL,  
    auth_st      VARCHAR2(20) NOT NULL,  
    auth_city    VARCHAR2(20) NOT NULL,  
    auth_state   CHAR(2) NOT NULL,  
    auth_country CHAR(2) NOT NULL,  
    auth_zip     NUMBER(8) NOT NULL  
);  
  
COMMENT ON COLUMN ydzc_auth.auth_id IS  
    'AUTHOR ID';  
  
COMMENT ON COLUMN ydzc_auth.auth_fname IS  
    'AUTHOR FIRST NAME';  
  
COMMENT ON COLUMN ydzc_auth.auth_lname IS  
    'AUTHOR LAST NAME';  
  
COMMENT ON COLUMN ydzc_auth.auth_email IS  
    'AUTHOR EMAIL';  
  
COMMENT ON COLUMN ydzc_auth.auth_hno IS
```

```

        'AUTHOR HOUSE NUMBER';

COMMENT ON COLUMN ydzc_auth.auth_st IS
    'AUTHOR STREET';

COMMENT ON COLUMN ydzc_auth.auth_city IS
    'AUTHOR CITY';

COMMENT ON COLUMN ydzc_auth.auth_state IS
    'AUTHOR STATE ABBREVIATION';

COMMENT ON COLUMN ydzc_auth.auth_country IS
    'AUTHOR COUNTRY ABBREVIATION';

COMMENT ON COLUMN ydzc_auth.auth_zip IS
    'AUTHOR ZIPCODE';

ALTER TABLE ydzc_auth ADD CONSTRAINT ydzc_auth_pk PRIMARY KEY
( auth_id );

CREATE TABLE ydzc_bk (
    bk_isbn    NUMBER(13) NOT NULL,
    bk_title   VARCHAR2(30) NOT NULL
);

COMMENT ON COLUMN ydzc_bk.bk_isbn IS
    'INTERNATION STANDARD BOOK NUMBER';

COMMENT ON COLUMN ydzc_bk.bk_title IS
    'BOOK TITLE';

ALTER TABLE ydzc_bk ADD CONSTRAINT ydzc_bk_pk PRIMARY KEY ( bk_isbn );

CREATE TABLE ydzc_bk_auth (
    auth_id    NUMBER(4) NOT NULL,
    bk_isbn    NUMBER(13) NOT NULL
);

ALTER TABLE ydzc_bk_auth ADD CONSTRAINT ydzc_bk_auth_pk PRIMARY KEY
( auth_id,
  bk_isbn );

CREATE TABLE ydzc_bk_top (

```

```

        bk_isbn    NUMBER(13) NOT NULL,
        top_name   VARCHAR2(20)
    );

    ALTER TABLE ydzc_bk_top ADD CONSTRAINT ydzc_bk_top_pk PRIMARY KEY
    ( bk_isbn,
                                           top_name );

CREATE TABLE ydzc_bkcpy (
    bkcpy_id      NUMBER(8) NOT NULL,
    bkcpy_stat    CHAR(1) NOT NULL,
    bk_isbn       NUMBER(13) NOT NULL
);

COMMENT ON COLUMN ydzc_bkcpy.bkcpy_id IS
    'BOOK COPY ID';

COMMENT ON COLUMN ydzc_bkcpy.bkcpy_stat IS
    'BOOK COPY STATUS: AVAILABLE(Y) OR UNAVAILABLE(N)';

ALTER TABLE ydzc_bkcpy ADD CONSTRAINT ydzc_bkcpy_pk PRIMARY KEY
( bkcpy_id );

CREATE TABLE ydzc_cc (
    pay_id        NUMBER(10) NOT NULL,
    paycc_chn     VARCHAR2(40) NOT NULL
);

COMMENT ON COLUMN ydzc_cc.pay_id IS
    'PAYMENT ID';

COMMENT ON COLUMN ydzc_cc.paycc_chn IS
    'CREDIT CARD HOLDER NAME';

ALTER TABLE ydzc_cc ADD CONSTRAINT ydzc_cc_pk PRIMARY KEY ( pay_id );

CREATE TABLE ydzc_cust (
    cust_id       NUMBER(8) NOT NULL,
    cust_fname    VARCHAR2(20) NOT NULL,
    cust_lname    VARCHAR2(20) NOT NULL,
    cust_phone    NUMBER(10) NOT NULL,
    cust_email    VARCHAR2(30) NOT NULL,
    cust_idtype   CHAR(1) NOT NULL,
    cust_idno     NUMBER(9) NOT NULL

```

```

);

COMMENT ON COLUMN ydzc_cust.cust_id IS
    'CUSTOMER ID';

COMMENT ON COLUMN ydzc_cust.cust_fname IS
    'CUSTOMER FIRST NAME';

COMMENT ON COLUMN ydzc_cust.cust_lname IS
    'CUSTOMER LAST NAME';

COMMENT ON COLUMN ydzc_cust.cust_phone IS
    'CUSTOMER PHONE NUMBER';

COMMENT ON COLUMN ydzc_cust.cust_email IS
    'CUSTOMER EMAIL';

COMMENT ON COLUMN ydzc_cust.cust_idtype IS
    'CUSTOMER ID TYPE: DRIVER LICENSE(D), PASSPORT(P) OR SSN(S)';

COMMENT ON COLUMN ydzc_cust.cust_idno IS
    'CUSTOMER ID NUMBER';

ALTER TABLE ydzc_cust ADD CONSTRAINT ydzc_cust_pk PRIMARY KEY ( cust_id );

CREATE TABLE ydzc_evt (
    evt_id      NUMBER(8) NOT NULL,
    evt_name    VARCHAR2(50) NOT NULL,
    evt_type    CHAR(1) NOT NULL,
    evt_startdt DATE NOT NULL,
    evt_stopdt  DATE NOT NULL
);

ALTER TABLE ydzc_evt
    ADD CONSTRAINT ch_inh_ydzc_evt CHECK ( evt_type IN ( 'E', 'S' ) );

COMMENT ON COLUMN ydzc_evt.evt_id IS
    'EVENT ID';

COMMENT ON COLUMN ydzc_evt.evt_name IS
    'EVENT NAME';

COMMENT ON COLUMN ydzc_evt.evt_type IS
    'EVENT TYPE';

```

```
COMMENT ON COLUMN ydzc_evt.evt_startdt IS  
'EVENT START DATETIME';
```

```
COMMENT ON COLUMN ydzc_evt.evt_stopdt IS  
'EVENT STOP DATETIME';
```

```
ALTER TABLE ydzc_evt ADD CONSTRAINT ydzc_evt_pk PRIMARY KEY ( evt_id );
```

```
CREATE TABLE ydzc_evt_top (  
    evt_id      NUMBER(8) NOT NULL,  
    top_name    VARCHAR2(20)  
);
```

```
ALTER TABLE ydzc_evt_top ADD CONSTRAINT ydzc_evt_top_pk PRIMARY KEY  
( evt_id,  
  
                                top_name );
```

```
CREATE TABLE ydzc_exh (  
    evt_id      NUMBER(8) NOT NULL,  
    evtexh_expense  NUMBER(6, 2) NOT NULL  
);
```

```
COMMENT ON COLUMN ydzc_exh.evt_id IS  
'EVENT ID';
```

```
COMMENT ON COLUMN ydzc_exh.evtexh_expense IS  
'EXHIBITION EXPENSE';
```

```
ALTER TABLE ydzc_exh ADD CONSTRAINT ydzc_exh_pk PRIMARY KEY ( evt_id );
```

```
CREATE TABLE ydzc_fund (  
    fund_amount  NUMBER(10, 2) NOT NULL,  
    spr_id       NUMBER(4) NOT NULL,  
    evt_id       NUMBER(8) NOT NULL  
);
```

```
COMMENT ON COLUMN ydzc_fund.fund_amount IS  
'SPONSOR FUND AMOUNT';
```

```
ALTER TABLE ydzc_fund ADD CONSTRAINT ydzc_fund_pk PRIMARY KEY ( spr_id,  
                                                                evt_id );
```

```
CREATE TABLE ydzc_ind (  

```



```

        spr_id          NUMBER(4) NOT NULL,
        sprind_fname     VARCHAR2(20) NOT NULL,
        sprind_lname     VARCHAR2(20) NOT NULL
    );

```

```

COMMENT ON COLUMN ydzc_ind.spr_id IS
    'SPONSOR ID';

```

```

COMMENT ON COLUMN ydzc_ind.sprind_fname IS
    'INDIVIDUAL SPONSOR FIRST NAME';

```

```

COMMENT ON COLUMN ydzc_ind.sprind_lname IS
    'INDIVIDUAL SPONSOR LAST NAME';

```

```

ALTER TABLE ydzc_ind ADD CONSTRAINT ydzc_ind_pk PRIMARY KEY ( spr_id );

```

```

CREATE TABLE ydzc_inv (
    invc_id          NUMBER(8) NOT NULL,
    invc_date        DATE NOT NULL,
    invc_amount      NUMBER(6, 2) NOT NULL,
    rent_id          NUMBER(8)
);

```

```

COMMENT ON COLUMN ydzc_inv.invc_id IS
    'INVOICE ID';

```

```

COMMENT ON COLUMN ydzc_inv.invc_date IS
    'INVOICE DATE';

```

```

COMMENT ON COLUMN ydzc_inv.invc_amount IS
    'INVOICE AMOUNT';

```

```

ALTER TABLE ydzc_inv ADD CONSTRAINT ydzc_inv_pk PRIMARY KEY
( invc_id );

```

```

CREATE TABLE ydzc_inv (
    invt_id  NUMBER(8) NOT NULL,
    evt_id   NUMBER(8) NOT NULL,
    auth_id  NUMBER(4) NOT NULL
);

```

```

COMMENT ON COLUMN ydzc_inv.invt_id IS
    'INVITATION ID FOR CUSTOMER TO ATTEND EXHIBITION';

```

```
ALTER TABLE ydzc_invt ADD CONSTRAINT ydzc_invt_pk PRIMARY KEY ( auth_id,  
                                                                evt_id );
```

```
CREATE TABLE ydzc_org (  
    spr_id          NUMBER(4) NOT NULL,  
    sprorg_name     VARCHAR2(40) NOT NULL  
);
```

```
COMMENT ON COLUMN ydzc_org.spr_id IS  
    'SPONSOR ID';
```

```
COMMENT ON COLUMN ydzc_org.sprorg_name IS  
    'ORGANIZATION SPONSOR NAME';
```

```
ALTER TABLE ydzc_org ADD CONSTRAINT ydzc_org_pk PRIMARY KEY ( spr_id );
```

```
CREATE TABLE ydzc_pay (  
    pay_id          NUMBER(10) NOT NULL,  
    pay_date        DATE NOT NULL,  
    pay_amount      NUMBER(6, 2) NOT NULL,  
    pay_meth        VARCHAR2(8) NOT NULL,  
    rent_id         NUMBER(8)  
);
```

```
ALTER TABLE ydzc_pay  
    ADD CONSTRAINT ch_inh_ydzc_pay CHECK ( pay_meth IN ( 'CREDIT', 'CASH',  
'DEBIT', 'PAYPAL' ) );
```

```
COMMENT ON COLUMN ydzc_pay.pay_id IS  
    'PAYMENT ID';
```

```
COMMENT ON COLUMN ydzc_pay.pay_date IS  
    'PAYMENT DATE';
```

```
COMMENT ON COLUMN ydzc_pay.pay_amount IS  
    'PAYMENT AMOUNT';
```

```
COMMENT ON COLUMN ydzc_pay.pay_meth IS  
    'PAYMENT METHOD';
```

```
ALTER TABLE ydzc_pay ADD CONSTRAINT ydzc_pay_pk PRIMARY KEY ( pay_id );
```

```
CREATE TABLE ydzc_reg (  
    reg_id          NUMBER(10) NOT NULL,
```

```

    evt_id    NUMBER(8) NOT NULL,
    cust_id   NUMBER(8) NOT NULL
);

COMMENT ON COLUMN ydzc_reg.reg_id IS
    'REGISTRATION ID FOR AUTHOR TO JOIN SEMINAR';

ALTER TABLE ydzc_reg ADD CONSTRAINT ydzc_reg_pk PRIMARY KEY ( evt_id,
                                                                cust_id );

CREATE TABLE ydzc_rent (
    rent_id    NUMBER(8) NOT NULL,
    rent_stat  CHAR(1) NOT NULL,
    rent_bordt DATE NOT NULL,
    rent_erntdt DATE NOT NULL,
    rent_arntdt DATE,
    bkcpy_id   NUMBER(8),
    cust_id    NUMBER(8)
);

COMMENT ON COLUMN ydzc_rent.rent_id IS
    'RENTAL ID';

COMMENT ON COLUMN ydzc_rent.rent_stat IS
    'RENTAL STATUS: BORROWED(B), LATE(L), RETURNED(R)';

COMMENT ON COLUMN ydzc_rent.rent_bordt IS
    'BORROW DATE';

COMMENT ON COLUMN ydzc_rent.rent_erntdt IS
    'EXPECTED RETURN DATE';

COMMENT ON COLUMN ydzc_rent.rent_arntdt IS
    'ACTUAL RETURN DATE';

ALTER TABLE ydzc_rent ADD CONSTRAINT ydzc_rent_pk PRIMARY KEY ( rent_id );

CREATE TABLE ydzc_resv (
    cust_id    NUMBER(8) NOT NULL,
    rmsect_id  NUMBER(8) NOT NULL
);

ALTER TABLE ydzc_resv ADD CONSTRAINT ydzc_resv_pk PRIMARY KEY ( cust_id,
                                                                rmsect_id );

```

```
CREATE TABLE ydzc_rm (
    rm_id    NUMBER(4) NOT NULL,
    rm_cap   NUMBER(4) NOT NULL
);
```

```
COMMENT ON COLUMN ydzc_rm.rm_id IS
    'ROOM ID';
```

```
COMMENT ON COLUMN ydzc_rm.rm_cap IS
    'ROOM CAPACITY';
```

```
ALTER TABLE ydzc_rm ADD CONSTRAINT ydzc_rm_pk PRIMARY KEY ( rm_id );
```

```
CREATE TABLE ydzc_rmsect (
    rmsect_id    NUMBER(8) NOT NULL,
    rmsect_dt    DATE NOT NULL,
    rmsect_ts    CHAR(1) NOT NULL,
    rmsect_rmncap NUMBER(4) NOT NULL,
    rm_id        NUMBER(4) NOT NULL
);
```

```
COMMENT ON COLUMN ydzc_rmsect.rmsect_id IS
    'ROOM SECTION ID IDENTIFY DATE AND TIMESLOT';
```

```
COMMENT ON COLUMN ydzc_rmsect.rmsect_dt IS
    'ROOM SECTION DATE';
```

```
COMMENT ON COLUMN ydzc_rmsect.rmsect_ts IS
    'RESERVATION TIMESLOT: 8AM-10AM(A),11AM-1PM(B),1PM-3PM(C),4PM-6PM(D)';
```

```
COMMENT ON COLUMN ydzc_rmsect.rmsect_rmncap IS
    'REMIANING ROOM CAPACITY';
```

```
ALTER TABLE ydzc_rmsect ADD CONSTRAINT ydzc_rmsect_pk PRIMARY KEY
( rmsect_id );
```

```
CREATE TABLE ydzc_sem (
    evt_id        NUMBER(8) NOT NULL,
    evtsem_totfund NUMBER(10, 2) NOT NULL
);
```

```
COMMENT ON COLUMN ydzc_sem.evt_id IS
```

```

        'EVENT ID';

COMMENT ON COLUMN ydzc_sem.evtsem_totfund IS
    'TOTAL FUND AMOUNT';

ALTER TABLE ydzc_sem ADD CONSTRAINT ydzc_sem_pk PRIMARY KEY ( evt_id );

CREATE TABLE ydzc_spr (
    spr_id    NUMBER(4) NOT NULL,
    spr_type  CHAR(1) NOT NULL
);

ALTER TABLE ydzc_spr
    ADD CONSTRAINT ch_inh_ydzc_spr CHECK ( spr_type IN ( 'T', 'O' ) );

COMMENT ON COLUMN ydzc_spr.spr_id IS
    'SPONSOR ID';

COMMENT ON COLUMN ydzc_spr.spr_type IS
    'SPONSOR TYPE: INDIVIDUAL(I) OR ORGANIZATION(O)';

ALTER TABLE ydzc_spr ADD CONSTRAINT ydzc_spr_pk PRIMARY KEY ( spr_id );

CREATE TABLE ydzc_top (
    top_name VARCHAR2(20) NOT NULL
);

COMMENT ON COLUMN ydzc_top.top_name IS
    'TOPIC NAME';

ALTER TABLE ydzc_top ADD CONSTRAINT ydzc_top_pk PRIMARY KEY
( top_name );

ALTER TABLE ydzc_bk_auth
    ADD CONSTRAINT ydzc_bk_auth_ydzc_auth_fk FOREIGN KEY ( auth_id )
        REFERENCES ydzc_auth ( auth_id );

ALTER TABLE ydzc_bk_auth
    ADD CONSTRAINT ydzc_bk_auth_ydzc_bk_fk FOREIGN KEY ( bk_isbn )
        REFERENCES ydzc_bk ( bk_isbn );

ALTER TABLE ydzc_bk_top
    ADD CONSTRAINT ydzc_bk_top_ydzc_bk_fk FOREIGN KEY ( bk_isbn )
        REFERENCES ydzc_bk ( bk_isbn );

```

```
ALTER TABLE ydzc_bk_top
ADD CONSTRAINT ydzc_bk_top_ydzc_top_fk FOREIGN KEY ( top_name )
REFERENCES ydzc_top ( top_name );
```

```
ALTER TABLE ydzc_bkcpy
ADD CONSTRAINT ydzc_bkcpy_ydzc_bk_fk FOREIGN KEY ( bk_isbn )
REFERENCES ydzc_bk ( bk_isbn );
```

```
ALTER TABLE ydzc_cc
ADD CONSTRAINT ydzc_cc_ydzc_pay_fk FOREIGN KEY ( pay_id )
REFERENCES ydzc_pay ( pay_id );
```

```
ALTER TABLE ydzc_evt_top
ADD CONSTRAINT ydzc_evt_top_ydzc_evt_fk FOREIGN KEY ( evt_id )
REFERENCES ydzc_evt ( evt_id );
```

```
ALTER TABLE ydzc_evt_top
ADD CONSTRAINT ydzc_evt_top_ydzc_top_fk FOREIGN KEY ( top_name )
REFERENCES ydzc_top ( top_name );
```

```
ALTER TABLE ydzc_exh
ADD CONSTRAINT ydzc_exh_ydzc_evt_fk FOREIGN KEY ( evt_id )
REFERENCES ydzc_evt ( evt_id );
```

```
ALTER TABLE ydzc_fund
ADD CONSTRAINT ydzc_fund_ydzc_sem_fk FOREIGN KEY ( evt_id )
REFERENCES ydzc_sem ( evt_id );
```

```
ALTER TABLE ydzc_fund
ADD CONSTRAINT ydzc_fund_ydzc_spr_fk FOREIGN KEY ( spr_id )
REFERENCES ydzc_spr ( spr_id );
```

```
ALTER TABLE ydzc_ind
ADD CONSTRAINT ydzc_ind_ydzc_spr_fk FOREIGN KEY ( spr_id )
REFERENCES ydzc_spr ( spr_id );
```

```
ALTER TABLE ydzc_invc
ADD CONSTRAINT ydzc_invc_ydzc_rent_fk FOREIGN KEY ( rent_id )
REFERENCES ydzc_rent ( rent_id );
```

```
ALTER TABLE ydzc_invt
ADD CONSTRAINT ydzc_invt_ydzc_auth_fk FOREIGN KEY ( auth_id )
REFERENCES ydzc_auth ( auth_id );
```

```

ALTER TABLE ydzc_invt
    ADD CONSTRAINT ydzc_invt_ydzc_evt_fk FOREIGN KEY ( evt_id )
        REFERENCES ydzc_evt ( evt_id );

ALTER TABLE ydzc_org
    ADD CONSTRAINT ydzc_org_ydzc_spr_fk FOREIGN KEY ( spr_id )
        REFERENCES ydzc_spr ( spr_id );

ALTER TABLE ydzc_pay
    ADD CONSTRAINT ydzc_pay_ydzc_rent_fk FOREIGN KEY ( rent_id )
        REFERENCES ydzc_rent ( rent_id );

ALTER TABLE ydzc_reg
    ADD CONSTRAINT ydzc_reg_ydzc_cust_fk FOREIGN KEY ( cust_id )
        REFERENCES ydzc_cust ( cust_id );

ALTER TABLE ydzc_reg
    ADD CONSTRAINT ydzc_reg_ydzc_exh_fk FOREIGN KEY ( evt_id )
        REFERENCES ydzc_exh ( evt_id );

ALTER TABLE ydzc_rent
    ADD CONSTRAINT ydzc_rent_ydzc_bkcpy_fk FOREIGN KEY ( bkcpy_id )
        REFERENCES ydzc_bkcpy ( bkcpy_id );

ALTER TABLE ydzc_rent
    ADD CONSTRAINT ydzc_rent_ydzc_cust_fk FOREIGN KEY ( cust_id )
        REFERENCES ydzc_cust ( cust_id );

ALTER TABLE ydzc_resv
    ADD CONSTRAINT ydzc_resv_ydzc_cust_fk FOREIGN KEY ( cust_id )
        REFERENCES ydzc_cust ( cust_id );

ALTER TABLE ydzc_resv
    ADD CONSTRAINT ydzc_resv_ydzc_rmsect_fk FOREIGN KEY ( rmsect_id )
        REFERENCES ydzc_rmsect ( rmsect_id );

ALTER TABLE ydzc_rmsect
    ADD CONSTRAINT ydzc_rmsect_ydzc_rm_fk FOREIGN KEY ( rm_id )
        REFERENCES ydzc_rm ( rm_id );

ALTER TABLE ydzc_sem
    ADD CONSTRAINT ydzc_sem_ydzc_evt_fk FOREIGN KEY ( evt_id )
        REFERENCES ydzc_evt ( evt_id );

```

```

CREATE OR REPLACE TRIGGER arc_fkarc_8_ydzc_exh BEFORE
  INSERT OR UPDATE OF evt_id ON ydzc_exh
  FOR EACH ROW
DECLARE
  d CHAR(1);
BEGIN
  SELECT
    a.evt_type
  INTO d
  FROM
    ydzc_evt a
  WHERE
    a.evt_id = :new.evt_id;

  IF ( d IS NULL OR d <> 'E' ) THEN
    raise_application_error(-20223,
      'FK YDZC_EXH_YDZC_EVT_FK in Table
YDZC_EXH violates Arc constraint on Table YDZC_EVT - discriminator column EVT_TYPE
doesn"t have value "E"');
  END IF;

EXCEPTION
  WHEN no_data_found THEN
    NULL;
  WHEN OTHERS THEN
    RAISE;
END;
/

CREATE OR REPLACE TRIGGER arc_fkarc_8_ydzc_sem BEFORE
  INSERT OR UPDATE OF evt_id ON ydzc_sem
  FOR EACH ROW
DECLARE
  d CHAR(1);
BEGIN
  SELECT
    a.evt_type
  INTO d
  FROM
    ydzc_evt a
  WHERE
    a.evt_id = :new.evt_id;

```



```

        IF ( d IS NULL OR d <> 'S' ) THEN
            raise_application_error(-20223,
                                   'FK YDZC_SEM_YDZC_EVT_FK in Table
YDZC_SEM violates Arc constraint on Table YDZC_EVT - discriminator column EVT_TYPE
doesn"t have value "S"');
        END IF;

    EXCEPTION
        WHEN no_data_found THEN
            NULL;
        WHEN OTHERS THEN
            RAISE;
    END;
/

CREATE OR REPLACE TRIGGER arc_fkarc_9_ydzc_org BEFORE
    INSERT OR UPDATE OF spr_id ON ydzc_org
    FOR EACH ROW
DECLARE
    d CHAR(1);
BEGIN
    SELECT
        a.spr_type
    INTO d
    FROM
        ydzc_spr a
    WHERE
        a.spr_id = :new.spr_id;

    IF ( d IS NULL OR d <> 'O' ) THEN
        raise_application_error(-20223,
                                'FK YDZC_ORG_YDZC_SPR_FK in Table
YDZC_ORG violates Arc constraint on Table YDZC_SPR - discriminator column SPR_TYPE
doesn"t have value "O"');
    END IF;

    EXCEPTION
        WHEN no_data_found THEN
            NULL;
        WHEN OTHERS THEN
            RAISE;
    END;
/

```

```

CREATE OR REPLACE TRIGGER arc_fkarc_9_ydzc_ind BEFORE
    INSERT OR UPDATE OF spr_id ON ydzc_ind
    FOR EACH ROW
DECLARE
    d CHAR(1);
BEGIN
    SELECT
        a.spr_type
    INTO d
    FROM
        ydzc_spr a
    WHERE
        a.spr_id = :new.spr_id;

    IF ( d IS NULL OR d <> 'T' ) THEN
        raise_application_error(-20223,
                                'FK YDZC_IND_YDZC_SPR_FK in Table
                                YDZC_IND violates Arc constraint on Table YDZC_SPR - discriminator column SPR_TYPE
                                doesn"t have value "I"');
    END IF;

EXCEPTION
    WHEN no_data_found THEN
        NULL;
    WHEN OTHERS THEN
        RAISE;
END;
/

CREATE OR REPLACE TRIGGER arc_fkarc_10_ydzc_cc BEFORE
    INSERT OR UPDATE OF pay_id ON ydzc_cc
    FOR EACH ROW
DECLARE
    d VARCHAR2(6);
BEGIN
    SELECT
        a.pay_meth
    INTO d
    FROM
        ydzc_pay a
    WHERE
        a.pay_id = :new.pay_id;

    IF ( d IS NULL OR d <> 'CREDIT' ) THEN

```

```

        raise_application_error(-20223,
                                'FK YDZC_CC_YDZC_PAY_FK in Table
                                YDZC_CC violates Arc constraint on Table YDZC_PAY - discriminator column PAY_METH
                                doesn"t have value "CREDIT"');
    END IF;

EXCEPTION
    WHEN no_data_found THEN
        NULL;
    WHEN OTHERS THEN
        RAISE;
END;
/

```

## CHECK DDL Code

```

ALTER TABLE ydzc_cust ADD CONSTRAINT c_ydzc_cust_cust_idtype CHECK (cust_idtype
in ('P', 'S', 'D'));
ALTER TABLE ydzc_bkcpy ADD CONSTRAINT c_ydzc_bkcpy_bkcpy_stat
CHECK(bkcpy_stat in ('Y', 'N'));
ALTER TABLE ydzc_rent ADD CONSTRAINT c_ydzc_rent_rent_stat CHECK(rent_stat in ('B',
'L', 'R'));
ALTER TABLE ydzc_rmsect ADD CONSTRAINT c_ydzc_rmsect_rmsect_ts
CHECK(rmsect_ts in ('A', 'B', 'C', 'D'));

```

## Trigger Code

When a book is returned, we update ydzc\_rent with both rent\_arntdt and rent\_stat (From 'B' to 'L' or 'R'). This update of rent\_stat is not included in trigger to avoid deadlock.

```

CREATE OR REPLACE TRIGGER ydzc_gene_invc
AFTER UPDATE OF rent_arntdt
ON ydzc_rent
FOR EACH ROW
DECLARE
    invc_id    NUMBER(8);
    rent_id    NUMBER(8);
    invc_date  DATE;
    bor_date   DATE;
    ernt_date  DATE;
    arnt_date  DATE;
    invc_amt   NUMBER(6,2);

```

```

BEGIN
    SELECT :old.rent_bordt, :old.rent_erntdt, :new.rent_arntdt, :old.rent_id INTO bor_date,
ernt_date, arnt_date, rent_id FROM dual;
    SELECT MAX(inv_c_id)+1 INTO inv_c_id FROM ydzc_inv;
    SELECT sysdate INTO inv_c_date FROM dual;
    IF arnt_date <= ernt_date THEN
        inv_c_amt := (arnt_date - bor_date)*0.2;
    ELSE
        inv_c_amt := (ernt_date - bor_date)*0.2 + (arnt_date - ernt_date)*0.4;
    END IF;
    INSERT INTO ydzc_inv(inv_c_id, inv_c_date, inv_c_amount, rent_id) VALUES (inv_c_id,
inv_c_date, inv_c_amt, rent_id);
    UPDATE ydzc_bkcpy SET bkcpy_stat='Y' WHERE bkcpy_id=:old.bkcpy_id;
END;
/

```

## Sample Data DML Code

```

-- ydzc_cust
INSERT INTO ydzc_cust VALUES (1, 'Eren', 'Yeager', 2129981211, 'eren@nyu.edu', 'S',
437625001);
INSERT INTO ydzc_cust  VALUES (2, 'Mikasa', 'Ackerman', 2129981212, 'mikasa@nyu.edu',
'D', 437625002);
INSERT INTO ydzc_cust VALUES (3, 'Armin', 'Arlert', 2129981213, 'armin@nyu.edu', 'S',
437625003);
INSERT INTO ydzc_cust VALUES (4, 'Reiner', 'Braun', 2129981214, 'reiner@nyu.edu', 'P',
437625004);
INSERT INTO ydzc_cust VALUES (5, 'Jean', 'Kirstein', 2129981215, 'jean@nyu.edu', 'D',
437625005);
INSERT INTO ydzc_cust VALUES (6, 'Marco', 'Bott', 2129981216, 'marco@nyu.edu', 'S',
437625006);
INSERT INTO ydzc_cust VALUES (7, 'Connie', 'Springer', 2129981217, 'connie@nyu.edu', 'P',
437625007);
INSERT INTO ydzc_cust VALUES (8, 'Sasha', 'Blouse', 2129981218, 'sasha@nyu.edu', 'P',
437625008);
INSERT INTO ydzc_cust VALUES (9, 'Historia', 'Reiss', 2129981219, 'historia@nyu.edu', 'D',
437625009);
-- ydzc_auth
INSERT INTO ydzc_auth VALUES(1, 'Zeke', 'Yeager', 'zeke@nyu.edu', '3#', 'West Road',
'NewYork', 'NY', 'US', 10001);
INSERT INTO ydzc_auth VALUES(2, 'Bertolt', 'Hoover', 'bertolt@nyu.edu', '81#', 'North Road',
'Phoenix', 'AZ', 'US', 10021);
INSERT INTO ydzc_auth VALUES(3, 'Annie', 'Leonhart', 'annie@nyu.edu', '21#', 'South Road',

```

```

'Montgomery', 'AL', 'US', 10081);
INSERT INTO ydzc_auth VALUES(4, 'Marcel', 'Galliard', 'marcel@nyu.edu', '33#', 'West Road',
'Denver', 'CO', 'US', 10011);
INSERT INTO ydzc_auth VALUES(5, 'Porco', 'Galliard', 'porco@nyu.edu', '22#', 'West Road',
'Los Angeles', 'CA', 'US', 10026);
INSERT INTO ydzc_auth VALUES(6, 'Pieck', 'Finger', 'pieck@nyu.edu', '88#', 'West Road',
'Chicago', 'IL', 'US', 10024);
INSERT INTO ydzc_auth VALUES(7, 'Gabi', 'Braun', 'gabi@nyu.edu', '72#', 'West Road',
'Boston', 'MA', 'US', 10052);
INSERT INTO ydzc_auth VALUES(8, 'Falco', 'Grice', 'falco@nyu.edu', '90#', 'West Road',
'Detroit', 'MI', 'US', 10073);
-- ydzc_top
INSERT INTO ydzc_top VALUES ('History');
INSERT INTO ydzc_top VALUES ('Children');
INSERT INTO ydzc_top VALUES ('Science');
INSERT INTO ydzc_top VALUES ('Arts');
INSERT INTO ydzc_top VALUES ('Travel');
-- ydzc_bk
INSERT INTO ydzc_bk VALUES (9782222211111, 'Western Culture');
INSERT INTO ydzc_bk VALUES (9783333322222, 'Le Petit Prince');
INSERT INTO ydzc_bk VALUES (9784444433333, 'Van Gogh: The Life');
INSERT INTO ydzc_bk VALUES (9785555544444, 'Lonely Planet');
INSERT INTO ydzc_bk VALUES (9786666655555, 'The Beauty of Science');
INSERT INTO ydzc_bk VALUES (9787777766666, 'Little Duck');
INSERT INTO ydzc_bk VALUES (9788888877777, 'Hundred Thousand Whys');
INSERT INTO ydzc_bk VALUES (9789999988888, 'Ancient Egypt');
-- ydzc_bkcpy
INSERT INTO ydzc_bkcpy VALUES (1, 'N', 9782222211111);
INSERT INTO ydzc_bkcpy VALUES (2, 'Y', 9782222211111);
INSERT INTO ydzc_bkcpy VALUES (3, 'Y', 9782222211111);
INSERT INTO ydzc_bkcpy VALUES (4, 'N', 9783333322222);
INSERT INTO ydzc_bkcpy VALUES (5, 'N', 9784444433333);
INSERT INTO ydzc_bkcpy VALUES (6, 'Y', 9785555544444);
INSERT INTO ydzc_bkcpy VALUES (7, 'Y', 9786666655555);
INSERT INTO ydzc_bkcpy VALUES (8, 'Y', 9787777766666);
INSERT INTO ydzc_bkcpy VALUES (9, 'Y', 9788888877777);
INSERT INTO ydzc_bkcpy VALUES (10, 'Y', 9788888877777);
INSERT INTO ydzc_bkcpy VALUES (11, 'Y', 9788888877777);
INSERT INTO ydzc_bkcpy VALUES (12, 'Y', 9789999988888);
-- ydzc_rent
INSERT INTO ydzc_rent VALUES (10000001, 'R', TO_DATE('01/02/2021', 'DD/MM/YYYY'),
TO_DATE('08/02/2021', 'DD/MM/YYYY'), TO_DATE('08/02/2021', 'DD/MM/YYYY'), 4, 3);
INSERT INTO ydzc_rent VALUES (10000002, 'R', TO_DATE('01/02/2021', 'DD/MM/YYYY'),
TO_DATE('15/02/2021', 'DD/MM/YYYY'), TO_DATE('06/02/2021', 'DD/MM/YYYY'), 6, 2);

```

```

INSERT INTO ydzc_rent VALUES (10000003, 'R', TO_DATE('01/02/2021', 'DD/MM/YYYY'),
TO_DATE('15/02/2021', 'DD/MM/YYYY'), TO_DATE('11/02/2021', 'DD/MM/YYYY'), 8, 1);
INSERT INTO ydzc_rent VALUES (10000004, 'L', TO_DATE('01/02/2021', 'DD/MM/YYYY'),
TO_DATE('15/02/2021', 'DD/MM/YYYY'), TO_DATE('18/02/2021', 'DD/MM/YYYY'), 11, 5);
INSERT INTO ydzc_rent VALUES (10000005, 'L', TO_DATE('01/02/2021', 'DD/MM/YYYY'),
TO_DATE('15/02/2021', 'DD/MM/YYYY'), TO_DATE('18/02/2021', 'DD/MM/YYYY'), 12, 5);
INSERT INTO ydzc_rent VALUES (10000006, 'B', TO_DATE('01/04/2021', 'DD/MM/YYYY'),
TO_DATE('01/05/2021', 'DD/MM/YYYY'), NULL, 1, 6);
INSERT INTO ydzc_rent VALUES (10000007, 'B', TO_DATE('01/04/2021', 'DD/MM/YYYY'),
TO_DATE('01/05/2021', 'DD/MM/YYYY'), NULL, 4, 6);
INSERT INTO ydzc_rent VALUES (10000008, 'B', TO_DATE('01/04/2021', 'DD/MM/YYYY'),
TO_DATE('01/05/2021', 'DD/MM/YYYY'), NULL, 5, 6);
-- ydzc_invc
INSERT INTO ydzc_invc VALUES (20000001, TO_DATE('06/02/2021', 'DD/MM/YYYY'),
1.00, 10000002);
INSERT INTO ydzc_invc VALUES (20000002, TO_DATE('08/02/2021', 'DD/MM/YYYY'),
1.40, 10000001);
INSERT INTO ydzc_invc VALUES (20000003, TO_DATE('11/02/2021', 'DD/MM/YYYY'),
2.00, 10000003);
INSERT INTO ydzc_invc VALUES (20000004, TO_DATE('18/02/2021', 'DD/MM/YYYY'),
4.00, 10000004);
INSERT INTO ydzc_invc VALUES (20000005, TO_DATE('18/02/2021', 'DD/MM/YYYY'),
4.00, 10000005);
-- ydzc_pay
INSERT INTO ydzc_pay VALUES (30000001, TO_DATE('06/02/2021', 'DD/MM/YYYY'),
1.00, 'PAYPAL', 10000002);
INSERT INTO ydzc_pay VALUES (30000002, TO_DATE('08/02/2021', 'DD/MM/YYYY'),
1.40, 'CREDIT', 10000001);
INSERT INTO ydzc_pay VALUES (30000003, TO_DATE('12/02/2021', 'DD/MM/YYYY'),
1.00, 'CREDIT', 10000003);
INSERT INTO ydzc_pay VALUES (30000004, TO_DATE('14/02/2021', 'DD/MM/YYYY'),
0.50, 'CREDIT', 10000003);
INSERT INTO ydzc_pay VALUES (30000005, TO_DATE('14/02/2021', 'DD/MM/YYYY'),
0.50, 'CREDIT', 10000003);
INSERT INTO ydzc_pay VALUES (30000006, TO_DATE('20/02/2021', 'DD/MM/YYYY'),
2.00, 'DEBIT', 10000004);
INSERT INTO ydzc_pay VALUES (30000007, TO_DATE('20/02/2021', 'DD/MM/YYYY'),
1.50, 'CASH', 10000005);
INSERT INTO ydzc_pay VALUES (30000008, TO_DATE('22/02/2021', 'DD/MM/YYYY'),
2.50, 'DEBIT', 10000005);
INSERT INTO ydzc_pay VALUES (30000009, TO_DATE('24/02/2021', 'DD/MM/YYYY'),
2.00, 'CREDIT', 10000004);
-- ydzc_cc
INSERT INTO ydzc_cc VALUES (30000002, 'Armin');

```

```

INSERT INTO ydzc_cc VALUES (30000003, 'Eren');
INSERT INTO ydzc_cc VALUES (30000004, 'Eren');
INSERT INTO ydzc_cc VALUES (30000005, 'Mikasa');
INSERT INTO ydzc_cc VALUES (30000009, 'Connie');
-- ydzc_evt
INSERT INTO ydzc_evt VALUES (21001, 'Ancient Greek Arts', 'E', TO_DATE('01/03/2021',
'DD/MM/YYYY'), TO_DATE('03/03/2021', 'DD/MM/YYYY'));
INSERT INTO ydzc_evt VALUES (21002, 'Van Gogh Works Exhibition', 'E',
TO_DATE('01/03/2021', 'DD/MM/YYYY'), TO_DATE('01/04/2021', 'DD/MM/YYYY'));
INSERT INTO ydzc_evt VALUES (21003, 'Tiny Physical Experiment', 'E',
TO_DATE('05/03/2021', 'DD/MM/YYYY'), TO_DATE('25/03/2021', 'DD/MM/YYYY'));
INSERT INTO ydzc_evt VALUES (21004, 'Travel Photography', 'E', TO_DATE('15/03/2021',
'DD/MM/YYYY'), TO_DATE('16/03/2021', 'DD/MM/YYYY'));
INSERT INTO ydzc_evt VALUES (21005, 'The Second War', 'E', TO_DATE('20/03/2021',
'DD/MM/YYYY'), TO_DATE('27/03/2021', 'DD/MM/YYYY'));
INSERT INTO ydzc_evt VALUES (21006, 'Quantum Mechanics Future', 'S',
TO_DATE('28/03/2021', 'DD/MM/YYYY'), TO_DATE('31/03/2021', 'DD/MM/YYYY'));
INSERT INTO ydzc_evt VALUES (21007, 'Crystal Mechanics Future', 'S',
TO_DATE('28/03/2021', 'DD/MM/YYYY'), TO_DATE('31/03/2021', 'DD/MM/YYYY'));
INSERT INTO ydzc_evt VALUES (21008, 'Flow Mechanics Future', 'S',
TO_DATE('28/03/2021', 'DD/MM/YYYY'), TO_DATE('31/03/2021', 'DD/MM/YYYY'));
INSERT INTO ydzc_evt VALUES (21009, 'Structural Mechanics Future', 'S',
TO_DATE('28/03/2021', 'DD/MM/YYYY'), TO_DATE('31/03/2021', 'DD/MM/YYYY'));
INSERT INTO ydzc_evt VALUES (21010, 'Engineering Mechanics Future', 'S',
TO_DATE('28/03/2021', 'DD/MM/YYYY'), TO_DATE('31/03/2021', 'DD/MM/YYYY'));
-- ydzc_exh
INSERT INTO ydzc_exh VALUES (21001, 2800.00);
INSERT INTO ydzc_exh VALUES (21002, 5000.00);
INSERT INTO ydzc_exh VALUES (21003, 2100.50);
INSERT INTO ydzc_exh VALUES (21004, 2000.00);
INSERT INTO ydzc_exh VALUES (21005, 1500.00);
-- ydzc_sem
INSERT INTO ydzc_sem VALUES (21006, 1500.00);
INSERT INTO ydzc_sem VALUES (21007, 2000.00);
INSERT INTO ydzc_sem VALUES (21008, 600.00);
INSERT INTO ydzc_sem VALUES (21009, 600.00);
INSERT INTO ydzc_sem VALUES (21010, 450.00);
-- ydzc_spr
INSERT INTO ydzc_spr VALUES (1, 'I');
INSERT INTO ydzc_spr VALUES (2, 'O');
INSERT INTO ydzc_spr VALUES (3, 'I');
INSERT INTO ydzc_spr VALUES (4, 'I');
INSERT INTO ydzc_spr VALUES (5, 'O');
INSERT INTO ydzc_spr VALUES (6, 'O');

```

```

INSERT INTO ydzc_spr VALUES (7, 'T');
INSERT INTO ydzc_spr VALUES (8, 'O');
INSERT INTO ydzc_spr VALUES (9, 'O');
INSERT INTO ydzc_spr VALUES (10, 'T');
-- ydzc_ind
INSERT INTO ydzc_ind VALUES (1, 'Erwin', 'Smith');
INSERT INTO ydzc_ind VALUES (3, 'Hange', 'Zoe');
INSERT INTO ydzc_ind VALUES (4, 'Levi', 'Ackerman');
INSERT INTO ydzc_ind VALUES (7, 'Kenny', 'Ackerman');
INSERT INTO ydzc_ind VALUES (10, 'Frieda', 'Reiss');
-- ydzc_org
INSERT INTO ydzc_org VALUES (2, 'Google');
INSERT INTO ydzc_org VALUES (5, 'Facebook');
INSERT INTO ydzc_org VALUES (6, 'Twitter');
INSERT INTO ydzc_org VALUES (8, 'Netflix');
INSERT INTO ydzc_org VALUES (9, 'FIFA');
-- ydzc_rm
INSERT INTO ydzc_rm VALUES (101, 80);
INSERT INTO ydzc_rm VALUES (102, 80);
INSERT INTO ydzc_rm VALUES (103, 80);
INSERT INTO ydzc_rm VALUES (201, 30);
INSERT INTO ydzc_rm VALUES (202, 50);
INSERT INTO ydzc_rm VALUES (301, 20);
-- ydzc_rmsect
INSERT INTO ydzc_rmsect VALUES (1, TO_DATE('01/04/2021', 'DD/MM/YYYY'), 'A', 50,
101);
INSERT INTO ydzc_rmsect VALUES (2, TO_DATE('01/04/2021', 'DD/MM/YYYY'), 'A', 0,
102);
INSERT INTO ydzc_rmsect VALUES (3, TO_DATE('01/04/2021', 'DD/MM/YYYY'), 'A', 26,
103);
INSERT INTO ydzc_rmsect VALUES (4, TO_DATE('01/04/2021', 'DD/MM/YYYY'), 'B', 15,
101);
INSERT INTO ydzc_rmsect VALUES (5, TO_DATE('01/04/2021', 'DD/MM/YYYY'), 'B', 8,
102);
INSERT INTO ydzc_rmsect VALUES (6, TO_DATE('02/04/2021', 'DD/MM/YYYY'), 'A', 16,
301);
INSERT INTO ydzc_rmsect VALUES (7, TO_DATE('02/04/2021', 'DD/MM/YYYY'), 'D', 20,
301);
INSERT INTO ydzc_rmsect VALUES (8, TO_DATE('03/04/2021', 'DD/MM/YYYY'), 'B', 24,
202);
-- ydzc_bk_top
INSERT INTO ydzc_bk_top VALUES (9782222211111, 'Arts');
INSERT INTO ydzc_bk_top VALUES (9784444433333, 'Arts');
INSERT INTO ydzc_bk_top VALUES (9789999988888, 'Arts');

```



```

INSERT INTO ydzc_bk_top VALUES (9783333322222, 'Children');
INSERT INTO ydzc_bk_top VALUES (9786666655555, 'Children');
INSERT INTO ydzc_bk_top VALUES (9787777766666, 'Children');
INSERT INTO ydzc_bk_top VALUES (9788888877777, 'Children');
INSERT INTO ydzc_bk_top VALUES (9786666655555, 'History');
INSERT INTO ydzc_bk_top VALUES (9788888877777, 'History');
INSERT INTO ydzc_bk_top VALUES (9784444433333, 'Science');
INSERT INTO ydzc_bk_top VALUES (9789999988888, 'Science');
INSERT INTO ydzc_bk_top VALUES (9785555544444, 'Travel');
-- ydzc_evt_top
INSERT INTO ydzc_evt_top VALUES (21001, 'Arts');
INSERT INTO ydzc_evt_top VALUES (21001, 'History');
INSERT INTO ydzc_evt_top VALUES (21002, 'Arts');
INSERT INTO ydzc_evt_top VALUES (21002, 'History');
INSERT INTO ydzc_evt_top VALUES (21003, 'Children');
INSERT INTO ydzc_evt_top VALUES (21003, 'Science');
INSERT INTO ydzc_evt_top VALUES (21004, 'Arts');
INSERT INTO ydzc_evt_top VALUES (21004, 'Travel');
INSERT INTO ydzc_evt_top VALUES (21005, 'History');
INSERT INTO ydzc_evt_top VALUES (21006, 'Science');
INSERT INTO ydzc_evt_top VALUES (21007, 'Science');
INSERT INTO ydzc_evt_top VALUES (21008, 'Science');
INSERT INTO ydzc_evt_top VALUES (21009, 'Science');
INSERT INTO ydzc_evt_top VALUES (21010, 'Science');
-- ydzc_bk_auth
INSERT INTO ydzc_bk_auth VALUES (1, 9782222211111);
INSERT INTO ydzc_bk_auth VALUES (1, 9783333322222);
INSERT INTO ydzc_bk_auth VALUES (2, 9783333322222);
INSERT INTO ydzc_bk_auth VALUES (3, 9784444433333);
INSERT INTO ydzc_bk_auth VALUES (4, 9785555544444);
INSERT INTO ydzc_bk_auth VALUES (5, 9786666655555);
INSERT INTO ydzc_bk_auth VALUES (6, 9787777766666);
INSERT INTO ydzc_bk_auth VALUES (7, 9788888877777);
INSERT INTO ydzc_bk_auth VALUES (8, 9788888877777);
INSERT INTO ydzc_bk_auth VALUES (8, 9789999988888);
-- ydzc_invt
INSERT INTO ydzc_invt VALUES (20210001, 21006, 1);
INSERT INTO ydzc_invt VALUES (20210002, 21006, 2);
INSERT INTO ydzc_invt VALUES (20210003, 21007, 3);
INSERT INTO ydzc_invt VALUES (20210004, 21007, 4);
INSERT INTO ydzc_invt VALUES (20210005, 21008, 4);
INSERT INTO ydzc_invt VALUES (20210006, 21009, 5);
INSERT INTO ydzc_invt VALUES (20210007, 21009, 6);
INSERT INTO ydzc_invt VALUES (20210008, 21009, 7);

```

```

-- ydzc_fund
INSERT INTO ydzc_fund VALUES (500.00, 1, 21006);
INSERT INTO ydzc_fund VALUES (1000.00, 2, 21006);
INSERT INTO ydzc_fund VALUES (1200.00, 3, 21007);
INSERT INTO ydzc_fund VALUES (800.00, 4, 21007);
INSERT INTO ydzc_fund VALUES (600.00, 4, 21008);
INSERT INTO ydzc_fund VALUES (250.00, 5, 21009);
INSERT INTO ydzc_fund VALUES (350.00, 6, 21009);
INSERT INTO ydzc_fund VALUES (450.00, 7, 21010);
-- ydzc_reg
INSERT INTO ydzc_reg VALUES (20211001, 21001, 1);
INSERT INTO ydzc_reg VALUES (20211002, 21001, 2);
INSERT INTO ydzc_reg VALUES (20211003, 21001, 3);
INSERT INTO ydzc_reg VALUES (20211004, 21002, 5);
INSERT INTO ydzc_reg VALUES (20211005, 21002, 7);
INSERT INTO ydzc_reg VALUES (20211006, 21002, 8);
INSERT INTO ydzc_reg VALUES (20211007, 21003, 2);
INSERT INTO ydzc_reg VALUES (20211008, 21003, 9);
INSERT INTO ydzc_reg VALUES (20211009, 21004, 5);
INSERT INTO ydzc_reg VALUES (20211010, 21004, 6);
-- ydzc_resv
INSERT INTO ydzc_resv VALUES (1, 2);
INSERT INTO ydzc_resv VALUES (2, 2);
INSERT INTO ydzc_resv VALUES (3, 2);
INSERT INTO ydzc_resv VALUES (1, 5);
INSERT INTO ydzc_resv VALUES (2, 5);
INSERT INTO ydzc_resv VALUES (5, 6);
INSERT INTO ydzc_resv VALUES (7, 6);
INSERT INTO ydzc_resv VALUES (8, 6);
INSERT INTO ydzc_resv VALUES (9, 6);

```

## COUNT(\*) Query and Result for Each Table

We could query each table as following:

```

74
75 SELECT COUNT(*) FROM ydzc_auth;
76
--

```

COUNT(*)
8

[Download CSV](#)

```
75 SELECT COUNT(*) FROM ydzc_bk;
76
--
```

COUNT(*)
8

[Download CSV](#)

```
75 SELECT COUNT(*) FROM ydzc_bkcpy;
76
--
```

COUNT(*)
12

[Download CSV](#)

Or we could use another method to figure out the number of each table's rows faster:

DDL Code:

DECLARE

TYPE tab\_type IS TABLE OF VARCHAR2(20);

tab\_list tab\_type;

BEGIN

SELECT table\_name BULK COLLECT INTO tab\_list FROM user\_tables;

FOR i IN 1..tab\_list.COUNT LOOP

EXECUTE IMMEDIATE 'ANALYZE TABLE '||tab\_list(i)||' COMPUTE STATISTICS';

END LOOP;

END;

SELECT table\_name, num\_rows FROM user\_tables;

Result:

TABLE_NAME	NUM_ROWS		
YDZC_AUTH	8		
YDZC_BK	8		
YDZC_BKCPY	12		
YDZC_BK_AUTH	10		
YDZC_BK_TOP	12		
YDZC_CC	5		
YDZC_CUST	9		
YDZC_EVT	10		
YDZC_EVT_TOP	14		
YDZC_EXH	5		
YDZC_FUND	8		
YDZC_IND	5		
YDZC_INVC	5		
YDZC_INVT	8	YDZC_RESV	9
YDZC_ORG	5	YDZC_RM	6
YDZC_PAY	9	YDZC_RMSECT	8
YDZC_REG	10	YDZC_SEM	5
YDZC_RENT	8	YDZC_SPR	10
YDZC_RESV	9	YDZC_TOP	5

# Data Dictionary Queries and Their Corresponding Results

```

15 SELECT a.table_name,
16        a.column_name,
17        d.data_type,
18        d.data_length,
19        c.search_condition,
20        b.constraint_name,
21        c.constraint_type,
22        a.comments
23 FROM user_col_comments a, user_cons_columns b, user_constraints c, user_tab_columns d
24 WHERE a.table_name like 'YDZC%'
25 AND a.table_name = b.table_name
26 AND b.table_name = c.table_name
27 AND c.table_name = d.table_name
28 AND b.constraint_name = c.constraint_name
29 AND a.column_name = b.column_name
30 AND b.column_name = d.column_name;
31

```

TABLE_NAME	COLUMN_NAME	DATA_TYPE	DATA_LENGTH	SEARCH_CONDITION	CONSTRAINT_NAME	CONSTRAINT_TYPE	COMMENTS
YDZC_AUTH	AUTH_ID	NUMBER	22	"AUTH_ID" IS NOT NULL	SYS_C0055229181	C	AUTHOR ID
YDZC_AUTH	AUTH_ID	NUMBER	22	-	YDZC_AUTH_PK	P	AUTHOR ID
YDZC_AUTH	AUTH_FNAME	VARCHAR2	20	"AUTH_FNAME" IS NOT NULL	SYS_C0055229182	C	AUTHOR FIRST NAME
YDZC_AUTH	AUTH_LNAME	VARCHAR2	20	"AUTH_LNAME" IS NOT NULL	SYS_C0055229183	C	AUTHOR LAST NAME
YDZC_AUTH	AUTH_EMAIL	VARCHAR2	25	"AUTH_EMAIL" IS NOT NULL	SYS_C0055229184	C	AUTHOR EMAIL

A	B	C	D	E	F	G	H	I	J	K	L
TABLE_NAME	COLUMN_NAME	DATA_TYPE	DATA_LENGTH	SEARCH_CONDITION	CONSTRAINT_NAME	CONSTRAINT_TYPE	COMMENTS				
YDZC.AUTH	AUTH_ID	NUMBER	22	AUTH_ID IS NOT NULL	SYS_C0055229181	C	AUTHOR ID				
YDZC.AUTH	AUTH_ID	NUMBER	22	-	YDZC.AUTH_PK	P	AUTHOR ID				
YDZC.AUTH	AUTH_FNAME	VARCHAR2	20	AUTH_FNAME IS NOT NULL	SYS_C0055229182	C	AUTHOR FIRST NAME				
YDZC.AUTH	AUTH_LNAME	VARCHAR2	20	AUTH_LNAME IS NOT NULL	SYS_C0055229183	C	AUTHOR LAST NAME				
YDZC.AUTH	AUTH_EMAIL	VARCHAR2	25	AUTH_EMAIL IS NOT NULL	SYS_C0055229184	C	AUTHOR EMAIL				
YDZC.AUTH	AUTH_HNO	VARCHAR2	10	AUTH_HNO IS NOT NULL	SYS_C0055229185	C	AUTHOR HOUSE NUMBER				
YDZC.AUTH	AUTH_ST	VARCHAR2	20	AUTH_ST IS NOT NULL	SYS_C0055229186	C	AUTHOR STREET				
YDZC.AUTH	AUTH_CITY	VARCHAR2	20	AUTH_CITY IS NOT NULL	SYS_C0055229187	C	AUTHOR CITY				
YDZC.AUTH	AUTH_STATE	CHAR	2	AUTH_STATE IS NOT NULL	SYS_C0055229188	C	AUTHOR STATE ABBREVIATION				
YDZC.AUTH	AUTH_COUNTRY	CHAR	2	AUTH_COUNTRY IS NOT NULL	SYS_C0055229189	C	AUTHOR COUNTRY ABBREVIATION				
YDZC.AUTH	AUTH_ZIP	NUMBER	22	AUTH_ZIP IS NOT NULL	SYS_C0055229190	C	AUTHOR ZIPCODE				
YDZC.BK	BK_ISBN	NUMBER	22	BK_ISBN IS NOT NULL	SYS_C0055229202	C	INTERNATION STANDARD BOOK NUMBER				
YDZC.BK	BK_ISBN	NUMBER	22	-	YDZC.BK_PK	P	INTERNATION STANDARD BOOK NUMBER				
YDZC.BK	BK_TITLE	VARCHAR2	30	BK_TITLE IS NOT NULL	SYS_C0055229203	C	BOOK TITLE				
YDZC.BKCPY	BKCPY_ID	NUMBER	22	BKCPY_ID IS NOT NULL	SYS_C0055229234	C	BOOK COPY ID				
YDZC.BKCPY	BKCPY_ID	NUMBER	22	-	YDZC.BKCPY_PK	P	BOOK COPY ID				
YDZC.BKCPY	BKCPY_STAT	CHAR	1	BKCPY_STAT IS NOT NULL	SYS_C0055229235	C	BOOK COPY STATUS: AVAILABLE(Y) OR UNAVAILABLE(N)				
YDZC.BKCPY	BK_ISBN	NUMBER	22	-	YDZC.BKCPY_YDZC.BK_FK	R	-				
YDZC.BKCPY	BK_ISBN	NUMBER	22	BK_ISBN IS NOT NULL	SYS_C0055229236	C	-				
YDZC.BK.AUTH	AUTH_ID	NUMBER	22	-	YDZC.BK.AUTH_YDZC.AUTH_FK	R	-				
YDZC.BK.AUTH	AUTH_ID	NUMBER	22	AUTH_ID IS NOT NULL	SYS_C0055229228	C	-				
YDZC.BK.AUTH	AUTH_ID	NUMBER	22	-	YDZC.BK.AUTH_PK	P	-				
YDZC.BK.AUTH	BK_ISBN	NUMBER	22	-	YDZC.BK.AUTH_YDZC.BK_FK	R	-				
YDZC.BK.AUTH	BK_ISBN	NUMBER	22	BK_ISBN IS NOT NULL	SYS_C0055229229	C	-				
YDZC.BK.AUTH	BK_ISBN	NUMBER	22	-	YDZC.BK.AUTH_PK	P	-				
YDZC.BK.TOP	BK_ISBN	NUMBER	22	-	YDZC.BK.TOP_YDZC.BK_FK	R	-				
YDZC.BK.TOP	BK_ISBN	NUMBER	22	BK_ISBN IS NOT NULL	SYS_C0055229231	C	-				
YDZC.BK.TOP	BK_ISBN	NUMBER	22	-	YDZC.BK.TOP_PK	P	-				
YDZC.BK.TOP	TOP_NAME	VARCHAR2	20	-	YDZC.BK.TOP_YDZC.TOP_FK	R	-				
YDZC.BK.TOP	TOP_NAME	VARCHAR2	20	-	YDZC.BK.TOP_PK	P	-				
YDZC.CC	PAY_ID	NUMBER	22	-	YDZC.CC_YDZC.PAY_FK	R	PAYMENT ID				
YDZC.CC	PAY_ID	NUMBER	22	PAY_ID IS NOT NULL	SYS_C0055229240	C	PAYMENT ID				
YDZC.CC	PAY_ID	NUMBER	22	-	YDZC.CC_PK	P	PAYMENT ID				
YDZC.CC	PAYCC_CHN	VARCHAR2	40	PAYCC_CHN IS NOT NULL	SYS_C0055229241	C	CREDIT CARD HOLDER NAME				
YDZC.CUST	CUST_ID	NUMBER	22	CUST_ID IS NOT NULL	SYS_C0055229245	C	CUSTOMER ID				
YDZC.CUST	CUST_ID	NUMBER	22	-	YDZC.CUST_PK	P	CUSTOMER ID				
YDZC.CUST	CUST_FNAME	VARCHAR2	20	CUST_FNAME IS NOT NULL	SYS_C0055229246	C	CUSTOMER FIRST NAME				
YDZC.CUST	CUST_LNAME	VARCHAR2	20	CUST_LNAME IS NOT NULL	SYS_C0055229247	C	CUSTOMER LAST NAME				
YDZC.CUST	CUST_PHONE	NUMBER	22	CUST_PHONE IS NOT NULL	SYS_C0055229248	C	CUSTOMER PHONE NUMBER				
YDZC.CUST	CUST_EMAIL	VARCHAR2	30	CUST_EMAIL IS NOT NULL	SYS_C0055229249	C	CUSTOMER EMAIL				
YDZC.CUST	CUST_IDTYPE	CHAR	1	CUST_IDTYPE IS NOT NULL	SYS_C0055229250	C	CUSTOMER ID TYPE: DRIVER LICENSE(D), PASSPORT(P) OR SSN(S)				
YDZC.CUST	CUST_IDNO	NUMBER	22	CUST_IDNO IS NOT NULL	SYS_C0055229251	C	CUSTOMER ID NUMBER				
YDZC.EVT	EVT_ID	NUMBER	22	-	YDZC.EVT_PK	P	EVENT ID				
YDZC.EVT	EVT_ID	NUMBER	22	EVT_ID IS NOT NULL	SYS_C0055229271	C	EVENT ID				
YDZC.EVT	EVT_NAME	VARCHAR2	50	EVT_NAME IS NOT NULL	SYS_C0055229272	C	EVENT NAME				
YDZC.EVT	EVT_TYPE	CHAR	1	EVT_TYPE IS NOT NULL	SYS_C0055229273	C	EVENT TYPE				
YDZC.EVT	EVT_TYPE	CHAR	1	evt.type IN ( 'E', 'S' )	CH_INH_YDZC.EVT	C	EVENT TYPE				
YDZC.EVT	EVT_STARTDT	DATE	7	EVT_STARTDT IS NOT NULL	SYS_C0055229274	C	EVENT START DATETIME				
YDZC.EVT	EVT_STOPDT	DATE	7	EVT_STOPDT IS NOT NULL	SYS_C0055229275	C	EVENT STOP DATETIME				
YDZC.EVT.TOP	EVT_ID	NUMBER	22	EVT_ID IS NOT NULL	SYS_C0055229296	C	-				