



Nanyang Technological University
School of Computer Science and Engineering

CZ2007 DATABASES LAB 3 REPORT

Name:

Ang Wan Qi

An Zheyuan

Thong Hoi Wei

Janssen Tan

Lee Suyeon

Lab/Group:

SSR1 Group 5

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The database schema:

User(UserID, name, sex, email, hometown, birthday)

Keys: UserID

Primary Key: UserID

FDs: UserID → name, sex, email, hometown, birthday

The relation is in 3NF.

Employer(EmployerName)

Keys: EmployerName

Primary Key: EmployerName

FDs: EmployerName → EmployerName

The relation is in 3NF.

WorkedAt(UserID, EmployerName, city/town, position, startTime, endTime)

Keys: {UserID, EmployerName}

Primary Key: {UserID, EmployerName}

FDs: UserID, EmployerName → city/town, position, startTime, endTime

The relation is in 3NF.

School(SchoolName, schoolType)

Keys: SchoolName

Primary Key: SchoolName

FDs: SchoolName → schoolType

The relation is in 3NF.

Attended(UserID, SchoolName, classYear)

Keys: {UserID, SchoolName}

Primary Key: {UserID, SchoolName}

FDs: UserID, SchoolName → classYear

The relation is in 3NF.

Message(timestamp, senderID, receiver, content)

Keys: {timestamp, senderID}

Primary Key: {timestamp, senderID}

FDs: timestamp, senderID → receiver, content

The relation is in 3NF.

Comment(msg_timestamp, msg_senderID, userID, timestamp, content)

Keys: {userID, timestamp}

Primary Key: {userID, timestamp}

FDs: userID, timestamp → msg_timestamp, msg_senderID, content

Assumption: A user can only make one comment at one instant of time.
The relation is in 3NF.

Friends(ownerID, friendID)

Keys: {ownerID, friendID}

Primary Key: {ownerID, friendID}

FDs: owner ID, friendID \rightarrow ownerID, friendID

The relation is in 3NF.

FriendList(ownerID, listName)

Keys: {ownerID, listName}

Primary Key: {ownerID, listName}

FDs: ownerID, listName \rightarrow ownerID, listName

The relation is in 3NF.

Contain(ownerID, listName, UserID)

Keys: {OwnerID, listName, UserID}

Primary Key: {OwnerID, listName, UserID}

FDs: OwnerID, listName, UserID \rightarrow OwnerID, listName, UserID

The relation is in 3NF.

PointOfInterest(POI_ID, name, description, coordinates, address, category, contactInfo)

Keys: POI_ID,

Primary Key: POI_ID

FDs: POI_ID \rightarrow name, description, coordinates, address, category, contactInfo
coordinates \rightarrow address

The relation is not in 3NF because coordinates \rightarrow address violates 3NF. Its LHS does not contain a key and its RHS is not contained in a key or in its LHS.

Decomposing PointOfInterest:

- 1) A minimal basis for the FDs: {POI_ID \rightarrow name, POI_ID \rightarrow description, POI_ID \rightarrow coordinates, POI_ID \rightarrow category, POI_ID \rightarrow contactInfo, coordinates \rightarrow address}
- 2) Combine FDs with the same left hand side:
S = {POI_ID \rightarrow name, description, coordinates, category, contactInfo
coordinates \rightarrow address}
- 3) For each FD in S, create a table:
 - a) POI_1(POI_ID, name, description, coordinates, category, contactInfo)
Keys: POI_ID
Primary Key: POI_ID
FDs: POI_ID \rightarrow name, description, coordinates, category, contactInfo
The relation is in 3NF.
 - b) POI_2(coordinates, address)
Keys: coordinates

Primary Key: coordinates
FDs: coordinates -> address
The relation is in 3NF.

Category(name)

Keys: name
Primary Key: name
FDs: name -> name
The relation is in 3NF.

Has(POI_ID, category_name)

Keys: {POI_ID, category_name}
Primary Key: {POI_ID, category_name}
FDs: POI_ID, name -> POI_ID, category_name
The relation is in 3NF.

Tip(UserID, POI_ID, timestamp, text)

Keys: {UserID, timestamp}
Primary Key: {UserID, timestamp}
FDs: UserID, timestamp → POI_ID, text
Assumption: A user can only tip one POI at one instant of time.
The relation is in 3NF.

CheckIn(UserID, POI_ID, timestamp, shout)

Keys: {UserID, timestamp}
Primary Key: {UserID, timestamp}
FDs: UserID, timestamp → POI_ID, shout
Assumption: One user can check in at only one POI at one instant of time.
The relation is in 3NF.

Photo(photoID, caption)

Keys: photoID
Primary Key: photoID
FDs: photoID -> caption
The relation is in 3NF.

Association(UserID, POI_ID, PhotoID)

Keys: photoID
Primary Key: photoID
FDs: photoID -> UserID, POI_ID
Assumption: From the user requirements, each photo can only be associated once by one user to one point of interest.
The relation is in 3NF.

