Lớp: L01 (ĐHBKTPHCM)

Báo cáo bài tập lớn số 2 - 2019

Danh sách thành viên:

Đề tài: HỆ THỐNG QUẢN LÍ THÔNG TIN TICKLAB

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I. Phần chung

1. Các câu lệnh tạo bảng và ràng buộc:

```
-- CREATE DATABASE
CREATE DATABASE TickLabInfoSystem;
USE TickLabInfoSystem;
-- CREATE TABLE
    -- Project Fund Contributor
    CREATE TABLE ProjectFundContributor (
        projectFundContributor INT NOT NULL,
        PRIMARY KEY(projectFundContributor)
    );
    -- Person
    CREATE TABLE Person (
        profileNumber INT NOT NULL,
        username TEXT,
        passwd TEXT,
        gender BIT,
        permanentAddress TEXT,
        dateOfBirth DATE,
        firstName TEXT,
        middleName TEXT,
        lastName TEXT,
        nationality TEXT,
        nationalIDNumber VARCHAR(9),
        nationalIDIssueDate DATE,
        passportNumber TEXT,
        passportPlaceOfIssue TEXT,
        passportDateOfIssue DATE,
        passportDateOfExpiry DATE,
        profilePhotoURL TEXT,
        projectFundContributor INT,
        PRIMARY KEY(profileNumber),
        FOREIGN KEY(projectFundContributor) REFERENCES
ProjectFundContributor(projectFundContributor)
    );
    -- TickLab ID CARD
    CREATE TABLE TickLabIDCard (
        profileNumber INT NOT NULL,
        dateOfIssue DATE NOT NULL,
        rfidNumber VARCHAR(9) NOT NULL,
        PRIMARY KEY(profileNumber, dateOfIssue, rfidNumber),
        FOREIGN KEY(profileNumber) REFERENCES Person(profileNumber)
    );
    -- Contact address
    CREATE TABLE PersonContactAddress (
        profileNumber INT NOT NULL,
        contactAddress VARCHAR(256) NOT NULL,
        PRIMARY KEY(profileNumber, contactAddress),
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    FOREIGN KEY(profileNumber) REFERENCES Person(profileNumber)
);
-- Email address
CREATE TABLE PersonEmailAddress (
    profileNumber INT NOT NULL,
    emailAddress VARCHAR(256) NOT NULL,
    PRIMARY KEY(profileNumber, emailAddress),
    FOREIGN KEY(profileNumber) REFERENCES Person(profileNumber)
);
-- System roles
CREATE TABLE PersonSystemRole (
    profileNumber INT NOT NULL,
    systemRole VARCHAR(256) NOT NULL,
    PRIMARY KEY(profileNumber, systemRole),
    FOREIGN KEY(profileNumber) REFERENCES Person(profileNumber)
);
-- Person related documents
CREATE TABLE PersonRelatedDoc (
    profileNumber INT NOT NULL,
    personDocumentURL VARCHAR(256) NOT NULL,
    PRIMARY KEY(profileNumber, personDocumentURL),
    FOREIGN KEY(profileNumber) REFERENCES Person(profileNumber)
);
-- Person phone number
CREATE TABLE PersonPhoneNumber (
    profileNumber INT NOT NULL,
    phoneNumber VARCHAR(11) NOT NULL,
    PRIMARY KEY(profileNumber, phoneNumber),
    FOREIGN KEY(profileNumber) REFERENCES Person(profileNumber)
);
-- Department
CREATE TABLE Department (
    departmentID INT NOT NULL,
    departmentName TEXT,
    departmentDescription TEXT,
    PRIMARY KEY(departmentID)
);
-- Project
CREATE TABLE Project (
    projectID INT NOT NULL,
    projectName TEXT,
    projectStartTime DATE,
    projectEndTime DATE,
    projectStatus TEXT,
    expectedFinishTime DATE,
    projectDescription TEXT,
    TickLabBudget MONEY,
    projectManager INT,
    ofDepartment INT,
    PRIMARY KEY(projectID),
    FOREIGN KEY(projectManager) REFERENCES Person(profileNumber),
    FOREIGN KEY(ofDepartment) REFERENCES Department(departmentID)
);
    -- Project's paricipant
CREATE TABLE ProjectParticipant (
    participantID INT NOT NULL,
    projectID INT,
    profileNumber INT,
    formDate DATE,
    toDate DATE,
    PRIMARY KEY(participantID),
    FOREIGN KEY(projectID) REFERENCES Project(projectID),
        FOREIGN KEY(profileNumber) REFERENCES Person(profileNumber)
    );
    -- Project related documents
    CREATE TABLE ProjectRelatedDoc (
        projectID INT NOT NULL,
        projectDocumentURL VARCHAR(256) NOT NULL,
        PRIMARY KEY(projectID, projectDocumentURL),
        FOREIGN KEY(projectID) REFERENCES Project(projectID)
    );
    -- Contributing
    CREATE TABLE Contributing (
        projectFundContributor INT NOT NULL,
        projectID INT NOT NULL,
        contributingDate DATETIME,
        amountOfMoney MONEY,
        PRIMARY KEY(projectFundContributor, projectID),
        FOREIGN KEY(projectFundContributor) REFERENCES
ProjectFundContributor(projectFundContributor),
        FOREIGN KEY(projectID) REFERENCES Project(projectID)
    );
    -- Internal project
    CREATE TABLE InternalProject (
        internalProjectID INT NOT NULL,
        PRIMARY KEY(internalProjectID),
        FOREIGN KEY(internalProjectID) REFERENCES Project(projectID)
    );
    -- Community activity
    CREATE TABLE CommunityActivity (
        communityID INT NOT NULL,
        place TEXT,
        PRIMARY KEY(communityID)
    );
    -- Seminar workshop
    CREATE TABLE SeminarWorkshop (
        projectID INT NOT NULL,
        topic TEXT,
        communityID INT,
        FOREIGN KEY(projectID) REFERENCES Project(projectID),
        FOREIGN KEY(communityID) REFERENCES CommunityActivity(communityID)
    );
    -- Interview
    CREATE TABLE Interview (
        projectID INT,
        requirement TEXT,
        communityID INT,
        FOREIGN KEY(projectID) REFERENCES Project(projectID),
        FOREIGN KEY(communityID) REFERENCES CommunityActivity(communityID)
    );
    -- Application form
    CREATE TABLE ApplicationForm (
        communityIDForm INT NOT NULL,
        formID INT NOT NULL,
        formFirstName TEXT,
        formMiddleName TEXT,
        formLastName TEXT,
        formGender BIT,
        formDateOfBirth DATE,
        formPhoneNumber VARCHAR(11),
        formContactAddress TEXT,
        formSocialAccount TEXT,
        formEmail TEXT,
        formCVURL TEXT,
        PRIMARY KEY(communityIDForm, formID),
        FOREIGN KEY(communityIDForm) REFERENCES CommunityActivity(communityID)
    );
    -- Company
    CREATE TABLE Company (
        taxIDNumber VARCHAR(9) NOT NULL,
        conpanyName TEXT,
        companyDescription TEXT,
        projectFundContributor INT,
        PRIMARY KEY(taxIDNumber),
        FOREIGN KEY(projectFundContributor) REFERENCES
ProjectFundContributor(projectFundContributor)
    );
    -- Company related documents
    CREATE TABLE CompanyRelatedDoc (
        taxIDNumber VARCHAR(9) NOT NULL,
        companyDocumentURL VARCHAR(256) NOT NULL,
        PRIMARY KEY(taxIDNumber, companyDocumentURL),
        FOREIGN KEY(taxIDNumber) REFERENCES Company(taxIDNumber)
    );
    -- Position
    CREATE TABLE WorkPosition (
        posID INT NOT NULL,
        posName TEXT,
        posDescription TEXT,
        posInDepartment INT,
        PRIMARY KEY(posID),
        FOREIGN KEY(posInDepartment) REFERENCES Department(departmentID)
    );
    -- Person take position
    CREATE TABLE Taking (
        profileNumberTake INT NOT NULL,
        posIDTake INT NOT NULL,
        takeFromDate DATE,
        takeToDate DATE,
        PRIMARY KEY(profileNumberTake, posIDTake),
        FOREIGN KEY(profileNumberTake) REFERENCES Person(profileNumber),
        FOREIGN KEY(posIDTake) REFERENCES WorkPosition(posID)
    );
    -- Task
    CREATE TABLE Task (
        taskID INT NOT NULL,
        taskStartTime DATE,
        taskEndTime DATE,
        whatToDo TEXT,
        taskDescription TEXT,
        taskStatus TEXT,
        ofProject INT,
        PRIMARY KEY(taskID),
        FOREIGN KEY(ofProject) REFERENCES Project(projectID)
    );
    -- Task's participant
    CREATE TABLE TaskParticipant (
        participantID INT NOT NULL,
        taskID INT NOT NULL,
        fromDate DATE,
        toDate DATE,
        PRIMARY KEY(participantID, taskID),
        FOREIGN KEY(participantID) REFERENCES Participate(participantID),
        FOREIGN KEY(taskID) REFERENCES Task(taskID)
    );
    -- Task remake
```

```
CREATE TABLE TaskRemark (
    taskID INT NOT NULL,
    taskRemark VARCHAR(256) NOT NULL,
    PRIMARY KEY(taskID, taskRemark),
    FOREIGN KEY(taskID) REFERENCES Task(taskID)
);
-- Duty
CREATE TABLE Duty (
    dutyID INT NOT NULL,
    dutyName TEXT,
    shift TEXT,
    dutyDescription TEXT,
    PRIMARY KEY(dutyID)
);
-- Has to do duty
CREATE TABLE HaveToDoDuty (
    profileNumberDuty INT NOT NULL,
    dutyID INT NOT NULL,
    PRIMARY KEY(profileNumberDuty, dutyID),
    FOREIGN KEY(profileNumberDuty) REFERENCES Person(profileNumber),
    FOREIGN KEY(dutyID) REFERENCES Duty(dutyID)
);
-- Infrastructures
CREATE TABLE Infrastructure (
    infraID INT NOT NULL,
    infraName TEXT,
    totalNumber INT,
    numberOfAvailable INT,
    infraDescription TEXT,
    PRIMARY KEY(infraID)
);
-- Borrow record
CREATE TABLE BorrowRecord (
    borrowID INT NOT NULL,
    borrowDate DATE,
    borrowStatus BIT,
    borrower INT,
    PRIMARY KEY(borrowID),
    FOREIGN KEY(borrower) REFERENCES Person(profileNumber)
);
-- Include
CREATE TABLE Including (
    borrowIDInclude INT NOT NULL,
    infraIDInclude INT NOT NULL,
    numberOfItem INT,
    dueDate DATE,
    returnDate DATE,
    PRIMARY KEY(borrowIDInclude, infraIDInclude),
    FOREIGN KEY(borrowIDInclude) REFERENCES BorrowRecord(borrowID),
    FOREIGN KEY(infraIDInclude) REFERENCES Infrastructure(infraID)
);
-- Fund
CREATE TABLE Fund (
    fundID INT NOT NULL,
    currentBudget MONEY,
    originalCapital MONEY,
    treasurer INT,
    PRIMARY KEY(fundID),
    FOREIGN KEY(treasurer) REFERENCES Person(profileNumber)
);
-- Revenue category
CREATE TABLE RevenueCategory (
    revenueID INT NOT NULL,
    revenueName TEXT,
    moneyHaveToPay MONEY,
    moneyPay MONEY,
    moneyRest MONEY,
    revenueDeadline DATE,
    revenueDescription TEXT,
    fundIDRevenue INT,
    PRIMARY KEY(revenueID),
    FOREIGN KEY(fundIDRevenue) REFERENCES Fund(fundID)
);
-- Expediture category
CREATE TABLE ExpeditureCategory (
    expeditureID INT NOT NULL,
    expeditureName TEXT,
    expeditureDate DATE,
    expeditureMoney MONEY,
    expeditureDescription TEXT,
    fundIDExpediture INT,
    PRIMARY KEY(expeditureID),
    FOREIGN KEY(fundIDExpediture) REFERENCES Person(profileNumber)
);
-- Have to pay
CREATE TABLE HaveToPay (
    profileNumberPay INT NOT NULL,
    revenueIDPay INT NOT NULL,
    weighting FLOAT,
    amount INT,
    PRIMARY KEY(profileNumberPay, revenueIDPay),
    FOREIGN KEY(profileNumberPay) REFERENCES Person(profileNumber),
    FOREIGN KEY(revenueIDPay) REFERENCES RevenueCategory(revenueID)
);
```

2. Các câu lệnh tạo chỉ mục:

```
-- Create index on Person table
CREATE INDEX PersonIndex ON Person(profileNumber)
-- Create index on Project table
CREATE INDEX Project ON Project(projectID)
```

3. Các câu lệnh insert dữ liệu:

Chèn dữ liệu vào bảng Person

```
INSERT INTO Person VALUES(0, 'ethan.roberts1112', 'eY5FXIcs3Gw5', 1, NULL,
CONVERT(DATETIME, 11-12-2000, 105), 'Ethan', NULL, 'Roberts', 'Viet Nam',
'618927954', CONVERT(DATETIME, 03-04-2017, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(1, 'mia.johnson1510', 'P2rNvS0cS4Qei6f94K61S', 1, NULL,
CONVERT(DATETIME, 15-10-1989, 105), 'Mia', NULL, 'Johnson', 'Viet Nam',
'637882913', CONVERT(DATETIME, 23-08-2006, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(2, 'mason.rodriguez287', '52f3cE67a20oYf', 1, NULL,
CONVERT(DATETIME, 28-07-1983, 105), 'Mason', NULL, 'Rodriguez', 'Viet Nam',
'777335998', CONVERT(DATETIME, 06-01-2000, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(3, 'margaret.rodriguez113', '2048jo14', 0, NULL,
CONVERT(DATETIME, 11-03-1999, 105), 'Margaret', NULL, 'Rodriguez', 'Viet Nam',
'618984143', CONVERT(DATETIME, 08-07-2015, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(4, 'sarah.rodriguez89', 't1nY619SN8fUxrBN0ok18', 1, NULL,
CONVERT(DATETIME, 08-09-1992, 105), 'Sarah', NULL, 'Rodriguez', 'Viet Nam',
'722828907', CONVERT(DATETIME, 07-12-2009, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(5, 'mason.wilson115', 'w259cpal7u503ZltKCWR', 1, NULL,
CONVERT(DATETIME, 11-05-1999, 105), 'Mason', NULL, 'Wilson', 'Viet Nam',
'229419698', CONVERT(DATETIME, 26-06-2014, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(6, 'daniel.taylor222', 'J3WXRbDg', 0, NULL,
CONVERT(DATETIME, 22-02-1991, 105), 'Daniel', NULL, 'Taylor', 'Viet Nam',
'582544161', CONVERT(DATETIME, 05-12-2008, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(7, 'richard.rodriguez2810', '3hMNE9X342p45ec8782J', 0,
NULL, CONVERT(DATETIME, 28-10-1996, 105), 'Richard', NULL, 'Rodriguez', 'Viet Nam',
'444429307', CONVERT(DATETIME, 25-07-2012, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(8, 'ethan.williams283', 'e795AU1Chf260', 1, NULL,
CONVERT(DATETIME, 28-03-1987, 105), 'Ethan', NULL, 'Williams', 'Viet Nam',
'034005310', CONVERT(DATETIME, 01-12-2004, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(9, 'barbara.wilson159', 'EMD8j8hSqo063oeDP5N32T7D4OM',
0, NULL, CONVERT(DATETIME, 15-09-1993, 105), 'Barbara', NULL, 'Wilson', 'Viet Nam',
'111730048', CONVERT(DATETIME, 02-09-2009, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(10, 'liam.thomas16', 'H0r0Km7WqgOAMwDyxtbH2Yc1bP', 1,
NULL, CONVERT(DATETIME, 01-06-1994, 105), 'Liam', NULL, 'Thomas', 'Viet Nam',
'265324442', CONVERT(DATETIME, 03-06-2010, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(11, 'david.taylor244', 'v34Rj165IXz76KU', 0, NULL,
CONVERT(DATETIME, 24-04-1982, 105), 'David', NULL, 'Taylor', 'Viet Nam',
'103155221', CONVERT(DATETIME, 05-01-1998, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(12, 'liam.miller2512', '20i51u0pNwma95Nhqr6L1', 1, NULL,
CONVERT(DATETIME, 25-12-1989, 105), 'Liam', NULL, 'Miller', 'Viet Nam',
'034175332', CONVERT(DATETIME, 19-10-2004, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(13, 'isabella.jones177', 'cVa1M0Hwbz8W5rMmH356bR9', 0,
NULL, CONVERT(DATETIME, 17-07-1989, 105), 'Isabella', NULL, 'Jones', 'Viet Nam',
'505880132', CONVERT(DATETIME, 08-09-2005, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(14, 'jacob.rodriguez224', '95Pib3bG088O3KB', 0, NULL,
CONVERT(DATETIME, 22-04-1990, 105), 'Jacob', NULL, 'Rodriguez', 'Viet Nam',
'356583948', CONVERT(DATETIME, 18-12-2005, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(15, 'mary.davies141', 'X9U45w8Q3iiFdU4oQU5', 1, NULL,
CONVERT(DATETIME, 14-01-1987, 105), 'Mary', NULL, 'Davies', 'Viet Nam',
'015176002', CONVERT(DATETIME, 31-10-2003, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(16, 'mary.brown281', 'U6W3EUk546zZOD03z9zZf2', 1, NULL,
CONVERT(DATETIME, 28-01-1997, 105), 'Mary', NULL, 'Brown', 'Viet Nam', '389287014',
CONVERT(DATETIME, 12-02-2013, 105), NULL, NULL, NULL, NULL, NULL, NULL);
INSERT INTO Person VALUES(17, 'charlotte.wilson104', 'j7laa2RSiDT037ejtHc8bExXg6',
1, NULL, CONVERT(DATETIME, 10-04-1984, 105), 'Charlotte', NULL, 'Wilson', 'Viet
Nam', '089360697', CONVERT(DATETIME, 05-04-2000, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(18, 'richard.johnson76', 'Tw6og5ZvqXwm7y', 0, NULL,
CONVERT(DATETIME, 07-06-1980, 105), 'Richard', NULL, 'Johnson', 'Viet Nam',
'049460362', CONVERT(DATETIME, 09-02-1996, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(19, 'isabella.wilson34', '2B9m8f6A8C7NYq28wybacKKk98C',
0, NULL, CONVERT(DATETIME, 03-04-1997, 105), 'Isabella', NULL, 'Wilson', 'Viet Nam',
'072552148', CONVERT(DATETIME, 08-03-2013, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
```

```
INSERT INTO Person VALUES(20, 'thomas.smith2110', 'HoM4yAxvh0iEsgHJ430sn34', 0,
NULL, CONVERT(DATETIME, 21-10-2000, 105), 'Thomas', NULL, 'Smith', 'Viet Nam',
'662904931', CONVERT(DATETIME, 19-10-2015, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(21, 'emma.taylor262', '4TpnpyGiOqW25Q2OeS7vipL', 0, NULL,
CONVERT(DATETIME, 26-02-1980, 105), 'Emma', NULL, 'Taylor', 'Viet Nam',
'298227858', CONVERT(DATETIME, 23-12-1995, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(22, 'emily.miller113', 'gmKIdOk8qIPO5M', 1, NULL,
CONVERT(DATETIME, 11-03-1997, 105), 'Emily', NULL, 'Miller', 'Viet Nam',
'934788163', CONVERT(DATETIME, 08-12-2013, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(23, 'isabella.williams36', 'SabLm0m9j342t70m', 1, NULL,
CONVERT(DATETIME, 03-06-1996, 105), 'Isabella', NULL, 'Williams', 'Viet Nam',
'037395972', CONVERT(DATETIME, 23-07-2013, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(24, 'ava.davies288', 'GSe81t5j0ij68N56oWiYTD28h4', 0,
NULL, CONVERT(DATETIME, 28-08-1989, 105), 'Ava', NULL, 'Davies', 'Viet Nam',
'272584739', CONVERT(DATETIME, 04-10-2005, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(25, 'isabella.davis211', 'R4j0jm9HeQaudCJcYfVi6E', 0,
NULL, CONVERT(DATETIME, 21-01-1994, 105), 'Isabella', NULL, 'Davis', 'Viet Nam',
'898999420', CONVERT(DATETIME, 10-08-2011, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(26, 'patricia.davis2612', 'b1U3qlBwX9as4H0GNp5kmU', 1,
NULL, CONVERT(DATETIME, 26-12-1989, 105), 'Patricia', NULL, 'Davis', 'Viet Nam',
'079158639', CONVERT(DATETIME, 14-02-2004, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(27, 'joseph.roberts225', 'leJmnry9Ir9WcX23', 0, NULL,
CONVERT(DATETIME, 22-05-1980, 105), 'Joseph', NULL, 'Roberts', 'Viet Nam',
'075531888', CONVERT(DATETIME, 28-04-1996, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(28, 'charlotte.smith303', 'h2CNUNDfmZATck8Yz', 0, NULL,
CONVERT(DATETIME, 30-03-1989, 105), 'Charlotte', NULL, 'Smith', 'Viet Nam',
'311257621', CONVERT(DATETIME, 10-02-2005, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
INSERT INTO Person VALUES(29, 'linda.smith3112', 'L4GfP7kC1d6XZ01v32xiFFc9', 0,
NULL, CONVERT(DATETIME, 31-12-1991, 105), 'Linda', NULL, 'Smith', 'Viet Nam',
'518368861', CONVERT(DATETIME, 20-01-2007, 105), NULL, NULL, NULL, NULL, NULL,
NULL);
```

```
INSERT INTO WorkPosition VALUES(0, 'IT Staff', NULL, 0);
INSERT INTO WorkPosition VALUES(1, 'IT Vice Leader', NULL, 0);
INSERT INTO WorkPosition VALUES(2, 'IT Leader', NULL, 0);
INSERT INTO WorkPosition VALUES(3, 'HR Staff', NULL, 1);
INSERT INTO WorkPosition VALUES(4, 'HR Vice Leader', NULL, 1);
INSERT INTO WorkPosition VALUES(5, 'HR Leader', NULL, 1);
INSERT INTO WorkPosition VALUES(6, 'EE Staff', NULL, 2);
INSERT INTO WorkPosition VALUES(7, 'EE Vice Leader', NULL, 2);
INSERT INTO WorkPosition VALUES(8, 'EE Leader', NULL, 2);
INSERT INTO WorkPosition VALUES(9, 'ME Staff', NULL, 3);
INSERT INTO WorkPosition VALUES(10, 'ME Vice Leader', NULL, 3);
INSERT INTO WorkPosition VALUES(11, 'ME Leader', NULL, 3);
INSERT INTO WorkPosition VALUES(12, 'Director', NULL, 4);
INSERT INTO WorkPosition VALUES(13, 'Vice Director', NULL, 4);
INSERT INTO WorkPosition VALUES(14, 'Treasurer', NULL, 4);
```

```
INSERT INTO Department VALUES(0, 'IT', NULL);
INSERT INTO Department VALUES(1, 'HR', NULL);
INSERT INTO Department VALUES(2, 'EE', NULL);
INSERT INTO Department VALUES(3, 'ME', NULL);
INSERT INTO Department VALUES(4, 'Administration', NULL);
```

```
INSERT INTO Taking VALUES(28, 1, NULL, NULL);
INSERT INTO Taking VALUES(8, 2, NULL, NULL);
INSERT INTO Taking VALUES(10, 4, NULL, NULL);
INSERT INTO Taking VALUES(29, 5, NULL, NULL);
INSERT INTO Taking VALUES(1, 7, NULL, NULL);
INSERT INTO Taking VALUES(5, 8, NULL, NULL);
INSERT INTO Taking VALUES(12, 10, NULL, NULL);
INSERT INTO Taking VALUES(14, 11, NULL, NULL);
INSERT INTO Taking VALUES(24, 12, NULL, NULL);
INSERT INTO Taking VALUES(0, 14, NULL, NULL);
INSERT INTO Taking VALUES(20, 13, NULL, NULL);
INSERT INTO Taking VALUES(21, 3, NULL, NULL);
INSERT INTO Taking VALUES(22, 0, NULL, NULL);
INSERT INTO Taking VALUES(4, 3, NULL, NULL);
INSERT INTO Taking VALUES(25, 0, NULL, NULL);
INSERT INTO Taking VALUES(3, 3, NULL, NULL);
INSERT INTO Taking VALUES(6, 6, NULL, NULL);
INSERT INTO Taking VALUES(15, 3, NULL, NULL);
INSERT INTO Taking VALUES(2, 0, NULL, NULL);
INSERT INTO Taking VALUES(18, 6, NULL, NULL);
INSERT INTO Taking VALUES(19, 6, NULL, NULL);
INSERT INTO Taking VALUES(7, 3, NULL, NULL);
INSERT INTO Taking VALUES(27, 6, NULL, NULL);
INSERT INTO Taking VALUES(9, 9, NULL, NULL);
INSERT INTO Taking VALUES(16, 9, NULL, NULL);
INSERT INTO Taking VALUES(13, 3, NULL, NULL);
INSERT INTO Taking VALUES(17, 3, NULL, NULL);
INSERT INTO Taking VALUES(23, 6, NULL, NULL);
INSERT INTO Taking VALUES(26, 9, NULL, NULL);
INSERT INTO Taking VALUES(11, 3, NULL, NULL);
```

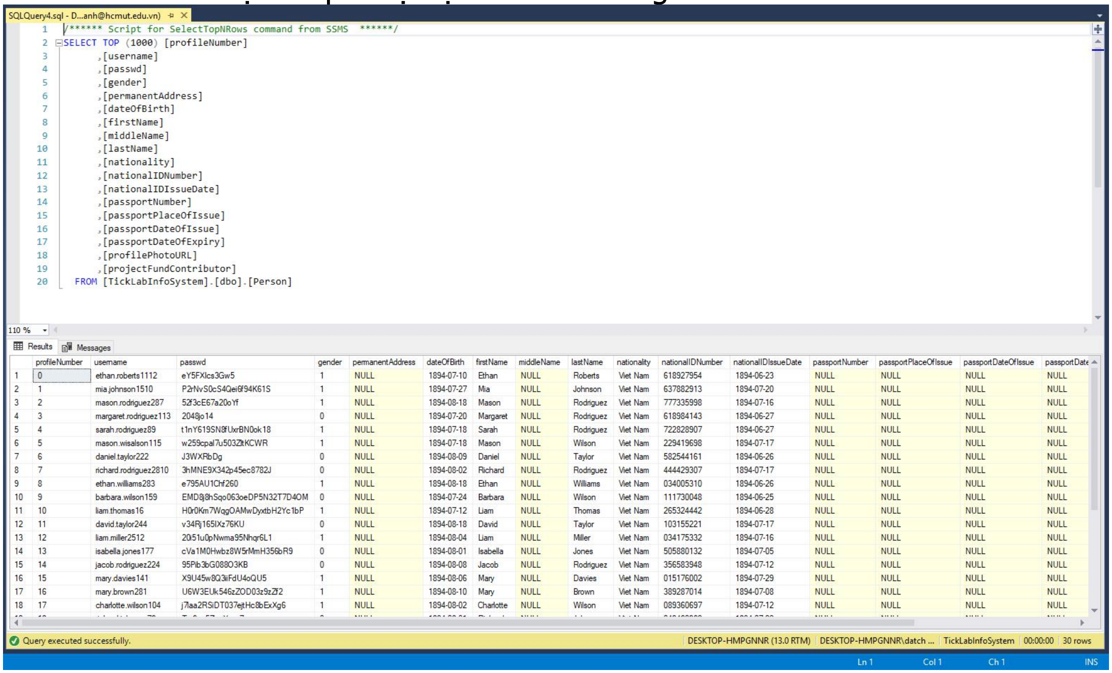
```
INSERT INTO PersonEmailAddress VALUES(0, 'ethan.roberts1112@gmail.com');
INSERT INTO PersonEmailAddress VALUES(0, 'ethan.roberts1112@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(1, 'mia.johnson1510@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(2, 'mason.rodriguez287@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(2, 'mason.rodriguez287@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(2, 'mason.rodriguez287@gmail.com');
INSERT INTO PersonEmailAddress VALUES(3, 'margaret.rodriguez113@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(3, 'margaret.rodriguez113@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(3, 'margaret.rodriguez113@gmail.com');
INSERT INTO PersonEmailAddress VALUES(4, 'sarah.rodriguez89@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(4, 'sarah.rodriguez89@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(4, 'sarah.rodriguez89@gmail.com');
INSERT INTO PersonEmailAddress VALUES(5, 'mason.wilson115@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(5, 'mason.wilson115@gmail.com');
INSERT INTO PersonEmailAddress VALUES(5, 'mason.wilson115@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(6, 'daniel.taylor222@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(6, 'daniel.taylor222@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(7, 'richard.rodriguez2810@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(8, 'ethan.williams283@gmail.com');
INSERT INTO PersonEmailAddress VALUES(8, 'ethan.williams283@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(9, 'barbara.wilson159@gmail.com');
INSERT INTO PersonEmailAddress VALUES(10, 'liam.thomas16@gmail.com');
INSERT INTO PersonEmailAddress VALUES(11, 'david.taylor244@gmail.com');
INSERT INTO PersonEmailAddress VALUES(11, 'david.taylor244@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(12, 'liam.miller2512@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(12, 'liam.miller2512@gmail.com');
INSERT INTO PersonEmailAddress VALUES(13, 'isabella.jones177@gmail.com');
INSERT INTO PersonEmailAddress VALUES(14, 'jacob.rodriguez224@hotmail.com');
```

```sql
INSERT INTO PersonEmailAddress VALUES(14, 'jacob.rodriguez224@gmail.com');
INSERT INTO PersonEmailAddress VALUES(15, 'mary.davies141@gmail.com');
INSERT INTO PersonEmailAddress VALUES(15, 'mary.davies141@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(15, 'mary.davies141@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(16, 'mary.brown281@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(16, 'mary.brown281@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(17, 'charlotte.wilson104@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(17, 'charlotte.wilson104@gmail.com');
INSERT INTO PersonEmailAddress VALUES(18, 'richard.johnson76@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(19, 'isabella.wilson34@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(19, 'isabella.wilson34@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(20, 'thomas.smith2110@gmail.com');
INSERT INTO PersonEmailAddress VALUES(20, 'thomas.smith2110@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(21, 'emma.taylor262@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(22, 'emily.miller113@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(23, 'isabella.williams36@gmail.com');
INSERT INTO PersonEmailAddress VALUES(23, 'isabella.williams36@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(23, 'isabella.williams36@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(24, 'ava.davies288@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(24, 'ava.davies288@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(24, 'ava.davies288@gmail.com');
INSERT INTO PersonEmailAddress VALUES(25, 'isabella.davis211@gmail.com');
INSERT INTO PersonEmailAddress VALUES(26, 'patricia.davis2612@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(26, 'patricia.davis2612@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(27, 'joseph.roberts225@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(27, 'joseph.roberts225@hotmail.com');
INSERT INTO PersonEmailAddress VALUES(27, 'joseph.roberts225@gmail.com');
INSERT INTO PersonEmailAddress VALUES(28, 'charlotte.smith303@gmail.com');
INSERT INTO PersonEmailAddress VALUES(29, 'linda.smith3112@yahoo.com');
INSERT INTO PersonEmailAddress VALUES(29, 'linda.smith3112@gmail.com');
INSERT INTO PersonEmailAddress VALUES(29, 'linda.smith3112@hotmail.com');
```

```sql
INSERT INTO TickLabIDCard VALUES(0, CONVERT(DATETIME, 24-01-2018, 105),
'498949875');
INSERT INTO TickLabIDCard VALUES(1, CONVERT(DATETIME, 04-08-2007, 105),
'878095690');
INSERT INTO TickLabIDCard VALUES(2, CONVERT(DATETIME, 20-08-2001, 105),
'580177467');
INSERT INTO TickLabIDCard VALUES(2, CONVERT(DATETIME, 29-11-2003, 105),
'121835714');
INSERT INTO TickLabIDCard VALUES(3, CONVERT(DATETIME, 09-02-2018, 105),
'302788597');
INSERT INTO TickLabIDCard VALUES(4, CONVERT(DATETIME, 26-04-2014, 105),
'137127534');
INSERT INTO TickLabIDCard VALUES(4, CONVERT(DATETIME, 22-01-2010, 105),
'141266330');
INSERT INTO TickLabIDCard VALUES(5, CONVERT(DATETIME, 25-08-2018, 105),
'816980139');
INSERT INTO TickLabIDCard VALUES(5, CONVERT(DATETIME, 29-04-2017, 105),
'655405065');
INSERT INTO TickLabIDCard VALUES(6, CONVERT(DATETIME, 10-01-2009, 105),
'622505252');
INSERT INTO TickLabIDCard VALUES(6, CONVERT(DATETIME, 18-06-2013, 105),
'280068306');
INSERT INTO TickLabIDCard VALUES(7, CONVERT(DATETIME, 22-08-2017, 105),
'520756181');
INSERT INTO TickLabIDCard VALUES(8, CONVERT(DATETIME, 09-09-2007, 105),
'926523212');
INSERT INTO TickLabIDCard VALUES(8, CONVERT(DATETIME, 20-09-2008, 105),
'874005995');
INSERT INTO TickLabIDCard VALUES(9, CONVERT(DATETIME, 27-10-2013, 105),
'511123397');
```

```sql
INSERT INTO TickLabIDCard VALUES(9, CONVERT(DATETIME, 18-06-2011, 105),
'048439249');
INSERT INTO TickLabIDCard VALUES(10, CONVERT(DATETIME, 02-06-2013, 105),
'766309080');
INSERT INTO TickLabIDCard VALUES(11, CONVERT(DATETIME, 19-06-2001, 105),
'395896257');
INSERT INTO TickLabIDCard VALUES(12, CONVERT(DATETIME, 29-03-2011, 105),
'930251577');
INSERT INTO TickLabIDCard VALUES(12, CONVERT(DATETIME, 02-09-2010, 105),
'785788423');
INSERT INTO TickLabIDCard VALUES(13, CONVERT(DATETIME, 26-06-2010, 105),
'041772131');
INSERT INTO TickLabIDCard VALUES(13, CONVERT(DATETIME, 28-10-2007, 105),
'150512215');
INSERT INTO TickLabIDCard VALUES(14, CONVERT(DATETIME, 22-07-2012, 105),
'284275840');
INSERT INTO TickLabIDCard VALUES(14, CONVERT(DATETIME, 28-07-2008, 105),
'358410334');
INSERT INTO TickLabIDCard VALUES(15, CONVERT(DATETIME, 18-05-2005, 105),
'560983579');
INSERT INTO TickLabIDCard VALUES(15, CONVERT(DATETIME, 08-01-2006, 105),
'740235416');
INSERT INTO TickLabIDCard VALUES(16, CONVERT(DATETIME, 18-11-2015, 105),
'912499376');
INSERT INTO TickLabIDCard VALUES(17, CONVERT(DATETIME, 24-01-2004, 105),
'977165013');
INSERT INTO TickLabIDCard VALUES(18, CONVERT(DATETIME, 09-07-1998, 105),
'744906119');
INSERT INTO TickLabIDCard VALUES(18, CONVERT(DATETIME, 27-06-2001, 105),
'197093331');
INSERT INTO TickLabIDCard VALUES(19, CONVERT(DATETIME, 31-03-2016, 105),
'598839513');
INSERT INTO TickLabIDCard VALUES(19, CONVERT(DATETIME, 28-03-2018, 105),
'819813343');
INSERT INTO TickLabIDCard VALUES(20, CONVERT(DATETIME, 18-08-2018, 105),
'176173060');
INSERT INTO TickLabIDCard VALUES(21, CONVERT(DATETIME, 25-05-1999, 105),
'720954325');
INSERT INTO TickLabIDCard VALUES(22, CONVERT(DATETIME, 28-02-2017, 105),
'157579237');
INSERT INTO TickLabIDCard VALUES(23, CONVERT(DATETIME, 17-12-2014, 105),
'638106876');
INSERT INTO TickLabIDCard VALUES(23, CONVERT(DATETIME, 20-11-2014, 105),
'956154138');
INSERT INTO TickLabIDCard VALUES(24, CONVERT(DATETIME, 22-02-2007, 105),
'133529048');
INSERT INTO TickLabIDCard VALUES(25, CONVERT(DATETIME, 14-03-2013, 105),
'030321108');
INSERT INTO TickLabIDCard VALUES(25, CONVERT(DATETIME, 09-04-2012, 105),
'289230282');
INSERT INTO TickLabIDCard VALUES(26, CONVERT(DATETIME, 13-02-2011, 105),
'249882717');
INSERT INTO TickLabIDCard VALUES(26, CONVERT(DATETIME, 25-06-2009, 105),
'340153423');
INSERT INTO TickLabIDCard VALUES(27, CONVERT(DATETIME, 06-05-2001, 105),
'249044985');
INSERT INTO TickLabIDCard VALUES(27, CONVERT(DATETIME, 24-10-2002, 105),
'017198832');
INSERT INTO TickLabIDCard VALUES(28, CONVERT(DATETIME, 27-10-2007, 105),
'834020121');
INSERT INTO TickLabIDCard VALUES(29, CONVERT(DATETIME, 22-03-2011, 105),
'805889573');
```

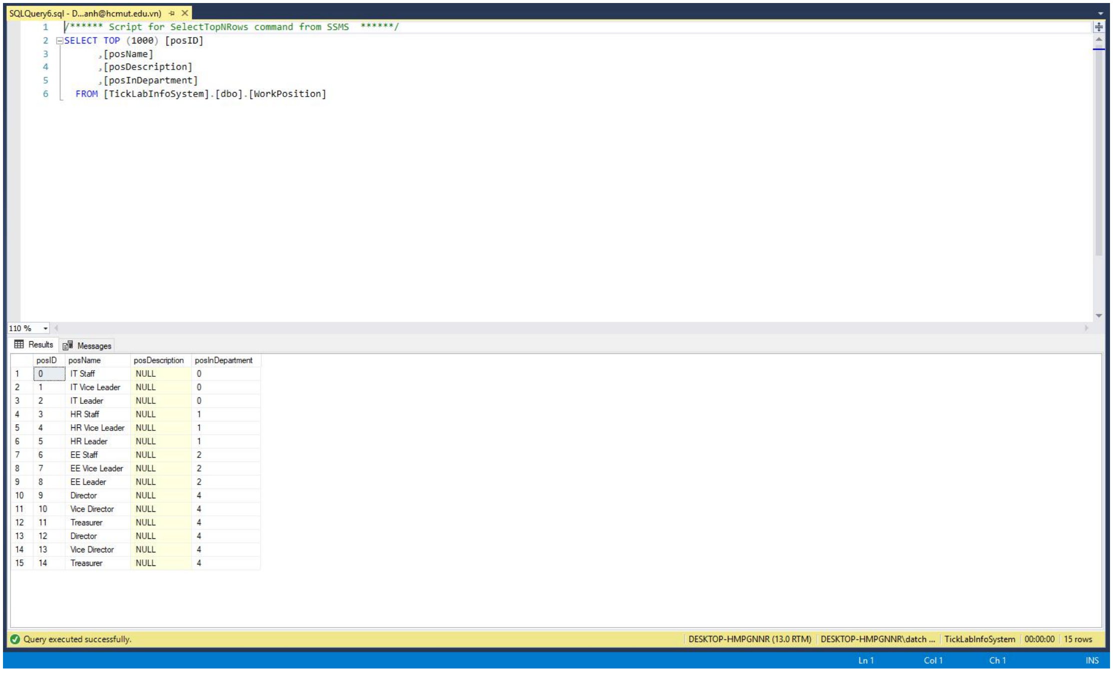
Các câu lệnh truy vấn bảng và dữ liệu được hiển thị sau khi thực hiện insert, màn hình hiển thị kết quả dự liệu của các bảng từ DBMS:



```
/****** Script for SelectTopNRows command from SSMS  ******/
SELECT TOP (1000) [profileNumber]
      ,[username]
      ,[passwd]
      ,[gender]
      ,[permanentAddress]
      ,[dateOfBirth]
      ,[firstName]
      ,[middleName]
      ,[lastName]
      ,[nationality]
      ,[nationalIDNumber]
      ,[nationalIDIssueDate]
      ,[passportNumber]
      ,[passportPlaceOfIssue]
      ,[passportDateOfIssue]
      ,[passportDateOfExpiry]
      ,[profilePhotoURL]
      ,[projectFundContributor]
  FROM [TickLabInfoSystem].[dbo].[Person]
```

	profileNumber	username	passwd	gender	permanentAddress	dateOfBirth	firstName	middleName	lastName	nationality	nationalIDNumber	nationalIDIssueDate	passportNumber	passportPlaceOfIssue	passportDateOfIssue	passportDate
1	0	ethan.roberts1112	eY5FXlcs3Gw5	1	NULL	1894-07-10	Ethan	NULL	Roberts	Viet Nam	618927954	1894-06-23	NULL	NULL	NULL	NULL
2	1	mia.johnson1510	P2rNvS0cS4Qei6f94K61S	1	NULL	1894-07-27	Mia	NULL	Johnson	Viet Nam	637882913	1894-07-20	NULL	NULL	NULL	NULL
3	2	mason.rodriguez287	52f3cE67a20oYf	1	NULL	1894-08-18	Mason	NULL	Rodriguez	Viet Nam	777335998	1894-07-16	NULL	NULL	NULL	NULL
4	3	margaret.rodriguez113	2048jo14	0	NULL	1894-07-20	Margaret	NULL	Rodriguez	Viet Nam	618984143	1894-06-27	NULL	NULL	NULL	NULL
5	4	sarah.rodriguez89	t1nY619SN8fUxrBN0ok18	1	NULL	1894-07-18	Sarah	NULL	Rodriguez	Viet Nam	722828907	1894-06-27	NULL	NULL	NULL	NULL
6	5	mason.wisalson115	w259cpal7u503ZltKCWR	1	NULL	1894-07-18	Mason	NULL	Wilson	Viet Nam	229419698	1894-07-17	NULL	NULL	NULL	NULL
7	6	daniel.taylor222	J3WXRbDg	0	NULL	1894-08-09	Daniel	NULL	Taylor	Viet Nam	582544161	1894-06-26	NULL	NULL	NULL	NULL
8	7	richard.rodriguez2810	3hMNE9X342p45ec8782J	0	NULL	1894-08-02	Richard	NULL	Rodriguez	Viet Nam	444429307	1894-07-17	NULL	NULL	NULL	NULL
9	8	ethan.williams283	e795AU1Chf260	1	NULL	1894-08-18	Ethan	NULL	Williams	Viet Nam	034005310	1894-06-26	NULL	NULL	NULL	NULL
10	9	barbara.wilson159	EMD8j8hSqo063oeDP5N32T7D4OM	0	NULL	1894-07-24	Barbara	NULL	Wilson	Viet Nam	111730048	1894-06-25	NULL	NULL	NULL	NULL
11	10	liam.thomas16	H0r0Km7WqgOAMwDyxtbH2Yc1bP	1	NULL	1894-07-12	Liam	NULL	Thomas	Viet Nam	265324442	1894-06-28	NULL	NULL	NULL	NULL
12	11	david.taylor244	v34Rj165lXz76KU	0	NULL	1894-08-18	David	NULL	Taylor	Viet Nam	103155221	1894-07-17	NULL	NULL	NULL	NULL
13	12	liam.miller2512	20i51u0pNwma95Nhqr6L1	1	NULL	1894-08-04	Liam	NULL	Miller	Viet Nam	034175332	1894-07-16	NULL	NULL	NULL	NULL
14	13	isabella.jones177	cVa1M0Hwbz8W5rMmH356bR9	0	NULL	1894-08-01	Isabella	NULL	Jones	Viet Nam	505880132	1894-07-05	NULL	NULL	NULL	NULL
15	14	jacob.rodriguez224	95Pib3bG088O3KB	0	NULL	1894-08-08	Jacob	NULL	Rodriguez	Viet Nam	356583948	1894-07-12	NULL	NULL	NULL	NULL
16	15	mary.davies141	X9U45w8Q3iiFdU4oQU5	1	NULL	1894-08-06	Mary	NULL	Davies	Viet Nam	015176002	1894-07-29	NULL	NULL	NULL	NULL
17	16	mary.brown281	U6W3EUk546zZOD03z9zZf2	1	NULL	1894-08-10	Mary	NULL	Brown	Viet Nam	389287014	1894-07-08	NULL	NULL	NULL	NULL
18	17	charlotte.wilson104	j7laa2RSiDT037ejtHc8bExXg6	1	NULL	1894-08-02	Charlotte	NULL	Wilson	Viet Nam	089360697	1894-07-12	NULL	NULL	NULL	NULL

Query executed successfully. | DESKTOP-HMPGNNR (13.0 RTM) | DESKTOP-HMPGNNR\datch ... | TickLabInfoSystem | 00:00:00 | 30 rows



```
/****** Script for SelectTopNRows command from SSMS  ******/
SELECT TOP (1000) [posID]
      ,[posName]
      ,[posDescription]
      ,[posInDepartment]
  FROM [TickLabInfoSystem].[dbo].[WorkPosition]
```

	posID	posName	posDescription	posInDepartment
1	0	IT Staff	NULL	0
2	1	IT Vice Leader	NULL	0
3	2	IT Leader	NULL	0
4	3	HR Staff	NULL	1
5	4	HR Vice Leader	NULL	1
6	5	HR Leader	NULL	1
7	6	EE Staff	NULL	2
8	7	EE Vice Leader	NULL	2
9	8	EE Leader	NULL	2
10	9	Director	NULL	4
11	10	Vice Director	NULL	4
12	11	Treasurer	NULL	4
13	12	Director	NULL	4
14	13	Vice Director	NULL	4
15	14	Treasurer	NULL	4

Query executed successfully. | DESKTOP-HMPGNNR (13.0 RTM) | DESKTOP-HMPGNNR\datch ... | TickLabInfoSystem | 00:00:00 | 15 rows

II. Phần riêng

Thành viên 1:
Họ tên: Huỳnh Hoàng Kha
MSSV: 1511449

1. Thủ tục chèn dữ liệu:

```
-- Insert to WorkPosition--
CREATE PROC workPosIns
    @posID INT,
    @posName TEXT,
    @posDescription TEXT,
    @posInDepartment INT
AS
    BEGIN
        IF @posID IS NULL PRINT N'posID can not be NULL'
        ELSE BEGIN
            IF EXISTS(SELECT posID FROM WorkPosition WHERE posID = @posID) PRINT
N'Dupplicate posID'
            ELSE BEGIN
                IF NOT EXISTS(SELECT departmentID FROM Department WHERE departmentID
= @posInDepartment)
                PRINT N'Foreign key not found'
                ELSE INSERT INTO WorkPosition VALUES(@posID, @posName,
@posDescription, @posInDepartment)
            END
        END
    END
GO
```

2. Trigger:

```
-- Before
CREATE TRIGGER aftDeleteWorkPos
ON WorkPosition
INSTEAD OF DELETE
AS
DECLARE
    @posID INT,
    @posName VARCHAR(256),
    @posDescription VARCHAR(256),
    @posInDepartment INT
SELECT @posID = deleted.posID FROM deleted
BEGIN TRAN
    DELETE FROM Taking WHERE posIDTake = @posID
     DELETE FROM WorkPosition WHERE posID = @posID
    COMMIT
GO
```

```
-- Before
CREATE TRIGGER bfEmailInsert
ON PersonEmailAddress
INSTEAD OF INSERT
AS
DECLARE
    @profileNumber INT,
    @emailAddress VARCHAR(256)
SELECT @profileNumber = inserted.profileNumber FROM inserted
SELECT @emailAddress = inserted.emailAddress FROM inserted
BEGIN TRAN
    IF @profileNumber IS NULL OR @emailAddress IS NULL
        BEGIN
            PRINT N'Primary key cannot be NULL'
            ROLLBACK
        END
    ELSE
        IF NOT EXISTS(SELECT profileNumber FROM Person WHERE profileNumber =
@profileNumber)
            BEGIN
                PRINT N'No one has that profile number.'
                ROLLBACK
```

```sql
           END
       ELSE
        BEGIN
            INSERT INTO PersonEmailAddress VALUES(@profileNumber, @emailAddress)
            COMMIT
        END

GO
```

```sql
-- After
CREATE TRIGGER aftInsertBorrowRecord ON BorrowRecord
FOR INSERT
AS
DECLARE
    @borrowRecordID INT,
    @infraID INT,
    @numberOfItem INT

    SELECT @borrowRecordID = inserted.borrowID FROM inserted
BEGIN
    SELECT @numberOfItem = numberOfItem, @infraID = infraIDInclude
    FROM Including
    WHERE borrowIDInclude = @borrowRecordID

    UPDATE Infrastructure
    SET numberOfAvailable -= @numberOfItem
    WHERE infraID = @infraID
END
GO
```

3. Thủ tục chứa câu SQL:

```sql
CREATE PROC getPhoneNumberByEmail
    @email VARCHAR(256)
AS
BEGIN
    DECLARE
        @profileNumber INT
    SELECT @profileNumber = profileNumber FROM PersonEmailAddress WHERE
emailAddress = @email
    SELECT phoneNumber FROM PersonPhoneNumber WHERE profileNumber = @profileNumber
END
GO
```

```sql
-- Count how many person just use only one phone number
CREATE PROC numberOfPersonUseJustOneNumber
AS
BEGIN
    SELECT COUNT(numberOfPhoneNumber) AS numberOfPersonUseJustOneNumber FROM
    (
    SELECT COUNT(phoneNumber) AS numberOfPhoneNumber FROM
        (SELECT firstName, lastName, phoneNumber, Person.profileNumber
        FROM
        Person INNER JOIN PersonPhoneNumber
        ON Person.profileNumber = PersonPhoneNumber.profileNumber) AS subsub
    GROUP BY profileNumber
    HAVING COUNT(phoneNumber) = 1) AS SUB
END
GO
```

4. Hàm:

```
---- Count how many man or woman employee in the whole team--------
CREATE FUNCTION sexCount
( @sex BIT )
RETURNS INT
AS
BEGIN
    DECLARE
        @result INT
    IF @sex = 1 SELECT @result = temp FROM (SELECT COUNT(gender) AS temp FROM Person
WHERE gender = 1) AS sub
    ELSE IF @sex = 0 SELECT @result = temp FROM (SELECT COUNT(gender) AS temp FROM
Person WHERE gender = 0) AS sub
    ELSE RETURN -1
    RETURN @result
END
```

5. Giao diện ứng dụng và các hình ảnh minh hoạ:

Thành viên 2:
Họ tên: Châu Thành Đạt
MSSV: 1710934

1. Thủ tục insert dữ liệu:

Thủ tục chèn dữ liệu vào bảng Department có kiểm tra khoá chính NULL hoặc đã tồn tại hay không

```
CREATE PROC UP_InsertDepartment
    @departmentID INT,
    @departmentName TEXT,
    @departmentDescription TEXT
AS
BEGIN
    IF @departmentID IS NULL
        PRINT N'Khoa chinh NULL'
    ELSE IF EXISTS(SELECT departmentID FROM Department WHERE departmentID =
@departmentID)
        PRINT N'Khoa chinh da ton tai'
    ELSE
        INSERT INTO Department VALUES(@departmentID, @departmentName,
@departmentDescription)
END
GO
```

2. Trigger:

Before trigger không cho phép xoá thông tin trong bảng Taking của thành viên thuộc phòng ban Administrator

```
CREATE TRIGGER UTG_DeleteTaking
ON Taking
FOR DELETE
AS
BEGIN
    DECLARE @Count INT

    SELECT @Count = COUNT(*)
    FROM DELETED
    WHERE DELETED.posIDTake >= 9 AND DELETED.posIDTake <= 14

    IF @Count > 0 ROLLBACK TRAN
END
GO
```

After trigger cập nhật số tiền quỹ trong bảng Fund khi thêm một khoản chi trong bảng ExpeditureCategory

```
CREATE TRIGGER UTG_InsertExpeditureCategory
ON ExpeditureCategory
FOR INSERT
AS
BEGIN
    DECLARE @ExpeditureMoney MONEY

    SELECT @ExpeditureMoney = INSERTED.expeditureMoney FROM INSERTED

    UPDATE Fund
    SET currentBudget -= @ExpeditureMoney
    WHERE fundID = 0
END
GO
```

3. Thủ tục chứa câu SQL:

Thủ tục nhận vào tên chức vụ và trả về tên của những người có chức vụ đó

```
CREATE PROC UP_SelectWhoTakingPosition
    @posName VARCHAR(256)
AS
BEGIN
    DECLARE
        @posID INT
    SELECT @posID = posID FROM WorkPosition WHERE posName = @posName
    SELECT lastName, middleName, firstName
    FROM Person
    WHERE profileNumber IN (SELECT profileNumberTake
                            FROM Taking
                            WHERE posIDTake = @posID)
    ORDER BY firstName
END
GO
```

```
CREATE PROC UP_Year
AS
BEGIN
    SELECT COUNT(profileNumber), YEAR(dateOfBirth)
    FROM (SELECT Person.profileNumber, Person.dateOfBirth, Taking.posIDTake
    FROM Person INNER JOIN Taking
    ON Person.profileNumber = Taking.profileNumberTake) AS JoinTable
    GROUP BY YEAR(dateOfBirth)
    ORDER BY COUNT(profileNumber) DESC
END
GO
```

4. Hàm:

```
-- Return age of profileNumber --
CREATE FUNCTION UF_Age (@profileNumber INT)
RETURNS INT
AS
BEGIN
    DECLARE @Age INT, @Year DATE
    IF @profileNumber IS NULL OR @profileNumber < 0
        SET @Age = 0
    ELSE
      BEGIN
        SELECT @Year = dateOfBirth FROM Person WHERE profileNumber = @profileNumber
        SET @Age = Year(getdate()) - Year(@Year)
      END
    RETURN @Age
END
```

5. Giao diện ứng dụng và các hình ảnh minh hoạ:

Thành viên 3:

Họ tên: Nguyễn Ngọc Duy Phong

MSSV: 1712617

1. Thủ tục chèn dữ liệu:

```
-- Insert/add person phone number
CREATE PROC addPersonPhoneNumber
    @profileNumber int,
    @phoneNumber varchar(11)
AS
BEGIN
    IF EXISTS(SELECT * FROM Person WHERE profileNumber = @profileNumber)
    BEGIN
        IF NOT EXISTS(SELECT * FROM PersonPhoneNumber WHERE phoneNumber =
@phoneNumber)
            INSERT INTO PersonPhoneNumber(profileNumber, phoneNumber)
            VALUES (@profileNumber, @phoneNumber);
        ELSE PRINT N'Duplicate Phone Number'
    END
END
GO
```

2. Trigger:

3. Thủ tục chứa câu SQL:

```
-- Find person First/Last name and print out national ID number and TickLab ID number
CREATE PROCEDURE printPersonIDByFirstNameOrLastName
    @name varchar(256)
AS
BEGIN
    DECLARE @likename varchar(256);
    SET @likename='%'+@name;
    SELECT firstName+' '+lastName AS name,nationalIDNumber,rfidNumber
    FROM Person,TickLabIDCard
    WHERE (firstName LIKE @likename OR lastName LIKE @likename) and
Person.profileNumber = TickLabIDCard.profileNumber
    ORDER BY name
    RETURN @@ROWCOUNT
END
```

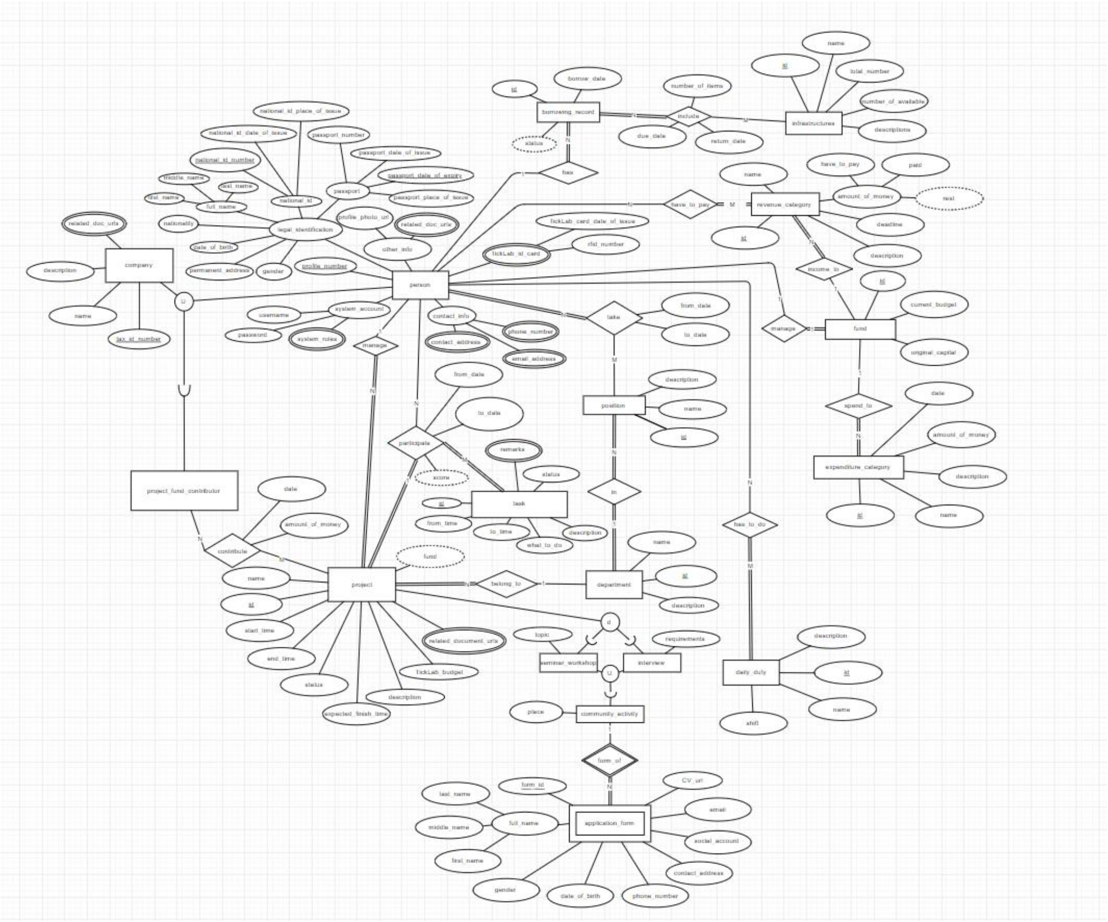
4. Hàm:

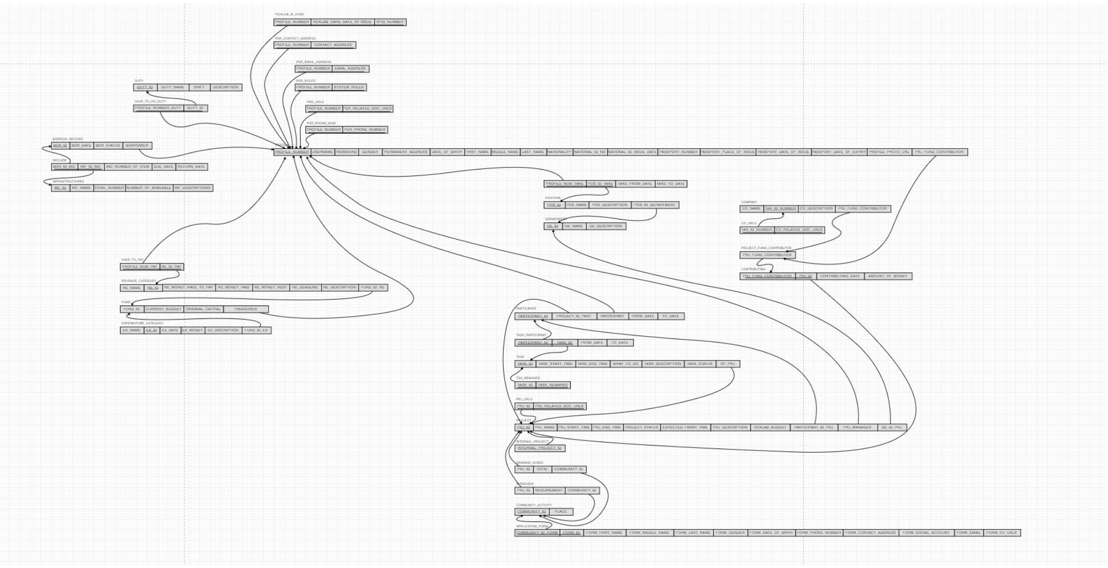
```
-- Get age person by profileNumber
CREATE FUNCTION AGE
( @profileNumber int )
RETURN int
AS
BEGIN
    DECLARE @age int
    if NOT EXISTS(SELECT * FROM Person WHERE profileNumber=@profileNumber) RETURN
-1;
    ELSE
        SELECT @age = year(getdate())-year((SELECT dateOfBirth FROM Person WHERE
profileNumber=@profileNumber));
    RETURN @age
END
```

5. Giao diện ứng dụng và hình ảnh minh hoạ:

III. Phụ lục

A. Báo cáo bài tập lớn số 1





TICKLAB_ID_CARD
PROFILE_NUMBER | TICKLAB_CARD_DATE_OF_ISSUE | RFID_NUMBER

PER_CONTACT_ADDRESS
PROFILE_NUMBER | CONTACT_ADDRESS

PER_EMAIL_ADDRESS
PROFILE_NUMBER | EMAIL_ADDRESS

PER_ROLES
PROFILE_NUMBER | SYSTEM_ROLES

PER_URLS
PROFILE_NUMBER | PER_RELATED_DOC_URLS

PER_PHONE_NUM
PROFILE_NUMBER | PER_PHONE_NUMBER

DUTY
DUTY_ID | DUTY_NAME | SHIFT | DESCRIPTION

HAVE_TO_DO_DUTY
PROFILE_NUMBER_DUTY | DUTY_ID

BORROW_RECORD
BOR_ID | BOR_DATE | BOR_STATUS | BORROWER

INCLUDE
BOR_ID_INC | INF_ID_INC | INC_NUMBER_OF_ITEM | DUE_DATE | RETURN_DATE

INFRASTRUCTURES
INF_ID | INF_NAME | TOTAL_NUMBER | NUMBER_OF_AVAILABLE | INF_DESCRIPTIONS

PERSON
PROFILE_NUMBER | USERNAME | PASSWORD | GENDER | PERMANENT_ADDRESS | DATE_OF_BIRTH | FIRST_NAME | MIDDLE_NAME | LAST_NAME | NATIONALITY | NATIONAL_ID_NO | NATIONAL_ID_ISSUE_DATE | PASSPORT_NUMBER | PASSPORT_PLACE_OF_ISSUE | PASSPORT_DATE_OF_ISSUE | PASSPORT_DATE_OF_EXPIRY | PROFILE_PHOTO_URL | PRJ_FUND_CONTRIBUTOR

PROFILE_NUM_TAKE | POS_ID_TAKE | TAKE_FROM_DATE | TAKE_TO_DATE

POSITION
POS_ID | POS_NAME | POS_DESCRIPTION | POS_IN_DEPARTMENT

DEPARTMENT
DE_ID | DE_NAME | DE_DESCRIPTION

COMPANY
CO_NAME | TAX_ID_NUMBER | CO_DESCRIPTION | PRJ_FUND_CONTRIBUTOR

CO_URLS
TAX_ID_NUMBER | CO_RELATED_DOC_URLS

PROJECT_FUND_CONTRIBUTOR
PRJ_FUND_CONTRIBUTOR

CONTRIBUTING
PRJ_FUND_CONTRIBUTOR | PRJ_ID | CONTRIBUTING_DATE | AMOUNT_OF_MONEY

HAVE_TO_PAY
PROFILE_NUM_PAY | RE_ID_PAY

REVENUE_CATEGORY
RE_NAME | RE_ID | RE_MONEY_HAVE_TO_PAY | RE_MONEY_PAID | RE_MONEY_REST | RE_DEADLINE | RE_DESCRIPTION | FUND_ID_RE

FUND
FUND_ID | CURRENT_BUDGET | ORIGINAL_CAPITAL | TREASURER

EXPENDITURE_CATEGORY
EX_NAME | EX_ID | EX_DATE | EX_MONEY | EX_DISCRIPTION | FUND_ID_EX

PARTICIPATE
PARTICIPANT_ID | PROJECT_ID_PART | PARTICIPANT | FROM_DATE | TO_DATE

TASK_PARTICIPANT
PARTICIPANT_ID | TASK_ID | FROM_DATE | TO_DATE

TASK
TASK_ID | TASK_START_TIME | TASK_END_TIME | WHAT_TO_DO | TASK_DESCRIPTION | TASK_STATUS | OF_PRJ

TSK_REMAKRS
TASK_ID | TASK_REMARKS

PRJ_URLS
PRJ_ID | PRJ_RELATED_DOC_URLS

PROJECT
PRJ_ID | PRJ_NAME | PRJ_START_TIME | PRJ_END_TIME | PROJECT_STATUS | EXPECTED_FINISH_TIME | PRJ_DESCRIPTION | TICKLAB_BUDGET | PARTICIPANT_ID_PRJ | PRJ_MANAGER | DE_ID_PRJ

INTERNAL_PROJECT
INTERNAL_PROJECT_ID

SEMINAR_WORKI
PRJ_ID | TOPIC | COMMUNITY_ID

INTERVIEW
PRJ_ID | REQUIREMENT | COMMUNITY_ID

COMMUNITY_ACTIVITY
COMMUNITY_ID | PLACE

APPLICATION_FORM
COMMUNITY_ID_FORM | FORM_ID | FORM_FIRST_NAME | FORM_MIDDLE_NAME | FORM_LAST_NAME | FORM_GENDER | FORM_DATE_OF_BIRTH | FORM_PHONE_NUMBER | FORM_CONTACT_ADDRESS | FORM_SOCIAL_ACCOUNT | FORM_EMAIL | FORM_CV_URLS

File: **softwareSpecifications.txt**

- **Kha**: I, II, VI, VII
- **Dat**: III, IV, V, VIII

```
SYSTEM Specifications
I. Employee profile management
```

```
1. Features:
- Add new profile
- Edit profile
+ Change information
+ Delete profile
- View profile
- Profile change request
2. Users:
- System admin:
+ Add new, edit, and view profiles
- Others users: View and request changes, the changes must be accepted
by the System Admin
3. Data:
- Person:
+ Profile number
+ Legal identification
-- Nationality
-- Fullname
++ First name
++ Middle name
++ Last name
-- Date of birth
-- Gender
-- Permanent address
-- National ID information
++ ID number
++ Date of issue
++ Place of issue
-- Passport (Option)
++ Passport number
++ Date of issue
++ Date of expiry
++ Place of issue
+ Local identification: TickLab ID card (many, in the case of reissuance)
-- RFID number
-- Date of issue
+ Contact information
-- Phone number (many): Mark some phone number as recently used
-- Contact address (many): Mark some address as recently used
-- Email address (many): Mark some email addr as recently used
+ Other information
-- Profile photo url
-- Related documents links (many)
+ System login account
-- username;
-- password;
-- System role: System admin/ Director/ Manager... (would be described later)
+ Project participation record list
+ Position took place (list by time)
II. Organizational structure management
1. Features
- Add/edit/remove department info
- View department info
- Manage department human resouce
+ Assign/remove employee to/from department
+ Enroll department position
2. Users
- System admin: full permission
- Other user: View department info
3. Data
- Department information
+ ID
+ Name
+ Description
+ Department human resouce (list of position)
+ Department projects (list of projects by time)
- Position:
+ ID
+ Name
+ Descriptions
+ Employee
+ Start Date
+ Stop date
III. Finance management
1. Features:
- View current budget
- View finance statistic
- Revenue categories management
+ Add revenue categories
+ Edit revenue categories
+ View revenue categories
+ Add/remove/edit employee
-- Add/remove/edit by person
-- Add/remove/edit by list
+ Add/remove records
+ Print receipt
- Expenditure categories management
+ Add expenditure categories
+ Edit expenditure categories
+ View expenditure categories
+ Add/remove records
+ Print receipt
```

2. Users:
- Admin users:
+ Full authority
- Other users:
+ View budget
+ View revenue and expenditure categories
+ View personal finance statistic

3. Data:
- Revenue category:
+ Employee (many)
+ ID
+ Name
+ Amount of money
-- Rest
-- Paid
-- Have to pay
+ Deadline
+ Status
+ Description
- Expenditure categories:
+ ID
+ Name
+ Amount of money
+ Description
+ Date
- Fund
+ Employee
+ ID
+ Current budget
+ Original capital

IV. Projects management

1. Features:
- Create/Edit/Remove project
- Add/Remove employees to project
- Assign task
- Update task log
- Start/Stop/Pause project
- View project (description, progress, participants, time...)
- Participants performance evaluation

2. Users:
- System admin: Create project
- Project Manager: Edit/Remove, Add/Remove employee, assign tasks, evaluate participant's performance
- Participants: update task log
- Other user: View

3. Data:

```
- Project
+ ID
+ Name
+ Descriptions
+ Project owner (department)
+ Project Manager (employee)
+ Start time
+ Expected finish time
+ Status (in progress/ finished/ cancelled/ postponed)
+ End time
+ Participants (list of employees who participate in the project)
+ Timeline (list of timeline note)
-- FromTime
-- ToTime
-- What to do
-- Status (Have not started, in progress, or finished)
+ Task
-- ID
-- Employee list (one or many)
-- Description
-- Begin time
-- Remark
-- Status
+ Project fund:
-- TickLab's budget
-- List of contributions:
++ Origin of contribution (partner company/ partner person...)
++ Amount of money
++ Date of contribution
+ Related document links (a list of urls);
- Project participation records
+ Employee (who)
+ Project
+ Start time
+ Endtime
+ TaskList
+ Score
V. Infrastructures management
1. Features:
- View list of infrastructures
- View status of infrastructures
- Borrow/Return requests
- Borrow infrastructures
+ Send borrow request
+ Accept borrow request
- Return infrastructures
```

+ Confirm the borrower has returned
- Add/Remove/Edit infrastructures
2. Users:
- Admin users:
+ Add/Remove/Edit infrastructures
+ View status of infrastructures
+ Accept borrow request
+ Confirm the borrower has returned
- Other users:
+ View status of infrastructures
+ Send borrow/return request
3. Data:
- Infrastructures
+ ID (for kind of item only)
+ Name
+ Total number of items
+ Number of available
+ Descriptions
- Borrow record
+ Employee
+ ID
+ Item
+ Status
+ Date
VI. Local user services
1. Features:
- Duty register system
+ Create/Remove/Edit a duty
-- Daily
-- Weekly
-- Monthly
+ View duty
+ Join/Out shift
+ Swap shift with another user
-- Send swap request
-- Accept/Reject swap request
+ Move to an available shift
- Internal event
+ Create/Remove an internal event
+ View event
+ Join/Out event
+ Note
2. Users:
- Admin users
+ Create/Remove a service
- Other users

+ View services
+ Join/Out services
+ Swap shift with another user
+ Move to an available shift
3. Data:
- Daily duty
+ ID
+ Name
+ Shift
+ Descriptions
VII. Community services
1. Features:
- Create/Edit/Remove event (workshop/seminar/interview)
- Register event
- Create interview schedule
- Manage applicants
2. Users:
- Admin users: Create/Edit/Remove event
- Guess: Register event
3. Data:
- Seminar/Workshop
+ ID
+ Name
+ Speaker
+ Subject
+ Time
-- Begin time
-- End time
+ Place
- Application form
+ Form ID
+ Name
-- First name
-- Middle name
-- Last name
+ Date of birth
+ Gender
+ Email
+ Phone number
+ Contact address
+ Social account
+ CV link

File: **entitiesList.txt**

- **Phong**: read the specification and make a list of entities/relationship

```
I.
Enti
ties
:
       1. Person
       - Profile number (key)
       - Legal identification
       + Nationality
       + Fullname
       -- First name
       -- Middle name
       -- Last name
       + Birthday
       + Gender
       + Permanent address
       + National ID information
       -- ID number (key)
       -- Date of issue
       -- Place of issue
       + Passport (optional)
       -- Passport number
       -- Date of issue
       -- Date of expiry
       -- Place of issue
       - TickLab ID card (multivalue)
       + RFID number
       + Date of issue
       - Contact infomation
       + Phone number (multivalue)
       + Contact address (multivalue)
       + Email address (multivatlue)
       - Other infomation
       + Profile photo url
       + Related document urls (multivalue)
       - System login account
       + Username
       + Password
       + System role (multivalue)
       2. Project
       - ID (key)
       - Name
       - Description
       - Start time
       - End time
       - Expected finish time
       - Status
       - Fund (derived)
       - TickLab's budget
       - Related document urls (multivalue)
       3. Department
       - ID (key)
       - Name
       - Description
       4. Position
       - ID (key)
       - Name
       - Description
       5. Task
       - ID (key)
       - Status
       - Description
       - Remark (multivalue)
       - From time
       - To time
       - What to do
       6. Company
       - Tax ID number (key)
       - Name
       - Description
       - Related document urls (multivalue)
       7. Infrastuctures
       - ID (key)
       - Name
       - Description
       - Total number of items
       - Number of available (derived)
       8. Project fund contributor
       9. Daily duty
       - ID (key)
       - Name
       - Description
       - Shift (multivalue)
       10. Revenue category
       - ID (key)
       - Name
       - Description
       - Employee
       - Amount of money
       + Paid
       + Have to pay
       + Rest (derived)
       - Deadline
       11. Expenditure category
       - ID (key)
       - Name
       - Description
       - Amount of money
       - Time
       12. Borrowing record
       - ID (key)
       - Borrow date
       - Status (derived)
       13. Comunity activity
       - Place
       14. Seminar workshop
       - Topic
       15. Interview
       - Requirement
       16. Application form
       - Form ID (partial key)
       - Full name
       + First name
       + Middle name
       + Last name
       - Gender
       - Date of birth
       - Phone number
       - CV url
       - Email
       - Social account
       - Contact address
       17. Fund
       - ID (key)
       - Current budget
       - Original capital
       II. Relationships:
       1. Manage project
       - Entity:
       + Person
       -- Mandatory: no
       -- Cardinality: 1
       + Project
```

```
-- Mandatory: yes
-- Cardinality: N
2. Manage fund
- Entity:
+ Person
-- Mandatory: no
-- Cardinality: 1
+ Fund
-- Mandatory: yes
-- Cardinality: 1
3. Participate
- Relationship attribute:
+ From date
+ To date
+ Score (derived)
- Entity:
+ Person
-- Mandatory: no
-- Cardinality: N
+ Project
-- Mandatory: yes
-- Cardinality: 1
+ Task
-- Mandatory: yes
-- Cardinality: M
4. Contribute
- Relationship attribute:
+ Amount of money
+ Date
- Entity:
+ Project fund contributor:
-- Mandatory: no
-- Cardinality: N
+ Project:
-- Mandatory: no
-- Cardinality: M
5. Belong to
- Entity:
+ Project
-- Mandatory: yes
-- Cardinality: N
+ Department
-- Mandatory: no
-- Cardinality: 1
6. In
- Entity:
```

```
+ Department
-- Mandatory: yes
-- Cardinality: 1
+ Position
-- Mandatory: yes
-- Cardinality: N
7. Take
- Relationship attribute:
+ From date
+ To date
- Entity:
+ Person
-- Mandatory: yes
-- Cardinality: N
+ Position
-- Mandatory: no
-- Cardinality: M
8. Have to pay
- Entity:
+ Person
-- Mandatory: no
-- Cardinality: N
+ Revenue category
-- Mandatory: yes
-- Cardinality: M
9. Has
- Entity:
+ Person
-- Mandatory: no
-- Cardinality: 1
+ Borrowing record
-- Mandatory: yes
-- Cardinality: N

10. Include
- Relationship attribute:
+ Number of items
+ Due date
+ Return date
- Entity:
+ Infrastructure
-- Mandatory: no
-- Cardinality: M
+ Borrowing record
-- Mandatory: yes
-- Cardinality: N
```

```
11. Income to
- Entity:
+ Revenue category
-- Mandatory: yes
-- Cardinality: N
+ Fund
-- Mandatory: no
-- Cardinality: 1
12. Spend to
- Entity:
+ Fund
-- Mandatory: no
-- Cardinality: 1
+ Expenditure category
-- Mandatory: yes
-- Cardinality: N
13. Form of (identifying)
- Entity:
+ Community activity
-- Mandatory: no
-- Cardinality: 1
+ Application form (weak)
-- Mandatory: yes
-- Cardinality: N
14. Has to do
- Entity:
+ Person
-- Mandatory: no
-- Cardinality: N
+ Borrowing record
-- Mandatory: yes
-- Cardinality: M
```

B. Source code chương trình

C. Bảng phân công nhiệm vụ cho phần chung và bài tập lớn 1

Phần chung

Kha + Phong: Generate data and SQL code for inserting into tables
Đạt: Write SQL code for creating tables and create indexes

Bài tập lớn 1

Vẽ ERD: Kha, Đạt
Vẽ Mapping: Đạt