



UNIVERSITI TUNKU ABDUL RAHMAN
LEE KONG CHIAN FACULTY ENGINEERING AND SCIENCE
ACADEMIC YEAR: 2018
FEBRUARY 2018 TRIMESTER

UECS1403/UECS1203/UEME4123 DATABASE SYSTEM FUNDAMENTALS /
DATABASE MANAGEMENT

Course: Software Engineering

Year & Trimester of Study: Y1/S3

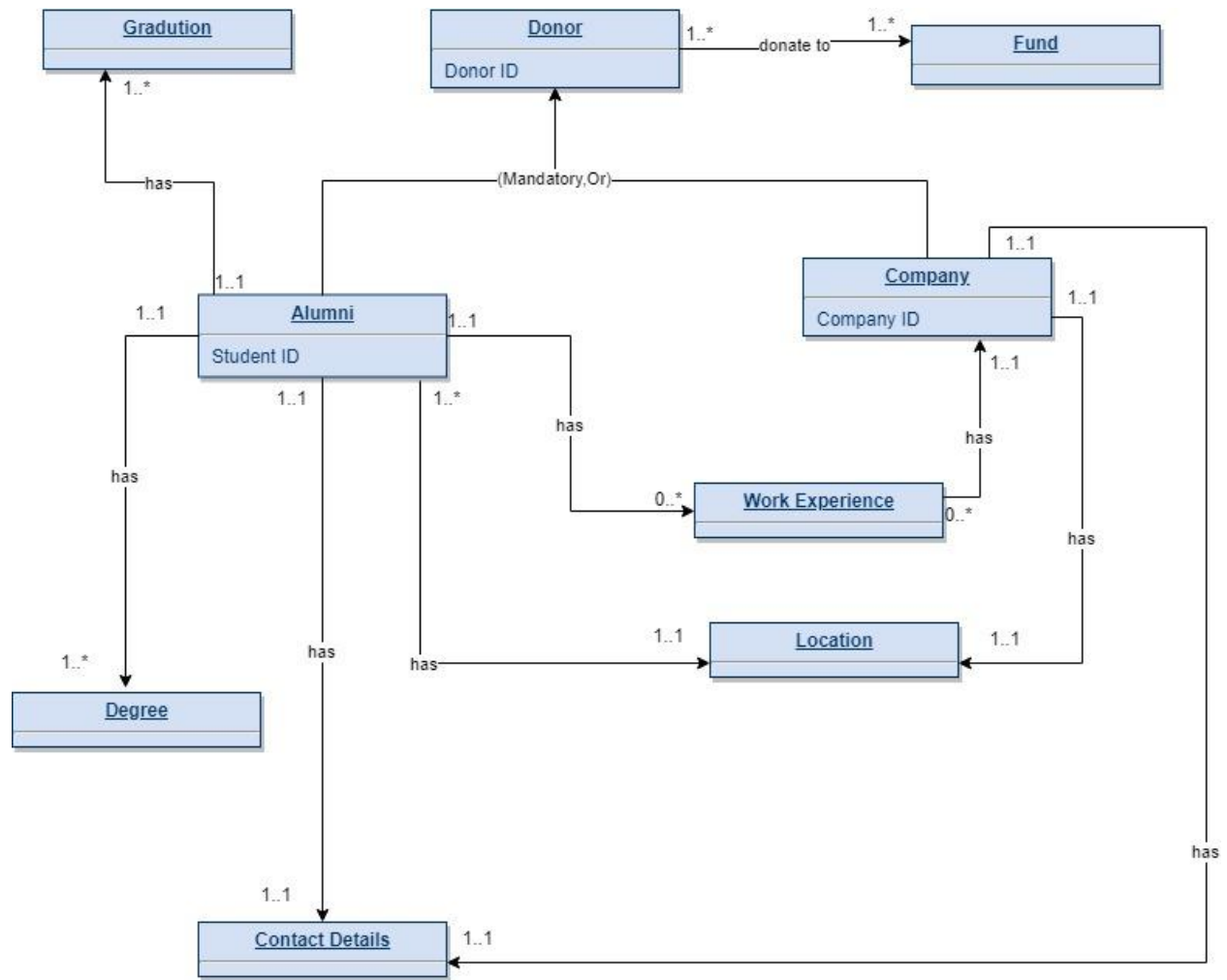
Lecture Group: L1

Lecturer's Name: Dr.Sugumaran a/l Nallusamy

Students' Details:

No.	Name	Student ID No.
1.	Lee Hoe Mun	1701281
2.	Tan Ying Yao	1703648
3.	Teh Liang Wei	1703486
4.	Leong Wei Ren	1701637
5.	Lim Zi Yin	1706602

Original ERD:



Logical Design Process:

1. **Donor** (Donor_ID, Donor_Name, Donor_Type, Donation_Date, Donated_Amount) **Fund** (Fund_ID, Fund_Description)

Primary Key Donor_ID

Primary Key Fund_ID

Donation (Donor_ID, Fund_ID, Donated_Amount, Donation_Date, Donor_Name, Donor_Type)

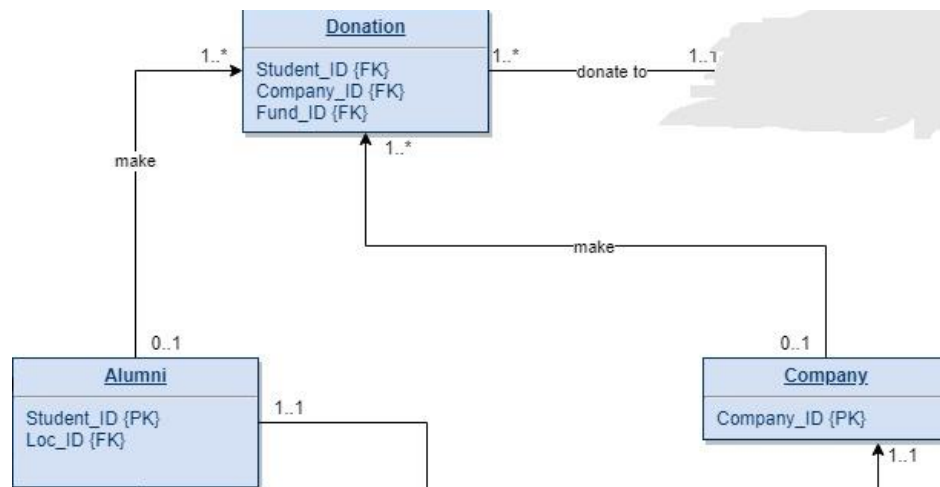
Foreign Key Donor_ID references Donor(Donor_ID)

Foreign Key Fund_ID references Fund(Fund_ID)

2. Entity: **Donor, Alumni, Company**

Relationship: Superclass, Subclass

Solution: Since it is a mandatory, or relationship, we can eliminate the superclass (**Donor**) and leave all the attribute inside the entity to the next entity (**Donation**) and leave the subclass (**Alumni, Company**) like so:



3. Entity: **Location, Company, Contact Details**

Relationship: Mandatory participation on every sides of 1:1 relationship

Solution: Combine all of the entity into one like so:

Company (Company_ID, Company_Name, Company_Start_Year, House_Number,
Street, City, State, ZIP_Code, Office_Number, Email)

Primary Key Company_ID

Reason: Since it is mandatory participation on every sides of 1:1 relationship, we can combine three of the entity to reduce the table.

4. Entity: **Alumni, Contact Details**

Relationship: Mandatory participation on both sides of 1:1 relationship

Solution: Combine all of the entity into one like so:

Alumni (Student_ID, Student_Name, Work_Number, Phone_Number, Home_Number,
Email, Student_IC)

Primary Key Student_ID

Reason: Since it is mandatory participation on both sides of 1:1 relationship, we can combine two of the entity to reduce the table.

5.



Location (Loc_ID, House_Number,
Street, City, State, ZIP_Code)

Alumni (Student_ID, Loc_ID,
Student_Name,)

Primary Key Loc_ID

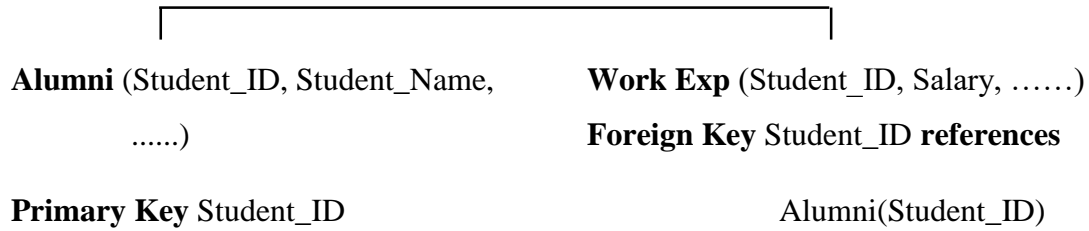
Primary Key Student_ID

Foreign Key Loc_ID references

Location(Loc_ID)

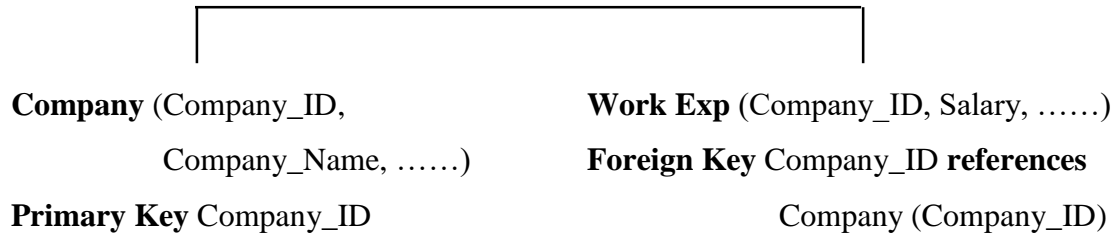
Reason: Since entity **Location** on “one side”, so it is designated the parent entity and entity **Alumni** on “many side” is the child entity.

6.



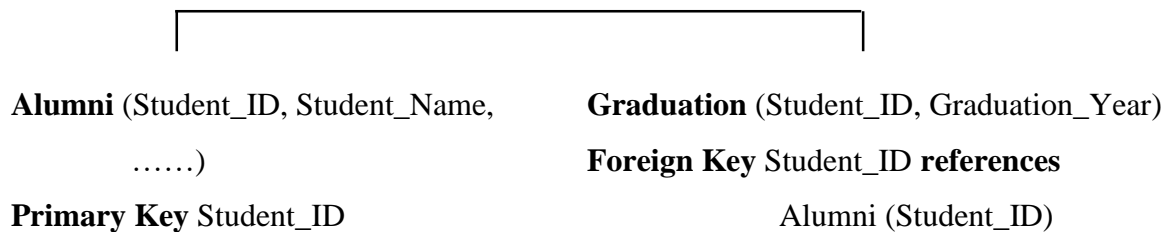
Reason: Since entity **Alumni** on “one side”, so it is designated the parent entity and entity **Work Exp** on “many side” is the child entity.

7.



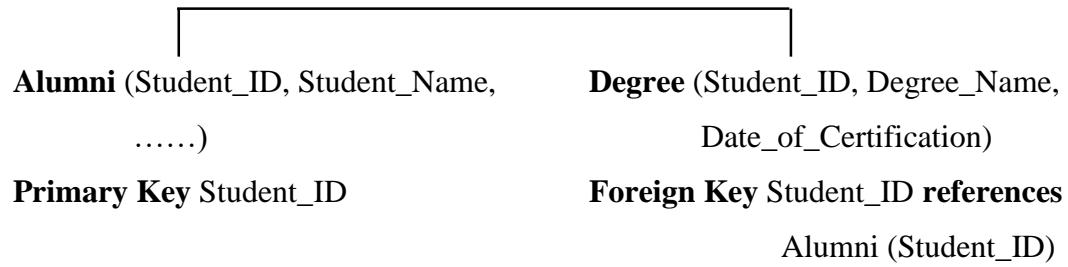
Reason: Since entity **Company** on “one side”, so it is designated the parent entity and entity **Work Exp** on “many side” is the child entity.

8.



Reason: Since entity **Alumni** on “one side”, so it is designated the parent entity and entity **Graduation** on “many side” is the child entity.

9.



Reason: Since entity **Alumni** on “one side”, so it is designated the parent entity and entity **Degree** on “many side” is the child entity.

Relations

Donation (Student_ID, Company_ID, Fund_ID, Donated_Amount, Donation_Date) Foreign Key Student_ID references Alumni (Student_ID) Foreign Key Company_ID references Company (Company_ID) Foreign Key Fund_ID references Fund (Fund_ID)
Fund (Fund_ID, Fund_Description) Primary Key Fund_ID
Alumni (Student_ID, Loc_ID, Student_Name, Student_IC, Work_Number, Phone_Number, Home_Number, Email) Primary Key Student_ID Foreign Key Loc_ID references Location(Loc_ID)
Company (Company_ID, Company_Name, Company_Start_Year, House_Number, Street, City, State, ZIP_Code, Office_Number, Email) Primary Key Company_ID
Work Experience (Company_ID, Student_ID, Salary, Date_Join, Date_Leave, Job_Title) Foreign Key Company_ID references Company (Company_ID) Foreign Key Student_ID references Alumni (Student_ID)
Location (Loc_ID, House_Number, Street, City, State, ZIP Code) Primary Key Loc_ID
Degree (Student_ID, Date_of_Certification, Degree_Name) Foreign Key Student_ID references Alumni (Student_ID)
Graduation (Student_ID, Graduation_Year) Foreign Key Student_ID references Alumni (Student_ID)

Data Dictionary

Table Name: Donation

Column Name	Description	Data Type	Size	Primary Key?	Foreign Key?	FK referenced table
Student_ID	Student's unique ID	Number	7	-	Yes	Alumni
Company_ID	Company's unique ID	Number	7	-	Yes	Company
Fund_ID	Fund's unique ID	Number	7	-	Yes	Fund
Donated_Amount	Donated amount for this donation	Number	6, 2	-	-	-
Donation_Date	Donation date	Date		-	-	-

Table Name: Fund

Column Name	Description	Data Type	Size	Primary Key?	Foreign Key?	FK referenced table
Fund_ID	Fund's unique ID	Number	7	Yes	-	-
Fund_Description	Fund's description	Text	50	-	-	-

Table Name: Graduation

Column Name	Description	Data Type	Size	Primary Key?	Foreign Key?	FK referenced table
Student_ID	Student's unique ID	Number	7	-	Yes	Alumni
Graduation_Year	Graduation year	Number	4	-	-	-

Table Name: Alumni

Column Name	Description	Data Type	Size	Primary Key?	Foreign Key?	FK referenced table
Student_ID	Student's unique ID	Number	7	Yes	-	-
Loc_ID	Unique location ID	Number	7	-	Yes	Location
Student_Name	Student's name	Text	30	-	-	-
Student_IC	Student's IC	Number	12	-	-	-
Work_Number	Student's work number	Number	8	-	-	-
Phone_Number	Student's phone number	Number	10	-	-	-
Home_Number	Student's home number	Number	8	-	-	-
Email	Student's email	Text	40	-	-	-

Table Name: Degree

Column Name	Description	Data Type	Size	Primary Key?	Foreign Key?	FK referenced table
Student_ID	Student's unique ID	Number	7	-	Yes	Alumni
Date_of_Certification	Date of certification	Date		-	-	-
Degree_Name	Degree name	Text	30	-	-	-

Table Name: Company

Column Name	Description	Data Type	Size	Primary Key?	Foreign Key?	FK referenced table
Company_ID	Company's unique ID	Number	7	Yes	-	-
Company_Name	Company name	Text	30	-	-	-
Company_Start_Year	Company started year	Number	4	-	-	-
House_Number	Company Number	Number	3	-	-	-
Street	Company Street Address	Text	20	-	-	-
City	Company's city	Text	20	-	-	-
State	Company's state	Text	20	-	-	-
ZIP_Code	Company's ZIP code	Number	5	-	-	-
Office_Number	Company's phone number	Number	8	-	-	-
Email	Company's email	Text	40	-	-	-

Table Name: Work Experience

Column Name	Description	Data Type	Size	Primary Key?	Foreign Key?	FK referenced table
Company_ID	Company's unique ID	Number	7	-	Yes	Company
Student_ID	Student's unique ID	Number	7	-	Yes	Alumni
Salary	Job salary	Number	5, 2	-	-	-
Date_Join	Joined Date	Date		-	-	-
Date_Leave	Left Date	Date		-	-	-
Job_Title	Job title	Text	20	-	-	-

Table Name: Location

Column Name	Description	Data Type	Size	Primary Key?	Foreign Key?	FK referenced table
Loc_ID	Location's unique ID	Number	7	Yes	-	-
House_Number	House Number	Number	3	-	-	-
Street	Street	Text	20	-	-	-
City	City	Text	20	-	-	-
State	State	Text	20	-	-	-
ZIP_Code	ZIP code	Number	5	-	-	-

Relation Diagram

