

DB Modeling

ERD

저녁이 있는 프로젝트
오상훈
6 Hours, 1 Month

Excel vs DataBase

❖ 필요 의한 발전

- Variable(변수) < List or Dictionary(목록) < Small Text File(파일) < Excel(계산 파일) < DB(큰 용량 파일) < Distributed system(나누어 관리 파일)
- 유사성(Excel vs DB)

relational databases



data stored in a record of a table

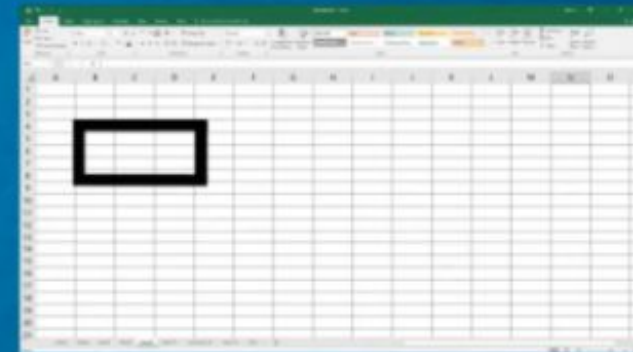
SALES				
purchase_number	date_of_purchase	customer_id	item_code	
1	03/09/2017	1	A_1	
2	03/09/2017	2	C_1	
1	04/09/2017	3	D_1	
2	04/09/2017	1	B_2	
3	04/09/2017	4	B_2	
4	04/09/2017	2	B_1	
1	05/09/2017	4	A_2	
1	06/09/2017	3	C_1	
2	06/09/2017	1	A_1	
3	06/09/2017	2	B_1	

formatting



Spreadsheets

data stored in a cell



formatting



Read - Visual Studio Code(ERD Editor)

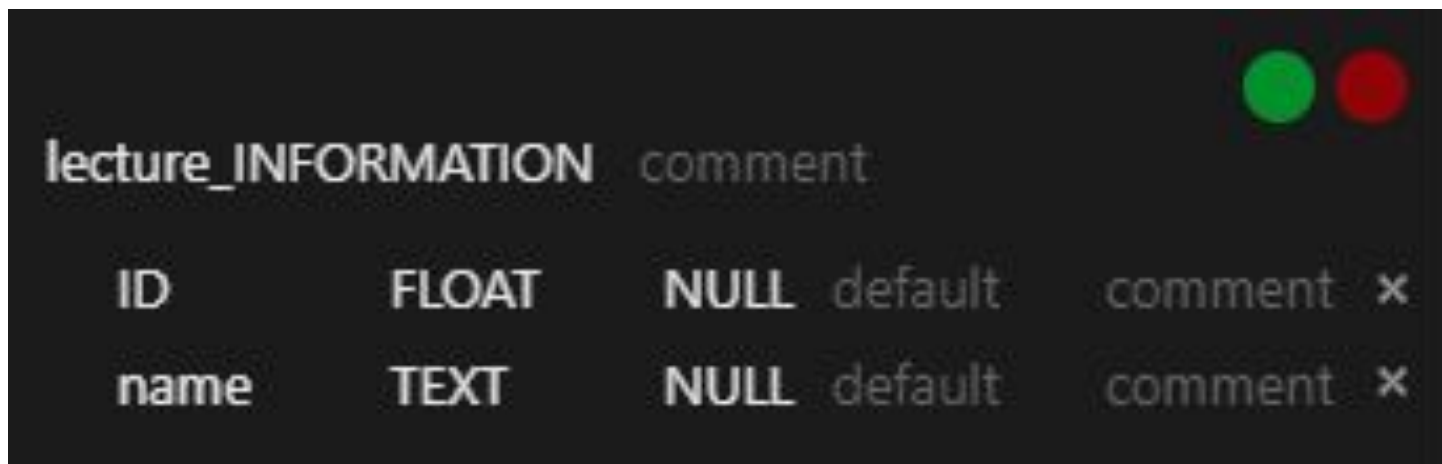
- ❖ install ERD editor In VCode : make Column(Alt + Enter)
 - Menu > Extensions:MarketPlace > Search 'ERD'
 - ERD data [filename].**vuerd.json** Save a file as a form
 - Focus on the saved file and click the **vuerd icon in the upper right corner** of the Editor window
- ❖ 함께 하기

```
CREATE TABLE lecture_INFORMATION (  
  ID  FLOAT NULL ,  
  name TEXT  NULL );
```

```
INSERT INTO lecture_INFORMATION (ID, name) VALUES (1, 'Allen');
```

```
SELECT * FROM lecture_INFORMATION;
```

```
DROP TABLE lecture_INFORMATION;
```



The screenshot shows the Visual Studio Code ERD Editor interface. At the top, the table name 'lecture_INFORMATION' is displayed with a 'comment' field. Below this, the table structure is shown with two columns: 'ID' and 'name'. Each column has a data type, a nullability constraint, a default value, and a comment field with a delete icon (X).

lecture_INFORMATION		comment
ID	FLOAT NULL	default comment X
name	TEXT NULL	default comment X

Read - Eclipse

- ❖ Plugin : ERmaster(<http://ermaster.sourceforge.net/>)
 - Menu > Help > Install New Software
 - Click “Add”
 - Insert Name : ERMaster, Location : <http://ermaster.sourceforge.net/update-site/>
- ❖ Plugin : Sql Development Tools
 - Menu > Help > Eclipse Marketplace... → input keyword ‘sql developments’
 - Click “install”
 - Menu > Window > Perspective > Others -> Database Development
 - Shortcut Menu > New In Database Development
 - import ojdbc6.jar
 - Catalog : USER
 - Connection URL : jdbc:oracle:thin:@server:1521:db
 - Database Name : orcl
 - Driver Class : oracle.jdbc.OracleDriver
 - Password : tiger
 - User ID : scott
 - Click “Test connection” → 이상 시 **Isnrctl START** in consol
- ❖ Install Database : /DataBase/ERD/*.erm
 - /DataBase/TableSchema/*.sql
 - /DataBase/testData/*.sql → 번호순대로(연관성 있음)

Read - Visual Studio Code(Spring Boot)

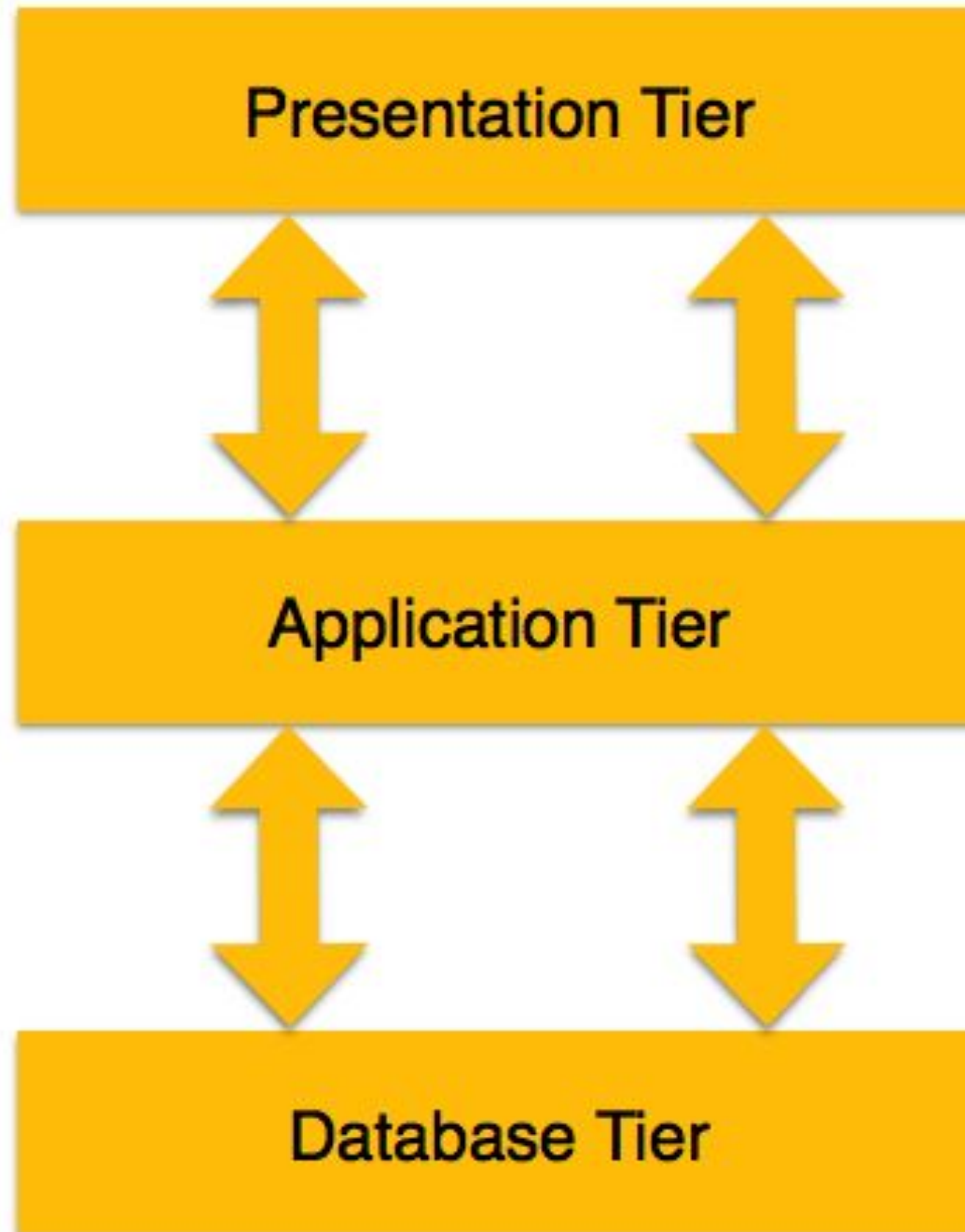
- ❖ <http://aquerytool.com/> 가입
- ❖ H2 Database : Embedded and server modes; in-memory databases
- ❖ Check out pom.xml

```
<groupId>com.h2database</groupId>
<groupId>spring-boot-starter-data-jpa</groupId>          ...
```
- \$ vi ?/resources/application.properties

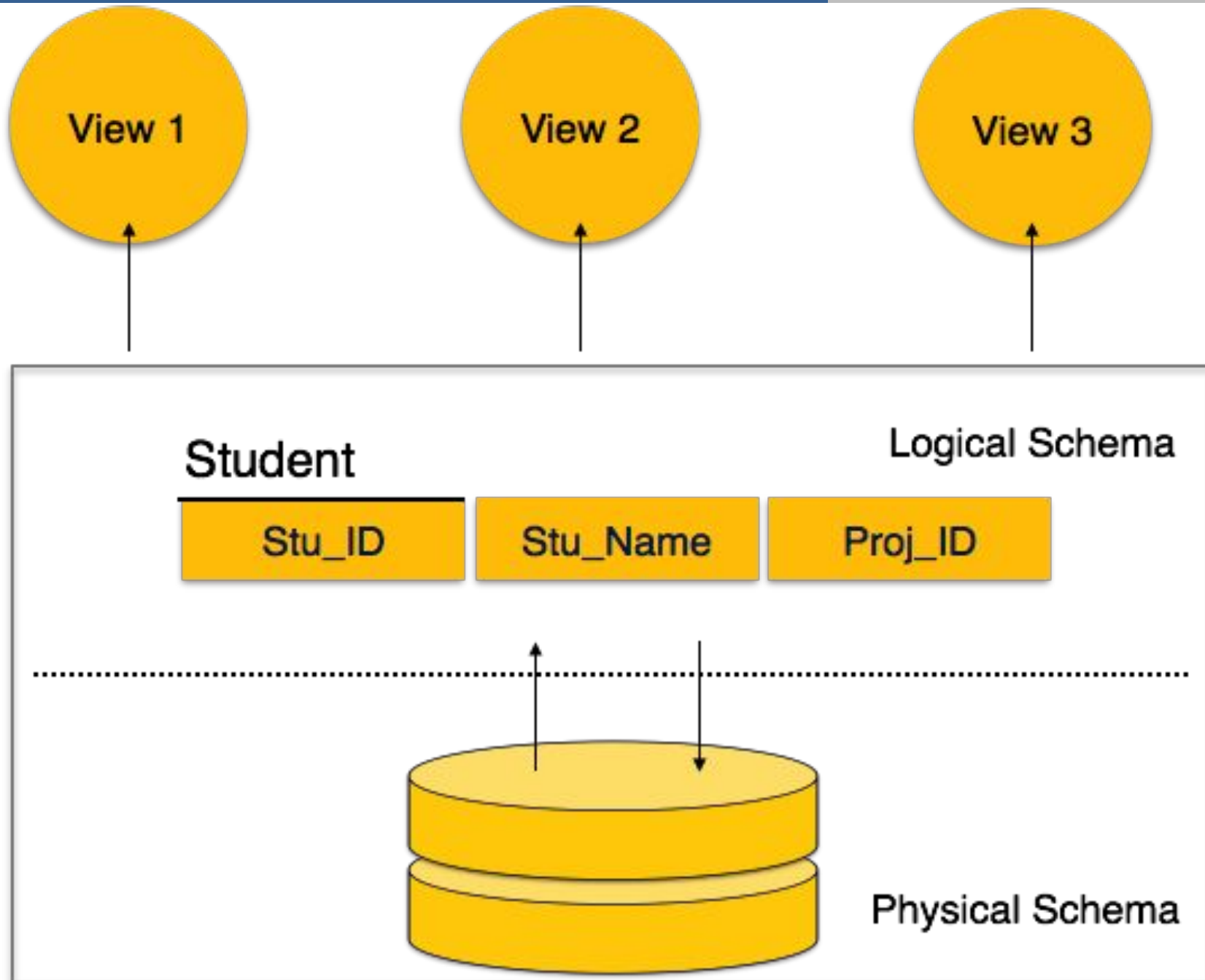
```
spring.h2.console.enabled=true
```
- \$ vi ?/resources/schema.sql

```
create table student (
  id integer not null,
  name varchar(255) not null,
  passport_number varchar(255) not null,
  primary key(id)
);
```
- \$ vi ?/resources/data.sql

```
insert into student values(10001,'Ranga', 'E1234567');
insert into student values(10002,'Ravi', 'A1234568');
```
- ❖ Start SpringBoot Server
- ❖ <http://localhost:8080/h2-console/> 접속
 - JDBC URL : jdbc:h2:mem:testdb 수정
 - Click 'connect'

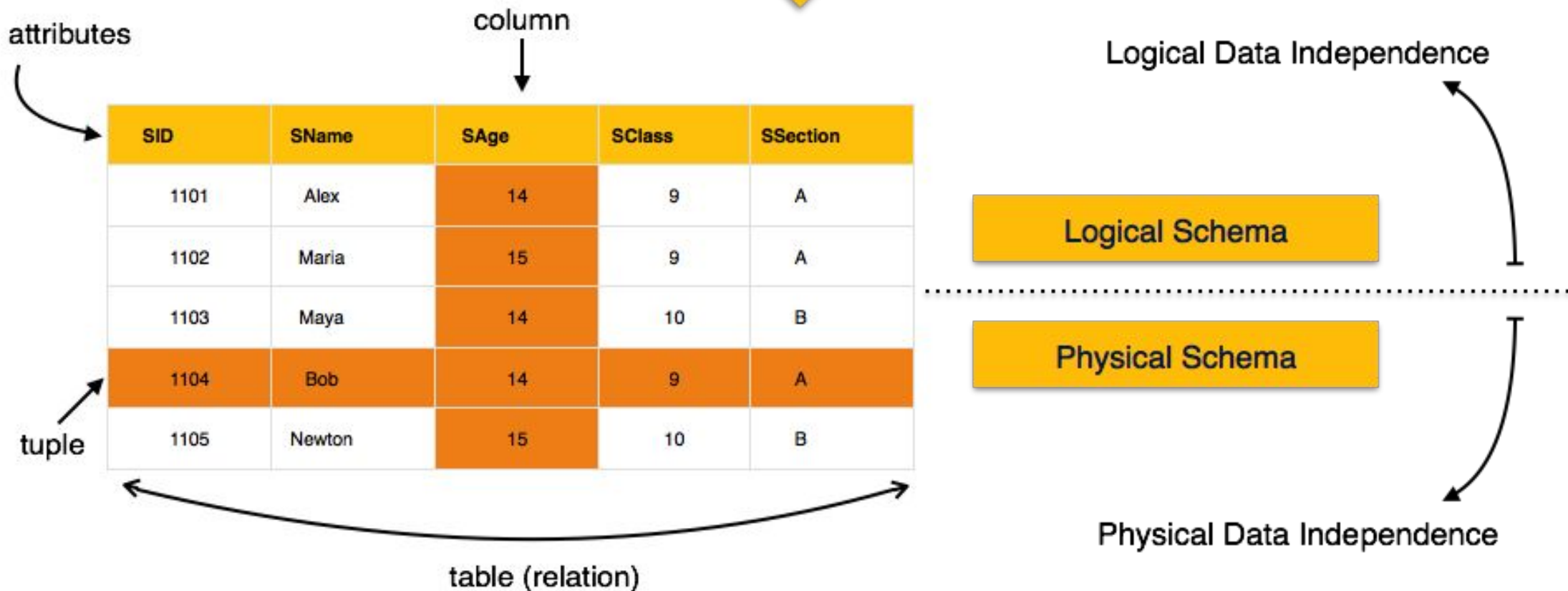
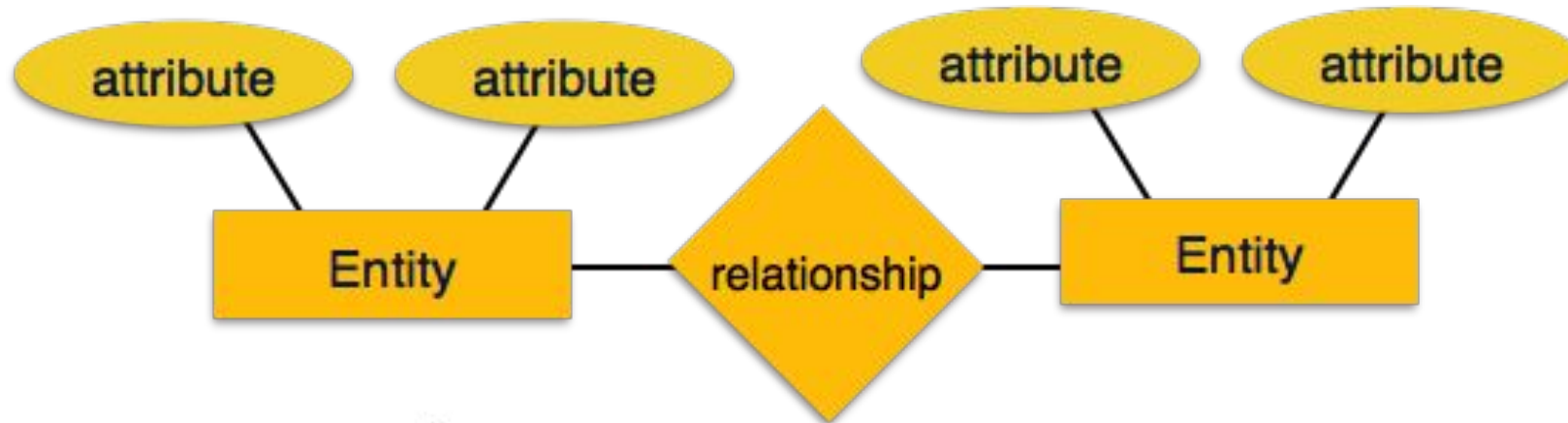


Database Schema



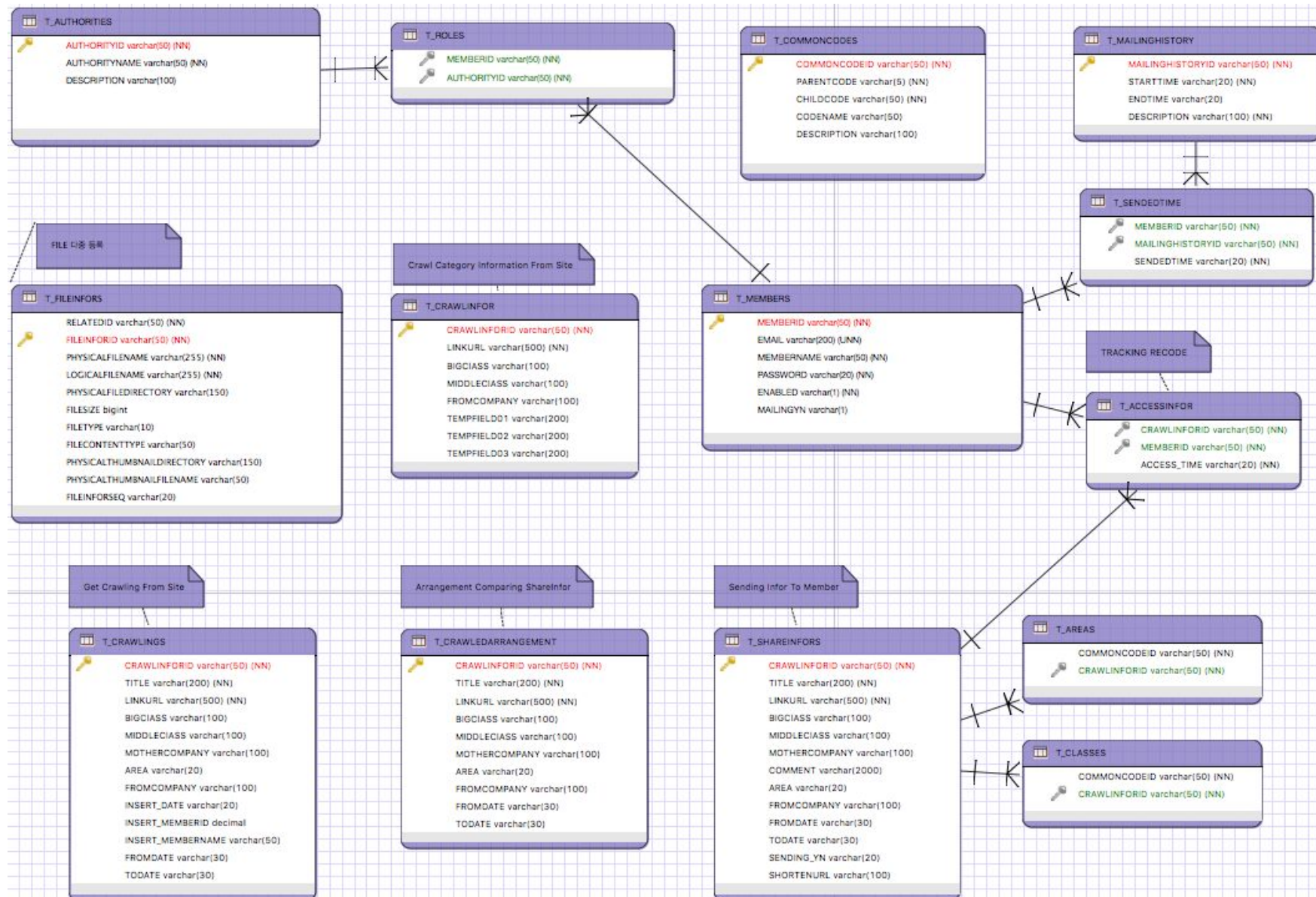
ERD(Entity Relationship Model)

- ❖ Entity - Table, attribute - Record



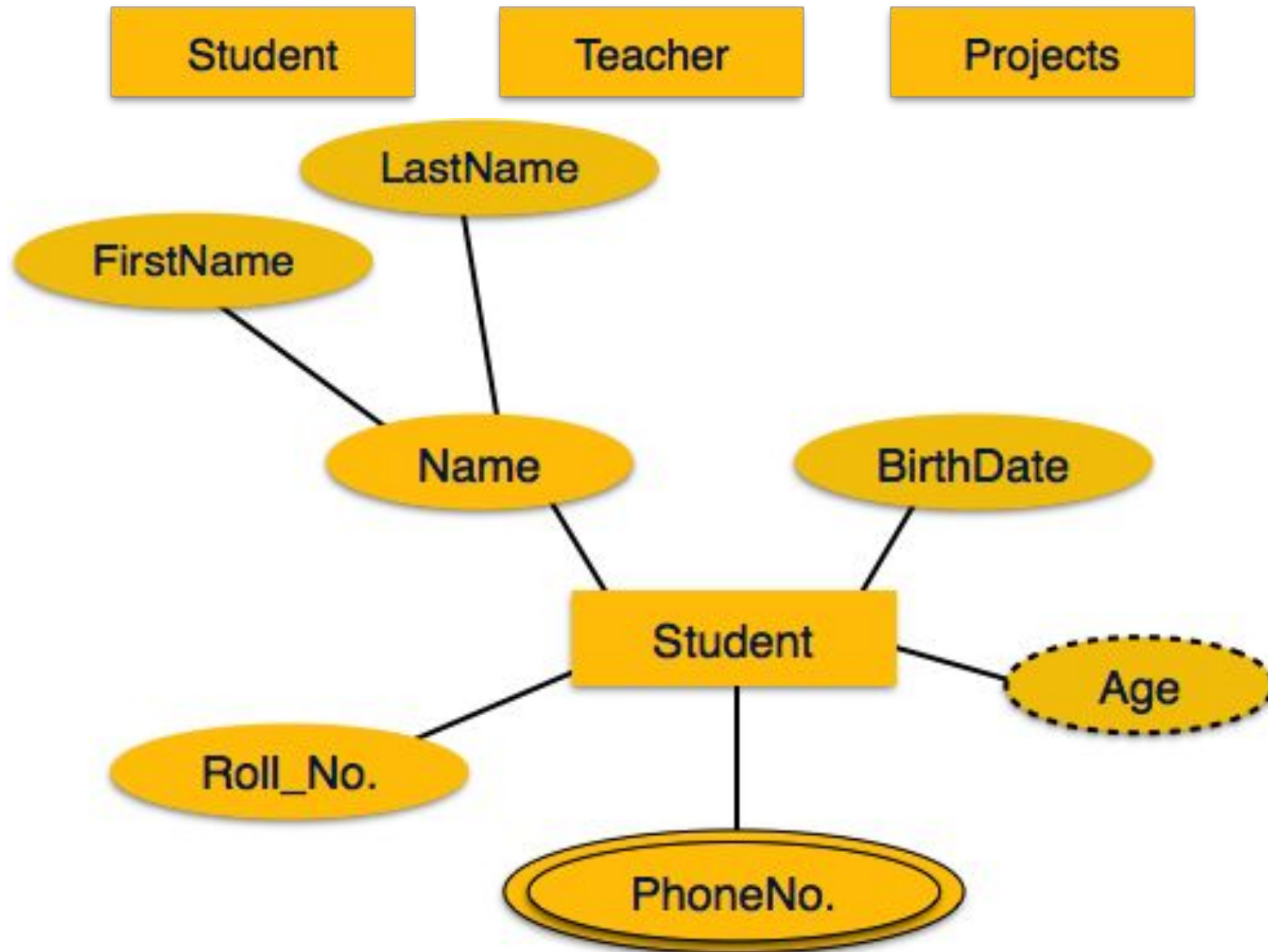
ER Tool

- ❖ Live Demo : <https://vuerd.github.io/vuerd/>
- ❖ Plugin ERMaster in Eclipse : <http://ermaster.sourceforge.net/update-site/>



ERD Representation

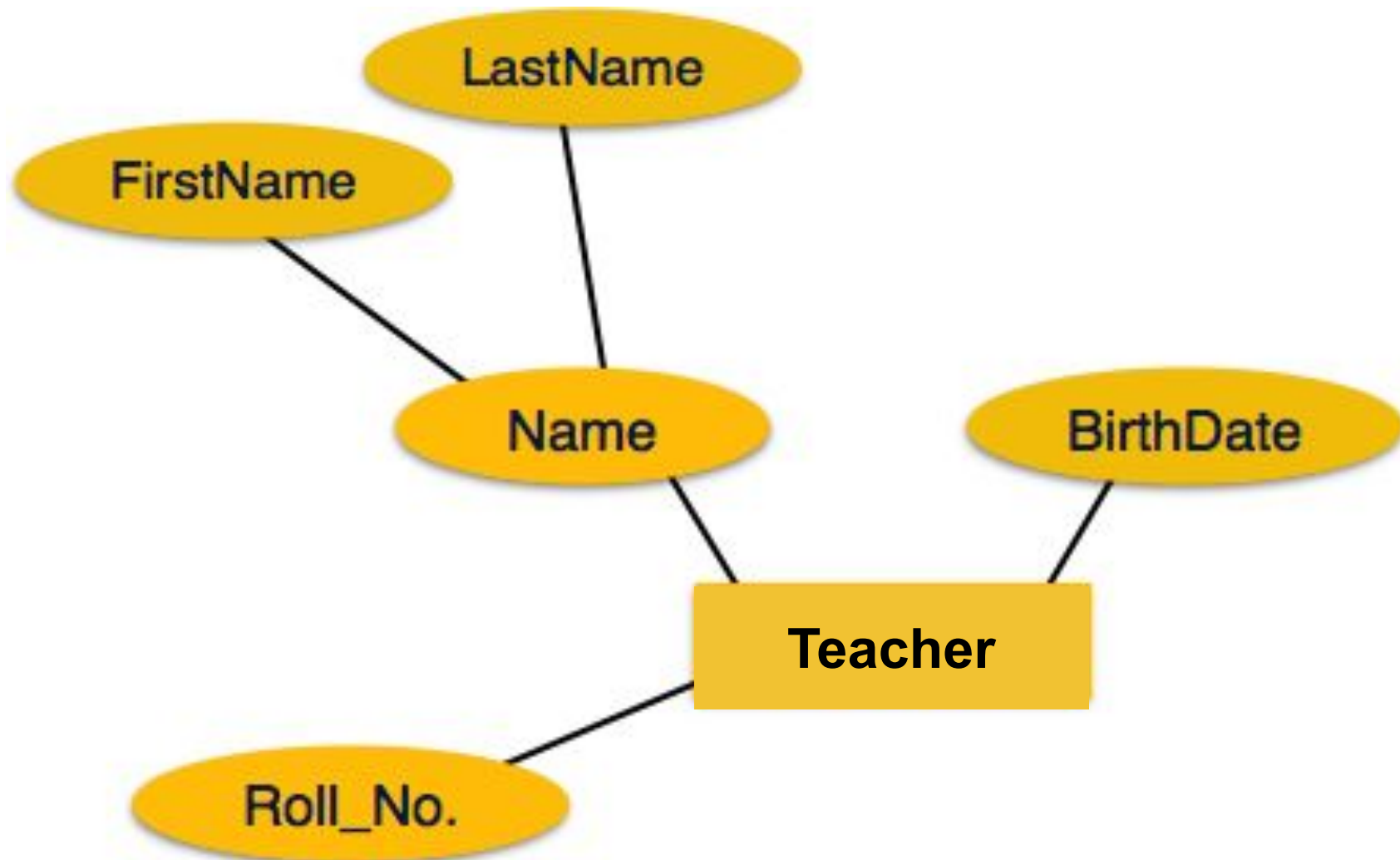
❖ Entity = Table, Attributes = Column



Try - ERD Representation

❖ 해보기

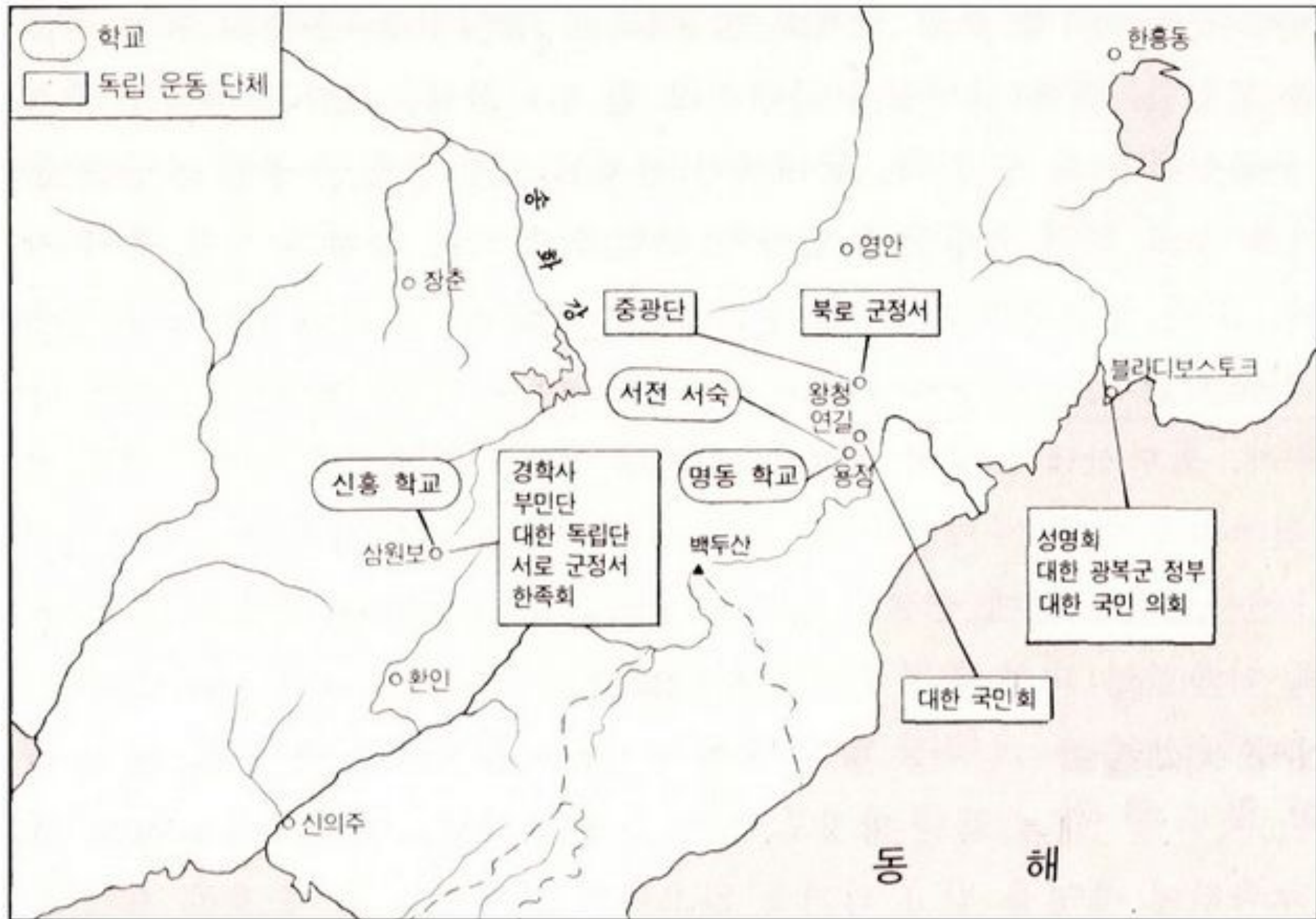
- Entity = Table, Attributes = Column
- Teacher와 Projects 각각 Attributes 가지 치기로 그리시오.
 - Google Drive Sheets 이용





ERD - 정규화

- ❖ 같이 하기 (여러분은 독립운동가! - 조직을 구성하라.)



Try - ERD 구현과 이해

❖ 해보기

- 회원 정보(Member) : ID(Email), password, name
- 회원 취미(hobby) : name

❖ 더 해보기

- 회원 로그 정보(LogHistory) : login Time, logout Time

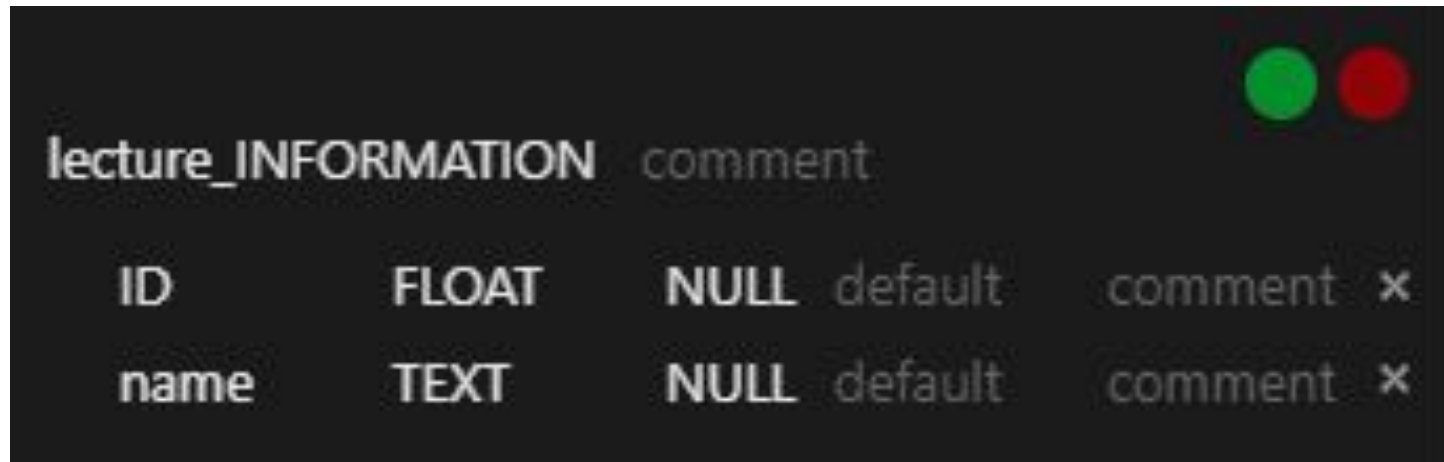
❖ 알기

```
CREATE TABLE lecture_INFORMATION (  
  ID  FLOAT NULL ,  
  name TEXT NULL );
```

```
INSERT INTO lecture_INFORMATION (ID, name) VALUES (1, 'Allen');
```

```
SELECT * FROM lecture_INFORMATION;
```

```
DROP TABLE lecture_INFORMATION;
```



The screenshot shows a window titled 'lecture_INFORMATION comment' with a green and red window control button in the top right corner. Below the title bar, there is a table structure view for the 'lecture_INFORMATION' table. The table has two columns: 'ID' and 'name'. The 'ID' column is of type 'FLOAT' and is 'NULL' with a 'default' value. The 'name' column is of type 'TEXT' and is 'NULL' with a 'default' value. Both columns have a 'comment' field which is empty, indicated by an 'x' in the comment column header.

lecture_INFORMATION comment				
				comment x
ID	FLOAT	NULL	default	
name	TEXT	NULL	default	

Try - ERD(1,영구 저장 대상 선별)

- ❖ 화면 구성 중 단수와 복수 구별 작성 : 모듬명칭 결정
 - 재사용(패스워드 확인 등)과 포함(복수성 컬럼) 여부 : 동일 모듬 여부 고민.
 - 제 1 정규화 : 하나 속성이 단일 값(atomic value) 갖게 설계

member > edit

Form Elements

MEMBER_ID Text Input
admin

Member PASSWORD Text Input
.....

Member Name Text Input

Organization Selects
구매부

Authority Inline Checkboxes
☐ SYSTEM_MANAGER ☐ ROLE_ADMIN ☐ USER ☐ GUEST

EMAIL Text Input with Placeholder
incubator@clusteringincubation.com
Base form incubator@clusteringincubation.com

CELLPHONE Text Input with Placeholder
000-0000-0000
Base form 000-0000-0000

Image File input

Choose File No file chosen

Choose File No file chosen

Insert Button

Reset Button

Try - ERD(2,모듬장 선별)

- ❖ 모듬 중 모듬장 선별 작성 : 모듬별 가상 데이터 3개 작성하기
 - 모듬장 2인 이상도 고려 가능.
 - 제 3 정규화 : 주 아닌 식별자에 종속된 속성 제거

member > edit

Form Elements

MEMBER_ID Text Input

admin

Member PASSWORD Text Input

.....

Member Name Text Input

Organization Selects

구매부

Authority Inline Checkboxes

☐ SYSTEM_MANAGER ☐ ROLE_ADMIN ☐ USER ☐ GUEST

EMAIL Text Input with Placeholder

incubator@clusteringincubation.com

Base form incubator@clusteringincubation.com

CELLPHONE Text Input with Placeholder

000-0000-0000

Base form 000-0000-0000

Image File input

Choose File No file chosen

Choose File No file chosen

Insert Button


Reset Button


Try - ERD(Table화)

❖ 해보기

➤ 정리한 내용 ERD화

- Table : 모듬 → Table
- Column : 모듬별 구성요소 → Column
 - Date Type : varchar2(20) or varchar2(100) or varchar2(2000) 중 하나
- PK : 모듬별 모듬장 → PK 부여

권한 종류/CIP_AUTHORITY	
	권한 코드/AUTHORITY_ID varchar2(40) (NN)
	명칭/NAME varchar2(1000) (NN)
	코드설명/DESCRIPTION varchar2(1000)
	사용 여부/USE_YN varchar2(40) (NN)
	등록자SEQ/REGISTER_SEQ varchar2(50) (NN)
	등록일자/REGISTRY_DATE varchar2(20) (NN)
	수정자_SEQ/MODIFIER_SEQ varchar2(40) (NN)
	수정일자/MODIFY_DATE varchar2(20) (NN)

그룹/조직/부서 구조도/CIP_ORGANIZATION	
	조직 일련번호/ORGANIZATION_SEQ varchar2(50) (NN)
	명칭/NAME varchar2(1000) (NN)
	대표 전화번호/TELEPHONE varchar2(40)
	정렬순서/ORDER_NUMBER number

회원정보/CIP_MEMBER	
	회원_SEQ/MEMBER_SEQ varchar2(40) (NN)
	회원 ID/MEMBER_ID varchar2(50) (NN)
	암호/PASSWORD varchar2(100) (NN)
	암호화된 암호/CRYPT_PASSWORD varchar2(100)
	명칭/NAME varchar2(1000) (NN)
	EMAIL/EMAIL varchar2(1000)
	휴대폰번호/CELLPHONE varchar2(20)
	등록자SEQ/REGISTER_SEQ varchar2(50) (NN)
	등록일자/REGISTRY_DATE varchar2(20) (NN)
	수정자_SEQ/MODIFIER_SEQ varchar2(40) (NN)
	수정일자/MODIFY_DATE varchar2(20) (NN)

Try - ERD(3,모듬 간 관계 설정)

❖ 모듬 간 역할 부여

- 주 활동, 지원 모듬 : 데이터 단수(1:N), 복수(N:N) 여부로 판단.
- 제 4정규형 : 다 연결성 존재 분리

member > edit

Form Elements

MEMBER_ID Text Input

admin

Member PASSWORD Text Input

.....

Member Name Text Input

Organization Selects

구매부

Authority Inline Checkboxes

☐ SYSTEM_MANAGER ☐ ROLE_ADMIN ☐ USER ☐ GUEST

EMAIL Text Input with Placeholder

incubator@clustringincubation.com

Base form incubator@clustringincubation.com

CELLPHONE Text Input with Placeholder

000-0000-0000

Base form 000-0000-0000

Image File input

Choose File No file chosen

Choose File No file chosen

Insert Button

Reset Button

Try - ERD(4,모듬 간 소통)

- ❖ 모듬 간 의사전달자(외지인) 선정
 - 은밀한 호칭 사용 : 컴퓨터는 문자보다 숫자 선호.
 - 제 2 정규화 : 주식별자에 종속된 속성 제거

member > edit

Form Elements

MEMBER_ID Text Input

Member PASSWORD Text Input

Member Name Text Input

Organization Selects

Authority Inline Checkboxes
☐ SYSTEM_MANAGER ☐ ROLE_ADMIN ☐ USER ☐ GUEST

EMAIL Text Input with Placeholder

Base form incubator@clustringincubation.com

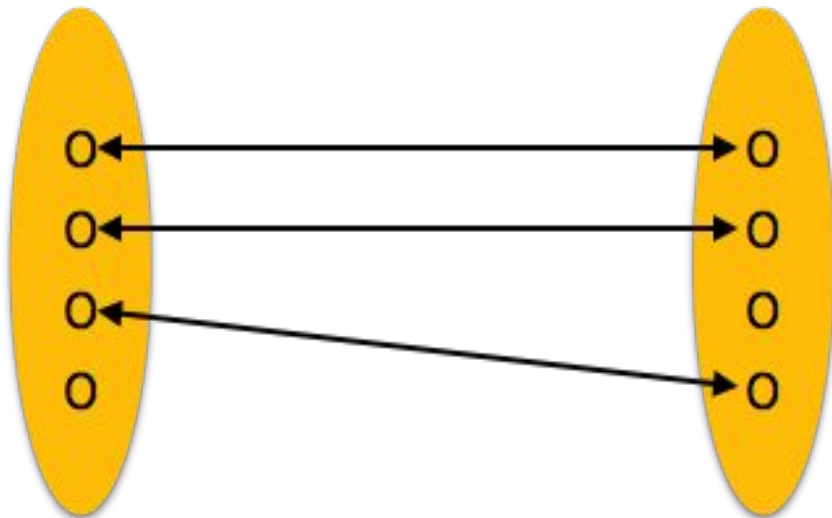
CELLPHONE Text Input with Placeholder

Base form 000-0000-0000

Image File input
 No file chosen
 No file chosen

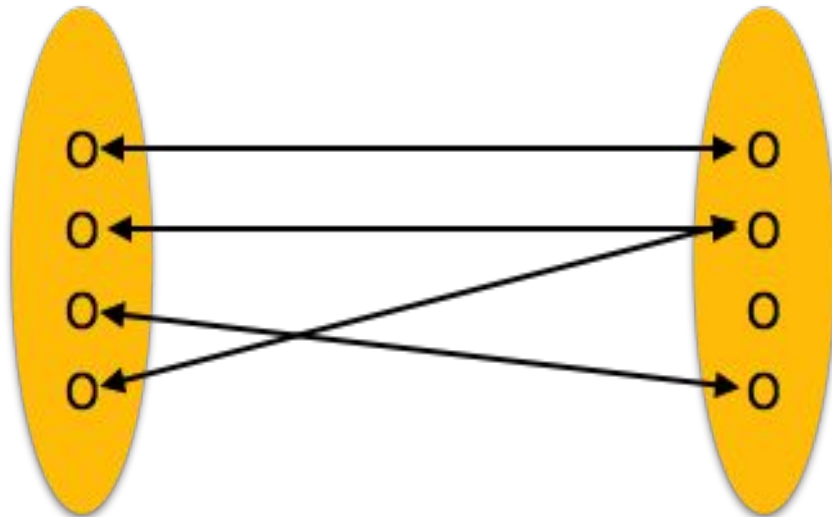
ERD Concepts(1)

- ❖ One-to-one, One-to-many, Many-to-one, Many-to-many



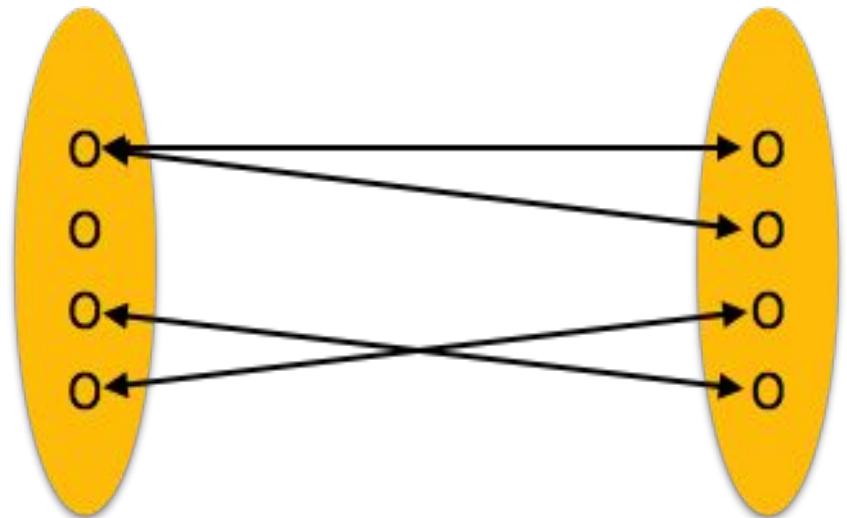
A

B



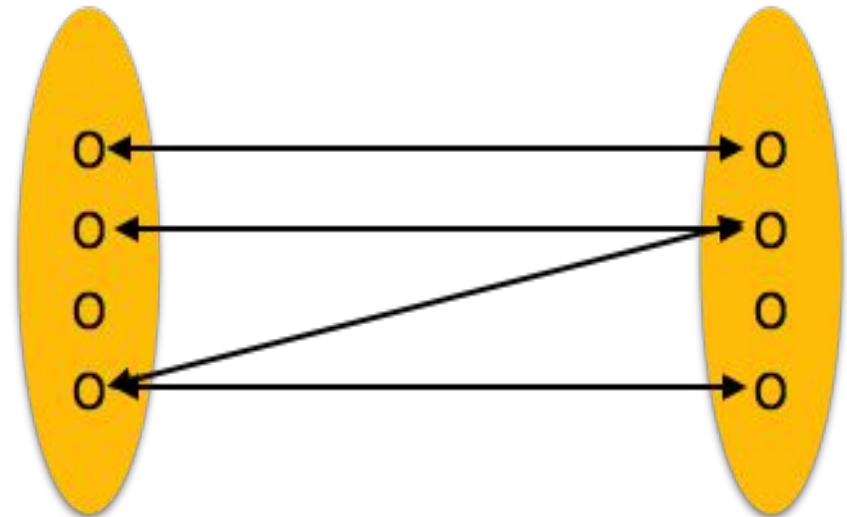
A

B



A

B

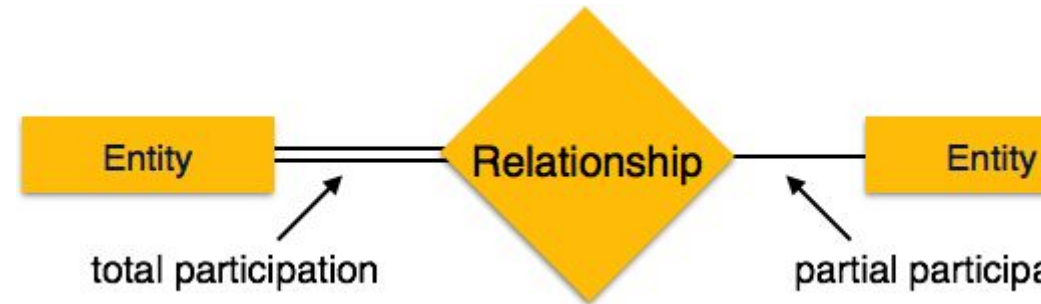
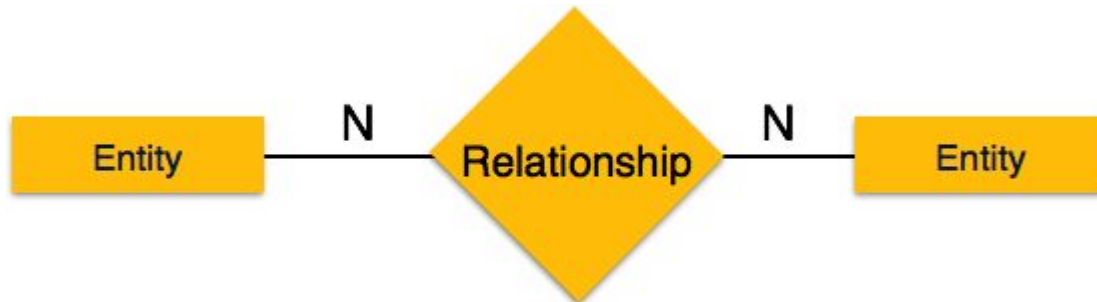
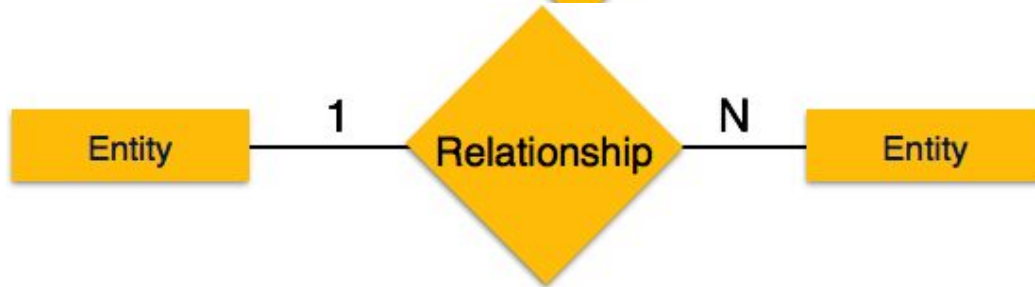
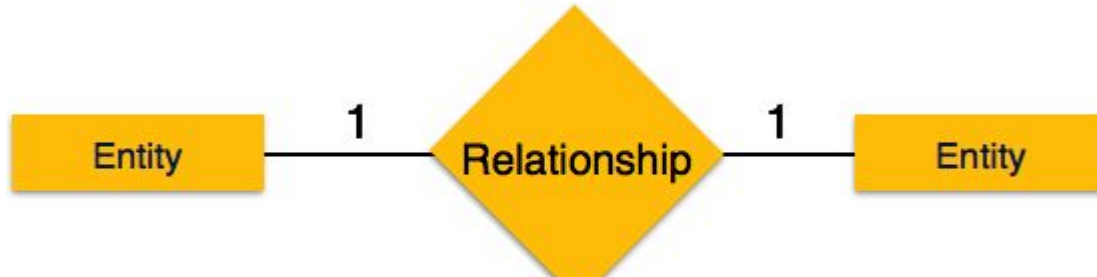


A

B

ERD Concepts(2)

- ❖ One-to-one, One-to-many, Many-to-one, Many-to-many

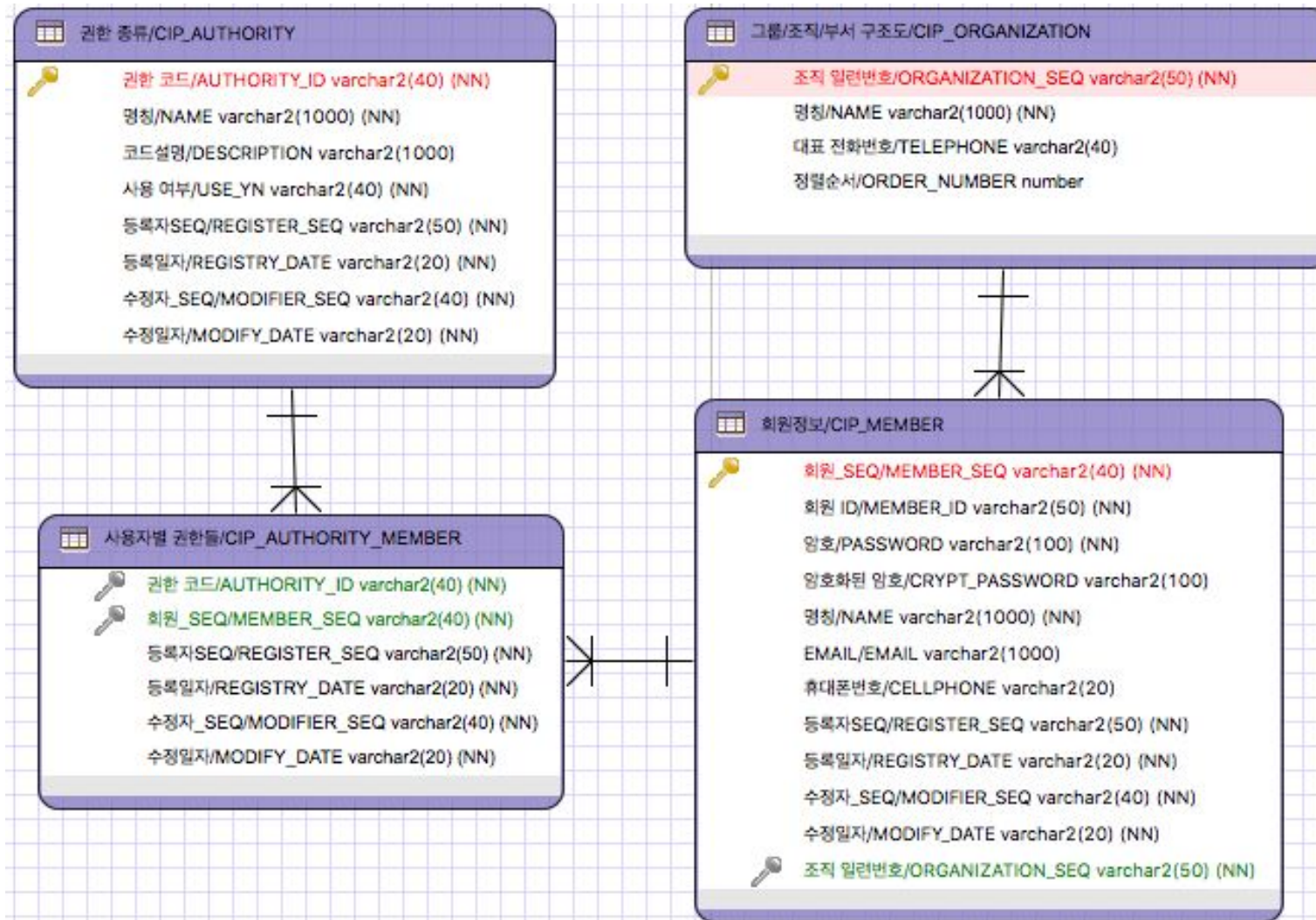


Try - ERD(Relation화)

❖ 해보기

➤ 정리한 내용 Relation 맺기

- 주활동, 지원 모듬 단수 관계 → 1 : N
- 주활동, 지원 모듬 복수 관계 → N : N



Try - ERD(기능)

❖ 해 보기

➤ 게시판 Table 추가

- 제목, 내용, 이미지(2개 이상 가능) 최소 필드
- 로그인 전제 게시판 작성

➤ 작성 순서 구글 공유

- 직관적 ERD 작성법, ERD 이미지

권한 종류/CIP_AUTHORITY	
권한 코드/AUTHORITY_ID varchar2(40) (NN)	
명칭/NAME varchar2(1000) (NN)	
코드설명/DESCRIPTION varchar2(1000)	
사용 여부/USE_YN varchar2(40) (NN)	
등록자SEQ/REGISTER_SEQ varchar2(50) (NN)	
등록일자/REGISTRY_DATE varchar2(20) (NN)	
수정자_SEQ/MODIFIER_SEQ varchar2(40) (NN)	
수정일자/MODIFY_DATE varchar2(20) (NN)	


그룹/조직/부서 구조도/CIP_ORGANIZATION	
조직 일련번호/ORGANIZATION_SEQ varchar2(50) (NN)	
명칭/NAME varchar2(1000) (NN)	
대표 전화번호/TELEPHONE varchar2(40)	
정렬순서/ORDER_NUMBER number	

멀티게시판/CIP_MULTI_BOARD	
게시물 일련번호/MULTI_BOARD_SEQ varchar2(40) (NN)	
제목/TITLE varchar2(4000)	
내용/댓글/CONTENT varchar2(4000) (NN)	
시작일시 (공지 등)/START_DATE varchar2(20)	
종료일시 (공지 등)/END_DATE varchar2(20)	
등록자SEQ/REGISTER_SEQ varchar2(50) (NN)	
등록일자/REGISTRY_DATE varchar2(20) (NN)	
수정자_SEQ/MODIFIER_SEQ varchar2(40) (NN)	
수정일자/MODIFY_DATE varchar2(20) (NN)	

회원정보/CIP_MEMBER	
회원_SEQ/MEMBER_SEQ varchar2(40) (NN)	
회원 ID/MEMBER_ID varchar2(50) (NN)	
암호/PASSWORD varchar2(100) (NN)	
암호화된 암호/CRYPT_PASSWORD varchar2(100)	
명칭/NAME varchar2(1000) (NN)	
EMAIL/EMAIL varchar2(1000)	
휴대폰번호/CELLPHONE varchar2(20)	
등록자SEQ/REGISTER_SEQ varchar2(50) (NN)	
등록일자/REGISTRY_DATE varchar2(20) (NN)	
수정자_SEQ/MODIFIER_SEQ varchar2(40) (NN)	
수정일자/MODIFY_DATE varchar2(20) (NN)	

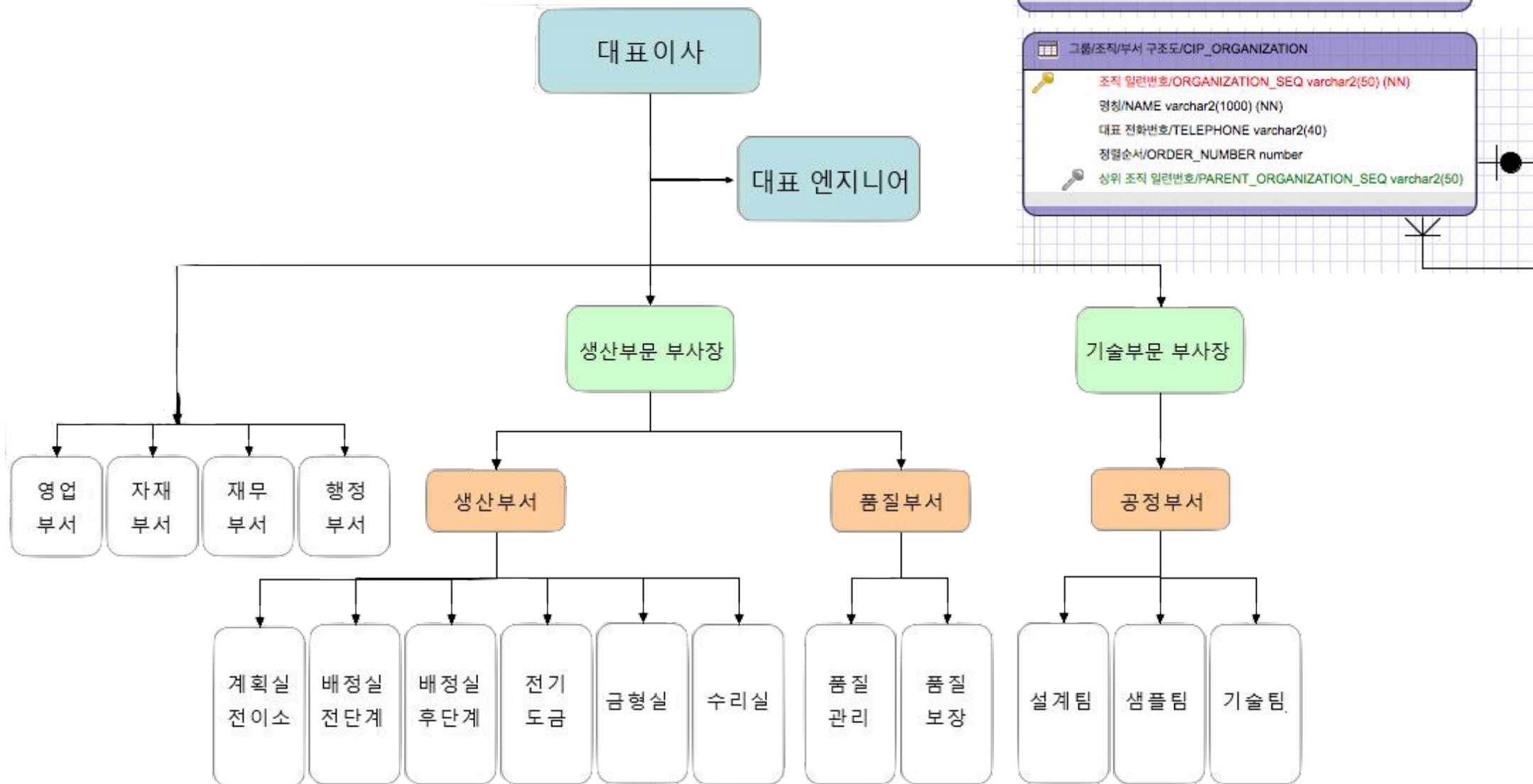
Try - ERD(5,공통 모듬 빼기)

- ❖ 공통 관계 모듬 사용 :
 - 이미지 모듬 별도 구성
 - 필요 모듬과 관계 방식 고려 : N:N
 - 역정규화 : 물리적 모델링에서 다시 통합, 분할
- ❖ 해보기
 - 요구 사항 추가 시 대응
 - 회원정보 이미지 입력 기능
 - 회원정보 이미지 2개 이상 입력 기능
 - 좀 더 고려하기
 - 요구 사항 추가 : 게시판 이미지 입력 기능

파일 정보/CIP_ATTACHFILE	
	첨부파일 일련번호/ATTACHFILE_SEQ varchar2(40) (NN)
	원본레코드 UNIQUE SEQ/SOURCE_UNIQUE_SEQ varchar2(40) (NN)
	첨부파일 유형/ATTACHFILE_TYPE varchar2(40)
	원본 파일명/ORIGINALFILE_NAME varchar2(200) (NN)
	첨부 파일명/PHYSICALFILE_NAME varchar2(200) (NN)
	썸네일 첨부파일명/THUMBNAİL_NAME varchar2(500)
	첨부파일 저장경로/ATTACHFILE_PATH varchar2(500)
	첨부파일 크기/ATTACHFILE_SIZE number
	파일 높이/ATTACHFILE_HEIGHT number
	파일 폭/ATTACHFILE_WIDTH number
	등록자SEQ/REGISTER_SEQ varchar2(50) (NN)
	등록일자/REGISTRY_DATE varchar2(20) (NN)
	수정자_SEQ/MODIFIER_SEQ varchar2(40) (NN)
	수정일자/MODIFY_DATE varchar2(20) (NN)

Try - ERD(모든 내 모든 참조 해결)

- ❖ 재귀(Recursive) 참조 필요 이유
- ❖ BOM 구조 적용
 - 조직, 게시판, 메뉴 등 사용.



Try - ERD

❖ 해보기

➤ 포트폴리오 ERD 작성

